Grace Charles

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Ecology Ph.D. with extensive international field work experience, primarily in Kenya. Collaborative team player skilled in project management and budgeting. Possess excellent writing and communication skills, including the production of publications and presentations for public and scientific audiences.

Education

University of California, Davis Davis, CA
Ph.D. in Ecology June 2018
Dissertation: *Herbivore-Mediated Trophic Cascades in an East African Savanna*
GPA: 3.87/4.00

Harvard University Cambridge, MA
B.A. in Organismic and Evolutionary Biology *cum laude* in field with high honors May 2011
Honors Thesis: *Interactive Effects of Large-Mammal Extinction and Climate Change in an African Savanna: Experimental Approaches*
GPA: 3.64/4.00

Environmental Coursework: Ecology, Principles of Ecology, Community Ecology, Principles of Soil Science, Ecosystem Biogeochemistry, Landscape and Ecosystem Ecology, Foundations of Biodiversity
Economics Coursework: Spatial Models for Social and Environmental Policy, Quantitative Statistical Methods for Economics
Quantitative/Statistical Coursework: Experimental Design and Analysis, Applied Statistical Modeling for Environmental Science, Data Manipulation in R, Geographic Information Systems, Modeling/Differential Equations for Biology, Introduction to Computer Science, Calculus, Series, and Differential Equations
Other Relevant Coursework: Elementary Swahili, History of Global Health

Skills

Software & Programming: Microsoft Office (Word, Excel, Access, PowerPoint), ArcGIS (9 & 10), QGIS, Tableau, R, Python, SAS
Research techniques (selected): Regression analysis, GIS and cartography, hierarchical mixed modeling, spatial statistics, predictive modeling, multivariate modeling
Languages: English, Spanish (intermediate), Swahili (conversational)

Work Experience

Dates of Employment: 09/2012 – 06/2018 *Job Title*: **Doctoral Researcher in Ecology**
Employer Name and Address: Department of Plant Sciences, University of California, Davis, 95616, USA
Supervisor Name and Contact: Dr. Truman Young, 530-754-9925, tpyoung@ucdavis.edu **[may contact]**
Hours and Salary: 40 hours/week; $34,000/year

My Ph.D. research took place in the semi-arid rangelands of Central Kenya. I drew on techniques from soil science, plant ecology, and remote sensing to ask how replacing native wildlife with domesticated animals affected savanna ecosystems. I collaborated with scientists from both the United States and Kenya on my research.

Duties and accomplishments:

- Designed and conducted five seasons of independent, international field research in Kenya. Led and supervised a research team comprised of 4 Kenyan research technicians.

- Successfully developed project proposals and budgets to fund dissertation research.
- Served as a student representative for the UC Davis Graduate Group in Ecology Awards Committee from 2016 – 2018.
    - Reviewed research project proposals and budgets for incoming and continuing graduate students.
    - Made recommendations for awards based on scientific merit, creativity, reasonableness of budget, and academic "distance traveled."
    - Responsible for distributing $245,000 of fellowship awards in 2018.
- Collected quantitative and qualitative data, created and organized databases and spreadsheets, performed data analyses, utilized statistical analysis tools, and produced research products including data visualizations and interactive maps.
- Awarded $5000 through a competitive "Graduate Research Internship Program" grant from the National Science Foundation to fund research collaboration with the Smithsonian Institute.
- Awarded $9398 through the National Science Foundation's "Research Experience for Undergraduates" supplement to fund and mentor 1 undergraduate researcher in Kenya.
    - Mentored undergraduate student in experimental design, data collection, data entry, writing, and statistical analyses.
- Wrote and analyzed data as an author on 7 peer-reviewed journal articles.
- Presented results at 3 national research conferences.
- Presented and shared results with public audiences as a Science Communication Fellow at the Powerhouse Science Center in Sacramento.
- Served as instructor for NSF Graduate Research Fellowship Program six-week writing workshop in 2013 and 2014.
    - Evaluated project proposals and provided writing and editing expertise to a total of 9 students. Out of 9 students, 67% received recognition: 4 (44%) received fellowships and 2 were awarded honorable mentions, surpassing typical award rates of ~20%.

Dates of Employment: 07/2011 – 07/2012 *Job Title*: **Project Manager, UHURU Project**
Employer Name and Address: Department of Ecology and Evolutionary Biology, Princeton University, Princeton, NJ, 08544, USA;
Supervisor Name and Contact: Dr. Robert Pringle, 609-258-8273, rpringle@princeton.edu **[may contact]**
Hours: 40 hours/week

I managed Ungulate Herbivory Under Rainfall Uncertainty (UHURU) project at Mpala Research Centre in Laikipia, Kenya for one year as its inaugural project manager. This job required me to adapt to challenging international field conditions and provided me with the fundamental skills to manage and lead multi-institutional research projects.

Duties and accomplishments:

- Supervised five full-time Kenyan research assistants.
- Organized and coordinated collaborations with other researchers and research projects.
- Scheduled all project-related fieldwork. Balanced fieldwork priorities among three PIs, as well as numerous graduate students and collaborators.
- Managed and organized field equipment and six field vehicles.
- Entered, error-checked, organized, and archived survey data. Designed databases to be available online and offline.
- Led outreach efforts, including arranging and planning educational science field days with local

Kenyan high school students.

- Collaborated with a graduate student to produce a pictorial identification guide for plants of the central Kenyan rangelands. Identification guide was used to facilitate communication between local ranchers, students, and researchers.
- Conceived and carried out independent field experiments.
- Demonstrated written communication skills by producing 3 manuscripts for publication.

Dates of Employment: 10/2009– 05/2011 *Job Title*: **Undergraduate Honors Thesis Research**
Employer Name and Address: Harvard University, Cambridge, MA, 02138, USA
Supervisor Name and Contact: Dr. Robert Pringle, 609-258-8273, rpringle@princeton.edu **[may contact]**
Hours: 20 hours/week

Duties and Accomplishments:

- Wrote and conceived research proposals for independent ecological fieldwork in Kenya.
- Developed budgets for field research.
- Awarded a total of $9000 through 4 competitive grants to carry out research.
- Supervised 1 full-time Kenyan research assistant.
- Designed, built, deployed, and tested experimental warming chambers to test low-cost methods to simulate climate change.
- Created, managed, and analyzed datasets. Identified trends in data using statistical techniques.
- Presented research to local community members and scientists in Kenya as an oral presentation at Mpala Research Center's *Discovery Day*.
- Presented results as a poster at the *Geospatial Collaboration* conference at Harvard University.
- Wrote results of research as honors thesis, resulting in recommendation for high honors in field for undergraduate degree.

Dates of Employment: 10/2009– 05/2011 *Job Title*: **Independent Undergraduate Researcher**
Employer Name and Address: Harvard University, Cambridge, MA, 02138, USA
Supervisor Name and Contact: Dr. Terry Ord, (+61 2 9385-3264), t.ord@unsw.edu.au **[may contact]**
Hours: 15 hours/week

Duties and Accomplishments:

- Analyzed imagery, videos, environmental, and phylogenetic information to ask why a particular trait in Anolis lizards may have evolved. Managed databases and spreadsheets.
- Utilized museum samples from the Harvard Museum of Comparative Zoology to fill in gaps in knowledge and to discover key evidence for trait evolution.
- Conducted statistical analyses using R and phylogenetic analyses using Mesquite.
- Summarized and wrote up results for publication as lead author.

Dates of Employment: 12/2008– 12/2009 *Job Title*: **Work-Study Research Technician**
Employer Name and Address: Harvard University, Cambridge, MA, 02138, USA
Supervisor Name and Contact: Dr. Terry Ord, (+61 2 9385-3264), t.ord@unsw.edu.au **[may contact]**
Hours: 15 hours/week

Duties and Accomplishments:

- Assisted in the planning and execution of domestic and international field experiments in El Yunque Rainforest, Puerto Rico and Cayman Brac Island, Cayman Islands.

- Demonstrated written communication skills as a co-author of two manuscripts.
- Managed and updated project spreadsheets and databases. Conducted data quality control.
- Conducted complex motion-image analysis using Matlab.

Service and Volunteering

Student representative, UC Davis Graduate Group in Ecology Awards Committee, 2016 – 2018
- Reviewed awards for incoming and continuing graduate students.
- Made recommendations for awards based on scientific merit, budgets, creativity, and academic "distance traveled."
- Responsible for distributing $245,000 of fellowship awards in 2018.

Instructor, NSF Graduate Research Fellowship Program writing workshop, 2013 & 2014
Reviewer, *Journal of Vegetation Science (3), Journal of Ecology (2), Oecologia (2), African Journal of Ecology, Ecosphere, Folia Geobotanica, Journal of Applied Ecology, Ecological Applications*
Co-organizer, UC Davis Society for Conservation Biology panel on non-academic careers in conservation, 2016
Mentor, Center for Land-based Learning program for high school students, 2013-2016
Mentor, Headwaters Science Institute science education program for middle school students, 2017
Mentor, Research Experience for Undergraduates student, 2015
Guest Lecturer, Ecology and Evolution 131: *Ecology of Tropical Latitudes*
Coach, Woodland Area Roller Derby, 2018: developed and implemented course for new skaters

Posters, Presentations, and Science Communication

1. 102nd Ecological Society of America Annual Meeting, Portland, OR. August 10, 2016. ***Talk title****: Diversity does not always beget diversity: multiple herbivore guilds combine to contribute to the maintenance of low woody diversity in an African savanna ecosystem*
2. Powerhouse Science Center, Sacramento, CA "Meet a Scientist Program". **Presentation and activity**: *Nature detectives: how scientists use clues to track wildlife*
3. **Charles, G.K.** 2016. Zebra = Cow? Effects of different herbivores on plant growth. *Mpala Memos* (Mpala Wildlife Foundation newsletter*)* December issue, 8-9
4. 101st Ecological Society of America Annual Meeting, Fort Lauderdale, FL. August 10, 2016. ***Poster title****: Impacts of different large herbivores on ecosystem function: cattle increase mean productivity, and wild herbivores reduce variability around the mean*
5. Graduate Student Symposium in Ecology. February 14, 2015. ***Talk title****: Interactions between large herbivores and termites drive multi-scalar patterns in community structure in a Kenyan savanna*
6. 99th Ecological Society of America Annual Meeting, Sacramento, CA. August 15, 2014. **Talk title:** *A massive and a tiny herbivore species drive patterns of plant community structure and landscape heterogeneity.*
7. Center for Geographic Analysis, Harvard University, "Geospatial Collaboration: New Common Ground." May 6, 2011. **Poster**: *Efficacy of using vegetation indices to predict plant productivity in African rangelands*
8. Mpala Research Centre, Kenya, with Denver Zoo "Discovery Day." July 24, 2010. **Talk Title**: *Interactive Effects of species loss and climatic variability: experimental approaches*

Grants & Fellowships

National Science Foundation Graduate Research Fellowship, 2012 – 2017 ($138,000)
Graduate Scholars Fellowship, UC Davis, 2012 – 2013 ($56,252)

Plant Sciences Departmental Fellowship, UC Davis, 2012 – 2017 (8 quarters of support)
UC Davis Department of Plant Sciences Travel Award, 2016**,** 2017($2000)
National Science Foundation Graduate Research Internship Program Fellowship, 2015. With the Smithsonian Institute ($5000)
Author, NSF Research Experience for Undergraduates supplement, 2015 ($9398)
Henry A. Jastro Graduate Research Scholarship, 2013, 2016 ($5100)
Center for Population Biology Research Award, 2013**,** 2014 ($2000)
Explorers Club Youth Activity Fund, 2010 ($3000)
Museum of Comparative Zoology Grants in Aid of Undergraduate Research, 2010 ($2500)
Harvard College Research Program, 2010 ($1000)
Harvard University Center for the Environment, 2010 ($2500)

Selected Manuscripts in Preparation

1. **Charles, G.K.**, C. Riginos, K.E. Veblen, D. Kimuyu, and T.P. Young. Dynamism in a stationary ecosystem engineer: response of mound-building termites to biotic changes in a Kenyan savanna (*submitted, Oecologia*).
2. **Charles, G.K**, T.P. Young, C. Riginos, K.E. Veblen, and D. Kimuyu. Diversity does not always beget diversity: multiple herbivore guilds combine to contribute to the maintenance of low woody diversity in an African savanna ecosystem.
3. **Charles, G.K**., K. Gravuer, C. Riginos, K.E. Veblen, and T.P. Young. Wildlife, termites, and tree density drive patterns in soil microbial diversity in a savanna ecosystem.

Publications

1. Odadi, W., **G.K. Charles**, and T.P. Young. Cattle select African savanna termite mound patches less when they share habitat with wild herbivores. *Accepted*, *Ecology and Evolution*.
2. Young, T.P., L.M. Porensky, C. Riginos, K.E. Veblen, W.O. Odadi, D.M. Kimuyu, **G.K. Charles**, H.S. Young. 2018. Relationships between cattle and biodiversity in a multi-use landscape revealed by the Kenya Long-term Exclosure Experiment (KLEE). *Rangeland Ecology & Management* 71(3), 281-291.
3. LoPresti, E.F., M. Robinson, B.A. Krimmel, **G.K. Charles**. 2018. The sticky fruit of the manzanita: potential functions beyond epizoochory. *Accepted, Ecology.*
4. **Charles, G.K.,** L.M. Porensky, C. Riginos, K.E. Veblen, T.P. Young. 2017. Grazing intensity stimulates herbaceous productivity, but herbivore identity constrains variability in an African savanna. *Ecological Applications* 27(1), 143-155.
5. Ord, T.J., **G.K. Charles**, M. Palmer, J.A. Stamps. 2016. Plasticity in social communication and its implications for the colonization of novel habitats. *Behavioral Ecology* 27(1), 341-351.
6. LoPresti, E.F., I.S. Pearse, **G.K. Charles.** 2015. The siren song of a sticky plant: columbines provision mutualist arthropods by attracting and killing passerby insects. *Ecology* 96(11), 2862-2869.
7. Zefferman, E., J.T. Stevens, **G.K. Charles**, M. Dunbar-Irwin, T. Emam, S. Fick, L. Morales, K.M. Wolf, D.J.N. Young, T.P. Young. 2015. Plant communities in harsh sites are less invaded: a summary of observations and proposed explanations. *Annals of Botany* plv056.
8. Pringle, R.M., J.R. Goheen, T.M. Palmer, **G.K. Charles,** E. Defranco, R. Hohbein, A.T. Ford, C. Tarnita. 2014. Low functional redundancy among mammalian browsers in regulating an encroaching shrub (*Solanum campylacanthum*) in an African savanna. *Proceedings of the Royal Society B* 281(1785).
9. Kartzinel, T.R., J.R. Goheen, **G.K. Charles**, E. Defranco, J.E. Maclean, T. Otieno, T.M. Palmer, R.M. Pringle. 2014. Plant and small mammal responses to large-herbivore exclusion in a semi-arid African savanna: the first five years of the UHURU experiment. *Ecology* 95(3):787.

10. Caro, T., **G.K. Charles**, D.J. Clink, J.R. Riggio, A. Weill, C. Whitesell. Terrestrial protected areas: threats and solutions. 2014. Pages 61-77. In: Sample, V. Alaric; Bixler, R. Patrick (editors). Forest conservation and management in the Anthropocene: conference proceedings. Proceedings RMRS-P-71. Fort Collins, CO: USDA Forest Service. Rocky Mountain Research Station.
11. Goheen, J.R., T.M. Palmer, **G.K. Charles,** K.M. Helgen, S.T. Kinyua, J.E. Maclean, H.S. Young, R.M. Pringle. 2013. Piecewise disassembly of a large-herbivore community across a rainfall gradient: The UHURU experiment. *PLoS One* 8(2): e55192.
12. **Charles, G.K.,** T.J. Ord. 2012. Factors leading to the evolution and maintenance of a male ornament in territorial species. *Behavioral Ecology and Sociobiology* 11, 127–31.
13. Ord, T.J., **G.K. Charles,** R.K. Hofer. 2010. Evolutionary ancestry determines whether communicating animals exploit periods of quiet in noisy environments. *The American Naturalist* 177:54-64.

References

1. Dr. Truman Young, Professor, Department of Plant Sciences, University of California, Davis. *Phone*: 530-754-9925 *Email*: tpyoung@ucdavis.edu
2. Dr. Richard Karban, Professor, Department of Entomology, University of California, Davis. *Phone*: 530-752-2800 *Email*: rkarban@ucdavis.edu
3. Dr. Andrew Latimer, Professor, Department of Plant Sciences, University of California, Davis. *Phone*: 530-752-2465 *Email*: amlatimer@ucdavis.edu
4. Dr. Robert Pringle, Professor, Department of Ecology and Evolution, Princeton University. *Phone:* 609-258-8273 *Email*: rpringle@princeton.edu