Kayleigh Chalkowski

P: (607) 319-6342
W: kayleighchalkowski.com
E: kzc0061@auburn.edu

Profile

I am a second-year PhD Student at Auburn University studying parasite ecology of invasive species.

Education

PhD student at Auburn University
(expected) graduation May 2021
Auburn, AL

BSc in Biological Sciences (conc. in Ecology and Evolutionary Biology)
Cornell University, 2013
Ithaca, NY

ASc in Mathematics and Science
Hudson Valley Community College, 2010
Troy, NY

Research Skill Set

> Statistical Analysis in R
> Geospatial analysis in ArcMap
> Systematic Literature Review
> Necropsy/dissection techniques
> Vertebrate field sampling
> Small mammal trapping

Awards & Fellowships

Graduate Research Fellowship Program
Honorable Mention, 2018
National Science Foundation

School of Forestry and Wildlife
Writing Fellowship, 2018
Auburn University

Cell & Molecular Biology
Graduate Research Fellowship, 2017-2018
Auburn University

IUCN World Conservation
Congress Student Participation
Opportunity Award, 2016

Segal Education Award, 2014, 2016
Americorps Corporation for National and Community Service

Frederich C.V. Bruch Award for
Excellence in the Organic
Chemistry Laboratory, 2010
Hudson Valley Community College

RPI Award for Excellence, 2010
Rensselaer Polytechnic Institute

Warren Joscelyn
Mathematics Award, 2009
Hudson Valley Community College

Research Interests

Toxoplasma gondii population genetics; parasite ecology and evolution; invasive species; neglected tropical diseases; endangered species; conservation; parasite transmission dynamics; planetary health

Publications

Chalkowski K, Lepczyk C, & Zohdy S. (2018)
Parasite ecology of invasive species: conceptual framework and new hypotheses.
Trends in Parasitology: 34(8) pp 655-663.

Chalkowski K., Wilson, A., Lepczyk C., Zohdy S.
A global meta-analysis of parasitic infection risk in domestic cats (*Felis catus*) (under review)

Chalkowski K & Zohdy S.
Under the Radar: Geographic Spread of an Avian Eyefluke with Zoonotic Potential (in prep)

Fiedler K., Chalkowski K., Lepczyk C.
Landscape and climatic risk factors for *Toxoplasma gondii* infection risk in Kaua'i, Hawai'i (in prep)

Research Experience

Cell and Molecular Biosciences Graduate Research Fellowship; Auburn University
(current) August 2017-May 2018

Conducted systematic literature review on parasites in invasive species, Parasite Ecology of Invasive Species: New Directions (manuscript in prep). Learned laboratory techniques for tissue homogenization, DNA extraction and by May 2018 will have learned qPCR for detection of parasite *Toxoplasma gondii* in animal tissue.

College of Tropical Agriculture and Human Resources, University of Hawaii; Disease Ecology Technician
February 2017-May 2017

Designed and implemented chicken traps and a system for organizing data. By end of season I captured, banded and bled ~300 feral chickens across different land use types (agricultural, public beaches and parks, wildlife refuges) on the island of Kaua'i. Data currently under analysis.

Kaua'i National Wildlife Refuge Complex; Americorps Intern
October 2015-August 2016

I wrote the protocol for all trapping operations on KNWRC, and conducted statistical analyses on trapping data collected across all trapping years on-refuge. Main responsibilities include running and maintaining two traplines for a total of about 47 feral cat traps; nest monitoring and resighting of Laysan Albatross; rodenticide bait station maintenance; tracking tunnel monitoring; assisting in banding of seabirds and waterbirds (chicks and adults); surveying for invasive Barn Owls; and data management and mapping for all trapping, rodenticide, tracking tunnel and LAAL data.

Ivy Expeditions; Tawau, Borneo; Cornell University
February 2014-May 2014

I participated in a 3-month expedition to Malaysian Borneo to gather life-history data for Suboscines. Throughout the season, we target-captured individuals; setup aerial nets for general and targeted capture; mist-netted, banded, measured and blood-sampled a variety of bird species; and prepared fluid specimens and spread wings. We also used a wide range of equipment to take audio and video recordings of target species for archival to Macaulay Library. I was responsible for my own data management and media curation.

Abstract

Madagascar, like many islands, has seen numerous introductions of invasive species throughout its history. An oft-overlooked facet of invasions is the ability of invasive species to introduce and spread parasites. The Giant African Land Snail, *Achatina fulica*, is one such invasive species introduced to island communities worldwide, including Madagascar, that may be responsible for the spread of soil-borne parasites such as *Toxoplasma gondii*. Previous evidence indicates that other species of molluscs make excellent mechanical transmitters of *T. gondii* oocysts, and thus it is likely that *A. fulica* would serve similar functions in *T. gondii* transmission. Invasive species such as *A. fulica* that act as mechanical transmitters can be especially harmful in ecosystems due to their ubiquity, and especially harmful to human health due to preference for anthropogenically modified landscapes. Therefore, I intend to use epidemiological modeling to determine the possible role of *A. fulica* in the spread of *T. gondii* oocysts across the landscape. Specifically, I will investigate factors such as land use, climate, snail abundance, and domestic cat (*Felis catus*) abundance and how they impact mechanical facilitation of *T. gondii* oocysts by *A. fulica*. As other parasites may be transported by this method, and *A. fulica* is a globally widespread invasive species, I expect this research to have widespread implications for public health in Madagascar and beyond.

Statement of Interest and Intent

Anthropogenic disturbance is an ever-growing threat to the stability of ecosystems worldwide, and has been linked to parasitic infection rates of native species across the globe. However, finer scales of anthropogenic disturbance are under-explored. That is, what is it about anthropogenically-modified habitat that increases parasitic infection? Among many, three inter-linked possibilities that characterize anthropogenic disturbance include changes to landscape features, greater prevalence of invasive species, and direct human influence. Invasive species, ubiquitous worldwide, commonly inhabit anthropogenically disturbed habitat. In addition to causing direct harm to ecosystems, invasive species can spread parasites by bringing them from their native range and transmitting to native species in the new range, or as disease facilitators, where they act as new reservoirs or improve habitat in a way that proliferates parasites already present in the ecosystem.

Madagascar, like many island communities, is an excellent model system for how invasive species such as the giant African land snail (*A. fulica*), domestic cats (*Felis catus*) and rats (*Rattus* spp.) impact human health and disrupt native ecosystems within anthropogenically modified landscapes. The particular *A. fulica*-*T. gondii* system I have proposed in my abstract to learn the modeling techniques taught in this workshop, in addition to being a stand-alone project, also fits into my broader dissertation work at Auburn University investigating specific factors of anthropogenically modified habitats and its influence on parasite transmission in Madagascar. Some of my other interests within this system, for which epidemiological modeling will be an invaluable skill, includes spread of enteric pathogens from humans to lemurs, possible role of feral dogs in dissemination of *Cryptosporidium parvum*, and impact of environmental and climactic variables on distribution of soil-borne pathogens. Specifically, I think the sections on occupancy and spatial modeling will be of particular interest to me in answering some of these questions.

All of my previous experience in conservation and wildlife biology has involved field sampling, but as I gain experience in my studies, I have gained an appreciation for the strength of research that combines modeling with observations in the field. Since starting graduate study, I have learned how to ask questions conceptually—as evidenced by my opinion piece in *Trends in Parasitology*. However, the ability to model would allow me to answer my questions mathematically, and later pair these models with evidence from field research.

While the topics taught in the E^2M^2 workshop would be invaluable in helping me conduct the research I am interested in, the fact that it is being taught in Madagascar is another positive feature. Since I plan on working in Madagascar to answer many of these questions, I am especially excited about the potential opportunity at the E^2M^2 workshop to network with other students and researchers there. Overall, this unique opportunity would help me ask and answer my own research questions, allow me to get feedback

from experts on Madagascar-specific research questions, and help me grow as a scientist in general by learning and collaborating with other students interested in epidemiological modeling in Madagascar. Furthermore, understanding modeling methodologies will not only enable me to answer my questions about epidemiology in Madagascar, it will give me a greater set of tools with which I can formulate new questions and give me enough background to think creatively about ecological problems. The skill set I hope to learn at the E^2M^2 workshop will give me a foundation to continue to learn epidemiological modeling throughout my career.