Elizabeth F. Ballare, Ph.D.

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EDUCATION

Doctor of Philosophy, Received 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
Independent Research: Genomic library for *Rana cascadae* and screening for polymorphic microsatellites

Associate of Science, August 2005
Biology, County College of Morris
Honors: National Dean's List

RELEVANT WORK HISTORY

Consultant, U.S.A and Madagascar, April 2025-present
Lemur Love Organization
Designing and implementing a biomarker monitoring program using lemur urine to assess health. Responsibilities include budgeting, vendor coordination, and reagent ordering; recommending target analytes based on species, sample matrix, storage, and field conditions; validating commercial assay kits for field and laboratory use; performing hormone assays and interpreting results. Developing protocols and workflows for future in-country laboratory implementation. Organizing and leading a capacity-building workshop to train local Malagasy partners in laboratory techniques and biomarker analysis.

Visiting Scientist, Rutgers, The State University of New Jersey, Jan2022 - present
Department of Anthropology
Performs colorimetric, radioimmuno-, and enzyme-linked immunosorbent assays to quantify biomarkers of stress, energetics, inflammation, immune responsiveness, and reproduction in primates, whales, and bats. Validates assays kits. Trains undergraduate and graduate students.

Treasurer, New Jersey, Jan2019 – present
CORE Borneo
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.

(Sub)Doctoral Lecturer, Hunter College, The City University of New York, Aug2024 – Aug2025
Department of Anthropology
Delivered lectures, discussions, and hands-on activities for undergraduate students in *The Human Species* (ANTHP105) laboratory, covering foundational concepts such as allele frequency, natural selection, genetic drift, primate phylogeny, hominin fossil comparisons, racial disparities in health, nutrition, heart rate, immunity, life history, and hormones (e.g., cortisol and stress, male and female reproduction). Integrated current research and practical applications to emphasize topic relevance in health, medicine, and everyday life. Implemented active learning strategies to enhance student engagement, critical thinking, and comprehension of biological systems. Maintained an inclusive and collaborative classroom environment.

Laboratory Manager, Aug2023 – Aug2024
Laboratory for Primate Dietary Ecology and Evolution
Organized laboratory equipment, maintenance, and schedules. Corresponded with vendors to obtain quotes and place orders, performs colorimetric, radioimmuno-, and enzyme-linked immunosorbent assays to quantify biomarkers of stress, energetics, inflammation, immune responsiveness, and reproduction in primates. Validated

assay kits. Trained undergraduate and graduate students as well as visiting scientists in laboratory techniques. Analyzed data in 'R'.

Post-Doctoral Research Fellow, University of Geneva, Switzerland, Aug2021 – Aug2023

Centre Interfacultaire en Sciences Affectives (CISA); eccePAN Laboratory

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

Teaching Assistant* and Part-time Lecturer**
***Ph.D. Candidate, Rutgers – New Brunswick**
****MSc. Candidate, Rutgers - Newark**
Spring, 2021, (01:70:102) Introduction to Human Evolution*
Fall, 2020, (01:70:207) Extinction*
Spring, 2020, (11:216:252/01:070:252) Fundamentals of Evolution*
Fall 2019, (01:70:102) Introduction to Human Evolution*
Spring 2019, (01:70:102) Introduction to Human Evolution*
Fall 2018, (01:70:102) Introduction to Human Evolution*
Summer 2018, (01:119:116) General Biology II*
Fall 2017 – Spring 2018, (01:119:115/116) General Biology I and II*
Summer 2017, (01:119:115) General Biology I*
Fall 2016 – Spring 2017, (01:119:115/116) General Biology I and II*
Summer 2014, (01:119:115) General Biology I*
Fall 2013-Spring 2014, (01:119:115/116) General Biology I and II*
Summer 2013, Tuanan Research Station Field Course (Borneo, Indonesia)*
Spring 2013, (01:70:102) Introduction to Human Evolution*
Fall 2012, (01:119:115) General Biology I*
Spring 2012, (21:120:205/206) Foundations in Ecology and Evolution**
Fall 2011, (28:120:321) Comparative Vertebrate Anatomy**
Summer 2011, Earth Ecology Aim High Academy Field Course**
Fall 2010 – Spring 2011, (21:120:101/102) General Biology Laboratory I and II**
Summer 2010, (21:120:356) Molecular Foundations**
Summer 2010, (28:120:340) Mammalian Physiology**
Fall 2009 – Spring 2010, (21:120:101/102) General Biology Laboratory I and II**

Laboratory Technician, **New Jersey Aug2011-Aug2012**

Laboratory for Primate Dietary Ecology and Physiology

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

Surgical Veterinary Technician, **New Jersey Jan2006 - Aug2009**

All Creatures Great and Small Animal Hospital

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, Florida, Jan2009 - Feb2009

Center for Great Apes

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.

Research Assistant, New Jersey May2008 – Aug2008

Six Flags Great Adventure – Safari Park

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

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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**

TRAINING/MENTORSHIP

2022-2025, Laboratory for Primate Dietary Ecology and Physiology, New Jersey
Trained students and faculty in laboratory safety and pipetting techniques along with radioimmuno- and enzyme-linked immunosorbent assays.

2022, Philadelphia Zoo, Pennsylvania
Trained browse workers how to collect and preserve phloem samples for nutritional analyses. Trained browse workers and undergraduate volunteers how to collect behavioral and feeding rate data for comparisons with wild orangutans.

2021-present, eccePAN Laboratory – UNIGE; Bugoma Primate Conservation Project – Hoima, Uganda
Mentored and trained 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, New Jersey
Trained one undergraduate student in data entry, statistical analyses, laboratory techniques and protocol, and colorimetric and enzyme-linked immunosorbant 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, Indonesia
Post-Release Monitoring Staff and Volunteers
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, Indonesia
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

2021, Skype a Scientist
Zoomed with matched participants (teachers, students, etc.) to discuss my research and engaged in a Q&A with inquisitive individuals.

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^{th}-9^{th} 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
Society for Conservation Biology/International Congress for Conservation Biology

PUBLICATIONS

Ballare, E., Mannion, K., Kugonza, J.B., Ugarte, A., Watford, M., Hobaiter, C., Utami Atmoko, S.S., Vogel, E.R., and Gruber, T. (in review, American Journal of Primatology). An analytical and biological validation of non-invasive urinary ketones in wild chimpanzees (*Pan troglodytes schweinfurthii*) and orangutans (*Pongo pygmaeus wurmbii)*

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, E.F., Brown, J., Alavi, S., Mitra-Setia, T., Al-Mubarok, 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., and Vogel., E.R (in prep): Comparison of creatinine and specific gravity for standardizing urinary urea in rehabilitant Bornean orangutans (*Pongo pygmaeus wurmbii*).

Ballare, E.F., Frazee, L.J., Alavi, S., Utami Atmoko, S.S., Al-Mubarok, 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.

Ballare, E.F., and Nuamenko, D.J. (in prep): Urinary cytokine measurements: how to incorporate values below the limit-of-detection (LOD).

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, 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.

Elizabeth F. Ballare & 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. (2020). *Primates in Captivity.*
California State University, Northridge. ANTH 490E, Seminar in Applied Anthropology

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

Vogel, E.R., Alavi, S.E., **Ballare, E.,** Brittain, R.S.A., Hernandez-Janer, E., Kunz, J., Prima Lady, Naumenko, D.J., O'Connell, C., Prasetyo, D., Rosenthal, G., Ugarte, A., van Noordwijk, M., Mitra Setia, T., Utami Atmoko, S.S. (2025). The ecology of stress: The effects of natural variation and disturbance on wild Bornean orangutans (*Pongo pygmaeus wurmbii*). 94th Annual Meeting of the American Association of Biological Anthropologists Conference. March 12-15, 2025. Baltimore, MD.

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.

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)*. 87th 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 pgymaeus wurmbii) populations in Central Kalimantan, Indonesia.* 1st 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 pgymaeus wurmbii) in Central Kalimantan, Indonesia.* 3rd 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 pgymaeus 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.* 82nd 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.