CM-010

ATTORNEY OR PARTY WITHOUT ATTORNEY *(Name, State Bar number, and address):*
CHRISTOPHER BERRY (SBN 283987) MONICA MILLER (SBN 288343)
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ATTORNEY FOR *(Name):* Petitioner Nonhuman Rights Project, Inc (on behalf of Billy and Tina)

FOR COURT USE ONLY

SUPERIOR COURT OF CALIFORNIA, COUNTY OF LOS ANGELES
STREET ADDRESS: 111 N Hill St,
MAILING ADDRESS:
CITY AND ZIP CODE: Los Angeles, CA 90012
BRANCH NAME:

CASE NAME:
NONHUMAN RIGHTS PROJECT, INC v. The CITY OF LOS ANGELES and DENISE VERRET

CIVIL CASE COVER SHEET

[X] **Unlimited** (Amount demanded exceeds $35,000) [ ] **Limited** (Amount demanded is $35,000 or less)

Complex Case Designation

[ ] Counter [ ] Joinder

Filed with first appearance by defendant (Cal. Rules of Court, rule 3.402)

CASE NUMBER:

JUDGE:

DEPT.:

Items 1–6 below must be completed (see instructions on page 2).

1. Check **one** box below for the case type that best describes this case:

Auto Tort
- [ ] Auto (22)
- [ ] Uninsured motorist (46)

Other PI/PD/WD (Personal Injury/Property Damage/Wrongful Death) Tort
- [ ] Asbestos (04)
- [ ] Product liability (24)
- [ ] Medical malpractice (45)
- [ ] Other PI/PD/WD (23)

Non-PI/PD/WD (Other) Tort
- [ ] Business tort/unfair business practice (07)
- [ ] Civil rights (08)
- [ ] Defamation (13)
- [ ] Fraud (16)
- [ ] Intellectual property (19)
- [ ] Professional negligence (25)
- [ ] Other non-PI/PD/WD tort (35)

Employment
- [ ] Wrongful termination (36)
- [ ] Other employment (15)

Contract
- [ ] Breach of contract/warranty (06)
- [ ] Rule 3.740 collections (09)
- [ ] Other collections (09)
- [ ] Insurance coverage (18)
- [ ] Other contract (37)

Real Property
- [ ] Eminent domain/Inverse condemnation (14)
- [ ] Wrongful eviction (33)
- [ ] Other real property (26)

Unlawful Detainer
- [ ] Commercial (31)
- [ ] Residential (32)
- [ ] Drugs (38)

Judicial Review
- [ ] Asset forfeiture (05)
- [ ] Petition re: arbitration award (11)
- [ ] Writ of mandate (02)
- [ ] Other judicial review (39)

Provisionally Complex Civil Litigation (Cal. Rules of Court, rules 3.400–3.403)
- [ ] Antitrust/Trade regulation (03)
- [ ] Construction defect (10)
- [ ] Mass tort (40)
- [ ] Securities litigation (28)
- [ ] Environmental/Toxic tort (30)
- [ ] Insurance coverage claims arising from the above listed provisionally complex case types (41)

Enforcement of Judgment
- [ ] Enforcement of judgment (20)

Miscellaneous Civil Complaint
- [ ] RICO (27)
- [ ] Other complaint *(not specified above)* (42)

Miscellaneous Civil Petition
- [ ] Partnership and corporate governance (21)
- [x] Other petition *(not specified above)* (43)

2. This case [ ] is [x] is not complex under rule 3.400 of the California Rules of Court. If the case is complex, mark the factors requiring exceptional judicial management:
   - a. [ ] Large number of separately represented parties
   - b. [ ] Extensive motion practice raising difficult or novel issues that will be time-consuming to resolve
   - c. [ ] Substantial amount of documentary evidence
   - d. [ ] Large number of witnesses
   - e. [ ] Coordination with related actions pending in one or more courts in other counties, states, or countries, or in a federal court
   - f. [ ] Substantial postjudgment judicial supervision
3. Remedies sought *(check all that apply):* a. [ ] monetary b. [x] nonmonetary; declaratory or injunctive relief c. [ ] punitive
4. Number of causes of action *(specify):* 1
5. This case [ ] is [x] is not a class action suit.
6. If there are any known related cases, file and serve a notice of related case. *(You may use form CM-015.)*

Date: 5-16-25

Christopher Berry
(TYPE OR PRINT NAME)

▶ Christopher Berry
(SIGNATURE OF PARTY OR ATTORNEY FOR PARTY)

NOTICE
- Plaintiff must file this cover sheet with the first paper filed in the action or proceeding (except small claims cases or cases filed under the Probate Code, Family Code, or Welfare and Institutions Code). (Cal. Rules of Court, rule 3.220.) Failure to file may result in sanctions.
- File this cover sheet in addition to any cover sheet required by local court rule.
- If this case is complex under rule 3.400 et seq. of the California Rules of Court, you must serve a copy of this cover sheet on all other parties to the action or proceeding.
- Unless this is a collections case under rule 3.740 or a complex case, this cover sheet will be used for statistical purposes only.

Form Adopted for Mandatory Use
Judicial Council of California
CM-010 [Rev. January 1, 2024]

CIVIL CASE COVER SHEET

Cal. Rules of Court, rules 2.30, 3.220, 3.400–3.403, 3.740;
Cal. Standards of Judicial Administration, std. 3.10
www.courts.ca.gov

INSTRUCTIONS ON HOW TO COMPLETE THE COVER SHEET

To Plaintiffs and Others Filing First Papers. If you are filing a first paper (for example, a complaint) in a civil case, you **must** complete and file, along with your first paper, the Civil Case Cover Sheet contained on page 1. This information will be used to compile statistics about the types and numbers of cases filed. You must complete items 1 through 6 on the sheet. In item 1, you must check **one** box for the case type that best describes the case. If the case fits both a general and a more specific type of case listed in item 1, check the more specific one. If the case has multiple causes of action, check the box that best indicates the **primary** cause of action. To assist you in completing the sheet, examples of the cases that belong under each case type in item 1 are provided below. A cover sheet must be filed only with your initial paper. Failure to file a cover sheet with the first paper filed in a civil case may subject a party, its counsel, or both to sanctions under rules 2.30 and 3.220 of the California Rules of Court.

To Parties in Rule 3.740 Collections Cases. A "collections case" under rule 3.740 is defined as an action for recovery of money owed in a sum stated to be certain that is not more than $25,000, exclusive of interest and attorney's fees, arising from a transaction in which property, services, or money was acquired on credit. A collections case does not include an action seeking the following: (1) tort damages, (2) punitive damages, (3) recovery of real property, (4) recovery of personal property, or (5) a prejudgment writ of attachment. The identification of a case as a rule 3.740 collections case on this form means that it will be exempt from the general time-for-service requirements and case management rules, unless a defendant files a responsive pleading. A rule 3.740 collections case will be subject to the requirements for service and obtaining a judgment in rule 3.740.

To Parties in Complex Cases. In complex cases only, parties must also use the Civil Case Cover Sheet to designate whether the case is complex. If a plaintiff believes the case is complex under rule 3.400 of the California Rules of Court, this must be indicated by completing the appropriate boxes in items 1 and 2. If a plaintiff designates a case as complex, the cover sheet must be served with the complaint on all parties to the action. A defendant may file and serve no later than the time of its first appearance a joinder in the plaintiff's designation, a counter-designation that the case is not complex, or, if the plaintiff has made no designation, a designation that the case is complex.

CASE TYPES AND EXAMPLES

Auto Tort
- Auto (22)–Personal Injury/Property Damage/Wrongful Death
- Uninsured Motorist (46) *(if the case involves an uninsured motorist claim subject to arbitration, check this item instead of Auto)*

Other PI/PD/WD (Personal Injury/ Property Damage/Wrongful Death) Tort
- Asbestos (04)
  - Asbestos Property Damage
  - Asbestos Personal Injury/ Wrongful Death
- Product Liability *(not asbestos or toxic/environmental)* (24)
- Medical Malpractice (45)
  - Medical Malpractice– Physicians & Surgeons
- Other Professional Health Care Malpractice
- Other PI/PD/WD (23)
  - Premises Liability (e.g., slip and fall)
  - Intentional Bodily Injury/PD/WD (e.g., assault, vandalism)
  - Intentional Infliction of Emotional Distress
  - Negligent Infliction of Emotional Distress
  - Other PI/PD/WD

Non-PI/PD/WD (Other) Tort
- Business Tort/Unfair Business Practice (07)
- Civil Rights (e.g., discrimination, false arrest) *(not civil harassment)* (08)
- Defamation (e.g., slander, libel) (13)
- Fraud (16)
- Intellectual Property (19)
- Professional Negligence (25)
  - Legal Malpractice
  - Other Professional Malpractice *(not medical or legal)*
- Other Non-PI/PD/WD Tort (35)

Employment
- Wrongful Termination (36)
- Other Employment (15)

Contract
- Breach of Contract/Warranty (06)
  - Breach of Rental/Lease Contract *(not unlawful detainer or wrongful eviction)*
  - Contract/Warranty Breach–Seller Plaintiff *(not fraud or negligence)*
  - Negligent Breach of Contract/ Warranty
  - Other Breach of Contract/Warranty
- Collections (e.g., money owed, open book accounts) (09)
  - Collection Case–Seller Plaintiff
  - Other Promissory Note/Collections Case
- Insurance Coverage *(not provisionally complex)* (18)
  - Auto Subrogation
  - Other Coverage
- Other Contract (37)
  - Contractual Fraud
  - Other Contract Dispute

Real Property
- Eminent Domain/Inverse Condemnation (14)
- Wrongful Eviction (33)
- Other Real Property (e.g., quiet title) (26)
  - Writ of Possession of Real Property
  - Mortgage Foreclosure
  - Quiet Title
  - Other Real Property *(not eminent domain, landlord/tenant, or foreclosure)*

Unlawful Detainer
- Commercial (31)
- Residential (32)
- Drugs (38) *(if the case involves illegal drugs, check this item; otherwise, report as Commercial or Residential)*

Judicial Review
- Asset Forfeiture (05)
- Petition Re: Arbitration Award (11)
- Writ of Mandate (02)
  - Writ–Administrative Mandamus
  - Writ–Mandamus on Limited Court Case Matter
  - Writ–Other Limited Court Case Review
- Other Judicial Review (39)
  - Review of Health Officer Order
  - Notice of Appeal–Labor Commissioner Appeals

Provisionally Complex Civil Litigation (Cal. Rules of Court Rules 3.400–3.403)
- Antitrust/Trade Regulation (03)
- Construction Defect (10)
- Claims Involving Mass Tort (40)
- Securities Litigation (28)
- Environmental/Toxic Tort (30)
- Insurance Coverage Claims *(arising from provisionally complex case type listed above)* (41)

Enforcement of Judgment
- Enforcement of Judgment (20)
  - Abstract of Judgment (Out of County)
- Confession of Judgment *(non-domestic relations)*
- Sister State Judgment
- Administrative Agency Award *(not unpaid taxes)*
- Petition/Certification of Entry of Judgment on Unpaid Taxes
- Other Enforcement of Judgment Case

Miscellaneous Civil Complaint
- RICO (27)
- Other Complaint *(not specified above)* (42)
  - Declaratory Relief Only
  - Injunctive Relief Only *(non-harassment)*
  - Mechanics Lien
  - Other Commercial Complaint Case *(non-tort/non-complex)*
  - Other Civil Complaint *(non-tort/non-complex)*

Miscellaneous Civil Petition
- Partnership and Corporate Governance (21)
- Other Petition *(not specified above)* (43)
  - Civil Harassment
  - Workplace Violence
  - Elder/Dependent Adult Abuse
  - Election Contest
  - Petition for Name Change
  - Petition for Relief From Late Claim
  - Other Civil Petition

SHORT TITLE	CASE NUMBER
NhRP on behalf of Billy and Tina v. City of Los Angeles and Denise M. Verret	

CIVIL CASE COVER SHEET ADDENDUM AND STATEMENT OF LOCATION

(CERTIFICATE OF GROUNDS FOR ASSIGNMENT TO COURTHOUSE LOCATION)

This form is required pursuant to Local Rule 2.3 in all new civil case filings in the Los Angeles Superior Court

Step 1: After completing the Civil Case Cover Sheet (Judicial Council form CM-010), find the exact case type in Column A that corresponds to the case type indicated in the Civil Case Cover Sheet.

Step 2: In Column B, check the box for the type of action that best describes the nature of the case.

Step 3: In Column C, circle the number which explains the reason for the court filing location you have chosen.

Applicable Reasons for Choosing Courthouse Location (Column C)	
1. Class Actions must be filed in the Stanley Mosk Courthouse, Central District.	7. Location where petitioner resides.
2. Permissive filing in Central District.	8. Location wherein defendant/respondent functions wholly.
3. Location where cause of action arose.	9. Location where one or more of the parties reside.
4. Location where bodily injury, death or damage occurred.	10. Location of Labor Commissioner Office.
5. Location where performance required, or defendant resides.	11. Mandatory filing location (Hub Cases – unlawful detainer, limited non-collection, limited collection).
6. Location of property or permanently garaged vehicle.	

	A Civil Case Cover Sheet Case Type	B Type of Action (check only one)	C Applicable Reasons (see Step 3 above)
Auto Tort	Auto (22)	☐ 2201 Motor Vehicle – Personal Injury/Property Damage/Wrongful Death	1, 4
	Uninsured Motorist (46)	☐ 4601 Uninsured Motorist – Personal Injury/Property Damage/Wrongful Death	1, 4
Other Personal Injury/ Property Damage/ Wrongful Death	Other Personal Injury/ Property Damage/ Wrongful Death (23)	☐ 2301 Premise Liability (e.g., dangerous conditions of property, slip/trip and fall, dog attack, etc.)	1, 4
		☐ 2302 Intentional Bodily Injury/Property Damage/Wrongful Death (e.g., assault, battery, vandalism, etc.)	1, 4
		☐ 2303 Intentional Infliction of Emotional Distress	1, 4
		☐ 2304 Other Personal Injury/Property Damage/Wrongful Death	1, 4
		☐ 2305 Elder/Dependent Adult Abuse/Claims Against Skilled Nursing Facility	1, 4
		☐ 2306 Intentional Conduct – Sexual Abuse Case (in any form)	1, 4

SHORT TITLE	CASE NUMBER
NhRP on behalf of Billy and Tina v. City of Los Angeles and Denise M. Verret	

	A Civil Case Cover Sheet Case Type	B Type of Action (check only one)	C Applicable Reasons (see Step 3 above)
		☐ 2307 Construction Accidents	1, 4
		☐ 2308 Landlord – Tenant Habitability (e.g., bed bugs, mold, etc.)	1, 4
Other Personal Injury/ Property Damage/ Wrongful Death	Product Liability (24)	☐ 2401 Product Liability (not asbestos or toxic/ environmental)	1, 4
		☐ 2402 Product Liability – Song-Beverly Consumer Warranty Act (CA Civil Code §§1790-1795.8) (Lemon Law)	1, 3, 5
	Medical Malpractice (45)	☐ 4501 Medical Malpractice – Physicians & Surgeons	1, 4
		☐ 4502 Other Professional Health Care Malpractice	1, 4
Non-Personal Injury/Property Damage/Wrongful Death Tort	Business Tort (07)	☐ 0701 Other Commercial/Business Tort (not fraud or breach of contract)	1, 2, 3
	Civil Rights (08)	☐ 0801 Civil Rights/Discrimination	1, 2, 3
	Defamation (13)	☐ 1301 Defamation (slander/libel)	1, 2, 3
	Fraud (16)	☐ 1601 Fraud (no contract)	1, 2, 3
	Professional Negligence (25)	☐ 2501 Legal Malpractice	1, 2, 3
		☐ 2502 Other Professional Malpractice (not medical or legal)	1, 2, 3
	Other (35)	☐ 3501 Other Non-Personal Injury/Property Damage Tort	1, 2, 3
Employment	Wrongful Termination (36)	☐ 3601 Wrongful Termination	1, 2, 3
	Other Employment (15)	☐ 1501 Other Employment Complaint Case	1, 2, 3
		☐ 1502 Labor Commissioner Appeals	10
Contract	Breach of Contract / Warranty (06) (not insurance)	☐ 0601 Breach of Rental/Lease Contract (not unlawful detainer or wrongful eviction)	2, 5
		☐ 0602 Contract/Warranty Breach – Seller Plaintiff (no fraud/negligence)	2, 5
		☐ 0603 Negligent Breach of Contract/Warranty (no fraud)	1, 2, 5
		☐ 0604 Other Breach of Contract/Warranty (no fraud/ negligence)	1, 2, 5
		☐ 0605 Breach of Rental/Lease Contract (COVID-19 Rental Debt)	2, 5
	Collections (09)	☐ 0901 Collections Case – Seller Plaintiff	5, 6, 11
		☐ 0902 Other Promissory Note/Collections Case	5, 11
		☐ 0903 Collections Case – Purchased Debt (charged off consumer debt purchased on or after January 1, 2014)	5, 6, 11
		☐ 0904 Collections Case – COVID-19 Rental Debt	5, 11
	Insurance Coverage (18)	☐ 1801 Insurance Coverage (not complex)	1, 2, 5, 8

SHORT TITLE	CASE NUMBER
NhRP on behalf of Billy and Tina v. City of Los Angeles and Denise M. Verret	

	A Civil Case Cover Sheet Case Type	B Type of Action (check only one)	C Applicable Reasons (see Step 3 above)
Contract (Continued)	Other Contract (37)	☐ 3701 Contractual Fraud	1, 2, 3, 5
		☐ 3702 Tortious Interference	1, 2, 3, 5
		☐ 3703 Other Contract Dispute (not breach/insurance/fraud/ negligence)	1, 2, 3, 8, 9
Real Property	Eminent Domain/ Inverse Condemnation (14)	☐ 1401 Eminent Domain/Condemnation Number of Parcels __________	2, 6
	Wrongful Eviction (33)	☐ 3301 Wrongful Eviction Case	2, 6
	Other Real Property (26)	☐ 2601 Mortgage Foreclosure	2, 6
		☐ 2602 Quiet Title	2, 6
		☐ 2603 Other Real Property (not eminent domain, landlord/tenant, foreclosure)	2, 6
Unlawful Detainer	Unlawful Detainer – Commercial (31)	☐ 3101 Unlawful Detainer – Commercial (not drugs or wrongful eviction)	6, 11
	Unlawful Detainer – Residential (32)	☐ 3201 Unlawful Detainer – Residential (not drugs or wrongful eviction)	6, 11
	Unlawful Detainer – Post Foreclosure (34)	☐ 3401 Unlawful Detainer – Post Foreclosure	2, 6, 11
	Unlawful Detainer – Drugs (38)	☐ 3801 Unlawful Detainer – Drugs	2, 6, 11
Judicial Review	Asset Forfeiture (05)	☐ 0501 Asset Forfeiture Case	2, 3, 6
	Petition re Arbitration (11)	☐ 1101 Petition to Compel/Confirm/Vacate Arbitration	2, 5
	Writ of Mandate (02)	☐ 0201 Writ – Administrative Mandamus	2, 8
		☐ 0202 Writ – Mandamus on Limited Court Case Matter	2
		☐ 0203 Writ – Other Limited Court Case Review	2
	Other Judicial Review (39)	☐ 3901 Other Writ/Judicial Review	2, 8
		☐ 3902 Administrative Hearing	2, 8
		☐ 3903 Parking Appeal	2, 8
Provisionally Complex Litigation	Antitrust/Trade Regulation (03)	☐ 0301 Antitrust/Trade Regulation	1, 2, 8
	Asbestos (04)	☐ 0401 Asbestos Property Damage	1, 11
		☐ 0402 Asbestos Personal Injury/Wrongful Death	1, 11

SHORT TITLE	CASE NUMBER
NhRP on behalf of Billy and Tina v. City of Los Angeles and Denise M. Verret	

	A Civil Case Cover Sheet Case Type	B Type of Action (check only one)	C Applicable Reasons (see Step 3 above)
Provisionally Complex Litigation (Continued)	Construction Defect (10)	☐ 1001 Construction Defect	1, 2, 3
	Claims Involving Mass Tort (40)	☐ 4001 Claims Involving Mass Tort	1, 2, 8
	Securities Litigation (28)	☐ 2801 Securities Litigation Case	1, 2, 8
	Toxic Tort Environmental (30)	☐ 3001 Toxic Tort/Environmental	1, 2, 3, 8
	Insurance Coverage Claims from Complex Case (41)	☐ 4101 Insurance Coverage/Subrogation (complex case only)	1, 2, 5, 8
Enforcement of Judgment	Enforcement of Judgment (20)	☐ 2001 Sister State Judgment	2, 5, 11
		☐ 2002 Abstract of Judgment	2, 6
		☐ 2004 Administrative Agency Award (not unpaid taxes)	2, 8
		☐ 2005 Petition/Certificate for Entry of Judgment Unpaid Tax	2, 8
		☐ 2006 Other Enforcement of Judgment Case	2, 8, 9
Miscellaneous Civil Complaints	RICO (27)	☐ 2701 Racketeering (RICO) Case	1, 2, 8
	Other Complaints (not specified above) (42)	☐ 4201 Declaratory Relief Only	1, 2, 8
		☐ 4202 Injunctive Relief Only (not domestic/harassment)	2, 8
		☐ 4203 Other Commercial Complaint Case (non-tort/noncomplex)	1, 2, 8
		☐ 4204 Other Civil Complaint (non-tort/non-complex)	1, 2, 8
Miscellaneous Civil Petitions	Partnership Corporation Governance (21)	☐ 2101 Partnership and Corporation Governance Case	2, 8
	Other Petitions (not specified above) (43)	☐ 4301 Civil Harassment with Damages	2, 3, 9
		☐ 4302 Workplace Harassment with Damages	2, 3, 9
		☐ 4303 Elder/Dependent Adult Abuse Case with Damages	2, 3, 9
		☐ 4304 Election Contest	2
		☐ 4305 Petition for Change of Name/Change of Gender	2, 7
		☐ 4306 Petition for Relief from Late Claim Law	2, 3, 8
		☑ 4307 Other Civil Petition	2, 9

SHORT TITLE NhRP on behalf of Billy and Tina v. City of Los Angeles and Denise M. Verret	CASE NUMBER

Step 4: Statement of Reason and Address: Check the appropriate boxes for the numbers shown under Column C for the type of action that you have selected. Enter the address, which is the basis for the filing location including zip code. (No address required for class action cases.)

<table>
<tr><td colspan="3">REASON:
☐ 1. ☑ 2. ☐ 3. ☐ 4. ☐ 5. ☐ 6. ☐ 7. ☐ 8. ☑ 9. ☐ 10. ☐ 11</td><td rowspan="2">ADDRESS:
Stanley Mosk Courthouse
111 N. Hill St.
Los Angeles, CA 90012</td></tr>
<tr><td>CITY:
Los Angeles</td><td>STATE:
California</td><td>ZIP CODE:
90012</td></tr>
</table>

Step 5: Certification of Assignment: I certify that this case is properly filed in the Central District of the Superior Court of California, County of Los Angeles [Code of Civ. Proc., 392 et seq., and LASC Local Rule 2.3(a)(1)(E)]

Dated: 05/16/2025

/s/ Christopher Berry

(SIGNATURE OF ATTORNEY/FILING PARTY

PLEASE HAVE THE FOLLOWING ITEMS COMPLETED AND READY TO BE FILED IN ORDER TO PROPERLY COMMENCE YOUR NEW COURT CASE:

1. Original Complaint or Petition.
2. If filing a Complaint, a completed Summons form for issuance by the Clerk.
3. Civil Case Cover Sheet Judicial Council form CM-010.
4. Civil Case Cover Sheet Addendum and Statement of Location form LASC CIV 109 (01/23).
5. Payment in full of the filing fee, unless there is a court order for waiver, partial or schedule payments.
6. A signed order appointing a Guardian ad Litem, Judicial Council form CIV-010, if the plaintiff or petitioner is a minor under 18 years of age will be required by Court to issue a Summons.
7. Additional copies of documents to be conformed by the Clerk. Copies of the cover sheet and this addendum must be served along with the Summons and Complaint, or other initiating pleading in the case.

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Attorneys for Petitioner

SUPERIOR COURT OF THE STATE OF CALIFORNIA
COUNTY OF LOS ANGELES

NONHUMAN RIGHTS PROJECT, INC., on behalf of BILLY and TINA, individuals, Petitioner, v. The CITY OF LOS ANGELES, and DENISE M. VERRET in her official capacity as Los Angeles Zoo and Botanical Gardens Chief Executive Officer & Zoo Director, Respondents.	Case No. ______________________ **VERIFIED PETITION FOR COMMON LAW WRIT OF HABEAS CORPUS** Hearing Date: Time: Department: Petition Filed:

VERIFIED PETITION FOR COMMON LAW WRIT OF HABEAS CORPUS

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TABLE OF AUTHORITIES

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CONSTITUTIONS, STATUTES, AND RULES OF COURT

OTHER AUTHORITIES

VERIFIED PETITION FOR COMMON LAW WRIT OF HABEAS CORPUS

1. Billy and Tina are two autonomous, self-aware beings with liberty interests materially similar to individuals whom this Court routinely protects through habeas corpus. For decades, they have suffered physical and psychological trauma in wholly unnatural captivity at the L.A. Zoo. On their behalf, the Petitioner Nonhuman Rights Project (hereafter NhRP) seeks relief under the writ of habeas corpus so that Billy and Tina need not spend the rest of their lives enduring captivity that strips them of all meaningful choice and causes chronic suffering. Though this request may seem extraordinary, the Great Writ's noblest tradition lies in protecting those society previously overlooked—what would be truly extraordinary is for this Court to turn its back on autonomous beings who demonstrably suffer and seek the Court's protection. This Court need not immediately decide the ultimate question of Billy and Tina's right to bodily liberty protected by habeas corpus. At this stage, NhRP seeks only an order to show cause to allow proper examination of their detention on the merits. Their lives hang in the balance, and they deserve, at minimum, a fair process to have their decades-long confinement meaningfully examined rather than summarily dismissed.

I.

PRELIMINARY STATEMENT

2. Billy and Tina are two Asian elephants who have been unjustly confined for decades at the L.A. Zoo, trapped in a wholly unnatural existence, unable to flourish and live as elephants should. The question in this case is whether their confinement is "so cruel, so antithetical to the essence of an elephant, that the writ of habeas corpus should be made available under the common law." *Nonhuman Rights Project, Inc. v. Breheny* (2022) 38 N.Y.3d 555, 579 (Wilson, J., dissenting) (hereafter *Breheny*). This purely common law case presents a unique opportunity "to affirm our own humanity by committing ourselves to the promise of freedom" for living beings who, though not human, are like us in all the ways that matter. *Id*. at 628 (Rivera, J., dissenting).

3. Although not human, Billy and Tina are autonomous, extraordinarily cognitively complex beings who are suffering severe physical and psychological harms—and will continue to do so without this Court's intervention, without access to the remedy provided by the Great Writ of Habeas Corpus. The ancient common-law writ is a flexible remedy of last resort to prevent severe and manifest injustice, and there is no principled reason to restrict its use to humans. "[I]n elevating our species, we should not lower the status of other highly intelligent species." *Nonhuman Rights Project, Inc., on Behalf of Tommy v. Lavery* (2018) 31 N.Y.3d 1054, 1057 (Fahey, J., concurring) (hereafter *Tommy*). California courts have embraced their ongoing responsibility for the upkeep of the common law, to change it when it is unjust or out of step with the times, or when it no longer reflects advances in science or contemporary ethical and social values. See generally *Rodriguez v. Bethlehem Steel Corp.* (1974) 12 Cal.3d 382, 393-94 (hereafter *Rodriguez*). The time has come for habeas corpus to evolve and to extend its protections to individuals beyond our species.

4. As demonstrated in the Petition, Billy and Tina are unlawfully confined at the L.A. Zoo: that is, they are being confined in violation of their common law right to bodily liberty protected by habeas corpus, having been deprived of the ability to meaningfully exercise their autonomy and extraordinary cognitive complexity, including the freedom to choose where to go, what to do, and with whom to be. Accordingly, they are entitled to an appropriate remedy. The Petition seeks their release to an elephant sanctuary accredited by the Global Federation of Animal Sanctuaries, where they will be able to exercise their autonomy and extraordinary cognitive complexity to the greatest extent possible.

5. The Petition is supported by expert declarations from eight of the world's most renowned experts on elephant cognition and behavior. The science is clear: zoo captivity is cruel and inhumane for elephants, as it prevents them from meeting their complex physical, psychological, and social needs. Elephants are highly social creatures who have evolved to move. In the wild, they are active more than 20 hours each day, moving many miles across landscapes

to locate resources, connect with friends, and search for mates. But when confined in small, unnatural spaces that typify zoos—often isolated from other members of their species—elephants become frustrated, bored, and depressed, and they almost invariably develop foot diseases, arthritis, joint problems, weight-related diseases, and heightened aggression. The conclusion of the Los Angeles Superior Court in 2012, following a trial concerning the L.A. Zoo's mistreatment of Billy and Tina (and a third elephant who has since died), remains just as true today:

> [T]he Elephants of Asia exhibit at the Los Angeles Zoo is not a happy place for elephants, nor is it for members of the public who go to the zoo and recognize that the elephants are neither thriving, happy, nor content. Captivity is a terrible existence for any intelligent, self-aware species, which the undisputed evidence shows elephants are. To believe otherwise, as some high-ranking zoo employees appear to believe, is delusional.

Leider v. Lewis (L.A. Cnty. Sup. Ct. July 23, 2012), Case No. BC375234 at 30, https://bit.ly/3KRQfln.[1]

6. Subjected to the continual dominance and control of keepers, with access to only 3 acres of usable space, Billy and Tina are deprived of autonomy—a vital component of their well-being. It is therefore no surprise that they have been observed engaging in extensive stereotypic behavior: repetitive movements such as rocking, swaying, and head-bobbing that serve no adaptive function (see here: https://bit.ly/43b3eX3). This behavior, never seen in the wild, is a coping mechanism for the loneliness, boredom, and frustration that characterize zoo life—and a direct manifestation of brain damage caused by chronic stress. From a neural perspective, imprisoning elephants and putting them on display is undeniably cruel.

7. On April 22, 2025, the L.A. Zoo announced its intention to relocate Billy and Tina—a decision that followed the deaths of two other elephants in the Zoo's custody. However,

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[1] Following an affirmance on appeal, the California Supreme Court reversed on legal grounds, finding that the plaintiffs in that case did not have the ability to enjoin animal abuse under a taxpayer waste theory. *Leider v. Lewis* (2017) 2 Cal.5th 1121.

rather than send them to an accredited elephant sanctuary where they can finally heal and thrive as elephants, the Zoo plans to relocate them to the Tulsa Zoo in Oklahoma, which would merely substitute one unacceptable place for another. The space available for elephants at the Tulsa Zoo pales in comparison to the space available at accredited elephant sanctuaries. In fact, if Billy and Tina were added to the five elephants already there, the available space per elephant (1.43 acres) would be less than the space per elephant at the L.A. Zoo. Video showing one of the elephants at the Tulsa Zoo engaging in stereotypic behavior (see here: bit.ly/4dm383I) confirms that if Billy and Tina were transferred to the Tulsa Zoo, they would very likely continue to suffer just as they currently do at the L.A. Zoo.

8. The California statutes and rules governing habeas corpus (Cal. Penal Code Sections 1473 et seq. and Cal. Rules of Court, rules 4.550 et seq) are procedural. They do not—and cannot—affect the substantive question of who may avail themselves of the Great Writ's protections, which must be decided in accordance with common law principles.

9. The initial question before this Court is whether the Petition states a prima facie case for relief, requiring the issuance of an order to show cause pursuant to Cal. Rules of Court 4.551(c)(1). The Court must accept the Petition's factual allegations as true and decide whether they entitle Billy and Tina to release to an accredited elephant sanctuary. "If so, the court must issue an order to show cause." Cal. Rules of Court 4.551(c)(1).

10. The issuance of an order to show cause reflects only a "*preliminary assessment* regarding whether the petitioner would be entitled to relief if the petitioner's factual allegations were proved." *Id*. (emphasis added). It "does not grant the relief sought in the petition." Cal. Rules of Court 4.551(c)(2). Moreover, prior to issuing an order to show cause, this Court may request an informal response from Respondents pursuant to Cal. Rules of Court 4.551(b), to assist the Court in determining the Petition's sufficiency.

11. This Court must issue an order to show cause because the Petition states a prima facie case that the L.A. Zoo is confining Billy and Tina in violation of their common law right to bodily liberty protected by habeas corpus, thus entitling them to an appropriate remedy.

12. In order to issue an order to show cause, this Court need not decide the crucial merits question at the heart of this case: Do Billy and Tina have the right to bodily liberty—that is, do they possess a fundamental liberty interest protected by habeas corpus? Similarly, it need not decide whether they are "persons" for purposes of habeas corpus. Resolving these questions is appropriate only following the issuance of an order to show cause. At this preliminary stage, and consistent with the nature and history of the Great Writ, this Court need only assume, without deciding, that Billy and Tina could have the right to bodily liberty.

13. This Court will not be the first court to issue an order to show cause for nonhuman animals alleged to be unlawfully imprisoned. See *Matter of Nonhuman Rights Project, Inc. v. Stanley* (N.Y. Sup. Ct. 2015) 49 Misc.3d 746, 748 (hereafter *Stanley*) (order to show issued for two chimpanzees imprisoned as research subjects); Debra Cassens Weiss, *Judge takes first step to decide whether Happy the elephant should be released from Bronx Zoo*, ABA J. (Nov. 20, 2018), https://bit.ly/3EnKSVv (order to show cause issued for elephant imprisoned in a zoo).

14. Once this case reaches the merits stage, the Court must decide whether California common law should evolve so that the right to bodily liberty extends to Billy and Tina. "This is not merely a definitional question, but a deep dilemma of ethics and policy that demands our attention." *Tommy*, 31 N.Y.3d. at 1058 (Fahey, J., concurring). Whether elephants may avail themselves of the Great Writ's protections is inherently a normative question, one that must be decided under common law principles—it is not a definitional or statutory interpretation question. The common law evolves in light of advances in scientific understanding, changing social norms, and the demands of justice, along with the fundamental principles of liberty and equality. These

considerations compel the recognition of Billy and Tina's right to bodily liberty, which is the only right the Petition seeks on their behalf.

15. Given the importance of the issues raised in the Petition, determining whether Billy and Tina have viable liberty claims requires careful consideration of the complex and novel arguments presented herein—including those concerning the history and nature of habeas corpus, the role of common law courts, the nature of legal personhood, and the supreme importance of autonomy, among others. Denying the Petition outright, without the benefit of input from both sides, would amount to a "refusal to confront a manifest injustice." *Id*. at 1059.

II.

PARTIES

A. Petitioner Nonhuman Rights Project on behalf of Billy and Tina

16. Petitioner NhRP is a 501(c)(3) non-profit corporation incorporated in the State of Massachusetts, with a principal address at 611 Pennsylvania Avenue SE #345 Washington, DC 20003. NhRP is the only civil rights organization in the United States dedicated solely to securing legal rights for nonhuman animals. Since 1995, NhRP has worked to obtain the legal right to bodily liberty for autonomous nonhuman animals such as chimpanzees and elephants.

1. Billy

17. Billy is a wild-born male Asian elephant who has spent all but one year of his life in captivity. Born roaming freely with his familial herd in Malaysia around 1985, Billy was captured less than a year after his birth. In 1989, he was imported to the United States and brought to the L.A. Zoo.

18. A 1989 training video[2] shows Billy being repeatedly jabbed and led around by a bullhook, a weapon-like device that is used to control elephants through the infliction of pain. In

[2] Last Chance for Animals, *Cruel Training of Billy at the Los Angeles Zoo*, YouTube (April 11, 2016), at: https://www.youtube.com/watch?v=Y-qXm0HjEi4.

the video, a zoo employee talks about chaining Billy and using the bullhook in various ways to exert control over him, such as touching Billy's hypersensitive body parts.

19. In 1993, Billy was sent to Have Trunk Will Travel, presumably for training to submit to commands. Have Trunk Will Travel was a notorious traveling entertainment operation that had been inundated by allegations of extreme cruelty to elephants. In 1994, Billy returned was to the L.A. Zoo where he has remained ever since.

20. The L.A. Zoo has just three acres of usable outdoor space for elephants, which is divided into four yards.[3] For the majority of the time Billy has been confined at the zoo, he has been held alone in a barren enclosure. For decades, he has been observed engaging in stereotypic behavior, most frequently intense head bobbing, which is a coping mechanism for dealing with chronic stress and an indication of brain damage caused by captivity.

21. Billy has been forced to participate in the Association of Zoos and Aquariums' captive breeding program. Public records[4] reveal that during a three-year period, the Zoo attempted to collect Billy's semen at least 55 times—a gross violation of Billy's autonomy, in addition to being a great risk to his health and safety. The semen collection procedure often involved placing Billy in an elephant restraint device, rendering him unable to freely move, and having a human insert their arm into his anus and massage his prostate to stimulate ejaculation. The most recent AZA Asian Elephant Population Analysis and Breeding & Transfer Plan recommends that Billy continue to be used for breeding purposes.[5] If Billy is transferred to the Tulsa Zoo, he will almost certainly be subjected to that zoo's captive breeding program.

22. In addition to enduring traumatic trainings, long-term isolation, and grotesque semen collection procedures, Billy has also suffered from inadequate foot care. Foot care is incredibly important for elephants held in small captive environments. Foot disease is a leading

[3] https://bit.ly/4390I3K.

[4] https://bit.ly/45c1krM.

[5] https://bit.ly/3EVtZa1.

cause of death in captive elephants. Records from 2023[6] show that the zoo did not perform regular foot care on Billy for eight months while he was in musth, resulting in overgrown nails[7] and a significant accumulation of dead tissue.

[6] https://bit.ly/4m7LCnz.

[7] https://bit.ly/4dhUSlh.

2. Tina

23. Tina is a female Asian elephant who has spent almost the entirety of her life held captive by zoos and circuses in the United States—a world away from the elephant family she was taken from when she was less than a year old. Since 2010, Tina has been confined at the L.A. Zoo.

24. Born at an unknown location in Asia around 1966, Tina was captured in the wild and taken from her familial herd in 1967 and imported to the United States in 1969. For the next

forty years, Tina was exploited by casinos and circuses and made to perform tricks and travel frequently across the country.

25. From 1980 until 2009, Tina was owned and exploited by three different circuses. During this time, Tina was held captive with a female elephant named Jewel, who would be her companion for the next 40 years. While held captive by the circuses, Tina was transported across the country in tiny trailers and made to perform in shows, almost always under the threat of a bullhook. In 2009, the US Department of Agriculture confiscated Tina and Jewel because of neglect and mistreatment—both Tina and Jewel were dangerously underweight. Tina and her companion Jewel were transferred to the San Diego Zoo, which then loaned them to the L.A. Zoo in 2010.

26. In January 2023, Jewel died. Less than a year later, Shaunzi, the other female elephant confined at the zoo, collapsed and was euthanized.

B. Respondents City of Los Angeles and Denise M. Verret

27. Billy and Tina are in the custody of Respondents City of Los Angeles and Denise M. Verret.

28. The City of Los Angeles owns and operates the L.A. Zoo, while Denise M. Verret is the Chief Executive Officer and Director of the L.A. Zoo.

III.

LIST OF EXHIBITS

29. The following exhibits are true copies of the documents indicated and are incorporated by reference into the Petition:

Exhibit 1: Declaration of Joyce Poole, Ph.D. (hereafter Poole Decl.)

Exhibit 2: Declaration of Michael Pardo, Ph.D. (hereafter Pardo Decl.)

Exhibit 3: Declaration of Keith Lindsay, Ph.D. (hereafter Lindsay Decl.)

Exhibit 4: Declaration of Bob Jacobs, Ph.D. (hereafter Jacobs Decl.)

Exhibit 5: Declaration of Cynthia Moss, Sc.D. (hereafter Moss Decl.)

Exhibit 6: Declaration of Karen McComb, Ph.D. (hereafter McComb Decl.)

Exhibit 7: Joint Declaration of Lucy Bates, Ph.D., and Richard M. Byrne, Ph.D. (hereafter Bates & Byrne Decl.)

30. The Expert Declarations (Exhibits 1 – 7) are from eight of the world's most renowned elephant scientists with expertise in elephant cognition and behavior.[8]

IV.

THE EXPERT DECLARATIONS

A. Elephants are autonomous, extraordinarily cognitively complex beings.

31. The Expert Declarations demonstrate that elephants are autonomous and extraordinarily cognitively complex.[9] The cognitive abilities of elephants include: autonomy; empathy; self-awareness; self-determination; theory of mind (awareness others have minds); insight; working memory; extensive long-term memory that allows them to accumulate social knowledge; the ability to act intentionally and in a goal-oriented manner, and to detect animacy and goal directedness in others; understanding the physical competence and emotional state of others; imitating, including vocal imitation; pointing and understanding pointing; engaging in true teaching (taking the pupil's lack of knowledge into account and actively showing them what to do); cooperating and building coalitions; cooperative problem-solving, innovative problem-solving, and behavioral flexibility; understanding causation; intentional communication,

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[8] One of the declarants, Dr. Joyce Poole, has created The Elephant Ethogram: A Library of African Elephant Behavior, which documents close to 500 behaviors with written descriptions and some 2,300 video clips. *The Elephant Ethogram*, ELEPHANTVOICES (2021), https://bit.ly/3qkupLK.

[9] References to elephants in the Expert Declarations are applicable to both African and Asian elephants. Dr. Joyce Poole notes: "If the general term 'elephants' is used with no specific delineation, it can be assumed the comment relates to the African species, though it is likely that it applies to the Asian species as well." Poole Decl. ¶ 23. This is because "both African and Asian elephants share many key traits of autonomy with humans and like humans are [both] autonomous beings." *Id.* at ¶ 69.

including vocalizations to share knowledge and information with others in a manner similar to humans; ostensive behavior that emphasizes the importance of a particular communication; displaying a wide variety of gestures, signals, and postures; using specific calls and gestures to plan and discuss a course of action, adjusting their planning according to their assessment of risk, and executing the plan in a coordinated manner; complex learning and categorization abilities; and, an awareness of and response to death, including grieving behaviors.[10]

32. Elephants share numerous complex cognitive capacities with humans, such as self-awareness, empathy, awareness of death, intentional communication, learning, memory, and categorization abilities.[11] Many of these capacities have been erroneously considered unique to humans, and each capacity is a component of autonomy.[12]

33. Elephants are autonomous, as they exhibit self-determined behavior that is based on freedom of choice.[13] As a psychological concept, autonomy implies that the individual is directing their behavior based on some non-observable, internal cognitive process, rather than simply responding reflexively.[14]

34. Elephants possess the largest absolute brain of any land animal.[15] Even relative to their body sizes, elephant brains are large.[16] An encephalization quotient (hereafter EQ) of 1.0

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[10] *See generally* Poole Decl.

[11] Bates & Byrne Decl. ¶ 37; McComb Decl. ¶ 31; Moss Decl. ¶ 25; Poole Decl. ¶ 29.

[12] Bates & Byrne Decl. ¶ 37; McComb Decl. ¶ 31; Moss Decl. ¶ 25; Poole Decl. ¶ 29.

[13] Bates & Byrne Decl. ¶ 30; McComb Decl. ¶¶ 24, 31, 54; Moss Decl. ¶¶ 18, 48; Poole Decl. ¶¶ 22, 69; Lindsay Decl. ¶¶ 10, 33-34.

[14] Bates & Byrne Decl. ¶ 30; McComb Decl. ¶ 24; Poole Decl. ¶ 22; Moss Decl. ¶ 18.

[15] Bates & Byrne Decl. ¶ 32; McComb Decl. ¶ 26; Poole Decl. ¶ 24; Moss Decl. ¶ 20.

[16] Bates & Byrne Decl. ¶ 32; McComb Decl. ¶ 26; Poole Decl. ¶ 24; Moss Decl. ¶ 20 ("Encephalization quotients (EQ) are a standardized measure of brain size relative to body size and illustrate by how much a species' brain size deviates from that expected for its body size.").

means a brain is exactly the size expected for that body size; values greater than 1.0 indicate a larger brain than expected for that body size.[17] Elephants have an EQ of between 1.3 and 2.3 (varying between sex and species).[18] This means an elephant's brain can be more than twice as large as is expected for an animal of its size.[19] These EQ values are like those of the great apes, with whom elephants have not shared a common ancestor for almost 100 million years.[20]

35. Given how metabolically costly brain tissue is, the large brains of elephants must confer significant advantages; otherwise their size would be reduced.[21] A large brain allows greater intelligence and behavioral flexibility.[22] Typically, mammals are born with brains weighing up to 90% of the adult weight.[23] This figure drops to about 50% for chimpanzees.[24] At birth, human brains weigh only about 27% of the adult brain weight and increase in size over a prolonged childhood period.[25] This lengthy period of brain development (termed "developmental delay") is a key feature of human brain evolution.[26] It provides a longer period in which the brain may be shaped by experience and learning, and plays a role in the emergence of complex cognitive abilities such as self-awareness, creativity, forward planning, decision

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[17] Bates & Byrne Decl. ¶ 32; McComb Decl. ¶ 26; Poole Decl. ¶ 24; Moss Decl. ¶ 20.

[18] Bates & Byrne Decl. ¶ 32; McComb Decl. ¶ 26; Poole Decl. ¶ 24; Moss Decl. ¶ 20.

[19] Bates & Byrne Decl. ¶ 32; McComb Decl. ¶ 26; Poole Decl. ¶ 24; Moss Decl. ¶ 20.

[20] Bates & Byrne Decl. ¶ 32; McComb Decl. ¶ 26; Poole Decl. ¶ 24; Moss Decl. ¶ 20.

[21] Poole Decl. ¶ 13.

[22] Bates & Byrne Decl. ¶¶ 32-33; McComb Decl. ¶ 26; Poole Decl. ¶ 24; Moss Decl. ¶ 20.

[23] Bates & Byrne Decl. ¶ 33; McComb Decl. ¶ 27; Poole Decl. ¶ 25; Moss Decl. ¶ 21.

[24] Bates & Byrne Decl. ¶ 33; McComb Decl. ¶ 27; Poole Decl. ¶ 25; Moss Decl. ¶ 21.

[25] Bates & Byrne Decl. ¶ 33; McComb Decl. ¶ 27; Poole Decl. ¶ 25; Moss Decl. ¶ 21.

[26] Bates & Byrne Decl. ¶ 33; McComb Decl. ¶ 27; Poole Decl. ¶ 25; Moss Decl. ¶ 21.

making and social interaction.[27] At birth, elephant brains weigh only about 35% of their adult weight, and elephants accordingly undergo a similarly protracted period of growth, development and learning.[28] This similar developmental delay in the elephant brain is likewise associated with the emergence of analogous cognitive abilities.[29]

36. Despite nearly 100 million years of separate evolution, elephants share certain characteristics of our large brains, namely deep and complex folding of the cerebral cortex, large parietal and temporal lobes, and a large cerebellum.[30] The temporal and parietal lobes of the cerebral cortex manage communication, perception, and recognition and comprehension of physical actions, while the cerebellum is involved in planning, empathy, and predicting and understanding the actions of others.[31] This means the physical similarities between human and elephant brains occur in areas that link directly to the capacities necessary for autonomy and self-awareness.[32]

37. Elephant brains hold nearly as many cortical neurons as do human brains, and a much greater number than do chimpanzees or bottlenose dolphins.[33] Elephants' pyramidal neurons—the class of neurons found in the cerebral cortex, particularly the pre-frontal cortex, which is the brain area that controls "executive functions"—are larger than in humans and most

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[27] Bates & Byrne Decl. ¶ 33; McComb Decl. ¶ 27; Poole Decl. ¶ 25; Moss Decl. ¶ 21.

[28] Bates & Byrne Decl. ¶ 33; McComb Decl. ¶ 27; Poole Decl. ¶ 25; Moss Decl. ¶ 21.

[29] Bates & Byrne Decl. ¶ 33; McComb Decl. ¶ 27; Poole Decl. ¶ 25; Moss Decl. ¶ 21.

[30] Poole Decl. ¶ 26.

[31] Poole Decl. ¶ 26.

[32] Poole Decl. ¶ 26.

[33] Bates & Byrne Decl. ¶ 35; McComb Decl. ¶ 29; Moss Decl. ¶ 23; Poole Decl. ¶ 27 ("Humans: 1.15 x 10^{10}; elephants: 1.1 x 10^{10}; chimpanzees: 6.2 x 10^{9}; dolphins: 5.8 x 10^{9}.").

other species.[34] The term “executive function” refers to controlling operations, such as paying attention, inhibiting inappropriate responses, and deciding how to use memory search. These abilities develop late in human infancy and are often impaired in dementia. The degree of complexity of pyramidal neurons is linked to cognitive ability, with more complex connections between pyramidal neurons being associated with increased cognitive capabilities.[35] Elephant pyramidal neurons have many connections with other neurons for receiving and sending signals, known as a dendritic tree.[36]

38. Pyramidal neurons in elephants are just as complex as similar neurons in the human cortex, and like in humans, these neurons are also more complex in the frontal lobe (involved with higher cognitive function) than in the occipital lobe (involved in the early processing of incoming visual information).[37] These are remarkable parallels in terms of the overall complexity of neurons and their functional involvement.[38] Due to the length of their dendrites, elephant neurons sample a wide variety of information; this broad synthesis of information may contribute to elephants’ contemplative nature—they often appear to be examining their surroundings and thinking very deeply about what is going on around them.[39] They have the leisure of their great size and few natural predators, which allows them to consider

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[34] Bates & Byrne Decl. ¶ 35; McComb Decl. ¶ 29; Poole Decl. ¶ 27; Moss Decl. ¶ 23.

[35] Bates & Byrne Decl. ¶ 35; McComb Decl. ¶ 29; Poole Decl. ¶ 27; Moss Decl. ¶ 23.

[36] Bates & Byrne Decl. ¶ 35; McComb Decl. ¶ 29; Poole Decl. ¶ 27; Moss Decl. ¶ 23.

[37] Jacobs Decl. ¶ 9.

[38] Jacobs Decl. ¶ 9.

[39] Jacobs Decl. ¶ 9.

their decisions very carefully.[40] This contemplative aspect of the elephant further supports the findings related to the psychologically damaging nature of zoo captivity.[41]

39. Elephants, like humans, great apes, and some cetaceans, possess *Von Economo neurons*, or spindle cells, the so-called "air-traffic controllers for emotions," in the anterior cingulate, fronto-insular, and dorsolateral prefrontal cortex areas of the brain.[42] In humans, these cortical areas are involved with the processing of complex social information, emotional learning and empathy, planning and decision-making, and self-awareness and self-control, among other things.[43] The presence of spindle cells in the same brain locations in elephants and humans strongly implies that these higher-order brain functions, which are the building blocks of autonomous, self-determined behavior, are common to both species.[44]

40. Elephants have extensive and long-lasting memories.[45] Using experimental playback of long-distance contact calls in Amboseli National Park, Kenya, showed that African elephants remember and recognize the voices of at least 100 other elephants.[46] Each adult female elephant tested was familiar with the contact-call vocalizations of individuals from an average of 14 families in the population.[47] When the calls came from the test elephants' own family, they contact-called in response and approached the location of the loudspeaker; when they were from

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[40] Jacobs Decl. ¶ 9.

[41] Jacobs Decl. ¶ 9.

[42] Moss Decl. ¶ 24.

[43] Moss Decl. ¶ 24.

[44] Moss Decl. ¶ 24.

[45] Bates & Byrne Decl. ¶ 54; McComb Decl. ¶ 48; Poole Decl. ¶ 49; Moss Decl. ¶ 42; Lindsay Decl. ¶ 14.

[46] Bates & Byrne Decl. ¶ 54; McComb Decl. ¶ 48; Poole Decl. ¶ 49; Moss Decl. ¶ 42.

[47] Bates & Byrne Decl. ¶ 54; McComb Decl. ¶ 48; Poole Decl. ¶ 49; Moss Decl. ¶ 42.

another non-related but familiar family, one that had been shown to have a high association index with the test group, they listened but remained relaxed.[48] However, when a test group heard unfamiliar contact calls from groups with a low association index with the test group, the elephants bunched together and retreated from the area.[49]

41. McComb et al. has demonstrated that this social knowledge accumulates with age, with older females having the best knowledge of the contact calls of other family groups, and that older females are better leaders than younger elephants, with more appropriate decision-making in response to potential threats (in this case, in the form of hearing lion roars).[50] Younger matriarchs under-reacted to hearing roars from male lions, elephants' most dangerous predators.[51] Sensitivity to the roars of male lions increased with increasing matriarch age, with the oldest, most experienced females showing the strongest response to this danger.[52] These studies show that elephants continue to learn and remember information about their environments throughout their lives, and this accrual of knowledge allows them to make better decisions and better lead their families as they age.[53]

42. The experiences elephants gain over a lifetime are shared between members of their strongly bonded social groups through example, teaching, and learning.[54] When we recognize that these qualities of elephants are deeply ingrained through millennia of evolutionary

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[48] Bates & Byrne Decl. ¶ 54; McComb Decl. ¶ 48; Poole Decl. ¶ 49; Moss Decl. ¶ 42.

[49] Bates & Byrne Decl. ¶ 54; McComb Decl. ¶ 48; Poole Decl. ¶ 49; Moss Decl. ¶ 42.

[50] Bates & Byrne Decl. ¶ 55; McComb Decl. ¶ 49; Poole Decl. ¶ 50; Moss Decl. ¶ 43.

[51] Bates & Byrne Decl. ¶ 55; McComb Decl. ¶ 49; Poole Decl. ¶ 50; Moss Decl. ¶ 43.

[52] Bates & Byrne Decl. ¶ 55; McComb Decl. ¶ 49; Poole Decl. ¶ 50; Moss Decl. ¶ 43.

[53] Bates & Byrne Decl. ¶ 55; McComb Decl. ¶ 49; Poole Decl. ¶ 50; Moss Decl. ¶ 43.

[54] Lindsay Decl. ¶ 34.

selection and adaptation to their particular native ecosystems, we must inevitably move from a position of domination towards appreciation of them as creatures deserving of, and requiring, autonomy to the greatest extent possible in appropriate environmental conditions.[55]

43. Further demonstration of elephants' long-term memory emerges from data on their movement patterns.[56] African elephants move over very large distances in their search for food and water.[57] Using GPS collars, scientists tracked the movements of elephants living in the Namib Desert, with one group traveling over 600 km (over 370 miles) in five months.[58] Further studies showed that elephants in the same region visited water holes approximately every four days, though some were more than 60 km (over 37 miles) apart.[59]

44. Elephants inhabiting the deserts of Namibia and Mali may travel hundreds of kilometers to visit remote water sources shortly after the onset of a period of rainfall, sometimes along routes that have not been used for many years.[60] These remarkable feats suggest exceptional cognitive mapping skills that rely upon the long-term memories of older individuals who may have traveled that same path decades earlier.[61] Thus, family groups headed by older matriarchs are better able to survive periods of drought.[62] These older matriarchs lead their families over larger areas during droughts than families headed by younger matriarchs, again

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[55] Lindsay Decl. ¶ 34.

[56] Bates & Byrne Decl. ¶ 56; McComb Decl. ¶ 50; Poole Decl. ¶ 51; Moss Decl. ¶ 44.

[57] Bates & Byrne Decl. ¶ 56; McComb Decl. ¶ 50; Poole Decl. ¶ 51; Moss Decl. ¶ 44.

[58] Bates & Byrne Decl. ¶ 56; McComb Decl. ¶ 50; Poole Decl. ¶ 51; Moss Decl. ¶ 44.

[59] Bates & Byrne Decl. ¶ 56; McComb Decl. ¶ 50; Poole Decl. ¶ 51; Moss Decl. ¶ 44.

[60] Bates & Byrne Decl. ¶ 56; McComb Decl. ¶ 50; Poole Decl. ¶ 51; Moss Decl. ¶ 44.

[61] Bates & Byrne Decl. ¶ 56; McComb Decl. ¶ 50; Poole Decl. ¶ 51; Moss Decl. ¶ 44.

[62] Bates & Byrne Decl. ¶ 56; McComb Decl. ¶ 50; Poole Decl. ¶ 51; Moss Decl. ¶ 44.

drawing on their accrued knowledge of permanent, drought-resistant sources of food and waters.[63]

45. Studies reveal that long-term memories, and the decision-making mechanisms that rely on this knowledge, are severely disrupted in elephants who have experienced trauma or extreme disruption due to "management" practices initiated by humans.[64] For example, South African elephants who experienced trauma decades earlier showed significantly reduced social knowledge.[65] As a result of archaic culling practices, these elephants had been forcibly separated from family members and subsequently taken to new locations.[66] Two decades later, their social knowledge, skills, and decision-making abilities were impoverished compared to an undisturbed Kenyan population.[67] Disrupting elephants' natural way of life has substantial negative impacts on their knowledge and decision-making abilities.[68]

46. Elephants display advanced 'working memory skills,' arguably greater than human working memory.[69] Working memory is the ability to temporarily store, recall, manipulate and coordinate items from memory.[70]Adult human working memory is generally thought to have the capacity for approximately seven items; in other words, you and I can keep about seven different items or pieces of information in mind at the same time.[71] Studies appear

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[63] Bates & Byrne Decl. ¶ 56; McComb Decl. ¶ 50; Poole Decl. ¶ 51; Moss Decl. ¶ 44.

[64] Bates & Byrne Decl. ¶ 57; McComb Decl. ¶ 51; Poole Decl. ¶ 52; Moss Decl. ¶ 45.

[65] Bates & Byrne Decl. ¶ 57; McComb Decl. ¶ 51; Poole Decl. ¶ 52; Moss Decl. ¶ 45.

[66] Bates & Byrne Decl. ¶ 57; McComb Decl. ¶ 51; Poole Decl. ¶ 52; Moss Decl. ¶ 45.

[67] Bates & Byrne Decl. ¶ 57; McComb Decl. ¶ 51; Poole Decl. ¶ 52; Moss Decl. ¶ 45.

[68] Bates & Byrne Decl. ¶ 57; McComb Decl. ¶ 51; Poole Decl. ¶ 52; Moss Decl. ¶ 45.

[69] Poole Decl. ¶ 53.

[70] Poole Decl. ¶ 53.

[71] Poole Decl. ¶ 53.

to show elephants have the capacity to continually track the locations of *at least* seventeen family members.[72] This remarkable ability to hold in mind and regularly update information about the locations and movements of a large number of family members is best explained by elephants possessing an unusually large working memory capacity, apparently much larger than that of humans.[73]

47. Elephants display a sophisticated categorization of their environment on par with humans.[74] Dr. Bates, Dr. Byrne, Dr. Poole, and Dr. Moss experimentally presented the elephants of Amboseli National Park, Kenya with garments that gave olfactory or visual information about their human wearers, either Maasai warriors who traditionally attack and spear elephants as part of their rite of passage, or Kamba men who are agriculturalists and traditionally pose little threat to elephants.[75] In the first experiment, the only thing that differed between the cloths was the smell, derived from the ethnicity and/or lifestyle of the wearers.[76] The elephants were significantly more likely to run away when they sniffed cloths worn by Maasai men than those worn by Kamba men or no one at all.[77]

48. In a second experiment, they presented the elephants with two cloths that had not been worn by anyone; one was white (a neutral stimulus) and the other red, the color ritually worn by Maasai warriors.[78] With access only to these visual cues, the elephants showed

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[72] Poole Decl. ¶ 53.

[73] Poole Decl. ¶ 53.

[74] Bates & Byrne Decl. ¶ 59; McComb Decl. ¶ 53; Poole Decl. ¶ 54; Moss Decl. ¶ 47.

[75] Bates & Byrne Decl. ¶ 59; McComb Decl. ¶ 53; Poole Decl. ¶ 54; Moss Decl. ¶ 47.

[76] Bates & Byrne Decl. ¶ 59; McComb Decl. ¶ 53; Poole Decl. ¶ 54; Moss Decl. ¶ 47.

[77] Bates & Byrne Decl. ¶ 59; McComb Decl. ¶ 53; Poole Decl. ¶ 54; Moss Decl. ¶ 47.

[78] Bates & Byrne Decl. ¶ 59; McComb Decl. ¶ 53; Poole Decl. ¶ 54; Moss Decl. ¶ 47.

significantly greater, sometimes aggressive, reactions to red garments than white.[79] They concluded that elephants are able to categorize a single species (humans) into sub-classes (i.e., "dangerous" or "low risk") based on either olfactory or visual cues alone.[80]

49. It is further demonstrated that the same elephants distinguish human groups based on their voices.[81] The elephants reacted differently, and appropriately, depending on whether they heard Maasai or Kamba men speaking, and whether the speakers were male Maasai versus female Maasai (who generally pose little threat).[82] Scent, sounds, and visual signs associated with Maasai men are categorized as "dangerous," while neutral signals are attended to but categorized as "low risk."[83] These sophisticated, multi-modal categorization skills may be exceptional among non-human animals and demonstrate elephants' acute sensitivity to the human world and how they monitor human behavior and learn to recognize when we intend to harm them.[84]

50. Human speech and language reflect autonomous thinking and intentional behavior.[85] Like humans, elephants vocalize to share knowledge and information.[86] Male elephants primarily communicate about their sexual status, rank, and identity, whereas females and dependents emphasize and reinforce their social units.[87] Call types are separated into those

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[79] Bates & Byrne Decl. ¶ 59; McComb Decl. ¶ 53; Poole Decl. ¶ 54; Moss Decl. ¶ 47.

[80] Bates & Byrne Decl. ¶ 59; McComb Decl. ¶ 53; Poole Decl. ¶ 54; Moss Decl. ¶ 47.

[81] Bates & Byrne Decl. ¶ 59; McComb Decl. ¶ 53; Poole Decl. ¶ 54; Moss Decl. ¶ 47.

[82] Bates & Byrne Decl. ¶ 59; McComb Decl. ¶ 53; Poole Decl. ¶ 54; Moss Decl. ¶ 47.

[83] Bates & Byrne Decl. ¶ 59; McComb Decl. ¶ 53; Poole Decl. ¶ 54; Moss Decl. ¶ 47.

[84] Bates & Byrne Decl. ¶ 59; McComb Decl. ¶ 53; Poole Decl. ¶ 54; Moss Decl. ¶ 47.

[85] Bates & Byrne Decl. ¶ 50; McComb Decl. ¶ 44; Poole Decl. ¶ 42; Moss Decl. ¶ 38.

[86] Bates & Byrne Decl. ¶ 50; McComb Decl. ¶ 44; Poole Decl. ¶ 42; Moss Decl. ¶ 38.

[87] Bates & Byrne Decl. ¶ 50; McComb Decl. ¶ 44; Poole Decl. ¶ 42; Moss Decl. ¶ 38.

produced by the larynx (such as "rumbles") and calls produced by the trunk (such as "trumpets"), with different calls in each category used in different contexts.[88] Field experiments have shown that African elephants distinguish between call types. For example, such contact calls as "rumbles" may travel kilometers and maintain associations between elephants, or "Estrus-Rumbles" may occur after a female has copulated, and these call types elicit different responses in listeners.[89]

51. Elephant vocalizations are not merely reflexive; they have distinct meanings to listeners and communicate in a manner like the way humans use language.[90] African savannah elephants address each other with individual names.[91] This indicates that, like us, African savannah elephants can determine if a call was intended for them or another individual by listening for their name.[92] The existence of names in elephants is a testament to the importance of their social bonds and suggests that they have complex mental representations of other individuals.[93]

52. Along with naming, elephants display more than two hundred gestures, signals and postures that they use to communicate information to their audience.[94] Such signals are adopted in many contexts, such as aggressive, sexual or socially integrative situations; the signals are well-defined, carry a specific meaning both to the actor and recipient, result in predictable

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[88] Bates & Byrne Decl. ¶ 50; McComb Decl. ¶ 44; Poole Decl. ¶ 42; Moss Decl. ¶ 38.

[89] Bates & Byrne Decl. ¶ 50; McComb Decl. ¶ 44; Poole Decl. ¶ 42; Moss Decl. ¶ 38.

[90] Bates & Byrne Decl. ¶ 50; McComb Decl. ¶ 44; Poole Decl. ¶ 42; Moss Decl. ¶ 38.

[91] Pardo Decl. ¶ 70.

[92] Pardo Decl. ¶ 70.

[93] Pardo Decl. ¶ 70.

[94] Bates & Byrne Decl. ¶ 52; McComb Decl. ¶ 46; Poole Decl. ¶ 43; Moss Decl. ¶ 40.

responses from the audience, and together demonstrate intentional and purposeful communication intended to share information and/or alter the others' behavior to fit their own will.[95]

53. Elephants use specific calls and gestures to plan and discuss a course of action.[96] These may be to respond to a threat through a group retreating or mobbing action (including a celebration of successful efforts), or planning and discussing where, when, and how to move to a new location. In group-defensive situations, elephants respond with highly coordinated behavior, both rapidly and predictably, to specific calls uttered and particular gestures exhibited by group members.[97] These calls and gestures carry specific meanings not only to elephant listeners but to experienced human listeners as well.[98] The rapid, predictable, and collective response of elephants to these calls and gestures indicates that elephants have the capacity to understand the goals and intentions of the signalling individual.[99] For example, elephants can detect alarm calls from some considerable distance and avoid the area where elephant killings by rural villagers or armed gangs take place.[100]

54. Elephant group defensive behavior is highly evolved and involves a range of different tactical maneuvers adopted by different elephants.[101] For example, matriarch Provocadora's contemplation of Dr. Joyce Poole's team through "Listening" and "J-Sniffing,"

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[95] Bates & Byrne Decl. ¶ 52; McComb Decl. ¶ 46; Poole Decl. ¶ 43; Moss Decl. ¶ 40.

[96] Poole Decl. ¶ 44.

[97] Poole Decl. ¶ 45.

[98] Poole Decl. ¶ 45.

[99] Poole Decl. ¶ 45.

[100] Lindsay Decl. ¶ 27.

[101] Poole Decl. ¶ 45.

followed by her purposeful “Perpendicular-Walk” toward her family (in relation to Dr. Poole’s team) and her “Ear-Flap-Slide,” clearly communicated that her family should begin a “Group-Advance” upon Dr. Poole’s team.[102] This particular elephant attack is a powerful example of elephant empathy, coalition, and cooperation.[103] Provocadora’s instigation of the “Group-Advance” led to a two-and-a-half minute “Group-Charge” in which the three other large adult females of the 36-member family took turns leading the charge, passing the baton, in a sense, from one to the next.[104] Once they succeeded in their goal of chasing Dr. Poole’s team away, they celebrated their victory by “High-Fiving” with their trunks and engaging in an “End-Zone-Dance.”[105] “High-Fiving” is also typically used to initiate a coalition and is both preceded by and associated with other specific gestures and calls that lead to goal-oriented, collective behavior.[106]

55. Ostensive communication refers to the way humans use behavior, such as tone of speech, eye contact, and physical contact, to emphasize that a particular communication is important.[107] Lead elephants in family groups use ostensive communication frequently to say, “Heads up—I am about to do something that you should pay attention to.”[108]

56. In planning and communicating intentions regarding a movement, elephants use both vocal and gestural communication.[109] For example, Dr. Poole has observed that a member

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[102] Poole Decl. ¶ 45.

[103] Poole Decl. ¶ 45.

[104] Poole Decl. ¶ 45.

[105] Poole Decl. ¶ 45.

[106] Poole Decl. ¶ 45.

[107] Poole Decl. ¶ 36.

[108] Poole Decl. ¶ 36.

[109] Poole Decl. ¶ 46.

of a family will use the axis of her body to point in the direction she wishes to go and then vocalize every couple of minutes with a specific call known as a "Let's-Go" rumble: "I want to go this way, let's go together."[110] The elephant will also use intention gestures—such as "Foot-Swinging"—to indicate her intention to move.[111] Such a call may be successful or unsuccessful at moving the group or may lead to a 45-minute (or longer) discussion (a series of rumble exchanges known as "Cadenced-Rumbles") that researchers interpret as negotiation.[112] Sometimes such negotiation leads to disagreement that may result in the group splitting and going in different directions for a period of time.[113] In situations where the security of the group is at stake, such as when movement is planned through or near human settlement, all group members focus on the matriarch's decision.[114] While "Let's Go" rumbles are uttered, others adopt a "Waiting" posture until the matriarch, after much "Listening," "J-Sniffing," and "Monitoring," decides it is safe to proceed; the elephants then bunch together and move purposefully at a fast pace in what's called a "Group-March."[115]

57. Elephants typically move through dangerous habitat at high speed in a clearly goal-oriented manner known as "streaking," which has been described and documented through the movements of elephants wearing satellite tracking collars.[116] The many different signals—calls, postures, gestures, and behaviors elephants use to contemplate and initiate such movement

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[110] Poole Decl. ¶ 46.

[111] Poole Decl. ¶ 46.

[112] Poole Decl. ¶ 46.

[113] Poole Decl. ¶ 46.

[114] Poole Decl. ¶ 46.

[115] Poole Decl. ¶ 46.

[116] Poole Decl. ¶ 46.

(including “Ear-Flap” and “Ear-Flap-Slide”)—are clearly understood by other elephants (just as they can be understood after a long-term study by human observers); they mean very specific things, and they indicate that elephants: 1) have a particular plan which they can communicate with others, 2) can adjust their plan according to their immediate assessment of risk or opportunity, and 3) can communicate and execute the plan in a coordinated manner.[117]

58. Elephants can vocally imitate sounds they hear, from the engines of passing trucks to the commands of human zookeepers.[118] Imitating another’s behavior is demonstrative of a sense of self because it is necessary to understand how one’s own behavior relates to the behavior of others.[119] African elephants recognize the importance of visual attentiveness on the part of an intended recipient, elephant or human, and of gestural communication, which further demonstrates that elephants’ gestural communications are intentional and purposeful.[120] This ability to understand the visual attentiveness and perspective of others is crucial for empathy, mental-state understanding, and “theory of mind” (the ability to mentally represent and think about the knowledge, beliefs, and emotional states of others while recognizing that these can be distinct from your own knowledge, beliefs, and emotions).[121]

59. As do humans, Asian elephants exhibit “mirror self-recognition” (hereafter MSR) using Gallup’s classic “mark test.”[122] MSR is the ability to recognize a reflection in the mirror as oneself, while the mark test involves surreptitiously placing a colored mark on an individual’s

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[117] Poole Decl. ¶ 46.

[118] Bates & Byrne Decl. ¶ 51; McComb Decl. ¶ 45; Poole Decl. ¶ 47; Moss Decl. ¶ 39.

[119] Bates & Byrne Decl. ¶ 51; McComb Decl. ¶ 45; Poole Decl. ¶ 47; Moss Decl. ¶ 39.

[120] Bates & Byrne Decl. ¶ 53; McComb Decl. ¶ 47; Poole Decl. ¶ 48; Moss Decl. ¶ 41.

[121] Bates & Byrne Decl. ¶¶ 40, 53; McComb Decl. ¶¶ 34, 47; Poole Decl. ¶¶ 32, 48; Moss Decl. ¶¶ 28, 41.

[122] Bates & Byrne Decl. ¶ 38; McComb Decl. ¶ 32; Poole Decl. ¶ 30; Moss Decl. ¶ 26.

forehead that she cannot see or be aware of without the aid of a mirror.[123] If the individual uses the mirror to investigate the mark, the individual must recognize the reflection as herself.[124]

60. MSR is significant because it is a key identifier of self-awareness.[125] Self-awareness is intimately related to autobiographical memory in humans and is central to autonomy and being able to direct one's own behavior to achieve personal goals and desires.[126] By demonstrating they can recognize themselves in a mirror, elephants are holding a mental representation of themselves from another perspective and are aware that they are a separate entity from others.[127]

61. One who understands the concept of dying and death possesses a sense of self.[128] Both chimpanzees and elephants demonstrate an awareness of death by reacting to dead family or group members.[129] Having a mental representation of the self, which is a pre-requisite for mirror-self recognition, likely confers an ability to comprehend death.[130]

62. Wild African elephants have been shown to be more interested in the bones of dead elephants than the bones of other animals.[131] They have frequently been observed using

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[123] Bates & Byrne Decl. ¶ 38; McComb Decl. ¶ 32; Poole Decl. ¶ 30; Moss Decl. ¶ 26.

[124] Bates & Byrne Decl. ¶ 38; McComb Decl. ¶ 32; Poole Decl. ¶ 30; Moss Decl. ¶ 26.

[125] Bates & Byrne Decl. ¶ 38; McComb Decl. ¶ 32; Poole Decl. ¶ 30; Moss Decl. ¶ 26.

[126] McComb Decl. ¶ 32; Poole Decl. ¶ 30; Moss Decl. ¶ 26; Bates & Byrne Decl. ¶ 38 ("'Autobiographical memory' refers to what one remembers about his or her own life; for example, not that 'Paris is the capital of France,' but the recollection that you had a lovely time when you went there.").

[127] Bates & Byrne Decl. ¶ 38; McComb Decl. ¶ 32; Poole Decl. ¶ 30; Moss Decl. ¶ 26.

[128] Poole Decl. ¶ 31; Bates & Byrne Decl. ¶ 39; Moss Decl. ¶ 27.

[129] Bates & Byrne Decl. ¶ 39; McComb Decl. ¶ 33; Poole Decl. ¶ 31; Moss Decl. ¶ 27.

[130] Bates & Byrne Decl. ¶ 39; McComb Decl. ¶ 33; Poole Decl. ¶ 31; Moss Decl. ¶ 27.

[131] Bates & Byrne Decl. ¶ 39; McComb Decl. ¶ 33; Poole Decl. ¶ 31; Moss Decl. ¶ 27.

their tusks, trunk, or feet to attempt to lift sick, dying, or dead individuals.[132] Although they do not give up trying to lift or elicit movement from a dead body immediately, elephants appear to realize that once dead, the carcass can no longer be helped; they then engage in "mournful" or "grief-stricken" behavior, such as standing guard over the body with a dejected demeanor and protecting it from predators.[133]

63. Wild African elephants have been observed to cover the bodies of their dead with dirt and vegetation.[134] Mothers who lose a calf may remain with the calf's body for an extended period, but do not behave towards the body as they would a live calf.[135] Indeed, the general demeanor of elephants attending to a dead elephant is one of grief and compassion, with slow movements and few vocalizations.[136] These behaviors are akin to human responses to the death of a close relative or friend and demonstrate that elephants possess some understanding of life and the permanence of death.[137]

64. Elephants' interest in the bodies, carcasses and bones of elephants who have passed is so marked that when one has died, trails to the site of death become worn into the ground by the repeated visits of many elephants over days, weeks, months, even years.[138] The accumulation of dung around the site attests to the extended time that visiting elephants spend

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[132] Bates & Byrne Decl. ¶ 39; McComb Decl. ¶ 33; Poole Decl. ¶ 31; Moss Decl. ¶ 27.

[133] Bates & Byrne Decl. ¶ 39; McComb Decl. ¶ 33; Poole Decl. ¶ 31; Moss Decl. ¶ 27.

[134] Bates & Byrne Decl. ¶ 39; McComb Decl. ¶ 33; Poole Decl. ¶ 31; Moss Decl. ¶ 27.

[135] Bates & Byrne Decl. ¶ 39; McComb Decl. ¶ 33; Poole Decl. ¶ 31; Moss Decl. ¶ 27.

[136] Bates & Byrne Decl. ¶ 39; McComb Decl. ¶ 33; Poole Decl. ¶ 31; Moss Decl. ¶ 27.

[137] Bates & Byrne Decl. ¶ 39; McComb Decl. ¶ 33; Poole Decl. ¶ 31; Moss Decl. ¶ 27.

[138] Poole Decl. ¶ 31.

touching and contemplating the bones.[139] Dr. Poole observed that, over years, the bones may become scattered over tens or hundreds of square meters as elephants pick up the bones and carry them away.[140] The tusks are of particular interest and may be carried and deposited many hundreds of meters from the site of death.[141]

65. The capacity for mentally representing the self as an individual entity has been linked to general empathic abilities.[142] Empathy is defined as identifying with and understanding another's experiences or feelings by relating personally to their situation.[143] Empathy is an important component of human consciousness and autonomy and is a cornerstone of normal social interaction.[144] It requires modeling the emotional states and desired goals that influence others' behavior, both in the past and future, and using this information to plan one's own actions; empathy is only possible if one can adopt or imagine another's perspective and attribute emotions to that other individual.[145] Thus, empathy is a component of the "theory of mind."[146]

66. Elephants frequently display empathy in the form of protection, comfort, and consolation, as well as by actively helping those in difficulty, such as assisting injured individuals to stand and walk or helping calves out of rivers or ditches with steep banks.[147]

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[139] Poole Decl. ¶ 31.

[140] Poole Decl. ¶ 31.

[141] Poole Decl. ¶ 31.

[142] Bates & Byrne Decl. ¶ 40; McComb Decl. ¶ 34; Poole Decl. ¶ 32; Moss Decl. ¶ 28.

[143] Bates & Byrne Decl. ¶ 40; McComb Decl. ¶ 34; Poole Decl. ¶ 32; Moss Decl. ¶ 28.

[144] Bates & Byrne Decl. ¶ 40; McComb Decl. ¶ 34; Poole Decl. ¶ 32; Moss Decl. ¶ 28.

[145] Bates & Byrne Decl. ¶ 40; McComb Decl. ¶ 34; Poole Decl. ¶ 32; Moss Decl. ¶ 28.

[146] Bates & Byrne Decl. ¶ 40; McComb Decl. ¶ 34; Poole Decl. ¶ 32; Moss Decl. ¶ 28.

[147] Bates & Byrne Decl. ¶ 41; McComb Decl. ¶ 35; Poole Decl. ¶ 33; Moss Decl. ¶ 29.

Elephants have been seen to react when anticipating the pain of others by wincing when a nearby elephant stretched her trunk toward a live wire and have been observed feeding those unable to use their own trunks to eat and attempting to feed those who have just died.[148]

67. In an analysis of behavioral data collected from wild African elephants over a 40-year continuous field study, Dr. Lucy Bates and colleagues concluded that, as well as possessing their own intentions, elephants can diagnose animacy and goal-directedness in others, understand the physical competence and emotional state of others, and attribute goals and mental states (intentions) to others.[149] This is borne out by examples such as:

> IB's family is crossing a river. The infant struggles to climb out of the bank after its mother. An adult female [not the mother] is standing next to the calf and moves closer as the infant struggles. The female does not push the calf out with its trunk but digs her tusks into the mud behind the calf's front right leg which acts to provide some anchorage for the calf, who then scrambles up and out and rejoins the mother. At 11.10ish Ella gives a "let's go" rumble as she moves further down the swamp . . . At 11.19 Ella goes into the swamp. The entire group is in the swamp except for Elspeth and her calf [<1 year] and Eudora [Elspeth's mother]. At 11.25 Eudora appears to "lead" Elspeth and the calf to a good place to enter the swamp—the only place where there is no mud.150

68. In addition to the examples analyzed in Bates et al., Dr. Poole observed two adult females rush to the side of a third female who had just given birth, back into her, and press their bodies to her in what appeared to be a spontaneous attempt to prevent injury to the newborn.[151] In describing the situation, Dr. Poole wrote:

> The elephants' sounds [relating to the birth] also attracted the attention of several males including young and inexperienced,

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[148] Bates & Byrne Decl. ¶ 41; McComb Decl. ¶ 35; Poole Decl. ¶ 33; Moss Decl. ¶ 29.

[149] Bates & Byrne Decl. ¶ 42; McComb Decl. ¶ 36; Poole Decl. ¶ 34; Moss Decl. ¶ 30.

[150] Bates & Byrne Decl. ¶ 42.

[151] Poole Decl. ¶ 34.

> Ramon, who, picking up on the interesting smells of the mother [Ella], mounted her, his clumsy body and feet poised above the newborn. Matriarch Echo and her adult daughter Erin, rushed to Ella's side and, I believe, purposefully backed into her in what appeared to be an attempt to prevent the male from landing on the baby when he dismounted.152

69. Such examples demonstrate that the acting elephant(s) (the adult female in the first example, Eudora in the second, and Erin and Echo in the third) were able to understand the intentions or situation of the other (the calf in the first case, Elspeth in the second, Ella's newborn and the male in the third), and could adjust their own behavior to counteract the problem being faced by the other.[153]

70. In raw footage filmed in the Massai Mara of Kenya by Dr. Poole's brother, an "allo-mother" (an elephant who cares for an infant and is not the infant's mother or father) moves a log from under the head of an infant in what appears to be an effort to make him more comfortable.[154] In a further example of the ability to understand the goal-directedness of others, elephants appear to understand that vehicles drive on roads or tracks and they further appear to know where these tracks lead.[155] In the Gorongosa National Park of Mozambique, where elephants exhibit a culture of aggression toward humans, charging, chasing, and attacking vehicles, adult females anticipate the direction the vehicle will go and attempt to cut it off by taking shortcuts *before* the vehicle has begun to turn.[156]

71. Empathic behavior begins early in elephants. In humans, rudimentary sympathy for others in distress has been recorded in infants as young as 10 months old; young elephants

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[152] Poole Decl. ¶ 34.

[153] Bates & Byrne Decl. ¶ 42; McComb Decl. ¶ 36; Poole Decl. ¶ 34; Moss Decl. ¶ 30.

[154] Poole Decl. ¶ 34.

[155] Poole Decl. ¶ 34.

[156] Poole Decl. ¶ 34.

similarly exhibit sympathetic behavior.[157] For example, during fieldwork in the Maasai Mara in 2011, Dr. Poole filmed a mother elephant using her trunk to assist her one-year-old female calf up a steep bank. Once the calf was safely up the bank, the calf turned around to face her five-year-old sister, who was also having difficulties getting up the bank. As the older calf struggled to clamber up the bank the younger calf approached her and first touched her mouth (a gesture of reassurance among family members) and then reached her trunk out to touch the leg that had been having difficulty. Only when her sibling was safely up the bank did the calf turn to follow her mother.[158]

72. Captive African elephants attribute intentions to others, as they follow and understand human pointing gestures.[159] The elephants understood that the human experimenter was pointing to communicate information to them about the location of a hidden object.[160] Attributing intentions and understanding another's reference point is central to both empathy and "theory of mind."[161]

73. There is evidence of "natural pedagogy," or true teaching—whereby a teacher considers the immediate knowledge of the learner as she passes on relevant information—in elephants. Dr. Bates, Dr. Byrne, and Dr. Moss's analysis of simulated "oestrus behaviours"[162] in

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[157] Poole Decl. ¶ 34.

[158] Poole Decl. ¶ 34.

[159] Bates & Byrne Decl. ¶ 43; McComb Decl. ¶ 37; Poole Decl. ¶ 35; Moss Decl. ¶ 31.

[160] Bates & Byrne Decl. ¶ 43; McComb Decl. ¶ 37; Poole Decl. ¶ 35; Moss Decl. ¶ 31.

[161] Bates & Byrne Decl. ¶ 43; McComb Decl. ¶ 37; Poole Decl. ¶ 35; Moss Decl. ¶ 31.

[162] Bates & Byrne Decl. ¶ 44 ("Ostension is the way that we can 'mark' our communications to show people that is what they are. If you do something that another copies, that's imitation; but if you deliberately indicate what you are doing to be helpful, that's 'ostensive' teaching. Similarly, we may 'mark' a joke, hidden in seemingly innocent words; or 'mark' our words as directed towards someone specific by catching their eye. Ostension implies that the signaler knows what they are doing.").

African elephants—whereby a non-cycling, sexually experienced older female will simulate the visual signals of being sexually receptive even though she is not ready to mate or breed again—demonstrates that these knowledgeable females can adopt false "oestrus behaviours" to show naïve young females how to attract and respond appropriately to suitable males.[163] The experienced females may be taking the youngster's lack of knowledge into account and actively showing them what to do—a possible example of true teaching as it is defined in humans.[164] This evidence, coupled with the data showing they understand the ostensive cues in human pointing, suggests that elephants understand the intentions and knowledge states (minds) of others.[165]

74. Coalitions and cooperation have been frequently documented in wild African elephants, particularly to defend family members or close allies from (potential) attacks by outsiders, such as when one family group tries to "kidnap" a calf from an unrelated family.[166] These behaviors are generally preceded by gestural and vocal signals, typically given by the matriarch, and acted upon by family members, and are based on one elephant understanding the emotions and goals of a coalition partner.[167]

75. Cooperation is evident in captive Asian elephants, who demonstrate they can work together in pairs to obtain a reward, but also understand the pointlessness of attempting the task if their partner was not present or could not access the equipment.[168] Problem-solving and working together to achieve a collectively desired outcome involve mentally representing both

[163] Bates & Byrne Decl. ¶ 44; McComb Decl. ¶ 38; Poole Decl. ¶ 36; Moss Decl. ¶ 32.

[164] Bates & Byrne Decl. ¶ 44; McComb Decl. ¶ 38; Poole Decl. ¶ 36; Moss Decl. ¶ 32.

[165] Bates & Byrne Decl. ¶ 44; McComb Decl. ¶ 38; Poole Decl. ¶ 36; Moss Decl. ¶ 32.

[166] Bates & Byrne Decl. ¶ 45; McComb Decl. ¶ 39; Poole Decl. ¶ 37; Moss Decl. ¶ 33.

[167] Bates & Byrne Decl. ¶ 45; McComb Decl. ¶ 39; Poole Decl. ¶ 37; Moss Decl. ¶ 33.

[168] Bates & Byrne Decl. ¶ 46; McComb Decl. ¶ 40; Poole Decl. ¶ 38; Moss Decl. ¶ 34.

a goal and the sequence of behaviors that is required to achieve that goal; it is based on (at the very least) short-term action planning.[169]

76. Wild elephants have frequently been observed engaging in such cooperative problem-solving as retrieving calves kidnapped by other groups, helping calves out of steep, muddy river banks, rescuing a calf attacked by a lion (calling to elicit help from others), and navigating through human-dominated landscapes to reach a desired destination such as a habitat, salt-lick, or waterhole.[170] These behaviors demonstrate the purposeful and well-coordinated social system of elephants and show that elephants can collectively hold specific aims in mind, then work together to achieve those goals.[171] Such intentional, goal-directed action forms the foundation of an independent agency, self-determination, and autonomy.[172]

77. Elephants also show innovative problem-solving in experimental tests of insight, defined as the "a-ha" moment when a solution to a problem suddenly becomes clear.[173] A juvenile male Asian elephant demonstrated such a spontaneous action by moving a plastic cube and standing on it to obtain previously out-of-reach food.[174] After solving this problem once, he showed flexibility and generalization of the technique to other similar problems by using the same cube in different situations, or different objects in place of the cube when it was

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[169] Bates & Byrne Decl. ¶ 46; McComb Decl. ¶ 40; Poole Decl. ¶ 38; Moss Decl. ¶ 34.

[170] Bates & Byrne Decl. ¶ 47; McComb Decl. ¶ 41; Poole Decl. ¶ 39; Moss Decl. ¶ 35.

[171] Bates & Byrne Decl. ¶ 47; McComb Decl. ¶ 41; Poole Decl. ¶ 39; Moss Decl. ¶ 35.

[172] Bates & Byrne Decl. ¶ 47; McComb Decl. ¶ 41; Poole Decl. ¶ 39; Moss Decl. ¶ 35.

[173] McComb Decl. ¶ 42; Poole Decl. ¶ 40; Moss Decl. ¶ 36; Bates & Byrne Decl. ¶ 48 ("In cognitive psychology terms, insight is the ability to inspect and manipulate a mental representation of something, even when you can't physically perceive or touch the something at the time. Or more simply, insight is thinking and using only thoughts to solve problems.").

[174] Bates & Byrne Decl. ¶ 48; McComb Decl. ¶ 42; Poole Decl. ¶ 40; Moss Decl. ¶ 36.

unavailable.[175] This experiment demonstrates that elephants can choose an appropriate action and incorporate it into a sequence of behavior to achieve a goal they kept in mind throughout the process.[176]

78. Asian elephants demonstrate the ability to understand goal-directed behavior.[177] When presented with food that was out of reach, but with some bits resting on a tray that could be pulled within reach, elephants learned to pull only those trays baited with food.[178] Success in this kind of "means-end" task demonstrates causal knowledge, which requires understanding not just that two events are associated with each other, but that some mediating force connects and affects the two which may be used to predict and control events.[179] Understanding causation and inferring object relations may be related to understanding psychological causation, which is an appreciation that others are animate beings who generate their own behavior and have mental states (e.g., intentions).[180]

79. Attempts to mitigate or eliminate human-elephant conflicts have been met with mixed success, in large part because elephants are able to respond and find ways around them.[181] For example, when electric fences are erected to keep elephants out of crop fields, elephants have responded to the hazard of electric shocks by handling the 'hot' wire with non-conducting tusks and breaking fences by pushing other elephants into them; both approaches demonstrate

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[175] Bates & Byrne Decl. ¶ 48; McComb Decl. ¶ 42; Poole Decl. ¶ 40; Moss Decl. ¶ 36.

[176] Bates & Byrne Decl. ¶ 48; McComb Decl. ¶ 42; Poole Decl. ¶ 40; Moss Decl. ¶ 36.

[177] Bates & Byrne Decl. ¶ 49; McComb Decl. ¶ 43; Poole Decl. ¶ 41; Moss Decl. ¶ 37.

[178] Bates & Byrne Decl. ¶ 49; McComb Decl. ¶ 43; Poole Decl. ¶ 41; Moss Decl. ¶ 37

[179] Bates & Byrne Decl. ¶ 49; McComb Decl. ¶ 43; Poole Decl. ¶ 41; Moss Decl. ¶ 37.

[180] Bates & Byrne Decl. ¶ 49; McComb Decl. ¶ 43; Poole Decl. ¶ 41; Moss Decl. ¶ 37.

[181] Lindsay Decl. ¶ 29.

their higher cognitive ability and autonomy.[182] The most effective responses to human-elephant conflicts treat elephants as autonomous beings and work with their biological nature to achieve solutions that promote coexistence.[183] It is now increasingly recognized by conservation workers that coexistence can be achieved by humans entering into 'negotiation' with elephants.[184]

B. Zoo captivity is physically and psychologically harmful to elephants.

80. Long-lived, large-brained mammals (like elephants) who possess large, complex brains integral to their intricate sociobehavioral existence cannot function normally in captivity.[185] Given that the brains of large mammals have a lot in common across species, there is no logical reason to believe that the large, complex brains of animals such as elephants would react any differently to a severely stressful environment than does the human brain.[186] Elephants sometimes experience permanent damage to their brains as a result of the trauma endured in impoverished environments.[187]

81. Over 60 years of neuroscience research indicates that an elephant's cerebral cortex is negatively affected by an impoverished environment.[188] These effects include a thinner cerebral cortex, decreased blood supply, smaller neuronal cell bodies with few glial ("helper") cells for metabolic support, decreased dendritic branching for synthesizing information, fewer dendritic spines (indicating fewer connections with other neurons), and smaller, less efficient

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[182] Lindsay Decl. ¶ 31.

[183] Lindsay Decl. ¶ 29.

[184] Lindsay Decl. ¶ 33.

[185] Jacobs Decl. ¶ 19.

[186] Jacobs Decl. ¶ 18.

[187] Jacobs Decl. ¶ 19.

[188] Jacobs Decl. ¶ 13.

synapses.[189] Additional studies reveal similar epigenetic-related deficiencies at the molecular and neurochemical level throughout the brain.[190]. These changes at the cortical level are associated with deficits in an animal's emotional and cognitive functioning.[191]

82. A crucial component to an enriched environment is exercise, which increases the supply of oxygenated blood to the brain and enhances cognitive abilities through a series of complex biochemical cascades.[192] Large, captive mammals are severely deprived of the exercise component of enrichment, particularly when one realizes that elephants in the wild travel tens of kilometers a day (sometimes more than 100 kilometers).[193] Captive/impoverished elephants possess cortical neurons that are "less complex, receive less metabolic support, and process information less efficiently than cortical neurons from animals in an enriched, more natural environment."[194]

83. Other areas of the elephant brain that are negatively affected by the chronic frustration, boredom, and stress rampant in captive/impoverished environments are two subcortical (beneath the cortex) brain structures known as the (1) hippocampus, which is involved primarily in declarative (i.e., facts and events) and spatial memory formation, and the (2) amygdala, which is involved in emotional processing.[195] Prolonged stress results in chronically elevated levels of glucocorticoids (i.e., stress hormones).[196]Chronic exposure to

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[189] Jacobs Decl. ¶ 13.

[190] Jacobs Decl. ¶ 13.

[191] Jacobs Decl. ¶ 13.

[192] Jacobs Decl. ¶ 14.

[193] Jacobs Decl. ¶ 14

[194] Jacobs Decl. ¶ 14

[195] Jacobs Decl. ¶ 15.

[196] Jacobs Decl. ¶ 15.

glucocorticoids contributes to wide-ranging neurodegeneration, including neuronal damage/death in the hippocampus resulting in memory deficits, and in the amygdala, emotional processing deficits.[197]

84. In a natural environment, the body's stress-response system is designed for "quick activation" to escape dangerous situations; in captivity, where animals have a near total lack of control over their environment, there is no escape.[198] This captivity-induced stress often fosters learned helplessness and conditioned defeat.[199] The stress that humans experience under similar conditions is associated with a variety of neuropsychiatric diseases such as anxiety/mood disorders, including major depression and post-traumatic stress disorder.[200] One neural consequence under such conditions is microglia activation and a sustained release of inflammatory mediators, which contributes to physiological, behavioral, affective, and cognitive disorders.[201]

85. Captivity and the psychological stress it engenders also have negative effects on the complex circuitry between the basal ganglia and cerebral cortex.[202] The basal ganglia select and orchestrate appropriate cortical activity for a given situation, including the two pathways involved in movement: the direct pathway and the indirect pathway.[203] Normal movement depends on a delicate balance between these two pathways, and stress can result in stereotypic

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[197] Jacobs Decl. ¶ 15.

[198] Jacobs Decl. ¶ 15.

[199] Jacobs Decl. ¶ 16.

[200] Jacobs Decl. ¶ 16.

[201] Jacobs Decl. ¶ 16.

[202] Jacobs Decl. ¶ 17.

[203] Jacobs Decl. ¶ 17.

behavior, which is invariably associated with an imbalance in the direct/indirect pathways.[204] Behavioral stereotypies may represent a coping strategy to mitigate the overwhelming effects of psychological stress.[205]

86. Stereotypies are common human and non-human responses to chronic stress.[206] Children with a history of early institutional care are more likely to exhibit stereotypies, underscoring the influential role of the environment during early development.[207] In nonhuman animals, such behavioral stereotypies are seldom if ever observed in nature but have been consistently documented in many captive animals.[208] As long as elephants have been studied in their natural habitats there has never been a recorded case of an elephant exhibiting such stereotypies, which reflects underlying disruptions of neural mechanisms in captive/impoverished elephants;[209] studies have found that up to 85% of zoo elephants exhibit stereotypic behavior.[210] Shockingly, one study of 89 elephants across 39 North American zoos found that stereotypic behavior was the second most common behavior exhibited by the elephants, accounting for 15.5% of their time during the day and 24.8% of their time at night.[211]

87. From a neural perspective, imprisoning elephants and putting them on display is "undeniably cruel."[212] Holding elephants captive and confined "prevents them from engaging in

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[204] Jacobs Decl. ¶ 17.

[205] Jacobs Decl. ¶ 17.

[206] Jacobs Decl. ¶ 18.

[207] Jacobs Decl. ¶ 18

[208] Jacobs Decl. ¶ 18.

[209] Jacobs Decl. ¶ 17.

[210] Pardo Decl. ¶ 94.

[211] Pardo Decl. ¶ 94.

[212] Jacobs Decl. ¶ 19.

normal, autonomous behavior and can result in the development of arthritis, osteoarthritis, osteomyelitis, boredom, and stereotypical behavior."[213] When held in isolation, "elephants become bored, depressed, aggressive, catatonic, and fail to thrive."[214] And "[h]uman caregivers are no substitute for the numerous, complex social relationships and the rich gestural and vocal communication exchanges that occur between free-living elephants."[215] It is now accepted that elephants experience a form of brain damage as a result of chronic boredom and a high prevalence of stress caused by zoo environments.[216]

C. The L.A. Zoo cannot meet Billy and Tina's needs.

88. The L.A. Zoo cannot meet Billy and Tina's physical, emotional, or social needs.[217] Without adequate space, no zoo can suitably manage and care for elephants, and the space available at the L.A. Zoo, and at zoos generally, is grossly inadequate to address and satisfy their needs in these vital areas.[218] As a result, Billy and Tina have no autonomy—almost every aspect of their lives is controlled by zookeepers.[219] Autonomy is an important component of an elephant's well-being, and it cannot be met in a small, confined, externally controlled environment like a zoo.[220] When elephants are confined in small spaces, without autonomy of

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[213] Poole Decl. ¶ 56.

[214] Poole Decl. ¶ 56

[215] Poole Decl. ¶ 56.

[216] Pardo Decl. at ¶ 62.

[217] Poole Decl. ¶ 57.

[218] Poole Decl. ¶ 57.

[219] Poole Decl. ¶ 58.

[220] Poole Decl. ¶ 62.

movement and behavior, and kept in socially deprived conditions, they become dysfunctional, unhealthy, depressed, and aggressive.[221]

89. Active more than 20 hours each day, elephants have evolved to move.[222] Elephants in the wild roam over large areas and move considerable distances each day: for example, in Amboseli, members of the elephant population range over approximately 5,000 sq km, and each elephant and its family have a core area of use encompassing at least 194 sq km.[223] They travel 8 to 20 kilometers a day.[224] Asian elephants have similar home ranges, averaging 350 km for males and 100 to 115 km for females, and have daily movements ranging between 8 and 22 km.[225]

90. In contrast, Billy and Tina's enclosure is 2,632 times smaller than the smallest recorded Asian elephant home ranges in the wild.[226] They have only 3 acres of usable outdoor space, and that area is divided into four small yards ranging from approximately ¼ acre to 1 acre.[227] It is inadequate to provide for sufficient exercise, to promote social interactions, or to allow for sufficient social group sizes to ensure emotional and behavioral development.[228] In such a small area, any natural substrate such as dirt is converted into a hard, compacted surface—and foot diseases, arthritis, weight-related diseases, infertility, heightened aggression, and other

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[221] Poole Decl. ¶ 66.

[222] Poole Decl. ¶ 56.

[223] Poole Decl. ¶ 60.

[224] Poole Decl. ¶ 60.

[225] Poole Decl. ¶ 60.

[226] Pardo Decl. ¶ 115.

[227] Poole Decl. ¶ 61.

[228] Poole Decl. ¶ 68.

neurotic behaviors almost invariably develop.[229] Concrete and compacted ground places great strain on the feet and legs of these multi-ton animals.[230]

91. At least part of the substrate at the L.A. Zoo elephant enclosure appears to be cement, which has been linked to foot and musculoskeletal pathologies in elephants.[231] Billy's medical records indicate he has suffered from chronic foot issues.[232] For 8 months in 2023, Billy was not provided with foot care, leading to his toenails becoming excessively overgrown.[233] Tina's 2024 medical records also indicate she has suffered from an array of foot problems, including as recently as August 2024 (see here: https://bit.ly/3RZcDvM).

92. In a gross violation of Billy's sexual autonomy, he has been repeatedly used for captive breeding purposes, which involves being restrained and having an arm inserted into his anus to induce ejaculation via prostate stimulation.[234] Records show the L.A. Zoo attempted to collect Billy's semen at least 55 times (see here: https://bit.ly/45c1krM). This is in stark contrast to what occurs in the wild, where choice is an important component of sexual behavior for elephants: they are selective about who they mate with, reflecting their status as autonomous individuals.[235] Billy has been forced to "participate" in the L.A. Zoo's unnatural captive breeding program.

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[229] Poole Decl. ¶ 61.

[230] Poole Decl. ¶ 61.

[231] Pardo Decl. ¶ 116.

[232] Pardo Decl. ¶ 116.

[233] Pardo Decl. ¶ 116.

[234] Pardo Decl. ¶ 121.

[235] Pardo Decl. ¶¶ 85, 102.

93. Not surprisingly, Billy and Tina have been observed engaging in extensive stereotypic behavior (see here: https://bit.ly/43b3eX3), such as swaying, rocking, and head-bobbing.[236] These neurotic behaviors are uniquely developed in captivity, and are a coping mechanism for the loneliness, boredom and frustration that characterize zoo life.[237] Stereotypic behavior has never been observed in wild elephants, yet it has been found in up to 85% of zoo elephants.[238] These behaviors are "a direct manifestation of brain damage caused by chronic stress."[239]

D. The only place that can meet Billy and Tina's needs is at an elephant sanctuary, not another zoo.

94. Experts on elephant cognition and behavior agree: Billy and Tina are suffering at the L.A. Zoo, which cannot meet their complex needs, and so the best option for them is to be sent to an elephant sanctuary.[240]

95. Sanctuaries provide orders of magnitude of greater space than zoo exhibits, which in turn allows elephants to exercise their autonomy, develop more healthy social relationships, and to engage in a near-natural movement, foraging, and repertoire of behavior.[241] For example, the largest enclosure at the Elephant Sanctuary in Tennessee is 6.9 km^2, which is several hundred times larger than the largest elephant exhibit in any zoo.[242] Sanctuaries report improved physical

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[236] Pardo Decl. ¶ 117.

[237] Poole Decl. ¶ 66.

[238] Pardo Decl. ¶ 94.

[239] Pardo Decl. ¶ 117.

[240] Poole Decl. ¶ 69; Pardo ¶ 109; Jacobs Decl. ¶ 21; Lindsay Decl. ¶ 43.

[241] Poole Decl. ¶ 69.

[242] Pardo Decl. ¶ 109.

and psychological health in elephants after their arrival, including decreased frequency or extinction in stereotypies, reduced aggression toward keepers, muscle tone gain, and formation of social bonds between elephants with different social histories, including elephants who were abused, traumatized, or solitary for decades.[243]

96. By providing elephants more opportunities for exercise, sanctuaries—because of their vastly larger size compared to zoos—can mitigate many of the detrimental physical effects of zoo captivity.[244] They also give elephants more opportunities for exploration, mental stimulation, and natural foraging behavior due to their much more varied and naturalistic habitats, including grasslands, woodlands, and bodies of water.[245]

97. Indeed, elephants with serious physical or psychological problems in zoos have usually become more normal functioning after being sent to an elephant sanctuary.[246] For example:

- Maggie was considered to be an anti-social, aggressive elephant, and by the time she was moved from the Alaska Zoo to the Performing Animal Welfare Society ("PAWS"), she was in such poor condition she could barely stand. Yet she thrived at PAWS until her death in 2021, and was considered to be PAWS' most social elephant.[247]
- Ruby was transferred from the L.A. Zoo to the Knoxville Zoo in Tennessee, where she did not successfully integrate with the Knoxville elephants. When she

[243] Jacobs Decl. ¶ 20.

[244] Pardo Decl. ¶ 110.

[245] Pardo Decl. ¶ 110.

[246] Poole Decl. ¶ 72.

[247] Poole Decl. ¶ 73.

was moved to PAWS, she integrated easily with the other elephants and became a respected leader of her group.[248]

- Sissy had been transferred four times and had spent a decade and a half alone before being sent to the Houston Zoo, where she was labeled autistic and antisocial. She was returned to her solitary zoo where she killed a person, which resulted in her being moved to the El Paso Zoo where she was beaten because she was a killer elephant. In 2000 she was transferred to The Elephant Sanctuary in Tennessee ("TES"), and within six months she was calm and cooperative, becoming a leader and putting all elephants at ease. In 2000 the United States Department of Agriculture had given Sissy only a year to live; twenty years later she is still going strong.[249]
- Bunny was 47 years old and had spent 40 years alone when she arrived at TES. She had been transferred four times and had only known less than a half-acre exhibit. Within 24 hours of arriving at the sanctuary, she was completely and seamlessly integrated into the group.[250]
- Maia and Guida, the first two elephants at the Global Sanctuary for Elephants Brazil, had lived together for 40 years. For most of these years, Maia was aggressive to Guida, knocking her over, pushing her down, and pinning her to the ground. Within 12 hours of arriving at the sanctuary, the gates were opened up between them, and from that day forward no further aggression was seen.[251]

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[248] Poole Decl. ¶ 74.

[249] Poole Decl. ¶ 75.

[250] Poole Decl. ¶ 76.

[251] Poole Decl. ¶ 77.

98. Relocating Billy and Tina to another zoo is no solution for addressing their physical and psychological needs, but would simply subject them to continued dominion and control, in violation of their autonomy.[252]

99. If Billy and Tina are transferred to the Tulsa Zoo, as intended by Respondents, they will very likely continue to suffer just as they currently suffer at the L.A. Zoo.[253] That the Tulsa Zoo cannot meet the needs of elephants is confirmed by video evidence showing one of the elephants there engaging in stereotypic behavior.[254] The size of the Tulsa Zoo pales in comparison to elephant sanctuaries: in fact, because the Tulsa Zoo already has five elephants, the addition of Billy and Tina would mean the available outdoor space per elephant would be 1.43 acres—less than the amount of space per elephant at the L.A. Zoo.[255] Moreover, the current AZA Asian Elephant Population Analysis & Breeding and Transfer Plan recommends that Billy continue to be used for breeding purposes, and so he will likely be subjected to highly invasive semen collection procedures, further violating his autonomy.[256]

V.

JURISDICTION AND VENUE

100. No previous application for a writ of habeas corpus has been made on behalf of Billy and Tina.

101. Jurisdiction and venue are proper in this Court pursuant to Cal. Const., art. VI, § 10 ("[S]uperior courts . . . have original jurisdiction in habeas corpus proceedings."); Cal. Penal Code § 1508(c) ("A writ of habeas corpus issued by a superior court or a judge thereof may be

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[252] Poole Decl. ¶ 68.

[253] Pardo Decl. ¶ 120.

[254] Pardo Decl. ¶ 120; Poole Decl. ¶ 68.

[255] Pardo Decl. ¶ 118.

[256] Pardo Decl. ¶ 121.

made returnable before the issuing judge or his court."); and Cal. Rules of Court 4.552(a) ("Except as stated in (b), the petition should be heard and resolved in the court in which it is filed.").

VI.

STANDING

102. The NhRP has standing to file the Petition on behalf of Billy and Tina pursuant to Cal. Penal Code § 1474, which reflects habeas corpus standing at common law. Section 1474 was enacted in 1872 and states in relevant part: "Application for the writ is made by petition, signed either by the party for whose relief it is intended, or by some person in his behalf." The 1872 statute is essentially unchanged from Ch. 32 of the Acts of 1850, § 2, which provided that "[a]n application for such writ shall be made by petition, signed either by the party for whose relief it is intended, or by some person in his behalf."

103. The 1850 statute merely enshrined the traditional habeas corpus standing rule at common law—in effect for centuries in English-speaking jurisdictions—that anyone (even a stranger) may seek habeas corpus relief on behalf of an individual deprived of their liberty.[257] See PAUL HALLIDAY, HABEAS CORPUS: FROM ENGLAND TO EMPIRE 45 (2010) ("Anyone could tell a story about someone else to touch off the writ's issuance."); *id.* at 46 ("[A]ny person, regardless of his or her social standing, could tell a story to justify the court's concern that it should learn more about a person's confinement by anyone, anywhere. Who told the story mattered little, if at all."). In fact, English cases "suggest powerfully that neither free nor slave status, nor apparent place of birth, precluded using habeas corpus." *Id*. at 207. "[W]hat modern law would call 'standing' was simply not an issue," as there was an "absence of concern about the legal nature of the detainee using habeas corpus." *Id*. at 208.

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[257] "When California became a State of the Union the common law was adopted and put in force except where superseded by statute." *In re Farley's Estate* (1944) 63 Cal.App.2d 130, 134. Cal. Penal Code § 1474 does not supersede habeas corpus standing at common law.

104. Indeed: "Any person is entitled to institute proceedings to obtain a writ of habeas corpus for the purpose of liberating another from an illegal imprisonment." 11 HALSBURY'S LAWS OF ENGLAND, § 1476, p. 783 (4th ed. 1976); accord JUDITH FARBEY ET AL., THE LAW OF HABEAS CORPUS 237 (3d ed. 2011) ("where a prisoner is being held in circumstances which do not allow for recourse to the courts . . . an application from a third party will be entertained"); ROLLIN C. HURD, A TREATISE ON THE RIGHT OF PERSONAL LIBERTY, AND ON THE WRIT OF HABEAS CORPUS 211-12 (1858) (It "is not necessary that [the application] proceed from [the prisoner]. An agent or friend may make it on behalf of the prisoner . . . no legal relation is required to exist between the prisoner and the person making the application. It may be made by any one."); *Somerset v. Stewart* (K.B. 1772) 1 Lofft. 1 (unrelated third parties received common law writ of habeas corpus on behalf of an enslaved individual imprisoned on a ship).[258]

105. Consistent with Cal. Penal Code § 1474, courts in this state have generally not restricted who may file a habeas corpus petition on another's behalf. See, e.g., *Ex parte The Queen of the Bay* (1850) 1 Cal. 157 (stranger obtained a writ of habeas corpus to bring five

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[258] That unrelated third parties may seek habeas corpus relief for an individual deprived of their liberty is recognized in sister jurisdictions and internationally. See, e.g., *Lemmon v. People* (1860) 20 N.Y. 562 (abolitionist stranger obtained a writ of habeas corpus on behalf of eight slaves); *In re Kirk* (1846) 1 Edm.Sel.Cas. 315 (abolitionist stranger obtained a writ of habeas corpus on behalf of a slave); *Commonwealth v. Taylor* (1841) 44 Mass. 72 (abolitionist stranger obtained a writ of habeas corpus on behalf of a child slave); *Commonwealth v. Aves* (1836) 35 Mass. 193 (abolitionist stranger obtained a writ of habeas corpus on behalf of a child slave); *Truth about Motorways Pty Limited v. Macquarie Infrastructure Investment Management Limited* (2000) HCA 11, 85 (High Court of Australia) (stranger may seek habeas corpus), https://bit.ly/3xjAxc0; *In re Ning Yi-Ching* (1940) 34 Am. J. Int'l 347 (stranger China Campaign Committee obtained a writ of habeas corpus on behalf of four Chinese nationals), https://bit.ly/3JyAyLI; *Boudreau v. Thaw* (Quebec Sup. Ct. 1913) 13 D.L.R. 712 (stranger obtained a writ of habeas corpus), https://bit.ly/3xiATQ9; *Gootoo and Inyokwana* (1891) 35 Sol. Jo. 481 (stranger and member of antislavery society obtained a writ of habeas corpus on behalf of children destined for slavery abroad), https://bit.ly/3uu9Ekl; *Ex Parte West* (Supreme Court of New South Wales 1861) 2 Legge. 1475 (stranger obtained a writ of habeas corpus on behalf of an aboriginal child), https://bit.ly/3uu9Ekl; *Case of Hottentot Venus* (K.B. 1805) 13 East 185, 104 Eng. Rep. 344 (stranger abolitionist society obtained a writ of habeas corpus on behalf of an African woman), https://bit.ly/3KIJsri.

females before the Court, "one of whom was the 'Queen of the Bay,' about fourteen years of age, and the others, who were 'daughters of chiefs'"); *In re Chin Mee Ho* (1903) 140 Cal. 263 (habeas corpus petition filed by a third-party organization to release minor in private detention); *In re Carey* (1922) 57 Cal.App. 297 (unknown person obtained a writ of habeas corpus on behalf of a woman committed to the California Industrial Farm for Women); *In re Hoffman* (1955) 131 Cal.App.2d 758 (attorney for a patient confined at Kimball Sanitarium obtained habeas corpus petition on patient's behalf); *Matter of Archy* (S.F. Cnty. Ct., Mar. 1858) (Freelon, J.), in RUDOLPH M. LAPP, ARCHY LEE: A CALIFORNIA FUGITIVE SLAVE CASE 21 (1969) (Black abolitionist living in San Francisco obtained a writ of habeas corpus on behalf of a fugitive enslaved individual and ultimately obtained the individual's freedom).

106. A caveat to this rule is that a third party cannot obtain a writ of habeas corpus on behalf of a competent individual declining assistance. See, e.g., *In re Borgogna* (1981) 121 Cal.App.3d 937, 947-49 ("Here, Andrew has chosen to stay at Fairview. . . . We conclude from his testimony, as did the trial court, that Andrew is competent to choose to remain at Fairview."); *Ex Parte Landsdown* (K.B. 1804) 5 East 34 (master cannot obtain a writ of habeas corpus on behalf of an apprentice who voluntarily joined the British navy), https://bit.ly/3Kxt0dC; *Ex Parte Child* (1854) 15 C.B. 239 (stranger may not obtain the writ of habeas corpus on behalf of one confined in a "lunatic asylum" if the detainee can seek his own writ), https://bit.ly/377A1TO.

107. This case is distinguishable from *Borgogna*, *Landsdown*, and *Child* because, unlike the individuals in those cases, Billy and Tina are obviously not competent to seek habeas relief themselves. See *In re Hop* (1981) 29 Cal.3d 82, 87 (a third-party public defender had standing to bring a habeas corpus petition on behalf of a developmentally-disabled woman who was placed in a state hospital by her mother). "*Hop* implies, at least in situations where the ward is not clearly competent to speak for himself, others may do so and are fully authorized to be heard." *In re Borgogna*, 121 Cal.App.3d at 946.

108. Courts in New York have explicitly found that NhRP had standing on behalf of nonhuman animals under the state's habeas corpus statute, which is similar to California's.[259] See *The Nonhuman Rights Project v. Breheny* (N.Y. Sup. Ct. 2020) 2020 WL 1670735 *1, *7 ("The NhRP has standing to file the Petition for habeas corpus on behalf of Happy."); *Stanley*, 49 Misc.3d at 756 ("As [CPLR 7002(a)] places no restriction on who may bring a petition for habeas corpus on behalf of the person restrained, and absent any authority for the proposition that the statutory phrase 'one acting on his behalf' is modified by a requirement for obtaining standing by a third party, petitioner has met its burden of demonstrating that it has standing [on behalf of two chimpanzees].").[260]

VII.

PRIMA FACIE CASE FOR RELIEF

A. Habeas corpus has long been used to challenge the unjust confinements of individuals with few or no rights—and that history supports its use for Billy and Tina.

109. Habeas corpus is "'a writ antecedent to statute, ... throwing its root deep into the genius of our common law,'" *Rasul v. Bush* (2004) 542 U.S. 466, 473 (citation omitted), and its use to secure release from unjust confinements became "an integral part of our common-law heritage." *Preiser v. Rodriguez* (1973) 411 U.S. 475, 485.

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[259] Compare Cal. Penal Code § 1474(1) (a petition can be made "by the party for whose relief it is intended, or by *some person in his behalf*") (emphasis added); with CPLR § 7002(a) (habeas petition can be made by "[a] person illegally imprisoned or otherwise restrained in his liberty within the state, or *one acting on his behalf* . . .") (emphasis added)

[260] Of the 13 habeas corpus petitions that NhRP has filed on behalf of nonhuman animals in five states, only three courts concluded that NhRP lacked standing. *Nonhuman Rights Project, Inc. v R.W. Commerford and Sons, Inc.* (2019) 192 Conn.App. 36, 41; *Nonhuman Rights Project, Inc. v R.W. Commerford and Sons, Inc.* (2020) 197 Conn.App. 353, 360; *Nonhuman Rts. Project, Inc. v. Cheyenne Mountain Zoological Soc'y*, 2025 CO 3, ¶ 34, reh'g denied (Feb. 10, 2025). However, all of these decisions were erroneously based on misconceptions of legal personhood and are contrary to the history and nature of habeas corpus.

110. Reverently called the Great Writ, the ancient common-law writ "has been justifiably lauded as the safe-guard and the palladium of our liberties and was considered by the founders of this country as the highest safeguard of liberty." *People v. Villa* (2009) 45 Cal.4th 1063, 1068 (cleaned up) (hereafter *Villa*). Today in California, it continues to serve "as a legal process designed and employed to give summary relief against illegal restraint of personal liberty." *People v. Romero* (1994) 8 Cal.4th 728, 736-37 (hereafter *Romero*).

111. As the California Supreme Court made clear, habeas corpus "'is not now and never has been a static, narrow, formalistic remedy; its scope has grown to achieve its grand purpose—the protection of individuals against erosion of their right to be free from wrongful restraints upon their liberty.'" *Villa*, 45 Cal.4th 1063, 1073 (citation omitted). "The very nature of the writ demands that it be administered with the initiative and flexibility essential to insure that miscarriages of justice within its reach are surfaced and corrected." *In re Brindle* (1979) 91 Cal.App.3d 660, 669–670. There is a reason why the Great Writ's "history is inextricably intertwined with the growth of fundamental rights of personal liberty. For its function has been to provide a prompt and efficacious remedy for whatever society deems to be intolerable restraints." *Fay v. Noia* (1963) 372 U.S. 391, 401–402, *overruled on other grounds by Wainwright v. Sykes* (1977) 433 U.S. 72.

112. Significantly for this case, habeas corpus has long been available to safeguard the liberty of individuals with few or no rights, and its history powerfully supports extending the Great Writ's use here.

113. Enlightened judges have long used habeas corpus "to nudge advances in the law." *Breheny*, 38 N.Y.3d at 589 (Wilson, J., dissenting); see generally id. at 588-602 (discussing the history and use of habeas corpus). "Most fundamentally, the writ was used to grant freedom to slaves, who were considered chattel with no legal rights or existence. . . . Similarly, the writ was used to grant freedom to wives and children, who, though not chattel, had few or no legal rights and legally were under the dominion of husbands and fathers." *Id.* at 589.

114. The famous case of *Somerset v. Stewart* (K.B. 1772) 1 Lofft. 1 "stands as an example of just how powerful the common law writ of habeas corpus could be, not only in protecting—but also expanding—liberty." AMANDA L. TYLER, HABEAS CORPUS: A VERY SHORT INTRODUCTION 27 (2021) (hereafter TYLER). There, Lord Mansfield ordered an enslaved man freed because "[t]he state of slavery is . . . so odious, that nothing can be suffered to support it" under the common law. 1 Lofft. at 19. This landmark decision is part of California law.[261]

115. Other examples throughout history attest to the writ's remarkable liberating potential, including for those whose humanity was routinely diminished. Husbands once held legal dominion over their wives under the doctrine of coverture, which erased women's legal identity and subjected them to violence sanctioned by law. See *Breheny*, 38 N.Y.3d at 595-96 (Wilson, J., dissenting). Yet in the face of laws rendering mistreatment by men lawful, courts employed the writ to free women and children trapped by abusive husbands and fathers. *Id*. at 597-600 (citing examples); see id. 630 (Rivera, J., dissenting) ("When women were legally subservient to their husbands, subject to violence without legal recourse, women could seek relief under the writ in common-law courts, even though, under the dominant patriarchal legal system, they were denied the full rights granted to men and were absolved of certain legal duties.").

116. The Great Writ's history thus "demonstrates that courts have used and should use it to enhance liberty when a captivity is unjust, even when the captor has statutory or common-law rights authorizing such captivities in general." *Id*. at 580 (Wilson, J., dissenting). It is a "proper judicial use of the writ to employ it to challenge conventional laws and norms that have become outmoded or recognized to be of dubious or contested ethical soundness." *Id*. at 602.

117. The fact that this case presents the novel question, not yet decided in California, of whether the Great Writ's protections extend beyond human beings is no reason to deny the

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[261] See Civ. Code, § 22.2 ("The common law of England, so far as it is not repugnant to or inconsistent with the Constitution of the United States, or the Constitution or laws of this State, is the rule of decision in all the courts of this State.").

Petition. The storied history of habeas corpus is a history of the writ's extension to novel situations: "a novel habeas case freed an enslaved person; a novel habeas case removed a woman from the subjugation of her husband; a novel habeas case removed a child from her father's presumptive dominion and transferred her to the custody of another." *Breheny*, 38 N.Y.3d at 584 (Wilson, J., dissenting). Moreover, in California, the writ has been extended "far beyond its common law use." *Ex parte Maro* (Cal. Ct. App. 1952) 248 P.2d 135, 140; see *In re Wessley W.* (1981) 181 Cal.Rptr. 401, 403 (noting that "the decisional law of recent years has expanded the writ's application to persons who are determined to be in constructive custody").[262]

118. Just as habeas corpus applied to humans with few or no rights, so too can it apply to Billy and Tina, as they are autonomous, extraordinarily cognitively complex beings suffering an unjust confinement. Indeed, history should "compel our acknowledgment of the availability of the writ to a nonhuman animal to challenge an alleged unjust confinement." *Breheny*, 38 N.Y.3d at 630 (Rivera, J., dissenting). In the words of Judge Rivera of the New York Court of Appeals,

> If an enslaved human being with no legal personhood, a Native American tribal leader whom the federal government argued could not be considered a person under law, a married woman who could be abused by her husband with impunity, a resident of Puerto Rico who is a United States citizen deprived of full rights because of Puerto Rico's colonial status, and an enemy combatant as defined by the federal government can all seek habeas corpus relief, so can an autonomous nonhuman animal.

Id. at 631 (citations omitted).

B. Courts presented with a habeas petition that states a prima facie case for relief must issue an order to show cause.

119. The California Supreme Court has left no ambiguity as to this state's habeas corpus procedures. See generally *Romero*, 8 Cal.4th 728, 736-42. A habeas proceeding begins

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[262] "[J]urists would do well to recall the period when the writ of habeas corpus earned Blackstone's praise as a 'second *magna carta*,' for that history tells a story of a habeas writ that could bring even the king of England to his knees before the law. It is a writ, in other words, with endless possibilities." TYLER at 124.

"with the filing of a verified petition for a writ of habeas corpus," in which the petition "must allege unlawful restraint, name the person by whom the petitioner is so restrained, and specify the facts on which [the petitioner] bases his [or her] claim that the restraint is unlawful." *Id*. at 737 (cleaned up).

120. A court "must first determine whether the petition states a prima facie case for relief-that is, whether it states facts that, if true, entitle the petitioner to relief-and also whether the stated claims are for any reason procedurally barred." *Id*. When a petition states a prima facie case for relief, the court is obligated to issue a writ of habeas corpus or an order to show cause.[263] *Id*. See id. at 740 ("the issuance of the writ (or order to show cause) is mandatory, not optional" if a habeas petition makes a prima facie showing). Only a petition that does not state a prima facie case for relief can be denied outright. *Id*. at 737.

121. In evaluating a petition for sufficiency, "the court takes petitioner's factual allegations as true and makes a preliminary assessment regarding whether the petitioner would be entitled to relief if the petitioner's factual allegations were proved. If so, the court must issue an order to show cause." Cal. Rules of Court 4.551(c)(1).

122. The "issuance of a writ of habeas corpus or an order to show cause is an intermediate but nonetheless vital step in the process of determining whether the court should grant the affirmative relief that the petitioner has requested. The function of the writ or order is to 'institute a proceeding in which issues of fact are to be framed and decided.'" *Romero*, 8 Cal.4th at 740 (citation omitted). In issuing an order to show cause, the court makes "an implicit preliminary determination that petitioner has carried his burden of allegation, that is, that he has

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[263] "Order to show cause" and "writ of habeas corpus" are functionally equivalent, with the only difference being that an order to show cause does not require the detainee to appear in court. *In re Lawler* (1979) 23 Cal.3d 190, 194, holding modified on other grounds *by People v. Duvall* (1995) 9 Cal.4th 464 ("We have previously observed that the order to show cause, although not expressly provided for in the statutes governing the writ, has developed as an appropriate means by which to initiate a hearing and disposition of a petition on behalf of a person in custody without the necessity of bringing the petitioner before the court.").

made a sufficient prima facie statement of specific facts which, if established, entitle him to ... relief." *In re Large* (2007) 41 Cal.4th 538, 549 (cleaned up). This determination "is truly preliminary: it is only initial and tentative, and not final and binding." *Id*. (cleaned up); see Cal. Rules of Court 4.551(c)(3) ("An order to show cause is a determination that the petitioner has made a showing that they may be entitled to relief. It does not grant the relief sought in the petition.").

123. When reviewing a habeas corpus petition, a "court should not reject the petitioner's factual allegations on credibility grounds without first conducting an evidentiary hearing." *People v. Lewis* (2021) 11 Cal.5th 952, 971, as modified on denial of reh'g (Aug. 25, 2021) (cleaned up). Issuance of an order to show cause reflects only a "*preliminary assessment* that the petitioner would be entitled to relief if his factual allegations are proved." *People v. Duvall* (1995) 9 Cal.4th 464, 475. Significantly, a court can issue an order to show cause and later determine that the relief should be denied. See *In re Sassounian* (1995) 9 Cal.4th 535, 547 ("In issuing our order to show cause, we had preliminarily determined that petitioner had carried his burden of allegation as to two claims and two claims alone. . . . We are now of the opinion that petitioner has failed to carry his burden of allegation as to *any* claim.").

124. A court may request an informal response from the respondent prior to issuing an order to show cause, to "assist the court in determining the petition's sufficiency." *Romero*, 8 Cal. 4th at 737. However, an order to show cause triggers the respondent's obligation to file a return, which "must allege facts establishing the legality of the petitioner's custody." *Id.* at 738; see Cal. Rules of Court 4.545(3) ("The 'return' is the respondent's statement of reasons that the court should not grant the relief requested by the petitioner."). The return "becomes the principal pleading," analogous to a civil complaint. *Romero*, 8 Cal. 4th at 739.

125. Following the submission of the return, the petitioner files a traverse (also known as a denial), which "may deny or controvert any of the material facts or matters set forth in the return, or except to the sufficiency thereof, or allege any fact to show either that his imprisonment

or detention is unlawful, or that he is entitled to his discharge." *Id*. (quoting Cal. Penal Code § 1484). The court then determines, at the merits stage, whether it can grant or deny relief based on the undisputed facts, and "should order an evidentiary hearing" if entitlement to relief would hinge on the resolution of factual disputes. *Id*.

C. This Court must issue an order to show cause because the Petition states a prima facie case that Billy and Tina are entitled to relief—i.e., release to an accredited elephant sanctuary.

1. At this preliminary stage, this Court need only assume, without deciding, that Billy and Tina could have the common law right to bodily liberty protected by habeas corpus.

126. In keeping with the Great Writ's history of reaching individuals with few or no rights—and its celebrated status as a palladium of liberty—this Court need only assume, without deciding, that Billy and Tina could possess the right to bodily liberty for purposes of issuing an order to show cause. Whether the Court will ultimately recognize their right is a matter that must be decided at the merits stage of the inquiry.

127. As detailed above, "the writ has long been available to those whose humanity was never fully recognized by law," notwithstanding "our country's tortured history of oppression and subjugation based on race, gender, culture, national origin, and citizenship." *Breheny*, 38 N.Y.3d at 630. (Rivera, J., dissenting). Habeas corpus has been "invoked on behalf of chattel (enslaved persons) or persons with negligible rights and no independent legal existence (women and children)." *Id.* at 602 (Wilson, J., dissenting).

128. In the landmark *Somerset* case, which freed an enslaved human and is part of California law, Lord Mansfield did not dismiss the petition on the basis that Somerset had no recognized common law right to bodily liberty. Instead, Lord Mansfield issued a writ of habeas corpus requiring the slaveholder to justify Somerset's imprisonment—implicitly assuming that Somerset could have this right—and after issuing the writ, proceeded to evaluate the imprisonment under the common law. Habeas corpus scholar Paul Halliday explained that the most significant aspect of *Somerset* was "not the result, but that it was a case at all":

> [T]he fact of the writ's issuance was of the first importance. King's Bench issued the writ by reasoning not from precedents, but from the writ's central premise: that it exists to empower the justices to examine detention in all forms. If the justices had any doubts about the propriety of doing so for a slave, they could look back to more than a century of novel uses found for the writ by the same process of reasoning that radiated from this core proposition.

PAUL D. HALLIDAY, HABEAS CORPUS: FROM ENGLAND TO EMPIRE 176 (2010).

129. Issuing a writ of habeas corpus or an order to show cause is simply a precondition for allowing the case to proceed to the merits, not a determination that relief will ultimately be granted. For example, in *In re Perkins* (1852) 2 Cal. 424, 429, the California Supreme Court issued a writ of habeas corpus on behalf of three enslaved persons brought to California from out of state, although it subsequently determined they were not entitled to their freedom. In *In re Kirk* (N.Y. Sup. Ct. 1846) 1 Edm.Sel.Cas. 315, 332, the court recognized its duty to issue the writ for an enslaved child: "I was bound to allow the writ of habeas corpus, even if I had been fully convinced of the legality of the imprisonment; and . . . it becomes my duty to consider and decide it--a duty from which I am not at liberty to shrink." The court added: "I approach this with all the caution becoming the gravity of the case, yet with a lively sense of what is due to personal liberty . . . ." *Id*. at 335.

130. More recently, courts in New York have issued habeas orders for nonhuman animals, even though they were constrained by precedent from granting relief.

131. In 2015, NhRP secured the first order to show cause for nonhuman animals, two chimpanzees imprisoned as research subjects in a state university: "Given the important questions raised here, I signed petitioner's order to show cause, and was mindful of petitioner's assertion that 'the court need not make an initial judicial determination that Hercules and Leo are persons in order to issue the writ and show cause order.'" *Stanley*, 49 Misc.3d at 748. At the merits hearing, Justice Barbara Jaffe noted the adaptability of habeas corpus and asked: "Isn't it

incumbent on the judiciary to at least consider whether a class of beings might be granted a right or something short of the right under the habeas corpus law?"[264]

132. In 2018, NhRP secured the first order to show cause for an elephant imprisoned at a zoo.[265] Following a transfer of venue and a hearing held over multiple days, a trial court found that NhRP advanced "extremely persuasive" arguments for transferring the elephant Happy to an elephant sanctuary. *The Nonhuman Rights Project v. Breheny* (N.Y. Sup. Ct. 2020) 2020 WL 1670735 at *10. Stating it was "[r]egrettably" bound by precedent to deny relief, *id*. at *9, the court went out of its way to recognize "Happy's plight," and that "Happy is more than just a legal thing, or property," but "an intelligent, autonomous being who should be treated with respect and dignity, and who may be entitled to liberty." *Id*. at *10.

133. Accordingly, consistent with the history and nature of the Great Writ, and as supported by *Somerset* and subsequent habeas precedent, this Court need not decide at this preliminary stage whether Billy and Tina have the common law right to bodily liberty protected by habeas corpus. It need only assume, without deciding, that they could have this right. As discussed below (*infra* § VIII), recognition of this right is supported by compelling considerations—including advances in science, evolving social norms, the demands of justice, and the fundamental principles of liberty and equality.

134. Moreover, for the same reason, this Court need not decide at this preliminary stage whether the term "person" in California's habeas corpus statute (Cal. Pen. Code 1474 (a)) encompasses Billy and Tina. As explained below (*infra* § VIII.A), a "person" is the consequence of being a rightsholder. Whether Billy and Tina are "persons" will depend on whether they have the common law right to bodily liberty protected by habeas corpus—a determination that must

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[264] James McKinley Jr., *Arguing in Court Whether 2 Chimps Have the Right to 'Bodily Liberty'*, N.Y. TIMES (May 27, 2015), https://bit.ly/3umXQlO.

[265] Debra Cassens Weiss, *Judge takes first step to decide whether Happy the elephant should be released from Bronx Zoo*, ABA J. (Nov. 20, 2018), https://bit.ly/3EnKSVv.

be based on a common law analysis. If Billy and Tina are ultimately recognized to have this right, they will necessarily be "persons" for purposes of habeas corpus.

2. The Petition establishes a prima facie case that Billy and Tina are being unlawfully confined—that is, confined in violation of their common law right to bodily liberty protected by habeas corpus.

135. As demonstrated by the Expert Declarations (*supra* § IV), Billy and Tina are autonomous, extraordinarily cognitively complex beings who are suffering immensely at the L.A. Zoo. Held in an unnatural environment, deprived of the ability to travel, forage, communicate, socialize, plan, live, and thrive as elephants should—in other words, to be autonomous—they are not living a life that is anything close to acceptable for an elephant. Their lives are nothing but a succession of boring and frustrating days, damaging to their minds and bodies, and punctuated only by interactions with their keepers, who are no substitute for elephant companionship. As documented in videos (see here: https://bit.ly/43b3eX3), Billy and Tina have been observed engaging in stereotypic behavior, which is "a coping mechanism for the loneliness, boredom and frustration that characterizes zoo life, and is among the neurotic behaviors that are uniquely developed in captivity." Poole Decl. ¶ 66. Notably, such behavior has never been observed in wild elephants. *Id*. Caused by chronic stress, stereotypies "reflect underlying (abnormal) disruption of neural mechanisms"—they are "a form of brain damage." Jacobs Decl. ¶ 17.

136. Zoo captivity simply cannot meet the complex physical, psychological, and social needs of elephants. When confined in small spaces, "without autonomy of movement and behavior, and kept in socially deprived conditions, elephants become dysfunctional, unhealthy, depressed, and aggressive." Poole Decl. ¶ 66. The only just and appropriate remedy for the grave harms inflicted upon Billy and Tina is to release them to an accredited elephant sanctuary, where they will be able to exercise their autonomy to the greatest extent possible.

137. Taking the Petition's factual allegations as true, as this Court must do, the Petition states a prima facie case that Billy and Tina are being unlawfully imprisoned at the Los

Angeles Zoo, entitling them to release to an accredited elephant sanctuary. Their imprisonment is unlawful because it violates their common law right to bodily liberty protected by habeas corpus—depriving them of their ability to meaningfully exercise their autonomy and extraordinary cognitive complexity, including the freedom to choose where to go, what to do, and with whom to be.

138. In a 2012 lawsuit concerning the L.A. Zoo's mistreatment of Billy and Tina (and a third elephant named Jewel, who died in 2023), the Superior Court of Los Angeles found, following a trial, that the Zoo "is not a happy place for elephants, nor is it for members of the public who go to the zoo and recognize that the elephants are neither thriving, happy, nor content." *Leider v. Lewis* (L.A. Cnty. Sup. Ct. July 23, 2012), Case No. BC375234 at 30, https://bit.ly/3KRQfln. The evidence showed that life for Billy and Tina was empty, purposeless, boring, and occasionally painful." *Id.* at 45. It still is.

139. In a similar habeas corpus case brought by NhRP on behalf of Happy (an elephant imprisoned at the Bronx Zoo), now-Chief Judge Rowan Wilson of the New York Court of Appeals found that Happy made a prima facie showing entitling her to release to an accredited elephant sanctuary, after "taking the information Happy has submitted as true, and granting every possible reasonable inference in her favor." See *Breheny*, 38 N.Y.3d at 618 (Wilson, J., dissenting). Judge Wilson considered two questions: (1) "'what does the information submitted by the petitioner [Happy] tell us about the petitioner?'" and (2) "'what does the information submitted by the petitioner tell us about the confinement?'" *Id.* at 621-22.

140. Regarding the first question, Judge Wilson found, based on the expert affidavits submitted on Happy's behalf, that "Happy and elephants like her 'possess complex cognitive abilities' of a great number:"

> Among those myriad qualities and abilities include "autonomy; empathy; self-awareness; self-determination; theory of mind (awareness that others have; insight; working memory; [and] an extensive long-term memory that allows them to accumulate social knowledge." They are able to "act intentionally and in a goal-oriented manner," "understand the physical competence and

> emotional state of others," "engage in true teaching," "cooperate and build coalitions," engage in "cooperative" and "innovative problem-solving," "understand causation," and engage in "intentional communication." They have "complex learning and categorization abilities," and they understand death, practicing grieving behaviors that "are akin to human responses to the death of a close relative or friend" when they have lost a companion.

Id. 618-19. These qualities, Judge Wilson recognized, "suggest Happy has a level of autonomy, intelligence and understanding that could make suffering particularly acute." *Id*. at 619.

141. Regarding the second question, Judge Wilson evaluated the nature of Happy's confinement, accepting as true the expert evidence that "elephants are [a] 'social species who suffer immensely when confined in small spaces and deprived of social contact with other members of their species.'" *Id*. at 619. He drew the "favorable inference" that Happy's habitation at the Bronx Zoo—which is "a miniscule fraction of the size of elephants' typical environments" in the wild—"is causing her deep physical and emotional suffering because it is so unnaturally different from conditions that meet the needs of elephants." *Id*. 619-620.

142. Thus, Judge Wilson concluded that Happy was entitled to a merits hearing on her habeas petition: "[H]as Happy made a prima facie showing of possible unjust confinement that grants her a full hearing to decide the merits of her habeas petition? She has. If we accept all of the information as true, Happy is a being with highly complex cognitive, social and emotional abilities. She has self-awareness, social needs and empathy. She also comes from a wild, highly social species whose bodies and minds are accustomed to traversing long distances to connect with others and to find food. Happy has established a prima facie case that her confinement at the Bronx Zoo stunts her needs in ways that cause suffering so great as to be deemed unjust." *Id*. at 620.

143. In her separate dissent in Happy's case, Judge Jenny Rivera also understood that "[w]hether the writ should issue turns on both the individual captive and the relief sought." *Id*. at 634 (Rivera, J., dissenting). Based on the "submitted affidavits from several internationally renowned elephant experts to establish Happy's autonomy and the inherent harm of her captivity

in the Zoo," Judge Rivera concluded that NhRP "made the case for Happy's release and transfer to an elephant sanctuary, and the writ should therefore be granted." *Id*. In other words, "the writ should issue because Happy's confinement at the Zoo was a violation of her right to bodily liberty as an autonomous being, regardless of the care she was receiving." *Id*. at 637. "She is held in an environment that is unnatural to her and that does not allow her to live her life as she was meant to: as a self-determinative, autonomous elephant in the wild." *Id*. at 642.

144. Accordingly, based on the factual allegations in the Petition, this Court must issue an order to show cause. The Petition states a prima facie case that Billy and Tina are being confined in violation of their common law right to bodily liberty protected by habeas corpus at the L.A. Zoo, where their unnatural existence has deprived them—for decades—of the ability to meaningfully exercise their autonomy and extraordinary cognitive complexity. Zoo captivity simply cannot meet the complex needs of elephants. Billy and Tina are entitled to a merits determination so they can prove they should be released to an accredited elephant sanctuary.

145. Importantly, because the unlawfulness of Billy and Tina's confinement is predicated on the violation of their common law right to bodily liberty, not the violation of any statute, it is irrelevant that Respondents may be in compliance with animal welfare statutes. Such compliance does not render the confinement lawful. The question here is not whether the confinement "violates some statute: historically, the Great Writ of habeas corpus was used to challenge detentions that violated no statutory right and were otherwise legal but, in a given case, unjust." *Breheny*, 38 N.Y.3d at 579 (Wilson, J., dissenting). Instead, the question is "whether the detention of an elephant can ever be so cruel, so antithetical to the essence of an elephant, that the writ of habeas corpus should be made available under the common law." *Id*. As demonstrated in Happy's case, and in this case, zoo confinement is harmful "not because it violates any particular regulation or statute relating to the care of elephants, but because an autonomous creature . . . suffers harm by the mere fact that her bodily liberty has been severely—and unjustifiably—curtailed." *Id*. at 642 (Rivera, J., dissenting).

146. Through the Petition, this Court is presented with a unique opportunity to affirm our own humanity—to recognize that the unjust suffering of Billy and Tina matters, even though they are not members of our species. The Petition should not be denied outright. Not allowing the case to proceed to a merits determination would constitute a "refusal to confront a manifest injustice." *Tommy*,31 N.Y.3d 1054, 1059 (Fahey, J., concurring).[266]

VIII.

BILLY AND TINA'S RIGHT TO BODILY LIBERTY AND ENTITLEMENT TO HABEAS CORPUS RELIEF

A. Upon recognition of Billy and Tina's common law right to bodily liberty protected by habeas corpus, they are necessarily "persons" for purposes of habeas corpus.

147. Cal. Pen. Code § 1473(a) provides: "A person unlawfully imprisoned or restrained of their liberty, under any pretense, may prosecute a writ of habeas corpus to inquire into the cause of the imprisonment or restraint." Following the issuance of an order to show cause, this Court will ultimately need to decide whether the term "person" in this procedural statute encompasses Billy and Tina. Because habeas corpus is a common law writ, the question of whether they may avail themselves of the writ's protections is not a definitional or statutory interpretation question, but a normative question that must be decided under common law principles. "[I]t is for this Court to decide the contours of the writ based on the qualities of the entity held in captivity and the relief sought." *Breheny*, 38 N.Y.3d at 633 (Rivera, J., dissenting).

148. Whether Billy and Tina are "persons" will depend on whether they have the common law right to bodily liberty protected by habeas corpus. If Billy and Tina are ultimately recognized as having that right, they will necessarily be "persons" for purposes of habeas corpus—because rightsholders are, by definition, legal persons.

149. "Person" is a juridical category rather than a biological one. "It is important to disambiguate the concept of the *person* from the concept of the *human*. Despite their colloquial

[266] In deciding whether to issue an order to show cause, this Court has the option to request an informal response from Respondents pursuant to Cal. Rules of Court 4.545(b).

synonymousness, they are distinct legal concepts." Matthew Liebman, *Animal Plaintiffs*, 108 MINN. L. REV. 1707, 1754 (2024).

150. Jurisprudential scholars have explained that "person" is not synonymous with being human, but refers to any entity possessing one or more legal rights. See id. at 1755 ("a legal person is a nonbiological concept that can refer to any entity to whom the law confers rights or from whom the law demands obligations"); *Person*, BLACK'S LAW DICTIONARY (12th ed. 2024) ("a person is any being whom the law regards as capable of rights or duties," and "[a]ny being that is so capable is a person, whether a human being or not") (quoting JOHN SALMOND, JURISPRUDENCE 318 (10th ed. 1947)); Richard Tur, *The "Person" in Law*, *in* PERSONS AND PERSONALITY: A CONTEMPORARY INQUIRY 121-22 (1987) ("[L]egal personality can be given to just about anything. . . . It is an empty slot that can be filled by anything that can have rights or duties.").[267]

151. In short, a "person" is the consequence of being a rightsholder, regardless of whether the rightsholder is human.[268] Because the term denotes the subject of legal rights, "if animals have legal rights, then they are legal persons." *Animal Plaintiffs*, 108 MINN. L. REV. at 1756. And animals certainly can have legal rights. "Indeed, if a corporation—a legal fiction created to benefit some humans—can have constitutional rights protected in our courts, the law can recognize an autonomous animal's right to judicial consideration of their claim to be released from an unjust captivity." *Breheny*, 38 N.Y.3d at 631 (Rivera, J., dissenting).[269]

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[267] See also F.H. Lawson, *The Creative Use of Legal Concepts*, 32 N.Y.U. L. REV. 909, 915 (1957) ("All that is necessary for the existence of a person is that the lawmaker, be he legislator, judge, or jurist, or even the public at large, should decide to treat it as a subject of rights or other legal relations."); IV ROSCOE POUND, JURISPRUDENCE 197 (1959) ("The significant fortune of legal personality is the capacity for rights.").

[268] Theoretically, there is even "no difficulty giving legal rights to a supernatural being and thus making him or her a legal person." JOHN CHIPMAN GRAY, THE NATURE AND SOURCES OF THE LAW 39 (2d ed. 1963).

[269] Importantly, being a "person" for one purpose does not necessarily entail being a "person" for other purposes (e.g., having the right to bodily liberty does not entail having the right to

152. The focus of this Court's substantive inquiry must be on whether Billy and Tina have the right to bodily liberty, which is inherently a normative question: "to whom to grant what rights is a normative determination, one that changes (and has changed) over time." *Id*. at 588 (Wilson, J., dissenting). "Does an intelligent nonhuman animal who thinks and plans and appreciates life as human beings do have the right to the protection of the law against arbitrary cruelties and enforced detentions visited on him or her? This is not merely a definitional question, but a deep dilemma of ethics and policy that demands our attention." *Tommy,* 31 N.Y.3d. at 1058 (Fahey, J., concurring).

153. In other words, in determining whether elephants have a fundamental liberty interest that the Great Writ must protect, this Court should not engage in a formalistic analysis of the term "person" in California's habeas procedural statute. Such an inquiry would fail to do justice to the serious liberty claims at stake. As Judge Fahey explained in NhRP's chimpanzee case:

> The better approach in my view is to ask not whether a chimpanzee fits the definition of a person or whether a chimpanzee has the same rights and duties as a human being, but instead whether he or she has the right to liberty protected by habeas corpus. That question, one of precise moral and legal status, is the one that matters here.

Id. at 1057; see also *Breheny,* 38 N.Y.3d at 582 (Wilson, J., dissenting) (noting that the word "person" in New York's similar habeas statute, CPLR article 70, "was meant to have no substantive component"; "Just as 'person' is used in a juridical sense to refer to any entity, real or fictional, as to which a statute or rule of the common law applies, 'person' in CPLR article 70 is irrelevant to whether the writ can extend beyond humans."); *id*. at 633 (Rivera, J., dissenting)

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vote). See *Byrn v. New York City Health & Hospitals Corp*. (1972) 31 N.Y.2d 194, 200 (while "unborn children" have rights "in narrow legal categories," they "have never been recognized as persons in the law in the whole sense"); 1 ENGLISH PRIVATE LAW § 3.24, 146 (Peter Birks ed. 2000) ("A human being or entity . . . capable of enforcing a particular right, or of owing a particular duty, can properly be described as a person *with that particular capacity*," though not necessarily "a person *with an unlimited set of capacities* . . . .").

("While CPLR article 70 sets forth the *procedure* to seek habeas relief, it does not create the right to bodily liberty nor determine who may seek such relief.").

B. This Court must recognize Billy and Tina's common law right to bodily liberty protected by habeas corpus because they are autonomous, extraordinarily cognitively complex beings.

1. The common law evolves: it must adapt to advances in science, changing social norms, and the demands of justice—considerations that compel the recognition of Billy and Tina's common law right to bodily liberty protected by habeas corpus.

154. California courts are charged with the "responsibility for the upkeep of the common law," and "[t]hat upkeep it needs continuously, as this case demonstrates." *People v. Pierce* (1964) 61 Cal.2d 879, 882. This judicial responsibility "arises from the role of the courts in a common law system." *Rodriguez v. Bethlehem Steel Corp.* (1974) 12 Cal.3d 382, 393 (hereafter *Rodriguez*). Describing the expansive and evolving nature of the common law, the California Supreme Court explained:

> In California as in other jurisdictions of Anglo-American heritage, the common law is not a codification of exact or inflexible rules for human conduct, for the redress of injuries, or for protection against wrongs, but is rather the embodiment of broad and comprehensive unwritten principles, inspired by natural reason and an innate sense of justice, and adopted by common consent for the regulation and government of the affairs of men.

Id. (citation omitted).

155. Courts must "remain alert to their obligation and opportunity to change the common law when reason and equity demand it." *Id*. at 394. Indeed, the common law's inherent capacity "for growth and change is its most significant feature," "constantly expanding and developing in keeping with advancing civilization and the new conditions and progress of society, and adapting itself to the gradual change of trade, commerce, arts, inventions, and the needs of the country." *Id*.

156. The common law is thus not an anachronism. It evolves to accord with the demands of justice, as well as advances in science and changing social norms. See id. ("The

nature of the common law requires that each time a rule of law is applied, it be carefully scrutinized to make sure that the conditions and needs of the times have not so changed as to make further application of it the instrument of injustice.") (citations omitted); *Nestle v. City of Santa Monica* (1972) 6 Cal.3d 920, 924 (The common law must reflect "knowledge as deep as the science and as broad and universal as the culture of their day.") (citation omitted); *Green v. Superior Court* (1974) 10 Cal.3d 616, 640 (It is the "well-established duty of common law courts to reflect contemporary social values and ethics.").

157. These considerations—scientific advances, changing social norms, and the demands of justice—compel the recognition of Billy and Tina's common law right to bodily liberty protected by habeas corpus.

158. At its core, this case is about "whether society's norms have evolved such that elephants . . . should be able to file habeas petitions to challenge unjust confinements." *Breheny*, 38 N.Y.3d at 588 (Wilson, J., dissenting). It "arises within our country's history of evolving norms and knowledge about animals," which provides "essential context for deciding this case." *Id*. 610.

159. "Society's determination as to whether elephants have a right to be free of oppressive confinement . . . is not likely to be the same today as it was 100 years ago." *Id*. "Whether an elephant could have petitioned for habeas corpus in the eighteenth century is a different question from whether an elephant can do so today because we know much more about elephant cognition, social organization, behaviors and needs than we did in past centuries, and our laws and norms have changed in response to our improved knowledge of animals." *Id*. at 603

160. Our changing social norms about wild animals—and elephants in particular—are driven by "our vastly enhanced understanding of their cognitive abilities, needs and suffering when in captivity." *Id*. at 606. "The idea of a habeas petition on behalf of an elephant would have seemed ludicrous" to seventeenth-century philosopher René Descartes, who "saw animals as

inanimate, insentient objects." *Id*. at 609. He thought nonhuman animals were unthinking machines that "'cry without pain . . . desire nothing, fear nothing and know nothing.'" *Id*. (citation omitted). However, "[g]iven what we know today, it would be even more absurd to allow Descartes's views to factor into a decision" in this case, "when human understanding of elephant cognition, social behavior, capabilities and needs demonstrates the absurdity of those ancient, uninformed views." *Id*. "[T]he contrast between what we now know and the paucity of information in earlier times must inform our analysis." *Id*. at 607.

161. Scientific understanding of elephants has advanced considerably over the past 50 years. Today, it is well established that elephants are autonomous, extraordinarily cognitively complex beings who suffer immensely in zoos—in unnatural environments that cannot meet their physical, psychological, and social needs. This knowledge is reflected in the growing recognition that confining elephants is unjust, given the documented horrifying impacts of captivity.[270] Such recognition is highly relevant to whether Billy and Tina should be able to test their confinement by way of habeas corpus, because we know their existence at the L.A. Zoo (or at any zoo) is cruel and incompatible with their well-being. See *Breheny*, 38 N.Y.3d at 607 ("particularly relevant to whether Happy should be able to test her confinement by way of habeas corpus" is scientific information "suggesting that her confinement may be cruel and unsuited to her well-being"); *id*. at 635 (Rivera, J., dissenting) (scientific conclusions on the autonomous nature of elephants were "critical to the merits of [Happy's] habeas petition"); see also *Tommy*, 31 N.Y.3d at 1058 (Fahey, J., concurring) (whether a chimpanzee has the right to bodily liberty

[270] See Emma Marris, *Modern Zoos Are Not Worth the Moral Cost*, N.Y. TIMES (June 11, 2021), https://nyti.ms/33ESIw3 ("Elephants are particularly unhappy in zoos, given their great size, social nature and cognitive complexity. Many suffer from arthritis and other joint problems from standing on hard surfaces; elephants kept alone become desperately lonely; and all zoo elephants suffer mentally from being cooped up in tiny yards while their free-ranging cousins walk up to 50 miles a day. Zoo elephants tend to die young. At least 20 zoos in the United States have already ended their elephant exhibits in part because of ethical concerns about keeping the species captive.").

protected by habeas corpus depends on "our assessment of the intrinsic nature of chimpanzees as a species," based on scientific information regarding their cognitive abilities).

162. Scientific advances, changing social norms, and the demands of justice all make one thing clear: zoo captivity for elephants is "an affront to a civilized society," as it severely curtails the bodily liberty of autonomous beings. *Breheny*, 38 N.Y.3d at 642 (Rivera, J., dissenting). Deprived of a self-determinative life in the wild—all for the purpose of human entertainment—Billy and Tina's decades-long confinement is "inherently unjust and inhumane." *Id*. Every day they remain captive as spectacles for humans, "we, too, are diminished." *Id*. It is time for California common law to evolve and protect the autonomy of these extraordinary beings by recognizing their right to bodily liberty protected by habeas corpus.

2. The fundamental principle of liberty compels the recognition of Billy and Tina's common law right to bodily liberty protected by habeas corpus.

163. Autonomy is a foundational legal concept: it is a supreme and cherished common law value that lies at the heart of the right to bodily liberty. "'Anglo American law starts with the premise of thorough-going self determination.'" *Thor v. Superior Court* (1993) 5 Cal.4th 725, 736 (citation omitted) (hereafter *Thor*). "No right is held more sacred, or is more carefully guarded, by the common law, than the right of every individual to possession and control of his own person . . . . The right to one's person may be said to be a right of complete immunity: to be let alone." *Id*. at 731 (quoting *Union Pac. Ry. Co. v. Botsford* (1891) 141 U.S. 250, 251)).

164. In our system of a free government, "notions of individual autonomy and free choice are cherished." *Rivers v. Katz* (1986) 67 N.Y.2d 485, 493. This is why "the role of the state is to ensure a maximum of individual freedom of choice and conduct." *Thor*, 5 Cal.4th at 740; see id. at 734-35 (recognizing "'the long-standing importance in our Anglo–American legal tradition of personal autonomy and the right of self-determination'") (citation omitted).

165. In California, the protection given to an individual's autonomy under the common law is of such supreme importance that a competent individual may choose to reject

lifesaving medical treatment and die. See id. at 744 ("a competent, informed adult, in the exercise of self-determination and control of bodily integrity, has the right to direct the withholding or withdrawal of life-sustaining medical treatment, even at the risk of death"); *Conservatorship of Wendland* (2001) 26 Cal.4th 519, 531 (*Thor* "held that the common law right of a competent adult to refuse life-sustaining treatment extends even to a state prisoner"); *Cobbs v. Grant* (1972) 8 Cal.3d 229, 242 ("[A] person of adult years and in sound mind has the right, in the exercise of control over his own body, to determine whether or not to submit to lawful medical treatment.").

166. The Great Writ, justifiably lauded as "the safe-guard and the palladium of our liberties," *Villa*, 45 Cal.4th at 1068 (cleaned up), must be used to protect the autonomy of elephants. For habeas corpus "serves to protect against unjust captivity and to safeguard the right to bodily liberty," and "those protections are not the singular possessions of human beings." *Breheny*, 38 N.Y.3d at 632 (Rivera, J., dissenting); see also *Stanley*, Misc. 3d at 753 ("The great writ of habeas corpus lies at the heart of our liberty, and is deeply rooted in our cherished ideas of individual autonomy and free choice.") (cleaned up).

167. Given the supreme importance of protecting autonomy, only one conclusion can be drawn consistent with the foregoing principles: "an autonomous animal has a right to live free of an involuntary captivity imposed by humans, that serves no purpose other than to degrade life." *Breheny*, 38 N.Y.3d at 629 (Rivera, J., dissenting). While elephants, like many humans, may not be capable of certain complex decisions (e.g., whether to refuse medical treatment), they are capable of making decisions relevant to habeas corpus. For example, they can use specific calls and gestures (e.g., Lets-Go-Rumble and Cadenced-Rumble) to discuss with other elephants where they wish to go, and when, and choose what they want to do, and with whom. Poole Decl. ¶ 44. For these extraordinary beings, they possess "a level of autonomy, intelligence and understanding that could make suffering particularly acute." *Breheny*, 38 N.Y.3d at 619 (Wilson, J., dissenting).

168. Accordingly, as a matter of liberty, this Court has a duty to protect Billy and Tina's autonomy by recognizing their right to bodily liberty protected by habeas corpus.

3. The fundamental principle of equality compels the recognition of Billy and Tina's common law right to bodily liberty protected by habeas corpus.

169. "Our whole system of law is predicated on the general fundamental principle of equality of application of the law." *Truax v. Corrigan* (1921) 257 U.S. 312, 332. Indeed, our "'institutions are founded upon the doctrine of equality.'" *Loving v. Virginia* (1967) 388 U.S. 1, 11 (citation omitted).

170. Equality is deeply woven into the fabric of the common law, in addition to being enshrined in state and federal constitutions.[271] See *Isrin v. Super. Ct. of L.A. Cnty.* (1965) 63 Cal.2d 153, 165 ("fundamental notions of equality and fairness" have existed "since the earliest days of the common law"); *Sullivan v. Minneapolis & R. R. Ry. Co.* (1913) 121 Minn. 488, 492 ("the general principle of equality is a principle of the common law"); *James v. Com.* (Pa. 1825) 12 Serg. & Rawle 220, 230 ("the common law . . . stamps freedom and equality upon all who are subject to it"). *Simrall v. City of Covington* (1890) 14 S.W. 369, 370 ("Perhaps the most distinguishing feature of the common law is its regard for the protection and equality of individual right.").

171. Equality embodies the foundational principle that relevantly similar individuals cannot be treated differently for an arbitrary or unjust reason. See, e.g., *People v. Marshall* (1990) 50 Cal.3d 907, 936 ("Of course, principles of equal protection prohibit dissimilar treatment for similarly situated persons."); *Perez v. Lippold* (1948) 32 Cal.2d 711, 714 ("No law within the

[271] While this case is not a constitutional or equal protection case, as it solely concerns the evolution of California common law, constitutional equality principles can and should inform this Court's analysis. It is well established that "constitutional values . . . can enrich the common law." Judith S. Kaye, Forward: *The Common Law and State Constitutional Law as Full Partners in the Protection of Individual Rights*, 23 RUTGERS L. J. 727, 743 (1992). The two-way street that exists between common law and constitutional adjudication can result in "common law decisionmaking infused with constitutional values." *Id.* at 747.

broad areas of state interest may be unreasonably discriminatory or arbitrary."); *De Ayala v. Florida Farm Bureau Cas. Ins. Co.* (Fla. 1989) 543 So.2d 204, 206 ("Under both our federal and state constitutions, as well as our common law heritage, all similarly situated persons are equal before the law.").

172. As demonstrated below, Billy and Tina are relevantly similar to humans for purposes of possessing the right to bodily liberty protected by habeas corpus. Equality thus demands recognizing their right to bodily liberty—because there is no non-arbitrary or just reason to treat them differently from humans concerning this right.

a. Billy and Tina are relevantly similar to humans for purposes of possessing the right to bodily liberty protected by habeas corpus.

173. It is "one of the most basic principles of the common law" that "like cases will be treated alike." *Benavidez v. Sierra Blanca Motors* (1996) 122 N.M. 209, 214. "Injustice . . . can consist in treating unequals equally or [in] treating equals unequally." *Petersen v. Bank of America Corp.* (2014) 232 Cal.App.4th 238, 254. In other words, equality requires similar treatment of relevantly similar individuals, and in California, the state's common law has evolved in accord with this principle.

174. For example, in *Muskopf v. Corning Hospital Dist.* (1961) 55 Cal.2d 211, 213 (hereafter *Muskopf*), the California Supreme Court discarded the rule of governmental immunity as "mistaken and unjust." It observed that the doctrine's exceptions "operate so illogically as to cause serious inequality" by allowing some individuals injured by governmental agencies—but not others—to recover for tort claims, *id*. at 216, and that the doctrine has reached an "illogical and inequitable extreme." *Id*. at 217. The reasoning in *Muskopf* relied "on the unequal treatment afforded similarly situated persons," paralleling "the constitutional principle embodied in our state and federal equal protection clauses." *Brown v. Merlo* (1973) 8 Cal.3d 855, 881.

175. Indeed, California courts have consistently updated the common law when maintaining the status quo would result in inequality. See, e.g., *Emery v. Emery* (1955) 45 Cal.2d

421, 430 (abrogating parental immunity for a willful or malicious tort, as "[a] child, like every other individual, has a right to freedom from such injury."); *Klein v. Klein* (1962) 58 Cal.2d 692, 695-96 (abrogating spousal immunity for intentional and negligent torts, thus treating spouses and non-spouses similarly for tort purposes); *Gibson v. Gibson* (1971) 3 Cal.3d 914, 919-20 (abrogating parental immunity by permitting a minor to sue his parent for negligence, thus treating all minors similarly for negligence purposes).

176. Three judges on New York's highest court understood that autonomous nonhuman animals are relevantly similar to humans for purposes of possessing the right to bodily liberty.

177. In *Tommy*, Judge Fahey explained that "in elevating our species, we should not lower the status of other highly intelligent species." 31 N.Y.3d at 1057 (Fahey, J., concurring). He asked: "Does an intelligent nonhuman animal who thinks and plans and appreciates life as human beings do have the right to the protection of the law against arbitrary cruelties and enforced detentions visited on him or her?" *Id*. at 1058. Suggesting that the answer for chimpanzees is yes, Judge Fahey emphasized the fact that they are "autonomous, intelligent creatures." *Id*. at 1059.

178. In *Breheny*, Judge Wilson emphasized that the evidence demonstrating Happy's unjust confinement at a zoo was "consistent with the kind of showings made by abused women and children and enslaved persons." 38 N.Y.3d at 626 (Wilson, J., dissenting). Similarly, Judge Rivera concluded: "history, logic, justice, and our humanity must lead us to recognize that if humans without full rights and responsibilities under the law may invoke the writ to challenge an unjust denial of freedom, so too may any other autonomous being, regardless of species." *Id*. at 628-29.

179. Habeas corpus is used to protect the autonomy of individuals held in unjust confinement, and the Expert Declarations establish that Billy and Tina suffer from the deprivation of their autonomy caused by their unjust confinement. In these key respects, they are

relevantly similar to humans—and thus relevantly similar for purposes of possessing the right to bodily liberty.

b. There is no non-arbitrary or just reason for treating Billy and Tina differently from humans for purposes of possessing the right to bodily liberty protected by habeas corpus.

180. Equality forbids arbitrary or unjust discrimination. "The grandest principle of our law, rightly termed the safeguard of our liberties and institutions, is that firmly fixed, but sometimes misunderstood, rule against discrimination between persons or classes merely because they are such." *Ex parte Finley* (1905) 1 Cal.App. 198, 205. "[C]lassification must not be arbitrary, nor result from mere caprice or the desire or ability to separate and classify. It must not be based on mere physical characteristics, such as height, weight, complexion, or age, nor on race, nativity, mentality, or other personal attribute[.]" *Id*. at 207.

181. In other words, distinctions between relevantly similar individuals based upon irrelevant characteristics are arbitrary and unjust and thus violate the core principle of equality. See, e.g., *Romer v. Evans* (1996) 517 U.S. 620, 633 (challenged law "identifie[d] persons by a single trait [sexual orientation] and then denie[d] them protection across the board").

182. Common law courts, in California and other states, have rejected the notion that irrelevant characteristics can justify treating relevantly similar individuals differently. For example, in *James v. Marinship Corp.* (1944) 25 Cal.2d 721, 739-40, the Court held that a labor union's denial of membership to Black workers solely based on their race constituted unreasonable discrimination in violation of the common law. Similarly, in *Williams v. International Broth. of Boilermakers, Iron Shipbuilders and Helpers of America* (1946) 27 Cal.2d 586, 591, the Court found that a "union's efforts [were] directed, not toward advancing the legitimate interests of a labor union, but rather against other workers solely on the basis of

race and color," and that "[n]o purpose appropriate to the functions of a labor organization may be found in such discriminatory conduct."[272]

183. Because distinctions between relevantly similar individuals grounded upon irrelevant biological characteristics are arbitrary and unjust, so too are those grounded upon species membership. There is no rational, non-arbitrary reason to exclude autonomous nonhuman animals from the Great Writ's protections. The position that only human biology matters for purposes of possessing the right to bodily liberty not only deeply conflicts with the importance of protecting an individual's autonomy under the common law but also perpetuates an arbitrary and unjust discrimination. This Court must choose the position that harmonizes best with the most essential values and principles embraced by California courts.

184. In *Tommy*, Judge Fahey recognized that given the autonomous nature of chimpanzees, denying them the right to bodily liberty because they are not human is arbitrary and unjust. See 31 N.Y.3d at 1057 (criticizing lower court's conclusion "that a chimpanzee cannot be considered a 'person' and is not entitled to habeas relief" as being "based on nothing more than the premise that a chimpanzee is not a member of the human species"). "To treat a chimpanzee as if he or she had no right to liberty protected by habeas corpus is to regard the chimpanzee as entirely lacking independent worth, as a mere resource for human use, a thing the value of which consists exclusively in its usefulness to others." *Id*. at 1058. "Instead, we should

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[272] See also *Gay Law Students Assn. v. Pacific Tel. & Tel. Co.* (1979) 24 Cal.3d 458, 476 ("Since medieval times, the common law has imposed various obligations upon enterprises that exercise monopoly power to assure that such power is not exerted in an arbitrary or discriminatory manner."); *Millington v. Southeastern Elevator Co.* (1968) 22 N.Y.2d 498, 509 ("terminating an unjust discrimination under New York law" that distinguished wives and husbands, regarding the right to recover loss of consortium, solely upon the irrelevant characteristic of sex); *Ferguson v. Gies* (1890) 82 Mich. 358, 365 ("Any discrimination founded upon the race or color of the citizen is unjust and cruel, and can have no sanction in the law of this state.").

consider whether a chimpanzee is an individual with inherent value who has the right to be treated with respect." *Id.*[273]

185. Embracing species bias—by limiting habeas corpus to humans based on species membership—is rooted in human exceptionalism: the ideology that humans are uniquely special among all biological creatures, and that this uniqueness justifies profound discrepancies under the law.[274] It is a version of might makes right, and "denies and denigrates the human capacity for understanding, empathy, and compassion." *Breheny*, 38 N.Y.3d at 626 (Wilson, J., dissenting). Researchers in the twentieth century "began to discredit the notion of human exceptionalism," when scientists discovered that "animals such as apes, dolphins and elephants—like humans—had substantial capacity to engage in and maintain social relationships, to learn and transpose information, to 'appreciate the thoughts and feelings of other sentient beings, and engage in strategic behavior.'" *Id.* at 606-07 (citation omitted). These advances in scientific understanding made it no longer tenable for humans to regard "themselves as 'unique in their sociality, individuality, and intelligence.'" *Id.* at 606.

186. In the same way, given what science now shows, it is no longer tenable to treat Billy and Tina differently from humans for purposes of possessing the right to bodily liberty protected by habeas corpus—when the sole reason for doing so is their species membership. Such reasoning is arbitrary and unjust, as it regards them as mere resources for human use, lacking inherent value. It ignores the crucial fact that Billy and Tina are autonomous,

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[273] "[I]t is arbitrary to utilize species membership alone as a condition of personhood, and it fails to satisfy the basic requirement of justice that we treat like cases alike. It picks out a single characteristic as one that confers rights without providing any reason for thinking it has any relevance to rights." KRISTIN ANDREWS ET AL., CHIMPANZEE RIGHTS: THE PHILOSOPHERS' BRIEF 34 (2019).

[274] "[H]uman exceptionalism holds that humans possess *a unique moral worth* that endows them alone, among all living creatures, with the right never to be treated merely as means to the ends of others." Angus Taylor, *Review of Wesley J. Smith's A Rat is a Pig is a Dog is a Boy: The Human Cost of the Animal Rights Movement*, BETWEEN THE SPECIES 233 (2010). It is "not a statement of fact, but an assertion of domination." *Id.* at 234.

extraordinarily cognitively complex beings, capable of experiencing severe harms just like humans who are unjustly confined. Accordingly, as a matter of equality, this Court must recognize their right to bodily liberty. Refusing to do so would permit an arbitrary and unjust discrimination to stand.

4. Recognition of Billy and Tina's common law right to bodily protected by habeas corpus is not a matter for the legislature.

187. The California Supreme Court has firmly asserted "the independence of the judicial branch" to "insure the just and rational development of the common law in our state." *Rodriguez*, 12 Cal.3d at 394 (citation omitted). Ensuring this development includes a judicial obligation to steward the common law absent legislative input.[275] *Id.* ("Although the Legislature may of course speak to the subject, in the common law system the primary instruments of this evolution are the courts, adjudicating on a regular basis the rich variety of individual cases brough before them."). Indeed: "We act in the finest common-law tradition when we adapt and alter decisional law to produce common-sense justice. . . . Legislative action there could, of course, be, but we abdicate our own function, in a field peculiarly nonstatutory, when we refuse to reconsider an old and unsatisfactory court-made rule." *Id.* at 397 (quoting *Millington v. Southeastern Elevator Co.* (1968) 22 N.Y.2d 498, 508).

188. California's courts do not hesitate to change outdated common law without waiting for legislative action. The California Supreme Court previously dealt "a major blow to

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[275] This is true in sister jurisdictions as well. See, e.g., *Ueland v. Reynolds Metals Co.* (1984) 103 Wash.2d 131, 136 ("When justice requires, this court does not hesitate to expand the common law and recognize a cause of action. . . . [T]o defer to the Legislature in this instance would be to abdicate our responsibility to reform the common law to meet the evolving standards of justice."); *Albert M. Greenfield & Co. v. Kolea* (1977) 475 Pa. 351, 357 ("'Courts have a duty to reappraise old doctrines in light of the facts and values of contemporary life.'") (citation omitted); *Lum v. Fullaway* (1958) 42 Haw. 500, 510 ("If we follow defendant's argument, the legislature alone may keep up with the times and the courts are but automatons to match the colors provided by previous legislative acts and by established precedents. We do not think that the legislature has become so potent, and the judiciary so atrophied, that we must defer to the former in every situation where the colors do not match.").

the contention that reconsideration of settled common law rules should await action by the Legislature" when it found "no valid reason for continuing the exception of sovereign immunity." *Id.* at 394 (citing *Muskopf*, 55 Cal.2d 211).

189. In other decisions, the Court has "abolished long-standing common law tort rules over the specific objection that the question should have been left for legislative action." *Id.* at 396 (citing multiple examples). For example, "we expressly rejected the contention that any change in the law of contributory negligence was exclusively a matter for the Legislature, and overturned more than a century of precedent." *County Sanitation Dist. No. 2 v. Los Angeles County Employees Assn.* (1985) 38 Cal.3d 564, 584 (citing *Li v. Yellow Cab Co.* (1975) 13 Cal.3d 804, 812). See also *Brown v. Merlo* (1973) 8 Cal.3d 855, 870 (citing *Rowland v. Christian* (1968) 69 Cal.2d 108) (noting *Rowland* "court went to the heart of the matter and exposed the entire business invitee-social guest-trespasser classification scheme as irrational in contemporary society").

190. The common law's evolutionary nature is particularly relevant here because habeas corpus is a common law writ. *Stone v. Powell* (1976) 428 U.S. 465, 475 n.6 ("It is now well established that the phrase 'habeas corpus' used alone refers to the common-law writ of habeas corpus Ad subjiciendum, known as the 'Great Writ.'") (citation omitted). "The Great Writ's use, as a case-by-case tool to probe whether the law may need to adapt, is part of the fundamental role of a common-law court to adapt the law as society evolves." *Breheny*, 38 N.Y.3d at 617 (Wilson, J, dissenting). This means in novel habeas corpus matters, the writ can evolve to suit exigencies not contemplated by its original use. See *Ex parte Maro* (Cal. Ct. App. 1952) 248 P.2d 135, 140 ("California has extended the use of habeas corpus far beyond its [original] common law use.").[276]

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[276] See also *Commonwealth v. Gibbons* (1899) 9 Pa. Super. 527, 533 ("[The Great Writ] may be moulded to suit the exigencies of the particular case.") (citing cases); *id.* at 534 ("[T]he efficacy of the common-law writ of habeas corpus . . . takes many forms, according to the character of the case in which it is applied.").

191. In accordance with the judicial "'responsibility for the upkeep of the common law,'" *Rodriguez*, 12 Cal.3d at 393 (citation omitted), this Court must not deflect its obligation to recognize Billy and Tina's common law right to bodily liberty protected by habeas corpus, even though this is a novel case:

> The judges, Justice Paine among them, who issued writs of habeas corpus freeing enslaved persons, or liberating women and children from households run by abusive men, or ordering the return home of underage soldiers could have said, as the majority does here, "that's a job for the legislature." They could have said, "existing law offers some protections, and we dare not do more." They could have said, "we can't be the first." But they did not. None of those declamations is remotely consistent with our Court's history, role or duty.

Breheny, 38 N.Y.3d at 617 (Wilson, J, dissenting); see also id. at 634 (Rivera, J., dissenting) ("the fundamental right to be free is grounded in the sanctity of the body and the life of autonomous beings and does not require legislative enactment")

192. "[I]t is for this Court to decide the contours of the writ based on the qualities of the entity held in captivity and the relief sought," since "[t]he common law is our bailiwick." *Id.* at 633 (Rivera, J. dissenting). "The difficultly of the task—i.e., determining the reach of a substantive common-law right whose existence pre-dates any legislative enactment on the subject and whose core guarantees are unalterable by the legislature—is no basis to shrink from our judicial obligation by recasting it as the exclusive purview of the legislative branch." *Id.*

C. Billy and Tina are entitled to habeas corpus relief—release to an accredited elephant sanctuary.

1. Billy and Tina's confinement at the L.A. Zoo is unlawful.

193. Billy and Tina's confinement at the L.A. Zoo violates their right to bodily liberty, thereby rendering their confinement unlawful. Remedying the violation of their right entitles them to be released from Respondents' custody. See Cal. Penal Code § 1485 ("If no legal cause

is shown for such imprisonment or restraint, or for the continuation thereof, such Court or Judge must discharge such party from the custody or restraint under which he is held.").

194. The violation of Billy and Tina's right to bodily liberty consists in the deprivation of their autonomy: they are deprived of the ability to make meaningful choices, including the freedom to choose where to go, what to do, and with whom to be. While confined at the L.A. Zoo (or at any zoo), they cannot plan for the future, they cannot properly forage, they cannot travel, they cannot choose with whom to socialize, and they cannot partake in any activities remotely close to acceptable for a member of their species. Billy and Tina have no variety in their lives, no challenge to employ their mental capacity for exploration, spatial memory, or problem-solving, and no opportunity to employ their wide range of vocalizations, to communicate and interact with a range of other elephants over distance. Simply, they cannot act as nature intended—autonomously.

195. The violation of Billy and Tina's right to bodily liberty is further made manifest by the exhibition of stereotypic behavior (see here: https://bit.ly/43b3eX3), behavior that has never been observed in free-living elephants. Pardo Decl. ¶ 94; Jacobs Decl. ¶ 17. Caused by chronic stress, stereotypies "reflect underlying (abnormal) disruption of neural mechanisms"—they are "a form of brain damage." *Id.* Such abnormal behavior is "a coping mechanism for the loneliness, boredom and frustration that characterizes zoo life, and is among the neurotic behaviors that are uniquely developed in captivity." Poole Decl. ¶ 66.

2. Billy and Tina should be released to an elephant sanctuary.

196. That Billy and Tina cannot be released into the streets of Los Angeles does not preclude habeas corpus relief, since this Court has the power to render a disposition as "the justice of the case may require." Cal. Pen. Code § 1484. "In fashioning an appropriate remedy in this case, we must keep in mind [that] habeas corpus is at its core, an equitable remedy." *People v. Booth* (2016) 3 Cal.App.5th 1284, 1312 (cleaned up); see id. ("When habeas relief is warranted, our power is not limited to either discharging the petitioner from, or remanding him

to, custody, but extend[s] to disposing of him as the justice of the case may require.") (cleaned up). The writ's very nature "demands that it be administered with the initiative and flexibility essential to insure that miscarriages of justice within its reach are surfaced and corrected." *In re Brindle* (1979) 91 Cal.App.3d 660, 669–670.

197. In this case, justice requires setting Billy and Tina free to an accredited elephant sanctuary, where they can exercise their autonomy and extraordinary cognitive complexity to the greatest extent possible—and finally have the opportunity to live fulfilling elephant lives. This is the recommendation of leading experts on elephant cognition and behavior. Poole Decl. ¶ 69-71; Jacobs Decl. ¶ 21; Lindsay Decl. ¶ 43; Pardo Decl. ¶ 118. At an elephant sanctuary, the "orders of magnitude of greater space" compared to zoo captivity "permits autonomy and allows elephants to develop more healthy social relationships and to engage in a near natural movement, foraging, and repertoire of behavior." Poole Decl. ¶ 69.

198. Allowing Billy and Tina to be relocated to another zoo—as the L.A. Zoo plans to do—would merely perpetuate the daily violations of their right to bodily liberty, effectively condemning them to a lifetime of suffering. That inhumane outcome would be manifestly unjust.

CONCLUSION

199. Billy and Tina are autonomous, extraordinarily cognitively complex beings suffering at the L.A. Zoo, unable to flourish in an environment that cannot meet their physical, psychological, and social needs. They deserve an opportunity to thrive as elephants. After over half a century in zoo captivity, Billy and Tina are entitled to live in a peaceful environment that will allow them to roam freely on soft grass, wallow in mud and natural bodies of water, and spend time with other elephants if they so desire. Through the remarkable power of the Great Writ, the precious safeguard of liberty, this Court can show empathy and compassion by correcting a grave wrong.

200. While the "nature of injustice is that we may not always see it in our own times," *Obergefell v. Hodges* (2015) 576 U.S. 644, 664, it is this Court's solemn obligation to look for

injustice and correct it. The Court should issue an order to show cause and examine Billy and Tina's entitlement to habeas corpus relief. It will find that they have an interest in liberty that is being wrongly violated every day they remain captive at a zoo, and that release to an accredited elephant sanctuary is the only just and equitable remedy.

PRAYER FOR RELIEF

Petitioner NhRP respectfully requests that this Court:

1. Issue an order to show cause pursuant to Cal. Rules of Court 4.551(c)(1);
2. Order Billy and Tina released from their unlawful confinement at the L.A. Zoo and transferred to an elephant sanctuary accredited by the Global Federation of Animal Sanctuaries;
3. Grant all other relief necessary for the just resolution of this case.

DATED: May 16, 2025

s/ *Christopher Berry*
Christopher A. Berry
Monica L. Miller
NONHUMAN RIGHTS PROJECT

Attorneys for Petitioner

VERIFICATION

I, Christopher Berry, declare as follows:

1. I am an attorney admitted to practice law in the State of California. I am an attorney for Petitioner Nonhuman Rights Project, Inc. on behalf of Billy and Tina and I am authorized to file this petition on their behalf.

2. Billy and Tina are confined at Los Angeles, California, and my office is in Oakland, California. For this reason, and the fact that they are unable to verify the Petition on account of their species, I am making this verification on their behalf under Code of Civil Procedure section 446(a).

3. I have read the Petition and believe the allegations therein are true.

I certify under penalty of perjury under the laws of California and of the United States that the foregoing is true and correct.

Executed on May 16, 2025

s/ *Christopher Berry*
Christopher A. Berry

Exhibit 1

Declaration of Joyce Poole

I, Joyce Poole, declare as follows:

Introduction and Qualifications

1. My name is Joyce Poole. I graduated with a Bachelor of Arts with High Honors in the Biological Sciences from Smith College in 1979. I received my PhD from the University of Cambridge in 1982 from the Sub-Department for Animal Behaviour, under the supervision of Professor Robert Hinde. I completed a Postdoctoral Research Fellowship from 1984-1988 at Princeton University under the guidance of Professor Daniel Rubenstein. I reside and work in Sandefjord, Norway, and in Il Masin, Kajiado County, Kenya. I have run elephant behavior and conservation projects in Amboseli and Maasai Mara ecosystem, Kenya, and in Gorongosa National Park, Mozambique.

2. I submit this Declaration in support of the Nonhuman Rights Project, Inc.'s petition for a writ of habeas corpus regarding the captive elephants at the Los Angeles Zoo. I am a nonparty to this proceeding.

3. I have studied wild elephants in Africa and worked toward their conservation and welfare for 50 years. My research interests are focused on social and reproductive behavior, acoustic and gestural communication, cognitive science, decision-making, and conservation. I am currently Scientific Director of ElephantVoices, a California 501(c)(3) non-profit organization I co-founded in 2002, which aims to inspire wonder in the intelligence, complexity and voices of elephants, and to secure a kinder future for them. We advance the study of elephant cognition, communication and social behavior, and promote the scientifically sound and ethical management and care of elephants through research, conservation, advocacy, and the sharing of knowledge. Specifically, I direct the research, conservation, and welfare work for ElephantVoices.

4. In addition to directing the science at ElephantVoices, I have worked and conducted research for a number of organizations, including: (1) as the Research Director of the Amboseli Elephant Research Project from 2002-2007, for the Amboseli Trust for Elephants, where I oversaw the elephant monitoring, collaborative research projects, and training programs for the then 3 decades-long study of elephants; (2) as a scientific advisor for Discovery in July, 1996 and July, 1997, for the IMAX production *Africa's Elephant Kingdom*; (3) as a Consultant for Richard Leakey & Associates from 1994-

1997 performing training, lecturing, and advising for wildlife documentaries; (4) as an Author from 1994-1995 for *Coming of Age with Elephants* (Hyperion Press, 1996; Hodder & Stoughton, 1996); (5) as a Coordinator of the Elephant Program for the Kenya Wildlife Service from 1991-1994, setting and implementing Kenya's elephant conservation and management policy, supervising management-oriented research, reconciling land use and other conflicts between elephants and people, and building local expertise; (6) as a Consultant for the World Bank, from 1990-1991, developing Pre-Project Facility by drafting the Elephant Conservation and Management Policy and Research Policy Framework and Investment Program for the Kenya Wildlife Service; (7) as a Consultant for the International Union for the Conservation of Nature, in 1990, compiling an overview of elephant conservation in Eastern Africa for the Paris Donors Conference; (8) as a Consultant for the Tanzanian Wildlife Department in 1989, drafting a successful proposal to the Convention on Trade in Endangered Species to up list the African elephant to Appendix I of the Convention; (9) as a Consultant to the World Wildlife Fund in 1989, engaging in discussions with Japanese and Chinese government officials and ivory carvers regarding detrimental impacts of the ivory trade on elephant survival; (10) as a Researcher for the African Wildlife Foundation in 1989, assembling data on effects of poaching on East African elephant populations; and (11) as a Researcher for the Amboseli Elephant Research Project from 1975-1980.

5. I have conducted field work as part of my scientific research in multiple sites in multiple countries over my career, including: (1) elephant monitoring, conservation and research as part of the Gorongosa Restoration Project in Mozambique, from 2011 - 2019; (2) elephant monitoring and conservation project in the Maasai Mara ecosystem in Kenya, from 2010-2016; (3) the initiation of Asian elephant monitoring and conservation in the Minneriya-Kaudulla National Parks in Sri Lanka in 2008; (4) the study of elephant communication, cognition, and social behavior, conducting playback experiments, and recording elephant vocalizations and behavior in the Amboseli National Park in Kenya, 1998-2009, 2020; (5) recording elephant vocalizations and behavior in Maasai Mara National Park, Tsavo National Park, and Laikipia District in Kenya in 1998; (6) assessing the numbers and habitat use of elephants in West Kilimanjaro, Tanzania in 1997; (7) overseeing numerous elephant surveys and studies of elephants carried out under my direction by the Kenya Wildlife Service Elephant Program in Kenya from 1990-1994; (8) studying elephant vocal and olfactory

communication via vocal, visual, and chemical signaling and assessment between musth males in Amboseli National Park, Kenya from 1984-1990; (9) studying the contextual use of very low frequency calls by elephants and assessing the effects of poaching on the age structure and social and reproductive patterns of elephant populations in Amboseli, Tsavo, Queen Elizabeth, and Mikumi National Parks in Kenya, Uganda, and Tanzania in 1989; (10) Focal animal sampling musth and male-male competition among elephants in Amboseli National Park, Kenya from 1980-1982; and (11) participating in Cynthia Moss' long-term studies of elephants in Amboseli National Park, Kenya from 1975-1979.

6. Over the course of my career, I have received several awards and honors related to my research, including: (1) the Horace Dutton Taft Alumni Medal awarded by the Taft School in 2017, for "going beyond the call of duty in service"; (2) an Outstanding Lifetime Achievement Award from the Jackson Hole Wildlife Film Festival in 2015; (3) a Certificate of Recognition from the California State Legislature and Assembly in 2007, for "tireless efforts in educating people on elephant captivity"; (4) the Smith College Medal in 1996 for elephant research and conservation work "exemplifying the true purpose of a liberal arts education"; and as a student (5) an F32 National Research Service Award (NRSA) Individual Postdoctoral Fellowship from the National Institute of Mental Health from 1985-1988; (6) a Research Fellowship from the Harry Frank Guggenheim Foundation in 1984; (7) a Research Fellowship from the New York Zoological Society from 1980-1981; (8) a Graduate Study Fellowship from Smith College in 1981; (9) the Sarah. W. Wilder and Sarah W. Whipple Fellowship from 1979-1980; (10) Sigma Xi from 1979-1980; and (11) the A. Brazier Howell Award in 1979 for my paper on *musth* in African elephants, presented at the 1979 American Society of Mammalogists meetings.

7. I am affiliated with a number of professional organizations and hold several board and advisory memberships, including: (1) member of the Board for the Global Sanctuary for Elephants, from 2015-present; (2) member of the Board of Directors for ElephantVoices, from 2008-present; (3) member of Kenya Elephant Forum 2010-present; (4) member of the Scientific Advisory Committee for the Amboseli Elephant Research Project, from 2002-2009; (5) member of the Science Advisory Board for the Captive Elephant Management Coalition, from 1988-2001; (6) member of the Panel of Experts for the Species Survival Network, in 2004; (7) Trustee for the Amboseli Trust

for Elephants, from 2002-2011; and (8) member of the African Elephant Specialist Group, as part of the Species Survival Commission for the IUCN, from 1988-2001; 2017-present; (9) National Geographic Explorer 1988-present.

8. I have written two books concerning my work with elephants: (1) *Elephants* (1997, Colin Baxter Photography, Grantown-on-Spey, Scotland), and (2) *Coming of Age with Elephants* (1996, Hyperion Press, New York; 1996, Hodder & Stoughton, London).

9. I have published 50 peer-reviewed scientific articles over my career. These articles have been published in many of the world's premier scientific journals, including: *Nature, Science, Frontiers in Zoology*, *Biology Letters, Proceedings of the Royal Society B, Immunogenetics, PLoS ONE, The Ecologist, Animal Behaviour, Oryx, Behavioral Ecology and Sociobiology, Behavior, Journal of Reproduction and Fertility, Molecular Ecology, Journal of Consciousness Studies, Current Biology, Journal of the Acoustical Society of America, Etica and Animali,* and *Conservation Biology*. Specific topics of these publications include: Female African elephant rumbles differ between populations and sympatric social groups; African elephants address one another with individually specific name-like calls; Stop elephant hunting in Tanzania borderlands; A culture of aggression: the Gorongosa elephants' enduring legacy of war; Promoting positive interactions with the traumatized elephants in Gorongosa National Park; Who's Who & Whereabouts: an integrated system for re-identifying and monitoring African elephants; The Gorongosa elephants through war and recovery: tusklessness, population size, structure and reproductive parameters; Ivory poaching and the rapid evolution of tusklessness in African Elephants; Does social complexity drive vocal complexity? Insights from the two African elephant species; The Elephant Ethogram: A Library of African Elephant Behavior; Persistence of effects of social disruption in elephants decades after culling; Persistence of early life experiences 40 decades later on survival and success among African elephants; Poaching and wildlife conservation; Leadership in elephants: The adaptive value of age; Elephants, ivory, and trade; Simulated oestrus behavior in African elephants; Major histocompatibility complex variation and evolution in two genera of elephants; Fine-scaled population genetic structure in a fission-fusion society; Do elephants show empathy?; Elephant cognition; Behavioural inbreeding avoidance in wild African elephants; African elephants have expectations about locations of out-of-sight family members; Elephants can classify human ethnic groups by odour and garment colour; Age, musth, and

paternity success in wild male African elephants; Wild African elephants discriminate between familiar and unfamiliar conspecific seismic alarm calls; Social trauma early in life can affect physiology, behavior, and culture of animals and humans over generations; Elephants are capable of vocal learning; Older bull elephants control young males; African elephants assess acoustic signals; The Aggressive state of musth in African elephants; Mate guarding, reproductive success, and female choice in African elephants; Rutting behavior in African elephants; and Musth in the African elephant. Additionally, my research has been published in six non-peer reviewed publications.

10. My scientific work has also been published as chapters in several peer-refereed books, including *Mammals of Africa* (2013, Academic Press), *The Amboseli Elephants: A Long-Term Perspective on a Long-Lived Mammal* (2011, University of Chicago Press), *An Elephant in the Room: The Science and Well Being of Elephants in Captivity* (2008, Tufts University Cummings School of Veterinary Medicine's Center for Animals and Public Policy), *Elephants and Ethics: Toward a morality of Co-existence* (2003, Johns Hopkins University Press), *Behavioral Ecology and Conservation Biology* (1998, Oxford University Press), *The Differences Between the Sexes* (1994, Cambridge University Press), *Primate Social Relationships* (1983. Blackwell Scientific Publications). In addition to these peer-reviewed book chapters, my scientific work has been published in three additional book chapters, which were not refereed.

11. My scientific research has additionally been published in several peer-reviewed symposia proceedings, including "Vocal imitation in African savannah elephants (Loxodonta Africana)" in *Razprave IV* (2006, Rezreda Sazu XLVII-3); "Conservation biology: The ecology and genetics of endangered species," in *Genes in Ecology* (1991, Blackwell Scientific Publications, London, The 33rd Symposium of the British Ecological Society); "Elephant mate searching: Group dynamics and vocal and olfactory communication" and in *The Biology of Large African Mammals in their Environment* (1989, Clarendon Press, Oxford, Proceedings of the Symposium of the Zoological Society of London.

12. In addition to my peer-reviewed scientific publications, I have also published numerous technical reports for various foundations, working groups, and organizations. These reports include: (1) a series of reports relating to our work on elephants in the Maasai Mara from 2012-2015; (2) a series of reports relating to our work on elephants

in Gorongosa National Park from 2012-2019 (3) a 2010 critique of "The status of African elephants (*Loxodonta africana*) in the 2008 IUCN Red List of Threatened Species"; (4) a 1997 Typescript Report describing a survey of elephants and other wildlife of the West Kilimanjaro Basin, Tanzania; (5) a 1996 report in "Decentralization and Biodiversity Conservation" as part of a World Bank Symposium; (6) a 1994 report in the *Proceedings of the 2nd International Conference on Advances in Reproductive Research in Man and Animals* about the Logistical and ethical considerations in the management of elephant populations through fertility regulation; (7) a 1993 report detailing Kenya's Initiatives in Elephant Fertility Regulation and Population Control Techniques in *Pachyderm*; (8) a 1992 survey of the Shimba Hills elephant population for the Elephant Programme, Kenya Wildlife Service; (9) a 1992 report on the Status of Kenya's Elephants by the Kenya Wildlife Service and the Department of Resource Surveys and Remote Sensing; (10) a 1991 Elephant Conservation Plan for the Kenya Wildlife Service, Ministry of Tourism and Wildlife; (11) a 1990 Regional Overview of Elephant Conservation in Eastern Africa, in *Regional Perspectives and Situation Regarding Elephant Conservation and the Ivory Trade,* produced for the Paris Donors Meeting of the IUCN; (12) a 1990 report on Elephant Conservation and Management in *The Zebra Book, Policy Framework and Five-year Investment Programme* for the Kenya Wildlife Service; and (13) a 1989 report on The effects of poaching on the age structures and social and reproductive patterns of selected East African elephant populations in *The Ivory Trade and the Future of the African Elephant* for the 7th CITES Conference of the Parties.

13. In addition to my scientific publications, I have published 17 popular articles in more general publications, including: National Geographic's blog *A Voice for Elephants*, *Basecamp Explorer AS, Swara, Care for the Wild News, Sotokoto, Wildlife News, Komba, Animal Kingdom,* and *Natural History.*

14. I have been an invited speaker at international meetings and symposia throughout the world, including: (1) Keynote, Jackson Hole Wildlife Film Festival, 2015; (2) National Geographic Retreat, International Council of Advisors in Stockholm, Sweden, 2014; (3) Chinese Zoo Directors Meeting on Animal Welfare, in Shenzhen, China in 2013; (4) the Royal Geographical Society, Hong Kong, China in 2013; (5) the Explorer's Club in New York, 2013; (6) the Explorer's Symposium for National Geographic, in Washington, DC in 2012; (7) "Nature's great masterpiece: Stories of

Elephants," the 2012 Sabine Distinguished Lecture in Psychology, Colorado College; (8) Panel discussion for the National Geographic Society, Washington DC in 2008; (9) Seminar on Language Evolution and Cognition held by Communication Research Centre, Northumbria University & Language Evolution and Computation Research Unit, University of Edinburgh, Scotland in 2007; (10) Public lecture at the Explorer's Club, New York in 2007; (11) lecture on communication, behavior, and social life among elephants, for the Science Museums of the la Caixa Foundation, Barcelona, Spain in 2006; (12) speaker in series of lectures on Animal Communication, for the Science Museums of the la Caixa Foundation, in Madrid, Spain in 2006; and (13) lecture on Animal Cognition and Communication, at the Tufts Center for Animals and Public Policy in Boston in 1999.

15. In addition to my scientific research, I have also focused extensively throughout my career on public education and outreach. I have utilized many different media formats in pursuit of this goal. I currently maintain several web channels, including: (1) www.ElephantVoices.org - about elephant social behavior, communication and welfare; (2) www.facebook.com/elephantvoices; (3) www.Intagram.com/elephantvoices; (4) www.twitter.com/elephantvoices; (5) www.vimeo.com/elephantvoices; (6) www.YouTube.com/elephantvoices; (7) www.soundcloud.com/elephantvoices; and (8) http://www.theelephantcharter.info – The Elephant Charter, co-written in 2008 by Joyce Poole, Cynthia Moss, Raman Sukumar, Andrea Turkalo and Katy Payne. I also currently maintain The Elephant Ethogram: A Library of African Elephant Behavior (on The Elephant Ethogram), which documents close to 500 behaviors with written descriptions and some 2,400 video clips.

16. My research concerning elephant social behavior and communication, as well as my conservation work, has been featured in a number of printed articles, including publications such as *Readers' Digest, Scientific American, Science, National Geographic Kids, National Geographic Magazine, National Geographic Adventure, New York Times Magazine, National Geographic Explorer, LA Times, Highlights for Children, Scholastic, The New York Times, Science Times, Science, Science News, Spektrumdirekt, National Geographic News, Kyodo News Washington Bureau, Daily Telegraph, and The Guardian*. Additionally, my life and work have been featured in several books, including: (1) Jodi Picoult's novel Leaving Time; (2) Martin Meredith's 2001 *Africa's Elephant,* a biography, and (3) Doug Chadwick's 1992 *Fate of the*

Elephant. My work was also highlighted by Doug Chadwick in his 1992 feature article for National Geographic Magazine. My elephant recordings have featured in (1) Paul Winter's Summer Solstice Concert in New York Cathedral, in 2013; (2) in the Emmy award winning work by Paul Winter, Miho in 2010; (3) in Avatar in 2009; (4) in Pulse of the Planet.

17. I have been interviewed and my research has been featured on a number of radio programs, including: (1) a 2012 Sam Litzinger interview on The Animal House/NPR (WAMU 88.5); (2) Elephant welfare views featured on WBUR's Inside Out Documentary on American Zoos with Diane Toomey in 2009; (3) Elephant communication research featured in Up Front Radio, San Francisco with Sandip Roy Chowdhury in 2008; (4) Elephant communication, cognition, and welfare with Karl Losken Animal Voices 102.7fm in Vancouver, BC Canada in 2008; (5) Science Update, American Association for the Advancement of Science (AAAS) in 2005; (6) BBC Radio Science, the Leading Edge in 2005; (7) German Public Radio (SWR) program Campus in 2005; (8) NPR in 2005 about elephant vocal learning; (9) BBC News Scotland in 2005 about vocal learning in elephants; (10) ABC's Radio 702 with Rory McDonald about elephant welfare in 2005; (11) Elephant communication research featured in BBC's Beyond our Senses program Sounds of Life with Grant Sonnex, in 2004; (12) Elephant communication research featured in NPR program on elephant language in 2004; (13) WETA-FM, News 820's Openline & WNYC in 1996; and (14) Musth in the African elephant, BBC Radio 4, The living World in 1981. In addition to these radio appearances, I have also appeared on the Science and the city Podcast, in 2007.

18. I have also appeared and been featured in a variety of Television programs, including in: (1) Secrets of the Elephants (2023); (2) Gorongosa Park: Rebirth of Paradise (2015), a PBS six-part series about the restoration of Gorongosa National Park in which my elephant work is highlighted in episodes 2 and 5; (3) An Apology to Elephants, an award winning 2013 documentary that explores abuse and brutal treatment of elephants; (4) War Elephants (2012), an award winning documentary about the traumatized elephants in Gorongosa National Park, Mozambique, and their recovery, by National Geographic Wild, worldwide; (5) Elephant communication research is featured in "Elephant having tales to tell" (2008), NHK, Japan (Japanese and English versions); (6) Interview on elephant communication and cognition for

Smart Planet for REDES-TVE, Spain (2006); (7) Elephants and vocal learning, Daily Planet Discovery Channel Canada (2005); (8) Elephant cognition and conservation views featured on National Geographic Explorer *Elephant Rage* (2005); (9) Elephant recordings featured in Discovery Channel's Echo III (2004); (10) Elephant communication research, Elephant's Talk, featured in BBC documentary *Talking with Animals* (2002); (11) Work featured on News and Talk shows such as CNN (1993), ABC news Women and Science, The Today Show, (1996), West 57th Street CBS News (1989), PM Magazine (1987); (12) Research featured in *Inside the Animal Mind Part 3 Animal Consciousness, WNET Nature* (1999); (13) Featured on Episode 16, *Elephants*, in series, *Champions of the Wild*, Omni Film Productions, Vancouver, Canada (1998); (14) Life, elephant research, and conservation work subject of National Geographic Special, *Coming of Age with Elephants* (1996); (15) *Wildlife Warriors,* National Geographic Special (1996); (16) *A Voice for Elephants USIA AfricaPIX* (1996); (17) Discovery Channel documentary "Ultimate Guide to Elephants" (1996); (18) *Elephants like us*, Rossellini and Associates (1990); (19) *The language of the elephants*, Rossellini and Associates (1990); (20) Elephant research and conservation work featured in National Geographic Special *Ivory Wars* (1989); (21) Research highlighted in BBC production *Trials of Life* with David Attenbourgh (1988); (22) Work on elephant infrasound featured in *Supersense* BBC Natural History Unit series on animal senses (1988); and (23) Featured in Sports and Adventure, *Women of the World* (1987).

19. I have testified as an expert witness in court cases in several countries, including: (1) In 1998 in South Africa in the Case of NSPCA v. Riccardo Ghiazza regarding the capture, mistreatment of 34 baby elephants. Ghiazza was eventually found guilty of cruelty; (2) In 2005 via video link in International Fund for Animal Welfare, et al. v. Minister for the Environment and Heritage et al., N2005/916 regarding the export of Asian elephants from Thailand to Australia; (3) In 2008 in Washington DC in American Society for the Prevention of Cruelty to Animals, Animal Welfare Institute, The Fund for Animals, Animal Protection Institute & Tom Rider Plaintiffs in ASCPA v. Ringling Brothers and Barnum & Bailey Circus; and (4) In 2012 in Los Angeles in Aaron Leider vs. John Lewis, City of Los Angeles, in a case regarding the welfare of the elephants of Los Angeles Zoo.

20. My Curriculum Vitae fully sets forth my educational background and experience and is annexed hereto as "Exhibit A".

Basis for Opinions

21. The opinions I state in this Declaration are based on my professional knowledge, education, training, and years of experience observing and studying elephants, as well as my knowledge of peer-reviewed literature about elephant behavior and intelligence published in the world's most respected journals, periodicals, and books that are generally accepted as authoritative in the field, and many of which were written by myself or colleagues whom I have known for several years and with whose research and field work I am personally familiar. A full reference list of peer-reviewed literature cited herein is annexed hereto as "Exhibit B".

Opinions

Premise

22. Elephants are autonomous beings. Autonomy in humans and nonhuman animals is defined as self-determined behavior that is based on freedom of choice. As a psychological concept it implies that the individual is directing their behavior based on some non-observable, internal cognitive process, rather than simply responding reflexively. Although we cannot directly observe these internal processes in other beings, we can explore and investigate them by observing, recording and analysing their behavior, as I have done with elephants for my entire career.

23. I shall indicate which species, African (*Loxodonta Africana*) or Asian (*Elephus maximus*), specific observations relate to. If the general term 'elephants' is used with no specific delineation, it can be assumed the comment relates to the African species, though it is likely that it applies to the Asian species as well.

Brain and Development

24. Elephants are large-brained, with the biggest absolute brain size of any land animal (Cozzi et al. 2001; Shoshani et al. 2006). Even relative to their body sizes, elephant brains are large. Encephalization quotients (EQ) are a standardised measure of brain size relative to body size and illustrate by how much a species' brain size deviates from that expected for its body size. An EQ of one means the brain is exactly the size expected for that body, and values greater than one indicate a larger brain than expected (Jerison 1973). Elephants have an EQ of between 1.3 and 2.3 (varying between sex and African and Asian species). This means an elephant's brain can be up to two and a half times larger than is expected for an animal of its size; this EQ is similar to that of the

great apes, with whom elephants have not shared a common ancestor for almost 100 million years (Eisenberg 1981, Jerison 1973). Given how metabolically costly brain tissue is, the large brains of elephants must confer significant advantages; otherwise their size would be reduced. A large brain allows for greater intelligence and behavioral flexibility (Bates et al. 2008a).

25. Generally, mammals are born with brains weighing up to 90% of the adult weight. This figure drops to about 50% for chimpanzees. Human baby brains weigh only about 27% of the adult brain weight (Dekaban & Sadowsky 1978). This long period of brain development over many years (termed 'developmental delay') is a key feature of human brain evolution and is thought to play a role in the emergence of our complex cognitive abilities, such as self-awareness, creativity, forward planning, decision making, and social interaction (Bjorkland 1997). Delayed development provides a longer period in which the brain may be shaped by experience and learning (Fuster 2002). Elephant brains at birth weigh only about 35% of their adult weight (Eltringham 1982), and elephants show a similarly protracted period of growth, development and learning (Lee 1986). This similar developmental delay in the elephant brain is therefore likewise associated with the emergence of similarly complex cognitive abilities.

26. Despite nearly 100 million years of separate evolution (Hedges 2001), elephants share certain characteristics of our large brains, namely deep and complex folding of the cerebral cortex, large parietal and temporal lobes, and a large cerebellum (Cozzi et al. 2001). The temporal and parietal lobes of the cerebral cortex manage communication, perception, and recognition and comprehension of physical actions (Kolb and Whishaw 2008), while the cerebellum is involved in planning, empathy, and predicting and understanding the actions of others (Barton 2012). Thus, the physical similarities between human and elephant brains occur in areas that link directly to the capacities necessary for autonomy and self-awareness.

27. Elephant brains hold nearly as many cortical neurons as do human brains: humans: 1.15×10^{10}; elephants: 1.1×10^{10} (Roth & Dicke 2005). Elephants' pyramidal neurons are larger than in humans and most other species (Cozzi et al. 2001). Pyramidal neurons are found in the cerebral cortex, particularly the pre-frontal cortex – the brain area that controls executive functions (a set of cognitive processes that are required for choosing and monitoring behaviors that facilitate an individual to reach certain goals, e.g., problem solving, planning, working memory, inhibitory and attentional control and

cognitive flexibility).

28. The degree of complexity of pyramidal neurons is linked to cognitive ability, with more (and more complex) connections between pyramidal neurons being associated with increased cognitive capabilities (Elston 2003). Elephant pyramidal neurons have a large dendritic tree, i.e. a large number of connections with other neurons for receiving and sending signals (Cozzi et al. 2001).

29. As described below, along with these common brain and life-history characteristics, elephants share many behavioral and intellectual capacities with humans, including: self-awareness, empathy, awareness of death, intentional communication, learning, memory, and categorisation abilities. Many of these capacities have previously been considered – erroneously – to be uniquely human, and each is fundamental to and characteristic of autonomy and self-determination.

Awareness of Self and Others

30. Asian elephants exhibit Mirror Self Recognition (MSR) using Gallup's classic 'mark test' (Gallup 1970; Plotnik et al. 2006). MSR is the ability to recognise a reflection in the mirror as oneself, and the mark test involves surreptitiously placing a coloured mark on an individual's forehead that it could not see or be aware of without the aid of a mirror. If the individual uses the mirror to investigate the mark, the individual recognises the reflection as herself. Besides elephants, the only other mammals that have successfully passed the mark test and exhibited MSR are the great apes (chimpanzees, bonobos, gorillas and orangutans) and bottlenose dolphins (Parker and Mitchell 1994, Reiss and Marino 2001). MSR is significant because it is considered to be the key identifier of self-awareness. Self-awareness is intimately related to autobiographical memory in humans (Prebble et al. 2013) and is central to autonomy and being able to direct one's own behavior to achieve personal goals and desires. By demonstrating that they can recognize themselves in a mirror, elephants holding a mental representation of themselves from another perspective, and thus be aware that they are a separate entity from others (Bates and Byrne 2014).

31. A being who understands the concept of dying and death possesses a sense of self. Based on the research conducted to date, observing reactions to dead family or group members suggests an awareness of death in only two animal genera beyond humans; chimpanzees and elephants (Anderson et al. 2010, Douglas-Hamilton et al. 2006).

Having a mental representation of the self – a pre-requisite for mirror-self recognition – contributes to the ability to comprehend death. Wild African elephants have been shown experimentally to be more interested in the bones of dead elephants than the bones of other animals (McComb et al. 2006), and have frequently been observed using their tusks, trunk or feet to attempt to lift sick, dying or dead individuals (Douglas-Hamilton 1972, Moss 1992, Poole 1996, Payne 2003, Douglas-Hamilton et al. 2006). Although they do not give up trying to lift or elicit movement from the body immediately, elephants appear to realise that once dead, the carcass cannot be helped anymore, and instead engage in more 'mournful' behavior, such as standing guard over the bodies, and protecting it from the approaches of predators (e.g. Douglas-Hamilton 1972, Croze cited in Moss 1982, Moss 1988, Poole 1996, Payne 2003, McComb et al. 2006). Others have observed them covering the bodies of dead elephants with dirt and vegetation (Moss 1992; Poole 1996). In the particular case of mothers who lose a calf, although they may remain with the calf's body for an extended period, they do not behave towards the body as they would a live calf. Indeed, the general demeanour of elephants who are attending to a dead elephant is one of grief and compassion, with slow movements and few, if any, vocalisations (Poole 1996). These behaviors are akin to human responses to the death of a close relative or friend, and illustrate that elephants possess some understanding of life and the permanence of death. Furthermore, elephants' interest in the bodies, carcasses and bones of elephants who have passed is so marked that when one has died, trails to the site of death are worn into the ground by the repeated visits of many elephants over days, weeks, months and even years (Poole, personal observation). The accumulation of dung around the site attests to the extended time that visiting elephants spend touching and contemplating the bones. I have observed that, over years, the bones may become scattered over tens or hundreds of square meters as elephant pick up the bones and carry them away. The tusks are of particular interest and may be carried and deposited many hundreds of meters from the site of death (Poole, personal observation).

32. The capacity for mentally representing the self as an individual entity has been linked to general empathic abilities (Gallup 1982), where empathy can be defined as identifying with and understanding another's experiences or feelings by imagining what it would be like to be in their situation. Empathy is an important component of human consciousness and autonomy and is a cornerstone of normal social interaction.

It goes beyond merely reading the emotional expressions of others. It requires modelling of the emotional states and desired goals that influence others' behavior both in the past and future, and using this information to plan one's own actions; empathy is only possible if one can adopt or imagine another's perspective, and attribute emotions to that other individual (Bates et al. 2008b). Empathy is, therefore, a component of and reliant on 'Theory of Mind' – the ability to mentally represent and think about the knowledge, beliefs and emotional states of others, whilst recognising that these can be distinct from your own knowledge, beliefs and emotions (Premack and Woodruff 1978, Frith and Frith 2005).

33. Elephants clearly and frequently display empathy in the form of protection, comfort and consolation, as well as by actively helping those who are in difficulty, such as assisting injured individuals to stand and walk, or helping calves out of rivers or ditches with steep banks (Bates et al. 2008b, Lee 1987, Poole 1996). Elephants have been observed to react when anticipating the pain of others (e.g. seen to wince when a nearby elephant stretched her trunk toward a live wire – Poole, personal observation) and have even been observed feeding those who are not able to use their own trunks to eat (Moses Kofi Sam, personal communication) and to attempt to feed those who have just died (Croze, cited in Moss 1982).

34. In an analysis of behavioral data collected from wild African elephants over a 40-year continuous field study, I have concluded that as well as possessing their own intentions, elephants can diagnose animacy and goal directedness in others, understand the physical competence and emotional state of others, and attribute goals and mental states (intentions) to others (Bates et al. 2008b), as evidenced in the examples below:

> *'IB family is crossing river. Infant struggles to climb out of bank after its mother. An adult female [not the mother] is standing next to calf and moves closer as the infant struggles. Female does not push calf out with its trunk, but digs her tusks into the mud behind the calf's front right leg which acts to provide some anchorage for the calf, who then scrambles up and out and rejoins mother.'*

> *'At 11.10ish Ella gives a 'lets go' rumble as she moves further down the swamp . . . At 11.19 Ella goes into the swamp. The entire group is in the swamp except Elspeth and her calf [<1 year] and Eudora [Elspeth's*

mother]. At 11.25 Eudora appears to 'lead' Elspeth and the calf to a good place to enter the swamp — the only place where there is no mud.'

In addition to the examples analyzed in Bates et al. 2008b, in what appeared to be a spontaneous attempt to prevent injury to the newborn, I observed two adult females rush to the side of a third female who had just given birth, back into her and press their bodies to her. In describing the situation I wrote:

> *'The elephants' sounds* [relating to the birth] *also attracted the attention of several males including young and inexperienced, Ramon, who, picking up on the interesting smells of the mother* [Ella], *mounted her, his clumsy body and feet poised above the newborn. Matriarch Echo and her adult daughter Erin, rushed to Ella's side and, I believe, purposefully backed into her in what appeared to be an attempt to prevent the male from landing on the baby when he dismounted."*

Examples such as these demonstrate that the acting elephant(s) (the adult female in the first example, Eudora in the second, and Erin and Echo in the third) was able to understand the intentions or situation of the other (the calf in the first case, Elspeth in the second; Ella's newborn and the male in the third) – i.e. to either climb out of or into the water, or be trampled on by the male – and they could adjust their own behavior in order to counteract the problem being faced by the other. While humans may act in this helpful manner on a daily basis, such interactions have been recorded for very few non-human animals (Bates et al. 2008b). In footage of Helping behaviour in The Elephant Ethogram an allo-mother in Maasai Mara, Kenya moves a log from under the head of an infant, in what appears to be an effort to make him more comfortable (see video here). There are numerous other examples of empathy in The Elephant Ethogram under Helping behaviour, including a dramatic rescue of an infant by two allomothers who, among other behaviours, prevent him from drowning by lifting his trunk out of the water so he can breathe. In a further example of understanding goal directedness of others, elephants appear to understand that vehicles drive on roads or tracks and furthermore they appear to know where these tracks lead. In Gorongosa, Mozambique, where elephants exhibit a culture of aggression toward humans, charging, chasing and attacking vehicles, adult females anticipate the direction the vehicle will go and attempt to cut it off by taking shortcuts *before* the vehicle has begun to turn (Poole personal observation 2012). The roots of empathetic behavior begin early in elephants. Just as in humans where rudimentary sympathy for others in distress has been recorded in infants as young as 10 months old (Kanakogi et al. 2013, see http://journals.plos.org/plosone/article?id=10.1371/journal.pone.0065292), young elephants exhibit behavior that indicates that they feel sympathy for others. For instance, during fieldwork in the Maasai Mara in 2011 I filmed a mother elephant using her trunk to assist her one-year-old female calf up a steep bank. Once the calf was safely up the bank she turned around to face her five-year-old sister, who was also having difficulties getting up the bank. As the older calf clambered up the bank with effort the younger calf approached her and first touched her mouth (a gesture of reassurance among family members) and then reached her trunk out to touch the leg that had been having difficulty. Only when her sibling was safely up the bank did the calf turn to follow her mother (video filmed by Poole, 2011).

35. Experimental evidence from captive African elephants further demonstrates that elephants attribute intentions to others, as they follow and understand human pointing gestures (the only animal so far shown to do so spontaneously). The elephants understood that the human experimenter was pointing in order to communicate information to them about the location of a hidden object (Smet and Byrne 2013). Attributing intentions and understanding another's reference point is central to empathy and theory of mind. Further documentation of pointing in elephants is described in a chapter I co-authored with Lucy Bates and Richard Byrnes for an upcoming book about pointing behavior in humans and other animals entitled, *Pointing With Your Nose: Do Elephants Point, And How Do We Know?*

36. Our analysis of simulated oestrus behaviors (see Simulate-Estrus) in African elephants – whereby a non-cycling, sexually experienced older female will simulate the visual signals of being sexually receptive, even though she is not ready to mate or breed again – shows that these knowledgeable females adopt false oestrus behaviors in order to demonstrate to naïve young females how to attract and respond appropriately to suitable males. The experienced females may be taking the youngsters lack of knowledge into account and actively showing them what to do; a possible example of true teaching as it is defined in humans (see an example here). Whilst this possibility requires further investigation, this evidence, coupled with the data showing that they understand the ostensive cues in human pointing, demonstrates that elephants do share some executive skills with humans, namely understanding the intentions and

knowledge states (minds) of others. Ostensive communication refers to the way humans use particular behavior such as tone of speech, eye contact, physical contact to emphasize that a particular communication is important. Lead elephants in family groups use ostensive communication frequently (e.g. Ear-Flap-Slide, Ear-Slap, Walk-Wait, Foot-Swinging, Trunk-Sweep, Body-Axis-Pointing as described in Poole & Granli 2011 and The Elephant Ethogram; Comment-Rumble described in Poole, 2011) as a way to say, "Heads up – I am about to do something that you should pay attention to."

37. Further related to empathy, coalitions and cooperation have been documented in wild African elephants, particularly to defend family members or close allies from (potential) attacks by outsiders, such as when a family group tries to 'kidnap' a calf from an unrelated family (Lee 1987, Moss and Poole 1983) or during the extraordinary teamwork executed by elephants when they defend themselves against predators, particularly, human beings (Poole and Granli 2011; Poole 2011). These latter behaviors are preceded by gestural and vocal signals typically given by the matriarch and acted upon by family members and have been documented many times amongst the Gorongosa elephants and in elephant behavior footage from there that we are currently analyzing. These behaviors are based on one elephant understanding the signals, emotions and goals of the coalition partner(s) (Bates et al. 2008b).

38. Cooperation is also evident in experimental tests with captive Asian elephants, whereby elephants demonstrated they can work together in pairs to obtain a reward, and understood that it was pointless to attempt the task if their partner was not present or could not access the equipment (Plotnik et al. 2011). Problem-solving and working together to achieve a collectively desired outcome involve mentally representing both a goal and the sequence of behaviors that is required to achieve that goal; it is based on (at the very least) short-term action planning.

39. Wild elephants have frequently been observed engaging in cooperative problem solving, for example when retrieving calves that have been kidnapped by other groups, when helping calves out of steep, muddy river banks (Bates et al. 2008b), when rescuing a calf attacked by a lion (acoustic recording calling to elicit help from others (Poole 2011) by or the vocal and gestural communication used when they are negotiating a plan of action (e.g. when elephants use Cadenced-Rumbling, Poole 2011, or High-Fiving to lend their "voice" to a proposed or targeted plan of action; see video

here) or when they must navigate through human-dominated landscapes to reach a desired destination (e.g. habitat, salt-lick, waterhole) as evidenced in video footage of Selengei and her family filmed in 2015. These behaviors demonstrate the purposeful and well-coordinated social system of elephants and show that elephants can hold particular aims in mind and work together to achieve those goals. Such intentional, goal-directed action forms the foundation of independent agency, self-determination, and autonomy.

40. Elephants also show innovative problem-solving in experimental tests of insight (Foerder et al. 2011), where insight can be defined as the 'a-ha' moment when a solution to a problem 'suddenly' becomes clear. (In cognitive psychology terms, insight is the ability to inspect and manipulate a mental representation of something, even when you can't physically perceive or touch the something at the time.) Or more simply, insight is thinking and using only thoughts to solve problems (Richard Byrne, Evolving Insight, Oxford Online Press, 2016). A juvenile male Asian elephant demonstrated just such a spontaneous action by moving a plastic cube and standing on it to obtain previously out-of-reach food. After solving this problem once, he showed flexibility and generalization of the technique to other, similar problems by using the same cube in different situations, or different objects in place of the cube when it was not available. This experiment again demonstrates that elephants can choose the appropriate action and incorporate it into a sequence of behavior in order to achieve a goal, which they kept in mind throughout the process.

41. Further experiments also demonstrate Asian elephants' ability to understand goal-directed behavior. When presented with food that was out of reach, but with some bits resting on a tray that could be pulled within reach, the elephants learned to pull only those trays that were baited with food (Irie-Sugimoto et al. 2007). Success in this kind of 'means-end' task demonstrates causal knowledge, which requires understanding not just that two events are associated with each other but also that there is some mediating force that connects and affects the two which may be used to predict and control events. Moreover, understanding causation and inferring object relations may be related to understanding psychological causation, i.e., the appreciation that others are animate beings that generate their own behavior and have mental states (e.g., intentions).

Communication and Social Learning

42. Speech is a voluntary behavior in humans, whereby a person can choose whether to utter words and thus communicate with another. Therefore, speech and language reflect autonomous thinking and intentional behavior. Elephants also intentionally use their vocalizations to share knowledge and information with others (Poole 2011). Females and dependents call to emphasize and reinforce their social units and to coordinate movement. Male elephants primarily communicate about their sexual status, rank and identity, though like females they also use calls to coordinate movement and interactions in their social groups. Call types (47 have been described by Poole 2011) can generally be separated into laryngeal calls (such as rumbles, cries, roars) or trunk calls (such as trumpets, snorts), with different calls in each category being used in different contexts (Poole et al. 1988; Poole 2011; Poole and Granli 2004; Soltis et al. 2005; Wood et al. 2005). Field experiments have shown that African elephants distinguish between different call types (for example, Contact-Calls – rumbles that travel long distances to maintain associations between elephants that could be several kilometres apart, Estrous-Rumbles – that occur after a female has copulated or Musth-Rumbles that are made by males in the heightened sexual and aggressive state of musth) and these different call types elicit different responses in the listeners. Elephant vocalisations are not simply reflexive, they have distinct meanings to listeners and they are truly communicative, similar to the volitional use of language in humans (Leighty et al. 2008; Poole 1999; Poole 2011).

43. Elephants display a wide variety (> 300 described) of gestures, signals and postures, used to communicate information to the audience (Poole and Granli 2011 and The Elephant Ethogram). Such signals are adopted in many different contexts, such as aggressive, sexual or socially integrative situations, and each signal is well defined and results in predictable responses from the audience. That is, each signal or gesture has a specific meaning both to the actor and recipient. Elephants' use of gestures demonstrates that they communicate intentionally and purposefully to share information with others and/or alter the others' behavior to fit their own will.

44. Elephants use specific calls and gestures to plan and discuss a course of action. These may involve responding to a threat by a group retreat or mobbing action (including celebration of successful efforts - See High-Fiving), or planning and discussing where, when and how to move to a new location (Let's-Go-Rumble and Cadenced-Rumble as described earlier). I have studied elephant communication for two

decades and have field notes, acoustic recordings, and raw footage of numerous examples of such communication.

45. In group-defensive situations elephants respond with highly coordinated behavior, both rapidly and *predictably,* to specific calls uttered and particular gestures exhibited by group members. In other words, these elephant calls and gestures hold specific meanings not only to elephant listeners, but also, through experience, to human observers. The rapid, predictable and collective response of elephants to these calls and gestures indicates that elephants have the capability of understanding the goals and intentions of the signalling individual. For example, as was documented and described by me in Episode 2 of PBS six-part series *Gorongosa Park: Rebirth of Paradise,* matriarch Provocadora's contemplation of us (Listening, J-Trunk) followed by her purposeful Perpendicular-Walk (in relation to us) toward her family and her Ear-Flap-Slide was a clear indication to her family to begin a Group-Advance (on us). This particular elephant attack is a beautiful example of elephants' use of empathy, coalition and cooperation. Provocadora's instigation of the Group-Advance led to a two and a half minute Group-Charge in which the three other large adult females of the 36-member family took turns to lead the charge, passing the baton, in a sense, from one to the next. Once they succeeded in their goal of chasing us away they celebrated their victory High-Fiving (with their trunks) and engaging in an End-Zone-Dance. High-Fiving is also typically used to initiate a coalition and is both preceded by and associated with other specific gestures and calls that lead to very goal oriented collective behavior. Elephant group defensive behavior is highly evolved and involves a range of different tactical manoeuvres adopted by different elephants. The calls and gestures used are too many to mention here but are described in Poole 2011 and on The Elephant Ethogram.

46. In planning and communicating intentions regarding a movement, elephants use both vocal and gestural communication. For example, I have observed that a member of a family will use the axis of her body, Body-Axis-Pointing, to point in the direction she wishes to go and then vocalize, every couple of minutes, with a specific call known as a "Let's-Go" Rumble (Poole et al. 1988; Poole 2011), "I want to go this way, let's go together." The elephant will also use intention gestures – such as Walk-Wait, Foot-Swinging – to indicate her intention to move and will Look-Back to see whether anyone is coming. Such a call may be successful or unsuccessful at moving the group or may lead to a longer (45 minutes or more) discussion (series of rumble exchanges known as

Cadenced-Rumbles) that I interpret as negotiation. A nice example of this behaviour, though without sound, can be seen in this video filmed in the Maasai Mara when members of Big Mama's family wanted to go in opposite directions. Sometimes such negotiation leads to disagreement and the group may spilt and go different ways for a period of time. In situations where the security of the group is at stake, for instance when a movement is planned through or near to human settlement, all group members are focused on the decision of the matriarch. So while "Let's-Go"-Rumbles are uttered, others adopt a Waiting posture until the matriarch, after much Listening, and Contemplation decides it is safe to proceed (see for example this video of matriarch Selengei), where upon they bunch together and move purposefully, and at a fast pace in a Group-March (see this example led by Selengei in Maasai Mara, 2015). Elephants typically move through dangerous habitat at high speed and at night in a very goal-oriented manner known as "streaking," which has been described and documented through the movements of elephants wearing satellite tracking collars (Douglas-Hamilton et al. 2005). The many different signals – calls, postures, gestures and behaviors elephants use to contemplate and initiate such movement (including others e.g. Ear-Slap, Ear-Flap-Slide) are clearly understood by other elephants (just as they can be by long-term study by human observers), mean very specific things and indicate that elephants 1) have a particular plan which they can communicate with others; 2) can adjust this plan according to their immediate assessment of risk or opportunity 3) can communicate and execute the plan in a coordinated manner.

47. Furthermore, elephants have been shown to vocally imitate the sounds they hear around them, from the engines of passing trucks (see for example Trunk-Like-Call) and the calls of other species to the commands of human zookeepers (Poole et al. 2005, Stoeger et al. 2012). Imitating another's behavior demonstrates a sense of self, as it is necessary to understand how one's own behavior relates to the behavior of others.

48. Experimental evidence demonstrates that African elephants recognize the importance of visual attentiveness of the intended recipient (in this case, human experimenters) of gestural communication (Smet & Byrne 2014), further supporting the conclusion that elephants' gestural communication is intentional and purposeful. Furthermore, the ability to understand the visual attentiveness and perspective of others is crucial for empathy and mental-state understanding. We now know that they use this ability in their daily lives to create and use names for one another (Pardo et al 2024).

Our recent groundbreaking discovery showing that elephants create and use names for one another helps to explain how elephants use the ability to imitate and create novel sounds in their daily lives (Pardo et al 2024). Our results have significant implications for elephant cognition, as inventing or learning sounds to address one another suggests that elephants have the capacity for some degree of symbolic thought.

Memory and Categorisation

49. Elephants have both extensive and long-lasting memories, just as the folk stories and adages encourage us to believe. McComb et al. (2000), using experimental playback of long-distance contact calls in Amboseli National Park, Kenya, showed that African elephants remember and recognize the voices of at least 100 other elephants. Each adult female elephant tested was familiar with the contact-call vocalizations of individuals from an average of 14 families in the population. When the calls were from a familiar family – that is, one that had previously been shown to have a high association index with the test group – the test elephants contact-called in response and approached the location of the loudspeaker. When a test group heard unfamiliar contact calls (from groups with a low association index with the test group), they bunched together and retreated from the area.

50. McComb et al. (2001) went on to show that this social knowledge accrues with age, with older females having the best knowledge of the contact calls of other family groups. McComb et al. (2011) also showed that older females are better leaders, with more appropriate decision-making in response to potential threats (in this case, in the form of hearing lion roars). Younger matriarchs under-reacted to hearing roars from male lions. Sensitivity to hearing this sound increased with increasing matriarch age, with the oldest, most experienced females showing the strongest response to this danger. These experimental studies show that elephants continue to learn and remember information about their environments throughout their lives, and this accrual of knowledge allows them to make better decisions and better lead their families as they grow older.

51. Elephants' long-term memory is further demonstrated from data on their movement patterns. African elephants are known to move over very large distances in their search for food and water. Leggett (2006) used GPS collars to track the movements of elephants living in the Namib Desert. He recorded one group traveling over 600 km in

five months, and Viljoen (1989) showed that elephants in the same region visited water holes approximately every four days, even though some of them were more than 60km apart. Elephants inhabiting the deserts of both Namibia and Mali have been described traveling hundreds of kilometers to arrive at remote water sources shortly after the onset of a period of rainfall (Blake et al. 2003; Viljoen 1989), sometimes along routes that researchers believe have not been used for many years. These remarkable feats suggest exceptional cognitive mapping skills, reliant on the long-term memories of older individuals who traveled that path sometimes decades earlier. Indeed it has been confirmed that family groups with older matriarchs are better able to survive periods of drought. The older matriarchs lead their families over larger areas during droughts than those with younger matriarchs, again apparently drawing on their accrued knowledge (this time about the locations of permanent, drought-resistant sources of food and water) to better lead and protect their families (Foley, Pettorelli, and Foley 2008).

52. It has recently been shown that long-term memories, and the decision-making mechanisms that rely on this knowledge, are severely disrupted in elephants who have experienced trauma or extreme disruption due to 'management' practices initiated by humans. Shannon et al. (2013) demonstrated that elephants in South Africa who had experienced trauma decades earlier showed significantly reduced social knowledge. During archaic culling practices, these elephants were forcibly separated from family members and subsequently translocated to new locations. Two decades later, they still showed impoverished social knowledge and skills and impaired decision-making abilities, compared with an undisturbed population in Kenya. Disrupting elephants' natural way of life can negatively impact their knowledge and decision-making abilities.

53. Elephants demonstrate advanced 'working memory' skills. Working memory is the ability to temporarily store, recall, manipulate and coordinate items from memory. Working memory directs attention to relevant information, and results in reasoning, planning, and coordination and execution of cognitive processes through use of a 'central executive' (Baddeley 2000). Adult human working memory is generally thought to have a capacity of around seven items. In other words, we can keep about seven different items or pieces of information in mind at the same time (Miller 1956). We conducted experiments with wild elephants in Amboseli National Park, Kenya, manipulating the location of fresh urine samples from related or unrelated elephants.

The elephants' responses to detecting urine from known individuals in surprising locations showed that they are able to continually track the locations of at least 17 family members in relation to themselves, as either absent, present in front of self, or present behind self (Bates et al. 2008a). This remarkable ability to hold in mind and regularly update information about the locations and movements of a large number of family members is best explained by elephants possessing an unusually large working memory capacity, apparently much larger than that of humans.

54. Elephants show sophisticated categorisation of their environment, with skills on a par with those of humans. My colleagues and I experimentally presented the elephants of Amboseli National Park, Kenya, with garments that gave olfactory or visual information about their human wearers – either Maasai moran (male warriors who traditionally attack and spear elephants on occasion as part of their rite of passage), or Kamba men (who are agriculturalists and traditionally pose little threat to elephants). In the first experiment, the only thing that differed between the cloths was the smell, derived from the ethnicity and/or lifestyle of the wearers. The elephants were significantly more likely to run away when they sniffed cloths worn by Maasai than those worn by Kamba men or no one at all. In a second experiment, we presented the elephants with two cloths that had not been worn by anyone, but here one was white (a neutral stimulus) and the other was red—the color that is ritually worn by Maasai moran. With access only to these visual cues, the elephants showed significantly greater reaction to red garments than white, often including signs of aggression. We concluded that elephants are able to categorize a single species (humans) into sub-classes (i.e. 'dangerous' or 'low risk') based on either olfactory or visual cues alone (Bates et al. 2007). McComb et al. went on to show that the same elephant population can also distinguish between human groups based on our voices: The elephants reacted differently (and appropriately) depending on whether they heard Maasai or Kamba men speaking, and also when they heard male or female Maasai (where female Maasai pose no threat as they are not involved in spearing events), and adult Maasai men or young Maasai boys (McComb et al. 2014). Scent, sounds and visual signs associated specifically with Maasai men are categorized as 'dangerous', while neutral signals are attended to but categorized as 'low risk'. These sophisticated, multi-modal categorization skills may be exceptional among non-human animals.

Zoo Captivity is an Unacceptable Place for Elephants: it Cannot Meet their Complex Physical, Psychological, and Social Needs.

55. Elephants are highly intelligent, social animals. In elephant society an intricate network of relationships radiates outward from the mother-offspring bond through the extended family and the bond group, to clan, population and beyond to strangers, including the primary predatory threat to their survival: Humans. Some 300 documented behaviors, gestures and calls have evolved helping to mediate and maintain these relationships, to communicate over miles, and to direct extraordinarily coordinated bonding ceremonies and group defense.

56. Over millions of years elephants have roamed the earth as intelligent and social mammals, capable of planning, negotiating and engaging in collective decision making. Active more than 20 hours each day elephants move many miles across landscapes to locate resources to maintain their large bodies, to connect with friends and to search for mates. Elephants have evolved to move. Holding them captive and confined prevents them from engaging in normal, autonomous behavior and can result in the development of arthritis, osteoarthritis, osteomyelitis, boredom, and stereotypical behavior. Held in isolation elephants become bored, depressed, aggressive, catatonic, and fail to thrive. Human caregivers are no substitute for the numerous, complex social relationships and the rich gestural and vocal communication exchanges that occur between free-living elephants. And while a captive elephant is generally better off with the company of another elephant, this is at best a small comfort and no justification for the deprivation of autonomy and free movement that results.

57. Elephants need sufficient space and social and environmental enrichment to maintain agility and good physical and mental health. It is simply not possible to meet an elephant's physical, social and emotional needs in a few acres. Without adequate space, no zoo can suitably manage and care for elephants. Suitable care of any captive elephant requires proper attention to their physical, social and emotional needs, but the space available to the elephant held at the Los Angeles Zoo ("L.A. Zoo"), and in zoo captivity generally, is grossly inadequate to address and satisfy their needs in any of these vital areas. There are multiple reasons for this conclusion.

58. Foremost among the considerations is the fact that elephants require large areas to travel. Life in a small area removes all autonomy from the elephants, destroys any

semblance of their ordinary social structure and with it, removes most of their emotional support. Accordingly, it is no surprise that the elephants at the L.A. Zoo have no autonomy; they have lived under the control of keepers who manage their every movement and make almost every decision on their behalf.

59. To make this point more clearly, the life histories, health and behavior of the over 2,200 free-ranging individuals who have been studied in Amboseli, can and should be compared with the health and behavior of elephants in captivity.

60. Elephants in the wild roam over large areas and move considerable distances each day. They are intelligent, highly social animals with a complex system of communication. Led by the oldest female--the matriarch--the family is bonded by kinship, affiliation, experience, great loyalty and affection. Elephants in the wild are raised in a positive and affiliative environment. In Amboseli, members of the elephant population range over approximately 5,000 sq km. Each elephant and its family have a core area of use encompassing at least 194 sq km. Elephants travel 8 to 20 kilometers a day, frequently walking further in areas of lower resource availability, or when a male is searching for receptive females. Figures for Asian elephants are similar with home ranges averaging 350 km for males and 100 to 115 km for females and daily movements ranging between 8 and 22 km.

61. In contrast, an L.A. Zoo elephant, of necessity, must be confined to a small area, on compacted soil and concrete. The elephants at the L.A. Zoo only have 3 acres of usable space, and that area is divided into four small yards ranging from approximately ¼ acre to 1 acre.[1] In such a small area, any natural substrate such as dirt, is converted into a hard compacted surface, and foot diseases, arthritis, weight related diseases, infertility, heightened aggression, and other neurotic behaviors almost invariably develop. Concrete and compacted ground places great strain on the feet and legs of these multi-ton animals.

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[1] Los Angeles Zoo elephant exhibit plans with enclosure dimensions: https://bit.ly/4390I3K

62. In the wild an elephant matriarch's strong leadership is obvious during a moment of crisis. Otherwise, any member of the family, including juveniles, can propose a course of action. Such a proposal may be followed by vocal negotiation during which members can make independent or group decisions regarding where to go and what to do. In other words, elephant society is democratic, not oppressive, authoritarian or despotic as life is for elephants in captivity where they are subject to the continual dominance and instruction of the keepers. Autonomy and freedom to choose is an important component of an elephant's well-being that cannot be met in a small, confined, externally controlled environment like a zoo.

63. Social networking is a predominant and essential aspect of an elephant's daily life. The L.A. Zoo simply cannot satisfy this requirement of an elephant's well-being. In fact, in captivity, elephants are frequently taken from the individuals with whom they are bonded, to be exchanged with elephants from other institutions.

64. In Amboseli, where elephants grow up in a nurturing social environment, have the freedom to move, and autonomy over their own lives, elephants do not develop foot or weight problems as they do in captivity in general, and at the L.A. Zoo in particular.

65. Of the 2,200 elephants who have lived in Amboseli over 34 years of study, not one has been observed to develop the type of foot infections and arthritic conditions so commonly observed in captivity. None have been overweight or obese.

66. In over 34,000 sightings of groups containing 1 to 550 elephants, not one elephant has been seen engaging in stereotypic behavior—such as bobbing its head up and down or swaying rhythmically back and forth. Yet, videos show Billy and Tina engaging in these abnormal behaviors: see here https://bit.ly/43b3eX3. Stereotypic behavior is a coping mechanism for the loneliness, boredom and frustration that characterizes zoo life, and is among the neurotic behaviors that are uniquely developed in captivity. Confined in small spaces, without autonomy of movement and behavior, and kept in socially deprived conditions, elephants become dysfunctional, unhealthy, depressed, and aggressive.

67. In addition to these emotional issues, confinement and inactivity leads not only to obesity, but also to foot diseases, joint problems, and arthritis. As a result, female zoo elephants are 31-72% heavier than their wild counterparts. Infertility, maternal rejection, maternal infanticide, high infant mortality, hyper-aggression are all common problems in captivity. Degraded by a life of repression, many captive elephants have inflicted deliberate injury and even death to their keepers.

68. The key biological and behavioral needs of elephants simply cannot be met in a zoo environment. Elephants need a chance to search for their own food, to roam on soft surfaces for hours, to interact with a range of companions, and to make their own choices. As explained above, the space at the Los Angeles Zoo is inadequate to provide for sufficient exercise, to promote social interactions or to allow for sufficient social group sizes to ensure emotional and behavioral development. The L.A. Zoo recently announced its plan to send Billy and Tina to the Tulsa Zoo in Oklahoma, but relocating them to another zoo is no solution. The Tulsa Zoo confines its five elephants to a small, barren enclosure with an industrial barn.[2] The Tulsa Zoo has an active captive elephant breeding program[3] and subjects the bulls to invasive semen collection procedures.[4] At least one of the elephants held captive there has been documented engaging in stereotypic behavior, which, as explained above, is abnormal behavior unique to zoo captivity and an indication of chronic stress.[5]

Sanctuary is Often the Best Option for Captive Elephants

69. For elephants in captivity, especially those born into it or kept there for a majority of their lives, going back to the "wild" is unfortunately not normally an option (but see Elephant Reintegration Trust – https://www.elephantreintegrationtrust.com/projects).

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[2] https://buildingbeyond.org/projects/lost-kingdom-elephants/

[3] https://www.aza.org/connect-stories/stories/tulsa-zoo-opens-new-elephant-preserve-barn (noting that the zoo's new elephant enclosure will "allow the facility to house multiple male elephants, and add privacy yards for new mothers and calves"); AZA

[4] *Population Anlaysis & Breeding and Transfer Plan, Asian Elephant (Elephas maximus) AZA Species Survival Plan Provisional Program*. The most recent breeding plan for Asian elephants in AZA accredited zoos shows that the Tulsa Zoo is subjecting its bull elephants to semen collection to be used in artificial insemination attempts. (pgs. 9, 23). https://drive.google.com/file/d/1L-DD-lXOIuvYPWbool3o7eL1kGxqIBZi/view?usp=sharing

[5] https://www.youtube.com/watch?v=aVk3Oo5nzDk&t=4s

For these elephants, human-run sanctuaries are currently the best option. The reasons are explained in detail in Poole & Granli, 2008 and relate to the orders of magnitude of greater space that is offered in sanctuaries. Such space permits autonomy and allows elephants to develop more healthy social relationships and to engage in a near natural movement, foraging, and repertoire of behavior.

70. Elephants are highly social animals and, whether male or female, they are suited to the company of other elephants. Elephants in captivity often do not get on with the elephants their captors select to put them with. Being fenced into areas too small to permit them to select between different companions and when to be with them, they have no autonomy. Elephants need a choice of social partners, and the space to permit them to be with the ones they want, when they want, and to avoid particular individuals, when they want.

71. Compliance with Association of Zoos and Aquariums (AZA) Standards for Elephant Management and Care, the United States federal Animal Welfare Act, or similar standards, laws, and regulations is inadequate for ensuring the wellbeing of elephants. I have long promoted the development of elephant sanctuaries and co-founded one of them (Santuário de Elefantes Brasil), because our more than four decades long study of free living elephants shows that the AZA specifications are woefully inadequate for meeting the needs of elephants (Poole & Granli 2008).

Examples of Successful Releases of Elephants to Sanctuary

72. Elephants with serious physical or psychological problems in zoos have usually become more normal functioning elephants when given more appropriate space in a sanctuary such as the Performing Animal Welfare Society (PAWS) in Northern California, The Elephant Sanctuary in Tennessee or Santuário de Elefantes Brasil.

73. For example, Maggie was considered to be an anti-social, aggressive elephant and by the time she was moved from the Alaska Zoo to PAWS she was in such poor condition she could barely stand. Yet until her death in 2021 she thrived at PAWS. Indeed she was considered to be PAWS' most social elephant (Ed Stewart, pers. comm.).

74. Ruby was transferred from the LA Zoo to the Knoxville Zoo in Tennessee where she did not successfully integrate with their elephants. When she was moved to PAWS

she integrated easily with the other elephants and became respected leader of her group (Ed Stewart, pers. comm.).

75. Sissy is another classic example. She had been transferred four times and had spent a decade and a half alone before being sent to the Houston Zoo, where she was labeled autistic and antisocial. She was returned to her solitary zoo where she killed a person. She was moved again to El Paso Zoo, where she was beaten because she was a killer elephant. In 2000 she was transferred to The Elephant Sanctuary in Tennessee (TES) and within six months of arrival she was calm and cooperative. She became a leader, putting all elephants at ease. In 2000 the United States Department of Agriculture (USDA) had given Sissy only a year to live. More than two decades later she is still going strong (Scott Blais, pers. comm.).

76. Bunny had been transferred four times and had only known a less than half an acre exhibit when she arrived at TES. She was 47 years old and had spent 40 years alone. Within 24 hours of arriving at sanctuary she was completely and seamlessly integrated into the group (Scott Blais, pers. comm.).

77. Maia and Guida, the first two elephants at Santuário de Elefantes Brasil, had lived together for 40 years. For most of these years, Maia was aggressive to Guida, knocking her over, pushing her down and pinning her to the ground. Within 12 hours of arriving at the sanctuary the gates were opened up between them. From the moment of arrival onward, no further aggression was seen. The sanctuary is currently home to six rescued elephants, with more on the way, who share 75 acres, including one area of 40 acres, another of 22 acres and three other smaller areas ranging from 1.5 to 4 acres. The three smaller yards are introductory areas to help assimilate and provide flexible care depending on the physical and emotional needs of the elephants, and they are generally left open into the larger habitats to permit a greater level of exploration and autonomous living. This combination of possible spaces allows for adaptable integration of new elephants. Presently, there is one female African elephant residing within 5.3 acres, divided into three interconnected spaces, with expansion up to 80 acres under construction. The second female African elephant is anticipated to arrive within the 6 weeks, while conversations advance for the retirement of elephants from other Latin American zoos. Santuário de Elefantes Brasil owns a total of 2800 acres (Scott Blais, pers. comm.).

78. In South Africa, African elephants that have been released from long-term captivity to the wild, after a period of suitable rehabilitation, have all adapted entirely, successfully resuming life as wild elephants despite decades in captivity, and not having lived in the ‘wild' since they were juveniles (see Elephant Reintegration Trust – https://www.elephantreintegrationtrust.com/projects).

79. As the above examples illustrate, the problems seen in captive elephants can usually be mitigated with the proper attention and environment. There is no basis for arguing that captive and wild elephants are fundamentally different. They have the same biology and needs, but the failure of captivity to meet these needs results in physical and psychological problems.

80. Captive elephants have been safely and successfully transferred long distances to sanctuary. For example, PAWS has been involved in moving more than a dozen elephants over the years without incident. These moves include older females from places as far away as Alaska and Toronto, Canada. Some of these elephants had lived in their prior facilities for over 40 years. There is no evidence that the inevitable stress of these moves has had a long-term effect on any of the elephants. Santuario de Elephantes Brasil moved Rana (https://globalelephants.org/rana/), a confiscated ex-circus elephant in her 50s, 1,675 miles to their sanctuary in late December 2018. In May 2020, in the midst of the global COVID-19 pandemic, an elephant named Mara (https://globalelephants.org/mara/) was transferred nearly 1,700 miles from the Buenos Aires Zoo to the same sanctuary, where she almost immediately bonded with Rana and has adapted well to life in sanctuary.[6] In November 2020, following an order of the Islamabad High Court, a male Asian elephant named Kaavan was flown about 2,500 miles from the Marghazar Zoo in Islamabad, Pakistan to the Kulen Promtep Wildlife Sanctuary in Cambodia, where he is adjusting and immediately began interacting with other elephant residents.[7]

Summary

[6] Brook Jarvis, “How to Move Your Elephant During a Pandemic,” New York Times (Aug. 9, 2020), available at: https://www.nytimes.com/2020/08/09/science/coronavirus-elephants-wildlife-zoo.html.

[7] Kelli Bender, “Kaavan the 'World's Loneliest Elephant' Makes an Elephant Friend for the First Time in 8 Years,” People (Dec. 1, 2020), available at: https://people.com/pets/kaavan-worlds-loneliest-elephant-meets-first-elephant-in-8-years/.

81. Scientific knowledge about elephant intelligence has been increasing rapidly in the past decade: what we currently know is only a tiny fraction of what elephant brains are likely capable of, and yet more amazing abilities are still likely to be discovered. But even based on what we know at this stage, including through my own and my colleagues' extensive experience, observations and studies, both African and Asian elephants share many key traits of autonomy with humans and like humans are autonomous beings.

I declare under penalty of perjury under the laws of the State of California that the foregoing is true and correct.

Executed on the ___13___ (date) of ___May___ (month), __2025____ (year)

at_______Borøya, Norway_______
(city or other location, and state or country)

_Joyce Poole, Ph.D.____

____

____
(signature)

EXHIBIT A

CURRICULUM VITAE

DR. JOYCE H. POOLE

(Updated 2 February 2022)

Born in Germany, 1 May 1956; United States citizen
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Facebook: www.fb.com/elephantvoices; **Instagram**: www.instagram.com/elephantvoices
Twitter: www.twitter.com/elephantvoices

RESEARCH INTERESTS

Acoustic communication, Cognitive science, Decision-making, Conservation.

EDUCATION

Postdoctoral	Princeton University Research Fellow 1984-1988; Advisor: Daniel Rubenstein.
Ph.D. 1982	University of Cambridge, U.K, Sub-Department Animal Behaviour. Dissertation*: Musth and male-male competition in the African elephant*; Supervisor: Robert Hinde.
B.A. 1979	Smith College, High Honours in the Biological Sciences. Dissertation: *Behavioral-Ecology of the African elephant.*

HONOURS AND AWARDS

2017	The Taft School - Horace Dutton Taft Alumni Medal
2015	Jackson Hole Wildlife Film Festival - Outstanding Achievement Award
2007	California Legislature Assembly - Certificate of Recognition *for tireless efforts in educating people on elephant captivity.*
1996	Smith College Medal - for elephant research and conservation work, *exemplifying the true purpose of a liberal arts education.*
1979	American Society of Mammalogists - A. Brazier Howell Award for paper on *musth* in African elephants.

PROFESSIONAL SOCIETIES/ BOARD and ADVISORY MEMBERSHIPS

2019	Member, Honorary Board of Directors, Performing Animal Welfare Society, PAWS
2017-present	Member, African Elephant Specialist Group, IUCN
2015-present	Member, Board of Directors, Global Sanctuary for Elephants
2015-present	Member, Conservation Alliance of Kenya
2010-present	Member, Kenya Elephant Forum
2010	Member, Alliance for Captive Elephants
2008-present	Member, Board of Directors, ElephantVoices
2004	Member, Panel of Experts, Species Survival Network
2002-2009	Member, Scientific Advisory Committee, Amboseli Elephant Research Project
2002-2011	Trustee, Amboseli Trust for Elephants
2001	Member, Science Advisory Board, Captive Elephant Management Coalition
1988-present	National Geographic Explorer
1988-2001	Member, African Elephant Specialist Group, Species Survival Commission, IUCN

EMPLOYMENT

2002-present	**Scientific Director, ElephantVoices:** Directing the research, conservation and welfare work of the US non-profit organisation, ElephantVoices.
2002-2007	**Research Director, Amboseli Elephant Research Project:** Amboseli Trust for Elephants: Overseeing the elephant monitoring and collaborative research projects, and training programs for the 3 decades long study of elephants.
1999-2001	**Consultant**, **Basecamp Explorer AS:** Wildlife issues.
7/96 & 7/97	**Consultant, IMAX**: Scientific Advisor *Africa's Elephant Kingdom*, Discovery.
1994-1997	**Consultant, Richard Leakey & Associates:** Training; Lecturing; Advisor, wildlife documentaries.
1994-1995	**Author**, *Coming of Age with Elephants* (Hyperion Press, 1996; Hodder & Stoughton, 1996).
1991-1994	**Coordinator, Elephant Program, Kenya Wildlife Service:** Setting and implementing Kenya's elephant conservation and management policy; supervising management-oriented research; reconciling land use and other conflicts between elephants and people; building local expertise.
1990-1991	**Consultant, World Bank:** Pre-Project Facility, drafting the Elephant Conservation and Management Policy and Research Policy Framework and Investment Program, Kenya Wildlife Service.
1990	**Consultant, International Union for the Conservation of Nature:** Compiling overview of elephant conservation in Eastern Africa for Paris Donors Conference.
1989	**Consultant, Tanzanian Wildlife Department:** Drafting successful proposal to the Convention on Trade in Endangered Species to up list the African elephant to Appendix I of the Convention.
1989	**Consultant, World Wildlife Fund:** Discussions with Japanese and Chinese government officials and ivory carvers regarding detrimental impacts of the ivory trade on elephant survival.
1989	**Researcher, African Wildlife Foundation:** Assessing effects of poaching on East African elephant populations.

FIELD RESEARCH

2020-ongoing	**Kenya:** Amboseli National Park: Documenting elephant behavior and communication for The Elephant Ethogram
2011-2019	**Mozambique:** Elephant monitoring and research, as part of the Gorongosa Restoration Project, Gorongosa National Park.
2011-2016	**Kenya:** Elephant conservation and citizen-science project in the Maasai Mara ecosystem.
2008	**Sri Lanka:** Minneriya-Kaudulla National Parks: Initiating an Asian elephant conservation project and behavior study.
1998-2009	**Kenya:** Amboseli National Park: Elephant communication, cognition and social behavior, conducting playback experiments and recording elephant vocalisations and behavior.
1998	**Kenya:** Maasai Mara National Park, Tsavo National Park & Laikipia District: Recording elephant vocalisations and behavior.
1997	**Tanzania:** West Kilimanjaro: Assessing elephant numbers and habitat use.
1990-1994	**Kenya:** Overseeing numerous elephant surveys and studies of elephants carried out under my direction by the Kenya Wildlife Service Elephant Program.
1975-1990	**Kenya:** Amboseli National Park: Male elephant behaviour; reproductive behavior; elephant vocal, gestural and olfactory communication.
1989	**Kenya, Uganda, Tanzania:** Amboseli, Tsavo, Queen Elizabeth and Mikumi National Parks: Assessing the effects of poaching on the age structure and social and reproductive patterns of elephant populations in East Africa.
1980-1982	**Kenya:** Amboseli National Park: Focal animal sampling *Musth* and male male competition among elephants.
1975-1979	**Kenya:** Amboseli National Park: participating in Cynthia Moss' long-term studies of elephants, identifying individual elephants, and collecting social behavior, demographic and ranging data.

LANGUAGES

English: Mother tongue
Kiswahili: Fluent
Norwegian: Working knowledge

PUBLICATIONS

Refereed articles, chapters, theses:

Published:

Lee, P.C., Moss, C.J, Njiraini, N., Poole, J.H., Sayialel, K. Fishlock, V.L. 2021. Cohort consequences of drought and family disruption for male and female African elephants. Behavioral Ecology, https://doi.org/10.1093/beheco/arab148

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Lee, P.C., Bussière, L.F., Webber, C.E., Poole, J.H., Moss, C.J. 2013. Enduring consequences of early experiences: 40 year effects on survival and success among African elephants (Loxodonta africana). *Biology Letters*. 04/2013; 9(2):20130011. https://royalsocietypublishing.org/doi/10.1098/rsbl.2013.0011.

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Poole, J.H. and C.J. Moss. 1981. Musth in the African elephant, *Loxodonta africana*. *Nature*, 292:830-831.

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Hedges, S., Beyers, R., Blake, S., Douglas-Hamilton, I., Fay, M., Greer, D., Fishlock, V., Foley, C., Grossman, F., Hart, J., Hart, T., Hicks, C., Lahm, S., Lee, P., Lindsay, K., Maisels, F., Moss, C., Nixon, S., Plumtre, A., Poole, J., Rainey, H., Redmond, I., Starkey, M., Stokes, E., Turkalo, A., Wittemyer, G. 2010. The status of African elephants (*Loxodonta africana*) in the 2008 IUCN Red List of Threatened Species: a critique. Submitted to IUCN.

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Poole, J.H. 1990. Elephant Conservation and Management. Annex 7b. In *The Zebra Book. Policy Framework and Five-Year Investment Programme.* Kenya Wildlife Service Publication. 54p.

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Popular Articles:

Cowell, G., Poole, J., Granli, P. 2017. Nalakite: The story of a Maasai Mara Matriarch. National Geographic Society Newsroom.

Poole, J., Granli, P. 2014. Gift to the Maasai Mara, a Male Elephant is Born. National Geographic Society Newsroom.

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Books:

Poole, J.H. 1997. *Elephants*. Colin Baxter Photography, Grantown-on-Spey, Scotland.

Poole, J.H. 1996. *Coming of Age with Elephants.* Hyperion Press, New York; Hodder & Stoughton, London.

PUBLIC EDUCATION

Websites and Social Media

ElephantVoices website	www.ElephantVoices.org
ElephantVoices on Facebook	www.facebook.com/elephantvoices
ElephantVoices on Instagram	www.instagram.com/elephantvoices
ElephantVoices on Twitter	www.twitter.com/elephantvoices
ElephantVoices on Vimeo	www.vimeo.com/elephantvoices
ElephantVoices on SoundCloud	www.soundcloud.com/elephantvoices
The Elephant Charter	www.theelephantcharter.info

Online Databases & Apps

The Elephant Ethogram: A Library of African Elephant Behavior Over 400 African savanna elephant behaviors documented with written descriptions, 2,400+ educational video clips and hundreds of audio files and images.

Gorongosa Elephants Who's Who & Whereabouts houses identity, demographic and sightings data for 396 adult elephants from Gorongosa National Park population, Mozambique. (Password-protected)

Mara Elephants Who's Who & Whereabouts houses identity, demographic and sightings data for 1,282 adult elephants from the Maasai Mara population, Kenya.

Mara EleApp: A cellphone application for data collection by scientists and citizen scientists for upload to the Mara Elephants Who's Who & Whereabouts

Gorongosa EleApp: A multi-language (English, Portuguese) cellphone application for data collection by scientists and citizen scientists for upload to the Gorongosa Elephants Who's Who & Whereabouts (Password-protected)

Printed Articles and books highlighting the work of Joyce Poole (a selection)

Elephant social behavior and communication research and conservation work featured in:
Aftenposten, Daily Telegraph, LA Times, Highlights for Children, Kyodo News, National Geographic Adventure, National Geographic Explorer, National Geographic Kids, National Geographic Magazine, National Geographic News, New York Times Magazine, New York Times, Readers' Digest, Science, Science News, Science Times, Scientific American, Scholastic, Spektrumdirekt, The Guardian.

2021 What Has Four Legs, a Trunk and a Behavioral Database, New York Times.

2021 The First Google Translate for Elephants Debuts, Scientific American.

2021 What are elephants saying? First-ever library reveals communication mysteries, National Geographic.

2021 Roat-Rumble And Squeal-Trumpet: Scientists Compile An Elephant Lexicon, Forbes.

2014 Jodi Picoult, *Leaving Time*, a novel.

2005 Kay Redfield Jamison, *Exuberance: A Passion for Life,* non-fiction.

2001 Martin Meredith's *Africa's Elephant*, a biography.

1992 Doug Chadwick, *Fate of the Elephant.*

1992 Doug Chadwick in his feature article for National Geographic Magazine.

Artistic work featuring elephant calls recorded by Joyce Poole (a selection)

2016 Carlos Casas, *Cemetery*, film, a visual and acoustic work in progress.

2013 Paul Winter, *Summer Solstice Celebration Performance* June 22 at the Cathedral in New York.

2010 Paul Winter, *Miho, Journey to the Mountain.*

2009 James Cameron, *Avatar*, film.

2002 Ruichi Sakamoto, *Elephantism,* DVD Book interviews and discussions.

2002 Jim Metzner, *Pulse of the Planet: Extraordinary Sounds from the Natural World*.

Radio (a selection)

2021 Scientist Joyce Poole On What Elephants Have To Say, NPR.

2012 Sam Litzinger interview on The Animal House/NPR (WAMU 88.5).

2009 Elephant welfare views featured on WBUR's Inside Out Documentary on American Zoos with Diane Toomey.

2008 Elephant communication research featured in Up Front Radio, San Francisco with Sandip Roy Chowdhury.

2008 Elephant communication, cognition and welfare with Karl Losken Animal Voices 102.7fm in Vancouver BC Canada.

2005 Science Update, American Association for the Advancement of Science (AAAS).

2005 BBC Radio Science, the Leading Edge.

2005 German Public Radio (SWR) program Campus.

2005 NPR Elephant vocal learning.

2005 BBC News Scotland Vocal Learning in elephants.

2005 Elephant welfare ABC's Radio 702 with Rory McDonald.

2004 Elephant communication research featured in BBC's Beyond our Senses program Sounds of Life with Grant Sonnex.

2004 Elephant communication research featured in NPR program on elephant language.

1996 WETA-FM, News 820's Openline & WNYC.

1981 Musth in the African elephant, BBC Radio 4, The living World.

Television (a selection)

2019 *Women of Impact,* National Geographic.

2016 *Mind of a Giant, award winning documentary,* National Geographic and Vulcan Productions.

2015 *Rebirth of Paradise, Episodes 2 and 5* National Geographic and PBS.

2013 *An apology to elephants,* HBO.

2012 *War Elephants*, award winning documentary about the traumatised elephants in Gorongosa National Park, Mozambique, and their recovery. National Geographic Wild, worldwide.

2012 Live conversation on National Geographic's Facebook Page.

2008 Elephant communication research is featured in Elephant having tales to tell, NHK, Japan (Japanese and English versions).

2006 Interview on elephant communication and cognition for Smart Planet for REDES-TVE, Spain.

2005 Elephants and vocal learning, Daily Planet Discovery Channel Canada.

2005 Elephant cognition and conservation views featured on National Geographic Explorer *Elephant Rage.*

2004 Elephant recordings featured in Discovery Channel's Echo III.

2002 Elephant communication research, Elephant's Talk, featured in BBC documentary *Talking with Animals.*

1999 Research featured in *Inside the Animal Mind Part 3 Animal Consciousness, WNET Nature.*

1998 Featured on Episode 16, *Elephants*, in series, *Champions of the Wild*, Omni Film Productions, Vancouver, Canada.

1996 Life, elephant research and conservation work subject of National Geographic Special, *Coming of Age with Elephants.*

1996 *Wildlife Warriors,* National Geographic Special.

1996 *A Voice for Elephants USIA AfricaPIX.*

1996 Discovery Channel documentary “Ultimate Guide to Elephants”.

1990 *Elephants like us*, Rossellini and Associates.

1990 *The language of the elephants*, Rossellini and Associates.

1989 Elephant research and conservation work featured in National Geographic Special *Ivory Wars.*

1988 Research highlighted in BBC production *Trials of Life* with David Attenborough.

1988 Work on elephant infrasound featured in *Supersense* BBC Natural History Unit series on animal senses.

1987 Featured in Sports and Adventure, *Women of the World.*

Work also featured on News and Talk shows such as CNN, 1993, ABC news Women and Science, The Today Show, 1996, West 57th Street CBS News, 1989, PM Magazine, 1987.

EXHIBIT B

Exhibit B

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Bates L.A. & R.W. Byrne (2014) Primate Social Cognition: What we have learned from nonhuman primates and other animals. In: *APA Handbook of Personality and Social Psychology Vol. 1. Attitudes and Social Cognition*. Eds. M.Mikulincer & P.R. Shaver. APA, Washington, DC.

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Exhibit 2

Declaration of Michael A. Pardo

I, Michael A. Pardo, declare as follows:

Introduction and Qualifications

1. My name is Michael A. Pardo. I graduated with a Bachelor of Science (*Summa Cum Laude*) in Environmental Biology from the State University of New York College of Environmental Science and Forestry in 2012. I earned a Ph.D. in Behavioral Biology from the Department of Neurobiology and Behavior at Cornell University in 2019, where I studied vocal communication and social cognition in both Asian elephants and acorn woodpeckers. From November 2019 to October 2023, I was a National Science Foundation Postdoctoral Research Fellow in the Department of Fish, Wildlife and Conservation Biology at Colorado State University, where I studied vocal communication in African savannah elephants. Since November 2023 I have been a postdoctoral associate in the K. Lisa Yang Center for Conservation Bioacoustics at the Cornell Lab of Ornithology.
2. I submit this declaration in support of the Nonhuman Rights Project, Inc.'s petition for a writ of habeas corpus regarding the captive elephants at the Los Angeles Zoo. I am a nonparty to this proceeding.
3. I study vocal communication, social cognition, and population ecology in animals, and most of my work has been with elephants or birds. My research focuses on animal vocalizations from a variety of perspectives, including investigating how wild animals communicate with one another, playing back pre-recorded vocalizations to wild animals to explore their cognitive ability to understand complex social scenarios, and using recordings of vocalizations to monitor wild animal populations for the purposes of conservation.

4. I have been studying elephant vocal communication and behavior for more than twelve years, since August 2012. For six of those years I was exclusively focused on elephants, and for the remaining six years I was also studying birds, while continuing to spend part of my time analyzing data and publishing scientific papers about elephants. I have spent over 21 months observing elephant behavior in the wild, including 7 months observing wild Asian elephants in Sri Lanka in 2012-2014, and 14+ months observing wild African savannah elephants in Kenya in 2019-2023. I have worked and co-authored studies with many of the world's preeminent elephant biologists, several of whom are also submitting declarations in this matter.
5. I have authored 10 peer-reviewed scientific journal articles about communication and cognition in elephants and other animals, as well as a book chapter about vocal communication in elephants. I have also co-authored a peer-reviewed book on statistical analysis geared toward other scientists who study animal behavior. My articles have been published in top scientific journals, including *Nature Ecology and Evolution*, *Current Biology*, *Proceedings of the Royal Society B*, *Royal Society Open Science*, *Behavioral Ecology*, and *Biological Reviews*. I have also written popular science articles about my work with elephants for *The Conservation* and *The UNESCO Courier*.
6. Additionally, my work on elephant vocal communication has been featured in more than 3,000 news articles, TV and radio broadcasts, and podcasts in at least 92 countries, including by major outlets such as the New York Times, the Associated Press, BBC World News, National Geographic Magazine, Scientific American, the Washington Post, CNN, Reuters, MSNBC, NPR: Morning Edition, The Atlantic, Fox News, Al Jazeera, and Vox.

My work was also featured in a documentary by Scripps News titled "How scientists are using AI technology to communicate with animals".

7. I have given several invited talks throughout the world, including: (1) Universidad CES, Medellin, Colombia, 2018; (2) University of Vienna, 2019; (3) Decoding Communication in Nonhuman Species Workshop, 2023; (4) Protolang Conference Symposium: Elephants as a promising model for studying language evolution, 2023; (5) Our Honor (continuing education for veterinarians), 2024; (6) Princeton University, 2024; (7) Interspecies Internet (consortium of scientists studying animal communication), 2024; (8) Leadership for Conservation in Africa: Unlocking Nature panel, 2024; (9) International Association of Lawyers: Elephants, Science and the Law panel, 2024; (10) Performing Animal Welfare Society, 2024; (11) University of California San Diego, 2024; (12) Frontiers in Social Evolution Seminar, 2025; and (13) Bridging Brains and Bioacoustics Seminar, 2025.
8. I was recently named to the EC50 Class of 2025 by The Explorers Club, an award given each year to "50 extraordinary people who are doing remarkable work to promote science and exploration."
9. My Curriculum Vitae fully sets forth my educational background and experience and is annexed hereto as "Exhibit A".

Basis for Opinions

10. The opinions I state in this Declaration are based on my professional knowledge, education, training, and years of experience observing and studying elephants, as well as my knowledge of peer-reviewed literature about elephant behavior and intelligence published in the world's most respected scientific journals and books that are generally accepted as

authoritative in the field. Much of this literature was written by myself or colleagues whom I have known for years and with whose research and field work I am personally familiar.

Opinions

Premise

11. Elephants are autonomous beings. Autonomy in humans and nonhuman animals is defined as self-determined behavior that is based on freedom of choice. As a psychological concept it implies that the individual is directing their behavior based on some non-observable, higher-order cognitive processes, rather than simply responding reflexively. Although we cannot observe these internal processes directly, we can infer their presence if animals exhibit behavior that would require higher-order cognitive processing in humans.

12. I shall indicate which elephant species specific observations refer to: African savannah elephants (*Loxodonta africana*), African forest elephants (*Loxodonta cyclotis*), both African species ("African elephants"), or Asian elephants (*Elephas maximus*). If the general term "elephants" is used with no specific delineation, it can be assumed that the comment in question applies to all three species. Note that in many cases the presence of a particular behavior has only been assessed in one or two of the three elephant species and data on the other species are lacking. Data are especially likely to be absent for African forest elephants, which are the most difficult of the three species to study. Thus, if a behavior is only mentioned as occurring in one or two elephant species, it should not be assumed that the behavior is absent in the other species unless I state otherwise.

Awareness of self and others

13. Self-awareness, or a conscious sense of self, is a strong indication that an individual is an autonomous being. The most widely used test for self-awareness in animals is the mirror

self-recognition test, in which the subject is marked on a part of their body they cannot see without the aid of a mirror, and if they touch the mark significantly more in the presence of the mirror than its absence, they are considered to have passed the test (Gallup 1970). One Asian elephant has been shown to recognize herself in a mirror in this way (Plotnik et al. 2006). Although two other Asian elephants tested in the same study failed, the mirror self-recognition test is widely recognized to be highly conservative, meaning that many animals may fail the strict requirements of the test even if they are self-aware (Brandl 2018). Even human children as old as six years often fail the mirror test depending on their cultural background (Broesch et al. 2011). Given that elephants naturally cover their bodies with mud and other debris as a form of sunscreen/insect repellent, they may not be motivated to remove a mark on their head (Plotnik et al. 2006). Thus, the fact that even one Asian elephant has passed this test suggests that Asian elephants are very likely self-aware.

14. Self-awareness is thought to be linked to theory of mind, or the ability to attribute mental states to others and understand that they do not necessarily have the same thoughts, beliefs, and feelings as oneself (van Veluw and Chance 2014). Elephants demonstrate an awareness of what others can see, a key component of theory of mind. Both Asian elephants and African savannah elephants were more likely to use begging gestures to obtain food from a human experimenter when the experimenter was facing them than when the experimenter was facing away (Nissani 2004; Smet and Byrne 2014a). In another study, African savannah elephants were more likely to use silent gestures when greeting another elephant who was looking at them, but were more likely to touch the intended receiver or vocalize when greeting an individual who was looking away (Eleuteri et al. 2024).

15. There are several anecdotal reports by experienced elephant researchers of adult African savannah elephants leading calves away from terrain that the adult could traverse but the calf could not toward an area that was easier for the calf to pass through. For example, adults have been observed to lead calves toward a less steep part of a riverbank, even though the adult herself had no issue climbing over the steeper part. This suggests that adult African savannah elephants understand that calves do not have the same physical abilities that they do (Bates, Lee, et al. 2008).
16. African savannah elephants understand human pointing and can use it to find hidden food (Smet and Byrne 2014b). They can also infer the direction of an olfactory stimulus based on the direction in which other elephants are sniffing, even if they have not yet smelled the stimulus themselves (Smet and Byrne 2020). This provides further evidence for African savannah elephants' ability to understand the mental states of others. Asian elephants do not respond to human pointing on average, although some individual Asian elephants may respond to the gesture (Ketchaisri et al. 2019). However, this should not be taken to mean that Asian elephants lack an ability to understand the mental states of others. Asian elephants' ability to take into account what humans can see (Nissani 2004) and to comfort other elephants in distress (Plotnik and de Waal 2014; see below) strongly suggests that, like African elephants, they do in fact understand others' mental states. They may simply not respond to pointing because it is a human gesture that is not part of their natural behavioral repertoire or because they don't rely very heavily on vision (Ketcharisri et al. 2019).

Behavior towards the dead

17. Both African savannah elephants and Asian elephants display unusual interest in the remains of deceased elephants, suggesting that they may have an awareness of death. They frequently react to dead elephants by standing near the body and repeatedly touching it (Douglas-Hamilton et al. 2006; Goldenberg and Wittemyer 2020; Sharma et al. 2020). In two separate experiments, researchers presented African savannah elephants with the bones of elephants and other large mammals (giraffes, rhinos, and buffalos) and the elephants extensively touched and smelled the elephant bones but ignored the bones of the other species, indicating that they recognize the remains of their own species, even when all the soft tissue has rotted away (McComb et al. 2006; Goldenberg and Wittemyer 2020). Both African savannah and Asian elephants been observed attempting to lift or support dying and very recently deceased elephants, but they have not been observed to do so with older remains, suggesting that they may understand the finality of death (Goldenberg and Wittemyer 2020; Sharma et al. 2020).

18. Elephants sometimes transport elephant remains. African savannah elephants frequently carry the bones and tusks of deceased elephants away from the carcass, and female African savannah and Asian elephants have been observed carrying or dragging dead calves (Goldenberg and Wittemyer 2020; Pokharel et al. 2022).

19. On several occasions, African savannah elephants have been observed partially covering elephant carcasses or the severed body parts of other elephants with soil or branches (Goldenberg and Wittemyer 2020). They also frequently visit the carcasses of deceased elephants. In a long-term study of African savannah elephants in Northern Kenya, all carcasses recorded in protected areas exhibited signs of repeated visitation by other

elephants, and elephants visited the carcasses of both relatives and non-relatives (Goldenberg and Wittemyer 2020).

20. A recent study documented five Asian elephant calves who were found partially buried in irrigation ditches in West Bengal, India, with only their legs protruding above the ground (Kaswan and Roy 2024). The authors argued that the calves were intentionally buried by other elephants based on several indirect pieces of evidence. 1) The calves all died of natural causes (cardiac arrest or bacterial infection), and there were no signs of human-caused injury, suggesting that the calves were not killed and buried by humans. 2) At least 3 of the 5 calves were surrounded by elephant footprints and/or elephant dung, indicating that a family group of elephants was present after the calf was buried. 3) At least 4 of the 5 calves had bruising or bleeding on their backs, consistent with the carcass being dragged some distance after death. 4) One of the calves was discovered 500 m from a human settlement and a post-mortem exam concluded that he had been dead for 60-72 hours. Kaswan and Roy argued that it is unlikely that the half-buried calf carcass would have gone unnoticed for 60-72 hours, suggesting that he was dragged there after death. 5) The irrigation ditches were 0.6-0.7 m deep, which Kaswan and Roy argued was likely too shallow for a calf to become trapped in. If these calves were indeed buried by other elephants, it would be an unprecedented example of sophisticated funerary behavior outside of humans.

21. Interestingly, Asian elephant family groups avoided the places where the calves were buried immediately after the burial, even though some of the calves were located along routes that were previously heavily trafficked by elephants (Kaswan and Roy 2024). This contrasts starkly with African savannah elephants going out of their way to visit elephant

carcasses (Goldenberg and Wittemyer 2020) and might reflect a difference in how the two species relate to death.

Social structure and relationships

22. Elephants live in complex societies with many differentiated social relationships. In all three species, males leave their mother's group as adolescents, and adult males live mostly separately from females and their dependent offspring (Moss and Poole 1983; de Silva and Wittemyer 2012; Fishlock and Lee 2013).
23. Female African savannah elephants live in a society with nested tiers of social affiliation. The most fundamental social unit is an adult female and her dependent calves. Multiple related females form a tightly knit "family group", led by the oldest female, or "matriarch". Multiple related family groups form a more loosely knit "bond group", and multiple unrelated bond groups form a "clan" (Moss and Poole 1983; Wittemyer et al. 2005). Female African savannah elephants regularly separate from and rejoin with their social affiliates in a "fission-fusion" dynamic, with larger groups tending to form in the wet season when more food is available (Wittemyer et al. 2005).
24. Female Asian elephants also live in social groups comprised of multiple related females and their dependent offspring, and like African savannah elephants exhibit a high degree of fission-fusion dynamics (Vidya and Sukumar 2005; de Silva et al. 2011; Nandini et al. 2018). However, their social groups tend to be smaller and less closely knit than those of female African savannah elephants (de Silva et al. 2011; de Silva and Wittemyer 2012).
25. Female African forest elephants typically travel in very small social groups consisting of just a mother and her dependent offspring due to the constraints of finding food in a dense rainforest environment (Fishlock and Lee 2013). However, they frequently congregate in

forest clearings for the purpose of social interaction (Fishlock and Lee 2013). Moreover, genetic analysis of dung samples has revealed that African forest elephants preferentially associate with related individuals at a dispersed spatial scale, which suggests that they maintain social relationships with kin even if they are not always close together (Schuttler et al. 2014).

26. Female African savannah elephants rely on the knowledge of the matriarch to navigate social interactions and avoid threats. Groups with more experienced matriarchs are better able to distinguish between the calls of familiar and unfamiliar elephant families and better at distinguishing between the roars of male and female lions, which pose different degrees of threat to elephants (McComb et al. 2001; McComb et al. 2011).
27. Matriarchs are also important sources of spatial knowledge in African savannah elephants. One study examined the movement patterns of three elephant clans in Tarangire National Park, Tanzania during a drought. Two of the clans had several family groups with matriarchs over the age of 30, and these clans left the park in search of food and water elsewhere. The third clan had only one family matriarch over the age of 30 due to heavy poaching. This clan stayed in the park during the drought, and as a result, suffered much higher infant mortality than the two clans that left. This suggests that female African savannah elephants rely on the knowledge accumulated by matriarchs to find water and food during times of drought (Foley 2002).
28. In semi-captive Asian elephants in Myanmar, the mortality rate of calves was eight times lower if their grandmother lived with them, suggesting that older females play a critical role in Asian elephant society as well (Lahdenperä et al. 2016).

29. In the 1980’s, South Africa culled African savannah elephants in Kruger National Park by shooting the adult members of family groups and capturing the young calves. Some of the juvenile elephants orphaned by these culls were translocated to Pilanesberg National Park, where they matured in the absence of older adults. Decades after the culling operations, female elephants in Pilanesberg showed impoverished social skills compared to a relatively undisturbed population in Amboseli National Park, Kenya. The Pilanesberg elephants failed to distinguish between the voices of familiar and unfamiliar individuals and failed to recognize vocal cues to the age of the caller, in sharp contrast to the Amboseli elephants. This indicates the importance of social learning for normal elephant behavior and the lasting negative impact of early social trauma in elephants (Shannon et al. 2013).

30. While male elephants were once thought to be solitary, it is now known that this is not the case (Morris-Drake and Mumby 2018; LaDue et al. 2022). Males frequently associate with other males in small loosely-knit groups with fission-fusion dynamics, and at least in African savannah elephants, studies have shown that they have preferred social partners and are more likely to associate with males to whom they are related (Evans and Harris 2008; Chiyo et al. 2011; Goldenberg et al. 2014; LaDue et al. 2022). Male Asian elephants in India form long-term, stable groups in human-modified landscapes, likely as a response to the danger associated with living near humans (Srinivasaiah et al. 2019).

31. Mature male elephants go through a period called musth every year, which is characterized by elevated testosterone levels, aggression, and sexual activity, and different individuals enter musth at different times of the year (Poole 1987). While male African savannah elephants tend to associate with each other most when they are not in musth, some males, especially older individuals, maintain their social ties even when in musth (Goldenberg et

al. 2014). Musth also affects social behavior in male Asian elephants, with older males primarily associating with other males when not in musth and with female groups when in musth, and younger males exhibiting the opposite pattern (LaDue et al. 2022).

32. At least in African savannah elephants, older males play a critical role in male sociality, just as matriarchs do for female African savannah elephants. Adolescent male African savannah elephants prefer to be near older males (Evans and Harris 2008), and older males are more socially connected and have stronger social relationships, suggesting that they are important for the cohesion of male social groups (Chiyo et al. 2011). Mature and highly socially integrated males are also more likely to initiate coordinated group movement, suggesting that they play a leadership role (O'Connell-Rodwell et al. 2024).

33. Young males in Pilanesberg National Park, South Africa, who matured in the absence of adult role models after their families were killed in government culls entered musth at a much younger age than is typical in undisturbed populations. They also exhibited the aberrant behavior of attacking and killing rhinos, possibly as a result of the psychological trauma they experienced as juveniles. When older males were introduced into the Pilanesberg population, this suppressed musth and rhino killing in the younger males, (Slowtow et al. 2000). Another study found that wild male African savannah elephants were less aggressive toward vehicles and non-elephant animals when older males were present (Allen et al. 2021). These studies further highlight the key leadership role of older males in African savannah elephant society.

34. Elephant social bonds appear to have a strong emotional component, evidenced by the behaviors that elephants exhibit when separated from and re-united with bonded social partners. When reuniting after a period of separation, bonded elephants produce greeting

displays that involve loud overlapping vocalizations, touching one another with their trunk, spinning around to stand in parallel with each other, and producing olfactory signals (urinating, defecating, and streaming fluid from their temporal glands) (Poole 2011; Eleuteri et al. 2024). Many of the vocalizations produced during these displays have acoustic properties that are associated with emotional arousal in many mammals (including humans), such as nonlinear phenomena and higher and more variable fundamental frequencies (Wood et al. 2005; Poole 2011; Soltis et al. 2011). Similar displays also occur in other social contexts likely to involve high emotional arousal, such as the birth of a calf, after the family group has been threatened, or when a member of the group mates (Poole 2011).

35. The strongest bond in elephants is between a mother and her offspring. Because female African savannah and Asian elephants usually stay in the group they were born into, the bonds between mothers and female offspring are normally retained for life (Moss and Poole 1983; Wittemyer et al. 2005; Archie et al. 2006).
36. Female African savannah elephants rely on their mother to help them form other social relationships, especially with older individuals (Goldenberg et al. 2016; Goldenberg and Wittemyer 2017). Orphaned females tend to have fewer social relationships with older (and therefore more dominant) females, which may restrict their access to resources (Goldenberg and Wittemyer 2017).

Cooperation and empathy

37. Elephants are highly cooperative, reflecting their prosocial tendencies. In one study, captive Asian elephants were presented with food on a sliding platform with a rope threaded around it. The elephants could access the food by pulling on the rope, but only if

another elephant pulled on the opposite end of the rope simultaneously. If the subject tried to pull the rope by herself, it would simply become unthreaded, and the platform would not move. The elephants quickly learned to only pull the rope when their partner was present, and waited up to 45 seconds for their partner to arrive, indicating that they can act intentionally rather than impulsively (wait times longer than 45 sec were not tested) (Plotnik et al. 2011).

38. In another study, semi-captive Asian elephants were presented with a similar apparatus and cooperated with each other 80.8% of the time, even if they were not closely bonded. When competition was introduced to the task by modifying the apparatus such that the food could be monopolized by one individual, the elephants used various competition mitigation strategies to allow cooperation to continue. The way that elephants responded to competition also depended on their relationship; for example, elephants were more likely to tolerate freeloading from individuals with whom they had closer relationships (Li-Li et al. 2021).

39. In the wild, female elephants often help take care of each other's calves, a behavior known as allomothering (Lee 1987; Vidya 2014). At least in African savannah elephants, allomothers are typically related to the calf but are not necessarily first order relatives (Lee 1987). Allomothers comfort the calf when the calf exhibits distress, accompany the calf to prevent it from getting lost when separated from its mother, help retrieve the calf if it does become lost, help protect it from danger, and sometimes allow the calf to suckle from them, regardless of whether or not they are lactating (Lee 1987).

40. The renowned anthropologist Margaret Mead famously said that the earliest sign of civilization is a healed femur (thigh bone), because this indicates that people had empathy

and cared for injured members of their group (Gautam and Singh 2022). Elephants also help other elephants who are sick, injured, or in distress, which suggests that they likewise have a capacity for empathy. When an elephant is unable to stand due to illness or injury, other elephants often stand by them, nudge them in an attempt to make them stand, and sometimes attempt to lift them or support them to keep them from collapsing (Douglas-Hamilton et al. 2006; Bates, Lee, et al. 2008; Sharma et al. 2020, Pokharel et al. 2022).

41. Asian elephants sometimes produce vocalizations such as trumpets, roars, and squeaks in the presence of dead individuals (Pokharel et al. 2022). These call types are typically associated with heightened emotion, suggested that the elephants experience a strong emotional response to the death of a family member or acquaintance (Nair et al. 2009; de Silva 2010). In one such case, a wild adult female Asian elephant was observed near an injured calf who was unable to move. After the calf collapsed, the female produced three trumpets. She then stayed with the calf until he died, touching him, attempting to help him stand, and charging at a veterinary team who came to examine the calf. Although the calf was too young to have been weaned, the female showed no signs of lactating, suggesting that she might not have been the calf's mother (Sharma et al. 2020).

42. During my own fieldwork with African savannah elephants in Kenya, I often observed a family group known as the M8s. The matriarch of the group, Silvia, was shot and injured by poachers more than a decade prior and often lagged behind the rest of the family when they walked from the hills down to the river, possibly as a result of her old injury. Silvia's younger sister Adelaide would frequently wait by the river for Silvia to catch up, sometimes calling to Silvia repeatedly, before they crossed the river together.

43. Adult African savannah elephants frequently help calves who are stuck in the mud or in a ditch by pulling or pushing the calf out or by digging a path for the calf to climb out on its own. Pushing the stuck calf or digging a path for it imply an understanding of the calf's intentions, as these behaviors cannot be explained by the adult simply trying to come closer to a calf in distress. While it is most often the mother who helps the calf, other adult females often do so as well, and in one case a calf who had fallen over was helped back up by an unrelated adult male (Bates, Lee, et al. 2008).

44. Elephants also comfort individuals who are in emotional distress, even if they are no longer in physical danger. African savannah elephants frequently comfort calves who have emitted distress calls by gently touching them and producing specific vocalizations known as "coo rumbles" (Bates, Lee, et al. 2008; Poole 2011). In one study of captive Asian elephants, the elephants directed more affiliative physical contact toward both adults and juveniles who had just exhibited distress, suggesting that they also comfort each other (Plotnik and de Waal 2014). The Asian elephants also produced more squeak vocalizations and trunk bounces after another individual in the group exhibited distress (Plotnik and de Waal 2014), which are signals generally associated with agitation (de Silva 2010). This suggests that they exhibit emotional contagion, a key component of empathy in which individuals adopt one another's emotional state (Plotnik and de Waal 2014).

Memory

45. As might be expected given their complex social networks and strong social bonds, elephants have an impressive ability to recognize and remember other individuals. Female African savannah elephants can distinguish between the calls of close social affiliates (family or bond group members), distant social affiliates (clan members), and non-

affiliates. This implies that, on average, a female African savannah elephant can recognize the voices of at least 100 individuals, including individuals with whom she interacts very infrequently (McComb et al. 2000).

47. Even though male adult African savannah elephants primarily socialize with other males, they also recognize many if not most of the females in their population by voice. They can discriminate between the calls of females from their population and females from a different population, and show greater interest in the calls of unfamiliar females (Stoeger and Baotic 2017).

48. Evidence suggests that elephants can remember bonded social companions for many years. When male Asian elephants were presented with the urine of their mother after 2-27 years of separation, they still recognized her scent and discriminated between their mother's urine and the urine of other elephants (Rasmussen and Krishnamurthy 2000).

49. In another study, researchers played the call of a family member who had died 23 months prior to one family of African savannah elephants and played the call of a family member who had transferred to a different group 12 years prior to another family of African savannah elephants. Elephants in both families called back and/or approached the speaker in response to the call of a family member who had died or changed groups. Calling back and/or approaching the speaker is a typical response that elephants give to the calls of current family members, but very different from the response they give to unfamiliar individuals (bunching together and/or retreating), suggesting that the elephants remembered their family members' calls for years (McComb et al. 2000).

50. In a third study of long-term social memory, two mother-daughter pairs of captive African savannah elephants who had been separated for 2 and 12 years, respectively, were

reintroduced to each other in a zoo setting. Both mother-daughter pairs performed exuberant greeting displays upon reintroduction, including running toward each other, vocalizing, entwining their trunks together, touching heads, spinning around, urinating, and defecating. By contrast, unrelated elephants being introduced to each other for the first time primarily exhibited aggressive behavior. Only one out of the six unrelated elephants vocalized during the initial introduction and none of them ran toward each other, entwined their trunks, touched heads, spun around, urinated, or defecated (Hörner et al. 2021).

51. Studies of the movement patterns of African savannah elephants in the arid region of northern Namibia have revealed that they have highly developed spatial memories. These elephants often move long distances (sometimes >60 km or 37 miles) in a mostly straight line to waterholes that they have not visited in months (Viljoen 1989). Their movements are highly directional and they head to the closest waterhole 90% of the time, which is best explained by detailed spatial memory for the locations of waterholes (Polansky et al. 2015). They also very rarely leave their home ranges, which is consistent with their survival being dependent on detailed knowledge of the location of resources within a familiar area (Viljoen 1989).

52. Three captive Asian elephants who had previously been trained to discriminate between light and dark disks to obtain a food reward were tested on the same task eight years later. One of the elephants chose the correct disk 41 out of 43 times, a much better performance than elephants who had no prior exposure to this task, indicating that she remembered the task for eight years. While the other two elephants struggled to complete the task after eight years, this turned out to be because they had a visual impairment and could no longer easily see the difference between the disks (Markowitz et al. 1975).

53. In addition to their impressive long-term memory, elephants also have exceptional working memory, defined as the ability to retain information in the short term while actively using it. One study presented wild female African savannah elephants with the urine of adult family members who were either walking in front of them or behind them. The elephants spent significantly more time sniffing the urine of individuals who were walking behind them, indicating that they keep track of the spatial positions of family members during group movement, and understand that an individual walking behind them cannot urinate in front of them. Elephants do not always walk in the same order and often overtake each other and switch positions during group movement, which means that they must continually update their knowledge about the locations of their family members. The average number of individuals per family group in this study was 14 (8 adults), with a maximum of 30 (17 adults), which suggests that African savannah elephants may be able to keep track of the locations of at least 17 if not 30 individuals at once (Bates, Sayialel, et al. 2008). For comparison, some studies suggest that humans can only hold 3-5 items in our working memory at once (Cowan 2010).

54. Further evidence that elephants have unusually well-developed working memory comes from an experiment in which captive African savannah elephants were trained to match human body scent to a corresponding sample. The elephants were presented with a target scent and then tasked with identifying which scent in a line-up of nine scents from different individual humans (some of whom were closely related to each other) matched the target sample. They identified the correct scent in 82% of trials on average and showed no decrease in performance when the target scent was at the end of the line-up compared to when it was at the beginning. This contrasts with forensic dogs, who were 15% less likely

to make the correct choice when the target scent was near the end of the line-up, even though the dogs were only presented with a six-scent line-up compared to the elephants' nine. This study suggests that African savannah elephants have a better working memory for scents than trained forensic dogs. This study also demonstrates that elephants can recognize individual humans by smell, including distinguishing between the scents of humans who are closely related (von Dürckheim et al. 2018).

Mental categorization of threats

55. Elephants can make fine-scale distinctions between different threats, which helps them survive in the wild. African savannah elephants can distinguish between human ethnic groups who differ in their propensity to attack elephants by both the smell of their clothing and the sound of their language (Bates et al. 2007; McComb et al. 2014). Furthermore, within the same ethnic group they can distinguish between the voices of men, who pose the greatest threat, and the voices of women and children (McComb et al. 2014).

56. Larger prides of lions and prides with more males pose a greater threat to elephants. Family groups of African savannah elephants responded more strongly to playbacks of three lions roaring vs. one lion roaring, indicating that they recognize the different levels of danger posed by different numbers of lions. Families with older matriarchs (but not families with young matriarchs) also responded more strongly to playbacks of male lions vs. females, highlighting the importance of learned experience for fine-scale categorization of threats (McComb et al. 2011).

57. Asian elephants can discriminate between the growls of tigers, who pose a threat to elephant calves, and leopards, who do not. They called aggressively in response to

playbacks of leopard growls but retreated silently in response to playbacks of tiger growls (Thuppil and Coss 2013).

Communication

58. Elephants communicate with a rich array of vocal, gestural, and chemical signals (Rasmussen and Krishnamurthy 2000; de Silva 2010; Poole 2011; Poole and Granli 2011). The total number of signals that elephants use to communicate is unknown, as it is difficult and time consuming to determine whether human classifications of signals align with the elephants' perception. However, dozens of potential call types (Poole 2011; Soltis et al. 2014) and hundreds of potential gestures (Poole and Granli 2011) have been described in African savannah elephants, and some of these signals have been experimentally shown to carry distinct meanings to the elephants (Poole 1999; Soltis et al. 2014).

59. Elephant vocalizations can be divided into several broad categories based on the acoustic properties of the call. Rumbles, roars, trumpets, snorts, barks/cries, and combination calls are produced by all elephant species (Poole 2011; Stoeger and de Silva 2014; Hedwig et al. 2021), and two additional call categories (squeaks and squeals) are produced only by Asian elephants (de Silva 2010). However, within these broad categories there are many call subtypes that differ substantially in their acoustic structure and meaning (Poole 1999; Poole 2011). There are also some rare calls that do not fall into any of these major categories (de Silva 2010; Poole 2011).

60. Anywhere from 66-91% of the vocalizations made by wild elephants fall into the broad category of "rumbles" (Thompson 2009; de Silva 2010; Poole 2011). There are several apparent parallels between rumbles and human speech, possibly because both humans and elephants have a need for unusually complex and flexible communication. First, rumbles

are extremely variable and used in almost every behavioral context, whereas other call categories are primarily produced in contexts associated with emotional arousal (de Silva 2010; Poole 2011; Hedwig et al. 2019). This may be analogous to the way in which humans use speech (a highly variable broad category of vocalization) in nearly every context, while producing other vocalizations such as laughter, screaming, and crying in specific emotional contexts.

61. Second, acoustic features known as formants are important for carrying information in both human speech and elephant rumbles. In humans, formants are the primary distinguishing feature between different vowel sounds and we can voluntarily change the frequencies of the formants in the sounds we make by moving our tongue and lips (Kent and Vorperian 2018). Elephants can also manipulate the formant frequencies in their rumbles, and doing so affects the meaning of the rumble (Stoeger, Heilmann, et al. 2012; Soltis et al. 2014; Beeck et al. 2022).

62. Finally, it seems to be easier for elephants to learn to produce rumbles on command than trumpets (Stoeger and Baotic 2021), similar to the way in which it is easier for humans to intentionally produce speech compared to emotional vocalizations such as spontaneous laughter (Bryant and Aktipis 2014).

63. Language is a voluntary behavior in humans, whereby a person can choose whether to communicate with another. Therefore, human language reflects autonomous thinking and intentional behavior. Elephants also communicate intentionally and voluntarily, which likewise reflects their status as autonomous individuals. The fact that African savannah elephants adjust their gestural communication based on whether the individual with whom they are trying to communicate can see them is evidence that they communicate

intentionally, in addition to showing that they have at least one component of theory of mind (see above) (Smet and Byrne 2014a; Eleuteri et al. 2024).

64. Asian elephants produce significantly fewer audible vocalizations when in areas with greater human presence, presumably to avoid detection by humans (Srinivasaiah et al. 2019). Similarly, African forest elephants reduce their overall vocal activity and shift to calling more at night after hearing gunshots (Verahrami 2023). This further suggests that elephants choose when to communicate based on a complex assessment of the circumstances.

65. Another key feature of human language is compositionality, in which two or more words are combined to create a compound word or sentence that conveys a new meaning, while still retaining some aspects of the meanings of its constituent components (Hedwig and Kohlberg 2024). Elephants also combine calls (specifically, rumbles and roars) together in ways that may be compositional (Pardo et al. 2019; Hedwig and Kohlberg 2024). In African forest elephants, the contexts of these combination calls differed from the contexts of stand-alone rumbles and roars while still having some contextual overlap, which suggests that combination calls may convey a new meaning partially derived from the meanings of their component calls (i.e., compositionality) (Hedwig and Kohlberg 2024).

66. In another possible parallel to human grammar, the order in which roars and rumbles are combined appears to follow certain rules. Nearly all combination calls follow the ordering "roar-rumble", "rumble-roar", or "rumble-roar-rumble", despite the fact that elephants are physically capable of producing other orderings, as evidenced by the fact that other combinations do occur extremely rarely (Pardo et al. 2019). The relative prevalence of the three most common orders differs significantly among the three species of elephants and

even between different populations of the same species (Pardo et al. 2019). Finally, in African savannah elephants, “rumble-roar-rumble” combinations are disproportionately likely to occur in the context of separation, suggesting that the order in which calls are combined may affect the meaning of the utterance (Pardo et al. 2019).

67. Elephants are among the few mammals capable of learning to produce completely novel sounds outside of their species’ typical vocal repertoire. Mlaika, a semi-captive African savannah elephant, learned to imitate the sounds of trucks (Poole et al. 2005). Calimero, a captive African savannah elephant housed with Asian elephants, learned to imitate the squeak calls that are frequently produced by Asian elephants but never observed in African elephants in the wild (Poole et al. 2005). Finally, Koshik, an Asian elephant in a South Korean zoo, learned to imitate at least five Korean words (Stoeger, Mietchen, et al. 2012). His imitations were close enough to the original that Korean speakers who had no previous familiarity with Koshik could reliably identify the vowels, though not the consonants, of the words he imitated. This type of open-ended vocal learning is critical for language in humans, and its existence in elephants highlights the flexibility and sophistication of their vocal behavior.

68. Elephant vocalizations differ between populations of the same species, which may be analogous to dialect or accent differences between human populations. For example, the rumbles of African savannah elephants in Samburu National Reserve, Kenya have higher and more variable fundamental frequencies than the rumbles of African savannah elephants in Amboseli National Park, Kenya (Pardo, Lolchuragi, et al. 2024). In one study, African savannah elephants in Namibia responded more strongly to playback of alarm vocalizations from their own population than from a population in Kenya, raising the possibility that the

vocal differences among elephant populations could present a barrier to communication (O'Connell-Rodwell et al. 2007).

69. Historically, nonhuman animal vocalizations were thought to be mere expressions of the caller's internal emotional state rather than references to specific entities external to the caller (Seyfarth et al. 1980). However, studies on African savannah elephants have found evidence for calls that refer to external entities. For example, African savannah elephants produce different alarm rumbles in response to different types of threats, such as humans and bees (King et al. 2010; Soltis et al. 2014). Playback of bee alarm rumbles caused elephants to retreat and shake their head more than usual, while playback of human alarm rumbles caused elephants to retreat without any increase in headshaking. As headshaking is a behavior that is used to dislodge stinging bees, this suggests that elephant alarm rumbles are references to specific threats, rather than generic expressions of fear (Soltis et al. 2014).

70. I led a study showing that African savannah elephants address each other with individual names, another example of elephant calls that refer to entities external to the caller. My colleagues and I found that African savannah elephants use distinct rumbles when addressing different members of their family group, and different callers appear to use at least partially similar rumbles to address the same individual. Moreover, when we played these rumbles back to the elephants, they responded more strongly to a rumble that was originally addressed to them compared to a rumble from the same caller that was originally addressed to someone else. This indicates that African savannah elephants can determine just by hearing a call if it was intended for them or for another individual (Pardo, Fristrup, et al. 2024). The existence of names in elephants is a testament to the importance of their

social bonds and suggests that they have complex mental representations of other individuals.

71. Evidence suggests that African savannah elephants may be more likely to include names in long-distance rumbles or in rumbles addressed to young calves in a caregiving context, and less likely to use names when greeting adults at close distance (Pardo, Fristrup, et al. 2024). The potentially high prevalence of name-use in calls addressed to young calves raises the possibility that mother elephants actively name their calves. This remains an untested hypothesis at present; however, both African savannah elephants and Asian elephants who have just given birth have been observed repeatedly rumbling to the newborn calf (personal observation; J. Poole and S. Lokhandwala, personal communication).

72. Both female and male African savannah elephants produce specific vocalizations known as "let's go" rumbles that indicate when they want the group to begin moving in a particular direction. These rumbles are typically followed by a back-and-forth exchange of rumbles between multiple members of the group, suggesting that African savannah elephants negotiate group decisions about movement (Poole 2011; O'Connell-Rodwell et al. 2012; O'Connell-Rodwell et al. 2024).

73. Elephants communicate over long distances, reflecting the fact that they have evolved to live in extremely large home ranges and repeatedly separate from and reunite with their social companions. Under ideal sound propagation conditions in a savannah environment, African savannah elephants can detect rumbles from up to 4 km (2.5 miles) away (Langbauer et al. 1991), and can recognize the caller from 1.5 km (0.9 miles) away (McComb et al. 2003). In a rainforest environment, African forest elephant rumbles can be

detected up to 3.2 km (2.0 miles) away under ideal propagation conditions, and 0.8 km (0.5 miles) away under average propagation conditions (Hedwig et al. 2018). Rumbles also couple with the ground to create a seismic wave that can travel even further than the sound wave travels through the air, and studies with African savannah elephants have found that they can detect and react to these seismic vibrations (O'Connell-Rodwell et al. 2006; O'Connell-Rodwell et al. 2007).

Personality

74. Elephants have unique personalities. Personality is defined as a set of behavioral and emotional traits that an individual exhibits consistently over time, which are different from the traits exhibited by other individuals of the same species. Individual elephants differ in a variety of traits, including activeness, affectionateness, aggressiveness, anxiety, curiosity, defiantness, excitability, mischievousness, protectiveness, sociability, and shyness (Barrett and Benson-Amram 2021).
75. Elephants' personality affects their performance on problem-solving tasks. For example, more aggressive elephants were faster at solving certain types of puzzles to get food (Barrett and Benson-Amram 2021).

Problem solving and tool use

76. Both Asian and African savannah elephants have been observed using a variety of simple tools. Asian elephants use branches as switches to repel flies and will intentionally modify branches to make them more effective for fly switching (Hart et al. 2001). Other types of tool use observed in both species include, but are not limited to, elephants using twigs to scratch themselves, dabbing cuts with clumps of grass, and throwing objects at other animals to repel them (Chevalier-Skolnikoff and Liska 1993).

77. Elephants can learn to solve a variety of complex problems by trial-and-error. One study presented 12 captive Asian elephants with a marshmallow inside a tube, where the only way to extract the marshmallow was to add water to the tube so that the marshmallow would float to the top. One of the elephants, Shanthi, figured out how to solve this problem on her own after just two trials (Barrett and Benson-Amram 2020). Two captive Asian elephants in another zoo learned to push food items out of inaccessible locations by blowing air at them (Mizuno et al. 2016). Both captive and wild Asian elephants learned via trial-and-error to solve a puzzle in which food is placed inside a box with doors that the elephant must either push, pull, or slide to open (Jacobson et al. 2022; Jacobson et al. 2023).

78. In comparative psychology, insight refers to the ability to "think through" a problem and spontaneously come up with a novel solution without trial-and-error learning. It is considered a highly advanced form of cognition as it requires individuals to understand the nature of the problem and imagine a solution to it. One study assessed whether Asian elephants are capable of insight by presenting three captive Asian elephants (two adults and a juvenile) with food hanging from a tree just out of reach. They also placed a moveable cube or tub in the enclosure that the elephants could use as a stepstool to reach the food. While the two adults never did this, the juvenile, Kandula, spontaneously pushed the cube underneath the tree and stood on it to reach the food. He did so without any trial-and-error learning, suggesting that he relied on insight to solve this challenge. In further trials, the researchers hid the cube and Kandula searched for it, retrieved it, and used it to access the food, indicating that his behavior was intentional and goal oriented. When the cube was replaced with a large tire, Kandula also immediately understood that the tire could be used in the same way (Foerder et al. 2011).

79. To further test Kandula's problem-solving ability, the researchers removed the cube and tire but provided several smaller objects, including a ball and several cutting boards. Kandula tried unsuccessfully to reach the food by standing on one of the cutting boards and then the ball. He then stacked two of the cutting boards together, but this was still not tall enough. The session ended before he tried stacking three boards together, which would have allowed him to reach the food. Nonetheless, this experiment suggests that he understood, without any training, the concept of stacking two objects together to increase their height (Foerder et al. 2011).

80. A possible case of insightful problem solving in the wild involved the response of a wild adolescent female Asian elephant named Genette to a calf who was repeatedly attempting to suck on her (nonlactating) nipple. This was apparently uncomfortable for Genette, as she kept trying to push the calf away, and eventually she offered the calf the tip of her trunk to suck on instead (Vidya 2014). Using the trunk as a pacifier in this way was an apparently novel behavior that had not previously been observed. While it is impossible to make strong inferences about cognition from a single observation such as this, it is possible that Genette understood the calf's intentions and spontaneously came up with a novel solution to stop the calf from harassing her.

81. According to another report, after government officials created a new road and began to use it to cull African savannah elephants, the elephants broke branches and piled them in the road, effectively blocking it off. When park officials cleared the branches, the elephants replaced them four times (Chevalier-Skolnikoff and Liska 1993). This raises the possibility that the elephants intentionally blocked the road to prevent it from being used to shoot

them, which would be an exceptionally sophisticated example of cause-and-effect reasoning and insightful problem solving.

Numerical reasoning

82. Both Asian and African savannah elephants can discriminate between different quantities of food and select the larger quantity (Irie-Sugimoto et al. 2009; Perdue et al. 2012; Snyder et al. 2021). An experiment with Asian elephants showed that they can discriminate between two quantities of sunflower seeds based on smell alone (Plotnik et al. 2019).
83. Most animals discriminate between quantities using visual estimations of the total quantity rather than by counting individual objects. In these species, the ability to discriminate between quantities decreases as the quantities become more similar in relative magnitude. Two studies found that this was also the case for African savannah and Asian elephants, suggesting that elephants likewise discriminate between quantities using visual estimation rather than by counting the individual items (Perdue et al. 2012; Snyder et al. 2021). However, two other studies found that Asian elephants' performance in a quantity discrimination task did *not* decline when the quantities were closer in relative size, suggesting that Asian elephants might be capable of counting individual objects rather than simply estimating relative quantities (Irie-Sugimoto et al. 2009; Irie et al. 2019). More research is necessary to resolve this question, but these results suggest that Asian elephants might be capable of more sophisticated numerical reasoning than most animals.
84. Asian elephants can also mentally add two quantities together. In one study, Asian elephants watched as an experimenter placed some food items one by one into one bucket, then placed some food items into a second bucket, then placed some additional food items into the first bucket and finally placed some additional food items into the second bucket.

Thus, in order to determine which bucket had more food, the elephants would have to remember the original quantity placed in each bucket and add it to the second quantity placed in the same bucket. The elephants chose the bucket with the larger quantity significantly more often than expected by chance, indicating that they were capable of mentally adding two quantities (Irie and Hasegawa 2012).

Autonomy in mate choice

85. Wild elephants are selective about who they mate with, reflecting their status as autonomous individuals. Male African savannah elephants avoid mating with both maternal and paternal relatives (Archie et al. 2007). Unlike some animals, who evolved to avoid inbreeding by simply moving far away from where they were born, male elephants do not always disperse far away from their natal group and occasionally visit their female relatives even after they have become independent (personal observation). This indicates that elephants recognize their kin and actively choose not to mate with them.

86. At least in African savannah elephants and Asian elephants, females usually prefer to mate with males who are older/larger and in musth (Poole 1989; Chelliah and Sukumar 2015). When a female elephant is in estrus (heat), she is often pursued by multiple males, and she runs away from them while roaring loudly (Poole 2011). If a female wants to mate with a male, she will eventually let him catch up to her and then stand still as he mounts her. In the wild, females can prevent a male from mating with her simply by refusing to stand still, as it is very difficult for the male to balance on his hind legs without the female's cooperation (Moss 1983; Poole 1989).

87. In wild African elephants, mating is an emotionally charged occasion. When a female mates, other females in the vicinity rush over to her, produce loud, overlapping

vocalizations and exhibit other signs of emotional arousal such as urinating, defecating, and streaming fluid from their temporal glands (Poole et al. 1988; Thompson 2009). This behavior, known as a "mating pandemonium", is similar to what is observed in other highly emotional social scenarios, such as the birth of a calf or when bonded individuals greet each other after a period of separation (Poole 2011).

Elephant welfare issues in zoos

88. In the wild, elephant home ranges are typically hundreds to thousands of square kilometers (Leggett 2006; Fernando et al. 2008; Alfred et al. 2012; Wall et al. 2021). By contrast, the Association of Zoos and Aquariums (AZA) recommends a minimum of just 0.0005 km^2 of outdoor space per elephant, 0.000056 km^2 of indoor space per male elephant, and 0.000037 km^2 of indoor space per female elephant (AZA 2024). Even the largest elephant exhibits in zoos are orders of magnitude smaller than the smallest elephant home range in the wild (e.g., 0.028 km^2 for Disney's Animal Kingdom, 0.013 km^2 for the San Diego Zoo Safari Park) (Doyle et al. 2024).

89. Studies that have attempted to measure how space affects elephant welfare in zoos have been hampered by the fact that even the largest zoo enclosures are so much smaller than elephants' natural home ranges that the existing variation in enclosure size among zoos likely makes no difference to the elephants (Greco et al. 2016; Doyle et al. 2024). However, lack of space in zoos is directly linked to many of the welfare issues experienced by captive elephants, including lack of exercise, improper diet, and lack of mental stimulation (Doyle et al. 2024).

90. Wild African savannah elephants walk an average of about 9-12 km/day and occasionally walk considerably more than 20 km in a single day (Leggett 2009; Polansky et al. 2013).

Although elephants in captivity do not need to walk long distances to find food and water, they still require the exercise provided by walking to stay healthy (Morfeld and Brown 2017). A study of Asian and African savannah elephants across 30 North American zoos found that they walked 5.3 km/day on average (no significant difference between the two species), about half of what is typical for wild African savannah elephants (Holdgate et al. 2016).

91. The lack of space in zoos makes it impossible for elephants to graze and browse as they would in the wild, because elephants will quickly destroy the limited amount of vegetation that can grow in a zoo enclosure. Thus, elephants in zoos are fed a diet that is lacking in fiber and certain essential vitamins and minerals compared to the food that elephants evolved to eat while simultaneously being higher in calories (Tsuchiya et al. 2023; Doyle et al. 2024). This, combined with the lack of sufficient exercise in zoos, frequently leads to dental problems, gastrointestinal issues, and obesity in zoo elephants (Doyle et al. 2024). One study of 132 African savannah elephants and 108 Asian elephants across 65 North American zoos found that 74% of the elephants were overweight and 34% were obese (Morfeld et al. 2016).

92. In the wild, where elephants typically range over hundreds to thousands of square kilometers, they encounter a wide variety of sensory experiences, social interactions, and mental challenges that cannot be reproduced in a zoo environment. Multiple studies have found that increased exhibit complexity is positively correlated with metrics of elephant welfare, indicating that environmental complexity matters to elephants (Scott and LaDue 2019; Brown et al. 2020). However, even the most enriched zoo enclosure is severely impoverished compared to the natural environment and cannot provide elephants with the

level of mental stimulation that they require to avoid chronic boredom and frustration (Atkinson and Lindsay 2022).

93. Elephants are naturally active both day and night, averaging only a few hours of sleep in a 24-hour period spread across multiple short naps (Gravett et al. 2017). However, most zoos lock elephants indoors all night long, which means they only have access to a small fraction of their exhibit for a significant portion of their waking hours (Miller et al. 2016).

94. A strong indication that elephants are chronically bored and stressed in zoos is the high prevalence of stereotypic behavior in zoo elephants. Stereotypic behavior refers to repetitive movements such as rocking, swaying, head-bobbing, and pacing that serve no adaptive function. When animals are chronically bored, frustrated, and stressed, they exhibit elevated levels of glucocorticoids, or stress hormones, in their blood. This causes dysregulation of the motor circuits in the brain, a form of brain damage, which results in repetitive movements (Jacobs et al. 2022). Stereotypic behavior has never been observed in wild elephants, but studies have found that up to 85% of zoo elephants exhibit stereotypic behavior (Clubb and Mason 2002; Mason and Veasey 2010; Greco et al. 2016). One study of 47 African savannah elephants and 42 Asian elephants across 39 North American zoos found that stereotypic behavior was the second most common behavior exhibited by the elephants, accounting for 15.5% of their time during the day and 24.8% of their time at night (Greco et al. 2016).

95. It is unheard of for a mother elephant to intentionally kill her calf in the wild, but this behavior is relatively common in zoo elephants (Kurt and Mar 1996; Clubb et al. 2008). One study of 121 Asian elephants born in European zoos found that 10% were killed by

their mother (Kurt and Mar 1996). The prevalence of this highly aberrant behavior in zoos is another indication of the damaging effects of captivity on elephant psychology.

96. All extant species of elephants are native to tropical and subtropical regions. Thus, zoo elephants in cold climates must spend much of their time indoors, further limiting their opportunities for exercise and mental stimulation. Low temperatures have been found to exacerbate stereotypic behaviors among Asian elephants who were already predisposed to stereotypic behavior (Rees 2004).

97. Zoo environments are often extremely noisy, which may be especially stressful for animals like elephants with sensitive hearing (Jakob-Hoff et al. 2019). Sources of noise include crowds of human visitors, loud fans in indoor spaces, and construction. The limited space of zoo enclosures exacerbates the negative impacts of noise by preventing elephants from moving away from it.

98. Zoos are unable to provide elephants with a normal social environment. While wild female elephants live in large social networks of mostly related individuals (Moss and Poole 1983; Wittemyer et al. 2005; Archie et al. 2006; de Silva et al. 2011), female elephants in zoos are typically housed in much smaller groups of mostly unrelated individuals who did not grow up together, and some are even housed alone (Doyle et al. 2024). Despite the abundant evidence that male elephants also have complex social lives in the wild (Evans and Harris 2008; Chiyo et al. 2011; Goldenberg et al. 2014; LaDue et al. 2022), most male elephants in zoos are housed alone due to their greater aggressiveness and the challenges of safely integrating them with other elephants in a small space (Doyle et al. 2024).

99. These unnatural social groupings negatively impact elephant welfare. Elephants housed alone or in smaller groups exhibit more stereotypic behavior and have higher levels of

stress hormone metabolites in their dung than elephants housed in larger groups, indicating that social deprivation causes chronic stress in elephants (Greco et al. 2016; Brown et al. 2020). Moreover, elephants housed with unrelated individuals exhibit more aggression towards one another (Williams et al. 2019).

100. Elephants are often transferred between zoos due to space limitations or to facilitate captive breeding programs, and over 80% of elephants in North American zoos have experienced at least one such transfer (Prado-Oviedo et al. 2016). Inter-zoo transfers break up social relationships that would normally be maintained for a lifetime in wild elephants. Elephants who have been transferred between zoos exhibit more stereotypic behavior than elephants who have not (Greco et al. 2016). Asian elephants who have experienced a transfer also have a lower life expectancy than their counterparts who were never transferred (Clubb et al. 2008). This suggests that the disruption to elephants' social lives caused by inter-zoo transfers has a major negative impact on elephant welfare.

101. Elephants exhibit more stereotypic behavior and higher levels of stress hormone metabolites in their dung when they have less opportunity to choose where to spend their time, which emphasizes the importance of autonomy for elephant welfare (Greco et al. 2016; Brown et al. 2020). Zoos restrict the autonomy of elephants in many ways, including restricting their movement, restricting their social interactions, and restricting their ability to choose when and what to eat.

102. Captive breeding programs in zoos also remove elephants' autonomy over their reproduction, in contrast to the wild where choice is an important component of elephant sexual behavior (Moss 1983; Poole 1989; Archie et al. 2007; Chelliah and Sukumar 2015). Captive breeding in North American zoos most often occurs via artificial insemination.

This involves first collecting semen from the male by inserting an arm into his rectum to stimulate his prostate. A similarly invasive procedure is then performed on the female to insert the semen into her reproductive tract, often multiple times. Elephants are usually restrained during these procedures (Hildebrandt and Goeritz 2023).

103. Many zoo enclosures have hard substrates such as concrete, which exert more pressure on elephants' feet than the natural substrates they evolved to walk on and cause chronic foot and musculoskeletal issues (Miller et al. 2016). Studies have documented foot disease in 50-80% of the zoo elephants examined (Doyle et al. 2024), and post-mortem exams on 21 deceased zoo elephants discovered foot pathologies in every single individual, suggesting that most zoo elephants will develop foot issues by the time they die (Regnault et al. 2017). Osteoarthritis, a painful condition caused by breakdown of the cartilage and bone in joints, is also common in zoo elephants, with one study documenting confirmed cases of osteoarthritis in 21.9% of the elephants examined and suspected cases in an additional 16.4% (Chusyd et al. 2023).

104. Elephants naturally push their tusks against hard surfaces such as trees, but in zoos, most of the available surfaces are made of materials such as concrete or metal that do not yield as easily. This leads to tusk fractures occurring much more frequently in zoos than in most wild populations (Doyle et al. 2024). One study of 350 Asian and African savannah elephants across 60 North American zoos found that 31% had tusk fractures, compared to a median of just 1.3% across 15 populations of wild African savannah elephants (Steenkamp et al. 2007). These fractures can be very painful if they expose the pulp of the tusk where nerves are located and can even be fatal if the pulp becomes infected (Rose et al. 2022).

105. Elephants often exhibit reproductive health issues in zoos, likely caused by a combination of obesity and the stress of living in captivity. Many captive female elephants develop ovarian cysts, stop cycling, or cycle irregularly (Doyle et al. 2024). Approximately 20% of Asian elephants born in Western zoos are stillborn or die within 24 hours of birth, compared to only 3% for captive working elephants in Asia (Taylor and Poole 1998; Perrin et al. 2021).

106. Zoo elephants are also more susceptible to certain infectious diseases than wild elephants, especially tuberculosis and elephant endotheliotropic herpesvirus (Perrin et al. 2021; Doyle et al. 2024). The high susceptibility of zoo elephants to tuberculosis is likely due at least in part to the stress of captivity (Mikota 2009).

107. Elephants have a much lower life expectancy in zoos compared to the wild or even compared to working elephants in Asia. One study found that the median lifespan for female African savannah elephants in zoos was only 19.6 years, compared to 56.0 years for wild females who died of natural causes (i.e., were not killed by humans). The median lifespan for female Asian elephants in zoos was 18.9 years, compared to 41.7 years for captive female Asian elephants in the Burmese logging industry (Clubb et al. 2008).

Best alternatives to zoos

108. When it is possible to do so, the best option for captive elephants is to reintegrate them into the wild. Reintroduction to the wild has almost exclusively been attempted for captive elephants in elephant range states. For example, 10 captive African savannah elephants who were used for elephant-back safaris in the Shambala Game Reserve in South Africa were gradually introduced to the wild in the same reserve over a period of seven months in 2016. Despite having spent most or all of their lives in captivity, the elephants

successfully integrated into the wild. The concentration of stress hormone metabolites in their dung increased in the first year after release, but by the second year it decreased to pre-release levels. This indicates that while the elephants at first experienced some physiological stress associated with needing to fend for themselves, they adjusted relatively quickly. Most notably, all stereotypic behavior stopped immediately as soon as the elephants were released into the wild, suggesting a substantial improvement in their psychological welfare (Pretorius et al. 2023).

109. In cases where release into the wild is impossible, the best option for elephants is to be released to an accredited sanctuary. Three accredited sanctuaries for elephants currently exist in the Western Hemisphere: The Elephant Sanctuary in Tennessee, the PAWS Sanctuary in California, and the Global Sanctuary for Elephants in Brazil (Atkinson and Lindsay 2022). While sanctuaries are also a form of captivity, they have orders of magnitude more space than zoos, making them a much better option for elephants' welfare. For example, the Elephant Sanctuary in Tennessee is 12.4 km^2 in total, with the largest enclosure being 6.9 km^2 (Atkinson and Lindsay 2022; Doyle et al. 2024). This is several hundred times larger than the largest elephant exhibit in any zoo.

110. Due to their vastly larger size compared to zoos, sanctuaries give elephants more opportunity for exercise, which mitigates many of the detrimental physical effects of captivity. Additionally, sanctuaries encompass much more varied and naturalistic habitat than zoos, including grasslands, woodlands, and bodies of water, which gives elephants far more opportunity for exploration, mental stimulation, and natural foraging behavior (Atkinson and Lindsay 2022). Sanctuaries also afford elephants more autonomy over their

movements and activities, which is known to have a significant effect on elephant welfare (Greco et al. 2016; Brown et al. 2020).

111. Finally, sanctuaries provide better social environments for elephants than zoos. Although sanctuaries cannot provide truly natural social groups for elephants (i.e., multi-generational herds of many related individuals), they allow elephants to live in much larger social groups than zoos typically do, which is positively associated with welfare (Greco et al. 2016). Moreover, the increased space allows elephants to choose who to interact with, giving them greater autonomy over their lives and reducing aggression (Atkinson and Lindsay 2022).

Billy and Tina

112. Billy and Tina are Asian elephants currently held captive by the Los Angeles (LA) Zoo. Billy is a male approximately 40 years of age, and Tina is a female approximately 59 years of age. Both Billy and Tina captured from the wild as calves and have spent the majority of their lives in captivity.

113. Billy and Tina have both endured a long history of abuse. In the early years of his captivity at the LA Zoo, Billy was trained using a bull hook, a device used to force elephants to comply with human commands via the infliction of pain (Leider vs. Lewis et al. 2012). He was also loaned to the Have Trunk Will Travel traveling animal entertainment act between 1993-1994, which has been criticized for allegedly shocking elephants with electric prods, hitting and jabbing them with bull hooks, and chaining them for 12 hours per day (https://www.ad-international.org/conservation/go.php?id=2180&ssi=0). Before coming to the LA Zoo, Tina was held captive by three different circuses, where she was made to perform under threat of a bull hook. In 2009, she was confiscated by the US

Department of Agriculture due to extreme neglect, as she was dangerously underweight (https://www.latimes.com/archives/blogs/la-unleashed/story/2009-08-21/texas-man-can-keep-one-elephant-not-three-chooses-his-boo).

114. Billy and Tina are currently both housed alone, with no opportunity to physically interact with each other or with any other elephants. Billy has been housed alone for the majority of his life at the LA Zoo. As detailed above, both male and female Asian elephants are highly social in the wild and suffer greatly when deprived of the opportunity for social interaction (de Silva et al. 2011; Greco et al. 2016; Brown et al. 2020; LaDue et al. 2022).

115. The LA Zoo has approximately 3 acres of usable outdoor space for elephants, which is 2,632 times smaller than the smallest recorded Asian elephant home ranges in the wild (Fernando et al. 2008). Moreover, this 3-acre space is divided into 4 yards, and Billy and Tina do not have access to all yards at once. Based on photos and videos that I reviewed of the elephant exhibit at the LA Zoo, the enclosures are devoid or nearly devoid of live foliage. I observed video footage of Billy attempting to reach through the fence to forage on the foliage outside his enclosure, which suggests that he may be frustrated and bored with his lack of opportunity to forage naturally (bit.ly/43sR64Y).

116. At least part of the substrate of the LA Zoo elephant enclosure appears to be cement, which has been linked to foot and musculoskeletal pathologies in elephants (Miller et al. 2016). According to Billy's medical records, he was not provided with foot care for 8 months in 2023 due to being in musth and thus presumably too dangerous to handle (Los Angeles Zoo & Botanical Gardens 2023). This led to his toenails becoming excessively overgrown (Los Angeles Zoo & Botanical Gardens 2023), as the confines of a zoo environment prevent elephants from walking enough to wear down their nails naturally.

Billy's medical records also indicate that he has suffered from chronic foot issues at the LA Zoo (Los Angeles Zoo & Botanical Gardens 2023), as is extremely common in zoo elephants (Regnault et al. 2017).

117. I reviewed 11 videos of Billy and 5 videos of Tina that show them engaging in extensive stereotypic behavior, including repeatedly bobbing the head up and down, repeatedly swinging the head from side to side, and repeatedly rocking the body from side to side (https://bit.ly/43b3eX3). As detailed above, these behaviors are a direct manifestation of brain damage caused by chronic stress, and are a very strong indicator that Billy and Tina are suffering in a zoo environment (Jacobs et al. 2022).

118. Transferring Billy and Tina to an accredited sanctuary would be a substantially better outcome for their welfare than transferring them to the Tulsa Zoo. The Tulsa Zoo elephant exhibit is currently being remodeled and the new exhibit is expected to have approximately 10 acres of outdoor space for the elephants. While this is slightly larger than the LA Zoo, it pales in comparison to accredited elephant sanctuaries; it is 169 times smaller than one enclosure at The Elephant Sanctuary in Tennessee (Atkinson and Lindsay 2022). Moreover, the Tulsa Zoo already has 5 elephants, meaning that if Billy and Tina are transferred there, the available outdoor space per elephant will be 1.43 acres, less than the amount of space per elephant at the LA Zoo. Due to their vastly larger size compared to the Tulsa Zoo, sanctuaries would provide Billy and Tina with much more varied habitat and opportunity for natural foraging, which will be notably better for their mental and physical welfare (Atkinson and Lindsay 2022).

119. Additionally, a sanctuary would provide Billy and Tina with much more opportunity for naturalistic social interaction than the Tulsa Zoo. An important component

of elephant social interaction in the wild is fission-fusion dynamics, in which elephants repeatedly separate from and rejoin their social companions (Wittemyer et al. 2005; de Silva et al. 2011). The Tulsa Zoo will deprive Billy and Tina of the opportunity to choose with whom to spend time, when to spend time with them, and for how long. By contrast, a sanctuary environment, with its greater space and focus on providing elephants with maximum autonomy, will allow Billy and Tina to exercise much greater control over their social lives. This will very likely have a positive effect on their welfare, as lack of autonomy over social interaction and space use often leads to stress in elephants (Greco et al. 2016; Atkinson and Lindsay 2022).

120. I have reviewed a video showing one of the elephants at the Tulsa Zoo engaging in stereotypic behavior, indicating that the environment at the Tulsa Zoo is inadequate to meet elephants' needs and provide them with positive welfare (bit.ly/4dm383I). Thus, if Billy and Tina are transferred to this zoo, it is very likely that they will continue to suffer just as they currently suffer at the LA Zoo.

121. At the LA Zoo, Billy has been repeatedly used for captive breeding purposes, which involves repeatedly being restrained and having an arm inserted into his anus to induce ejaculation via prostate stimulation. The current AZA Asian Elephant Population Analysis & Breeding and Transfer Plan recommends that Billy continue to be used for this purpose (AZA, 2023). Thus, if he is transferred to the Tulsa Zoo, he will likely continue to be subjected to the highly invasive procedure of semen collection. This procedure violates elephants' sexual autonomy, which as detailed above is an important feature of sexual behavior and reproduction in wild elephants (Poole 1989; Archie et al. 2007; Chelliah and Sukumar 2015). By contrast, accredited sanctuaries do not use elephants for captive

breeding, so Billy will not be forced to undergo this procedure anymore if he is transferred to a sanctuary. Captive breeding of elephants is irrelevant to the conservation of wild elephants, as no elephant born in a North American zoo has ever been released into the wild. Moreover, despite years of invasive semen collection attempts, Billy's semen has never been successfully used to sire any offspring.

I declare under penalty of perjury under the laws of the State of California that the foregoing is true and correct.

Executed on the 13 (date) of May (month), 2025 (year)

at: Fort Collins, Colorado, U.S.

(city or other location, and state or country)

/s/ Michael Pardo

(signature)

Michael A. Pardo, Ph.D.

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EXHIBIT A

EXHIBIT A: CURRICULUM VITAE

Michael A. Pardo
K. Lisa Yang Center for Conservation Bioacoustics
Cornell Lab of Ornithology
map385@cornell.edu

CURRENT POSITION

Postdoctoral associate 1 Nov 2023-Present
K. Lisa Yang Center for Conservation Bioacoustics, Cornell Lab of Ornithology
Supervisor: Dr. Connor Wood
PROJECT TITLE: Acoustic monitoring of riparian biodiversity in Southern California

PREVIOUS POSITION

NSF postdoctoral research fellow in biology 1 Nov 2019 - 31 Oct 2023
Host institution: Colorado State University
Sponsoring scientist: Dr. George Wittemyer
PROJECT TITLE: The function of vocal learning ability in African elephants

EDUCATION

Ph.D., Neurobiology and Behavior 15 August 2019
Cornell University
Advisors: Dr. Walter Koenig and Dr. Michael Webster
DISSERTATION: Vocal recognition and social cognition in the Acorn Woodpecker

Bachelor of Science, *Summa Cum Laude*, Environmental Biology May 2012
State University of New York College of Environmental Science and Forestry
HONORS THESIS: Tail communication in the Eastern gray squirrel, *Sciurus carolinensis*

MANUSCRIPTS IN REVIEW

M. A. Pardo, L. Gallagher, R. Byers*, J. Winiarski, J. Keane, M. Z. Peery, C. Wood. (In review). Passive acoustic monitoring reveals surprising patterns of avian community antipredator behavior at a landscape scale. *Ecology*.

P. Dumont*, **M. A. Pardo**, D. Lolchuragi, and G. Wittemyer. (In review). Elephant greeting rumbles vary with both absolute caller age and caller age relative to receiver age. *Animal Behaviour.*

PUBLICATIONS

M. A. Pardo. (2024) Elephant vocal communication. In: *International Encyclopedia of Linguistics* (ed. R. Boobalan).

M. A. Pardo, D. S. Lolchuragi*, J. Poole, P. Granli, C. Moss, I. Douglas-Hamilton, and G. Wittemyer. (2024) Female African elephant rumbles differ between populations and sympatric social groups. *Royal Society Open Science* 11:241264.

M. A. Pardo, K. Fristrup, D. S. Lolchuragi*, J. Poole, P. Granli, C. Moss, I. Douglas-Hamilton, and G. Wittemyer. (2024) African elephants address one another with individually specific name-like calls. *Nature Ecology and Evolution* 8:1353-1364.

K. Odom, M. Araya-Salas, J. Morano, R. Ligon, G. Leighton, C. Taff, A. Dalziell, A. Billings, R. Germain, **M. Pardo,** L. Guimarães de Andrade, D. Hedwig, S. Keen, Y. Shiu, R. Charif, M. Webster, A. Rice. (2021) Comparative bioacoustics: a roadmap for quantifying and comparing animal sounds across diverse taxa. *Biological Reviews* 96:1135-1159.

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M. A. Pardo, C. E. Hayes*, E. L. Walters, W. D. Koenig. (2020) Acorn woodpeckers vocally discriminate current and former group members from non-group members. *Behavioral Ecology* 31:1120-1128.

M. A. Pardo, J. H. Poole, A. S. Stoeger, P. H. Wrege, C. E. O'Connell-Rodwell, U. K. Padmalal, S. de Silva. (2019) Differences in combinatorial calls among the 3 elephant species cannot be explained by phylogeny. *Behavioral Ecology* 30:809-820.

M. A. Pardo, E. A. Sparks, T. S. Kuray, N. D. Hagemeyer, E. L. Walters, W. D. Koenig. (2018) Wild acorn woodpeckers recognize associations between individuals in other groups. *Proceedings of the Royal Society B* 285: 20181017 (cover article)

L. King, **M. Pardo**, S. Weerathunga, T. V. Kumara, N. Jayasena, J. Soltis, and S. de Silva. (2018) Wild Sri Lankan elephants *(Elephas maximus)* retreat from the sound of disturbed Asian honey bees *(Apis cerana indica). Current Biology* 28:R64-R65.

S. A. Pardo and **M. A. Pardo. (**2018) Statistical methods for field and laboratory studies in behavioral ecology. CRC Press, Boca Raton, FL 308p.

M. A. Pardo, S. A. Pardo, and W. M. Shields. (2014) Eastern gray squirrels *(Sciurus carolinensis)* communicate with the positions of their tails in an agonistic context. *American Midland Naturalist* 172:360-366.

*Undergraduate authors

SELECT INVITED TALKS

M. A. Pardo, D. Omer. What's in a name? Discovering individual vocal labels in African elephants. Invited talk for Bridging Brains and Bioacoustics Seminar, April 17, 2025.

M. A. Pardo. Elephant vocal communication: A promising model for language evolution. Invited talk for Frontiers in Social Evolution Seminar, March 25, 2025.

M. A. Pardo. Elephant cognition and its implications for welfare. Invited talk for Performing Animal Welfare Society Conference, 2024, Los Angeles, CA.

M. A. Pardo. Invited panelist for "Elephants, Science, and the Law" webinar, 2024, International Association of Lawyers.

M. A. Pardo. Vocal communication in African savannah elephants. Invited talk for Unlocking Nature panel, 2024, Leadership for Conservation in Africa.

M. A. Pardo, K. Fristrup, D. Lolchuragi, J. Poole, P. Granli, C. Moss, I. Douglas-Hamilton, and G. Wittemyer. What's in a name? Elephants address one another with individually specific calls. Invited talk for Interspecies Conversation Lecture Series, 2024, Interspecies Internet.

M. A. Pardo. Chicken cognition and its implications for welfare. Invited talk for Our Honor Continuing Education Lecture Series, 2024.

M. A. Pardo, K. Fristrup, D. Lolchuragi, J. Poole, P. Granli, C. Moss, I. Douglas-Hamilton, and G. Wittemyer. Do elephants have names? Individual vocal labeling in African elephants. Invited oral presentation at Protolang Conference Symposium: Elephants as a promising model for studying language evolution, 2023, Rome, Italy.

M. A. Pardo, K. Fristrup, D. Lolchuragi, J. Poole, P. Granli, C. Moss, I. Douglas-Hamilton, and G. Wittemyer. Do elephants have names? Individual vocal labeling in African elephants. Invited talk at Decoding Communication in Non-human Species Workshop, 2023, Berkeley, CA.

M. A. Pardo, E. L. Walters, and W. D. Koenig. Social cognition in the acorn woodpecker. Invited talk at University of Vienna, 2019, KLF Grünau, Austria.

M. A. Pardo, E. L. Walters, and W. D. Koenig. Social cognition in the acorn woodpecker (presented in Spanish). Invited talk at Universidad CES, 2018, Medellín, Colombia

TEACHING EXPERIENCE

Mapping culture and conservation Fall 2020, 2022

Designed and taught units on human-wildlife conflict and tribal conservation, Colorado State University

Batch detection of species-specific vocalizations in R Spring 2021
Virtual workshop on acoustic analysis in R for students at Northern Colorado University

Introduction to acoustic analysis in R Spring 2021
Virtual workshop on acoustic analysis in R for Colorado chapter of The Wildlife Society

Lying birds and dancing bees: How animals communicate
Spring 2019
Instructor of record for First-year Writing Seminar on animal communication, Cornell University

Hormones and Behavior Fall 2016, 2018
Teaching assistant, Cornell University

Introduction to Animal Behavior Fall 2014
Teaching assistant, Cornell University

COMPETITIVE AWARDS, GRANTS AND FELLOWSHIPS (total funds received: $415,132)

- Explorers Club EC50 Class of 2025 2025
- NSF Postdoctoral Research Fellowship in Biology 2019
- NSF Doctoral Dissertation Improvement Grant 2017
- National Geographic Young Explorers Grant 2017
- Athena Fund, Cornell Lab of Ornithology 2016
- Animal Behavior Society Student Research Grant 2014
- American Society of Mammalogists Student Research Grant 2014
- Sigma Xi Grant-in-Aid-of-Research 2014
- Athena Fund, Cornell Lab of Ornithology 2013
- NSF Graduate Research Fellowship (GRFP) 2013
- Athena Fund, Cornell Lab of Ornithology 2012

MENTORING EXPERIENCE

- Iroshmal Peiris (PhD student) Current
  - Studying the function of greeting calls in Acorn Woopeckers
- Riley Byers (undergrad) Summer 2024
  - Using passive acoustics to identify Mountain Chickadee responses to Northern Goshawks in the Sierra Nevada
- Piper Dumont (undergrad) 2020-2024
  - The social contexts of greeting rumbles in wild African elephants
- Moeumu Uili (Master's student) Fall 2022
  - Acoustic detection of the critically endangered and endemic Tooth-billed Pigeon
- Casey Hayes (undergrad) Spring & Summer 2018
  - Vocal recognition in Acorn Woodpeckers
- Robert Anderson and Sarah Heimbach (undergrad and recent grad) 2017
  - Vocal communication and social behavior in Acorn Woodpeckers

- Emilee Sparks and Tejal Kuray (recent grads) Spring 2016
    - Vocal communication and social cognition in Acorn Woodpeckers

SERVICE AND OUTREACH

- Peer reviewer for Nature Ecology & Evolution, Behavioral Ecology, Ethology, Ibis, Animals, New Zealand Journal of Zoology
- Wrote article for "The UNESCO Courier" about animal language (February 2025)
- Member of Onboarding and Professional Development Working Group for DEIJ committee of Cornell Lab of Ornithology (July 2024-present)
- Wrote article for "The Conversation" about my research on elephant vocal communication (June 2024) https://theconversation.com/african-elephants-address-one-another-with-name-like-calls-similar-to-humans-232096
- Presentation to staff of Save The Elephants in Kenya (April 2022)
- Designed and taught workshop on Microsoft Excel for Kenyan staff members of Save The Elephants, Ewaso Lions, and Grevy's Zebra Trust (November 2021)
- Designed and taught mini course on animal communication to teach to 4th grade students in Spring 2019 as part of Cornell GRASSHOPR program
- Helped teach workshop on ornithology to teach to 7th-9th grade girls in Spring 2019 as part of Expanding Your Horizons program at Cornell
- Mist-netting demonstration and presentation to undergraduates of underprivileged backgrounds from UC Berkeley (May 2018)
- Mist-netting demonstration and presentation for high school students from underprivileged backgrounds through California Academy of Sciences (Spring 2017)
- Presentation to undergraduate class from University of Chicago visiting Hastings Reserve (Spring 2017)
- Presentation about STEM career paths to underprivileged high school students through California Academy of Sciences (Spring 2016)
- Mist-netting demonstration and presentation for underprivileged high school students through California Academy of Sciences (Spring 2015)
- Presentation to undergraduate class from University of Chicago visiting Hastings Reserve (Spring 2015)
- Presentation to group of local schoolchildren and national park staff in Udawalawa, Sri Lanka (Spring 2014)
- Wrote blog posts about fieldwork with Asian elephants for maximus.trunksnleaves.org blog (December 2012 through May 2019)

SELECT MEDIA COVERAGE (>3,000 articles and broadcasts in at least 92 countries)

- T. Danovich. "Elephants are doing something deeply human." The Atlantic, June 18, 2024.
- K. Golembiewski. "Every elephant has its own name, study suggests." New York Times, June 13, 2024.
- N. Greenfieldboyce. "Wild elephants may have names that other elephants use to call them." NPR: Morning Edition, June 11, 2024.
- "Elephants have names for each other, new study finds." BBC Newshour, June 11, 2024.

- K. Ables. “Elephants call each other by name, study suggests.” Washington Post, June 11, 2024.
- C. Larson. “African elephants call each other by unique names, new study shows.” Associated Press, June 10, 2024.
- W. Dunham. “Study shows elephants might call each other by name.” Reuters, June 10, 2024.
- Orie. “African elephants use names to call each other, study suggests.” CNN, June 10, 2024.
- “Elephants call each other by name, study finds.” The Guardian, June 10, 2024.
- M. Zaraska. “Elephants call individuals’ names across the savanna.” Scientific American, June 10, 2024.
- L. Neme. “Elephants may call each other by name, a rare trait in nature.” National Geographic, June 10, 2024.
- Scripps News (documentary film). “How scientists are using AI to communicate with animals”. May, 2023.

Exhibit 3

Declaration of William Keith Lindsay

I, William Keith Lindsay, declare as follows:

Introduction and Qualifications:

1. My full name is William Keith Lindsay. I am also known more generally, and in some published work, by the name Keith Lindsay. I was awarded Bachelor of Science with Honours in Zoology from the University of British Columbia, Vancouver, Canada, in 1974. I completed an MSc in Zoology at the University of British Columbia in 1982, under the supervision of Professor A.R.E. Sinclair, with a dissertation entitled "Habitat selection and social group dynamics of African elephants, in Amboseli Kenya." I received a PhD in Zoology at the University of Cambridge in 1994, under the supervision of Dr. S.K Eltringham, for my dissertation entitled "Feeding ecology and population demography of African elephants in Amboseli, Kenya." I have published over forty scholarly articles related to elephants. My CV, which lists these articles, is attached as **Exhibit A**.
2. I submit this Declaration in support of the Nonhuman Rights Project, Inc.'s petition for a writ of habeas corpus regarding the captive elephants at the Los Angeles Zoo. I have personal and professional knowledge of the facts to which I attest, and I am not a party to the proceedings.
3. I am a natural resources advisor/monitoring & evaluation expert with over 40 years of professional experience in Southeast Asia, Africa, Latin America, the Caribbean, North America and Europe, in planning, conducting and evaluating field projects and in senior administrative and leadership roles. I was a senior staff member at the Oxford-based consultancy, The Environment & Development Group (EDG), during 1994-2013. I undertook a variety of long- and short-term consultancy missions and project work, both independently and with EDG, in project/programme monitoring and evaluation, environmental assessment and land-use planning, community-based natural resource management, protected area monitoring and management, and biodiversity research and conservation. Since 2013, I have been an independent consultant on assignments for international donor agencies and nongovernmental organizations (NGO) in Africa and Asia.
4. My life-long involvement with elephants began in 1977 when I joined the Amboseli Elephant Research Project (AERP) in southern Kenya. I went on to undertake and complete my MSc and PhD research projects on feeding ecology and population processes, through observational study of free-ranging wild African elephants in their natural environment. I

have remained a Collaborating Researcher with AERP, focusing on ecosystem change, elephant ranging, and human-elephant co-existence. There has been cross-over into my professional work; since the late 1980s/early 1990s, I have had elephant-focused assignments in all parts of Africa, including southern Africa (elephant management policies in Botswana and South Africa), Central Africa (regional elephant conservation coordination for the Convention on Migratory Species), West Africa (research on the movements, population structure and habitat requirements of the Gourma elephants in Mali) and East Africa (Kenya's national elephant strategy, woodland habitat conservation in Tanzania). My work in Asia includes community-based natural resource management and conservation in elephant-populated regions of Cambodia and Thailand and promotion of human-elephant coexistence in Myanmar. My current concerns include stopping the international trade in ivory and live elephants through supporting African elephant range states in a coordinated action on CITES (the Convention on the International Trade in Endangered Species) and facilitating dialogue towards resolution of human-elephant land-use conflict, in partnership with practitioners within and between Africa and Asia. For the past 10 years, I have been active in promoting improved well-being for elephants held in captivity in North American, European, and Asian zoos and circuses.

5. My participation in academic groups include as Associate Fellow, 2003-2006, Environmental Change Institute, University of Oxford, and Member, 2009-present, Oxford Centre for Tropical Forests, University of Oxford. I have been a member of the IUCN/ Species Survival Commission's African Elephant Specialist Group (AfESG) during 1992-2001 and more recently from September 2020 to present.
6. Much of my experience with elephant biology derives from my work with African savanna elephants but the fundamental principles of elephant ecology and behavior are applicable to African forest elephants and to Asian elephants. There is extensive literature on all three species, and while there are certainly documented distinctions between them in terms of habitat and food choices, and social behavior and relationships, the similarities due to common phylogeny and physical attributes and needs far outweigh these differences of detail. Throughout this document, I will simply refer to 'elephants,' but the consequences apply equally to all elephant taxa. The observations herein apply generally to captive elephants as well as those living in the wild.

Autonomy and higher cognition demonstrated in elephants' foraging decisions and use of space

7. As the largest living land animals, elephants have proportionately enormous metabolic requirements and thus the greatest need to find sufficient nutrients for maintenance, growth and reproduction (Christiansen 2004). They are the ultimate generalist herbivores, and they satisfy this ongoing need for nutrition by selecting diets from the diverse vegetation on offer in complex and constantly variable natural ecosystems (Roever *et al.* 2012; Woolley *et al.* 2011; Lindsay 1994). These ecosystems present both foraging opportunities and existential risks from natural and human hazards.
8. To navigate their way through this landscape of potential rewards and threats, elephants have evolved sensory systems and cognitive capacities that allow them to develop and exhibit flexible and responsive decision strategies, appropriate to each individual animal as well as to members of their social groups, to cope and prosper in the face of these multi-layered challenges (Poole & Granli 2009).
9. It has now been recognized that elephants possess complex cognitive abilities comparable in many respects to higher primates and cetaceans. Byrne & Bates (2011) reviewed the findings of research on elephants in the wild and in captivity and confirmed their significant capacity in several areas of physical and social cognition:
    - Physical cognition:
        - Knowledge of environmental spaces and objects
        - Use of tools and understanding of causality
        - Learning to discriminate among features and categories
        - Quantity judgments
    - Social cognition
        - Knowing about others and their interactions
        - Communication and social manipulation
        - Social learning
        - Theory of mind
10. Elephants display a high degree of autonomy in the choices they make throughout their decades-long lives. Several of the aspects of elephants' physical cognition, particularly in the way they find their way around their natural environment, its rewards and hazards, will be discussed in the sections below.

Foraging strategies: selectivity, manipulation, memory, anatomy and cognitive ability

11. Elephants select items from all parts of plants and a vast range of species in plant communities (Poole & Granli 2009; Lindsay 1994). The major component of biomass in

most plants is structural materials, including fibrous stems, branches, and roots. Down the abundance scale, with less fibre and greater soluble cell contents, are leaves and finally the most nutritious plant parts: fruits, seeds and flowers. In order to satisfy their large absolute forage needs, elephants must include in their diets large quantities of coarse plant material and cell walls, with varying degrees of lignification, and relatively smaller amounts of easily digestible material. The relative amounts of digestible plant parts will vary greatly between plant communities, and between seasons in the same locations (Roever *et al.* 2012; Duffy *et al.* 2011).

12. An elephant's foraging strategy must be able to respond to these changes, making use of the best foraging opportunities at any given time and place. These opportunities present themselves in areas of land ranging from tens to many thousands of square miles, depending on the productivity of the plant communities and their spatial extent (Sukumar 2003). In zones that are more stable and well-watered within and between years, large amounts of digestible plants will be more-or-less continuously available and there may be little need to cross more than a few square miles in search of food. In the more arid savannas and semi-deserts of sub-Saharan Africa, the timing and localization of rainfall events is much less predictable between years and their range areas are necessarily much larger, and flexible (Young *et al.* 2009, Duffy *et al.* 2011). Paradoxically, the forests of much of Asia and the African Congo basin provide relatively little food at ground level, with biomass and leaf canopy locked up in treetops. Forest elephants rely on scattered and ephemeral openings in the forest cover and seasonally fruiting trees for their forage (Campos-Arceiz & Blake 2011). To achieve the optimal nutritional intake, elephants must have considerable capacity for spatial and categorical memory of the localities of the plants available in the best foraging sites and their timings within such ranges (Roever *et al.* 2012).
13. There are different components to the predictability of food supplies: some plant communities, such as wetlands, will be continuously productive although with possibly less nutritious/more fibrous food, while others may be temporarily productive only during times of abundant rainfall yet may have highly nutritious plant components. The pattern of food abundance can change between years, varying between times of drought and plenty (Birkett *et al.* 2012). In forests, the timing of fruiting varies between different tree species, which are widely distributed and often isolated. Elephants must learn and remember all these locations and timings, and are able to recall them when appropriate (Polansky *et al.* 2015). Older elephants retain knowledge of past events and locations of food and water that were appropriate at specific times of drought or plenty, and they teach this knowledge to younger

family members (McComb *et al.* 2001).

14. This memory spans years and even decades, and there is evidence that older female elephants in family groups have better survival in droughts than do younger animals, and they can lead their companions to the best spots that had been favorable in the past (McComb *et al.* 2001). Areas of the brain active in spatial memory are well-developed in elephants (Jacobs *et al.* 2011). But to make use of this memory, they must also be able to put memories together with current sensory information, as they make the correct, context-appropriate decisions on the direction and distance to move (Polansky *et al.* 2015, Jacobs *et al.* 2014).
15. With their highly developed sense of smell, and in combination with hearing thunder, elephants can detect the direction of distant rainstorms that will result in flushes of fresh vegetation (Birkett *et al.* 2012). Olfactory areas of the elephant brain are also highly developed (Jacobs *et al.* 2014).
16. The location of other necessary resources, and their spatial and temporal availability, are searched for, monitored, remembered, and recalled. An elephant must drink large amounts of water at least every few days. Thus they must find sources of clean water for drinking. Other resources include: water or mud for cooling/wallowing; minerals - if they cannot be found in vegetation, then areas of salty soil or rock ('salt-licks') must be located; and shelter, such as tree canopies, for relief from the sun during the heat of the day (Boult *et al.* 2019).
17. Elephants' bodies are adapted for covering large distances. The average distance of ground covered per day is a remarkably consistent at ±10km in 24 hours (as evident in a variety of studies reviewed in Miller *et al.* 2016). This figure has been documented across very different biomes, from arid deserts, through different semi-arid savanna types, to moist tropical forests (Douglas-Hamilton 1998, Leggett 2009, Wall *et al.* 2013, Wyatt & Eltringham 1974, Merz 1986, Galanti *et al.* 2000). Within this stable daily movement pattern there is, however, a wide range in distance traveled in any given day, from less than 1km when foraging locally to 30km or more of directed movement when moving to new foraging areas.
18. Striding over large areas is accomplished most efficiently with long legs, and as longer legs evolved, there was the parallel evolution of foraging anatomy to reach from ground to mouth. Modification of a prehensile upper lip has led to the development of the trunk seen today (Shoshani 1998), which is a highly specialized organ useful not only for different forms of feeding, but also for drinking, olfaction, grooming, visual and auditory social

signaling, and other motor functions.

19. Studies of foraging elephants (*e.g.* Guy 1976, Short 1981, Lindsay 1994) have documented that a wide range of food items is chosen from hundreds of species of plants, including fruits, buds, leaves, climbing shoots, flowers, growing stems, woody stems and branches, bark, and roots. Because it forms continuous ground cover and is easy to pluck/harvest, grass forms a significant portion of elephants' diets when it is available and abundant. All grass parts - flowers/ seeds, leaves, stems, and roots - are eaten, as and when each is most nutritious at the time of year and growth stage. Each item of food requires specific processing and handling, to select the most nutritious, digestible bits and discard the less digestible parts or those holding soil or other contaminants (Poole & Granli 2009).

Use of trunk, other body parts and tools

20. The musculature of the trunk requires millions of sensory and motor nerve connections, and the trunk is capable of both immense strength and fine control in selecting, picking up, and moving objects in the environment. Elephants use their trunks in extremely dexterous manipulation of food items, analogous to the human hand in its ability to handle objects with delicate control, with the added quality of olfaction (Rasmussen & Munger 1996). As in humans, the evolution of this manipulation organ required accompanying neural development (Onodera & Hicks 1999).
21. Other food preparation techniques include the lifting and moving of branches to reveal lush grass beneath. Such adjustment of the local environment implies a deeper understanding of the localization of plant productivity. Elephants also use other body parts to process food items. Tusks are used in different ways: to cut grass stems, break twigs and branches, carve bark from trees, dig for roots or water. Feet are used in kicking up roots, crushing, or flattening thorns (Poole & Granli 2009).
22. Tools may be fashioned from tree branches and used to pry into bark or dig salty soil from ground sources. Tools in the form of branches serving as 'back scratchers' are also used for grooming, and matts of vegetation may be used as sunshades (Hart *et al.*2001).

Acute awareness of and response to risk factors in the environment

23. Elephants have a keen awareness of risk factors in their environment and they make swift assessments and take appropriate responses. Predation is a key risk. Very young calves are vulnerable to attack by lions, and when these predators are detected, all family members are cooperatively protective; alerted by a specific alarm call, they will rush to protect the

calf and chase away the predator. Older females in particular show rapid and appropriate responses (McComb *et al.* 2011).

24. The primary risk to elephants, however, is human beings. There are two ways that this presents itself: through competition in the way they use land and through killing for the ivory trade (Thouless *et al.* 2016). In land use competition, elephants can themselves come into conflict with human groups who practice both agriculture and livestock husbandry.
25. Elephants are displaced when their previously available wild habitat is converted to agriculture or settlement (Mmbaga *et al.* 2017). When this happens, there is active competition for the use of those fields, particularly when the plants in fields are more attractive to elephants than the vegetation on offer in natural habitats. Elephants make the rational foraging choice of preferring these more nutritious food sources to many of their natural foods that are declining in quality (Osborn 2004). Elephants also come into direct conflict with livestock owners who may also be semi-mobile pastoralists. There is more scope for the sharing of livestock grazing lands, but the key points of conflict are at waterpoints. Again, there is injury and mortality on both sides of this conflict (Kuriyan 2002).
26. There is very rapid learning by elephants of the dangers posed by these potential conflicts. One way that they avoid the conflict is to change their movement and foraging patterns to times of day when people are less active. Typically, this is at night. Elephants' 'raids' into agricultural fields are most common at night, as are visits to livestock waterpoints. If there is a protected area (national park or other designated wildlife protection zone) in the vicinity, elephants will retreat into it during daylight hours and emerge at night into the surrounding lands (Douglas-Hamilton *et al.* 2005). Evidence from radiotracking of elephants shows that they move much more quickly through landscapes they share with humans, from one zone of perceived relative safety to another (Graham *et al.* 2009).
27. Killing of elephants by rural villagers or armed gangs for their ivory is a much greater threat to elephants in the immediate term. Elephants can detect alarm calls from some considerable distance and avoid the area where killings take place (O'Connell-Rodwell & Wood 2007). Again, they seek the refuge provided by protected areas when they are secured by wildlife agencies.
28. There is clear evidence that elephants' response to humans is based on an ability to distinguish the risk posed by different human groups. Playback experiments show that this is mediated by vocal cues – they can recognize and respond to the sounds of Maasai warriors as distinct from that of women and children, and other ethnic groups, and respond

with a flight response to the former but not the latter (McComb *et al.* 2014). There is a similar ability to differentiate among types of humans through visual and olfactory cues (Bates *et al.* 2007).

Human-elephant conflict transformed to coexistence through negotiation

29. Many different attempts to mitigate or eliminate human-elephant conflict have been attempted over the past decades. Several of these have involved aggressive deterrence methods or hard barriers. But they have been met with mixed success, in large part because elephants are able to respond and find ways around them. The most effective responses to such conflicts treat elephants as autonomous and sentient beings and work with their biological nature to achieve solutions that promote coexistence rather than conflict (Shaffer *et al.* 2019).
30. One commonly used approach has been to try to scare elephants when they enter fields, with the use of firecrackers, 'thunderflashes', or shots from guns. While these measures may work in the short term, elephants soon discover that the noises are localized and generally nonlethal. Their use, however, does make the elephants more fearful and, thus, potentially more aggressive in their approach to humans (Davies *et al.* 2011).
31. Electric fences are erected by people to keep elephants out of crop fields (e.g. Kioko *et al.* 2008). Elephants, while initially deterred, respond to the hazard of electric shocks by handling the 'hot' wire with non-conducting tusks; they are then able to snap the wire and enter the field. They may also break fences by pushing other elephants into them; both these approaches demonstrate higher cognitive ability and autonomy. But it is the use of branches and logs as tools to break fences that is their most impressive feat. And these techniques, once discovered are rapidly copied and replicated by other elephants, a form of cultural transmission. The use of these fences, which deliver a powerful shock, also makes elephants more aggressive and more likely to attack humans in retaliation.
32. More effective fences have been developed that recognize elephants' natural aversion to pungent plant products, such as chillies (Osborn 2002), and to the stinging attacks of honey bees (King *et al.* 2017). Fences using these more natural approaches have the additional advantage of providing a livelihood supplement to the farmers. A fence system that startles elephants with strobe lights, rather than alarming noises, has also proven effective; indeed, several of the described methods are more effective if used without noise-makers (Davies *et al.* 2011). Early warning systems, where observers share information about the presence of elephants in an area or near contested sites, have allowed more targeted, preventive

approaches for reducing damage to human life, property, and livelihoods (Sugumar *et al.* 2013, Graham *et al.* 2011).

33. As noted above, it is now increasingly recognized by conservation workers that elephants are autonomous and sentient beings, and that coexistence can be achieved by people entering into 'negotiation' with elephants (Shaffer *et al.* 2019). Such programmes have reduced the use of aggressive methods that serve only to escalate the tension between humans and elephants and increase the potential for mutual harm. Instead, they emphasize more positive approaches that work with elephants' perceptions and decision-making, allowing them some autonomy in their movements and feeding choices, while at the same time protecting human interests (e.g. Songhurst *et al.* 2016).

Summary of elephants' intrinsic cognitive qualities and needs based on their use of space

34. Elephants, in their detailed understanding of, and carefully tailored responses to, the challenges of their natural habitats, demonstrate a deep degree of autonomy, sentience, and judgment in their foraging and movement strategies. The strategies for flexible, reactive problem-solving and decision-making make use of elephants' highly developed anatomical, sensory, and cognitive adaptations and abilities, and are fine-tuned over decades of experience in navigation of environments with both predictable and unpredictable elements. The experiences gained over a lifetime are then shared between members of their strongly bonded social groups through example, teaching, and learning. When we recognize that these qualities of elephants are deeply ingrained through millennia of evolutionary selection and adaptation to their particular native ecosystems, we must inevitably move from a position of domination towards appreciation of them as creatures deserving of, and requiring, autonomy to the greatest extent possible in appropriate environmental conditions.

Observations on minimum standards for captive elephants

35. It is instructive to consider some of the so-called "standards" for the husbandry of elephants held in captivity that have been developed and modified over time by different zoo associations and other concerned groups. A discussion of these standards, in comparison to the actual needs of elephants, is presented below.
36. The Standards of the American Association of Zoos and Aquariums (AZA 2022) specify the following minimum acceptable spatial areas for indoor and outdoor enclosures for its member zoos:

- Indoor: Females – 37m^2 (400 square feet) per animal; females with calves – 56m^2 (600 sq.ft.); Males – 56m^2 (600 sq.ft.)
- Outdoor: Females and males – 500 m^2 (5,400 sq.ft. or 0.12 acre).

The AZA standards also specify minimum figures for size and composition of social groups:

- Females: 3 adult females; Males: 2 adult males; Mixed group: 3 adults of either sex.

37. For the purpose of comparison, it is worth considering the current standards of the British and Irish Association of Zoos and Aquariums (BIAZA 2019). They go some way beyond AZA standards, having increased steadily over recent years, and include:

- Indoor: Females – 300m^2 (3,229 square feet) for up to and including 4 females; additional females 80m^2 each (861 sq.ft.); Males – 160m^2 each (1,722 sq.ft.)
- Outdoor: Females and males – 3,000m^2 for any shared space (32,290 sq.ft. or 0.75 acre); this is a minimum and a much larger space for 5 or fewer females and males of 20,000m^2 (4.9 acres) is considered desirable.

The BIAZA Standards minimum figures for size and composition of social groups are:

- Females: 4 compatible adult females; Males: at least 2 adult males of different ages in bachelor groups and with the opportunity of mixing with females.
- All elephants must have the option to get away from other elephants if so desired, through use of space and visual or physical barriers in the enclosure.

38. The "Best Practice" guidelines developed by the Coalition for Captive Elephant Well-Being (Kane *et al.* 2005), which were the result of a meeting attended by elephant husbandry and welfare experts and zoo professionals at Tufts University in 2004, are intended to take greater cognizance of elephant biology. The CCEWB recommends the following minimum conditions for space:

- Indoor: Females – 60m^2 (645 sq.ft.) per animal, overnight; 185m^2 (1,990 sq.ft.) per animal in winter quarters (i.e. longer term); males – 110 m^2 (1,184 sq.ft.) overnight; 320m^2 (3,444 sq.ft.) winter quarters
- Outdoor: Females and males – Sufficient to allow walking of 10 km (6.2 miles) per day.

and for social groups and companions:

- African savanna elephants: 10 individuals; African forest elephants and Asian elephants: 5 individuals
- Females; related animals and socially bonded animals never separated; Males: separated from their maternal group only by or after sexual maturity (10 years or older); Sub-adult and adult males: separate facilities, including separate night quarters and yards for male elephants, as well as the option of common housing and yards for males and females.

39. The fundamental biological needs of elephants have been established by the extensive scientific research undertaken thus far on the living elephant species in their natural ranges, as described in part above. A comparison between the sets of space and housing standards with each other, and with the evidence from elephant biology, makes it clear that the minimum standards adopted by the AZA for zoos located in the United States are weaker than both those of the United Kingdom and of the CCEWB elephant welfare experts, which are themselves also inadequate when compared to elephants' natural lives.
40. The AZA standards for social conditions are equally inadequate. These guidelines appear to be a compromise between the actual needs of elephants and the financial and logistical difficulties faced by AZA member zoos in meeting such requirements, with the balance tilted firmly towards the latter criteria.
41. All of these standards fall far, far short of fulfilling elephants' requirements for space and sociality in both indoor and outdoor facilities (in fact, by several orders of magnitude).
42. A review by Atkinson & Lindsay (2022) has argued persuasively that "*Quality space means that elephants can forage in natural, diverse vegetation, walk for miles each day, and exert a high degree of control over their social interactions. They suffer in zoos psychologically and physically because of the limits of what can be provided within such restricted environments.*" They conclude that, for captive situation, only "*100ha or more of diverse, natural habitat in a warm climate would offer individual elephants the opportunity to live fulfilling lives.*"

Conclusion

43. On the basis of my own extensive professional knowledge and understanding of elephants' undeniable biological needs, my professional conclusion and recommendation is that Billy and Tina not be moved to the Tulsa Zoo, rather they should be relocated to a suitable elephant sanctuary according to practices that are well-established by sanctuary

professionals. They both were taken from the wild at an early age and have spent all their remaining years in the barren confines of zoo compounds or, in Tina's case, the much worse conditions of performance venues. Their behavior has been completely controlled by their human handlers, and for this reason has been stressful to the point of psychological damage. There is no obstacle to their recovering some measure of successful and fulfilling lives in the favourable ecological and social surroundings of a large, appropriate habitat area such as a sanctuary.

I declare under penalty of perjury under the laws of the State of California that the foregoing is true and correct.

Executed on the 9th (date) of May (month), 2025 (year)

at 2 Jack Straw's Lane, Oxford, United Kingdom

(city or other location, and state or country)

William Keith Lindsay, Ph.D.

(signature)

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EXHIBIT A

Curriculum Vitae

Name	William Keith LINDSAY
Profession	Natural Resources Advisor/ Monitoring & Evaluation Expert
Date of Birth	5 November 1952
Nationality	Canadian / British (dual citizenship)

Key experience

Keith Lindsay is a natural resources advisor/ monitoring & evaluation expert with over 40 years' professional experience in Southeast Asia, Africa, Latin America, the Caribbean, North America and Europe, in planning, conducting and evaluating field projects and in senior administrative and leadership roles. He was a senior staff member at the Oxford-based consultancy, The Environment & Development Group (EDG), during 1994-2013. He undertook a variety of long- and short-term consultancy missions and project work, both independently and with EDG, in project/programme monitoring and evaluation, environmental assessment and land use planning, community-based natural resource management (CBNRM), protected area monitoring and management, and biodiversity research and conservation. Since 2013, Dr Lindsay has been an independent consultant on assignments for international donor agencies and NGOs in Africa and Asia.

Dr Lindsay has been engaged in research on the ecology of African savanna elephants with the Amboseli Elephant Research Project of southern Kenya since 1977, focussing on foraging behaviour, population dynamics, and coexistence with local human communities. His work continues on policy support for elephant conservation, international trade in ivory and live elephants under the Convention on International Trade in Endangered Species (CITES), and efforts to improve their well-being in both the wild and captivity.

Education

Ph.D. Zoology, 1995, University of Cambridge
M.Sc. Zoology, 1982, University of British Columbia, Vancouver, Canada
B.Sc. (Hons.) Zoology, 1974, University of British Columbia, Vancouver, Canada

Summary of selected employment record

- Switzerland: Survey of elephants in Swiss zoos (Fondation Franz Weber, 2023)
- Myanmar: Monitoring & evaluation of Human-Elephant Coexistence project (Elephant Family, 2019-present)
- UK/ Europe: Support to African Elephant Coalition in the context of CITES (FFW, 2017-present)
- Tanzania: Terminal Evaluation of Kilombero wetlands conservation (Enabel - Belgium, 2018)
- UK/ Brussels: Project design, Sustainable Wildlife Management Project (European Commission/FAO, 2018)
- UK: CITES Information Document on live trade in African elephants (Humane Society International, 2017)
- Japan: Survey and report on solitary elephants in Japan's zoos (Elephants in Japan/Zoocheck, 2017)
- Kenya: Guidelines for transboundary conservation projects in Africa (EC, 2017)
- Mongolia: Results Framework, Forest conservation project (FAO, 2015–16)
- Tanzania: Mid-term Evaluation CBNRM project suite (EC, 2015–16)
- Tanzania: MTE southern Tanzania parks (SPANEST) project (UNDP/GEF, 2015)
- Thailand: MTE Sustainable management of biodiversity (SMBT) project (UNDP/GEF, 2014–15)
- Zambia: Benefit sharing study in Zambia's Game Management Areas (UNDP, 2014–15)
- Cambodia: Revision of MTE of Sustainable Forest Management project (UNDP/GEF, 2014)
- UK/ Global: Revision of Monitoring & Reporting Framework for UNREDD, 2011-15 (FAO, 2013-14)
- Botswana: Terminal Evaluation Improved Sustainability of Protected Areas project (UNDP/GEF, 2013)
- UK/ Central Africa: Gaps & options for elephant conservation in Central Africa (CMS/UNEP, 2011)
- Kenya: National Conservation & Management Strategy for Elephants (Kenya Wildlife Service, 2007–08)
- South Africa: Contributing author SA Elephant Assessment (CSIR, 2007)
- South Africa: Corresponding member Science Round Table (Dept. Env. Affairs & Tourism, 2005–06)
- Cambodia: MTE Conservation of Cardamom Mountains forest (UNDP/GEF, 2004-05)
- UK/ Chile: Technical support at CITES CoP12 (Care for the Wild International, 2002, 2004)
- Mali: Initiating Measures to Protect Gourma Elephants (US Dept. of State/ USFWS, 2003–2005)
- Jordan: Range ecologist (IFAD, July 1995)
- Botswana: Support to stakeholders' conference: African Elephant in the Context of CITES (EU, 1994)
- Botswana: Wildlife Ecologist/ Elephant policy, Department of Wildlife & National Parks (EU, 1988-92)
- Kenya/ UK: PhD - Amboseli elephant ecology, University of Cambridge (1982-94)
- Kenya/ Canada: MSc - Amboseli elephant ecology, University of British Columbia, (1977-82)
- Kenya: Field ecologist Amboseli National Park (New York Zoological Society, 1977-79, 1983)

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2018: *Elephant conservation: International trade in live African elephants: an update.* PAWS International Captive Wildlife Conference 2018, 9-11 November 2018. Performing Animal Welfare Society, Los Angeles.

2018: *The lives of elephants in the wild and in captivity.* 9th International Symposium on Primatology and Wildlife Science. 3-5 March, 2018. Primate Research Institute, Kyoto University. During March 2018, the presentation was also given to meetings for: the City Council of Kofu: a group of zoo keepers and Directors including the Executive Officer of the Japanese Association of Zoos and Aquariums in Morioka; a public audience in Tokyo.

2016: *Elephant conservation: International trade in ivory and living elephants.* PAWS International Captive Wildlife Conference 2016, 11-13 November 2016. Performing Animal Welfare Society, San Andreas.

2014: *Elephants, captivity and conservation.* PAWS International Captive Wildlife Conference 2014, 8-10 November 2014. Performing Animal Welfare Society, Los Angeles.

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2006: *Elephant needs in captivity: Learning from nature.* Chicago City Council and Lincoln Park Zoo, 23 February 2006, Chicago.

Exhibit 4

Declaration of Bob Jacobs

I, Bob Jacobs, declare as follows:

Introduction and Qualifications

1. My name is Bob Jacobs. I graduated with a Bachelor of Arts, *Magna Cum Laude*, in German from Whitman College in 1980. I received an M.A. in Germanics, with a minor in Teaching English as a Second Language, from the University of Washington in 1982. I received my Ph.D. from the University of California, Los Angeles (UCLA) in Applied Linguistics in 1991, completing a neuroanatomy dissertation under the supervision of Drs. Arnold B. Scheibel and John Schumann. The dissertation was entitled: "A Quantitative Dendritic Analysis of Wernicke's Area." During this time, I also worked with Dr. Marian Diamond of the University of California, Berkeley. Post-doctoral research in neuroimaging was also completed from 1991-1993 under the supervision of Dr. Harry Chugani at UCLA. I began my tenure track professorship in the Department of Psychology at Colorado College in 1993, started the school's Neuroscience major in 1996, and was there for 30 years, retiring in 2023. I now reside in Lakebay, Washington.
2. I submit this Declaration in support of the Nonhuman Rights Project, Inc.'s petition for a writ of habeas corpus regarding the captive elephants at the Los Angeles Zoo. I have professional knowledge of the facts to which I attest and am not a party to this proceeding.
3. I have conducted research on the mammalian brain since 1984, when I began my dissertation research in the Laboratory of Dr. Arnold B. Scheibel at the UCLA Brain Research Institute. I have 48 peer-reviewed publications to my name, all in well-respected scientific journals. I also have two chapters in edited volumes, and 63 professional talks/posters presented at academic conferences, and over 60 invited lectures about the brain. From 1984 to 2010, my main research focus on the human cerebral cortex, specifically on the quantitative neuromorphology in the cerebral cortex, that is, the shape and size of nerve cells (neurons) in the outmost layers

of the brain involved in higher cognitive functions—18 publications have focused on human tissue.

4. From 2010 onward, I focused on comparative neuroanatomy, examining the brains of a variety of species—for many of these species, our studies constitute the first time anyone had explored the neurons in the brains of these animals. Species examined included: African elephant, giraffe, minke whale, humpback whale, bottlenose dolphin, Siberian tiger, clouded leopard, Florida manatee, cheetah, African leopard, chimpanzee, African wild dog, domestic dog, banded mongoose, caracal, zebra, wildebeest, pygmy hippopotamus, greater kudu, ring-tailed lemur, golden lion tamarin, chacma baboon, macaque monkey, Flemish giant rabbit, Bennett's wallaby, and Long-Even's rat. A total of 18 publications have focused on these non-human animals.

5. With regards to the African elephant, we documented the types of neurons in both the cerebral cortex and in the cerebellum, a part of the brain involved in balance, body control, and coordination. This research was conducted on adult and newborn elephants—resulting in a total of 4 publications focused exclusively on the elephant brain, which had not been explored previously. In addition to academic publications, I have presented these results at several scientific conferences (e.g., Society for Neuroscience, Performing Animal Welfare Society), and have written summaries of this research for the online publication known as "The Conversation" (see here and here).

6. My Curriculum Vitae fully sets forth my educational background and experience and is attached as "Exhibit A."

Basis for opinions

7. My early interest in brain research involved using the research techniques of Dr. Scheibel to extend both his and Dr. Diamond's interest into the effects of the environment on the brain. Dr. Diamond was a pioneer in documenting the effects of an impoverished and enriched environment on neuroanatomy in non-human animals; my dissertation extended that to the human brain, where we found education related differences in the neurons of the cerebral cortex. Specifically, individuals with a university education had more complex neurons than individuals with a high school or less than high school education.
8. I have followed this area of research my entire career, including when we examined the brains of both free and captive animals. As such, several decades of neuroscientific research has led me to several conclusions about the state of the brain in captive non-human animals, particularly with regard to long-lived, large-brained mammals such as elephants.
9. One of the main findings of our elephant cortex paper (Jacobs et al., 2011) was that pyramidal neurons in the elephant are just as complex as similar neurons in the human cortex. As is the case in humans, these neurons are also more complex in the frontal lobe, involved with higher cognitive function, than in the occipital lobe, involved in the early processing of incoming visual information. There are remarkable parallels in terms of overall complexity of neurons and the functional involvement of these neurons. One difference was noted between the cortical neurons in the African elephant and in humans—those in the African elephant appear to extend their branches more broadly than neurons in the human, which tend to be more compact. As such, elephant neurons sample a very wide array of information because of the length of their dendrites. This broad synthesis of information in the African elephant may contribute to their contemplative nature—elephants often appear to be examining their surroundings and thinking very deeply about what is going on around them. They have the leisure of their great size and few natural predators, which allows them to consider their decisions very carefully. Primate cortical neurons, by contrast, seem more designed for quick

responses to the environment. This contemplative aspect of the elephant further supports the findings expressed below with regards to how their brain responds to captivity.

10. Although my own research has focused on the African elephant, all of conclusions here apply equally to Asian elephants as well—in fact, the conclusion applies across all mammals studied to date. In terms of general neuroanatomy, the Asian elephant brain is very similar to the African elephant brain (Shoshani et al, 2006). There is no reason to suspect that the brain of an Asian elephant be different in terms of physiology, neurochemistry, and basic cellular makeup (Barasa & Schochatovitz, 1961) than any other mammal. All evidence suggests it is remarkably similar to the brain of an African elephant, both in terms of structure (Maseko et al., 2012) and function (Plotnick et al., 2006; Hart et al., 2008).

11. I recently published a co-authored comprehensive review article on the neural consequences of impoverished environments for elephants and cetaceans (Jacobs et al., 2021; see here). In addition, I also a co-authored the most comprehensive and up to date scientific review of the severe challenges faced by elephants in captivity (Doyle et al., 2024; see here). In that review, we discuss quantitative and qualitative aspects of the enclosed space for elephants as well as sociocognitive factors, dietary differences, and health/welfare concerns (e.g., stereotypies, physical health, nutrition, reproduction, life expectancy). These review articles form the basis of the opinions expressed in this declaration.

Opinions

12. In addition to a rather large list of well-documented physical ailments (Riddle & Stremme, 2011) and behavioral abnormalities (Greco et al., 2017) that afflict elephants in captivity (Doyle et al., 2024), ~~e~~xtensive neural consequences to an impoverished environment have been demonstrated in many species to date: mice, rats, rabbits, cats, and primates, including humans (Jacobs et al., 1993, 2021). No research of this nature has been completed on elephants as these are post-mortem studies and would therefore require killing of the animal; as such, we extrapolated from controlled scientific studies with all evidence suggesting that the brains of animals such as elephants would not "behave" any differently than the brain of any other

mammal, including humans. There is a great deal of evolutionary continuity across the brains of the species that have been examined, which makes this a very logical extension of the existing research. Indeed, much of what we know about the neuropsychiatric consequences of chronic stress in humans derives from nonhuman animal models (Lecorps et al., 2021).

13. Over 60 years of neuroscience research indicates that an impoverished environment negatively affects the cerebral cortex (Diamond et al., 1964; Diamond, 2001). These effects include a thinner cerebral cortex, decreased blood supply, smaller neuronal cells bodies with few glial ("helper") cells for metabolic support, decreased dendritic branching for synthesizing information, fewer dendritic spines (indicating fewer connections with other neurons), and smaller, less efficient synapses. Additional studies reveal similar epigenetic-related deficiencies at the molecular (van Praag et al., 2000) and neurochemical (Kozorovitskiy et al., 2005) level throughout the brain. These changes at the cortical level are associated with deficits in an animal's emotional and cognitive functioning (Neidl et al., 2016).

14. A crucial component to an enriched environment is exercise (Basso & Suzuki, 2017), which not only increases the supply of oxygenated blood to a metabolically expensive brain, but also contributes to potential neurogenesis and enhanced cognitive abilities through a series of complex biochemical cascades (Horowitz et al., 2020). Large, captive mammals are severely deprived of the exercise component of enrichment, particularly when one realizes that elephants naturally travel tens of kilometers a day (sometimes more than 100 kilometers) across diverse terrain with numerous plants and various substrates, something they cannot do in the small, monotonous enclosures that typify zoo exhibits (Holdgate et al., 2016; Doyle et al., 2024). Not only do elephants in larger enclosures exhibit lower glucocorticoid metabolite concentrations than their cohorts in smaller enclosures, but they also exhibit lower cortisol (stress hormones) levels when they can access diverse enrichment options and are allowed to be in compatible social groups (Brown et al., 2019). In Asian elephants, cortisol levels negatively correlate with locomotion and positively correlate with stereotypies (Schmid et al., 2001). Overall, these findings imply that cortical neurons in impoverished/captive animals are

less complex, receive less metabolic support, and process information less efficiently than cortical neurons from animals in an enriched, more natural environment (Rosenzweig & Bennett, 1969).

15. Two other brain areas are affected negatively by a captive/impoverished environment because such an environment severely constrains or even prevents the natural behavior of animals, resulting in chronic frustration, boredom, and stress. Two subcortical (beneath the cortex) brain structures negatively affected by such stress are the hippocampus, involved primarily in declarative (i.e., facts and events) and spatial memory formation, and the amygdala, involved in emotional processing. Decades of neuroscientific research in the laboratory and in the field (Sapolsky, 2005) have demonstrated that prolonged stress results in chronically elevated levels of glucocorticoids (stress hormones) (Sapolsky, 1996). Chronic exposure to these stress hormones contributes to wide-ranging neurodegeneration (Vyas et al., 2016), including neuronal damage/death in the hippocampus (Sapolsky et al., 1990), resulting in memory deficits, and in the amygdala (McEwen et al., 2015), resulting in emotional processing deficits. In natural environments, the body's stress-response system is designed for quick activation to escape from danger; in captivity, there is no escape. In captivity, animals have an almost complete lack of control (Sapolsky, 2012) over their environment. The resulting chronic stress tends to inhibit the immune system (Schedlowski & Schmidt, 1996), with negative health and neural consequences (McEwen et al., 2015). Under chronic psychological or physical stress, pro-inflammatory cytokines are released by activated immune cells and can interact with multiple corticolimbic brain structures, dysregulating different growth factors and neurogenesis, several neurotransmitter systems, and neuroendocrine communication (Capuron & Miller, 2011). Moreover, animals kept in social isolation exhibit increased aggression and depression like symptoms (Miura et al., 2002).

16. Stress from captivity often fosters learned helplessness and conditioned defeat (Maier & Seligman, 2016), which involves the amygdala (Hammack et al., 2012) and broad dysregulation of the neurotransmitter serotonin (Maier & Watkins, 2005). Under similar

conditions (Chugani et al., 2001), stress is associated with a variety of neuropsychiatric diseases in humans, such as anxiety/mood disorders (Zhang et al., 2018), including major depression, and post-traumatic stress disorder (PTSD) (Koenigs & Grafman, 2009). Current human research, in fact, suggests that childhood trauma may subsequently make the adult brain more vulnerable to maladaptive stress responses (Banihashemi et al., 2020), an issue particularly relevant for long-lived, highly social animals such as elephants and cetaceans born into captivity. One neural consequence under such conditions is microglia activation and a sustained release of inflammatory mediators (Leszek et al., 2016). Subsequent neuroinflammation contributes to physiological, behavioral, affective, and cognitive disorders (de Pablos et al., 2014; McLeod et al., 2001). To the extent that captivity induces stress-related immuno-suppression, captive animals are thus more susceptible not only to neuroinflammation but also to opportunistic infections and possible disruptions of fertility (Edwards et al., 2019). Given the highly conserved (Nikolova et al., 2018) nature of neural structures (i.e., brains have a lot in common across species), there is no logical reason to believe that the large, complex brains of animals such as elephants (Jacobs et al., 2011) would react any differently to a severely stressful environment than does the human brain.

17. Captivity and the psychosocial stress it engenders, has negative effects on complex circuitry between a subcortical collection of nuclei (groups of neurons) known as the basal ganglia and the cerebral cortex. Through a series of reciprocal connections, the basal ganglia select and orchestrate appropriate cortical activity for a given situation, including the two pathways involved in movement: the direct pathway and the indirect pathway. The direct pathway tends to be involved in generating movement/behavior whereas the indirect pathway is more crucial for inhibition of movement/behavior. Normal movement depends on a delicate balance between these two pathways. Stereotypic behavior resulting from stress has been documented in a large number of species (e.g., poultry, rodents, pigs, voles, cows, sheep, dogs, horses, and primates, including humans), and is invariably associated with an imbalance in the direct/indirect pathways (McBride & Parker, 2015). More specifically, the indirect pathway

is suppressed as a result of dysregulation of two neurotransmitter systems, dopamine and serotonin (Langen et al., 2011). Such behavioral stereotypies (a form of brain damage) may represent a coping strategy as the animal attempts to mitigate the overwhelming effects of psychosocial stress (Poirier & Bateson, 2017). It is worth noting that elephants, in their natural habitat, have never been noted to have exhibit such stereotypies, which reflect underlying (abnormal) disruption of neural mechanisms.

18. Stereotypies are common human and non-human responses to chronic stress. Children with a history of early institutional care are more likely to exhibit stereotypies, underscoring the influential role of the environment during early development (Bos et al., 2010). In nonhuman animals, such behavioral stereotypies are seldom if ever observed in nature (Boorer, 1972), but have been consistently documented in many captive animals beyond murid rodents. Chronic stress also creates heightened dopamine sensitivity in the nucleus accumbens, which is part of the mesolimbic pathway associated with motivation (Cabib, 2006). Environmental deprivation and social isolation have repeatedly been shown to dysregulate these motor control pathways in several species, resulting in stereotypies (Martin et al., 1991; McBride & Hemmings, 2005). By extension, comprehensive environmental enrichment appears to rebalance activity in these pathways, thus at least partially ameliorating or even preventing the emergence of stereotypies. Comprehensive environmental enrichment appears to prevent stereotyped behaviors by increasing metabolic activity in the motor cortex, the striatum, and the nucleus accumbens (Turner et al., 2002).

Summary

19. Long-lived individuals with large, complex brains integral to their intricate sociobehavioral existence cannot function normally in captivity (Doyle et al., 2024). The neural perspective outlined in Jacobs et al. (2021) underscores the sociobehavioral assessment of elephant needs. Physical and behavioral abnormalities are easy to observe, but one must look deeper to see the neural consequences. Evolution has constructed the brain—of all organisms—to be extremely and exquisitely responsive to the environment (for better and worse). This

responsivity extends to the level of gene expression, meaning that the environment can turn on or turn off different genes (Sapolsky, 2017). As such, the captive environment we place animals in significantly and sometimes permanently alters their brains in a negative manner. From a neural perspective, imprisoning large mammals and putting them on display is undeniably cruel.

20. Elephants exhibit behavioral patterns and physical abnormalities similar to other mammals in impoverished environments. Moreover, they possess very similar, highly conserved, neurobiological systems as do other mammals for responding to impoverishment and chronic stress. Therefore, elephants sustain neurobiological insults from living in confined, artificial environments. Insofar as most captive elephants cannot be "rewilded" for scientific and ethical reasons, the case can be made for transferring them to authentic sanctuaries, where they may live in a more natural environment. Authentic sanctuaries report improved physical and psychological health in elephants after their arrival, including decreased frequency or extinction of stereotypies, reduced aggression toward keepers, muscle tone gain, and formation of social bonds between elephants with different social histories, including elephants who were abused, traumatized, or solitary for decades (Buckley, 2009; Derby, 2009). Thus, elephants should either remain free (and protected) or, if already in captivity, they should be released into well-designed sanctuaries—several already exist for elephants; for example in Tennessee (see here), in Georgia (see here), and in Northern California (see here).

21. In concluding, I would like to point out that the Los Angeles Zoo's proposal to relocate Billy and Tina to the Tulsa Zoo rather than to an accredited elephant sanctuary is self-serving insofar as the main goal is to use Billy for artificial insemination as part of the AZA's captive elephant breeding program. Zoos see this as necessary because they cannot maintain a self-sustaining population of elephants. The ongoing challenge of housing elephants in zoos is reflected in the fact that the number of AZA accredited zoos holding elephants in the U.S. appears to have dropped from 67 to 49 in the last decade. Indeed, since 1991, 34 AZA accredited North

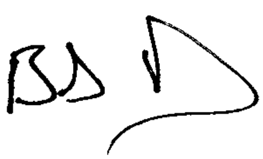
American zoos have ended their elephant exhibits. It is a failing industry when it comes to elephants. Both Billy and Tina will be subjected to a traumatic transfer to another barren zoo where their suffering will continue. I have carefully watched numerous videos of the elephant exhibit at the Tulsa Zoo. Although the zoos will claim the Tulsa Zoo is much better than the LA Zoo, it is not. It, along with the LA Zoo, has also been named to In Defense of Animals' 10 worst zoos for elephants list (here). Every negative conclusion we reach in our 2024 review paper on challenges for captive elephants is true for both zoos. I strongly urge everyone involved in this decision to read that review paper (here). The only ethical option at this point is to transfer Billy and Tina to an authentic sanctuary.

I declare under penalty of perjury under the laws of the State of California that the foregoing is true and correct.

Executed on the __8____ (date) of ___5___ (month), _2025_____ (year)

at ______Lakebay, Washington____
(city or other location, and state or country)

Bob Jacobs, Ph.D.____________________________________



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(signature)

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EXHIBIT A

CURRICULUM VITAE

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Birth date: Feb. 14, 1958
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Educational Background

1991-1993	UCLA	Post-doc	UCLA DANA Scholar, Pharmacology
1984-1991	UCLA	Ph.D.	Applied Linguistics Specialization: Cognitive Neuroscience
1980-1982	University of Washington	M.A.	Germanics TESL (minor)
1976-1980	Whitman College	B.A.	German

Grant Support

2001: Consultant on Center for the Study of Culture, Brain, and Development program grant; funded by Foundation for Psychocultural Research ($1,000,000)
2000: Hughes Foundation grant for laboratory equipment ($9,155)
1996: Hughes Foundation grant for laboratory equipment ($10,999.95)
1995: National Science Foundation: Instrumentation and Laboratory Improvement Grant ($24,430)

Selected Honors/Credentials

2016-17; 2020-22: Herman-Winkler Professorship
2005: Mentor Recognition Award—University of California, San Diego
1999: Faculty Spirit Award--Colorado College Center for Community Service
1996-98: John D. and Catherine T. MacArthur Assistant Professor in Psychology
1995: Nominated for National Science Foundation Presidential Faculty Fellows Award
1988-91: Ursula Mandal Scholarship (annual $10,000 award; University of California, Los Angeles)
1988: California State Teaching Credential
1982: Delta Phi Alpha (University of Washington)
1980: Phi Beta Kappa (Whitman College)

Language Experience

German	M.A. degree, relative fluency (two years abroad inclusive)
Japanese	Spoken and written: two years in Japan and formal study at UCLA
French	Two years, university level
Chinese (Mandarin)	One quarter, university level
Korean	One quarter, university level
Latin	Two quarters, university level

Teaching Experience

2006-present	Professor, Psychology	Colorado College
1999-2006	Associate Professor, Psychology	Colorado College
1993-1999	Assistant Professor, Psychology	Colorado College
1990-91	Guest Lecturer	University of California, Los Angeles
1984-91	Teaching Associate/Fellow	University of California, Los Angeles
1986-90	Instructor	UCLA American Language Center
1988	Instructor	Santa Monica College, CA.
1982-84	Chief language instructor, coordinator	Asahikawa Cultural Center, Japan
1980-82	German teaching assistant	University of Washington

Refereed publications

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Jacobs, B., Driscoll, L., & Schall, M. (1997). Lifespan dendritic and spine changes in areas 10 and 18 of human cortex: A quantitative Golgi study. *The Journal of Comparative Neurology*, *386*, 661-680. https://doi.org/10.1002/(SICI)1096-9861(19971006)386:4<661::AID-CNE11>3.0.CO;2-N

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Commentaries, abstracts/posters, presentations, commentaries

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Creswell, J., Hrubes, M., & **Jacobs, B.** (2001). Putative dendritic changes following corpus callosotomy in human cortex: A quantitative and qualitative case study. [Abstract/Poster] Society for Neuroscience, San Diego, California, November, #251.15.

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Kapler, E., Scheibel, A.B., & **Jacobs, B.** (2000). Cell packing density in Brodmann's areas 10 and 18 of the human cerebral cortex. [Abstract/Poster] Society for Neuroscience, New Orleans, LA, November, #461.17.

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Prather, M., Treml, M., Driscoll, L., Schall, M., & **Jacobs, B.** (1997). Regional variation in dendritic and spine complexity: A quantitative Golgi analysis of human cerebral cortex. [Abstract/Poster] Society for Neuroscience, New Orleans, LA, October, #87.13.

Kamm, G., Hovey, S., Treml, M., Prather, M., & **Jacobs, B.** (1997). The Colorado College elementary school outreach program for neuroscience education: What the children say. [Abstract/Poster] Society for Neuroscience, New Orleans, LA, October, #111.9.

Jacobs, B., & Larsen, L. (1997). Pluripotentiality, epigenesis, and language acquisition. Commentary on R-A. Müller, Innateness, autonomy, universality? Neurobiological approaches to language. *Behavioral and Brain Sciences*, 19:4, 639.

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Jacobs, B., & Horner, J. (1995). Language as a multimodal sensory enhancement system. Commentary on W. K. Wilkins & J. Wakefield, Brain evolution and neurolinguistic preconditions. *Behavioral and Brain Sciences.* 18:1, 194-95.

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Sato, E., & **Jacobs, B.** (1994). Selective attention and education: A neurobiological perspective. American Educational Research Association, New Orleans, LA, April 5.

Sato, E., & **Jacobs, B.** (1994). Neural mechanisms of selective attention essential to language development. American Association of Applied Linguists, Baltimore, Maryland, March 5.

Jacobs, B., & Raleigh, M. J. (1993). Sizing up social groups. Commentary on Dunbar, Coevolution of neocortical size, group size and language in humans. *Behavioral and Brain Sciences.* 16:4, 710-11.

Jacobs, B., Chugani, H. T., Allada, V., Chen, S., Colgan, M., Phelps, M. E., Pollack, D. B. & Raleigh, M. J. (1993). Metabolic brain development in rhesus macaques and vervet monkeys: A PET study. [Abstract] Sixteenth Meeting of the American Society of Primatologists, Sturbridge, Massachusetts, August 18-22.

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Allada, V., Schelbert, H. R., **Jacobs, B**., Chugani, H. T., Raleigh, M. J., Brunken, R. C., Williams, R. G., & Phelps, M. E. (1993). Cardiac metabolism in developing non-human primates with positron emission tomography. [Abstract #2354] 66th Scientific Session of the American Heart Association. Atlanta, Georgia. November 8-11.

Jacobs, B., Chugani, H. T., Allada, V., Chen, S., Phelps, M. E., Pollack, D. B. & Raleigh, M. J. (1993). Metabolic brain development in non-human primates: A quantitative PET study. [Abstract/Poster] XVIth International Symposium on Cerebral Blood Flow and Metabolism, Sendai, Japan, May 22-28.

Jacobs, B., & Schall, M. (1992). Exploring the changing human brain: The relationship between gender, hemisphere, education and dendritic measures. *Perspective,* 16:3, 37-45.

Jacobs, B., Chugani, H. T., Allada, V., Harris, G. C., Chen, S., Phelps, M. E., Pollack, D. B. & Raleigh, M. J. (1992). Brain development in vervet monkeys: A preliminary PET study. [Abstract/Poster] Society for Neuroscience, Anaheim, California, October 25-30.

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Jacobs, B., & Raleigh, M. J. (1992). Attachment: How early, how far? Commentary on G. W. Kraemer, A psychobiological theory of attachment. *Behavioral and Brain Sciences,* 15:3, 517. https://doi.org/10.1017/S0140525X0006982X

Jacobs, B. (1991). Neurobiology and language acquisition: Continuity and identity. Commentary on P. Greenfield, Language, tools, and brain: The ontogeny and phylogeny of hierarchically organized sequential behavior. *Behavioral and Brain Sciences.* 14:4, 565.

__________ (1991). Contribution to "Defining our field: Unity in diversity." *Issues in Applied Linguistics.* 1, 156.

Jacobs, B., & Scheibel, A. B. (1991). Education related changes and individual variability in Wernicke's area: A quantitative dendritic analysis. [Abstract/Poster] Society for Neuroscience, New Orleans, LA, November 10-15.

Scheibel, A. B., & **Jacobs, B.** (1991). Age-related changes in Wernicke's area: A quantitative dendritic analysis. [Abstract/Poster] Society for Neuroscience, New Orleans, LA, November 10-15.

Jacobs, B., (1989). A neurobiological perspective of individual differences in language acquisition. Workshop paper presented at the Stanford Child Language Research Forum. April 8.

__________ (1989). Environmental diversity and the brain: Implications for language acquisition. Paper presented at the Ninth Second Language Research Forum at the University of California, Los Angeles, February 24.

__________ (1988). The developing brain and SLA. Paper presented at the Eighth Second Language Research Forum at the University of Hawaii, Manoa, March 3-6.

Jacobs, B., & Hilles, S. (1987). Establishing a neurobiological perspective of primary and secondary language acquisition. Paper presented at the Seventh Second Language Research Forum at the University of Southern California, Los Angeles, February 22.

Invited lectures

Jacobs, B., Rally, H., Doyle, C., O'Brien, L., & Marino, L (2022). Putative neural consequences of captivity for elephants and cetaceans. International Captive Wildlife Conference. Sacramento, CA, November 12.

_________ (2019). Parent, children, brains…challenges and responsibilities. Colorado College, Gifted and Talented program, Colorado Springs, CO, June 10.

_________ (2018). Big cats, big neurons: What makes the felid brain special. International Captive Wildlife Conference. Los Angeles, CA, November 11.

_________ (2018). The neuroscience of captivity. International Captive Wildlife Conference. Los Angeles, CA, November 10.

_________ (2016). Insights from the elephant brain. International Captive Wildlife Conference. San Andreas, CA, November 12.

_________ (2016). Cortical neuromorphology: Beyond primates and rodents. International Conference on Brain Informatics and Health. Featured Speaker. Nebraska, Omaha, October 15.

_________ (2015). The ever-changing brain: Education and enrichment. Colorado College, Gifted and Talented program, Colorado Springs, CO, June 8.

_________ (2015). The ever-changing brain: education and enrichment. Colorado Springs School District 11, Colorado Springs, CO, April 22.

_________ (2003). Your brain, your life. Reach for Tomorrow. Colorado Springs, CO, August 7.

_________ (2002). A brain's view of language: Looking back and from within. Colloquium: Cognitive neuroscience and second language acquisition research: Defining the interface. American Association of Applied Linguistics. Salt Lake City, Utah, April 6-9.

_________ (2000). Educating the brain: Development, plasticity, and responsibility. Colorado Science Convention Beyond 2000: Sound Science & Sustainability. Denver, CO. Sept. 29.

_________ (1997). What teachers should know about the brain. National Science Teachers Association Western Area Convention. Denver, CO. Nov. 21.

Jacobs, B., Prather, M., & Kamm, G. (1997). The Colorado College Neuroscience Outreach Program. National Science Teachers Association Western Area Convention. Denver, CO. Nov. 20.

Jacobs, B. (1997). Four talks: (1) Positron emission tomography and the developing primate brain; (2) Lifespan changes in the human brain; (3) Education and the brain; and (4) Regional dendritic variation in the human cerebral cortex. Capital University of Medical Sciences, Anding Hospital, and Xuan Wu Hospital. Beijing, China, June 4-June 25.

Jacobs, B., & Chugani, H. T. (1994). Glucose metabolism in the developing brain: Correlations with synaptogenesis, plasticity and epilepsy. XIXth CINP Congress, Washington, D.C., July 1.

Jacobs, B. (1994). Metabolic brain development in rhesus macaques and vervet monkeys: A PET study. Social cognition affinity group. University of California, Los Angeles. March 14.

_________ (1994). Quantitative dendritic analysis of Wernicke's area. Neuroscience colloquium. Colorado State University, Fort Collins. Feb. 1.

__________ (1993). Dendritic and PET studies of the developing brain: Implications for language acquisition. English colloquium. University of Washington, Seattle, May 12.

__________ (1993). A PET study of metabolic brain maturation in vervet and rhesus monkeys. Psychology colloquium. The Colorado College, Feb. 5.

__________ (1993). Lifespan development and epigenetic influences on the dendritic systems in Wernicke's area. Psychology colloquium. The Colorado College, Feb. 5.

__________ (1993). Lifespan development and epigenetic influences on the dendritic systems in Wernicke's area. Psychology colloquium. Southern Connecticut State University, Feb. 1.

__________ (1993). Lifespan development and epigenetic influences on the dendritic systems in Wernicke's area. Center colloquium. Center for Molecular and Behavioral Neuroscience, Rutgers University, Jan. 29.

__________ (1992). Lifespan development and epigenetic influences on the dendritic systems in Wernicke's area. Psychology colloquium. Macalaster College, Dec. 8.

__________ (1991). Wernicke's area and the environment. Colloquium presentation at California State University. Fullerton, California, April 30.

__________ (1991). A quantitative dendritic analysis of Wernicke's area. Colloquium presentation at the University of North Carolina. Greensboro, North Carolina, February 8.

__________ (1991). A quantitative dendritic analysis of Wernicke's area. Colloquium presentation at Boys Town National Research Hospital. Omaha, Nebraska, January 10.

__________ (1990). Toward a neurobiological understanding of interaction in language acquisition. Paper presented to graduate second language acquisition course at the University of Washington, Seattle, May 16.

__________ (1989). The brain-environment interface: Implications for language acquisition. Colloquium paper presented at the University of Washington, Seattle, April 28.

__________ (1987). What the brain can tell us about language acquisition. Colloquium paper presented at the University of Washington, Seattle, March 11.

Community Presentations

Jacobs, B. (2019). Exploring the elephant brain: What their unique brain structure suggests about their mental abilities. Cheyenne Mountain Zoo, Colorado Springs, CO. May, 5.

Jacobs, B. & Lee, Laura (2014). Exploring the elephant brain and beyond. Talk to CC trustees. Colorado Springs, CO. Feb. 21.

Jacobs, B. (2013). Elephant and beyond: Brain research with exotic animals. BSCS: Peak Area Leadership in Science. Colorado Springs, CO. Feb. 12.

__________ (2013). What parents and teachers should know about the brain. BSCS: Peak Area Leadership in Science. Colorado Springs, CO. Feb. 12.

__________ (2011). What parents and teachers should know about the brain. Colorado College Summer Education Program. Colorado Springs, CO. June 11.

_________ **(2010).** The changing brain: Development, aging, and environmental influences. Dana Alliance Brain Awareness Week Lecture. Colorado Springs, CO. March 18.

_________ (2009). What teachers should know about the brain. Colorado College Education Seminar Series, CO, Nov. 3.

_________ (2008). Brain development, education, plasticity and enrichment. Colorado College Children's Center Seminar. Colorado Springs, CO. June 11.

_________ (2007). What parents and teachers should know about the brain. Colorado College Summer Education Program. Colorado Springs, CO. March 13.

Jacobs, B. & Erdal, K. (2006). The brain: A work in progress. Colorado College Student Life Staff Meeting. Colorado Springs, CO. Nov. 14.

Jacobs, B. (2005). The making of a liberal arts brain. Board of Trustees Meeting. Colorado Springs, CO. July 28.

_________ (2004). Neuroscience at Colorado College. Board of Trustees Meeting. Colorado Springs, CO. Feb. 20.

_________ & Travis, K. (2003). Neuroscience at Colorado College. The Colorado Forum. Colorado Springs, CO. Oct. 2.

_________ (2002). What teachers should know about the brain. Jenkins Middle School. Colorado Springs, CO. Dec. 4.

_________ (2002) The ever-changing brain. Widows or widowers group. Colorado Springs, CO. Aug. 5.

_________ (2001). What teachers should know about the brain. HUB presentation. Colorado Springs, CO. Oct. 17.

_________ (2001). What parents should know about the brain. Address at Colorado College Summer Education Program. Colorado Springs, CO. June 18.

Erdal, K., & **Jacobs, B.** (1996). Careers in Psychology. Palmer High School. Dec. 17.

Jacobs, B. (1996). Age-related changes in the human brain. Sigma Xi of Colorado Springs Seminar. Dec. 12.

_________ (1996). The aging brain. Mira Mesa Retirement Community. Colorado Springs, CO. June 10.

_________ (1996). Introduction to the brain. Palmer High School. Colorado Springs, CO. May 1.

_________ (1995). This is your brain at Colorado College. Homecoming Alumni Reunion. Colorado Springs, CO. Oct. 14.

_________ (1995). The human brain: The heart of humanity. Colorado College Business and Community Alliance. Colorado Springs, CO. Feb. 8.

_________ (1994). Introduction to the brain. Palmer High School. Colorado Springs, CO. Nov. 7.

_________ (1993). Educating the brain. Fountain Valley School of Colorado. Colorado Springs, Colorado. October 7.

_________ (1992). Brain development and education. Inter-sorority mother's club. University of California, Los Angeles. April 14.

Current professional organizations/activities

2006-present	*Cerebral Cortex*, Reviewer
2005-present	*Advances in Complex Systems*, Reviewer
2004-present	*Brain, Behavior and Evolution*, Reviewer
2003-present	*Neurobiology of Aging*, Reviewer
2000-present	*Language Learning*, Reviewer
1998-present	*Psi Chi* (undergraduate journal), Reviewer
1996-present	*Brain Research*, Reviewer
1993-present	Faculty for Undergraduate Neuroscience, Member
1993-present	Rocky Mountain Region Neuroscience Group, Member
1991-present	*Behavioral and Brain Sciences,* Associate member
1991-present	*Issues in Applied Linguistics*, Reviewer
1991-present	*American Journal of Primatology,* Reviewer
1989-present	Society for Neuroscience, Member
1987-present	*Studies in Second Language Acquisition,* Reviewer

Colorado College Support obtained for Faculty Research

Research funds from the Natural Science Executive Committee

1993-1994	Quantitative dendritic analysis of human frontal and occipital cortices [$2,079]
1994-1995	Quantitative dendritic analysis of human frontal and occipital cortices [$2,280]
1995--sup.	Quantitative dendritic analysis of human frontal and occipital cortices [$1,000]
1995-1996	Quantitative dendritic analysis of human frontal and occipital cortices [$2,979]
1996-1997	Quantitative dendritic analysis of human cerebral cortices [$2,500]
1997-1998	Quantitative neuromorphology [$2,900]
1998-1999	Quantitative neuromorphology [$2,900]
1999-2000	Quantitative neuromorphology [$2,900]
2000-2001	Quantitative neuromorphology [$3,000]
2001-2002	Quantitative neuromorphology [$3,500]
2002.2003	Quantitative neuromorphology [$2,500]
2003-2004	Quantitative neuromorphology [$3,875]
2004-2005	Quantitative neuromorphology [$2,930]
2005-2006	Quantitative neuromorphology [$3,487.50]
2006-2007	Quantitative neuromorphology [$3,745]
2007-2008	Quantitative neuromorphology [$3,600]
2008-2009	Quantitative neuromorphology—comparative: elephant [$4,400]
2009-2010	Quantitative neuromorphology—comparative: cetacea [$4,820]
2010-2011	Quantitative neuromorphology—comparative: giraffe, manatee [$4,320]
2011-2012	Quantitative neuromorphology—comparative: tiger [$4,049]
2012-2013	Quantitative neuromorphology [$4,510]
2013-2014	Quantitative neuromorphology [$5,000]
2014-2015	Quantitative neuromorphology [$5,000]
2015-2016	Quantitative neuromorphology [$5,000]
2016-2017	Quantitative neuromorphology [$5,000]
2017-2018	Quantitative neuromorphology [$5,000]
2018-2019	Quantitative neuromorphology [$5,000]

Colorado College Elementary School Outreach Program for Neuroscience Education

Summary: I developed the Colorado College Elementary School Outreach Program for Neuroscience Education in 1993. The program is designed to introduce local elementary school children to basic neuroscience by providing them with hands-on experience with brain tissue at the gross and microscopic level. To date, my Neuroscience students have accomplished the following:

Number of classrooms visited: 1,100

Grades visited: generally, 1st through 6th; and some middle school children

Number of elementary school students involved: approximately 25,254

We have also visited several local high schools and talked to over 1,000 students, and had students from several local schools of all levels visit the Laboratory of Quantitative Neuromorphology.

Undergraduate publications with students

Travis, K. & **Jacobs, B.** (2003). Regional dendritic variation in human neonatal cortex: A quantitative Golgi analysis. *Journal of Behavioral and Neuroscience Research*, *1*, 8-16. [Online, peer-reviewed Journal]

Creswell, J., Britt, J., Hrubes, M., **Jacobs, B**. (2001). Putative dendritic changes following corpus callosotomy in human cortex: A quantitative and qualitative case study. *Journal of Psychology and the Behavioral Sciences, 15,* 1-21.

Gaddis, B. (1999). Behavioral dysfunctions resulting from frontal lobe damage: A case study. *Journal of Psychology and the Behavioral Sciences, 13,* 72-83.

Prather, M., Schall, M., & **Jacobs, B.** (1998). Regional differences in dendritic and spine complexity: A quantitative Golgi analysis of human cerebral cortex. *Psi Chi Journal, 3:1*, 151-162.

Fisher, B. M., & **Jacobs, B.** (1998). A quantitative dendritic analysis of a bulimic brain: A case study. *Psi Chi Journal, 3:1,* 3-17.

Courns, K., & **Jacobs, B.** (1996). Age-related dendritic changes in human occipital and prefrontal cortices: A quantitative Golgi study. *Modern Psychological Studies, 4:1,* 10-20.

Baca, S. M., & **Jacobs, B.** (1995). A quantitative dendritic analysis of four functionally distinct areas of human cerebral cortex. *Modern Psychological Studies, 3:2,* 52-63.

Walter, L. (1995). Recovery from stroke involving the left middle cerebral artery. *Modern Psychological Studies, 3:2, 21-28.*

Larsen, L. L. & **Jacobs, B.** (1995). Quantitative dendritic and spine analyses of human prefrontal and occipital cortices. *The Drexel University Journal of Undergraduate Research. 1,* 14-20.

Undergraduate research grants/awards received by students (total awards = $100,775)

Vivian Nguyen	2019	Colorado College Conference Grant ($910)
Lili Uchida	2019	Colorado College Conference Grant ($1,000)

Vivian Nguyen	2019	Tabor Award in the Natural Sciences ($500)
Coby Dodelson	2019	Colorado College Faculty-Student Collaborative Research Grant ($4,500)
Vivian Nguyen	2018	Colorado College Conference Grant ($950)
Allysa Warling	2018	Colorado College Conference Grant ($920)
Lili Uchida	2018	Colorado College Conference Grant ($900)
Vivian Nguyen	2018	Tashjian Crecelius Family Prize for Women in Science ($500)
Allysa Warling	2018	Tabor Award in the Natural Sciences ($500)
Vivian Nguyen	2018	Colorado College Faculty-Student Collaborative Research Grant ($4,500)
Allysa Warling	2017	Colorado College Faculty-Student Collaborative Research Grant ($4,500)
Beck Shea-Shumsky	2017	Colorado College Venture Grant for 2017 Society for Neuroscience conference ($1,000)
Allysa Warling	2017	Colorado College Venture Grant for 2017 Society for Neuroscience conference ($1,000)
Lucy Sloan	2017	Colorado College Venture Grant for 2017 Society for Neuroscience conference ($1,000)
Beck Shea-Shumsky	2016	Colorado College Venture Grant for 2016 Society for Neuroscience conference ($924)
Madeleine Garcia	2015	Colorado College Faculty-Student Collaborative Research Grant ($4,500)
Madeleine Garcia	2015	Tashjian Crecelius Family Prize for Women in Science ($500)
Karen Chui	2015	Colorado College Faculty-Student Collaborative Research Grant ($4,500)
Brian Kopec	2014	Colorado College Venture Grant for 2014 Society for Neuroscience conference ($761)
Cameron Johnson	2014	Colorado College Venture Grant for 2014 Society for Neuroscience conference ($1,000)
Cameron Johnson	2014	Colorado College Faculty-Student Collaborative Research Grant ($3,500)
Laura Lee	2013	Colorado College Venture Grant for 2013 Society for Neuroscience conference ($1,000)
Tessa Harland	2012	Colorado College Venture Grant for 2012 Society for Neuroscience conference ($865)

Deb Kennedy	2012	Colorado College Venture Grant for 2012 Society for Neuroscience conference ($865)
Nicholas Johnson	2012	Colorado College Venture Grant for 2012 Society for Neuroscience conference ($850)
Leona Waller	2011	Colorado College Faculty-Student Collaborative Research Grant ($3000)
Tessa Harland	2011	Colorado College Faculty-Student Collaborative Research Grant ($3000)
Caroline Janeway	2010	Colorado College Venture Grant for 2010 Society for Neuroscience conference ($850)
Courtney Townshend	2010	Colorado College Venture Grant for 2010 Society for Neuroscience conference h ($850)
Jessica Borst	2009	Colorado College Venture Grant for summer research ($1000)
Kaeley Anderson	2008	Colorado College Venture Grant for 2008 Society for Neuroscience conference ($1000)
Ryan Casserly	2008	Colorado College Venture Grant for 2008 Society for Neuroscience conference ($1000)
Brooks Robinson	2007	Colorado College Venture Grant for 2007 Society for Neuroscience conference ($850)
Brian Bones	2007	Colorado College Venture Grant for 2007 Society for Neuroscience conference ($850)
Brian Bones	2007	Colorado College Faculty-Student Collaborative Research Grant ($3000)
Charles Hass	2004	Colorado College Venture Grant for 2004 Society for Neuroscience conference ($700)
Caitlin Dufault	2004	Colorado College Venture Grant for 2004 Society for Neuroscience conference ($700)
Hyo Lee	2004	Faculty for Undergraduate Neuroscience travel grant for 2004 Society for Neuroscience conference ($250)
Emilie Steffen	2004	Colorado College Venture Grant for senior thesis ($801)
Caitlin Dufault	2003	Colorado College Venture Grant for 2003 Society for Neuroscience conference ($850)
Hyo Lee	2003	Colorado College Venture Grant for 2003 Society for Neuroscience conference ($850)
Katie Travis	2003	Faculty for Undergraduate Neuroscience travel grant for 2003 Society for Neuroscience conference ($300)

Hyo Lee	2003-summer	Howard Hughes Undergraduate Research Program ($3,000)
Katie Travis	2003	Best paper/presentation at Colorado-Wyoming Academy of Science, April 26.
Jon Britt	2001	Colorado College Venture Grant for 2001 Society for Neuroscience conference ($591.50)
Johanna Creswell	2001	Colorado College Venture Grant for 2001 Society for Neuroscience conference ($591.50)
Jon Britt	2001-summer	Howard Hughes Undergraduate Research Program ($3,000)
Johanna Creswell Melody Hrubes	2001	Outstanding poster presentation at the 26th Annual West Coast Biological Sciences Undergraduate Research Conference, April 28, Santa Clara University. [$50]
Sharon Sann	2000	Colorado College Venture Grant for 2000 Society for Neuroscience conference ($850)
Melody Hrubes	2000	Colorado College Venture Grant for 2000 Society for Neuroscience conference ($850)
Jesse Jacobs	1999	Colorado College Venture Grant for 1999 Society for Neuroscience conference ($550)
Elisa Kapler	1999	Colorado College Venture Grant for 1999 Society for Neuroscience conference ($550)
Ting Shen	1999	Colorado College Venture Grant for 1999 Society for Neuroscience conference ($550)
Jesse Jacobs	1999-summer	Howard Hughes Undergraduate Research Program ($3,000)
Elisa Kapler	1999-summer	Howard Hughes Undergraduate Research Program ($3,000)
Clarissa Parker	1999-summer	Colorado College Faculty-Student Collaborative Research Grant ($2,500)
Melissa Prather	1998	Psi-Chi/Allyn & Bacon Publishers Psychology National Award for outstanding undergraduate psychology paper (1st place; $500)
Ting Shen	1998-summer	Associated Colleges of the Midwest Program for Minority Students and Academic Careers ($3,000)
Bethany Gaddis	1998-summer	Colorado College Faculty-Student Collaborative Research Grant ($2,500)
Melissa Prather	1997	Colorado College Venture Grant for 1997 Society for Neuroscience conference ($700)
Melinda Treml	1997	Colorado College Venture Grant for 1997 Society for Neuroscience conference ($700)
Melissa Prather	1997-summer	Colorado College Faculty-Student Collaborative Research Grant ($2,500)

Melinda Treml	1997-summer	Howard Hughes Undergraduate Research Program ($2,500)
Sonja Hovey	1997	Colorado College Venture Grant for 1997 conference on Multiple Intelligences ($450)
Dan Haas	1996-summer	Howard Hughes Undergraduate Research Program ($2,500)
Birgit Fisher	1996	National Honor Society in Psychology (Psi Chi): Award for research excellence ($150)
Jennifer Ferguson	1995	Colorado College Venture Grant for 1995 Society for Neuroscience conference ($771)
Renee Moorehouse	1995	Howard Hughes Undergraduate Research Program ($1,250)
Jennifer Ferguson	1995	Howard Hughes Undergraduate Research Program ($1,250)
Lori Larsen	1995	Psi-Chi/Allyn & Bacon Publishers Psychology National Award for outstanding undergraduate psychology paper (1st place; $500)
Kelly Courns	1995-summer	Associated Colleges of the Midwest Program for Minority Students and Academic Careers ($3,000)
Sherry Bekhit	1995	National Conference on Undergraduate Research travel grant ($446)
Lori Larsen	1994	Faculty for Undergraduate Neuroscience travel grant for 1994 Society for Neuroscience conference ($500)
Serapio Baca	1994	Colorado College Venture Grant for 1994 Society for Neuroscience conference ($681)
Serapio Baca	1994-summer	Associated Colleges of the Midwest Program for Minority Students and Academic Careers ($3,000)
Sherry Bekhit	1994-summer	Howard Hughes Undergraduate Research Program ($2,500)
Serapio Baca	1994-95	Howard Hughes Undergraduate Research Program ($2,500)
Rebecca Kernan	1994	Howard Hughes Undergraduate Research Program ($1,250)

Selected student presentations

Garcia, M., & Shea-Shumsky, B. (2016). Comparative neuronal morphology of gigantopyramidal neurons in mammals. Colorado Springs Undergraduate Research Forum, United States Air Force Academy, Colorado Springs. April 15.

Garcia, M., Shea-Shumsky, B., Tennison, M., Chui, K., & **Jacobs, B.** (2016). Neuromorphology of gigantopyramidal cells across artiodactyls, perissodactyls, feliformia, caniformia, primates, a rodent, a lagomorph, and a diprotodont. Front Range Neuroscience Meeting, Colorado State University, Fort Collins, December 7.

Lee, L., Raghanti, M. A., Lewandowski, A., Roberts, J. F., Sherwood, C. C., & **Jacobs, B.** (2013). Neocortical neuronal morphology in the infant giraffe (*Giraffa camelopardalis tippelskirchi*) and infant elephant (*Loxodonta Africana*). Colorado Springs Undergraduate Research Forum, University of Colorado, Colorado Springs. April 13.

Johnson, N., Sherwood, C.C., Manger, P.R., & **Jacobs, B.** (2013). Comparative morphology of cerebellar cortex neurons in clouded leopard, Siberian tiger, humpback whale, and chimpanzee. Colorado Springs Undergraduate Research Forum, University of Colorado at Colorado Springs, Colorado Springs. April 13.

Wahl, D., Hof, P.R., Sherwood, C.C., Maseko, B.C. Manger, P.R., & **Jacobs, B.** (2012). Comparative neuromorphology of Florida manatee, giraffe, human, and African Elephant cerebellar cortex. Rocky Mountain Regional Neuroscience Group, Aurora Colorado. May 10.

Kennedy, D. & Harland, T. (2012). Neuronal morphology in the giraffe (*Giraffa camelopardalis*) neocortex. Colorado Springs Undergraduate Research Forum, Colorado College, Colorado Springs. April 28.

Wahl, D. (2012). Comparative neuromorphology of Florida manatee, giraffe, human, and African Elephant cerebellar cortex. Colorado Springs Undergraduate Research Forum, Colorado College, Colorado Springs. April 28.

Janeway, C. & Townshend, C. (2011). Quantitative neuromorphology in cetacea: Bottlenose dolphin (*Turisops truncatus*), north Atlantic minke whale (*Balaenoptera acutostrata acutostrata*), and humpback whale (*Megaptera novaeangliae*). Colorado Springs Undergraduate Research Forum, United States Air Force Academy, Colorado Springs. April 30.

Anderson, K. (2009). The morphology of supragranular pyramidal neurons in the human insular cortex: A quantitative Golgi study. Colorado Springs Undergraduate Research Forum, Colorado College, Colorado Springs. April 11.

Anderson, K. (2008). The morphology of supragranular pyramidal neurons in the human insular cortex: A quantitative Golgi study. Undergraduate Research Symposia in the Biological Sciences and Psychology. University of Chicago, Oct. 31-Nov. 2.

Bones, B. & **Jacobs, B.** (2008). Regional variation of basilar dendrites from supragranular pyramidal neurons of the insula cortex: A quantitative Golgi study. Colorado Springs Undergraduate Research Forum, University of Colorado, Colorado Springs. April 12.

Mendoza, J. (2008). Does musical training enhance language abilities? Colorado Springs Undergraduate Research Forum, University of Colorado, Colorado Springs. April 12.

Hass, C. & **Jacobs, B.** (2005). Dendritic morphometrics of human insular pyramidal neurons. Colorado Springs Undergraduate Research Forum. April 30.

Lee, H.W. & **Jacobs, B.** (2004) Regional dendritic variation in human insular cortex: A quantitative Golgi analysis. [Oral Presentation] Annual West Coast Biological Sciences Undergraduate Research Conference, April 24.

Lee, H.W., Travis, K., Dufault, C. & **Jacobs, B.** (2004). Regional dendritic variation in human insular cortex: A quantitative Golgi Analysis. Southwestern and Rocky Mountain Division of the American Association for the Advancement of Science, April 10.

Travis, K., & **Jacobs, B.** (2003). Regional dendritic variation in neonatal cortex: A quantitative Golgi Analysis. Colorado-Wyoming Academy of Science, April 26.

Watt, H., & **Jacobs, B.** (2003). Quantitative dendritic properties of human insular cortex. Colorado-Wyoming Academy of Science, April 26.

Travis, K., & **Jacobs, B.** (2003). Regional dendritic variation in neonatal human cortex: A quantitative Golgi Analysis. Preparing Future Faculty Conference. Boulder, CO, Feb. 1.

Creswell, J., Britt, J., Hrubes, M., & **Jacobs, B.** (2002). Putative dendritic changes following corpus callosotomy in human cortex: A quantitative and qualitative case study. Loyola Marymount College, CA, April 27. [note: more comprehensive than the 2001 presentation]

Creswell, J., Hrubes, M., & **Jacobs, B.** (2001). Putative dendritic changes following corpus callosotomy in human cortex: A quantitative and qualitative case study. West Coast Biological Sciences Undergraduate Research Conference. Santa Clara, CA, April 28.

Faust, J. (2001). The effects of formalin fixation on the Golgi-Kopsch and rapid Golgi methods. West Coast Biological Sciences Undergraduate Research Conference. Santa Clara, CA, April 28.

Sann, S. (2000). Regional dendritic variation in spine-free nonpyramidal cells: A quantitative Golgi study in humans. Colorado College Third Annual Psychology/Neuroscience Poster Day. Colorado Springs, Colorado, May 5.

Kapler, E. (2000). Cell packing density in Brodmann's areas 10 and 18 in the human cerebral cortex. Colorado College Twelfth Annual Biology Day. Colorado Springs, Colorado, April 15.

Jacobs, J. (2000). A quantitative Golgi analysis of laminae III and V neurons in four regions of human cerebral cortex: A case study. Colorado College Twelfth Annual Biology Day. Colorado Springs, Colorado, April 15.

Davenport, P. (1999). Quantitative Golgi analysis of dendritic and spine systems in the prefrontal and occipital cortices over the life-span of the vervet monkey. Colorado College Second Annual Psychology/Neuroscience Poster Day. Colorado Springs, Colorado, May 7.

Shen, T., & **Jacobs, B.** (1999). A quantitative Golgi analysis of developing dendritic systems in four regions of human cerebral cortex. 24th West Coast Biological Sciences Undergraduate Research Conference. University of California, Irvine, May 1.

Shen, T., & **Jacobs, B.** (1998). A quantitative Golgi analysis of developing dendritic systems in four regions of human cerebral cortex. PEW Midstates Science and Mathematics Consortium: Undergraduate Research Symposium in the Biological Sciences and Psychology. University of Chicago, Nov. 20-22.

Shen, T., & **Jacobs, B.** (1998). A quantitative Golgi analysis of developing dendritic systems in four regions of human cerebral cortex. Associated Colleges of the Midwest Minority Students and Academic Careers Workshop. Ripon College, Oct. 2-3.

Prather, M., Schall, M., & **Jacobs, B.** (1998). Regional differences in dendritic and spine complexity: A quantitative Golgi analysis of human cerebral cortex. Colorado College Tenth Annual Biology Day. Colorado Springs, Colorado, April 25.

Prather, M., Schall, M., & **Jacobs, B.** (1998). Regional differences in dendritic and spine complexity: A quantitative Golgi analysis of human cerebral cortex. Colorado College First Annual Psychology/Neuroscience Poster Day. Colorado Springs, Colorado, May 1.

Jacobson, A., & **Jacobs, B.** (1998). Quantitative Golgi analysis of dendritic and spine systems in the prefrontal and visual cortices of the neonatal vervet monkey. Colorado College Tenth Annual Biology Day. Colorado Springs, Colorado, April 25.

Hovey, S., & **Jacobs, B.** (1998). Educators' perspectives on teaching with the multiple intelligences. Colorado College First Annual Psychology/Neuroscience Poster Day. Colorado Springs, Colorado, May 1.

Treml, M., & **Jacobs, B.** (1998). Quantitative dendritic and spine analyses of primary and heteromodal areas of human cerebral cortex. Colorado College First Annual Psychology/Neuroscience Poster Day. Colorado Springs, Colorado, May 1.

Treml, M., & **Jacobs, B.** (1998). Quantitative dendritic and spine analyses of primary and heteromodal areas of human cerebral cortex. Colorado College Tenth Annual Biology Day. Colorado Springs, Colorado, April 25.

Prather, M., Treml, M., & **Jacobs, B.** (1997). Regional variation in dendritic and spine complexity: A quantitative Golgi analysis of human cerebral cortex. [Abstract/Poster] PEW Midstates Science and Mathematics Consortium, Nov. 7-9.

Rattenbury, K., & **Jacobs, B.** (1997). The rehabilitation and acute recovery of aphasic traumatic brain injury and brainstem infarct: Two case studies. Annual Rocky Mountain Region Neurosceince Group Symposium. University of Colorado, Boulder, May 20.

Rattenbury, K., & **Jacobs, B.** (1997). The rehabilitation and recovery of aphasic traumatic brain injury and brainstem infarct: Two case studies. Southern Colorado Undergraduate Research and Creative Work Conference. University of Colorado, Colorado Springs, April 26.

Haas, S.D, & **Jacobs, B.** (1996). Quantitative dendritic and spine analyses of fifteen distinct cortical areas: A case study. Colorado College Tenth Annual Biology Day. Colorado Springs, Colorado, April 5.

Courns, K., & **Jacobs, B**. (1996). Age-related dendritic changes in human occipital and prefrontal cortices: A quantitative Golgi study. [Abstract/Poster] 21st Annual West Coast Biological Sciences Undergraduate Research Conference, San Diego, April 27.

Ferguson, J., & **Jacobs, B.** (1996). Quantitative dendritic and spine analyses of eight functionally distinct areas of human cerebral cortex. Colorado College Ninth Annual Biology Day. Colorado Springs, Colorado, April 12.

Ginardi, R., & **Jacobs, B.** (1996). Quantitative dendritic analysis of area 18 of human cerebral cortex: Age-related changes. Colorado College Ninth Annual Biology Day. Colorado Springs, Colorado, April 12.

Fisher, B., & **Jacobs, B.** (1996). Quantitative analysis of a bulimic brain: A case study. Rocky Mountain Psychological Association. Park City, Utah, April 11-14.

Courns, K., & **Jacobs, B.** (1995). Age-related dendritic changes in human occipital and prefrontal cortices: A quantitative Golgi study. [Abstract/Poster] PEW Midstates Science and Mathematics Consortium: Undergraduate Research Symposium in the Biological Sciences and Psychology. Washington University, Nov. 10-12.

Courns, K., & **Jacobs, B.** (1995). Age-related dendritic changes in human occipital and prefrontal cortices: A quantitative Golgi study. [Abstract/Poster] Associated Colleges of the Midwest Minority Students and Academic Careers Workshop. Beloit College, Oct. 7.

Baca, S. M., & **Jacobs, B.** (1995). A quantitative dendritic analysis of four functionally distinct areas of human cerebral cortex. [Abstract/Talk] Rocky Mountain Region Neuroscience Group. Denver, Colorado, May 23.

Bekhit, S., & **Jacobs, B.** (1995). Quantitative dendritic and spine analysis of speech cortices. [Abstract/Poster] National Conference on Undergraduate Research. Union College, New York. April, 20-22, 1995.

Baca, S. M., & **Jacobs, B.** (1995). A quantitative dendritic analysis of four functionally distinct areas of human cerebral cortex. [Abstract/Talk] Colorado-Wyoming Academy of Science. Colorado Springs, Colorado, April 21.

Larsen, L., Swanson, R. L., Wainwright, M. L, & **Jacobs, B.** (1995). Quantitative dendritic and spine analyses of human prefrontal and occipital cortices. [Abstract/Talk] Colorado-Wyoming Academy of Science. Colorado Springs, Colorado, April 21.

Walter, L. & **Jacobs, B.** (1995). Recovery from stroke involving the left middle cerebral artery. [Abstract/Talk] Colorado-Wyoming Academy of Science. Colorado Springs, Colorado, April 21.

Baca, S. M., & **Jacobs, B.** (1995). A quantitative dendritic analysis of four functionally distinct areas of human cerebral cortex. [Abstract/Poster] Colorado College Eighth Annual Biology Day. Colorado Springs, Colorado, April 15.

Bekhit, S., & **Jacobs, B.** (1995). Quantitative dendritic and spine analysis of speech cortices. [Abstract/Poster] Colorado College Eighth Annual Biology Day. Colorado Springs, Colorado, April 15.

Kernan, R., & **Jacobs, B.** (1995). Hierarchical cognitive function and neuronal complexity: A quantitative dendritic and spine analysis. [Abstract/Poster] Colorado College Eighth Annual Biology Day. Colorado Springs, Colorado, April 15.

Baca, S. M. (1995). A quantitative dendritic analysis of four functionally distinct areas of human cerebral cortex. [Abstract/Talk] Fourth Annual Undergraduate Psychology Seminar. Colorado Springs, Colorado, Feb. 25.

Walter, L. (1995). Recovery from stroke involving the left middle cerebral artery. [Abstract/Talk] Fourth Annual Undergraduate Psychology Seminar. Colorado Springs, Colorado, Feb. 25.

Baca, S. M., & **Jacobs, B.** (1994). A quantitative dendritic analysis of four functionally distinct areas of human cerebral cortex. [Abstract/Poster] Associated Colleges of the Midwest Minority Students and Academic Careers Workshop. Mount Vernon, Iowa, Oct. 1.

Selected senior theses

Beck Shea-Shumsky	2017	Comparative neuronal morphology of gigantopyramidal neurons in mammals
Madeleine Garcia	2017	Comparative neuronal morphology of gigantopyramidal neurons in mammals
Korbyn Ukasick	1017	The potential for flow within the structure of closed-skill individual sports and open-skill team sports
Mackenzie Tennison	2016	Comparative neuronal morphology of gigantopyramidal neurons in felines, primates, ungulates, the wallaby, and the rat
Molly Winston	2016	Pupillometry in healthy controls: Age as a predictor of the pupillary light response

Dylan Mohr	2015	Apical dendrites across species
Brian Kopex	2015	Apical dendrites across species
Cameron Johnson	2015	Quantitative neuromorphology in the neocortex of the Siberian tiger and clouded leopard
Laura Lee	2014	Neocortical neuronal morphology in the infant giraffe (*Giraffa camelopardalis tippelskirchi*) and infant African elephant (*Loxodonta africana*)
Nicholas Johnson	2013	Comparative morphology of cerebellar cortex neurons in Ccouded leopard, Siberian tiger, humpback whale, and chimpanzee
Deb Kennedy	2012	Neuronal morphology in the giraffe (*Giraffa camelopardalis*) neocortex
Tessa Harland	2012	Neuronal morphology in the giraffe (*Giraffa camelopardalis*) neocortex
Devin Wahl	2012	Comparative neuromorphology of Florida manatee, giraffe, human, and African elephant cerebellar cortex
Sam McCune	2012	The Localization, morphology, and function of Betz cells
Jennifer Morishita	2012	Obsessive-compulsive disorder and the female reproductive cycle
Caroline Janeway	2011	Investigation of cortical neuromorphology in three cetacean species: Bottlenose dolphin (*Tursiops truncates*), north Atlantic minke whale (*Balaenoptera acutorostrata acutorostrata*), and humback whale (*Megaptera novaeangliae*)
Courtney Townshend	2011	Neuromorphology of cetacean neocortex: Bottlenose dolphin (*Tursiops truncates*), north Atlantic minke whale (*Balaenoptera acutorostrata acutorostrata*), and humback whale (*Megaptera novaeangliae*)
Erika Pirotte	2011	Effects of multiple concussions in the National Football League: Chronic traumatic encephalopathy
Jessica Borst	2010	Quantitative morphology of supragranular pyramidal neurons in elephant cerebral cortex
Markus Hannan	2010	Quantitative morphology of elephant neurons
Brittney Moore	2010	Recovery and rehabilitation: The effects of stroke on language
Samara Haver	2010	The neuronal basis of theory of mind in the autistic brain
Kaeley Anderson	2009	The Morphology of Supragranular Pyramidal Neurons in the Human Insular Cortex: A Quantitative Golgi Study
Ryan Casserly	2009	Like a Rock: Contributions of Proprioceptive and Motor Systems in Embodied Grounding [with Tomi-Ann Roberts]

Hanna Gleason	2009	Neurophysiology of Meditation and Well-Being
Jessica Rice	2009	Comparison of Three-Dimension Neuronal Reconstructions: Neurolucida Lucivid vs Neurolucida Camera
Jaime Webster	2008	The effects of neglect on children's brain growth, attachment patterns, and emotional development
Matthew Shepherd	2008	Mirror neurons
Brooks Robinson	2008	Variation in dendritic morphology in human insular cortex
Brian Bones	2008	Quantitative study of dendritic extent in human insula
Jenny Mendoza	2007	Does musical training enhance language abilities?
Rosemary Tracy	2007	Positive psychology as a treatment for mental illness
Molly Long	2007	The neurobiology of meditation
Brittany Bishop	2007	Qi and Its Mechanisms in the Body and Brain: Scientific Support
Yi, Crystal	2006	The native language neural commitment hypothesis and language acquisition
Neophytou, Andreas	2006	Allelic frequencies of seven STR loci in the Greek-Cypriot Population [with Ralph Bertrand, Distinction—Neuroscience]
Michel, Courtney	2006	Morphological gender differences in human insula: A quantitative Golgi study
Tearse, Phill	2006	Gender differences in the left human insula: A quantitative Golgi study
Hass, Charlie	2005	Dendritic morphometrics of human insular pyramidal neurons [Distinction—Neuroscience]
Dionne, Kalen	2005	The morphological effects of polybrominated diphenyl ether (PBDE) exposure on cortical pyramidal neurons in the postnatal rat: A quantitative dendritic analysis [with Lori Driscoll, Distinction—Neuroscience]
Steffen, Emilie	2004	"Oh! Thanks goodness! You you have:" An examination of aphasia diagnosis and classification [with Kristi Erdal]
Lee, Hyo Won	2004	Regional dendritic variation in human insular cortex: A quantitative Golgi study [Distinction—Neuroscience]
Travis, Katie	2003	Regional dendritic variation in neonatal human cortex: A quantitative Golgi analysis. [Distinction—Neuroscience]
Watt, Hilary	2003	Quantitative dendritic properties of the human insular cortex.
Jennifer Godfrey	2002	Relationships between clicks, whistles and accuracy of task performance in bottlenose dolphins (*Tursiops truncates*)

		[with Kristi Erdal]
John Rino	2002	Neuromorphological analysis of apical and basilar dendrites in BA10: A quantitative Golgi analysis
David Heister	2002	Apical and basilar dendrites of layer III pyramidal cells of Brodmann's area 10 in the human cortex: A quantitative Golgi analysis
Jon Britt	2001	Elongated basilar dendrites on cortical pyramidal cells in adult callosotomy patients: A quantitative Golgi study [Distinction—Neuroscience]
Johanna Creswell	2001	Quantitative and qualitative analysis of dendritic systems following callosotomy in humans: A Golgi-Kopsch study
Melody Hrubes	2001	Effect of corpus callosotomy in BA4, BA10, and BA44 dendrites in human cortex
Jon Faust	2001	The effects of formalin fixation on the Golgi-Kopsch and rapid Golgi methods [Distinction—Neuroscience]
Sharon Sann	2001	Regional dendritic variation in spine-free nonpyramidal cells: A quantitative Golgi study in humans [Distinction—Neuroscience]
Elisa Kapler	2000	Cell packing density in Brodmann's areas 10 and 18 in the human cerebral cortex [Distinction—Neuroscience]
Jesse Jacobs	2000	A quantitative Golgi analysis of laminae III and V neurons in four regions of human cerebral cortex: A case study [Distinction—Neuroscience]
Clarissa Parker	2000	The effect of environmental enrichment on a mandrill's (*Mandrillus sphinx*) psychological well-being.
Clara Vondrich	2000	Teaching a zoo-reared orangutan an imitative concept: A pilot study [Distinction—Neuroscience]
Ting Shen	2000	A quantitative Golgi analysis of developing dendritic systems in four regions of human cerebral cortex
Bethany Gaddis	1999	Behavioral dysfunctions resulting from frontal lobe damage: A case study
Peter Davenport	1999	Quantitative Golgi analysis of dendritic and spine systems in the prefrontal and occipital cortices over the life-span of the vervet monkey
Melissa Prather	1998	Regional differences in dendritic and spine complexity: A quantitative Golgi analysis of human cerebral cortex [Distinction—Psychology]
Annelise Jacobson	1998	Quantitative Golgi analysis of dendritic and spine systems in the prefrontal and visual cortices of the neonatal vervet monkey
Sonja Hovey	1998	Educators' perspectives on teaching with the multiple intelligences

Melinda Treml	1998	Quantitative dendritic and spine analyses of primary and heteromodal areas of human cerebral cortex [Poster only]
Kumi Rattenbury	1997	The rehabilitation and acute recovery of aphasic traumatic brain injury and brainstem infarct: Two case studies [Distinction—Neuroscience]
Kelly Courns	1997	Age-related dendritic changes in human occipital and prefrontal cortices: A quantitative Golgi study. [Distinction--Neuroscience]
Katharine Raker	1997	Dolphin consciousness: A social psychological perspective
S. Daniel Haas	1997	Quantitative dendritic and spine analysis of fifteen distinct cortical areas: A case study
Jennifer Ferguson	1996	Dendritic and spine analyses of eight functionally distinct areas of human cerebral cortex [Poster only]
Michael Allen	1996	Age-related dendritic changes in the human prefrontal cortex: A quantitative Golgi study [Distinction--Psychology]
Reneé Ginardi	1996	Quantitative dendritic analysis of area 18 of human cerebral cortex: Age-related changes
Haven Iverson	1996	The role of development in violent behavior
Rebecca Kernan	1996	Hierarchical cognitive function and neuronal complexity: A quantitative dendritic and spine analysis [Distinction--Psychology]
Eric Kuhn	1995	Isolation of epinephrine, norepinephrine and dopamine receptor sites in the medial medulla of the rat brain utilizing tyrosine hydroxylase immunocytochemistry. [with Carolyn Glaubensklee, Biology; Distinction--Biology]
Ashwin Budden	1995	The pineal hormone melatonin and circadian rhythms: Implications for neonatal care
Stacy Traylor	1995	"The best part of my body": Children's developing theories of brain
Lori Walter	1995	Recovery from stroke involving the left middle cerebral artery
Birgit Fisher	1995	A quantitative dendritic analysis of human primary motor and supplementary motor areas, the angular gyrus and prefrontal areas [Distinction--Psychology]
Serapio Baca	1995	A quantitative dendritic analysis of four functionally distinct areas of human cerebral cortex [Distinction--Psychology]
Becky Swanson	1994	Quantitative dendritic and spine analysis of human frontal and occipital cortices [Distinction--Psychology]
Lori Larsen	1994	Quantitative dendritic and spine analysis of human prefrontal and occipital cortices [Distinction--Psychology]

Exhibit 5

Declaration of Cynthia J. Moss

I, Cynthia J. Moss, declare as follows:

Introduction and Qualifications

1. My name is Cynthia J. Moss.

2. I am over the age of 18 and understand the obligations of an oath.

3. I graduated with a Bachelor of Arts in Philosophy from Smith College in 1962, and received an honorary Doctorate of Science from Smith College in 2002 and an honorary Doctorate of Social Science from Yale University in 2019. I reside and work in Amboseli National Park, Kenya.

4. I submit this Declaration in support of the Nonhuman Rights Project, Inc.'s petition for a writ of habeas corpus regarding the captive elephants at the Los Angeles Zoo. I am a nonparty to this proceeding.

5. I have studied and worked with elephants in Africa for the past 52 years. I am currently the Director of the Amboseli Elephant Research Project and have been since 1972, and I am currently the Director of the Amboseli Trust for Elephants and have been since 2001. Prior to founding the Amboseli Elephant Research Project, I worked: (1) as the editor for the African Wildlife Foundation's Wildlife News from 1971 to 1985; (2) part-time as a freelance journalist, mainly for Time and Life magazines, from 1970 to 1971; (3) as a research assistant on various projects with Drs. A.M. and S. Harthoorn, Dr. V. Finch, and Dr. J.B. Sale, consecutively from 1969-1970; (4) a research assistant to Dr. I. Douglas-Hamilton full time in 1968 and part-time in 1969, 1970, and 1971; (5) a reporter/researcher for Newsweek Magazine in New York from 1964 to 1968.

6. As Director of the Amboseli Elephant Research Project, and also as the director of the Amboseli Trust for Elephants, I have set up the world's longest-running research project on wild elephants in the Amboseli National Park, Kenya. My research focus incorporates the distribution, demography, population dynamics, social organization and behavior of the Amboseli elephants. My current work includes directing and supervising research and monitoring in the Amboseli National Park; training elephant researchers from African elephant

range states; outreach to the local Maasai community; carrying out surveys and training courses at other elephant study sites in Africa; disseminating scientific results; advocating for elephant welfare; promoting public awareness by writing popular articles and books and by making films about elephants; and fund raising for and administering the Amboseli Elephant Research Project.

7. Over the course of my career, I have received awards from international nongovernmental, media, academic, research, zoological, and professional organizations, including: (1) the Outstanding Achievement Award from the Jackson Hole Wildlife Film Festival in 2015; (2) the John D. & Catherine T. MacArthur Foundation Fellowship (2002-2007); (3) the Conservation Award from the Cincinnati Zoo in 2005; (4) the Guardian Award from In Defense of Animals in 2004; (5) the Distinguished Conservation Fellow Award from the Los Angeles Zoo in 2002; (6) my Honorary Doctorate Degree from Smith College in 2002; (7) an Award from Performing Animal Welfare Society in 2002; (8) elected Fellow of the Society of Women Geographers in 2001; (9) Advisor to the International Fund for Animal Welfare, ongoing since 2001; (10) sabbatical Fellowships at the National Center for Ecological Analysis & Synthesis, University of California, Santa Barbara (1999, 2000, 2001); (11) the Centennial Conservation Award from the Woodland Park Zoo in 1999; (12) the Conservation Excellence Award from the Oakland Zoo in 1999; (13) my book Little Big Ears received an award from the John Burroughs Foundation and the American Museum of Natural History in 1998; (14) elected Fellow of the Royal Geographical Society in 1997; (15) my film “Echo of the Elephants” received awards at Jackson Hole Wildlife Film Festival and the Italian Film Festival in 1993; (16) the Smith College Medal for alumnae achievement in 1985; (and 17) nomination of my book “Portraits in the Wild: Behavior Studies of East African Mammals” (1975, Houghton Mifflin, Boston) for the American Book Award for best science paperback of the year in 1982.

8. I am affiliated with a number of professional organizations, including: (1) the Author’s Guild; (2) the Royal Geographic Society (elected Fellow); (3) the Society of Women Geographers (elected Fellow); (4); (5) the East African Natural History Society; (6) the East African Wild Life Society; (7) the Kenya Society for the Protection & Care of Animals; and

(8) PEN America. I was a member of the IUCN/SSC African Specialist Group from 1988-1996. Throughout my career, I have continued to lecture on elephant social organization and behavior to university students, wildlife club members, and specialist groups in Kenya, India, the US, and the United Kingdom. I have also served as a Consultant to conservation groups, animal welfare organizations, zoos, and others on elephant-related issues throughout my career.

9. During the course of my research career, I have been awarded extramural research grants from a number of institutions and groups including: (1) the African Wildlife Foundation in 1975; (2) the Midgard Foundation from 1978-1979; (3) the New York Zoological Society as a Research Fellow from 1979-1984; (4) the Disney Conservation Foundation from 1996-2006; (5) the Delano Foundation from 1996-1999; (6) the International Fund for Animal Welfare (IFAW); (7) Born Free Foundation, ongoing; (8) Detroit Zoological Society, ongoing; (9) East Bay Zoological Society, ongoing; (10) Rettet die Elefanen, ongoing; (12) Fairplay Foundation, ongoing; (13) Rogers Family Foundation, ongoing; (14) Charles Engelhard Foundation; and (15) Maue Kay Foundation, ongoing.

10. I have written six books concerning my work with elephants, including: (1) Portraits in the Wild: Behavior Studies of East African Mammals. (1975, Houghton Mifflin, Boston); (2) Portraits in the Wild: Behavior Studies of East African Mammals (Second Edition – Revised, 1982, University of Chicago Press, Chicago); (3) Elephant Memories: Thirteen Years in the Life of an Elephant Family. (1988, William Morrow, New York, also in Swedish, Finnish, Dutch, Italian, French & Spanish editions); (4) Die Elefanten Vom Kilmandscharo. (1990, Rasch und Rohring, Hamburg, German edition of Elephant Memories, with an additional chapter covering 1987-90); (5) Echo of the Elephants. (1992, BBC Books, London, also in U.S., German and Japanese editions); (6) Little Big Ears: The Story of Ely. (1997, Simon & Schuster, New York).

11. I have served as co-editor for two books regarding my work with elephants: (1) Elephant Woman (with Laurence Pringle, 1997, Atheneum, New York), and (2) The Amboseli Elephants: A Long-Term Perspective on a Long-Lived Mammal (co-edited with H.J. Croze & P.C. Lee), 2011, University of Chicago Press, Chicago.)

12. Over the course of my career, I have also contributed chapters concerning elephant cognition and welfare to five additional books: (1) The World Book Encyclopedia (1991, Chicago: World Book); (2) Elephants: Majestic creatures of the wild (1992, editor - J. Shoshani, Weldon Owen, Sydney); (3) The Smile of a Dolphin: Remarkable Accounts of Animal Emotions (2000, editor - M. Bekoff, Discovery Books, New York); (4) Never Forgetting: Elephants and Ethics (2008, editors - C. Wemmer and K. Christen, Johns Hopkins University Press); and (5) An Elephant in the Room: the Science and Well-being of Elephants in Captivity (2009, editor - D. Forthman, Tufts University Press).

13. I have published 75 peer-reviewed scientific articles on the social structure, vocalization and communication (both short and long-range), cognition, mating behavior, maternal behavior, techniques for aging, determining diet and habitat use, mourning behavior, and elephant identification via sight and odor of human tribal groups. These articles have been published in many of the world's premier scientific journals and books, including: Nature, Science, PLoS One, Animal Behaviour, Behaviour, Journal of Wildlife Management, Behavioral Ecology and Sociobiology, Pachyderm, Journal of Zoology, Mammalian Social Learning, Molecular Ecology Notes, Biology Letters, Molecular Ecology, Current Biology, Journal of Consciousness Studies, Animal Welfare, and the Journal of Wildlife Diseases. My scientific work has also been published in: Symposium of the Zoological Society of London, Proceedings 2nd International NCRR Conference, A Research Update on Elephants and Rhinos: Proceedings of the International Elephant and Rhino Research Symposium, and Proceedings of the Royal Society B. Specific topics of these publications include: musth in the African elephant, oestrus behavior and female choice in the African elephant, age estimation and population age structure of elephants from footprint dimensions, early maternal investment in male and female African elephant calves, social context of some very low frequency calls of African elephants, isotopic tracking of change in diet and habitat use in African elephants, statural growth in known-age African elephants, social context for learning and behavioural development among wild African elephants, matriarchs as repositories of social knowledge in African elephants, characterization of tetranucleotide microsatellite loci in the African Savannah Elephant, long-distance communication of cues to social identity in African

elephants, locus size predicts the rate of allelic dropout in two large-scale noninvasive genotyping projects, early disruption of attachment can affect the physiology, behavior, and culture of animals and humans over generations, genetic relatedness predicts fission and fusion of social groups in wild African elephants, elephants show high levels of interest in the skulls and ivory of their own species, elephants classify human ethnic groups by odour and garment colour, can elephants show empathy, and fecundity and population viability in female zoo elephants.

14. In addition to my scientific publications, I have also published 30 articles in more general audience publications, including: Smithsonian, New York Times Book Review, BBC Wildlife, New Scientist, the Sunday Times Magazine, Australian Women's Weekly, Wildlife News, Ms., Swara, International Wildlife, Wildlife, Animal Kingdom, Nature's Best, ASPCA's Animal Watch, Disney's Animal Kingdom, and Geospatial Solutions.

15. In addition to my academic and general audience articles, I have also written film scripts and provided scientific consulting for several films, including: (1) "Echo of the Elephants" (1990-1992, BBC Natural History Unit, received awards at Jackson Hole Wildlife Film Festival and Italian Film Festival); (2) "Echo of the Elephants: The Next Generation" (1992-1995, BBC Natural History Unit); (3) "Africa's Forgotten Elephants" (1996-1997, Scorer Associates for BBC); (4) "Echo of the Elephants: The Last Chapter?" (2002-2005, BBC Natural History Unit); (5) "Echo and the Elephants of Amboseli (2007-2008, Animal Planet, 13-part series); (6) "Echo: An Elephant to Remember" (2009-2010, BBC Natural History Unit); and (7) "An Apology to Elephants" (2013, HBO).

16. My Curriculum Vitae fully sets forth my educational background and experience and is attached as **Exhibit A**.

Basis for opinions

17. The opinions I state in this Declaration are based on my professional knowledge, education, training, and years of experience observing and studying elephants, as well as my knowledge of peer-reviewed literature about elephant behaviour and intelligence published in the world's most respected journals, periodicals and books that are generally accepted as

authoritative in the field, and many of which were written by myself or colleagues whom I have known for several years and with whose research and field work I am personally familiar. A full reference list of peer-reviewed literature cited herein is attached as **Exhibit B**.

Opinions

Premise

18. Autonomy in humans is defined as self-determined behaviour that is based on freedom of choice. As a psychological concept it implies that the individual is directing their behaviour based on some non-observable, internal cognitive process, rather than simply responding reflexively. Although we cannot directly observe these internal processes in other people, we can explore and investigate them by observing, recording and analysing behaviour. For non-human animals, observing similar behaviour and recording evidence of shared cognitive capacities should, parsimoniously, lead to similar conclusions about autonomy.

19. I shall indicate which species, African (*Loxodonta Africana*) or Asian (*Elephus maximus*), specific observations relate to. If the general term 'elephants' is used with no specific delineation, it can be assumed the comment relates to both species.

Brain And Development

20. Elephants are large-brained, with the biggest absolute brain size of any land animal (Cozzi et al 2001; Shoshani et al 2006). Even relative to their body sizes, elephant brains are large. Encephalization quotients (EQ) are a standardised measure of brain size relative to body size, and illustrate by how much a species' brain size deviates from that expected for its body size. An EQ of one means the brain is exactly the size expected for that body, and values greater than one indicate a larger brain than expected (Jerison 1973). Elephants have an EQ of between 1.3 and 2.3 (varying between sex and African and Asian species). This means an elephant's brain can be up to two and a half times larger than is expected for an animal of its size; this EQ is similar to that of the great apes, with whom elephants have not shared a common ancestor for almost 100 million years (Eisenberg 1981, Jerison 1973). Given how metabolically costly brain tissue is, the large brains of elephants must confer significant advantages; otherwise their

size would be reduced. Presumably this advantage is allowing greater intelligence and behavioural flexibility (Bates et al 2008a).

21. Generally, mammals are born with brains weighing up to 90% of the adult weight. This figure drops to about 50% for chimpanzees. Human baby brains weigh only about 27% of the adult brain weight (Dekaban & Sadowsky 1978). This long period of brain development over many years (termed 'developmental delay') is a key feature of human brain evolution and is thought to play a role in the emergence of our complex cognitive abilities, such as self-awareness, creativity, forward planning, decision making and social interaction (Bjorkland 1997). Delayed development provides a longer period in which the brain may be shaped by experience and learning (Fuster 2002). Elephant brains at birth weigh only about 35% of their adult weight (Eltringham 1982), and elephants show a similarly protracted period of growth, development and learning (Lee 1986). This similar developmental delay in the elephant brain is therefore likely associated with the emergence of similarly complex cognitive abilities.

22. Despite nearly 100 million years of separate evolution (Hedges 2001), elephants share certain characteristics of our large brains, namely deep and complex folding of the cerebral cortex, large parietal and temporal lobes, and a large cerebellum (Cozzi et al 2001). The temporal and parietal lobes of the cerebral cortex manage communication, perception, and recognition and comprehension of physical actions (Kolb and Whishaw 2008), while the cerebellum is involved in planning, empathy, and predicting and understanding the actions of others (Barton 2012). Thus, the physical similarities between human and elephant brains occur in areas that are relevant to capacities necessary for autonomy and self-awareness.

23. Elephant brains hold nearly as many cortical neurons as do human brains, and a much greater number than chimpanzees or bottlenose dolphins (humans: 1.15×10^{10}; elephants: 1.1×10^{10}, chimpanzees: 6.2×10^{9}; dolphins: 5.8×10^{9}, Roth & Dicke 2005). Elephants' pyramidal neurons (a class of neuron that is found in the cerebral cortex, particularly the pre-frontal cortex - the brain area that controls executive functions) are larger than in humans and most other species (Cozzi et al 2001). The degree of complexity of pyramidal neurons is linked to cognitive ability, with more (and more complex) connections between pyramidal neurons being associated with increased cognitive capabilities (Elston 2003). Elephant pyramidal

neurons have a large dendritic tree, i.e. a large number of connections with other neurons for receiving and sending signals (Cozzi et al 2001).

24. Elephants, like humans, great apes and some cetaceans, possess *von Economo neurons*, or spindle cells – the so-called ‘air-traffic controllers for emotions’ – in the anterior cingulate, fronto-insular, and dorsolateral prefrontal cortex areas of the brain (Hakeem et al 2009). In humans, these cortical areas are involved - among other things - in the processing of complex social information, emotional learning and empathy, planning and decision-making, and self-awareness and self-control (Allman et al 2001; Allman et al 2002; Allman et al 2011). The shared presence of spindle cells in the same brain locations in elephants and humans strongly implies these higher-order brain functions – the building blocks of autonomous, self-determined behaviour – are common between these species (Butti et al 2009; Hakeem et al 2009).

25. As described below, evidence demonstrates that along with these common brain and life-history characteristics, elephants share many behavioural and intellectual capacities with humans, including: self-awareness, empathy, awareness of death, intentional communication, learning, memory, and categorisation abilities. Many of these capacities have previously been considered – erroneously – to be uniquely human, and each is fundamental to and characteristic of autonomy and self-determination.

Awareness Of Self And Others

26. Asian elephants have been shown to exhibit Mirror Self Recognition (MSR) using Gallup’s classic ‘mark test’ (Gallup 1970; Plotnik et al 2006). MSR is the ability to recognise a reflection in the mirror as oneself, and the mark test involves surreptitiously placing a coloured mark on an individual’s forehead that it could not see or be aware of without the aid of a mirror. If the individual uses the mirror to investigate the mark, it is logical to assume that the individual recognises the reflection as itself. Almost all animals tested on this task fail: they do not recognise the image in the mirror as being a reflection of themselves. Indeed, the only other mammals beyond humans who have successfully passed the mark test and exhibit MSR are the great apes (chimpanzees, bonobos, gorillas and orangutans) and bottlenose dolphins

(Parker and Mitchell 1994, Reiss and Marino 2001). MSR is significant because it is considered to be the key identifier of self-awareness. Self-awareness is intimately related to autobiographical memory in humans (Prebble et al 2013), and is central to autonomy and being able to direct one's own behaviour to achieve personal goals and desires. By demonstrating that they can recognize themselves in a mirror, elephants must be holding a mental representation of themselves from another perspective, and thus be aware that they are a separate entity from others (Bates and Byrne 2014).

27. Related to possessing a sense of self is an understanding of death. Observing reactions to dead family or group members suggests an awareness of death in only two animal genera beyond humans; chimpanzees and elephants (Anderson et al 2010, Douglas-Hamilton et al 2006). Having a mental representation of the self – a pre-requisite for mirror-self recognition – probably also confers an ability to comprehend death. Wild African elephants have been shown experimentally to be more interested in the bones of dead elephants than the bones of other animals (McComb et al 2006), and they have frequently been observed using their tusks, trunk or feet to attempt to lift sick, dying or dead individuals (Poole & Granli 2011). Although they do not give up trying to lift or elicit movement from the body immediately, elephants appear to realise that once dead, the carcass cannot be helped anymore, and instead they engage in more 'mournful' behaviour, such as standing guard over the bodies, and apparently protecting it from the approaches of predators (Poole & Granli 2011They also have been observed to cover the bodies of dead elephants with dirt and vegetation (Moss 1992; Poole 1996). In the particular case of mothers who lose a calf, although they may remain with the calf's body for an extended period, they do not behave towards the body as they would a live calf. Indeed, the general demeanour of elephants who are attending to a dead elephant is one of grief and compassion, with slow movements and few vocalisations (Poole, pers. comm.). These behaviours are akin to human responses to the death of a close relative or friend, and illustrate that elephants possess some understanding of life and the permanence of death.

28. The capacity for mentally representing the self as an individual entity has been linked to general empathic abilities (Gallup 1982), where empathy can be defined as identifying

with and understanding another's experiences or feelings by imagining what it would be like to be in their situation. Empathy is an important component of human consciousness and autonomy, and is a cornerstone of normal social interaction. It goes beyond merely reading the emotional expressions of others. It requires modelling of the emotional states and desired goals that influence others' behaviour both in the past and future, and using this information to plan one's own actions; empathy is only possible if one can adopt or imagine another's perspective, and attribute emotions to that other individual (Bates et al 2008b). Empathy is, therefore, a component of and reliant on 'Theory of Mind' – the ability to mentally represent and think about the knowledge, beliefs and emotional states of others, whilst recognising that these can be distinct from your own knowledge, beliefs and emotions (Premack and Woodruff (1978)/ Frith and Frith 2005).

29. Elephants clearly and frequently display empathy in the form of protection, comfort and consolation, as well as by actively helping those who are in difficulty, such as assisting injured individuals to stand and walk, or helping calves out of rivers or ditches with steep banks (Bates et al 2008b, Lee 1987). Elephants have even been observed feeding those who are not able to use their own trunks to eat (Poole and Granli 2011).

30. In an analysis of behavioural data collected from wild African elephants over a 43-year continuous field study, we concluded that as well as possessing their own intentions, elephants can diagnose animacy and goal directedness in others, understand the physical competence and emotional state of others, and attribute goals and mental states (intentions) to others (Bates et al 2008b), as evidenced in the examples below:

> *'IB family is crossing river. Infant struggles to climb out of bank after its mother. An adult female [not the mother] is standing next to calf and moves closer as the infant struggles. Female does not push calf out with its trunk, but digs her tusks into the mud behind the calf's front right leg which acts to provide some anchorage for the calf, who then scrambles up and out and rejoins mother.'*

> *'At 11.10ish Ella gives a 'lets go' rumble as she moves further down the swamp . . . At 11.19 Ella goes into the swamp. The entire group is in the swamp*

except Elspeth and her calf [<1 year] and Eudora [Elspeth's mother]. At 11.25 Eudora appears to 'lead' Elspeth and the calf to a good place to enter the swamp — the only place where there is no mud.'

Examples such as these demonstrate that the acting elephant (the adult female in the first example, and Eudora (also an adult female, the calf's grandmother) in the second) was able to understand the intentions of the other (the calf in the first case, and Elspeth in the second) – i.e. to either climb out of or into the water – and they could adjust their own behaviour in order to counteract the problem being faced by the other. Whilst humans may act in this helpful manner on a daily basis, such interactions have been recorded for very few non-human animals (Bates et al 2008b).

31. Experimental evidence from captive African elephants further demonstrates that elephants attribute intentions to others, as they follow and understand human pointing gestures - the only animal so far shown to do so spontaneously. The elephants understood that the human experimenter was pointing in order to communicate information to them about the location of a hidden object (Smet and Byrne 2013). Attributing intentions and understanding another's reference point is central to empathy and theory of mind.

32. Evidence of 'natural pedagogy' is rare among non-human animals, with only a few potential examples of true teaching (whereby the teacher takes into account the knowledge states of the learner as they pass on relevant information) recorded anecdotally in chimpanzees (Boesch 1991) and killer whales (Guinet and Bouvier 1995)[1]. Teaching is therefore still widely considered to be unique to humans (Csibra and Gergely 2009). Our analysis of simulated oestrus behaviours in African elephants – whereby a non-cycling, sexually experienced older female will simulate the visual signals of being sexually receptive, even though she is not ready to mate or breed again – shows that these knowledgeable females adopt false oestrus behaviours in order to demonstrate to naïve young females how to attract and respond appropriately to suitable males. The experienced females may be taking the youngsters lack of

[1] Functional teaching has been experimentally demonstrated in various animal species including ants, babblers, meerkats, cheetahs and some primates, but this is not the same as deliberate pedagogy, as it does not rely on representing the knowledge states of the learners.

knowledge into account and actively showing them what to do; a possible example of true teaching as it is defined in humans. Whilst this possibility requires further investigation, this evidence, coupled with the data showing that they understand the ostensive cues in human pointing, suggests that elephants do share some executive skills with humans, namely understanding the intentions and knowledge states (minds) of others.

33. Further related to empathy, coalitions and cooperation have been documented in wild African elephants, particularly to defend family members or close allies from (potential) attacks by outsiders, such as when a family group tries to 'kidnap' a calf from an unrelated family (Lee 1987, Moss and Poole 1983). These behaviours are based on one elephant understanding the emotions and goals of the coalition partner (Bates et al 2008b).

34. Cooperation is also evident in experimental tests with captive Asian elephants, whereby elephants demonstrated they can work together in pairs to obtain a reward, and understood that it was pointless to attempt the task if their partner was not present or could not access the equipment (Plotnik et al 2011). Problem-solving and working together to achieve a collectively desired outcome involve mentally representing both a goal and the sequence of behaviours that is required to achieve that goal; it is based on (at the very least) short-term action planning.

35. Wild elephants have frequently been observed engaging in cooperative problem solving, for example when retrieving calves that have been kidnapped by other groups, or when helping calves out of steep, muddy river banks (Bates et al 2008b, Moss 1992) These behaviours demonstrate the purposeful and well-coordinated social system of elephants, and show that elephants can hold particular aims in mind and work together to achieve those goals. Such intentional, goal-directed action forms the foundation of independent agency, self-determination, and autonomy.

36. Elephants also show innovative problem solving in experimental tests of insight (Foerder et al 2011), where insight can be defined as the 'a-ha' moment when a solution to a problem 'suddenly' becomes clear. (In cognitive psychology terms, insight is the ability to inspect and manipulate a mental representation of something, even when you can't physically perceive or touch the something at the time. Or more simply, insight is thinking and using only

thoughts to solve problems (Byrne 2016). A juvenile male Asian elephant demonstrated just such a spontaneous action by moving a plastic cube and standing on it to obtain previously out-of-reach food. After solving this problem once, he showed flexibility and generalization of the technique to other, similar problems by using the same cube in different situations, or different objects in place of the cube when it was not available. This experiment again demonstrates that elephants can choose the appropriate action and incorporate it into a sequence of behaviour in order to achieve a goal, which they kept in mind throughout the process.

37. Further experiments also demonstrate Asian elephants ability to understand goal-directed behaviour. When presented with food that was out of reach, but with some bits resting on a tray that could be pulled within reach, the elephants learned to pull only those trays that were baited with food (Irie-Sugimoto et al 2008). Success in this kind of 'means-end' task is a demonstration of causal knowledge, which requires understanding not just that two events are associated with each other but also that there is some mediating force that connects and affects the two which may be used to predict and control events. Moreover, understanding causation and inferring object relations may be related to understanding psychological causation, i.e., the appreciation that others are animate beings that generate their own behaviour and have mental states (e.g., intentions).

Communication and social learning

38. Speech is a voluntary behaviour in humans, whereby a person can choose whether to utter words and thus communicate with another. Therefore speech and language are reflections of autonomous thinking and intentional behaviour. Elephants also use their vocalisations to share knowledge and information with others, apparently intentionally (Poole 2011). Male elephants primarily communicate about their sexual status, rank and identity, whereas females and dependents call to emphasise and reinforce their social units. Call types can generally be separated into laryngeal calls (such as rumbles) or trunk calls (such as trumpets), with different calls in each category being used in different contexts (Poole 2011; Poole and Granli 2004; Soltis et al 2005; Wood et al 2005). Field experiments have shown that African elephants distinguish between different call types (for example, contact calls – rumbles

that travel long distances to maintain associations between elephants that could be several kilometres apart, or oestrus rumbles – that occur after a female has copulated) and these different call types elicit different responses in the listeners. Elephant vocalisations are not simply reflexive, they have distinct meanings to listeners and they are truly communicative, similar to the volitional use of language in humans (Leighty et al 2008; Poole 1999; Poole 2011).

39. Furthermore, elephants have been shown to vocally imitate the sounds they hear around them, from the engines of passing trucks to the commands of human zookeepers (Poole et al 2005, Stoeger et al 2012). Imitating another's behaviour is demonstrative of a sense of self, as it is necessary to understand how one's own behaviour relates to the behaviour of others.

40. Elephants display a wide variety of gestures, signals and postures, used to communicate information to the audience (Poole and Granli gestures chapter 2011). Such signals are adopted in many different contexts, such as aggressive, sexual or socially integrative situations, and each signal is well defined and results in predictable responses from the audience. That is, each signal or gesture has a specific meaning both to the actor and recipient. Elephants' use of gestures demonstrates that they communicate intentionally and purposefully to share information with others and/or alter the others' behaviour to fit their own will.

41. Experimental evidence demonstrates that African elephants recognize the importance of visual attentiveness of the intended recipient (in this case, human experimenters) of gestural communication (Smet & Byrne 2014), further supporting the suggestion that elephants' gestural communication is intentional and purposeful. Furthermore, the ability to understand the visual attentiveness and perspective of others is crucial for empathy and mental-state understanding.

Memory And Categorisation

42. Elephants have both extensive and long-lasting memories, just as the folk stories and adages encourage us to believe. McComb et al. (2000), using experimental playback of long-distance contact calls in Amboseli National Park, Kenya, showed that African elephants remember and recognize the voices of at least 100 other elephants. Each adult female elephant

tested was familiar with the contact-call vocalizations of individuals from an average of 14 families in the population. When the calls were from a familiar family— that is, one that had previously been shown to have a high association index with the test group—the test elephants contact-called in response and approached the location of the loudspeaker. When a test group heard unfamiliar contact calls (from groups with a low association index with the test group), they bunched together and retreated from the area.

43. McComb et al (2001) went on to show that this social knowledge accrues with age, with older females having the best knowledge of the contact calls of other family groups. McComb et al (2011) also showed that older females are better leaders, with more appropriate decision-making in response to potential threats (in this case, in the form of hearing lion roars). Younger matriarchs under-reacted to hearing roars from male lions, potential predators of elephant calves. Sensitivity to hearing this sound increased with increasing matriarch age, with the oldest, most experienced females showing the strongest response to this danger. These experimental studies show that elephants continue to learn and remember information about their environments throughout their lives, and this accrual of knowledge allows them to make better decisions and better lead their families as they grow older.

44. Further demonstration of elephants' long-term memory comes from data on their movement patterns. African elephants are known to move over very large distances in their search for food and water. Leggett (2006) used GPS collars to track the movements of elephants living in the Namib Desert. He recorded one group traveling over 600 km in five months, and Viljoen (1989) showed that elephants in the same region visited water holes approximately every four days, even though some of them were more than 60km apart. Elephants inhabiting the deserts of both Namibia and Mali have been described traveling hundreds of kilometers to arrive at remote water sources shortly after the onset of a period of rainfall (Blake et al. 2003; Viljoen 1989), sometimes along routes that researchers believe have not been used for many years. These remarkable feats suggest exceptional cognitive mapping skills, reliant on the long-term memories of older individuals who traveled that path sometimes decades earlier. Indeed it has been confirmed that family groups with older matriarchs are better able to survive periods of drought. The older matriarchs lead their families over larger areas during droughts than those

with younger matriarchs, again apparently drawing on their accrued knowledge (this time about the locations of permanent, drought-resistant sources of food and water) to better lead and protect their families (Foley, Pettorelli, and Foley 2008).

45. It has recently been shown that long-term memories, and the decision-making mechanisms that rely on this knowledge, are severely disrupted in elephants who have experienced trauma or extreme disruption due to 'management' practices initiated by humans. Shannon et al (2013) demonstrated that elephants in South Africa who had experienced trauma decades earlier showed significantly reduced social knowledge. During archaic culling practices, these elephants were forcibly separated from family members and subsequently translocation to new locations. Two decades later, they still showed impoverished social knowledge and skills and impaired decision-making abilities, compared with an undisturbed population in Kenya. Disrupting elephants' natural way of life can negatively impact their knowledge and decision-making abilities.

46. Elephants demonstrate advanced 'working memory' skills. Working memory is the ability to temporarily store, recall, manipulate and coordinate items from memory. Working memory directs attention to relevant information, and results in reasoning, planning, and coordination and execution of cognitive processes through use of a 'central executive' (Baddeley 2000). Adult human working memory is generally thought to have a capacity of around seven items. In other words, we can keep about seven different items or pieces of information in mind at the same time (Miller 1956). We conducted experiments with wild elephants in Amboseli National Park, Kenya, manipulating the location of fresh urine samples from related or unrelated elephants. The elephants' responses to detecting urine from known individuals in surprising locations showed that they are able to continually track the locations of at least 17 family members in relation to themselves, as either absent, present in front of self, or present behind self (Bates et al. 2008a). This remarkable ability to hold in mind and regularly update information about the locations and movements of a large number of family members is best explained by predicting that elephants possess an unusually large working memory capacity, apparently much larger than that of humans.

47. Elephants show sophisticated categorisation of their environment, with skills on a

par with those of humans. We experimentally presented the elephants of Amboseli National Park, Kenya, with garments that gave olfactory or visual information about their human wearers – either Maasai moran (male warriors who traditionally attack and spear elephants on occasion as part of their rite of passage), or Kamba men (who are agriculturalists and traditionally pose little threat to elephants). In the first experiment, the only thing that differed between the cloths was the smell, derived from the ethnicity and/or lifestyle of the wearers. The elephants were significantly more likely to run away when they sniffed cloths worn by Maasai than those worn by Kamba men or no one at all. In a second experiment, we presented the elephants with two cloths that had not been worn by anyone, but here one was white (a neutral stimulus) and the other was red—the color that is ritually worn by Maasai moran. With access only to these visual cues, the elephants showed significantly greater reaction to red garments than white, often including signs of aggression. We concluded that elephants are able to categorize a single species (humans) into sub-classes (i.e. 'dangerous' or 'low risk') based on either olfactory or visual cues alone (Bates et al. 2007). McComb et al went on to show that the same elephants can also distinguish between human groups based on our voices. The elephants reacted differently (and appropriately) depending on whether they heard Maasai or Kamba men speaking, and also when they heard male or female Maasai (where female Maasai pose no threat as they are not involved in spearing events), and adult Maasai men or young Maasai boys (McComb et al 2014). Scent, sounds and visual signs associated specifically with Maasai men are categorized as 'dangerous', while neutral signals are attended to but categorized as 'low risk'. These sophisticated, multi-modal categorization skills may be exceptional among non-human animals.

Summary

48. Both African and Asian elephants evidently share many key traits of autonomy with humans, and so parsimoniously it must be concluded that elephants are also autonomous beings.

49. Scientific knowledge about elephant intelligence has been increasing rapidly in the past decade: what we currently know is only a tiny fraction of what elephant brains are likely capable of, and yet more amazing abilities are still likely to be discovered.

I declare under penalty of perjury under the laws of the State of California that the foregoing is true and correct.

Executed on the __12____ (date) of _May_____ (month), ___2025___ (year)

at __Nairobi, Kenya____
(city or other location, and state or country)

_Cynthia J. Moss____

___
____
(signature)

EXHIBIT A

CURRICULUM VITAE

NAME: Cynthia J. Moss

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Nairobi, Kenya
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E-mail: cmoss@elephanttrust.org

DATE OF BIRTH: July 24, 1940

PLACE OF BIRTH: Ossining, New York

NATIONALITY: U.S.A. (resident of Kenya)

EDUCATION: BA, Smith College, 1962; D.Sc., Smith College, 2002

PRESENT POSITION: Director, Amboseli Elephant Research Project
Amboseli Trust for Elephants

PROFESSIONAL HISTORY:

1972-present: Director Amboseli Elephant Research Project and since 2001 Director of the Amboseli Trust for Elephants. Set up long-term research project on the elephant population in the Amboseli ecosystem in southern Kenya. Conducted research on the distribution, demography, population dynamics, social organization and behavior of the Amboseli elephants. Present activities include: directing and supervising research and monitoring; training elephant researchers from African elephant range states; outreach to Maasai community; carrying out surveys and training courses at other elephant study sites in Africa; disseminating scientific results; advocating for elephant welfare; promoting public awareness by writing popular articles and books and by making films about elephants; fund raising for and administering Project.

1971-1985: Editor of African Wildlife Foundation's *Wildlife News.*

1970-1971: Part-time work as freelance journalist, mainly for *Time* and *Life* magazines.

1969-1970: Research assistant to Drs. A.M. and S. Harthoorn, veterinary research, Nairobi, 6 months; compiled and wrote a 75-page report on elephants for Cinema Center Films' "The African Elephant", 6 months; research assistant to Dr. V. Finch, environmental physiology project on eland, hartebeest, zebra, wildebeest, ostrich, and Boran cattle, Athi Plains, Kenya, 2 months; research assistant to Dr. J.B. Sale, U. of Nairobi, feeding ecology of elephants in Tsavo National Park, Kenya, 2 months.

1968: Research Assistant to Dr. I. Douglas-Hamilton, elephant behaviour and ecology, Lake Manyara National Park, Tanzania, 8 months. (Subsequently worked on the project for shorter periods in 1969, 1970, and 1971.)

1964-1968: Reporter/Researcher, *Newsweek* Magazine, New York.

GRANTS, FELLOWSHIPS, AWARDS:

1975	African Wildlife Foundation grant
1978 - 1979	Midgard Foundation grant
1979 - 1984	Research Fellow, grants, New York Zoological Society
1982	*Portraits in the Wild* nominated for American Book Award for best science paperback of the year
1985	Smith College Medal for alumnae achievement
1993	"Echo of the Elephants" received awards at Jackson Hole Wildlife Film Festival and Italian Film Festival.
1996-2006	Disney Conservation Foundation grants
1996-1999	Delano Foundation grants
1997	Elected Fellow of the Royal Geographic Society
1998	*Little Big Ears* received an award from the John Burroughs Foundation and the American Museum of Natural History
1999	Conservation Excellence Award from the Oakland Zoo
1999	Centennial Conservation Award from Woodland Park Zoo
1999, 2000, 2001	Sabbatical fellowships at National Center for Ecological Analysis & Synthesis, University of California, Santa Barbara
2000	Howard Gilman Foundation grant
2001-ongoing	Advisor to the International Fund for Animal Welfare
2001	Elected Fellow of the Society of Women Geographers
2002-2007	John D. & Catherine T. MacArthur Foundation Fellowship
2002	Award from Performing Animal Welfare Society (PAWS)
2002	Smith College Honorary Doctorate Degree
2002	Distinguished Conservation Fellow Award, LA Zoo
2004	Guardian Award from In Defense of Animals
2005	Conservation Award, Cincinnati Zoo

PROFESSIONAL ACTIVITIES:

1988-1996	IUCN/SSC African Elephant Specialist Group member
Ongoing:	Lectures on elephant social organization and behaviour to university students, wildlife club members, and specialist groups in Kenya, India, U.S., and U.K.
Ongoing:	Consultant to conservation groups, animal welfare organizations, zoos and others on elephant-related issues

MEMBERSHIPS:

American Museum of Natural History
Authors Guild
East African Natural History Society
East African Wild Life Society
Flying Doctors Society of Kenya
Kenya Society for the Protection & Care of Animals
PEN America
Royal Geographic Society (Fellow)
Society of Women Geographers (Fellow)
Explorers Club (Fellow)

PUBLICATIONS

BOOKS:

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4. Poole, J.H. & **Moss, C.J.** (1983) Musth discovered in the African elephant. *African Elephant and Rhino Newsletter,* 1:8.
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Moss, Cynthia & Croze, Harvey (2002) Spatial elephant memories. *Geospatial Solutions,* October, pp. 32-37.

FILM SCRIPTS AND SCIENTIFIC CONSULTING FOR FILMS:

1990-1992	"Echo of the Elephants", BBC Natural History Unit
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1996-1997	"Africa's Forgotten Elephants", Scorer Associates for BBC
2002-2005	"Echo of the Elephants: The Last Chapter?", BBC Natural History Unit
2007-2008	"Echo and the Elephants of Amboseli, Animal Planet 13-part series
2009-2010	"Echo: An Elephant to Remember", BBC Natural History Unit
2013	"An Apology to Elephants", HBO.

EXHIBIT B

Exhibit B

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Exhibit 6

Declaration of Karen McComb

I, Karen McComb, declare as follows:

Introduction and Qualifications

1. My name is Karen McComb. I was awarded my Bachelors of Science with 1st Class Honours in Zoology from the University of Edinburgh in 1984. I earned my PhD from the University of Cambridge from 1984-1988, under the supervision of Professor T.H. Clutton-Brock, for a thesis entitled "Roaring and reproduction in red deer (Cervus elaphus)". I completed a Postdoctoral Research Fellowship from 1989-1990 at the University of Minnesota, and then was a Research Fellow at Newnham College, at the University of Cambridge, from 1990-1993. I have worked at the University of Sussex since 1993, where I have been a Lecturer/Senior Lecturer from 1993-2004, a Reader from 2004-2013, and a Professor (of Animal Behaviour and Cognition) since 2013. I work in the School of Psychology at University of Sussex in Brighton, United Kingdom and reside in East Sussex.

2. I submit this Declaration in support of the Nonhuman Rights Project, Inc.'s petition for a writ of habeas corpus regarding the captive elephants at the Los Angeles Zoo. I am a nonparty to this proceeding.

3. My current research is directed towards the investigation of emotional awareness as a basis for social success in the domestic horse. Although the essential role that emotional intelligence plays in human social behaviour is well recognized, we collectively still know very little of how individual variation in the ability to identify and respond appropriately to emotional signals influences social integration and success in animal groups. My research team is designing a broad array of naturalistic tests to quantitatively assess individual differences in emotional abilities, which we will examine in relation to measures of social success. In addition to the scientific significance of my research, there are considerable implications for animal welfare, and my group's findings will allow us to more accurately understand the emotional capacities and requirements of individual horses within the domestic environment.

4. My research career has centered on using naturalistic experiments to probe and understand vocal communication and cognitive abilities in a wide range of mammals, including African elephants, horses, lions, red deer, and domestic cats and dogs.

Through the design and implementation of novel experiments which provide a window into abilities that animals use to make every-day decisions in their native environments, I have made breakthroughs that have significantly advanced our fundamental understanding of animal minds and social behaviour. My research has contributed significantly towards advances in: (1) Understanding social cognition and conceptual knowledge. My work focusing on social cognition in domestic horses has led to fundamental insights about how individuals within a group recognize each other, and my research team provided the first systematic demonstration of cross-modal individual recognition of conspecifics in a nonhuman. This finding demonstrates how multi-sensory representations can underlie animals' knowledge of each other, and fundamentally advances our understanding of how conceptual knowledge may have arisen evolutionarily; (2) Understanding social intelligence in wild mammals. My original work evaluating social cognition in African lions laid the groundwork for understanding how the potential costs of fighting with larger groups over limited resources may have provided a selective evolutionary pressure for numerical assessment skills in social species. This potential biological basis for the evolution of mathematical abilities has led broadly to new research on other species based largely on my experimental paradigm. In my research with African elephants, I have demonstrated that the collective experiences and knowledge found in the oldest members of a group can influence the social knowledge of the group as a whole, which has provided fundamental insights into how cognitively advanced social mammals acquire and store information in the wild. Subsequent work provided the first empirical evidence that groups benefit from older leaders specifically due to the group's collectively enhanced ability to respond to predators based on the knowledge of the oldest individual, allowing for the development of intriguing hypotheses for the evolutionary benefits of longevity. More recent work demonstrated for the first time that elephants' knowledge of human predators is much more sophisticated than previously recognized, by showing that elephants can determine ethnicity, gender, and age of humans from acoustic cues in human voices; and (3) Understanding sexual signals and the origins of language. My original research on the function of roaring in red deer provided the foundation for a novel, systematic experimental approach to studying the role of vocal signaling in sexual selection in mammals. In a series of influential papers, my research group showed that formants, key parameters in human speech, play a critical role in the communication of non-human mammals. In addition, I have used a comparative approach to demonstrate that increases in non-human primate group size and extent of social bonding are related to the development of larger vocal repertoires, providing new information for the scientific investigation of language evolution.

5. In addition to the scientific implications of my research, it has also had impacts for animal conservation and welfare. Specifically, by demonstrating the crucial role that the oldest individuals play in elephant social groups, we have shown how entire populations of cognitively advanced social mammals can be severely disrupted by the removal of even a few critical individuals. Our recent work has also shown that the effects of social disruption can have severe, long-term effects on the cognitive abilities of elephants. This research has significant implications for the conservation and welfare of both wild and captive animals, not just elephants but also other long-lived, large-brained social mammals such as whales and dolphins. Due to this work, I was invited to contribute to the recommendations of the recent Convention on the Conservation of Migratory Species of Wild Animals (CMS).

6. Along with my colleague David Reby, I developed a very successful research group in Mammal Vocal Communication and Cognition (http://www.lifesci.sussex.ac.uk/cmvcr/Home.html) at the University of Sussex. This research group has attracted and supported many talented postgraduates and independent research fellows. Currently, I have 3 PhD students and a postdoc, working with me on projects ranging from emotional awareness in domestic animals to investigating cultural differences between elephant populations.

7. I have been awarded significant extramural grants to fund my research throughout my career from a number of foundations and organizations, including: (1) Levehulme Trust Research Grants, in both 2009 and 2014; (2) a National Geographic grant in 2006; (3) a Waltham Foundation grant in 2002; (4) an EU Marie Curie grant in 2000; (5) a BBSRC research grant in 1996; (6) Tusk Trust grants, in 1994, 1995, and 1996; (7) a Nuffield Foundation grant in 1994; (8) a Royal Society Research grant in 1994; (9) and an NERC small project grant in 1993. Additionally, I have received a number of Royal Society Conference grants throughout my career, most recently in 2005 and 2009.

8. Over the course of my career, I have received several awards and honors related to my research, including; (1) the 2008 PNAS Cozzarelli Prize for outstanding originality

and scientific excellence for the article "Cross-modal individual recognition in domestic horses (Equus caballus)" with L. Proops and D. Reby; (2) the prize for best talk by a research student at the Association for the Study of Animal Behaviour Spring Conference in 1987 during my PhD at Cambridge; (3) The University of Edinburgh Class Medal & Ashworth Prize in Zoology in 1984; (4) the Class Medal and William Turner Award in Zoology in 1983; (5) the Moira Lyndsay Stewart Award in Zoology in 1982; and (6) the Jack Roberts Memorial Prize in Botany in 1982.

9. I have served with a number of professional organizations throughout my career, including: (1) as an appointed Reviewer for European Research Council grants in 2012; (2) as an academic Editor for *PLoS One* since 2007; (3) as part of the Editorial Board for *Bioacoustics* since 1997; (4) as a consulting Editor for *Animal Behaviour* from 1996-1998; (5) as a Council Member for the Association for the Study of Animal Behaviour (ASAB) from 1993-1997; (6) as a liaison representative for the ASAB with the Institute of Biology from 1995-1997; and (7) as a manuscript reviewer for a number of premier scientific publications, including *Science, Nature, Current Biology, Proceedings of the Royal Society B, Proceedings for the National Academy of Sciences, PLoS One,* and *Animal Behaviour*, as well as other journals.

10. I have organized a number of conferences during my career, including: (1) a symposium on "Mammal Vocal Communication: Insights into cognitive abilities and the origins of language" at the International Ethological Congress in Budapest, in August 2005 (with David Reby); and (2) the 1999 Association for the Study of Animal Behaviour Conference on "Evolution of Mind" in London, attended by more than 200 people.

11. I have given numerous professional academic lectures throughout my career. Some of these include: (1) an invited lecture to the Cetacean Culture Workshop in 2014, organized jointly by the Convention on the Conservation of Migratory Species of Wild Animals (CMS) and Whale and Dolphin Conservation (WDC); (2) a Plenary talk at the 2012 Association for the Study of Animal Behaviour meeting on "Cognition in the Wild"; (3) an invited lecture at the 2011 international workshop on communication and social cognition at the Institute of Evolutionary Biology and Environmental Studies at the University of Zurich; (4) an invited lecture at the 2010 International workshop on referential communication at the Wissenschaftskolleg zu Berlin, Institute for Advanced Study in Berlin; (5) a Plenary lecture at the 2010 Nordic meeting of the International

Society for Applied Ethology, in Kuopia, Finland; (6) an invited lecture at the 2009 International Ethological Congress in Rennes, France; (7) an invited lecture in 2009 at the Ecology and Evolutionary Biology Department at the University of Princeton; (8) an invited lecture at the Novartis day at the 2006 Royal Society Discussion meeting on Social Intelligence, in London; (9) an invited lecture (and conference organizer) at the 2005 International Ethological Congress Symposium on "Mammal Vocal Communication: insights into cognitive abilities and the origin of language" in Budapest; (10) a Keynote lecture at the 2003 British Association for the Advancement of Science Symposium on "Where do numbers come from?" at Salford, England; (11) a Plenary lecture at the 2002 Association for the Study of Animal Behaviour conference on "Information Gathering"; (12) an invited lecture at the 2001 symposium on Alternative Approaches to Studying Social Cognition at the International Ethological Congress in Tubingen, Germany; (13) an invited lecture at a 2000 International workshop on animal signaling, Talkbank, at the University of Philadelphia; and (14) a Plenary lecture at the 1999 Association for the Study of Animal Behaviour Conference on "Communication and Social Behaviour" in Lisbon.

12. In addition to academic lectures, I have given a number of public lectures over the course of my career, including: (1) as an invited panel member/speaker at the 2014 Festival of Sound, organized by Magdalene College at the University of Cambridge; (2) as an invited member/speaker at the 2012 Gulbenkian Foundation Supersonix Festival, organized on behalf of the Exhibition Road Cultural Group to focus on the art and science of sound and music-making; (3) a public lecture on "Animal Communication" in the "Learning about Animals" series in London in 2007; (4) a lecture to the 2006 Pet Care Trust Conference in Edinburgh; (5) a Press conference for the launch of my *Science* paper, organized by the American Academy for the Advancement of Science, at the London Zoo in 2001; (6) a lecture at the British Library National Sound Archive in 2000; and (7) a joint lecture with Cynthia Moss at a Royal Geographical Society lecture, attended by more than 600 members of the public, in 1996.

13. I have published over 50 peer-reviewed scientific articles over my career. These articles have been published in many of the world's premier scientific journals, including: *Nature, Science, PNAS, Frontiers in Zoology*, *Animal Behaviour, Current Biology, Biology Letters, PLoS ONE, Proceedings of the Royal Society B, Ethology,*

Animal Cognition, Journal of the Acoustical Society of America, Journal of Comparative Psychology, Advances in the Study of Behaviour, American Journal of Primatology, Behavioural Ecology, and *Trends in Ecology & Evolution*. Six of these publications have been featured as cover articles in the journals *Science, Nature, PNAS, Proceedings of the Royal Society B,* and *Biology Letters.* Specific topics of these publications have included: Animals remember previous facial expressions that specific humans have exhibited; Elephants can determine ethnicity, gender, and age from acoustic cues in human voices; The Equine Facial Action Coding System; The eyes and ears are visual indicators of attention in domestic horses; Cross-modal discrimination of human gender by domestic dogs; Effects of social disruption in elephants persist decades after culling; The responses of young domestic horses (Equus caballus) to human-given cues; Leadership in elephants: the adaptive value of age; African wild dogs as a fugitive species: playback experiments investigate how wild dogs respond to their major competitors; Cross-modal perception of body size in domestic dogs; the use of human-given cues by domestic horses; Acoustic bases of motivational misattributions; Oestrus red deer hinds prefer male roars with higher fundamental frequencies; Size communication in domestic dog (Canis familiaris) growls; Manipulation by domestic cats: the cry embedded within the purr; Context-related variation in the vocal growling behaviour of the domestic dog; Cross-modal individual recognition in domestic horses; Human listeners attend to size information in domestic dog growls; Experimental investigation of referential looking in free-ranging barbary macaques; Female perception of size-related formant shifts in red deer (Cervus elaphus); African elephants show high levels of interest in the skulls and ivory of their own species; Co-evolution of vocal communication and sociality in primates; Long-distance communication of cues to social identity in African elephants; Vocal communication and reproduction in deer; Information content of female copulation calls in yellow baboons; Matriarchs act as repositories of social knowledge in African elephants; Elephant hunting and conservation; Roaring and social communication in African lions; Unusually extensive networks of vocal recognition in African elephants; Perception of female reproductive state from vocal cues; Female grouping as a defense against infanticide by males; Behavioural deception; Roaring and numerical assessment in contests between groups of female lions; Female lions can identify potentially infanticidal males from their roars; Roaring and oestrus; Roaring by red deer stags advances date of oestrus in hinds; and Are talkers the only thinkers?.

14. My scientific work has also been published as chapters in several books and edited volumes, including (1) *The Social Dog* (2014, editors J. Kaminski and S. Marshall-Pescini, Elsevier); (2) *The Amboseli Elephants: A Long-Term Perspective on a Long-Lived Mammal* (2011, University of Chicago Press); (3) *New Encyclopedia of Neuroscience* (2008, editor L.R. Squire, Academic Press); (4) *The Barbary macaque: biology, management, and conservation* (2006, editors J.K. Hodges and J. Cortes, Nottingham University Press); (5) *Animal Communication Networks* (2005, editor P.K. McGregor, Cambridge University Press); (6) *Studying Elephants* (1996, African Wildlife Foundation Technical Handbook series); and (7) *Playback and Studies of Animal Communication* (1992, editor P.K. McGregor, Plenum Publishing Corporation).

15. My work has garnered significant media coverage over the course of career. I have made appearances on British, American, Australian, Canadian, and German TV and radio stations (including BBC TV news, Discovery Channel, Radio 4 Today programme, and BBC Science in Action) and my work has been featured in articles in major British, European, and American newspapers (including The Guardian, Times, Liberation, National Geographic magazine, and New Scientist).

16. In April 2001, *Science* organized a press conference in London for the launch of my paper, which was featured as their cover story. Later cover stories in *Biology Letters* (2006), *PNAS* (2009), and *Proceedings of the Royal Society B* (2011) also generated significant media attention, as did my *Current Biology* paper in 2009 which featured as the most popular story on the BBC website, as well as the top Science and Entertainment story.

17. Several of my recent papers, including *Current Biology* (2018), *PNAS* (2014) and *Frontiers in Zoology* (2013) received unusually extensive world-wide media coverage. This included interviews on the Radio 4 Today Programme, ITV News at Ten, BBC World TV News, Newsround, BBC World Service, and Science in Action, as well as coverage in BBC Breakfast, BBC Radio 2, 3, and 4 news reports, Time magazine, The Economist, *Nature*, *Science*, National Geographic, and by more than 200 other news outlets in the UK and around the world.

18. My elephant research was covered in BBC's "Inside the Animal Mind" in February 2014, and my horse research was filmed for the BBC series "Talk to the Animals" which aired in July 2014. Both programmes were shown in prime-time slots and were

very well received by the public. My recent research on emotional awareness in horses also featured in the award-winning CBC documentary “Equus: story of the horse”.

19. I have done regular consultancies for the BBC and other companies making wildlife documentaries on animal communication. Most recently, I was a scientific consultant for the popular two-part BBC documentary “Talk to the Animals” (2014). I have also provided sound recordings for wildlife documentaries by the BBC and Windfall films, and have a sound recording credit (with Martyn Colbeck) on the BBC’s “Echo of the elephants: the next generation” (1995).

20. My work has been featured in a number of textbooks and popular books, including: (1) John Alcock’s and Lee Dugatkin’s major textbooks on Animal Behaviour; (2) new edition of the Krebs & Davies *An Introduction to Behavioural Ecology*; (3) new edition of Bradbuy and Vehrencamp’s *Principles of Animal Communication*; (4) new edition of Shettleworth’s *Cognition, Evolution, and Behavior*; (5) Brian Butterworth’s *The Mathematical Brain*; (6) Tim Clutton-Brock’s *Mammal Societies*; and (7) as a chapter in the best-selling *Animal Wise* by Virginia Morell.

21. I provided photographic material to The Field Museum, in Chicago, for an exhibition on Mammoths and Mastodons, Titans of the Ice Age. This exhibit has been touring internationally.

22. My Curriculum Vitae fully sets forth my educational background and experience and is annexed hereto as “Exhibit A”.

Basis for opinions

23. The opinions I state in this Declaration are based on my professional knowledge, education, training, and years of experience observing and studying elephants and other social mammals, as well as my knowledge of peer-reviewed literature about elephant behaviour and intelligence published in the world’s most respected journals, periodicals and books that are generally accepted as authoritative in the field, and many of which were written by myself or colleagues whom I have known for several years and with whose research and field work I am personally familiar. A full reference list of peer-reviewed literature cited herein is annexed hereto as “Exhibit B”.

Opinions

Premise

24. Autonomy in humans is defined as self-determined behaviour that is based on freedom of choice. As a psychological concept it implies that the individual is directing their behaviour based on some non-observable, internal cognitive process, rather than simply responding reflexively. Although we cannot directly observe these internal processes in other people, we can explore and investigate them by observing, recording and analysing behaviour. For non-human animals, observing similar behaviour and recording evidence of shared cognitive capacities should, parsimoniously, lead to similar conclusions about autonomy.

25. I shall indicate which species, African (*Loxodonta Africana*) or Asian (*Elephus maximus*), specific observations relate to. If the general term "elephants" is used with no specific delineation, it can be assumed the comment relates to both species.

Brain And Development

26. Elephants are large-brained, with the biggest absolute brain size of any land animal (Cozzi et al 2001; Shoshani et al 2006). Even relative to their body sizes, elephant brains are large. Encephalization quotients (EQ) are a standardised measure of brain size relative to body size, and illustrate by how much a species' brain size deviates from that expected for its body size. An EQ of one means the brain is exactly the size expected for that body, and values greater than one indicate a larger brain than expected (Jerison 1973). Elephants have an EQ of between 1.3 and 2.3 (varying between sex and African and Asian species). This means an elephant's brain can be up to two and a half times larger than is expected for an animal of its size; this EQ is similar to that of the great apes, with whom elephants have not shared a common ancestor for almost 100 million years (Eisenberg 1981, Jerison 1973). Given how metabolically costly brain tissue is, the large brains of elephants would be expected to confer significant advantages; otherwise their size would be reduced. Presumably this advantage is allowing greater cognitive capacities and behavioural flexibility (Bates et al 2008a).

27. Generally, mammals are born with brains weighing up to 90% of the adult weight. This figure drops to about 50% for chimpanzees. Human baby brains weigh only about 27% of the adult brain weight (Dekaban & Sadowsky 1978). This long period of brain development over many years (termed 'developmental delay') is a key feature of human brain evolution and is thought to play a role in the emergence of our complex cognitive abilities, such as self-awareness, creativity, forward planning, decision making and

social interaction (Bjorkland 1997). Delayed development provides a longer period in which the brain may be shaped by experience and learning (Fuster 2002). Elephant brains at birth weigh only about 35% of their adult weight (Eltringham 1982), and elephants show a similarly protracted period of growth, development and learning (Lee 1986). This similar developmental delay in the elephant brain is therefore likely associated with the emergence of similarly complex cognitive abilities.

28. Despite nearly 100 million years of separate evolution (Hedges 2001), elephants share certain characteristics of our large brains, namely deep and complex folding of the cerebral cortex, large parietal and temporal lobes, and a large cerebellum (Cozzi et al 2001). The temporal and parietal lobes of the cerebral cortex manage communication, perception, and recognition and comprehension of physical actions, while the cerebellum is involved in planning, empathy, and predicting and understanding the actions of others (Barton 2012). Thus, the physical similarities between human and elephant brains occur in areas that are relevant to capacities necessary for autonomy and self-awareness.

29. Elephant brains hold three times more neurons than do human brains, with 97% of their found neurons in the cerebellum and 5.6 billion neurons in the cerebral cortex (Herculano-Houzel et al 2014); This figure for cortical neurons is lower than previous estimates, which suggested 11 billion cortical neurons for elephants and 11.5 billion for humans (Roth & Dicke 2005).

30. Elephant pyramidal neurons have a large dendritic tree, i.e. a large number of connections with other neurons for receiving and sending signals (Cozzi et al 2001; Jacobs et al 2011; Maseko et al 2012). The degree of complexity of pyramidal neurons is linked to cognitive ability, with more (and more complex) connections between pyramidal neurons being associated with increased cognitive capabilities (Elston 2003).

31. As described below, research demonstrates that along with these common brain and life-history characteristics, there is evidence that elephants may share many behavioural and intellectual capacities with humans, including: self-awareness, empathy, awareness of death, intentional communication, learning, memory, and categorisation abilities. Many of these capacities have previously been considered – erroneously – to be uniquely human, and each is fundamental to and characteristic of autonomy and self-determination.

Awareness Of Self And Others

32. An Asian elephant has been show to exhibit Mirror Self Recognition (MSR) using Gallup's classic 'mark test' (Gallup 1970; Plotnik et al 2006). MSR is the ability to recognise a reflection in the mirror as oneself, and the mark test involves surreptitiously placing a coloured mark on an individual's forehead that it could not see or be aware of without the aid of a mirror. If the individual uses the mirror to investigate the mark, it is logical to assume that the individual recognises the reflection as itself. (See video here). Almost all animal species tested on this task fail: they do not recognise the image in the mirror as being a reflection of themselves. Indeed, the only other mammals beyond humans who have successfully passed the mark test and exhibit MSR are the great apes (chimpanzees, bonobos, gorillas, and orangutans) and bottlenose dolphins (Parker and Mitchell 1994, Reiss and Marino 2001). MSR is significant because it is considered by many to be a key identifier of self-awareness. Self-awareness is intimately related to autobiographical memory in humans (Prebble et al 2013), and is central to autonomy and being able to direct one's own behaviour to achieve personal goals and desires. By demonstrating that they can recognize themselves in a mirror, elephants appear to be holding a mental representation of themselves from another perspective, and thus be aware that they are a separate entity from others (Bates and Byrne 2014).

33. Related to possessing a sense of self is an understanding of death. Observing reactions to dead family or group members suggests such an awareness of death in only two animal genera beyond humans; chimpanzees and elephants (Anderson et al 2010, Douglas-Hamilton et al 2006). Having a mental representation of the self – a pre-requisite for mirror-self recognition – probably also confers an ability to comprehend aspects of death. Wild African elephants have been shown experimentally to be more interested in the bones of dead elephants than the bones of other animals (McComb et al 2006) (See video here), and they have frequently been observed using their tusks, trunk or feet to attempt to lift sick, dying or dead individuals (Poole & Granli, 2011). Although they do not give up trying to lift or elicit movement from the body immediately, elephants appear to realise that once dead, the carcass cannot be helped anymore, and instead they engage in apparently "grief-stricken" behaviour, such as standing guard over the body, and protecting it from the approaches of predators (Poole & Granli, 2011). They also have been observed to cover the bodies of dead elephants

with dirt and vegetation (Moss 1992; Poole 1996). In the particular case of mothers who lose a calf, although they may remain with the calf's body for an extended period, they do not behave towards the body as they would a live calf. Indeed, the general demeanour of elephants who are attending to a dead elephant is one of grief, with slow movements and few vocalisations (Poole, pers. comm.). These behaviours are akin to human responses to the death of a close relative or friend, and illustrate that elephants appear to possess some understanding of life and the permanence of death (See photographs here).

34. The capacity for mentally representing the self as an individual entity has been linked to general empathic abilities (Gallup 1982), where empathy can be defined as identifying with and understanding another's experiences or feelings by relating personally to their situation. Empathy is an important component of human consciousness and autonomy, and is a cornerstone of normal social interaction. It goes beyond merely reading the emotional expressions of others. It requires modelling of the emotional states and desired goals that influence others' behaviour both in the past and future, and using this information to plan one's own actions; cognitive empathy is possible if one can adopt another's perspective, and attribute emotions to that other individual (Bates et al 2008b). Empathy is, therefore, a component of and reliant on 'Theory of Mind' - the ability to mentally represent and think about the knowledge, beliefs and emotional states of others, whilst recognising that these can be distinct from your own knowledge, beliefs and emotions (Premack and Woodruff 1978/ Frith and Frith 2005).

35. Elephants clearly and frequently display empathy in the form of protection, comfort, and consolation, as well as by actively helping those who are in difficulty, such as assisting injured individuals to stand and walk, or helping calves out of rivers or ditches with steep banks (Bates et al 2008b, Lee 1987) (See video here). Elephants have even been observed feeding those who are not able to use their own trunks to eat (see Poole and Granli, 2011).

36. In an analysis of behavioural data collected from wild African elephants over a 40-year continuous field study, Bates and colleagues concluded that as well as possessing their own intentions, elephants can diagnose animacy and goal directedness in others, understand the physical competence and emotional state of others, and attribute goals

and mental states (intentions) to others (Bates et al 2008b), as evidenced in the examples below:

> *'IB family is crossing river. Infant struggles to climb out of bank after its mother. An adult female [not the mother] is standing next to calf and moves closer as the infant struggles. Female does not push calf out with its trunk, but digs her tusks into the mud behind the calf's front right leg which acts to provide some anchorage for the calf, who then scrambles up and out and rejoins mother.'* (See video here)

> *'At 11.10ish Ella gives a 'lets go' rumble as she moves further down the swamp . . . At 11.19 Ella goes into the swamp. The entire group is in the swamp except Elspeth and her calf [<1 year] and Eudora [Elspeth's mother]. At 11.25 Eudora appears to 'lead' Elspeth and the calf to a good place to enter the swamp — the only place where there is no mud.'*

Examples such as these demonstrate that the acting elephant (the adult female in the first example, and Eudora in the second) was able to understand the intentions of the other (the calf in the first case, and Elspeth in the second) – i.e. to either climb out of or into the water – and they could adjust their own behaviour in order to counteract the problem being faced by the other. Whilst humans may act in this helpful manner on a daily basis, such interactions have been recorded for very few non-human animals (Bates et al 2008b).

37. Experimental evidence from captive African elephants further demonstrates that elephants have the potential to attribute intentions to others, as they follow and understand human pointing gestures. The elephants understood that the human experimenter was pointing in order to communicate information to them about the location of a hidden object (Smet and Byrne 2013) (See video here). Attributing intentions and understanding another's reference point is central to empathy and theory of mind.

38. Evidence of 'natural pedagogy' is rare among non-human animals, with only a few potential examples of true teaching (whereby the teacher takes into account the knowledge states of the learner as they pass on relevant information) recorded anecdotally in chimpanzees (Boesch 1991) and killer whales (Guinet and Bouvier

1995)[1]. Teaching is therefore still widely considered to be unique to humans (Csibra and Gergely 2009). Bates & Byrne's analysis of simulated oestrus behaviours in African elephants – whereby a non-cycling, sexually experienced older female will simulate the visual signals of being sexually receptive, even though she is not ready to mate or breed again – shows that these knowledgeable females can adopt false oestrus behaviours in order to demonstrate to naïve young females how to attract and respond appropriately to suitable males. The experienced females may be taking the youngster's lack of knowledge into account and actively showing them what to do; a possible example of true teaching as it is defined in humans. Whilst this possibility requires further investigation, this evidence, coupled with the data showing that they understand the ostensive cues in human pointing, suggests that elephants do share some executive skills with humans, namely understanding the intentions and knowledge states (minds) of others.

39. Further related to empathy, the occurrence of coalitions and cooperation have been documented in wild African elephants, particularly to defend family members or close allies from (potential) attacks by outsiders, such as when a family group tries to 'kidnap' a calf from an unrelated family (Lee 1987, Moss and Poole 1983). These behaviours are based on one elephant understanding the emotions and goals of the coalition partner (Bates et al 2008b).

40. Cooperation is also evident in experimental tests with captive Asian elephants, whereby elephants demonstrated they can work together in pairs to obtain a reward, and understood that it was pointless to attempt the task if their partner was not present or could not access the equipment (Plotnik et al. 2011) (See video here). Problem-solving and working together to achieve a collectively desired outcome involve mentally representing both a goal and the sequence of behaviours that is required to achieve that goal; it is based on (at the very least) short-term action planning.

41. Wild elephants have frequently been observed engaging in cooperative problem solving, for example when retrieving calves that have been kidnapped by other groups, or when helping calves out of steep, muddy river banks (Bates et al 2008b, Moss, 2011) These behaviours demonstrate the purposeful and well-coordinated social system of

[1] Functional teaching has been experimentally demonstrated in various animal species including ants, babblers, meerkats, cheetahs and some primates, but this is not the same as deliberate pedagogy, as it does not rely on representing the knowledge states of the learners.

elephants, and show that elephants can hold particular aims in mind and work together to achieve those goals. Such intentional, goal-directed action forms the foundation of independent agency, self-determination, and autonomy.

42. Elephants also show innovative problem solving in experimental tests of insight (Foerder et al 2011), where insight can be described as the 'a-ha' moment when a solution to a problem 'suddenly' becomes clear. (In cognitive psychology terms, insight is the ability to inspect and manipulate a mental representation of something, even when you can't physically perceive or touch the something at the time. Or more simply, insight is thinking and using only thoughts to solve problems (*see* Richard Byrne, *Evolving Insight*, Oxford Online Press, 2016[2]). A juvenile male Asian elephant demonstrated just such a spontaneous action by moving a plastic cube and standing on it to obtain previously out-of-reach food. After solving this problem once, he showed flexibility and generalization of the technique to other, similar problems by using the same cube in different situations, or different objects in place of the cube when it was not available. (See video here). This experiment again demonstrates that elephants can choose the appropriate action and incorporate it into a sequence of behaviour in order to achieve a goal, which they kept in mind throughout the process.

43. Further experiments also demonstrate Asian elephants' ability to understand goal-directed behaviour. When presented with food that was out of reach, but with some bits resting on a tray that could be pulled within reach, the elephants learned to pull only those trays that were baited with food (Irie-Sugimoto et al 2008). Success in this kind of 'means-end' task is a demonstration of causal knowledge, which requires understanding not just that two events are associated with each other but also that there is some mediating force that connects and affects the two which may be used to predict and control events. Moreover, understanding causation and inferring object relations may be related to understanding psychological causation, i.e., the appreciation that others are animate beings that generate their own behaviour and have mental states (e.g., intentions).

Communication and social learning

[2] Available at https://global.oup.com/academic/product/evolving-insight-9780198757078?cc=us&lang=en&.

44. Speech is a voluntary behaviour in humans, whereby a person can choose whether to utter words and thus communicate with another. Therefore speech and language are reflections of autonomous thinking and intentional behaviour. Elephants also use their vocalisations to share knowledge and information with others, apparently intentionally (Poole 2011). Male elephants primarily communicate about their sexual status, rank and identity, whereas females and dependents call to co-ordinate and reinforce their social units. Call types can generally be separated into calls produced primarily by the larynx (such as rumbles) or trunk calls (such as trumpets), with different calls in each category being used in different contexts (Poole 2011; Poole and Granli 2004; Soltis et al 2005; Wood et al 2005). Field experiments have shown that African elephants distinguish between different call types (for example, contact calls – rumbles that travel long distances to maintain associations between elephants that could be several kilometres apart, or oestrus rumbles – that occur after a female has copulated) and these different call types elicit different responses in the listeners. Elephant vocalisations are not simply reflexive, they have distinct meanings to listeners and they are truly communicative, similar to the volitional use of language in humans (Leighty et al 2008; Poole 1999; Poole 2011).

45. Furthermore, elephants have been shown to vocally imitate the sounds they hear around them, from the engines of passing trucks to the commands of human zookeepers (Poole et al 2005, Stoeger et al 2012). Imitating another's behaviour is demonstrative of a sense of self, as it is necessary to understand how one's own behaviour relates to the behaviour of others.

46. Elephants display a wide variety of gestures, signals and postures, used to communicate information to the audience (Poole and Granli gestures chapter 2011). Such signals are adopted in many different contexts, such as aggressive, sexual or socially integrative situations, and each signal is well defined and results in predictable responses from the audience. That is, each signal or gesture has a specific meaning both to the actor and recipient. Elephants' use of gestures demonstrates that they communicate intentionally and purposefully to share information with others and/or alter the others' behaviour to fit their own desires.

47. Experimental evidence demonstrates that African elephants recognize the importance of visual attentiveness of the intended recipient (in this case, human experimenters) of gestural communication (Smet & Byrne 2014), further supporting

the suggestion that elephants' gestural communication is intentional and purposeful. Furthermore, the ability to understand the visual attentiveness and perspective of others is crucial for empathy and mental-state understanding.

Memory And Categorisation

48. Elephants have both extensive and long-lasting memories, just as the folk stories and adages encourage us to believe. McComb et al. (2000), using experimental playback of long-distance contact calls in Amboseli National Park, Kenya, showed that African elephants remember and differentiate the voices of at least 100 other elephants. Each adult female elephant tested was familiar with the contact-call vocalizations of individuals from an average of 14 families in the population. When the calls were from the test elephants' own family, they contact-called in response and approached the location of the loudspeaker and when they were from another non-related but familiar family — that is, one that had previously been shown to have a high association index with the test group — they listened but remained relaxed. However, when a test group heard unfamiliar contact calls (from groups with a low association index with the test group), they bunched together and retreated from the area.

49. McComb et al. (2001) went on to show that this social knowledge accumulates with age, with older females having the best knowledge of the contact calls of other family groups. McComb et al. (2011) also showed that older females are better leaders, with more appropriate decision-making in response to potential threats (in this case, in the form of hearing lion roars). Younger matriarchs were less skilled at pinpointing roars from male lions, the most dangerous predators because they can subdue a young elephant even when hunting alone. Sensitivity to picking out the roars of male lions increased with increasing matriarch age, with the oldest, most experienced females showing the strongest response to this danger. These experimental studies show that elephants continue to learn and remember information about their environments throughout their lives, and this accrual of knowledge allows them to make better decisions and better lead their families as they grow older.

50. Further demonstration of elephants' long-term memory comes from data on their movement patterns. African elephants are known to move over very large distances in their search for food and water. Leggett (2006) used GPS collars to track the movements of elephants living in the Namib Desert. He recorded one group traveling

over 600 km in five months, and Viljoen (1989) showed that elephants in the same region visited water holes approximately every four days, even though some of them were more than 60km apart. Elephants inhabiting the deserts of both Namibia and Mali have been described traveling hundreds of kilometers to arrive at remote water sources shortly after the onset of a period of rainfall (Blake et al. 2003; Viljoen 1989), sometimes along routes that researchers believe have not been used for many years. These remarkable feats suggest exceptional cognitive mapping skills, reliant on the long-term memories of older individuals who traveled that path sometimes decades earlier. Indeed it has been confirmed that family groups with older matriarchs are better able to survive periods of drought. The older matriarchs lead their families over larger areas during droughts than those with younger matriarchs, again apparently drawing on their accrued knowledge (this time about the locations of permanent, drought-resistant sources of food and water) to better lead and protect their families (Foley, Pettorelli, and Foley 2008).

51. Very importantly, it has recently been shown that long-term memories, and the decision-making mechanisms that rely on this knowledge, are severely disrupted in elephants who have experienced trauma or extreme disruption due to 'management' practices initiated by humans. Shannon et al (2013) demonstrated that elephants in South Africa who had experienced trauma decades earlier showed significantly reduced social knowledge. During archaic culling practices, these elephants were forcibly separated from family members and subsequently translocation to new locations (practices which have also accompanied taking elephants into captivity). Two decades later, they still showed impoverished social knowledge and skills and impaired decision-making abilities, compared with an undisturbed population in Kenya. Disrupting elephants' natural way of life can very negatively impact their knowledge and decision-making abilities.

52. Elephants demonstrate advanced "working memory" skills. Working memory is the ability to temporarily store, recall, manipulate and coordinate items from memory. Working memory directs attention to relevant information, and results in reasoning, planning, and coordination and execution of cognitive processes through use of a "central executive" (Baddeley 2000). Adult human working memory is generally thought to have a capacity of around seven items. In other words, we can keep about seven different items or pieces of information in mind at the same time (Miller 1956).

Bates and colleagues conducted experiments with wild elephants in Amboseli National Park, Kenya, manipulating the location of fresh urine samples from related or unrelated elephants. The elephants' responses to detecting urine from known individuals in surprising locations showed that they are able to continually track the locations of at least 17 family members in relation to themselves, as either absent, present in front of self, or present behind self (Bates et al. 2008a). This remarkable ability to hold in mind and regularly update information about the locations and movements of a large number of family members is best explained by predicting that elephants possess an unusually large working memory capacity, apparently much larger than that of humans.

53. Elephants show sophisticated categorisation of their environment, with skills on a par with those of humans. Bates and co-authors experimentally presented the elephants of Amboseli National Park, Kenya, with garments that gave olfactory or visual information about their human wearers — either Maasai moran (male warriors who traditionally attack and spear elephants on occasion as part of their rite of passage), or Kamba men (who are agriculturalists and traditionally pose little threat to elephants). In the first experiment, the only thing that differed between the cloths was the smell, derived from the ethnicity and/or lifestyle of the wearers. The elephants were significantly more likely to run away when they sniffed cloths worn by Maasai than those worn by Kamba men or no one at all (See video here). In a second experiment, the researchers presented the elephants with two cloths that had not been worn by anyone, but here one was white (a neutral stimulus) and the other was red — the color that is ritually worn by Maasai moran. With access only to these visual cues, the elephants showed significantly greater reaction to red garments than white, often including signs of aggression. Bates et al. concluded that elephants are able to categorize a single species (humans) into sub-classes (i.e. "dangerous" or "low risk") based on either olfactory or visual cues alone (Bates et al. 2007). McComb et al. went on to show that the same elephants can also distinguish between human groups based on just their voices. The elephants reacted differently (and appropriately) depending on whether they heard Maasai or Kamba men speaking, and also whether they heard male or female Maasai (where female Maasai pose no threat as they are not involved in spearing events), and adult Maasai men or young Maasai boys (McComb et al. 2014). Scent, sounds, and visual signs associated specifically with Maasai men are categorized as "dangerous," while neutral signals are attended to but categorized as "low risk."

These sophisticated, multi-modal categorization skills may be exceptional among non-human animals. The above experiments also demonstrate the acute sensitivity that elephants have to the human world, monitoring our behavior and learning to recognize situations where humans might cause them harm.

Summary

54. As will be evident from this Declaration, both African and Asian elephants have been shown to demonstrate highly advanced cognitive abilities and levels of emotional awareness, sharing many key traits with humans. Based on the evidence presented, it seems clear that they should be treated as autonomous beings who direct their behaviour based on complex internal cognitive processes, rather than simply responding reflexively.

55. Scientific knowledge about elephant intelligence has been increasing rapidly in recent decades: what we currently know is only a tiny fraction of what elephant brains are likely to be capable of, with recent advances underlining just how sophisticated elephant behavior and cognition is likely to be.

I declare under penalty of perjury under the laws of the State of California that the foregoing is true and correct.

Executed on the 12th (date) of May (month), 2025 (year)

at POLEGATE BN26 5RD, EAST SUSSEX, U.K.

(city or other location, and state or country)

Karen McComb, Ph.D.

[signature]

(signature)

EXHIBIT A

Prof. Karen McComb:
Curriculum Vitae

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SCIENTIFIC CAREER & QUALIFICATIONS

B.Sc., University of Edinburgh (1980-1984)
- 1st Class Honours in Zoology

Ph.D., University of Cambridge (1984-1988)
- Thesis title: Roaring and reproduction in red deer (Cervus elaphus). Supervised by Prof. T.H. Clutton-Brock

Research Fellow, University of Minnesota (1989 – 90)

Research Fellow, Newnham College, University of Cambridge (1990 – 93)

Lecturer / Senior Lecturer, University of Sussex (1993 – 2004)

Reader, University of Sussex (2004 – 2013)

Professor, University of Sussex (2013 – present)

PRIZES & AWARDS

University & early career
- University of Edinburgh Class Medal & Ashworth Prize in Zoology (1984), Class Medal & William Turner Award in Zoology (1983), Moira Lyndsay Stewart Award in Zoology & Jack Roberts Memorial Prize in Botany (1982).
- Prize for best talk by a research student at the Association for the Study of Animal Behaviour Spring Conference (1987) during PhD at Cambridge.

Recent career
- *PNAS* Cozzarelli Prize (2008) for outstanding originality and scientific excellence for article "Cross-modal individual recognition in domestic horses (*Equus caballus*)" with L. Proops and D. Reby. I led this study, taking a major role in conceiving and designing the experiment and writing the paper. http://www.pnas.org/site/misc/cozzarelliprize.shtml

CURRENT RESEARCH FOCUS

My current research is focused on investigating emotional awareness as a basis for social success in a non-human – the domestic horse. Despite the key role that emotional intelligence is believed to play in human social behaviour – we still know little of how individual differences in abilities to identify and respond appropriately to the emotional signals of others determine social integration and success in animal groups. With the strong research team that I have built in this area, I am developing a novel battery of naturalistic tests to quantitatively assess individual differences in emotional abilities and directly relating performance to measures of social success. As well as its scientific importance, our work has considerable significance for animal welfare and will allow us to better understand the emotional capacities and requirements of individual horses within the domestic environment.

SUMMARY OF RESEARCH CAREER

My research career has focused on using naturalistic experiments to provide important new insights into vocal communication and cognitive abilities in a wide range of mammals including African elephants, horses, lions, red deer and domestic cats and dogs. By devising novel experimental designs that tap into abilities animals use in decision-making in their natural environments, I have made significant breakthroughs in a number of key areas including:

Advances in our understanding of social cognition and conceptual knowledge
I previously led major new work on social cognition in domestic horses, including developing novel paradigms to examine cross-modal individual recognition in this species. Our study in *PNAS* (Proops et al., 2009), which was awarded the Cozzarelli Prize, provided the first systematic demonstration of cross-modal individual recognition of conspecifics in a nonhuman. This constituted a major advance, suggesting that rich multi-sensory representations could underlie animals' knowledge of each other. I am now initiating experimental studies on horses that will extend our understanding of animal social cognition to encompass decision-making about one of the most pertinent available indices of another's response - their emotional state (see current research above).

Advances in our understanding of social intelligence in wild mammals
My original work on social cognition in African lions (McComb et al., 2004) was important in showing that the costs of fighting with larger groups could have selected for numerical assessment skills in social species – suggesting a possible biological basis for the evolution of mathematical abilities and stimulating new research on other species based on my experimental paradigm. In a highly cited cover article in *Science* (McComb et al., 2001), I subsequently used playback experiments on African elephants to demonstrate that the possession of enhanced discriminatory abilities by the oldest individual in a group could influence the social knowledge of the group as a whole, providing the first insights into how cognitively advanced social mammals acquire and store information in the wild. I also provided the first empirical evidence that groups benefit from older leaders because of their enhanced ability to make crucial decisions about predatory threat, throwing new light on selection for longevity (McComb et al., 2011). Our most recent *PNAS* paper

(McComb et al., 2014) demonstrated that elephants' knowledge of human predators was extremely precise – revealing unusual abilities to determine ethnicity, gender and age from acoustic cues in human voices.

Advances in our understanding of sexual signals and the origins of language
My original papers on the functions of roaring in red deer provided the basis for a new systematic experimental approach to studying the role of vocal signals in sexual selection in mammals (e.g. McComb, 1987, which was a cover story in *Nature*). I realised early on the importance of applying source-filter theory to the study of mammal vocal communication and subsequently developed this approach with David Reby (originally my postdoc) and Ben Charlton (our PhD student) in a series of influential papers showing that formants, key parameters in human speech, also play a crucial role in the communication of non-human mammals (e.g. Reby & McComb, 2003; Reby et al., 2005). This work is given detailed coverage in the new edition of the flagship behavioural ecology text (Davies, Krebs & West, 2012 *An Introduction to Behavioural Ecology*). I have also used a comparative approach to show that evolutionary increases in the size of non-human primate vocal repertoires have been associated with increases in group size and extent of social bonding, results that have added new perspectives to ongoing debates about language evolution (McComb & Semple, 2005).

As well as its scientific significance, my work has also had important practical consequences for animal conservation and welfare. In particular, by revealing the key role that the oldest individuals play in elephant social groups, we demonstrated how whole populations of cognitively advanced social mammals could be dramatically affected by the removal of just a few key individuals (McComb et al. 2001 & 2011). In addition, our recent work illustrating that social disruption can have very significant long-term effects on elephant cognitive abilities had implications for the conservation and welfare of both wild and captive animals. As a result of the above findings, which are relevant to the conservation and welfare not just of elephants but also of other long lived, large-brained social mammals such as whales and dolphins, I was invited to contribute to the recommendations of the recent Convention on the Conservation of Migratory Species of Wild Animals (CMS).

SUMMARY OF TEACHING

I have always aimed to deliver excellence in Teaching and Learning at both undergraduate and postgraduate (MSc & PhD) levels. At undergraduate level, I currently organise and teach a successful final year module in Animal Vocal Communication and contribute to modules on Psychobiology and Contemporary Issues in Psychology. I also teach on post-graduate modules on Social Neuroscience and Voice Analysis and Re-synthesis.

Student feedback comments on Animal Vocal Communication illustrate the key elements that the students appreciate: "Most interesting course I have taken while at Sussex doing Psychology, very up to date research, great teaching, got to go into lab and discover how real research is conducted", "This was the best course of my degree", "The practical sessions reinforced what was learnt in the lectures, but in a fun way. Karen is very enthusiastic about this course and about the subject area which makes it a much more interesting and enjoyable class", "The workshops encourage critical thinking about experimental design and enable us to apply what we have learned in lectures", "Karen is clearly passionate about her subject and is very willing to discuss topic areas further when asked. It's also really nice to have someone lecturing who contributes so much to the scientific literature covered in the course".

Undergraduates and MSc students have benefitted from conducting their research projects as part of my lab, where they become integrated members of the research group. Several of these projects have contributed to significant publications on which students have been co-authors) and inspired students to go on to further MSc and PhD degrees themselves. My PhD students and postdocs have also performed outstandingly and many have gone on to very successful academic careers.

ADDITIONAL SCHOOL & UNIVERSITY CONTRIBUTION

I have held a number of significant administrative responsibilities within the university, notably:

- Chair of Postgraduate Exam Board 2014 – present
- Deputy Chair of Postgraduate Exam Board 2013
- Co-ordinator of undergraduate research projects for School of Psychology (2005 onwards) and previously for Experimental Psychology (1998/99 onwards)
- Exam Board secretary (2001-2003)
- Member of Academic Appeals Board (2002)
- Internal assessor for Periodic Review of Teaching in Biology (1997)

Mammal Vocal Communication and Cognition Research Group

In addition to fulfilling the specific internal roles above, I have served the university through developing, alongside my colleague David Reby, a highly successful research group in Mammal Vocal Communication and Cognition http://www.lifesci.sussex.ac.uk/cmvcr/Home.html
This has attracted and supported talented postgraduates and independent research fellows. At present, I have 3 PhD students, a postdoc and a full-time research assistant, working on projects ranging from social communication in African lions to emotional awareness in horses; an additional postdoc on culture in elephants is expected next year. Along with David Reby's students and collaborators, this makes for a vibrant research community.

I have also significantly enhanced the University's profile through the success of my external academic and public activities as documented below.

MEMBERSHIPS & NETWORKS

(i) Journals & academic affiliations

- UFAW link representative for University of Sussex 2014 onwards.

- Academic editor for *PLoS ONE* 2007 onwards.
- Editorial board of *Bioacoustics* 1997 onwards.
- Consulting editor for *Animal Behaviour* 1996-1998
- Council member for the Association for the Study of Animal Behaviour 1993-1996. ASAB liaison representative for the Institute of Biology 1995-1997
- Reviewer for *Science, Nature, Current Biology, Proceedings of the Royal Society B, Proceedings for the National Academy of Sciences, PLoS ONE, Animal Behaviour* and other journals
- Appointed reviewer for European Research Council grants 2012

(ii) Conference organisation

- Organised symposium on "Mammal vocal communication: insights into cognitive abilities and the origins of language" at the International Ethological Congress in Budapest, August 2005 (with David Reby)
- Organiser of the Association for the Study of Animal Behaviour Conference on "Evolution of Mind" held in London in December 1999 (with Stuart Semple), attended by more than 200 people

(iii) Recent invited academic lectures

- Invited speaker, Cetacean Culture Workshop, organised jointly by the Convention on the Conservation of Migratory Species of Wild Animals (CMS), and Whale and Dolphin Conservation (WDC) (April 2014)
- Plenary talk at the Association for the Study of Animal Behaviour meeting on "Cognition in the Wild" (December 2012)
- Invited speaker, International workshop on communication and social cognition, Institute of Evolutionary Biology and Environmental Studies, University of Zurich (March 2011)
- Invited speaker, International workshop on referential communication, Wissenschaftskolleg zu Berlin, Institute for Advanced Study, Berlin, (June 2010)
- Plenary speaker, International Society for Applied Ethology, Nordic meeting, Kuopia, Finland (January 2010)
- Invited speaker, International Ethological Congress, Rennes (August 2009)
- Invited speaker, Ecology and Evolutionary Biology, University of Princeton (April 2009)
- Invited speaker, Novartis day at the Royal Society Discussion meeting on Social Intelligence in London (May 2006)
- Invited speaker (and organiser), International Ethological Congress Symposium on "Mammal vocal communication: insights into cognitive abilities and the origins of language", Budapest (August, 2005)
- Keynote speaker, British Association for the Advancement of Science, Symposium on "Where do numbers come from", Salford (September 2003)
- Plenary speaker, Association for the Study of Animal Behaviour conference on Information Gathering (December 2002)
- Invited speaker, symposium on Alternative Approaches to Studying Social Cognition, International Ethological Congress, Tubingen (August 2001)

- Invited participant, International workshop on animal signalling, TalkBank, University of Philadelphia (May 2000)
- Plenary speaker, Association for the Study of Animal Behaviour Conference on Communication and Social Behaviour, Lisbon (July 1999)

BUSINESS, ENTERPRISE & THE COMMUNITY

(i) Lectures to the general public / industry

- Invited panel member/speaker Festival of Sound, organised by Magdalene College, University of Cambridge (December 2014)
- Invited panel member/speaker in Gulbenkian Foundation Supersonix Festival, organised on behalf of the Exhibition Road Cultural Group to focus on the art and science of sound & music-making (June 2012)
- Public lecture on 'Animal Communication' in Learning About Animals series in London (May 2007)
- Lecture to the Pet Care Trust Conference in Edinburgh (November 2006)
- Press conference at London Zoo in April 2001 for launch of my *Science* paper, organised by the American Academy for the Advancement of Science
- Lecture at the British Library National Sound Archive (December 2000)
- Royal Geographical Society lecture (jointly with Cynthia Moss) attended by more than 600 members of the public (November 1996)

(ii) Media involvement & TV documentaries

- There has been considerable media coverage of my work over the years, with appearances on British, American, Australian, Canadian and German TV and radio stations (including BBC TV news, Discovery Channel, Radio 4 Today programme and BBC Science in Action) and articles in major British, European and American newspapers (eg, The Guardian, Times, Liberation, National Geographic magazine, New Scientist). *Science* organised a press conference in London in April 2001 for the launch of my paper, which was their cover story – and later cover stories in *Biology Letters* (2006*), PNAS* (2009) *and Proceedings of the Royal Society B* (2011) also generated widespread media attention, as did my *Current Biology* paper in 2009 which featured as the most popular story on the BBC web site, as well as the top science and environment story. Two of my most recent papers – in *PNAS* (2014) and *Frontiers in Zoology* (2013) – received unusually extensive world-wide coverage, as did a recent *Current Biology* (2014) paper with my PhD student. This included interviews on the Radio 4 Today Programme, ITV News at Ten, BBC World TV News, Newsround, BBC World Service, and Science in Action, as well as being covered in BBC Breakfast, BBC Radio 2, 3 & 4 news reports, Time Magazine, The Economist, *Nature*, *Science*, National Geographic and by more than 200 other news outlets here and abroad.
- I have done regular consultancies for the BBC and other companies making wildlife documentaries on animal communication. Most recently, I was scientific consultant for the popular two-part BBC documentary "Talk to the Animals" (2014). I have also provided sound recordings for wildlife documentaries by the BBC and Windfall films and have a sound recording

credit (with Martyn Colbeck) on the BBC's "Echo of the elephants: the next generation" (1995).
- My elephant research was covered in BBC's "Inside the Animal Mind" in February 2014 and my horse research was filmed for the BBC series "Talk to the Animals" which aired in July 2014. Both programmes were given prime-time slots and were very well received by the public.

(iii) Educational Displays for Museums
- I provided photographic material to The Field Museum, Chicago for an exhibition on Mammoths and Mastodons, Titans of the Ice Age. This exhibition is currently on tour round the world.

(iv) Contribution to Primary Education
- I was invited to write an autobiographical outline for "STEM stories" an NSF project designed to encourage girls in the U.S.A. to pursue careers in Science by introducing them to the senior scientists in particular fields (http://www.stemstories.org/).

(v) Contribution to major textbooks and popular books
- My work has featured in John Alcock's and Lee Dugatkin's major textbooks on Animal Behaviour and currently receives detailed coverage in the new editions of the Krebs & Davies *An Introduction to Behavioural Ecology,* Bradbury & Vehrencamp's *Principles of Animal Communication* and Shettleworth's *Cognition, Evolution and Behavior*. It has also been reported in popular books including Brian Butterworth's *The Mathematical Brain* and there is a chapter on my research in the best-selling book: *Animal Wise* by Virginia Morell.

RESEARCH GRANTS

I have received consistent funding for my research over the years, most notably from The Leverhulme Trust and BBSRC:

Leverhulme Trust Research Grant (PI): £285,389 (Jan 2014) *Emotional awareness as a basis for social success in a non-human: the domestic horse*. This project is currently in progress and employs 2 full-time research staff – Dr Leanne Proops (PDRF) and Ms Kate Grounds (RA).

Leverhulme Trust Research Grant (PI): £174,892 (Mar 2009) *Age and experience as determinants of acquired knowledge in a non-human mammal.*

National Geographic grant (PI): $27,000 plus PDRA salaried by Durban (Jan 2006) *Elephant matriarchs and conservation.*

Waltham Foundation grant (PI): £9,632 (July 2002)
The Function of Purring in Cats: Seismic and Airborne Communication.

EU Marie Curie grant (Co-PI/Supervisor of PDRF): 114,072 Euro (Oct 2000)
Origin, Structure & Function of Sender-related Acoustical Features in Sexually Selected Mammal Vocalisations.

BBSRC research grant (PI): £166,092 (Mar 1996)
Communication Networks, Social Organisation and Reproductive Success.

Tusk Trust grants (PI): 3 x £1,500 (awarded 1994, 1995 & 1998)
Acoustic Communications in Elephants.

Nuffield Foundation grant (PI): £3,960 (Nov 1994)
Acoustic Communication in Social Mammals.

Royal Society Research grant (PI): £9,253 (Mar 1994)
Infrasonic Signalling in Elephants.

NERC small project grant (PI): £14, 832 (Oct 1993)
Acoustic Communication & the Evolution of Mammal Social Systems.

In addition I have had a number of Royal Society Conference grants, most recently in 2005 & 2009.

SCIENTIFIC PUBLICATIONS

JOURNAL ARTICLES

* McComb, K. Shannon, G., Sayialel, K. & Moss, C. (2014) Elephants can determine ethnicity, gender, and age from acoustic cues in human voices ***PNAS*** 111(14), 5433-5438.
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EXHIBIT B

Exhibit B

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Exhibit 7

Joint Declaration of Lucy Bates and Richard M. Byrne

We, Lucy Bates and Richard M. Byrne, declare as follows:

I. Introduction and Qualifications

A. Lucy Bates

1. My name is Lucy Bates. I graduated with a Bachelor of Arts (with Honors) in Experimental Psychology from Oriel College at the University of Oxford in 2000. I earned a Master's of Science in Human Biology from the Institute of Biological Anthropology, University of Oxford in 2001 and earned a Ph.D. in Evolutionary Biology from the University of St. Andrews in 2005. From January 2016 to December 2017, I was a Daphne Jackson Trust Postdoctoral Research Fellow at the School of Psychology, University of Sussex, studying culture in elephants. As of January 2018 I have held the title of Visiting Research Fellow at Sussex, and since September 2019 have been additionally employed as an Associate Lecturer within the School of Psychology and Counselling of the Open University. I currently reside in Paris, France.

2. I submit this declaration in support of the Nonhuman Rights Project, Inc.'s petition for a writ of habeas corpus regarding the captive elephants at the Los Angeles Zoo. I am a nonparty to this proceeding.

3. I study the evolution of cognition and social behavior, and my research focuses on the evolution of cognitive skills which allow social mammals to thrive in close-knit groups. My research has focused on the social and cognitive skills of African elephants since 2005, when I became a Leverhulme Trust Post-Doctoral Research Fellow at the University of St. Andrews. I was an Honorary Research Associate at the University of St. Andrews from 2008 – 2016, and since January 2016 I have continued my research as a Research Fellow at the School of Psychology, University of Sussex.

4. I have been studying elephant cognition and social behaviour for fifteen years, since 2005. During this time, I have worked with the world's pre-eminent elephant biologists, many of whom are also submitting declarations in this matter, and spent months observing wild African elephants in both Kenya and South Africa, working in collaboration with the Amboseli Trust for Elephants, Elephant Voices, and Save the Elephants. In order to be more efficient, my colleagues and I agreed that I would draft the main declaration, which I would circulate to my colleagues for them to add or delete anything they believed was appropriate.

5. I have authored 24 scientific articles and book chapters on social cognition in African elephants and primates. These articles have been published in many of the world's premier scientific journals and books, including: APA Handbook of Personality and Social Psychology, Animal Behaviour, Biology Letters, Current Biology, Neuron, and PLoS One. I have also co-authored a field guide to elephant behaviour, and researched and fully drafted ('ghost-wrote') a popular science book about African elephants for a British media personality.

6. In addition to my research work, I also currently serve as a Director and Management Committee Member for the Elephant Specialist Advisory Group (ESAG), South Africa, a non-profit organisation that offers advice on elephant behaviour and management policy for government departments and managers of reserves within South Africa. I have previously acted as a consultant in elephant welfare and conservation, including freelance work for Save the Elephants, Kenya; Ezevelo KwaZulu Natal Wildlife, South Africa; and Society for the Prevention of Cruelty to Animals, Zimbabwe.

7. I have previously served as a consulting expert in legal matters, including: (1) in 2010/11, where I commented on licensing documents and attended a workshop for Ezemvelo KZN (Kwa Zulu Natal) Wildlife authority (South Africa), which resulted in tighter controls being implemented in the license agreement, considerably improving the elephants' welfare; and (2) in 2009, at the request of the Zimbabwe SPCA, I conducted a site visit and inspection

of a private farm where 10 juvenile elephants were being held. The elephants had been illegally captured from the wild and were undergoing training for the elephant-back safari industry. The ZNSPCA presented our reports to the then Minister for Environment and Tourism, who intervened and said that the elephants were to be rehabilitated and released back in to the wild. They were released six months later, and have adapted well.

8. My Curriculum Vitae fully sets forth my educational background and experience and is annexed hereto as “Exhibit A”.

Basis for opinions

9. The opinions I state in this Declaration are based on my professional knowledge, education, training, and over 10 years of experience observing and studying elephants, as well as my knowledge of peer-reviewed literature about elephant behaviour and intelligence published in the world’s most respected journals, periodicals and books that are generally accepted as authoritative in the field, and many of which were written by myself or colleagues whom I have known for several years and with whose research and field work I am personally familiar. A full reference list of peer-reviewed literature cited herein is annexed hereto as “Exhibit B”.

B. Richard Byrne

10. My name is Richard William Byrne. I earned my Master of Arts with 1st Class Honours in Natural Sciences from St. John’s College, Cambridge between 1969-1972. I received my Ph.D. from the University of Cambridge in 1975 for my thesis entitled “Memory in complex tasks.” I am a Fellow of the Royal Society of Edinburgh. I reside and work in St. Andrews, Scotland.

11. I submit this declaration in support of the Nonhuman Rights Project, Inc.’s petition for a writ of habeas corpus regarding the captive elephants at the Los Angeles Zoo. I am a nonparty to this proceeding.

12. I have studied the evolution of cognition and social behavior throughout my career. As a Professor of Evolutionary Psychology at the University of St Andrews, Scotland, I have studied the evolution of cognition with a particular focus on the origins of uniquely human characteristics, utilizing evidence from a number of mammalian species including great apes, elephants, and domestic pigs, among other animals. I have studied the evolutionary basis of gestural communication, the use of tools, spatial mapping, cognition, and social behaviour.

13. Over the course of my career, I have received several awards and honors related to my research, including; (1) the Wright Prize & Hughes Prize, St Johns College, Cambridge, in 1972; (2) an MRC Studentship, tenure at MRC Applied Psychology Unit, Cambridge, from 1972-1975; (3) a Development Fellowship from the Association of Commonwealth Universities in 1993; (4) *British Psychology Society* Book Award for my Oxford University Press monograph "The Thinking Ape" in 1997; (5) awarded *Convenorship* of Focus Group 2003, "Precursors to Culture," from the Institute of Advanced Study, Collegium Budapest, Hungary in 2001; (6) elected Fellow of the *Royal Society of Edinburgh* (FRSE) in 2002; and (7) elected Fellow of the *Higher Education Academy* in 2007; (8) awarded *British Psychology Society* Lifetime Achievement Award in 2017.

14. In 1987, I founded (along with Bill McGrew at Stirling University, Liz Rogers at Edinburgh University, and Andy Whiten at St. Andrews University) the *Scottish Primate Research Group*, in order to coordinate the research interests of the 3 centers, promote new joint grant applications, encourage outside visitors to Scotland and postgraduate admissions, and coordinate joint seminars and lectures. The *Scottish Primate Research Group* now boasts national and international acclaim and attendance at hosted research presentations and seminars, and it is now larger and more productive than ever with 21 faculty members and over 50 affiliated researchers, including at Aberdeen and Abertay Universities. The focus of SPRG research is the natural behaviour, mentality, and ecology of primates. Field studies are carried

out by core SPRG members at several sites in Africa, Asia, and South America; captive primate studies rely on well-housed breeding groups at Edinburgh Zoo, particularly the SPRG Living Links Research Centre, as well as primate centers in France, Japan, and the USA. (Full Group member and affiliated researcher information can be found at the SPRG website: http://psy.st-andrews.ac.uk/research/sprg/).

15. I have conducted field work as part of my scientific research in multiple sites over my career, including: (1) at Mont Assirik, Senegal from January to April 1979, studying the Guinea baboon (*Papio papio*); (2) at Giant's Castle Game Reserve, South Africa from August to December 1983, studying the Chacma baboon (*Papio ursinus*); (3) at the Mahale Mountains, Tanzania from July to December 1984, studying the Chimpanzee (*Pan troglodytes*); (4) at the Virunga Volcanoes, Rwanda from July to December 1989, studying the Mountain gorilla (*Gorilla b. beringei*); and (5) at Mbeli Bai, Republic of the Congo from August to October 2010, studying the Western gorilla (*Gorilla g. gorilla*).

16. Throughout my career, I have been involved with Editorial work in a variety of capacities. Since 2000, this editorial work has included: (1) Serving on the Editorial Board of *Current Biology*, ongoing since 2006; (2) Serving on the Editorial Board of *Biology Letters*, from 2007-2013; (3) serving on the Editorial Board of *Animal Cognition*, from 1997-2011; (4) Serving on the Editorial Board of the *Journal of the Royal Anthropological Institute*, from 1995-2010; (5) Refereeing of book proposals for a number of publishers, including Basil Blackwell, Cambridge University Press, Curzon Press, Lawrence Erlbaum Associates, Oxford University Press, and John Wiley; (6) Refereeing of manuscripts for many premier scientific journals, including *Science, Nature, PNAS, Proc.Roy.Soc.B., Phil.Trans.B, TICS, TINS, Psychological Science, Psychological Bulletin,* and *Current Biology*; (7) Refereeing of promotion applications for a number of Universities in both the USA and United Kingdom, including Arizona State University, University of California San Diego, University of

Colorado, University of Florida (Gainesville, FL), Max Planck Institute for Evolutionary Anthropology (Leipzing), Miami University of Ohio, University of Natal (Republic of South Africa), University of Portsmouth (UK), University of Stirling (UK), and York University (Toronto); (8) Refereeing of research grants for many research foundations including the Biomedical and Biological Sciences Research Council (BBSRC), the Economic and Social Research Council (ESRC), Israel Academy of Sciences and Humanities (Basic Research Foundation), LSB Leakey Foundation (Oakley, California), Leverhulme Trust, Medical Research Council (MRC, United Kingdom), National Science Foundation (NSF, USA), National Environment Research Council (NERC, United Kingdom), and the National Science and Engineering Research Council (NSERC, Canada); and (9) Refereeing of research programmes for the Leverhulme Trust, Max-Planck-Society (Germany), and Earthwatch Europe.

17. I am affiliated with a number of professional organizations and have engaged in a variety of professional activities throughout my career. Since the year 2000, this has included: (1) Focus Group Convenor, "Precursors to Culture," at the Collegium Budapest Institute for Advanced Studies, Hungary, from Oct-Dec 2003; (2) Member of the Subgroup on *Use of non-human primates in research and testing* from 2000-2002 for the Boyd Group; (3) Vice-President for the *International Primatological Society* from 1996-2001; (4) organized symposium of 18th Congress of the *International Primatological Society*, Adelaide, 2001; (5) discussant at *Perspectives on Imitation*, France, 2002; (6) discussant at *Nijmegen Lectures*, Max Planck Institute for Psycholinguistics/University of Nijmegen, Holland, 2002; (7) organized symposium of St Andrews International Conference on *Animal Social Learning*, June 2005; (8) discussant at symposium *The cognitive triangle: Primates, Cetaceans, and Corvids*, Kyoto, 2006; (9) organized symposium of the 23rd Congress of the *International Primatological Society*, Kyoto, 2010; and (10) served as part of the Steering Committee for

Assessment for the *Quality Assurance Agency /Scottish Higher Education Funding Council* from 2003-2005.

18. I have written two books concerning my work with cognition: (1) *The Thinking Ape: evolutionary origins of intelligence* (1995, Oxford University Press, Oxford, 266 pages; 1997 *British Psychological Society* Book Award winner; Reprinted annually; Japanese edition published by Otsuki Shoten, Tokyo, 1998; Chinese edition, in translation, published by Hunan Education Publishing House, 2006); (2*) Evolving Insight* (2016, Oxford University Press, Oxford, 304 pages).

19. I have co-edited two books concerning my work with cognition: (1) *Machiavellian Intelligence: Social Expertise and the Evolution of Intellect in Monkeys, Apes and Humans* (Co-edited with A. Whiten, 1988, Oxford University Press, Oxford, 413 pages; Japanese edition published by Nakanishiya Shuppan Press, Kyoto, 2004); (2) *Machiavellian Intelligence II: Extensions and Evaluations* (Co-edited with A. Whiten, Cambridge University Press, Cambridge, 1997, 403 pages; Japanese edition published by Nakanishiya Shuppan Press, Kyoto, 2004).

20. I have published 165 peer-reviewed scientific articles over my career. These articles have been published in many of the world's premier scientific journals, including: *Science, Biology Letters, Animal Cognition, Animal Behaviour, Biosemiotics, Behavioural Ecology and Sociobiology, Current Biology, International Journal of Primatology, Annals of the New York Academy of Sciences, Journal of Comparative Psychology, American Journal of Primatology, Trends in Evolution & Ecology, PLoS Biology, PLoS One, Trends in Cognitive Sciences, Philosophical Transactions of the Royal Society of London – Series B Biological Sciences, The Behavioral and brain sciences, Methods, American Journal of Physical Anthropology, Canadian Journal of Psychology, and The British Journal of Mathematical and Statistical Psychology*. Over the last four years, specific topics of these publications have

included: African elephants interpret a trunk gesture as a clue to direction of interest, Interpretation of human pointing by African elephants – generalization and rationality, African elephants recognize visual attention from face and body orientation, Flexibility and survival of Apes in the Anthropocene, Wild baboons (*Papio ursinus*) remember single foraging episodes, The what as well as the why of animal fun, Change point analysis of travel routes reveals novel insights into foraging strategies and cognitive maps of wild baboons, Age-dependent social learning in a lizard, Isolation rearing does not constrain social plasticity in a family-living lizard, The animal origins of disgust: reports of basic disgust in nonhuman great apes, The gestural repertoire of the wild bonobo (*Pan paniscus*): a mutually understood communication system, The meanings of chimpanzee gestures, Bonobo and chimpanzee gestures overlap extensively in meaning, Using cross correlations to investigate how chimpanzees use conspecific gaze cues to extract and exploit information in a foraging competition, Complexity in animal behaviour: towards common ground, African elephants can use human pointing cues to find hidden food, Deictic gesturing in wild chimpanzees – some possible cases, Laterality in the gestural communication of wild chimpanzees, Age-related differences in the use of the “moo” call in black howler monkeys, Evolutionary origins of human handedness – evaluating contrasting hypotheses, Titi monkey call sequences vary with predator location and type, Animal curiosity, Evidence for semantic communication in Titi monkey alarm calls, The alarm call system of wild black-fronted Titi monkeys, From parsing actions to understanding intentions, Serial gesturing by wild chimpanzees – its nature and function for communication, What are we learning from teaching? Local traditions in gorilla manual skill – Evidence for observational learning of behavioural organization, Animal behaviour in a human world: A crowdsourcing study on horses that open door and gate mechanisms, and Cognition in the wild – exploring animal minds with observational evidence.

21. My scientific work has also been published as chapters in 71 books. Over the last four years, these books have included *The Amboseli Elephants: A Long-Term Perspective on a Long-Lived Mammal* (2011, University of Chicago Press), *Integrating Gestures. The interdisciplinary nature of gesture* (2011, John Benjamins Publishing Company, Amsterdam), *Current research in applied ethology* (2011, Kuratorium für Technik und Bauwesen in der Landwirtschaft e.V. (KTBL), Darmstadt, Germany), *Developments in Primate Gesture Research* (2012, John Benjamins Publishing Company, Amsterdam), *Tool Use in Animals: Cognition and Ecology* (2013, Cambridge University Press), *New Perspectives on the symbolic species* (new edition in press, Springer-Verlag, Heidelberg, Germany), *The Emergence of Personhood: A Quantum Leap?* (in press, William B. Eerdmans Publishing Company, Grand Rapids, Michigan), and *Formal Models in Evolutionary Cognitive Archaeology* (in press, New York: Oxford University Press).

22. I have given major invited lectures at international research meetings and symposia throughout the world over the course of my career. Since the year 2000, these have included: (1) a public lecture and discussion on the topic of deception and fake news, with Evan Davies, BBC, at the Royal Institution, London; (2) the 85th James Arthur Lecture at the American Museum of Natural History (Public lecture, 2015), and a public lecture at Emory University, Atlanta; (3) two lectures in 2013: (a) the Tarragona Laterality Conference (invited lecture to closed conference) and (b) a public lecture at the University of Portsmouth; (4) an Invited lecture in the 2012 Workshop "Unpacking intentionality in animal vocal communication: an integrative approach" at the Institute of Evolutionary Biology, University of Zurich; (5) three lectures in 2011: (a) an invited lecture to a symposium entitled "The Emergence of Personhood" for the John Templeton Foundation, (b) a lecture at a closed workshop entitled "The evolution of human handedness" at the Hanse-Wissenschaftskolleg in Delmenhorst, Germany, and (c) a public lecture at the Institute of Evolutionary Biology at the University of Zurich; (6) a

referential communication for a workshop at the 2010 INCORE Thematic Meeting in Berlin; (7) three lectures in 2009: (a) a Plenary lecture at the 11th Congress of the German Society for Primatology in Hanover, Germany, (b) a public "Year of Darwin Lecture" for the School of Biosciences at Birmingham University, and (c) a lecture at the Workshop "Understanding Tool Use" at the Max Planck Institute for Evolutionary Anthropology in Leipzig, Germany; (8) an invited lecturer at the 2008 Summer School on "Social Cognition" at the Institute of Cognitive Sciences in Montreal; (9) four lectures in 2007: (a) an inter-faculty series "The evolution of social cognition" for the Faculty of Life Sciences at the University of Vienna, (b) a Plenary lecture at the Second Congress of the European Federation of Primatology, at Charles University, Prague, (c) an invited lecture at a Workshop on "Social Cognition" by the MRC/Cold Spring Harbor at St Anne's College, Oxford, and (d) a Plenary lecture at the "Missing Links" conference at Carlsberg Academy, Copenhagen; (10) two lectures in 2006: (a) a lecture at the symposium "From Brain to Culture" hosted by The Royal Society, London, and (b) a Plenary lecture at the 66th Annual Meeting of the Japan Society for Animal Psychology in Kyoto; (11) two lectures in 2005: (a) Plenary lectures at the Portuguese Primatological Association's 2nd International Conference in Lisbon, and (b) a lecture in the "Evolutionary Cognitive Sciences" series at the University of Tokyo; (12) two lectures in 2004: (a) a Public lecture at the Institute of Cognitive & Decision Sciences at the University of Oregon, and (b) a lecture at the closed conference "Roots of Human Sociality" for the Wenner-Gren Foundation for Anthropological Research in North Carolina; (13) an International Workshop in 2003 for the European Workshop in Cognitive Neuropsychology in Bressanone, Italy; (14) three lectures in 2002: (a) a lecture in the Annual Autumn School in Cognitive Neuroscience with the theme "Rational animals?" for the McDonnell-Pew Centre at the University of Oxford, (b) a lecture at an International Workshop called "Perspectives on Imitation" in Royaumont Abbey, France, and (c) Public lectures for the Fundacio "la Caixa"

Museum of Science in Barcelona and the Social & Cultural Centre in Tarragona, Spain; (15) six lectures in 2001: (a) the Keynote Address to the VIIth European Congress of Psychology, forming part of the BPS Centenary in London, (b) a lecture at the "Human Cognition" symposium at the Institute of Cognitive Neurology at UCL, London, (c) a lecture and Press Conference on "Constraints on Culture" for the British Association for the Advancement of Science in Glasgow, (d) the Keynote Lecture for the Consciousness & Experiential Psychology section of the British Psychological Society, (e) a lecture entitled "Knapping Stone: a uniquely hominid behaviour?" for an International Workshop in Abbaye des Premontres, France, and (f) a lecture at an International Workshop "Malingering & Illness Deception" in Blenheim, Oxford; and (16) seven lectures in 2000: (a) a Plenary lecture to the Millennial Meeting "The social brain" for the British Neuropsychiatry Association, (b) the Invited Main Lecture entitled "Primate Cognition" for the International Congress for Cognitive Science in Inuyama, Japan, (c) a lecture at the Symposium "Animal Architecture" for the Gaia Research Project in Edinburgh, (d) a lecture at the International Conference "Human Nature" for the Royal Society of Edinburgh in Edinburgh, a lecture at the Workshop "Cognitive Science" at Sorbonne University in Paris, (e) a lecture at the Symposium "The Social Brain" at the Max Planck Institute in Andechs, Germany, and (f) a lecture at the Symposium "Science and Philosophy of Pain" for the University of Ghent, in Ghent, Belgium.

23. In addition to the major invited lectures listed above, I have given invited, funded talks at: Auckland University (Psychology, Zoology); BAAS SET7 Week (St Andrews); Gesamthochschule, Kassel (Primatenbiologie); Deutsches Primatenzentrum, Gottingen; Duke University, North Carolina (Biological Anthropology); Dundee University (teaching forum); Durham University (Psychology, Anthropology); Eotvos Lorand University, Budapest (Ethology); Hang Sen Centre for Cognitive Studies, Sheffield (twice); Hawaii University, Honolulu (Psychology); Kyoto University; Living Links Center, Emory University; MRC

Cognitive Brain Research Unit, Cambridge (twice); Max Planck Institute, Leipzig; Max Planck Institute, Seewiesen, Bavaria; Miami University, Ohio (Zoology); University of Otago, New Zealand (Psychology); Queens University, Kingston Ontario (Psychology); Universite de Rennes 1 (Zoology); Royal Anthropological Institute, London; Royal (Dick) School of Veterinary Studies, Edinburgh; Yerkes Regional Primate Research Center, Atlanta GA; UCSD (Psychology); York University, Toronto (Psychology); Universities of Aberdeen (Psychology), Abertay (Psychology), Cambridge (Psychology), Archaeology & Anthropology), Reading (Archaeology), St Andrews (Divinity, Modern Languages, Zoology, Psychology), Stirling (Psychology), UCL (Archaeology), Sussex (Neuroscience & Robotics), York (Centre for Human Palaeontology & Human Origins); and the Zoological Society of London.

24. Throughout my scientific career, I have had the privilege of supervising PhD level students. Since the year 2000, these have included: (1) R. Noser, (self-funded), “Navigation by chacma baboons within the home-range” from 1999-2004; (2) R. da Cunha (funded by CAPES, Brazil), “Long distance communication of howler monkeys” from 2000-2004; (3) A. Valero (funded by CONACYT, Mexico), “Social interactions of spider monkeys” from 2000-2004; (4) L. Bates (funded by BBSRC), “Foraging skills of female chimpanzees” from 2001-2005; (5) E. Cartmill (funded by Univ. St Andrews), “Gestural communication in great apes” from 2004-2008; (6) F. Moore (joint supervision), “Effects of resource control on female reproductive strategies from 2005-2006; (7) A. Ruiz (funded by James Cook Foundation and ORS), “Monkeys’ understanding of intention and attention” from 2005-2009; (8) C. Hobaiter (funded by own EC grant), “Gestural communication in great apes” from 2007-2010; (9) C. Casar (funded by CAPES, Brazil), “Vocal communication of wild Titi monkeys” from 2007-2011; (10) K. Hall (funded by Janet Anderson Trust and ORSAS), “Theory of mind in chimpanzees” from 2008-2012; (11) L. Orr (funded by NSF Studentship), “Gestural communication in gorillas” from 2010-2014; (12) A. Smet (funded by Univ. St Andrews),

"Cognition in the African Elephant" from 2011-2015; (13) B. Fallon (self-funded), Gestural communication by sexually consorting male chimpanzees" 2012 - 2016; and (14) K. Graham (funded by Univ. St Andrews), "Negotiation of sexual relationships among bonobos" 2013 - 2016.

25. In addition to direct supervision of PhD students, I have also served as an External Postgraduate Examiner for individuals. Since the year 2000, these have included: (1) L. Ambrose, Ph.D. Oxford Brookes University (Anthropology) in 2000; (2) A. Nowell, M.Sc. University of Stirling (Psychology) in 2001; (3) B. A. Whiting, M.Sc. University of Durham (Anthropology) in 2002; (4) K. Rigby, Ph.D. London School of Economics (Psychology) in 2002; (5) P. Citrynell, Ph.D. Exeter University (Psychology) in 2003; (6) J. Dally Ph.D. University of Cambridge (Psychology) in 2004; (7) P. Citrynell Ph.D. Exeter University (Psychology, re-examination) in 2004; (8) J. Dalley Ph.D. University of Cambridge (Psychology); (9) Dr. Thomal Bugnyar, Habilitation, University of Vienna (Faculty of Life Sciences) in 2008; (10) C. Bird University of Cambridge (Psychology) in 2009; (11) P. Bertolani University of Cambridge (Archaeology & Anthropology) in 2012; (12) J. Trosciano University of Birmingham (Psychology) in 2012; (13) J. Wathen University of Sussex in 2015; (14) A. Picard, University of York, 2016; (15) A. Frohnwieser, University of Lincoln, 2017; (16) M. de Guinea, Oxford Brookes University, 2020.

26. I have been interviewed and my scientific research has been featured on a number of radio broadcasts, including: (1) interviews with BBC Radio 4 "Today" in 2000 and 2008; (2) with BBC Radio 4 as an interview with Jonathan Miller, "Self-made things" in 2005; (3) interview on Australian Radio with an article on my own research in "The Science Show" in 2001; (4) interview on Radio Netherlands with an article on my own research in 2001. Additionally, other interviews on my own research have been featured on: ABC Radio Australia, Austrian Broadcasting Corporation, US Public Broadcasting Network, Breakfast

Radio Auckland (NZ), Radio Canada, Western Australia Radio, Discovery Canada, Radio New Zealand "Morning Report," Radio Ireland, Talkback Radio (Ireland), BBC World Service, BBC Radio Scotland, Radio Wales, Radio Cambridgeshire, BBC Radio Jersey, BBC Radio 5 Live, Radio Tay, Kingdom FM, Talk 107, Voice of Russia, and Wave 102.

27. I have appeared and been featured in a number of Television broadcasts, including: (1) Interview with BBC1 6 O' Clock News (Scotland) on my own great ape research in 2008; (2) Interview with BBC1 6 O' Clock News (UK) on my own elephant research in 2013; (3) as a consultant for the BBC2 Program "The Secret Life of Pigs" in 2010; (4) Interview with BBC World/BBC4 Evening News on my own elephant research in 2013; (5) Interview with ITV/STV (ITN News) on my own elephant research in 2013; and (6) Interview with Australian ABC Channel TV as part of a programme on my research in the "Catalyst" series.

28. My Curriculum Vitae fully sets forth my educational background and experience and is annexed hereto as "Exhibit C".

Basis for opinions

29. The opinions I state in this Declaration are based on my professional knowledge, education, training, and years of experience observing and studying elephants, as well as my knowledge of peer-reviewed literature about elephant behaviour and intelligence published in the world's most respected journals, periodicals and books that are generally accepted as authoritative in the field, and many of which were written by myself or colleagues whom I have known for several years and with whose research and field work I am personally familiar. A full reference list of peer-reviewed literature cited herein is annexed hereto as "Exhibit B".

II. Opinions

A. Premise

30. Elephants are autonomous beings. Autonomy in humans and nonhuman animals is defined as self-determined behaviour that is based on freedom of choice. As a psychological concept it implies that the individual is directing their behaviour based on some non-observable,

internal cognitive process, rather than simply responding reflexively. Although we cannot directly observe these internal processes in other humans, we can explore and investigate them by observing, recording and analysing their behaviour. We can explore autonomy in non-human animals in a similar way, by observing similar behaviour and recording evidence of shared cognitive capacities in elephants.

31. We shall indicate which species, African (*Loxodonta Africana*) or Asian (*Elephus maximus*), specific observations relate to. If the general term 'elephants' is used with no specific delineation, it can be assumed the comment relates to both species.

B. Brain And Development

32. Elephants are large-brained, with the biggest absolute brain size of any land animal (Cozzi et al. 2001; Shoshani et al. 2006). Even relative to their body sizes, elephant brains are large. Encephalization quotients (EQ) are a standardised measure of brain size relative to body size, and illustrate by how much a species' brain size deviates from that expected for its body size. An EQ of one means the brain is exactly the size expected for that body, and values greater than one indicate a larger brain than expected (Jerison 1973). Elephants have an EQ of between 1.3 and 2.3 (varying between sex and African and Asian species). This means an elephant's brain can be more than twice as large than is expected for an animal of its size. These EQ values are similar to those of the great apes, with whom elephants have not shared a common ancestor for almost 100 million years (Eisenberg 1981, Jerison 1973). Given how metabolically costly brain tissue is, the large brains of elephants must confer significant advantages; otherwise their size would be reduced. The advantage of a large brain is to allow greater cognitive skill and behavioural flexibility (Bates et al. 2008a).

33. Typically, mammals are born with brains weighing up to 90% of the adult weight. This figure drops to about 50% for chimpanzees. Human baby brains weigh only about 27% of the adult brain weight, increasing in size over the prolonged childhood period (Dekaban &

Sadowsky 1978). This long period of brain development over many years (termed 'developmental delay') is a key feature of human brain evolution. It provides a longer period in which the brain may be shaped by experience and learning (Fuster 2002), and plays a role in the emergence of our complex cognitive abilities such as self-awareness, creativity, forward planning, decision making, and social interaction (Bjorkland 1997). Likewise, elephant brains at birth weigh only about 35% of their adult weight (Eltringham 1982), and elephants show a similarly protracted period of growth, development and learning (Lee 1986). This similar developmental delay in the elephant brain is likewise associated with the emergence of analogous cognitive abilities.

34. Despite nearly 100 million years of separate evolution (Hedges 2001), elephants share certain characteristics of our large brains, namely deep and complex folding of the cerebral cortex, large parietal and temporal lobes, and a large cerebellum (Cozzi et al. 2001). The temporal and parietal lobes of the cerebral cortex manage communication, perception, and recognition and comprehension of physical actions (Kolb and Whishaw 2008), while the cerebellum is involved in movement, planning, empathy, and predicting and understanding the actions of others (Barton 2012). The physical similarities between human and elephant brains occur in areas that are relevant to capacities necessary for autonomy and self-awareness.

35. Elephant brains hold three times more neurons than do human brains, with 97% of their found neurons in the cerebellum and 5.6 billion neurons in the cerebral cortex (Herculano-Houzel et al. 2014). (This figure for cortical neurons is lower than previous estimates, which suggested 11 billion cortical neurons for elephants and 11.5 billion for humans (Roth & Dicke 2005)). Elephants' pyramidal neurons (a class of neuron that is found in the cerebral cortex, particularly the pre-frontal cortex - the brain area that controls executive functions) are larger than in humans and most other species (Cozzi et al. 2001; Jacobs et al. 2011). (This term "executive function" refers to controlling operations, for example paying attention, inhibiting

inappropriate responses, deciding how to use memory search, and so on. These abilities develop late in human infancy and are often impaired in dementia).

36. Elephant pyramidal neurons have a large dendritic tree, i.e. a large number of connections with other neurons for receiving and sending signals (Cozzi et al. 2001; Jacobs et al. 2011; Maseko et al. 2012). The degree of complexity of pyramidal neurons is linked to cognitive ability, with more (and more complex) connections between pyramidal neurons being associated with increased cognitive capabilities (Elston 2003).

37. As described below, evidence demonstrates that along with these common brain and life-history characteristics, elephants share many behavioural and intellectual capacities with humans, including: self-awareness, awareness of death, empathy, intentional communication, learning, memory, and categorisation abilities. Many of these capacities have previously been considered – erroneously – to be uniquely human, and each relates to autonomy and self-determination.

C. Awareness Of Self And Others

38. An Asian elephant has exhibited Mirror Self Recognition (MSR) using Gallup's classic 'mark test' (Gallup 1970; Plotnik et al. 2006). MSR is the ability to recognise a reflection in the mirror as oneself, and the mark test involves surreptitiously placing a coloured mark on an individual's forehead that it could not see or be aware of without the aid of a mirror. If the individual uses the mirror to investigate the mark, the individual must recognise the reflection as herself. (See video here). Despite numerous attempts and trials in other species, the only other mammals (beyond humans) who have successfully passed the mark test and exhibit MSR are the great apes (chimpanzees, bonobos, gorillas and orangutans) (Parker, Mitchell & Boccia 1994) and one bottlenose dolphin Reiss and Marino 2001). MSR is significant because it is a key identifier of self-awareness. Self-awareness is intimately related to autobiographical memory in humans (Prebble et al. 2013) and is central to autonomy and

being able to direct one's own behaviour to achieve personal goals and desires. ("Autobiographical memory" refers to what one remembers about his or her own life; for example, not that "Paris is the capital of France", but the recollection that you had a lovely time when you went there). By demonstrating that they can recognize themselves in a mirror, elephants must be holding a mental representation of themselves from another perspective, and thus be aware that they are a separate entity from others (Bates and Byrne 2014).

39. Related to possessing a sense of self is an understanding of death. Observing reactions to dead family or group members appears to demonstrate an awareness of death in two known animal genera beyond humans; chimpanzees and elephants (Anderson et al. 2010, Douglas-Hamilton et al. 2006; Sharma et al. 2020). Having a mental representation of the self – a pre-requisite for mirror-self recognition – likely also confers an ability to comprehend death. Wild African elephants have been shown experimentally to be more interested in the bones of dead elephants than the bones of other animals (McComb et al. 2006) (See video here), and they have frequently been observed using their tusks, trunk or feet to attempt to lift sick, dying or dead individuals (see Poole & Granli 2011; Goldenberg & Wittemyer 2020). Although they do not give up trying to lift or elicit movement from the body immediately, elephants appear to realise that once dead, the carcass cannot be helped anymore, and instead they engage in more 'mournful' behaviour, such as standing guard over the body and protecting it from the approaches of predators (Poole & Granli 2011; Goldenberg & Wittemyer 2020) (See photographs here). They also have been observed to cover the bodies of dead elephants with dirt and vegetation (Moss 1992; Poole 1996). In the particular case of mothers who lose a calf, although they may remain with the calf's body for an extended period, they do not behave towards the body as they would a live calf. Indeed, the general demeanour of elephants who are attending to a dead elephant is one of grief and compassion, with slow movements and few vocalisations (Poole, pers. comm.; Goldenberg & Wittemyer 2020). These behaviours are akin

to human responses to the death of a close relative or friend, and illustrate that elephants possess some understanding of life and the permanence of death.

40. The capacity for mentally representing the self as an individual entity has been linked to general empathic abilities (Gallup 1982), where empathy can be defined as identifying with and understanding another's experiences or feelings by relating personally to their situation. Empathy is an important component of human consciousness and autonomy, and is a cornerstone of normal social interaction. It goes beyond merely reading the emotional expressions of others. It requires modeling of the emotional states and desired goals that influence others' behaviour both in the past and future, and using this information to plan one's own actions; empathy is only possible if one can adopt or imagine another's perspective, and attribute emotions to that other individual (Bates et al. 2008b). Empathy is, therefore, a component of and reliant on 'Theory of Mind' - the ability to mentally represent and think about the knowledge, beliefs and emotional states of others, whilst recognising that these can be distinct from your own knowledge, beliefs and emotions (Premack and Woodruff 1978; Frith and Frith 2005).

41. Elephants clearly and frequently display empathy in the form of protection, comfort and consolation, as well as by actively helping those who are in difficulty, such as assisting injured individuals to stand and walk, or helping calves out of rivers or ditches with steep banks (Bates et al. 2008b; Lee 1987). Elephants have even been observed feeding those who are not able to use their own trunks to eat (Poole and Granli 2011).

42. In an analysis of behavioural data collected from wild African elephants over a 40-year continuous field study, we concluded that as well as possessing their own intentions, elephants can diagnose animacy and goal directedness in others, understand the physical competence and emotional state of others, and attribute goals and mental states (intentions) to others (Bates et al. 2008b), as evidenced in the examples below:

'IB family is crossing river. Infant struggles to climb out of bank after its mother. An adult female [not the mother] is standing next to calf and moves closer as the infant struggles. Female does not push calf out with its trunk, but digs her tusks into the mud behind the calf's front right leg which acts to provide some anchorage for the calf, who then scrambles up and out and rejoins mother.'

(See video here).

'At 11.10ish Ella gives a 'lets go' rumble as she moves further down the swamp . . . At 11.19 Ella goes into the swamp. The entire group is in the swamp except Elspeth and her calf [<1 year] and Eudora [Elspeth's mother]. At 11.25 Eudora appears to 'lead' Elspeth and the calf to a good place to enter the swamp — the only place where there is no mud.'

Examples such as these demonstrate that the acting elephant (the adult female in the first example, and Eudora in the second) was able to understand the intentions of the other (the calf in the first case, and Elspeth in the second) – i.e. to either climb out of or into the water – and they could adjust their own behaviour in order to counteract the problem being faced by the other. Whilst humans may act in this helpful manner on a daily basis, such interactions have been recorded for very few non-human animals (Bates et al. 2008b).

43. Experimental evidence from captive African elephants further demonstrates that elephants attribute intentions to others, as they follow and understand human pointing gestures - the only wild animal so far shown to do so spontaneously – and can also read direction information in the trunk movements of other elephants (Smet and Byrne 2020). The elephants understood that the human experimenter was pointing in order to communicate information to them about the location of a hidden object (Smet and Byrne 2013) (See video here). Attributing intentions and understanding another's reference point is central to empathy and theory of mind.

44. Our analysis of simulated oestrus behaviours in African elephants – whereby a

non-cycling, sexually experienced older female will simulate the visual signals of being sexually receptive, even though she is not ready to mate or breed again – shows that these knowledgeable females adopt false oestrus behaviours in order to demonstrate to naïve young females how to attract and respond appropriately to suitable males. The experienced females may be taking the youngsters lack of knowledge into account and actively showing them what to do; an example of true teaching as it is defined in humans. This evidence, coupled with the data showing that they understand the ostensive cues in human pointing, demonstrates that elephants do share some executive theory of mind skills with humans, namely understanding the intentions and knowledge states (minds) of others. (Ostension is the way that we can "mark" our communications to show people that that is what they are. If you do something that another copies, that's imitation; but if you deliberately indicate what you are doing to be helpful, that's "ostensive" teaching. Similarly, we may "mark" a joke, hidden in seemingly innocent words; or "mark" our words as directed towards someone specific, by catching their eye. Ostension implies that the signaler knows what they are doing).

45. Further related to empathy, coalitions and cooperation have been documented in wild African elephants, particularly to defend family members or close allies from (potential) attacks by outsiders, such as when a family group tries to 'kidnap' a calf from an unrelated family (Lee 1987; Moss and Poole 1983). These behaviours are based on one elephant understanding the emotions and goals of the coalition partner (Bates et al. 2008b).

46. Cooperation is also evident in experimental tests with captive Asian elephants, whereby elephants demonstrated they can work together in pairs to obtain a reward, and understood that it was pointless to attempt the task if their partner was not present or could not access the equipment (Plotnik et al. 2011) (See video here). Problem-solving and working together to achieve a collectively desired outcome involve mentally representing both a goal

and the sequence of behaviours that is required to achieve that goal; it is based on (at the very least) short-term action planning.

47. Wild elephants have frequently been observed engaging in cooperative problem solving, for example when retrieving calves that have been kidnapped by other groups, or when helping calves out of steep, muddy river banks (Bates et al. 2008b; Moss 1992). These behaviours demonstrate the purposeful and well-coordinated social system of elephants, and show that elephants can hold particular aims in mind and work together to achieve those goals. Such intentional, goal-directed action forms the foundation of independent agency, self-determination, and autonomy.

48. Elephants also show innovative problem solving in experimental tests of insight (Foerder et al. 2011), where insight can be defined as the 'a-ha' moment when a solution to a problem 'suddenly' becomes clear. (In cognitive psychology terms, insight is the ability to inspect and manipulate a mental representation of something, even when you can't physically perceive or touch the something at the time. Or more simply, insight is thinking and using only thoughts to solve problems (Richard Byrne, *Evolving Insight*, Oxford Online Press, 2016[1]). A juvenile male Asian elephant demonstrated just such a spontaneous action by moving a plastic cube and standing on it to obtain previously out-of-reach food. After solving this problem once, he showed flexibility and generalization of the technique to other, similar problems by using the same cube in different situations, or different objects in place of the cube when it was not available (See video here). This experiment again demonstrates that elephants can choose the appropriate action and incorporate it into a sequence of behaviour in order to achieve a goal, which they kept in mind throughout the process.

49. Further observations and experiments also demonstrate Asian elephants' ability to understand goal-directed behaviour (Irie-Sugimoto et al. 2008; Mizuno et al. 2016). When

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[1] Available at https://global.oup.com/academic/product/evolving-insight-9780198757078?cc=us&lang=en&.

presented with food that was out of reach, but with some bits resting on a tray that could be pulled within reach, the elephants learned to pull only those trays that were baited with food (Irie-Sugimoto et al. 2008). Success in this kind of 'means-end' task is a demonstration of causal knowledge, which requires understanding not just that two events are associated with each other but also that there is some mediating force that connects and affects the two which may be used to predict and control events. Moreover, understanding causation and inferring object relations may be related to understanding psychological causation, i.e., the appreciation that others are animate beings that generate their own behaviour and have mental states (e.g., intentions).

D. Communication and social learning

50. Speech is a voluntary behaviour in humans, whereby a person can choose whether to utter words and thus communicate with another. Therefore, speech and language are reflections of autonomous thinking and intentional behaviour. Elephants also use their vocalisations to share knowledge and information with others (Poole 2011). Male elephants primarily communicate about their sexual status, rank, and identity, whereas females and dependents call to emphasise and reinforce their social units. Call types can generally be separated into calls produced by the larynx (such as rumbles) or calls produced by the trunk (such as trumpets), with different calls in each category being used in different contexts (Poole 2011; Poole and Granli 2009; Soltis et al. 2005; Stoeger-Horwarth et al. 2007; Wood et al. 2005). Field experiments have shown that African elephants distinguish between different call types (for example, contact calls – rumbles that travel long distances to maintain associations between elephants that could be several kilometres apart, or oestrus rumbles – that occur after a female has copulated) and these different call types elicit different responses in the listeners. Elephant vocalisations are not simply reflexive, they have distinct meanings to listeners and

they are truly communicative, similar to the volitional use of language in humans (Leighty et al. 2008; Pardo et al. 2019; Poole 1999; Poole 2011; Stoeger & Baotic 2016, 2017).

51. Furthermore, elephants have been shown to vocally imitate the sounds they hear around them, from the engines of passing trucks to the commands of human zookeepers (Poole et al. 2005; Stoeger et al. 2012). Imitating another's behaviour can be demonstrative of a sense of self, as it is necessary to understand how one's own behaviour relates to the behaviour of others.

52. Elephants display a wide variety of gestures, signals and postures, used to communicate information to the audience (Poole and Granli 2011). Such signals are adopted in many different contexts, such as aggressive, sexual, or socially integrative situations, and each signal is well defined and results in predictable responses from the audience. That is, each signal or gesture has a specific meaning both to the actor and recipient. Elephants' use of gestures demonstrates that they communicate intentionally and purposefully to share information with others and/or alter the others' behaviour to fit their own will.

53. Experimental evidence demonstrates that African elephants recognize the importance of visual attentiveness of the intended recipient (in this case, human experimenters) of gestural communication (Smet & Byrne 2014), further supporting that elephants' gestural communication is intentional and purposeful. Furthermore, the ability to understand the visual attentiveness and perspective of others is crucial for empathy and mental-state understanding.

E. Memory And Categorisation

54. Elephants have both extensive and long-lasting memories, just as the folk stories and adages encourage us to believe. McComb et al. (2000), using experimental playback of long-distance contact calls in Amboseli National Park, Kenya, showed that African elephants remember and differentiate the voices of at least 100 other elephants. Each adult female elephant tested was familiar with the contact-call vocalizations of individuals from an average

of 14 families in the population. When the calls were from the test elephants' own family, they contact-called in response and approached the location of the loudspeaker and when they were from another non-related but familiar family— that is, one that had previously been shown to have a high association index with the test group— they listened but remained relaxed. However, when a test group heard unfamiliar contact calls (from groups with a low association index with the test group), they bunched together and retreated from the area.

55. McComb et al. (2001) went on to show that this social knowledge accumulates with age, with older females having the best knowledge of the contact calls of other family groups. McComb et al. (2011) also showed that older females are better leaders, with more appropriate decision-making in response to potential threats (in this case, in the form of hearing lion roars). Younger matriarchs under-reacted to hearing roars from male lions, elephants' most dangerous predators. Sensitivity to the roars of male lions increased with increasing matriarch age, with the oldest, most experienced females showing the strongest response to this danger. These experimental studies show that elephants continue to learn and remember information about their environments throughout their lives, and this accrual of knowledge allows them to make better decisions and better lead their families as they grow older.

56. Further demonstration of elephants' long-term memory comes from data on their movement patterns. African elephants are known to move over very large distances in their search for food and water. Leggett (2006) used GPS collars to track the movements of elephants living in the Namib Desert. He recorded one group traveling over 600 km in five months, and Viljoen (1989) showed that elephants in the same region visited water holes approximately every four days, even though some of them were more than 60km apart. Elephants inhabiting the deserts of both Namibia and Mali have been described traveling hundreds of kilometers to arrive at remote water sources shortly after the onset of a period of rainfall (Blake et al. 2003; Viljoen 1989), sometimes along routes that researchers believe have not been used for many

years. These remarkable feats suggest exceptional cognitive mapping skills, reliant on the long-term memories of older individuals who traveled that path sometimes decades earlier. Indeed, it has been confirmed that family groups with older matriarchs are better able to survive periods of drought. The older matriarchs lead their families over larger areas during droughts than those with younger matriarchs, again apparently drawing on their accrued knowledge (this time about the locations of permanent, drought-resistant sources of food and water) to better lead and protect their families (Foley et al. 2008).

57. Significantly, it has recently been shown that long-term memories, and the decision-making mechanisms that rely on this knowledge, are severely disrupted in elephants who have experienced trauma or extreme disruption due to 'management' practices initiated by humans. Shannon et al. (2013) demonstrated that elephants in South Africa who had experienced trauma decades earlier showed significantly reduced social knowledge. During historic culling practices, juvenile 'cull-orphan' elephants were forcibly separated from family members and subsequently translocated to new locations. Two decades later, they still showed impoverished social knowledge and skills, with impaired decision-making abilities compared to elephants from an undisturbed population in Kenya. Disrupting elephants' natural way of life has substantial negative impacts on their knowledge and decision-making abilities, much as it can with humans.

58. Elephants demonstrate advanced 'working memory' skills. Working memory is the ability to temporarily store, recall, manipulate, and coordinate items from memory. Working memory directs attention to relevant information, and results in reasoning, planning, and coordination and execution of cognitive processes through use of a 'central executive' (Baddeley 2000). Adult human working memory is generally thought to have a capacity of around seven items. In other words, we can keep about seven different items or pieces of information in mind at the same time (Miller 1956). We conducted experiments with wild

elephants in Amboseli National Park, Kenya, manipulating the location of fresh urine samples from related or unrelated elephants. The elephants' responses to detecting urine from known individuals in surprising locations showed that they are able to continually track the locations of at least 17 family members in relation to themselves, as either absent, present in front of self, or present behind self (Bates et al. 2008c). This remarkable ability to hold in mind and regularly update information about the locations and movements of a large number of family members is best explained by the fact that elephants possess an unusually large working memory capacity, apparently much larger than that of humans.

59. Elephants show sophisticated categorisation of their environment, with skills on a par with those of humans. We experimentally presented the elephants of Amboseli National Park, Kenya, with garments that gave olfactory or visual information about their human wearers - either Maasai warriors (men who traditionally attack and spear elephants on occasion as part of their rite of passage), or Kamba men (who are agriculturalists and traditionally pose little threat to elephants). In the first experiment, the only thing that differed between the cloths was the smell, derived from the ethnicity and/or lifestyle of the wearers. The elephants were significantly more likely to run away when they sniffed cloths worn by Maasai men than those worn by Kamba men or no one at all (See video here). In a second experiment, we presented the elephants with two cloths that had not been worn by anyone, but here one was white (a neutral stimulus) and the other was red—the color that is ritually worn by Maasai warriors. With access only to these visual cues, the elephants showed significantly greater reaction to red garments than white, often including signs of aggression. We concluded that elephants are able to categorize a single species (humans) into sub-classes (i.e. 'dangerous' or 'low risk') based on either olfactory or visual cues alone (Bates et al. 2007). McComb et al. went on to show that the same elephants can also distinguish between human groups based on our voices. The elephants reacted differently (and appropriately) depending on whether they heard Maasai

or Kamba men speaking, and also when they heard male or female Maasai (where female Maasai pose no threat as they are not involved in spearing events), and adult Maasai men or young Maasai boys (McComb et al. 2014). Scent, sounds and visual signs associated specifically with Maasai men are categorized as 'dangerous', while neutral signals are attended to but categorized as 'low risk'. Two captive Asian elephants have also recently been shown to differentiate between familiar and unfamiliar humans based on visual and olfactory signals (Polla et al. 2018). Asian elephants have also shown remarkable skills in judging quantities, using both visual and olfactory information (Irie et al. 2019; Plotnik et al. 2019), leading to the statement in one peer-reviewed paper that elephants 'have cognitive characteristics partially identical to human counting' (Irie et al. 2019). These sophisticated, multi-modal categorization and numerical skills may be exceptional among non-human animals. Moreover, these experiments demonstrate elephants' acute sensitivity to the human world – monitoring our behavior and learning to recognize when we might cause them harm.

III. Conclusion

60. Both African and Asian elephants demonstrate highly adapted cognitive abilities, and share many key traits of advanced cognition and autonomy with humans. Based on the evidence, it is clear to us they should also be considered autonomous beings.

61. Scientific knowledge about elephant intelligence has been increasing rapidly in the past decade: what we currently know is only a tiny fraction of what elephant brains are likely capable of, and yet more amazing abilities are still likely to be discovered.

I declare under penalty of perjury under the laws of the State of California that the foregoing is true and correct.

Executed on the 13_____ (date) of __May (month), 2025__ (year)

at Vaucresson, 92420, Hauts de Seine, France______________________
(city or other location, and state or country)

_Lucy Bates, Ph.D.____________________________________

____
(signature)

I declare under penalty of perjury under the laws of the State of California that the foregoing is true and correct.

Executed on the 6th (date) of May (month), 2025 (year)

at St Andrews, UK
(city or other location, and state or country)

Richard M. Byrne, Ph.D

RWByrne
(signature)

EXHIBIT A

Lucy Anne **BATES**

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EMPLOYMENT

Oct 2019 – Present
Associate Lecturer, School of Psychology, The Open University
Tutoring on final year 'Investigating Psychology' research module for undergraduate students. **(0.2FTE)**

Jan 2018 – Present
Visiting Research Fellow, School of Psychology, University of Sussex
Continuing *Culture in elephants* research project; finalizing publications, developing future funding proposals, continuing to supervise related MSc and BSc research projects and deliver lectures. **(0.6FTE)**

Jan 2016 – Jan 2018
Daphne Jackson Research Fellow, School of Psychology, University of Sussex
Culture in elephants? Exploring social traditions across elephant populations
Conceived, designed and led survey-based, collaborative research project working with 10 independent elephant research sites across east and southern Africa, supervised by Prof. Karen McComb. **(0.5FTE)**

Oct 2012 – Dec 2015
Maternity leave for my two children born in 2012 and 2014.

Jun 2008 – Present
Director, Elephant Specialist Advisory Group (ESAG), South Africa (0.2 FTE since 2012)
Freelance Elephant Conservation Advisor, Pretoria, South Africa
Committee member advising national and local government on elephant management and conservation policy. Consultancy including report writing, assessment, analysis for: Save the Elephants, Kenya; Ezemvelo Kwa Zulu Natal Wildlife, South Africa; and Society for the Prevention of Cruelty to Animals, Zimbabwe.

Mar 2005 – May 2008
Research Fellow, School of Psychology, University of St Andrews
Leverhulme Trust funded project: Socio-Cognitive skills of the African Elephant
Designed, conducted and published high-impact experimental and observational field research exploring elephant cognition and social skills in Amboseli, Kenya; grant co-written with PI Prof. Richard Byrne.

EDUCATION

Nov 2001 – Mar 2005
PhD Evolutionary Psychology, School of Psychology, University of St Andrews
Title: *Travel and food location by chimpanzees of the Budongo Forest Reserve, Uganda*
Supervised by Prof. Richard Byrne. Supported by a BBSRC Studentship.

Oct 2000 – Oct 2001
MSc Human Biology, Institute of Biological Anthropology, University of Oxford
Dissertation: *Gregariousness in female chimpanzees of the Budongo Forest Reserve, Uganda*
Supervised by Prof. Vernon Reynolds.

Oct 1997 – Jun 2000

BA (Hons) Experimental Psychology, Oriel College, University of Oxford

Papers completed: Animal Behaviour; Biology of Learning and Memory; Brain and Behaviour; Individual Differences; Memory and Cognition; Perception; Social Psychology.

RESEARCH

Publications **h-index: 16**

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Byrne RW & **Bates LA** (2007) Animal Brain Evolution: When is a group not a group? *Current Biology* 17 (20) R883-R884.

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Popular Books

Wood L (2020) *The Last Giants.* Hodder, London.

ESAG (Garai ME, **Bates LA,** Pretorius Y, Hofmeyr M, Henley M, Selier J) (2017) *Understanding Elephants: Guidelines for safe and enjoyable elephant viewing.* Struik Nature: South Africa.

Oral Presentations (selected)

Keynote presentation: Bates, LA (2019) The role of women in conservation and ethology**.** *Workshop: Herding together for conservation,* organised by Elephants Alive, Elephants for Africa and Southern African Conservation Trust, **Hoedspruit, South Africa.**

Invited Presentation: Bates, LA (2018) Elephant conservation: Does culture have a role to play? *Workshop: The Conservation Applications of Research on Elephant Behaviour and Ecology,* **Wissenschaftskolleg zu Berlin, Germany.**

Invited Presentation: Bates, LA (2017) Culture in elephants? *Daphne Jackson Trust Research Conference,* **Royal Society, London, UK.**

Plenary Lecture: Bates, LA (2017) Studying elephant minds: What can primatologists learn? *Primate Society of Great Britain Spring Meeting,* **Manchester, UK.**

Bates, LA (2010) Using observational data to study cognition: elephants and primates. *International Primatology Society XXIII Congress,* **Kyoto, Japan.**

Invited Presentation: Bates, LA (2009) Social knowledge in African elephants.
Department of Zoology & Entomology, **University of Pretoria, South Africa.**

Bates, LA (2006) Travel and food location in chimpanzees.
Animal Behaviour Society Conference, **Utah, USA.**

Funding Obtained

Apr 2016
University of Sussex Research Development Fund
£8,200. Wrote application for support including temporary Research Assistant and field-trip expenses.

Jan 2016
Daphne Jackson Trust Research Fellowship, University of Sussex
0.5FTE salary plus £10,000 research expenses. Conceived & wrote application for fellowship research.

Mar 2005
Leverhulme Trust Research Project Grant - Named Post-Dcotoral Fellow
£102,000. Prepared and wrote application with PI Prof. Richard Byrne.

Oct 2001
Biotechnology and Biological Sciences Research Council PhD Studentship
Full funding award, including fees, stipend and field-work expenses.

TEACHING

Student Supervision and Examining

Oct 2019 – Present
Research Methods and BSc research projects, School of Psychology, The Open University
Teaching on final year *Investigating Psychology* module. Supervising BSc research projects on topics within Individual Differences and Social Psychology and writing lectures delivered both face-to-face and online.

Sep 2016 – Present
Co-supervising PhD, MSc and BSc research projects, School of Psychology, University of Sussex
Supervised 11 BSc Honours projects, four MSc projects and two PhD projects (ongoing) on various topics detailing elephant cognition and behaviour.

Oct 2016
External examiner for MSc thesis, Faculty of Natural and Agricultural Sciences, University of Pretoria, South Africa. Thesis title: Social organisation of African elephants in Pilanesberg.

Lectures and Seminars

Feb 2017, 2018, 2019
Lectures: *Animal Culture*, Psychology Now 2nd year module, University of Sussex
Devised and delivered two lectures; devised essay questions and marking scheme, supervised calibration.

Feb 2016
Lectures: *Primate Cognition*, Psychobiology 1st year module, University of Sussex
Delivered two lectures previously prepared by Prof. Karen McComb.

Mar 2006 & 2007
Seminar series: *Evolutionary Psychology*, School of Psychology, University of St Andrews
Led seminars tied to associated second-year lecture course by Prof. Richard Byrne.

DEVELOPMENT, TRAINING AND ENGAGEMENT

Jul 2019 – Oct 2019

Researched, planned, drafted popular science book 'The Last Giants' for Mr Levison Wood. Wrote complete first draft of this book at the request of the named author and edited subsequent drafts.

Aug 2017 – Aug 2018

Supervising student research project for Junior Science Symposium, Briarcliff High School, New York State, USA. Supervising internet-based research project on tool-use in elephants for student participating in USA-wide high school science competition.

Jan 2016 – Nov 2017

Daphne Jackson Trust and University of Sussex training courses: Funding and professional skills; Leadership skills; Media and PR skills; Presentation skills; Time-management and work-life balance. Completing courses which have eased the transition back to academia and enhanced my professional development, readying me for the multi-facted challenges of a lectureship role.

Oct 2007 – Present

Media interviews about my research, Numerous internet, print, radio, and tv media. Including for: *BBC One*; *BBC World Service*; *Discovery Channel*; *National Geographic*; *New Scientist*; *Off the Fence Productions*; *Radio New Zealand; Scientific American*; *The Guardian*; *The Times*; *The Psychologist; Tortoise*.

ADMINISTRATION

Jan 2016 – Present

Member of working group '*Culture and Social Complexity*', Convention on the Conservation of Migratory Species (UNEP-CMS). Analysing the conservation implications of culture in priority species.

Oct 2015 – Present

Member of working groups: '*Translocating elephants*', '*Elephant welfare*' and '*Policy and legislation*', ESAG. Ensuring activities in these areas are compatible with latest scientific knowledge.

Oct 2003 – Present

Peer reviewing, Reviewed manuscripts and book proposals for numerous international journals and publishers, including *Animal Cognition*, *Animal Behaviour*, *Biology Letters* and *Current Biology*.

Mar 2011

Co-editor of Special Feature 'Cognition in the Wild', *Biology Letters*, with Prof. Richard Byrne.

Sep 2010

Symposium Co-ordinator: 'Cognition in the Wild', IPS XXIII Congress, Kyoto, Japan. Proposed and organised symposium with Prof. Richard Byrne, involving eight speakers.

EXHIBIT B

Exhibit B

References cited

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Barton, R.A. (2012) Embodied cognitive evolution and the cerebellum. *Philosophical Transactions of the Royal Society, Series B*, **367**: 2097-2107.

Bates L.A., K. Sayialel, N.W. Njiraini, J.H. Poole, C.J. Moss & R.W. Byrne (2007) Elephants classify human ethnic groups by odour and garment colour. *Current Biology* **17** (22): 1938-1942.

Bates L.A., J.H. Poole & R.W. Byrne (2008a) Elephant cognition. *Current Biology* **18** (13): R544-R546.

Bates L.A., P.C. Lee, N. Njiraini, J.H. Poole, K. Sayialel, S. Sayialel, C.J. Moss & R.W. Byrne (2008b) Do elephants show empathy? *Journal of Consciousness Studies* **15** (10-11): 204-225.

Bates L.A., K. Sayialel, N. Njiraini, J.H. Poole, C.J. Moss & R.W. Byrne (2008c) African elephants have expectations about the locations of out-of-sight family members. *Biology Letters* **4** (1): 34-36.

Bates L.A. & R.W. Byrne (2014) Primate Social Cognition: What we have learned from nonhuman primates and other animals. In: *APA Handbook of Personality and Social Psychology Vol. 1. Attitudes and Social Cognition*. Eds. M.Mikulincer & P.R. Shaver. APA, Washington, DC.

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Douglas-Hamilton, I., S. Bhalla, G. Wittemyer, & F. Vollrath, (2006) Behavioural reactions of elephants towards a dying and deceased matriarch? *Applied Animal Behaviour Science*, **100**: 87-102.

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Sharma, N., Pokharel, S.S., Kohshima, S. *et al.* (2020) Behavioural responses of free-ranging Asian elephants (*Elephas maximus*) towards dying and dead conspecifics. *Primates* **61**, 129–138.

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Smet, A.F. & R.W. Byrne (2013) African elephants can use human pointing cues to find hidden food. *Current Biology*, **23** (20): 2033-2037.

Smet, A.F. & R.W. Byrne (2014) African elephants recognize visual attention from face and body orientation. *Biology Letters*, **10**: 20140428.

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Stoeger, A.S., D. Mietchen, S. Oh, S. de Silva, C.T. Herbst, S. Kwon & W.T. Fitch (2012) An Asian Elephant Imitates Human Speech. *Current Biology*, **22**(22): 2144-8

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Stoeger, A., Baotic, A. (2017) Male African elephants discriminate and prefer vocalizations of unfamiliar females. *Sci Rep* **7**, 46414.

Viljoen, P. J. (1989) Spatial distribution and movements of elephants (*Loxodonta africana*) in the northern Namib desert region of Kaokoveld, South West Africa–Namibia. *Journal of Zoology*, **219**: 1–19.

Wood, J.D., B. McCowan, W.R. Langbauer, J.J. Viloen & L.A. Hart (2005) Classification of African elephant *Loxodonta africana* rumbles using acoustic parameters and cluster analysis. *Bioacoustics*, **15**: 143–161.

EXHIBIT C

Richard William Byrne FRSE | Emeritus Professor
6th September 2018 | University of St Andrews

Education

1969-1972 M.A. in Natural Sciences, St John's College, Cambridge (1st Class Honours)
1972-1975 Ph.D., University of Cambridge, *"Memory in complex tasks"*

Career

1976-1991 Lecturer in Psychology, University of St Andrews
1991-1997 Reader in Psychology, University of St Andrews
1997-2017 Professor of Evolutionary Psychology, University of St Andrews

Awards

1972 Wright Prize & Hughes Prize*, St Johns College, Cambridge*
1972-1975 MRC Studentship, tenure at MRC Applied Psychology Unit, Cambridge
1993 *Association of Commonwealth Universities*: Development Fellowship
1997 *British Psychological Society*: Book Award
2001 *Collegium Budapest*: Institute of Advanced Study. Awarded *Convenorship* of Focus Group 2003 "Precursors to Culture".
2002 Elected Fellow of the *Royal Society of Edinburgh*
2007 Elected Fellow of the *Higher Education Academy*
2017 *British Psychological Society*: Research Board Lifetime Achievement Award 2017

Professional activities (since 2000)

Focus Group Convenor, *Precursors to Culture*, Collegium Budapest Institute Advanced Studies, Hungary. Oct-Dec 2003.
Boyd Group Member of Subgroup on *Use of non-human primates in research and testing.* 2000-2002
Vice-President, *International Primatological Society* 1996 – 2001
National teaching: *Quality Assurance Agency/ Scottish Higher Education Funding Council*: Steering Committee for Assessment (2003-5)

H-Index: 64 (H-Index since 2013: 43)

Scottish Primate Research Group

In 1987 I set up (with McGrew, Stirling; Rogers, Edinburgh; Whiten, St Andrews) the *Scottish Primate Research Group*, to co-ordinate the cognate research interests of the 3 centres, promote new joint grant applications, encourage outside visitors to Scotland and postgraduate admissions, and co-ordinate joint seminars and lectures. The *Scottish Primate Research Group* now attracts international notice (e.g. US researchers coming to spend Sabbatical with Group), and it is now larger and more productive than ever, with 21 faculty members and over 50 researchers.

Fieldwork Periods

Mont Assirik, Senegal. January-April 1979. (Guinea baboon *Papio papio*)
Giant's Castle Game Reserve, South Africa. August-December 1983. (Chacma baboon, *Papio ursinus*)
Mahale Mountains, Tanzania. July-December 1984. (Chimpanzee, *Pan troglodytes*)
Virunga Volcanoes, Rwanda. July-December 1989. (Mountain gorilla, *Gorilla b. beringei*)
Mbeli Bai, Republic of Congo. August-October 2010. (Western gorilla, *Gorilla g. gorilla*)

Editorial work (since 2000)

Current Biology, **Editorial Board**, 2006 - present
Biology Letters, **Editorial Board**, 2007 - 2013
Animal Cognition, **Editorial Board**, 1997 - 2011
Animal Behaviour, **Consulting Editor**, 1996 – 2000
Journal of the Royal Anthropological Institute, **Editorial Board**, 1995 - 2010
Refereeing of **book proposals**: Basil Blackwell, Cambridge University Press, Curzon Press, Lawrence Erlbaum Associates, Oxford University Press, John Wiley.
(And refereeing of **manuscripts**: numerous journals, including Science, Nature, PNAS, Proc.Roy.Soc.B., Phil.Trans.B , TICS, TINS, Psychological Science, Psychological Bulletin, Current Biology.)
Refereeing of **promotion applications***:* Arizona State University; University of California, San Diego; University of Colorado; University of Florida, Gainsborough, FL; Max Planck Institute for Evolutionary Anthropology, Leipzig; Miami University, Ohio; University of Natal, RSA; University of Portsmouth, UK; University of Stirling, UK; York University, Toronto
Refereeing of **research grants**: BBSRC, ESRC, Israel Academy of Sciences and Humanities (Basic Research Foundation), L S B Leakey Foundation (Oakland, California), Leverhulme Trust, MRC, NSF (USA), NERC, NSERC (Canada)
Refereeing of **research programmes**: Leverhulme Trust, Max-Planck-Society, Germany, Earthwatch Europe

Major invited lectures (since 2000)

2018 *The Royal Institution, London*. (**Public lecture and discussion**, 8th November)
2016 *University of Emory, Atlanta.* (**Public lecture**, 12th April)
2015 *85th James Arthur Lecture, American Museum of Natural History.* (**Public lecture**, 5th March)
2013 *Tarragona Laterality Conference.* (Invited lecture to Closed Conference)
University of Portsmouth. (**Public lecture**, 25th April)
2012 *Institute of Evolutionary Biology, University of Zurich.* (Invited lecture in Workshop, *Unpacking intentionality in animal vocal communication: an integrative approach*.)
2011 *John Templeton Foundation.* (Invited lecture to Symposium, *The Emergence of Personhood*)
Hanse-Wissenschaftskolleg, Delmenhorst. (Closed Workshop, *The evolution of human handedness*)
Institute of Evolutionary Biology, University of Zurich. (**Public lecture**, 29th September)
2010 *INCORE Thematic Meeting, Berlin.* (Workshop, *Referential communication)*
2009 *German Society for Primatology* (**Plenary lecture**, 11th Congress, Hanover)
Year of Darwin Lecture, School of Biosciences, Birmingham University (**Public lecture**)
Max Planck Institute for Evolutionary Anthropology, Leipzig. (Workshop, *Understanding Tool Use*)
2008 *Institute of Cognitive Sciences, Montréal.* (Invited lecturer, Summer School on *Social Cognition)*
2007 *University of Vienna, Faculty of Life Sciences.* (Inter-faculty series, "The evolution of social cognition")
European Federation of Primatology. (**Plenary lecture**, Second Congress, Charles University Prague)
MRC / Cold Spring Harbor. (Invited lecturer, Workshop on *Social Cognition*, St Anne's College, Oxford)
Carlsberg Academy, Copenhagen. (**Plenary lecture**, conference *Missing Links*)
2006 *The Royal Society, London*. (Symposium, *From Brain to Culture*)
Japan Society for Animal Psychology (**Plenary lecture**, 66th Annual Meeting, Kyoto.)
2005 *Portuguese Primatological Association, 2nd Int. Conf.* (**Plenary lectures** to conference, Lisbon)
University of Tokyo, "Evolutionary Cognitive Sciences" series (Lecture)
2004 *Institute of Cognitive & Decision Sciences, University of Oregon.* (**Public Lecture**).
Wenner-Gren Foundation for Anthropological Research. (Closed conference "Roots of Human Sociality", North Carolina.)
2003 *European Workshop in Cognitive Neuropsychology.* (International workshop, Bressanone, Italy.**)**
2002 *University of Oxford, McDonnell-Pew Centre Centre.* (Annual Autumn School in Cognitive Neuroscience.)
Perspectives on Imitation. (International workshop, Royaumont Abbey, France.)
University of Oxford, McDonnell-Pew Centre for Cognitive Neuroscience. (Theme "Rational animals?" Autumn School)
Fundació "la Caixa" Museum of Science, Barcelona; & Social & Cultural Centre, Tarragona (**Public lectures**)
2001 *VIIth European Congress of Psychology.* (**Keynote address** to Congress, forming part of BPS Centenary, London.)
Institute of Cognitive Neurology. (Symposium, "Human Cognition", UCL, London.)
British Association for the Advancement of Science. (Lecture, **press conference**. "Constraints on Culture", Glasgow.)
British Psychological Society. (**Keynote lecture**, Consciousness & Experiential Psychology section.)
Knapping Stone: a uniquely hominid behaviour? (International workshop, Abbaye des Prémontrés, France.)
Malingering & Illness Deception. (International workshop**,** Blenheim, Oxford.)
2000 *British Neuropsychiatry Association.* (**Plenary lecture** to Millennial Meeting, "The social brain")
International Congress for Cognitive Science. (**Invited main lecture**, "Primate Cognition", Inuyama.)
Gaia Research Project. (Symposium, "Animal Architecture", Edinburgh.)
Sorbonne University. (Workshop, "Cognitive Science", Paris.)
The Royal Society of Edinburgh. (International Conference, "Human Nature", Edinburgh.)
Max Planck Institute, Andechs. (Symposium, "The Social Brain", Bochum.)
*University of Ghent***.** (Symposium, "Science and Philosophy of Pain", Gent.)

Additional invited, funded talks at: Auckland University (Psychology, Zoology); BAAS SET7 Week (St Andrews); Gesamthochschule, Kassel (Primatenbiologie); Deutsches Primatenzentrum, Gottingen; Duke University, North Carolina (Biological Anthropology); Dundee University (teaching forum); Durham University (Psychology, Anthropology); Eötvos Lorand University, Budapest (Ethology); Hang Sen Centre for Cognitive Studies, Sheffield (twice); Hawaii University, Honolulu (Psychology); Kyoto University; Living Links Center, Emory University; MRC Cognitive Brain Research Unit, Cambridge (twice); Max Planck Institute, Leipzig; Max Planck Institute, Seewiesen, Bavaria; Miami University, Ohio (Zoology); University of Otago, New Zealand (Psychology); Queens University, Kingston Ontario (Psychology); Université de Rennes 1 (Zoology); Royal Anthropological Institute, London; Royal (Dick) School of Veterinary Studies, Edinburgh; Yerkes Regional Primate Research Center, Atlanta GA; UCSD (Psychology); York University, Toronto (Psychology); Universities of Aberdeen (Psychology), Abertay (Psychology), Cambridge (Psychology, Archaeology & Anthropology), Durham (Psychology, Anthropology), Edinburgh (Psychology, Zoology), Exeter (Psychology), Leeds (Psychology), Liverpool (Psychology, Zoology), Manchester (Psychology), Oxford (Zoology), Oxford Brookes (Anthropology), Reading (Archaeology), St Andrews (Divinity, Modern Languages, Zoology, Psychology), Stirling (Psychology), UCL (Archaeology), Sussex (Neuroscience & Robotics), York (Centre for Human Palaeontology & Human origins); Zoological Society of London.

Broadcasting (since 2000)

BBC1 6 O'Clock News (Scotland) interview on own great ape research 2008; *6 O'Clock news (UK)* interview on own elephant research 2013

BBC2 "The Secret Life of Pigs" (consultant 2010)

BBC World/BBC4 Evening News interview on own elephant research 2013

ITV/STV (ITN News) interview on own elephant research (2013)

Australian ABC Channel TV (programme on my research in *Catalyst* series)

BBC Radio 4 "Today" (interviews 2008, 2000)

BBC Radio 4 Interview with Jonathan Miller, *Self-made things* (2005)

Australian Radio (article on own research in "The Science Show", 2001); *Radio Netherlands* (article on own research, 2001)

Numerous other interviews on own research: *ABC Radio Australia, Austrian Broadcasting Corporation, US Public Broadcasting Network, Breakfast Radio Auckland (NZ), Radio Canada, Western Australia Radio, Discovery Canada, Radio New Zealand "Morning Report" Radio Ireland, Talkback Radio (Ireland),BBC World Service, BBC Radio Scotland, Radio Wales*, *Radio Cambridgeshire, BBC Radio Jersey, BBC Radio 5 Live*, *Radio Tay, Kingdom FM, Talk 107, Voice of Russia, Wave 102*

External Postgraduate Examining (since 2000)

2000 *Ph.D. Oxford Brookes University (Anthropology)* L. Ambrose.
2001 *M.*Sc. *University of Stirling (Psychology)* A Nowell.
2002 *M.*Sc. *University of Durham (Anthropology)* B A Whiting.
Ph.D. London School of Economics (Psychology) K Rigby.
2003 *Ph.D. Exeter University (Psychology)* P.Citrynell.
2004 *Ph.D. University of Cambridge (Psychology)* J Dally
Ph.D. Exeter University (Psychology) P.Citrynell, re-examination
2005 *Ph.D. University of Cambridge (Psychology)* J Dally
2008 *Habilitation. University of Vienna (Faculty of Life Sciences)* Dr Thomas Bugnyar
2009 *Ph.D. University of Cambridge (Psychology)* C Bird
2012 *Ph.D. University of Cambridge* (Archaeology & Anthropology) P Bertolani
Ph.D. University of Birmingham (Psychology) J Trosciano
2016 *Ph.D. University of York* (*Psychology*) Alejandra Picard
2017 *Ph.D. University of Lincoln (Psychology)* A Frohnwieser
2018 *PhD Oxford Brookes University (Psychology)* M de Guinea

PhD Supervision (since 2000)

1999-04 R Noser (self-funded), "Navigation by chacma baboons within the home-range"
2000-04 R da Cunha (funded by CAPES, Brazil), "Long distance communication of howler monkeys"
2000-04 A Valero (funded by CONACYT, Mexico), "Social interactions of spider monkeys"
2001-05 L Bates (funded by BBSRC), "Foraging skills of female chimpanzees"
2004-08 E Cartmill (funded by Univ. St Andrews) "Gestural communication in great apes"
2005-06 F Moore (joint supervision) "Effects of resource control on female reproductive strategies"
2005-09 A Ruiz (funded by ORS) "Monkeys' understanding of intention and attention"
2007-10 C Hobaiter (funded by own EC grant) "Gestural communication in great apes"
2007-11 C Casar (funded by CAPES, Brasil) "Vocal communication of wild titi monkeys"
2008-12 K Hall (funded by Janet Anderson trust and ORSAS) "Theory of mind in chimpanzees"
2010-14 L Orr (funded by NSF Studentship) "gestural communication in gorillas"
2011-15 A Smet (funded by Univ. St Andrews) "Cognition in the African elephant"
2012-16 B Fallon (self-funded) "Gestural communication by sexually consorting male chimpanzees"
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