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# Urmila B. Mallick

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## EDUCATION

**Yale University** 2023-Present *New Haven, CT*

School of the Environment, *PhD*

*Advisors:* Dr. Oswald Schmitz, Dr. Mark Bradford

*Research:* Impacts of domestic and wild megafauna on plant-mycorrhizal dynamics and ecosystem carbon balance in tropical and boreal ecosystems

**Yale University** 2021-2023 *New Haven, CT*

School of the Environment, *Master of Environmental Science*

*Advisor:* Dr. Oswald Schmitz

**Worcester Polytechnic Institute (WPI)** 2017- 2021 *Worcester, MA*

Biology and Biotechnology, *Bachelor of Science*

Environmental & Sustainability Studies, *Bachelor of Arts*

Social Entrepreneurship, *Minor*

*Advisor:* Dr. Marja Bakermans

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## FELLOWSHIPS, AWARDS & GRANTS (Total = \$250,750)

<b>NSF Graduate Research Fellowship (Pre-doctoral)</b> , National Science Foundation (2021-2026)	<b>\$138,000</b>
<b>BIOGEOMON 2024 Conference Travel Grant</b> (2024)	<b>\$1250</b>
<b>Doctoral Conference Travel Fund</b> , Yale University (2023)	<b>\$500</b>
<b>Yale Tropical Resources Institute Endowment Fellowship</b> , Yale University (2023-2024)	<b>\$8000</b>
<b>Yale Tropical Resources Institute Endowment Fellowship</b> , Yale University (2022-2023)	<b>\$8000</b>
<b>Yale Institute for Biospheric Studies Early Grant</b> , Yale University (2022-2023)	<b>\$3500</b>
<b>Yale Institute for Biospheric Studies Research Matching Funds</b> , Yale University (2022-2023)	<b>\$500</b>
<b>David T. Schiff Fund for Wildlife, Habitat, and Biodiversity Research</b> , Yale University (2022)	<b>\$4000</b>
<b>NSF Research Experience for Undergraduates (REU) Fellow</b> , Harvard University (2020)	<b>\$6000</b>
<b>Women's Young Investigator Fellowship</b> , Worcester Polytechnic Institute (2019-2020)	<b>\$1000</b>
<b>Worcester Polytechnic Institute Merit Scholarship</b> , Worcester Polytechnic Institute (2015)	<b>\$80,000</b>
<b>Provost's (1st place) Major Qualifying Project Award in Dept. of Biology and Biotechnology</b> , WPI	
<b>Dean's List; Graduation with High Distinction</b> , WPI	

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## RESEARCH EXPERIENCE

**NSF Graduate Research Fellow; PhD research** Terra Nova National Park, Newfoundland, Canada  
Yale School of the Environment; Memorial University of Newfoundland Aug 2023- Present

- Assessing the impacts of moose activity on plant-mycorrhizal dynamics and soil carbon storage in a boreal forest system (funded by the Yale Center for Natural Carbon Capture)

**NSF Graduate Research Fellow; Master's thesis (PI: Dr. Oswald Schmitz)** Maun, Botswana  
Yale School of the Environment; Okavango Research Institute (University of Botswana) Sep 2021- May 2023

- Exploring the impacts of wildlife, livestock, species functional traits, and anthropogenic presence on soil carbon in Botswana's Makgadikgadi National Park and bordering community rangelands

**Graduate Research Assistant (PI: Dr. Simon Queenborough)** New Haven, CT  
Yale School of the Environment Jan 2023 - Present

- Analyzing long-term data from a montane tropical rain forest in Puerto Rico (Luquillo Forest Dynamics Plot) to explore the effects of hurricanes on biotic and abiotic drivers of understory plant dynamics (*Heliconia caribaea*) across a long-term research site

**Graduate Research Assistant (PI: Prof. Anna Behm Masozera)** New Haven, CT  
Yale School of the Environment Jan 2022 – Present

- Manuscript conceptualization, publication preparation, and discussion with experts on international collaboration and conflict concerning mountain gorilla conservation in the Greater Virunga Landscape (central Africa)

**Graduate Research Assistant (PI: Dr. Oswald Schmitz)** Terra Nova National Park, Newfoundland, Canada  
Yale School of the Environment; Memorial University of Newfoundland June - July 2023

- Field assistant for project exploring the impacts of moose management on boreal forest soil carbon flux (assisted with site setup, soil sampling, and vegetation surveys)

**Graduate Research Assistant (PI: Dr. James Saiers)** New Haven, CT  
Yale School of the Environment March - May 2023

- Lab assistant for enhanced mineral weathering natural carbon capture project (assisted with soil and vegetation sample processing and soil carbon analyses)

**Graduate Research Assistant (PI: Dr. Oswald Schmitz)** New Haven, CT  
Yale School of the Environment Sep 2022- Dec 2023

- Lab assistant for natural carbon capture project exploring the impacts of moose management on boreal forest soil carbon flux (assisted with soil sample processing and analyses)

**Graduate Research Assistant (PI: Dr. Oswald Schmitz)** New Haven, CT  
Yale School of the Environment Sep 2021- May 2022

- Assisted doctoral students and postdocs in the lab with soil sampling, processing, and laboratory analyses

**NSF Research Experience for Undergraduates (REU); Visiting Undergraduate** Cambridge, MA  
Harvard University (PI: Dr. Colleen Cavanaugh, Dept. of Organismic & Evolutionary Biology) May '20-Aug '21

- Participated in a Leadership Alliance REU, hosted by Harvard's Summer Research-Early Identification Program
- Participated in professional development events with faculty, doctoral students, and postdoctoral fellows from Harvard OEB and Brown University's Leadership Alliance
- Conducted research on bacterial symbiosis in the human oral microbiome: used metagenomics and metatranscriptomics to study the ecology of bacteria in healthy and diseased bacterial genomes and transcriptomes
- Continued research as a visiting undergraduate at Harvard OEB (August 2020-2021)

**Interactive Qualifying Project (Advisor: Dr. Khalid Saeed)** Worcester, MA  
Worcester Polytechnic Institute, Dept. of Social Science & Policy Studies Apr 2020- 2021

- Developed a system dynamics model and gaming environment for cost-benefit analyses of conventional free-ranging dog population management strategies and a newly proposed social integration policy

**Major Qualifying Project (Advisors: Dr. Marja Bakermans, Dr. Khalid Saeed)** Worcester, MA; Kolkata, India  
Worcester Polytechnic Institute; Depts: Biology & Biotechnology, Social Science & Policy May 2019-Oct '20

- Independently structured undergraduate thesis: Social integration feasibility of free-ranging dogs (FRD) for animal welfare, public health, and conservation benefits
- Assessed local/national Indian perspectives, FRD welfare, FRD threats on conservation efforts, and human-FRD interactions through semi-structured interviews with professionals and local communities, literature review, FRD field surveys in Kolkata, and multivariate data analyses

**Research Volunteer (PI: Dr. Guangping Gao)**  
Horaë Gene Therapy Center, UMass Medical School

Worcester, MA  
Oct 2014-May 2016

- Assisted in adeno-associated virus development for Canavan disease gene therapy
- Laboratory skill development (e.g., PCR, gel electrophoresis, western blot, mouse handling/testing)

### **PUBLICATIONS (\* indicates shared co-first authorship)**

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- **Mallick, U.B.**, Bakermans, M.H., Saeed, K. 2021. Transforming a liability into an asset: A system dynamics model for free-ranging dog population management. *Systems* 9(56) doi: 10.3390/systems9030056
- *In prep*: **Mallick, U.B.**, Orrick, K., Masunga, G., Schmitz, O.J. Landscape-scale variation in large herbivore functional guilds and soil carbon storage across a semi-arid rangeland.
- *In prep*: **Mallick, U.B.** Matlaga, D. Bruna, E.M. Zimmerman, J.K. Uriarte, M. Queenborough, S. The importance of disturbance: hurricanes modify the biotic and abiotic drivers of herbaceous understory plant dynamics in a tropical rain forest.
- *In prep*: **Mallick, U.B.\***, Masozera, A.B.\*, McVey, A., Ruzigandekwe, F., Teferi, T., Koliba, C., Sanford L., Martin, A. Longitudinal exploration of international cooperation and conflict in a social-ecological system: A study of mountain gorilla conservation for transboundary conservation action planning.
- *In prep*: **Mallick, U.B.** Utter, D.R., Cavanaugh, C.M. Saccharibacteria express the Arginine Deiminase System consistently across Health and Periodontal Disease.

### **CONFERENCES & PRESENTATIONS**

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- **Mallick, U.B.**, Matlaga, D., Bruna, E.M., Zimmerman, J., Uriarte, M., Queenborough, S. “The importance of disturbance: hurricanes as controls on biotic and abiotic drivers of herbaceous understory plant dynamics in a tropical rain forest.” *Oral Presentation*. **11th International BIOGEMON Symposium on Ecosystem Behavior**, San Juan, Puerto Rico. January 2024.
- **Mallick, U.B.**, Orrick, K., Masunga, G., Schmitz, O.J. “Differentiating the Impacts of Animal Functional Guilds on Soil Carbon Storage across a Semi-arid Rangeland and Protected Area in Botswana.” *Poster*. **American Geophysical Union: Annual Meeting 2023**, San Francisco, CA. December 2023.
- **Mallick, U.B.** “Animal-mediated soil carbon storage across a semi-arid rangeland and protected area in Botswana.” *Oral Presentation*. **Confluence Research Discussion Series**, Yale School of the Environment, New Haven, CT. April 2023.
- **Mallick, U.B.** “Animal-mediated soil carbon storage across a semi-arid rangeland and protected area in Botswana.” *Oral Presentation*. **Tropical Research Institute Symposium**, Yale School of the Environment, New Haven, CT. April 2023.
- **Mallick, U.B.** “Animal-mediated soil carbon storage across a semi-arid rangeland and protected area in Botswana.” *Oral Presentation*. **YSE Research Day**, Yale School of the Environment, New Haven, CT. April 2023.
- **Mallick, U.B.**, Utter, D.R., Cavanaugh, C.M. “Bacterial symbiosis in the human oral microbiome: combining metagenomics and transcriptomics to identify the ecology of TM7x in health and disease.” *Oral Presentation*. **5th Annual Leadership Alliance National Symposium** (online). August 2020.
- **Mallick, U.B.**, Utter, D.R., Cavanaugh, C.M. “Bacterial symbiosis in the human oral microbiome: combining metagenomics and transcriptomics to identify the ecology of TM7x in health and disease.” *Oral Presentation*. **E3 and MCO Summer Research Opportunities at Harvard Joint Symposium**, Harvard University (online). July 2020.
- **Mallick, U.B.**, Bakermans, M., Saeed, K. “Modeling social integration feasibility of free-ranging dogs: a population management intervention for conservation benefits”. *Poster*. **Society for Conservation Biology: North American Congress for Conservation Biology** (online). July 2020.

- **Mallick, U.B.**, Bakermans, M. “Social integration feasibility of free-ranging dogs: exploring stories and experiences.” *Oral Presentation*. 13<sup>th</sup> **Annual Association for Environmental Studies and Sciences Conference** (online). June 2021.
- **Mallick, U.B.** “Modeling social integration feasibility of free-ranging dogs for animal welfare, public health and conservation benefits.” *Oral Presentation*. **Women’s Young Investigator Fellowship Symposium**, Worcester Polytechnic Institute, MA. April 2020.

## SKILLS

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- **Programming:** R, LaTeX, Bash
- **Software (statistical, spatial, remote sensing, AI):** Microsoft Office, Git, Github, RStudio, ENVI, ArcGIS Pro, MegaDetector, TrapTagger, ImageJ, MaxEnt, Minitab, Stella Architect, Vensim, LitMaps, Inkscape, Zotero/Obsidian
- **Bioinformatics:** Anvi’o, Next Generation Sequencing (NGS) data analysis, NGS quality control, Assembling and annotating genomes, Differential gene analysis, RNAseq processing and transcriptomics
- **Field research:** Transect surveys; Camera trapping; Avian banding; Semi-structured qualitative interviews; Soil sampling; Experience in Botswana, India, Newfoundland, and northeast US
- **Laboratory and Instrumentation:** Soil sample processing, pH, and texture by hydrometer; ELTRA carbon-sulfur elemental analyzer; Cell culture; DNA/protein purification; Agarose gel electrophoresis; Western blot, PCR
- **Other:** Research and grant writing, Data cleaning and management, Data visualization
- **Languages:** Bengali (native), English (native), Hindi (fluent), French (basic), Oriya (basic)

## CERTIFICATES

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Winter School in Bioinformatics, Physalia Courses

Online, Feb 2024

## TEACHING & MENTORSHIP

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**Mentor for National Science Foundation REU Student (PI: Dr. Marja Bakermans)**

Worcester, MA

Worcester Polytechnic Institute

Jun-Aug 2021

- Mentored undergraduate REU student studying the effects of wind farms on bird population dynamics and habitat availability in the US

**Teaching Assistant**

Worcester, MA

Worcester Polytechnic Institute

Oct 2018-May 2021

- Employed for eight courses over five semesters, in: Biodiversity, Chemistry, and System Dynamics (Depts: Biology & Biotechnology, Chemistry & Biochemistry, and Social Science & Policy Studies)
- Assisted professors with course management, laboratory supervision, project guidance, student office hours, and assignment/exam grading in laboratory and online environments

## PROFESSIONAL AFFILIATIONS

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British Ecological Society

2024- Present

American Geophysical Union

2023- Present

Society for Conservation Biology

2020- Present

Ecological Society of America

2020- Present

## ACTIVITIES

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**Community infrastructure development project** Maun, Botswana  
Collaborator: Mr. Dikatholo Kedikilwe (Round River Botswana Trust) Aug 2022- Present

- Procuring funding to establish a system of solar-powered streetlights for main roads across 4 villages in the Okavango Delta, an area with no access to powerlines and a long history of human-wildlife conflict

**Volunteer** New Haven, CT  
Yale School of the Environment Semester of Service Sept – Dec 2022

**Fundraising and education volunteer** Worcester, MA  
Canines for Disabled Kids Jan- Dec 2021

**Peer Learning Mentor for undergraduates** Worcester, MA  
Worcester Polytechnic Institute Oct 2020- May 2021

## OTHER

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**Odissi (Soloist, Teacher, and Choreographer)** New York City, Boston  
Independent 2020-Present

- Collaborator and dance instructor in the Boston and New York metropolitan areas
- Featured in New York City Center's 2023 Studio 5 series

**Ensemble Member** International  
Nrityagram Dance Ensemble 2014-2020

- Six reviewed international tours (notable venues: Lincoln Center, Metropolitan Museum, Royal Festival Hall)
- Conducted over 50 workshops and classes at universities and theaters in the US, India, and Canada
- Trained village children, city students, and ensemble members at Nrityagram (Bangalore, India)