Mai Fahmy, PhD

Postdoctoral Research Scientist | Conservation Biologist

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Fordham University • Department of Biological Sciences • 441 East Fordham Road • Bronx, NY 10458

**EDUCATION**

**PhD, Biological Sciences**, Fordham University

2022

* Dissertation: *Assessing biodiversity in Madagascar through leech-derived iDNA: Methodological advancements and ecological insights*

**BA, Ecosystems and Human Impact & Sustainability Studies**, Stony Brook University

**Study Abroad Program**, Central ValBio, Madagascar

**Study Abroad Program**, Deakin University, Australia

2015

2014

2013

**PROFESSIONAL APPOINTMENTS**

**Postdoctoral Research Scientist**

Fordham University & The American Museum of Natural History (Hekkala Lab)

Jan 2023 - Present

Investigated innovative strategies to preserve biodiversity and mitigate human impact on ecosystems, leveraging interdisciplinary approaches to inform conservation policies and promote sustainable coexistence between nature and society

* NSF STS: Integrating art, history, and diverse knowledge systems in crocodylian systematics - A Framework to advance inclusive practice in taxonomy

**Explorer’s Club Member**

2019 – present

**PUBLICATIONS**

1. **Fahmy, M.,** Tessler, M. A Jumping terrestrial leech from Madagascar. *Biotropica* (accepted).
2. Tessler, M., **Fahmy, M.** Terrestrial leech (Haemadipsidae) basics: iDNA surveys and beyond. *Conservation Genetics* (in prep).
3. **Fahmy, M.,** Tombotiana, A. V., Hekkala, E., Ravelomanantsoa, N. A. F. Description of a new haemadipsids species of genus Chtonobdella from Ranomafana National Park using micro-computed tomography. *Madagascar Conservation and Development* (submitted).
4. **Fahmy, M.,** Andrianoely, D.,Wright, P.C., Hekkala, E. (2023) Leech-derived iDNA enhances species detections for rapid biodiversity sampling in the tropics. *Environmental DNA* 00: 1-17.
5. **Fahmy, M,** and Siddall, M.E. (2022). Leeches, Hirudinea. Natural History of Madagascar, *eds* Goodman S and Benstead JP.
6. **Fahmy, M.**, Williams, K.M., Tessler, M., Weiskopf, S., Hekkala, E., Siddall, M.E. (2020). Multilocus metabarcoding of terrestrial leech bloodmeal iDNA increases species richness uncovered in surveys of vertebrate host biodiversity. *American Journal of Parasitology* 106 (6): 843-853.
7. Williams, K.M., Barkdull, M., **Fahmy, M.,** Hekkala, E., Siddall, M.E., Kvist, S. (2020). Caught red handed: iDNA reveals wild sources of CITES contraband leeches. *European Journal of Wildlife Research*. 66:80, 1-10.
8. **Fahmy, M.**, Ravelomantsoa, N., Youssef, S., Hekkala, E., Siddall, M.E. (2019). Biological inventory of Ranomafana National Park tetrapods using leech-derived iDNA. *European Journal of Wildlife Research.* 65:70, 1-13.
9. Donohue, M., **Fahmy, M.**, Pochron, S. Investigating pervasive contradictions in the field of ecotoxicology: *Eisenia fetida* weight loss in response to laboratory handling (in prep).
10. **Fahmy, M.**, Carlen, E. Toppling towers teach community structure and the importance of biodiversity (in prep).

**GENERAL AUDIENCE PUBLICATIONS**

1. **Fahmy, M.** (2023).Interview with Dr. Mai Fahmy: Digitizing CVB's crocodile fossil collection to support collaborative, community-centered research
2. **Fahmy, M**. (2022). Cold, wet, and covered in blood. The Explorer’s Club Winter Log.

**AWARDS AND SCHOLARSHIPS**

$10,000 | Rolex Exploration Grant

2022

$34,000 | Freedman Fellowship

$68,000 | Clare Booth Luce Fellowship, Henry Luce Foundation & Fordham University

2022

2019-2022

$750 | Fordham University Three Minute Thesis Competition, 2nd Place Winner

$5,000 | Fjällräven Explorer’s Club Field Grant

2021

2019

$1,000 | GeneWiz Week Next Generation Sequencing Grant

$190 | Fordham University Student Support Grant

2019

2019

$100 | New England Association of Parasitology Best Student Talk

$123,679 | Centennial Scholarship, GSAS, Fordham University

2018

2015-2019

Stony Brook University Dean’s List

Excellence in Student Leadership, Earthworm Ecotoxicology Lab

2011-2015

2015

**PRESENTATIONS**

“Applications of eDNA for biodiversity monitoring: Vegetation swabs, water sampling, and leech-derived iDNA” Seneca Falls Zoo.

2024

“Assessing biodiversity in Madagascar through leech-derived iDNA: Methodological advancements and ecological insights,” Columbia University, Population Biology Seminar.

2023

“My time in the Rainforests of Madagascar,” Reach the World, collaborated with classrooms K-12 across the US to share my field experiences and research, remote from New York.

2019-present

“Assessing vertebrate biodiversity in Madagascar through leech-derived iDNA: Methodological advancements and ecological insights,” Avenues The World School, Science and Pseudoscience, Dr. Christina Frare’s upperclassmen, presenter.

2022

“Assessing vertebrate biodiversity in Madagascar through leech-derived iDNA: Methodological advancements and ecological insights,” The Explorer’s Club, Grantee Symposium.

2022

“Assessing vertebrate biodiversity in Madagascar through leech-derived iDNA: Methodological advancements and ecological insights,” Yale University, Caccone Lab Seminar, guest speaker.

2022

“The Species Among Us: Women in Biodiversity,” The Explorer’s Club, shared my experiences as a woman in biodiversity science, guest panelist.

2021

“Small species with big impact: The importance of non-charismatic fauna to biodiversity and human existence,” The Explorer’s Club x Fjällräven Walk with Nature series, partnered with fellow grant recipient, PhD student from Zimbabwe, to emphasize the importance of invertebrates on biodiversity, remote from New York.

2020

“What’s on TAP at the Explorer’s Club: Women in the Field,” The Explorer’s Club, shared trials and testimonies facing women in exploration, guest panelist.

2020

Explore by the Seat of Your Pants, live stream from the field sharing stories and explaining my research with over 100 school children K-12, remote from Ranomafana, Madagascar.

2019

“Assessing vertebrate biodiversity in Madagascar through leech-derived iDNA: Methodological advancements and ecological insights,” 6th Young Natural History Scientist’s Meeting, Muséum Nationale d’Histoire Naturelle, Paris, France, presentation.

2019

“Biological inventory of Madagascar’s tetrapods using leech-derived iDNA,” New England Association of Parasitologists, Smith College, Massachusetts, presentation.

2018

“iDNA from blood feeding leeches for assessing vertebrate diversity in Madagascar,” 9th Student Conference on Conservation Science, American Museum of Natural History, speed talk.

2018

“Rapid biological inventory of Malagasy fauna using iDNA,” 27th International Primatological Society Congress, United Nations Office, Nairobi, Kenya, poster.

2018

Sustainability Studies Alumni Career Panel, Stony Brook University, guest panelist. Offered guidance to senior undergraduate students regarding the transition from college to career.

2017

“Leeches as a source of iDNA: Identifying leech host preference to inform an emerging technique in biodiversity surveying,” Centre ValBio, Ranomafana, Madagascar.

2017

“Quantifying a pervasive experimental anomaly in the field of ecotoxicology: Weight loss in control groups,” Stony Brook University Undergraduate Research & Creative Activities Symposium, poster.

2016

“Short and long-term changes in earthworm population size and body weight after exposure to a commonly used glyphosate-based product and fertilizer,” Stony Brook University Undergraduate Research & Creative Activities Symposium, poster.

2015

“Short and long-term effects of cadmium and used glyphosate-based product on soil microbial respiration and earthworm health,” Stony Brook University Undergraduate Research & Creative Activities Symposium, poster.

2015

“The effect of cadmium on soil microbial respiration and *Eisenia fetida* health,” Miller Place High School, Miller Place, NY.

2015

“The effect of Roundup herbicide on soil microbial respiration and *Eisenia fetida* health,” Miller Place High School, Miller Place, NY.

2015

“Centre ValBio conservation education in villages around Ranomafana National Park,” Centre ValBio, Ranomafana, Madagascar.

2014

“Centre ValBio conservation education in villages around Ranomafana National Park,” Population Biology SBC 204, Stony Brook University.

2014

“Centre ValBio conservation education in villages around Ranomafana National Park,” United States Embassy, Antananarivo.

2014

**RESEARCH EXPERIENCE**

**Graduate Student Researcher & Research Affiliate**

Sep 2016 – Dec 2022

Fordham University & The American Museum of Natural History

* Developed and validated an efficient environmental-DNA sampling technique using terrestrial blood-feeding leeches as a tool for biodiversity monitoring
* Established and oversaw use of a lab technique for DNA sequencing which saved over $30,000 in research expenses
* Designed a bioinformatics pipeline for DNA analysis in conservation biology
* Managed large databases, performed statistical analyses, and communicated science through data visualization
* Communicated results to scientific and lay audiences at both national and international academic conferences
* Collaborated with scientists and educators to promote wildlife conservation through effective outreach

**Principal Investigator**

Jan 2016 – Aug 2017

* Managed a lab of 40 undergraduate students examining the effects of environmental exposures on earthworm (*Eisenia fetida*) and soil health
* Designed experiments, collected data, and analyzed data, which was presented at various universities through poster presentations

**Undergraduate Research Lead**

Sep 2013 – May 2015

Stony Brook University, Earthworm Ecotoxicology Lab

* Exercised leadership and responsibility for forty undergraduate students; supervised students through experiments, the writing process, and lab safety procedures
* Edited and co-author two scientific papers
* Created posters for exhibition at the Undergraduate Research & Creative Activities symposium
* Bred cadmium and glyphosate resistant earthworms for resistance gene mapping
* Measured and recorded soil pH

**Research Intern**

Stony Brook University, School of Marine and Atmospheric Sciences (Fisher Lab)

Sep 2013 – Dec 2013

* Assisted post-doctoral students in researching radionuclide build up in tuna species affected by the Fukushima nuclear power plant disaster
* Entered data to Microsoft Excel, organized, labeled, and prepared tuna samples for methylmercury concentration assessment

**FIELD WORK**

**Principal Investigator & Expedition Lead**

Nov 2019, 2023

Ivohiboro Protected Area, Ihosy, Madagascar

* Objective: Describe the vertebrate diversity of a newly discovered forest fragment with eDNA, leech-derived iDNA alongside visual inventories and camera traps
* Results of these efforts provided impetus to elevate it to protected status
* Collected a total of 1,451 leeches, the largest ever recorded number of samples collected from a single site, to date
* Managed a team of Malagasy research assistants

**Principal Investigator**

Apr 2017 – Aug 2019

Ranomafana National Park, Madagascar

* Objectives: 1) Investigating leech (*Chtonobdella spp.*) diversity in Ranomafana National Park, 2) Comparing vertebrate species richness across disturbance gradients using leech-derived ingested vertebrate DNA (iDNA), 3) Comparing Sanger and next generation DNA sequencing techniques to validate quality of sequences obtained from individual versus pooled leech blood meals to inform future iDNA protocol
* Collected 593 leeches through rigorous off-trail hikes
* Mentored local graduate students from the University of Antananarivo
* Managed a team of Malagasy research assistants

**Principal Investigator**

Apr 2019

Andasibe, Madagascar

* Objective: collect leeches from Analamazoatra Special Reserve and Andasibe-Mantadia National Park for iDNA assessment
* iDNA analyses will reveal the fauna which inhabit these forests, and which may contribute taxonomically to the richness of the Ivohiboro Protected Area
* Managed a team of Malagasy research assistants

**Independent Researcher**

Jul 2014 – Aug 2014

Stony Brook University, Madagascar Study Abroad Program

* Collaborated with Centre ValBio (CVB) researchers and undergraduate students to investigate efficacy of CVB’s conservation education program in villages throughout Ranomafana, Madagascar
* Designed and administered surveys with a local guide to assess Malagasy opinion of environmental conservation efforts under the guidance of Dr. Patricia Wright
* Analyzed data using Microsoft Excel and R statistical computing
* Presented findings in the United States Embassy in Antananarivo, Madagascar to an audience of international ambassadors, local government officials, and university faculty/students

**Undergraduate Researcher**

Mar 2013 – Jul 2013

Stony Brook University, Australia Study Abroad Program

* Camped in temperate rainforests of Victoria to monitor sugar glider, squirrel glider, antechnius, and phascogale use of manmade tree hollows

**TEACHING, MENTORSHIP, & OUTREACH**

**Lead Research Coordinator** **& Graduate Student Mentor**

Mar 2021 - Present

Fordham University & The American Museum of Natural History

* Encouraged routine goal setting to stay on track for graduation
* Provided feedback on student research and presentation materials
* Fostered a safe environment for students to ask questions and express concerns

**Explorer & Educator**

Oct 2019 – Present

Reach the World

* Created science communication materials for school children from underrepresented backgrounds
* Shared my experiences as a field biologist with over 300 students ranging from grades K-12

**Teaching Fellow**

Sep 2016 – May 2019

Fordham University, Introductory Biology Lab I

* Managed laboratory experiments exploring fundamental concepts in biology
* Prepared and presented lectures to a class of 24 undergraduate students
* Instructed students on laboratory techniques such as measuring pH, pipetting, preparing electrophoresis gels, and plasmid mapping
* Created exam questions, graded exams and assignments, and offered assistance to students outside class hours

**Undergraduate Student Mentor**

Jul 2018

The American Museum of Natural History, Research Experience For Undergraduates

* Mentored undergraduate students in molecular laboratory techniques
* Assessed laboratory and sequencing techniques in generating results for iDNA surveys in Madagascar
* Program culminated in students presentations at The American Museum of Natural History

**Undergraduate Student Mentor**

Oct 2017 – May 2018

Fordham University

* Mentored undergraduate students in molecular laboratory techniques
* Student assisted in iDNA laboratory techniques
* Student developed and presented her own research at Fordham University Undergraduate Research Symposium

**Teaching Fellow**

Jan 2017 – May 2017

Fordham University, Introductory Biology Lab II

* Managed laboratory experimented aimed at understanding the diversity of life
* Prepared and presented lectures to a class of 24 undergraduate students
* Students explored the diversification of biological organisms through dissections
* Helped created exam questions, graded exams/assignments, and offered assistance to students outside of class hours

**Teaching Assistant** (Course: Systems and Models, Undergraduate Teaching Practicum)

Jan 2015 – May 2015

Stony Brook University

* Guided students in the use of iSEE STELLA modeling software to model dynamic systems
* Conducted and improved class procedures by communicating feedback from students to the instructor
* Worked closely with students outside class meeting hours and consistently monitored student progress

**SKILLS**

**Bioinformatic Techniques**

* Developed pipeline for DNA metabarcoding for trimming, dereplicating, and clustering next-generation sequencing reads
* DNA sequence alignment with MAFFT, MUSCLE, and BLAST
* Linux, R

**Geographic Information Systems (GIS)**

* Proficient in ArcGIS mapping software
* Mapped endangered species’ home ranges, executed appropriate map layout,
* symbolization, and color choice
* Analyzed the relationship between disease outbreaks and deforestation
* Experience in introductory Geospatial Analysis Lab performing GPS tagging

**iSEE STELLA Dynamic Modeling**

* Modeled the projected long-term effects of tourism on coral reef ecosystems in the Red Sea
* Assisted students in modeling various dynamic systems

**PADI Certified Open Water Diver**

* Dives recorded in the Red Sea and Mozambique Channel

**Language**

* Arabic, Egyptian-Dialect: fluent (speaking), basic (reading)
* French: intermediate (speaking, reading, writing)
* Malagasy: basic (speaking, reading, writing)

**ACTIVITIES & WORKSHOPS**

**Finding Creative & Collaborative Solutions to Knowledge Inequity in Conservation**

Mar 2024

* Practical steps to remove barriers to molecular conservation research

**Introduction to Ancient DNA Data Analysis**

Mar 2024

Globe Institute, University of Copenhagen & The American Museum of Natural History

**Wild-Life Artist**

Jan 2021 - Present

* Wildlife illustrator specializing in watercolor, oil paints, and digital art

**Intermediate Webinar: Using the UN Biodiversity Lab to Monitor the Pulse of the Planet**

Apr 2022

* Utilized geospatial data to monitor and measure biodiversity at various scale

**Phylogenetic Foundations Workship**

Aug 2019

Willi Hennig Society

* Implemented techniques in tree-searching, sequence alignment, and character weighting

**Listen: Lemur Calls Turned Into Beautiful Beatbox Jams**

Mar 2015

National Geographic, Special

* Recorded featured footage of ring-tailed lemurs

**Art Instructor**

Oct 2015 – Dec 2015

Jeddah, Saudi Arabia

* Hosted private art class for students aged 5-10yrs
* Students learned to express themselves creatively through a series of 12 two-hour sessions
* Art projects were focused on the theme of environmental consciousness and sustainability

**Diversity Peer Education Intern**

Jan 2014 – May 2014

Stony Brook University

* Engaged peers in discourse of socially sensitive topics, racism, sexism, privilege, etc
* Conducted an educational program on campus on religious misconceptions

**Sustainability Studies Department Volunteer**

Sep 2012 – May 2015

Stony Brook University

* Assisted in set up of admitted student’s day
* Answered questions of visiting students and their families
* Assisted set up of yearly campus-wide Earth Day events