

# Elizabeth F. Ballare, PhD

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## EDUCATION

### Doctor of Philosophy, March 2021

Ecology and Evolution, Rutgers University, The State University of New Jersey

Title: Health effects of rehabilitation and release in Bornean orangutans (*Pongo pygmaeus wurmbii*)

Honors: Fulbright Student Research Scholar 2014 – 2015

### Master of Science, transferred to Ph.D. Program

Ecology and Evolution, Rutgers, The State University of New Jersey

Title: Determining the phylogenetic status of *Odonata:Macromiidae*

### Bachelor of Science, January 2007

Biology, Montclair State University

Honors: National Dean's List

## AWARDS, FELLOWSHIPS, GRANTS

2022 Early Career Fellowship Award, Duke University **\$500**

2019 Professional Development Award, Rutgers University **\$1,000**

2018 Professional Development Award, Rutgers University **\$971.25**

2018 Graduate Student Conference Travel Award, Rutgers University **\$200**

2017 Second Place Poster Session Award, STEM Community Outreach Symposium **\$150**

2017 Graduate Student Conference Travel Award, Rutgers University **\$200**

2017 Center for Human Evolutionary Studies Albert Fellows Dissertation Research Award **\$13,000**

2017 Professional Development Award, Rutgers University **\$925**

2016 Margot Marsh Biodiversity Foundation **\$10,000**

2016 Riverbanks Zoo and Garden Conservation Support Fund **\$5,000**

2016 Cleveland Zoological Society and Cleveland Metroparks Zoo **\$2,500**

2016 Crowdsourcing **\$2,710**

2014-2015 Fulbright Institute of International Education Student Research Scholarship **\$18,500**

2014 Fulbright Critical Language Enhancement Award **\$5,000**

2013 Center for Human Evolutionary Studies Small Grant **\$1,000**

2013 Graduate Student Conference Travel Award, Rutgers University **\$100**

2011 Graduate Student Conference Travel Award, Rutgers University **\$200**

## RELEVANT WORK HISTORY

### Laboratory Manager, Rutgers, The State University of New Jersey, 2023 - present

*Department of Anthropology, Laboratory for Primate Dietary Ecology and Evolution*

Organizes laboratory equipment, maintenance, and schedules. Corresponds with vendors to obtain quotes and place orders, performs colorimetric, radioimmuno-, and enzyme-linked immunosorbent assays to quantify biomarkers of energetics and inflammation in primates. Validates assay kits. Trains undergraduate and graduate students as well as visiting scientists in laboratory techniques. Analyzes data in 'R'.

### Visiting Scientist, Rutgers, The State University of New Jersey, 2022 - present

*Department of Anthropology*

Performed colorimetric, radioimmuno-, and ELISA to quantify measures of energetics in great ape urine and human urine and saliva. Analyzed data statistically ('R') to investigate variations in the health of wild and captive primates as it pertains to diet, nutrition, and tool use.

### Post-Doctoral Research Fellow, University of Geneva, Switzerland, 2021 – 2023

*Centre Interfacultaire en Sciences Affectives (CISA); Gruber Laboratory (eccePAN)*

Designs and implements research projects and protocols exploring diet, physiology, and tool use in chimpanzees (Bugoma Primate Conservation Project, Uganda) and humans (CISA, Switzerland). Trains graduate students and field assistants in data collection and entry, urine and/or saliva collection and preservation, identification of wild

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plant parts/species consumed by chimpanzees, and/or laboratory assays and associated techniques (colorimetric, radioimmuno-, and ELISA). Conducts laboratory assays to quantify measures of energetics and health. Validates assay kits for use with biological samples from novel species. Analyzes data statistically using R. Manages ordering, vendors, and project budgets. Maintains multiple databases. Writes grants and manuscripts. Presents at regional, national, and international conferences.

**Treasurer**, CORE Borneo, New Jersey, 2019 – present

Manages and oversees the financial affairs of CORE Borneo, a non-governmental organization which supports research efforts at the Tuanan Orangutan Research Station as well as environmental education, community development, and fire management within the Mawas Conservation Area in Central Kalimantan, Borneo, Indonesia.

**Teaching Assistant**, Rutgers University, New Jersey, USA, 2009-2014, 2016-2021

Lectured, designed laboratory assignments, and wrote and gave examinations for the following courses: Tuanan Short Field Course, Aim High Academy Field Course, General Biology I and II, Molecular Foundations, Comparative Vertebrate Anatomy, Foundations in Ecology and Evolution, Introduction to Human Evolution, Fundamentals of Evolution, Extinction

**Laboratory Manager**, Laboratory for Primate Dietary Ecology and Physiology, New Jersey 2012 – 2013

Validated assays. Ran training sessions with lab members. Organized data. Corresponded with vendors.

**Surgical Veterinary Technician**, All Creatures Great and Small, New Jersey 2006 – 2009

Prepped and monitored patients. In charge of pre- and post-operative care. Assisted doctor in surgeries. Drew blood, developed radiographs, gave vaccinations, filled prescriptions. Assisted doctor in examination rooms.

**Husbandry Intern**, Center for Great Apes, Florida 2009

Worked with Chimpanzees (*Pan troglodytes*) and Orangutans (*Pongo pygmaeus*, *Pongo abelii*) rescued from entertainment industry or illegal pet trade. Participated in keeper responsibilities, emergency training, and clerical duties.

**Training Assistant**, Six Flags Great Adventure, New Jersey 2008

Assisted an MSc candidate in Primate Conservation at Oxford Brookes University, England with thesis research in behavioral study to determine effects of positive reinforcement training without removing individuals from their social group.

### TRAINING/MENTORSHIP

2022-2023, Laboratory for Primate Dietary Ecology and Physiology – Rutgers

Trained one doctoral candidate in laboratory safety and pipetting techniques along with radioimmuno- and enzyme-linked immunosorbent assays.

2021-present, eccePAN Laboratory – UNIGE; Bugoma Primate Conservation Project – Hoima, Uganda

Mentoring and training two master's and one doctoral student in physiological research design, biological sample collection, laboratory techniques (e.g., pipetting, aliquoting, sample processing, sample preservation, etc.), and data collection pertaining to energetics and tool use in humans (saliva and urine samples) and wild Ugandan chimpanzees (Bugoma Forest Reserve).

2017- 2019, Laboratory for Primate Dietary Ecology and Physiology - Rutgers

Training one undergraduate student in data entry, statistical analyses, laboratory techniques and protocol, and colorimetric and enzyme-linked immunosorbent assays.

2016-2017, ARESTY Research Center, Division of Undergraduate Academic Affairs - Rutgers

Mentored one undergraduate student in laboratory techniques, colorimetric assays, and statistical analyses who correlated creatinine and urea concentrations in rehabilitated orangutans between different field preservation mediums (frozen urine vs. urine dried on filter paper).

2015-2017, Borneo Orangutan Survival Foundation Post-Release Monitoring Staff and Volunteers

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Trained ten post-release monitoring staff and volunteers at the Borneo Orangutan Survival Foundation Bukit Batikap Conservation Forest in urine and fecal sample collection and preservation, data collection, and urinary Chemstrip analysis.

2015–2017, Indonesian Student Counterparts and Assistants

Trained two undergraduate Indonesian student counterparts from Universitas Gadjah Mada in data and sample collection, wildlife biology/field methods, data entry, gastro-intestinal parasite identification, and laboratory techniques such as fecal flotation and sedimentation.

2013-2014, ARESTY Research Center, Division of Undergraduate Academic Affairs - Rutgers

Mentored one undergraduate student in laboratory techniques and colorimetric assays who investigated physiological effects orangutans employ under times of dietary stress.

2012-2013, ARESTY Research Center, Division of Undergraduate Academic Affairs - Rutgers

Mentored two undergraduates who compared the validity of urine storage field methods (frozen vs. filter papers) and investigated sample deterioration on filter paper over a six-month period.

### **OUTREACH**

2020, Guest Speaker for Christina Campbell, Ph.D., ANTH 490E, Seminar in Applied Anthropology – Primates in Captivity, California State University, Northridge

Spoke with students about general primate and orangutan specific rehabilitation and release. Answered questions based on suggested readings.

2020, Skype a Scientist

Skyped with matched participants (teachers, students, etc.) to discuss my research and engaged in a Q&A with inquisitive individuals.

2019, John P. Stevens High School – Edison, New Jersey

Lectured Advance Placement science students in rehabilitation and release practices. Discussed factors that contribute to habitat loss, similarities and differences in rehabilitation and release between animal groups, and current program struggles and successes.

2018, Polar ICE Sci-I Project (NSF funded)

Reviewed and provided feedback of research proposals written by 6<sup>th</sup>-9<sup>th</sup> grade students using real data collected by scientists in the public polar dataset. The goals of the program were to engage students in science, interact with local scientists, and create testable questions, analyze and represent provided data, and present findings. By providing feedback they could better formulate their research questions before presenting final products to Rutgers in June 2018.

2018, Science Café – Edison, New Jersey

Discussed climate change and international conservation opportunities with AP Biology students and faculty

2017, John P. Stevens High School - Edison, New Jersey

Lectured Advance Placement general biology students in worldwide conservation efforts.

2017, STEM Community Outreach Symposium at Rutgers – New Jersey

Spoke with visiting high school students about non-medical science careers.

### **PROFESSIONAL MEMBERSHIPS**

International Primatological Society

American Association for the Advancement of Science

Northeastern Evolutionary Primatologists

International Society of Wildlife Endocrinology

American Society of Primatologists

Sigma Delta Epsilon – Graduate Women in Science

Center for Human and Evolutionary Studies

American Association of Biological Anthropologists

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Society for Conservation Biology/International Congress for Conservation Biology

## PUBLICATIONS

- Ballare, E.**, Naumenko, D., Watford, M., Ugarte, A., Mannion, K., Kugonza, J.B., Utami Atmoko, S.S., Vogel, E.R., and Gruber, T. (in prep). Validation of a commercial colorimetric kit for the investigation of urinary ketone bodies and energetics in wild chimpanzees and orangutans.
- Ballare, E.F.**, Brown, J., Alavi, S., Mitra-Setia, T., Al-Mubarak, F., Risfatul, U., Suad, Z., Tandang, M., Sihite, J., Vogel, E.R. (in prep): Protein and energy balance in rehabilitant and released Bornean orangutans (*Pongo pygmaeus wurmbii*) in Central Kalimantan, Indonesia.
- Ballare, E.F.**, Utami Atmoko, S.S., Husson, S., Nurcahyo, A., Vogel, E.R. (in prep): Habitat, health, behavior, and biology of rehabilitant and reintroduced Bornean orangutans (*Pongo pygmaeus wurmbii*) in Central Kalimantan, Indonesia: A Review.
- Ballare, E.F.**, Frazee, L.J., Alavi, S., Utami Atmoko, S.S., Al-Mubarak, F., Risfatul, U., Suad, Z., Fachroni, A., Sihite, J., Moldawer, L., Vogel, E.R. (in prep): Urinary neopterin and cytokines as indicators of inflammation and immune system responsiveness in rehabilitant Bornean orangutans (*Pongo pygmaeus wurmbii*) in Central Kalimantan, Indonesia.
- Mannion, K., **Ballare, E.**, Marks, M., and Gruber, T. (2022). A multicomponent approach to studying cultural propensities during foraging in the wild. *Journal of Animal Ecology*. 00, 1-11. <https://doi.org/10.1111/1365-2656.13820>
- Ballare, Elizabeth F.** (2011): Aim High Academy: Summer Earth Ecology Program  
ARGIA: The News Journal of the Dragonfly Society of the Americas, 23:3, 25-29.
- Ballare, Elizabeth F.** & Jessica L. Ware (2011): Dragons fly, biologists classify:  
an overview of molecular odonate studies, and our evolutionary understanding of dragonfly and damselfly (Insecta: Odonata) behavior, *International Journal of Odonatology*, 14:2, 137-147.

## INVITED GUEST LECTURES

- Ballare, E.F.** (2015). *Orangutan Reintroduction: Challenges and Opportunities*. Universitas Gadjah Mada. May 22, 2015. Yogyakarta, Indonesia.
- Ballare, E.F.** (2013). *Orangutan Conservation in Borneo: Nutritional Adaptations to Declining Forest Habitats*. Invited Guest Lecture. University of Florida, College of Medicine. January 14, 2013. Gainesville, FL.

## CONFERENCE PRESENTATIONS & POSTERS

- Ballare, E.F.**, Naumenko, D.J., Watford, M., Mannion, K.R., Ugarte, A., Kugonza, J.B., Hobaiter, C., Utami Atmoko, S.S., Vogel, E.R., and Gruber, T. (2023). *Validation of a commercial colorimetric kit for the investigation of urinary ketone bodies and energetics in wild chimpanzees (*Pan troglodytes schweinfurthii*) and orangutans (*Pongo pygmaeus wurmbii*)*. Joint Meeting of the International Primatological Society and the Malaysian Primatological Society. August 19-25, 2023. Kuching, Malaysia.
- Ballare, E.F.**, Mannion, K.R., Vogel, E.R., and Gruber, T. (2022). *Ecological and energetic correlates of cultural behavior in wild western Ugandan chimpanzees (*Pan troglodytes schweinfurthii*)*. Energetics in Anthropology Workshop. May 2-3, 2022. Durham, North Carolina.
- \***Ballare, E.F.**, Prasetyo, D., and Vogel, E.R. (2020). *Evaluation of nutrition and health in rehabilitant and wild Bornean orangutans (*Pongo pygmaeus wurmbii*): current status and future recommendations*. Joint Meeting of the International Primatological Society and the Latin American Society of Primatologists. August 17-22, 2020. Quito, Ecuador. \*Postponed until Jan 2022 due to COVID
- Ballare, E. F.**, Jeffrey Brown, and Vogel, E.R. (2018). *Urea and C-peptide concentrations as a measure of protein balance and energetics in pre- and post-release Bornean orangutans (*Pongo pygmaeus wurmbii*)*. Columbia Rutgers Princeton Penn Yale Graduate Student Symposium. April 18, 2018. New Brunswick, NJ.

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- Ballare, E.F.**, Jeffrey Brown, and Vogel, E.R. (2018). *Urea concentration as a measure of protein balance in pre- and post- release Bornean orangutans (Pongo pygmaeus wurmbii)*. 87<sup>th</sup> Annual Meeting of the American Association of Physical Anthropologists Conference. April 11-14, 2018. Austin, TX.
- Ballare, E.F.** and Vogel E.R. (2017). *Stress in rehabilitated and released orangutan (Pongo pygmaeus wurmbii) populations in Central Kalimantan, Indonesia*. 1<sup>st</sup> Annual STEM Community Outreach Symposium at Rutgers. November 10, 2017. New Brunswick, NJ.
- Ballare, E.F.** and Vogel, E.R. (2017). *Cortisol variation in rehabilitated and released orangutans (Pongo pygmaeus wurmbii) in Central Kalimantan, Indonesia*. 3<sup>rd</sup> Annual Northeastern Evolutionary Primatologists Conference. November 27-28, 2017. Hartford, CT.
- Ballare, E.F.** and Vogel, E.R. (2017). *Urinary cytokine variation as indicator of immune function in rehabilitated Bornean orangutans (Pongo pygmaeus wurmbii)*. Annual Rutgers Princeton Penn Columbia Graduate Student Symposium. May 7, 2017. New York, NY.
- Ballare, E.F.** and Vogel, E.R. (2017). *Comparison of Creatinine and Specific Gravity for Standardizing Urinary Urea in Rehabilitated Orangutans*. Mapping New Directions in International Research: Inaugural Graduate Student Symposium: The Centers for Global Advancement and International Affairs. April 18, 2017. New Brunswick, NJ.
- Ballare E.F.** (2016) *Physiological Health Effects of Rehabilitation and Release in Bornean Orangutans (Pongo pygmaeus wurmbii)*. Nature Conservation Agency (BKSDA). August 1, 2016. Palangkaraya, Indonesia.
- Ballare, E.F.** (2015). *Health of Rehabilitated and Released Orangutans (Pongo pygmaeus wurmbii)*. Fulbright Indonesia Research Seminar 2015: Society, Environment and Education. May 20 -21, 2015. Yogyakarta, Indonesia.
- Ballare, E.F.** (2015) *Health of Rehabilitated and Released Orangutans (Pongo pygmaeus wurmbii)*. Borneo Orangutan Survival Foundation. February 28, 2015. Palangkaraya, Indonesia.
- Ballare, E.F.**, Knott, C., and Vogel, E.R. (2013). *Nitrogen Limitation in Bornean Orangutans in a Peat Swamp Habitat*. 82<sup>nd</sup> Annual Meeting of the American Association of Physical Anthropologists. April 9 -13, 2013. Knoxville, TN.
- Ballare, E.F.** (2013). *Protein Balance and Immuno-responsiveness in Rehabilitated and Released Orangutans (Pongo pygmaeus wurmbii)*. Ecology and Evolution Graduate Student Association Student Seminar Series. New Brunswick, NJ. September 20, 2013. New Brunswick, NJ.
- Ballare, E.F.** (2013). *Protein Balance, Immuno-responsiveness, and Gastrointestinal Parasites in Rehabilitated and Released Orangutans (Pongo pygmaeus wurmbii)*. Borneo Orangutan Survival Foundation. May 30, 2013. Palangkaraya, Indonesia.

## LANGUAGES

English - Fluent (native language)  
Bahasa Indonesia – Fluent  
French – Beginner/Intermediate  
Spanish – Beginner  
Kiswahili – Beginner

## CERTIFICATIONS

First Aid and CPR AED Certification, American Heart Association  
PADI Open Water Certification  
Laboratory Safety  
Radiation Safety  
IATA/ICAO: UN3245 ; UN3373 ; UN1845

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