MICHAEL CULSHAW-MAURER

https://www.michaelc-m.com/ culshawmaurer@arizona.edu

EDUCATION

University of California, Davis	April 2021
PhD in Ecology	
Advised By: Jay Rosenheim and Sebastian Schreiber	
Dissertation: "Bugs Behaving Badly: Insect Pest Behavior and Pathogen-Induced Cannibalism"	
Saint John's University	May 2015
Saint John's University BA in Biology, 3.86 GPA	May 2015
Saint John's University BA in Biology, 3.86 GPA Graduated Magna Cum Laude with Distinction in Biology	May 2015

Honors Thesis: "The Induced Heart Rate Response to Fish Kairomones in Daphnia pulex"

PUBLICATIONS

Swetnam, T.L, Bartelme, R., Choi, I., Cooksey, A.M., Culshaw-Maurer, M. et al. (*in prep*) CyVerse: cyberinfrastructure for data intensive scientific discovery.

Pollack, L., Munson, A., Zepeda, E., Culshaw-Maurer, M., and Sih, A. (*Animal Behaviour, in press*) Variation in plastic consumption: social group size influences individual susceptibility to an evolutionary trap.

Bohman, B.J., Culshaw-Maurer, M., et al. (European Journal of Agronomy, accepted with revisions) Quantifying the uncertainty in critical N concentration for potato using Bayesian methods.

Culshaw-Maurer et al. (in prep) An agent-based model of indirect virulence via pathogen- induced cannibalism.

Culshaw-Maurer, M., Sih, A. and Rosenheim, J.A. (2020) Bugs scaring bugs: enemy-risk effects in biological control systems. Ecology Letters 23(11): 1693-1714 https://doi.org/10.1111/ele.13601

Bernoff A.J., Culshaw-Maurer M., et al. (2020) Agent-based and continuous models of hopper bands for the Australian plague locust: How resource consumption mediates pulse formation and geometry. PLOS Computational Biology 16(5): e1007820.

https://doi.org/10.1371/journal.pcbi.1007820

Rosenheim, J.A., Booster, N.A., Culshaw-Maurer, M. et al. (2019) Disease, contagious cannibalism, and associated population crash in an omnivorous bug, *Geocoris pallens*. Oecologia 190: 69-83 https://doi.org/10.1007/s00442-019-04407-y

HONORS AND AWARDS

USDA NIFA AFRI Predoctoral Fellowship 2019-2021 (\$120,000)

Robert and Peggy van den Bosch Scholarship, Center for Biological Control, UC Berkeley 2017 (\$15,000) Robert and Peggy van den Bosch Scholarship, Center for Biological Control, UC Berkeley 2018 (\$20,000)

UC Davis Graduate Group in Ecology Fellowship 2015-2018

UC Davis Graduate Group in Ecology Endowment Award 2017

Henry A. Jastro Research Fellowship 2018 (\$1500)

St. John's University Honors Thesis

CSB/SJU Regents/Trustees Scholarship

Eldon Siehl Memorial Scholarship

St. John's Undergraduate Biology Research Fellowship

RESEARCH PROJECTS

Modeling Nymphal Locust Movement

- · Ongoing collaboration with group of mathematicians modeling the movement of nymphal Australian plague locust hopper bands
- · Developed agent-based model in R to complement partial differential equations models
- · Analyzing movement tracking data from videos of locust movement

Dynamics of Disease-Induced Cannibalism

- · Dissertation work including field surveys, laboratory behavioral assays, and agent-based modeling
- · Conducted extensive field surveys and laboratory assays of cannibalism behavior and viral infection in Geocoris pallens
- · Developed spatially explicit agent-based model of disease and cannibalism dynamics, conducted simulations and utilized machine learning models to analyze simulation results

Enemy Risk Effects Across Multiple Trophic Levels in an Aphid Parasitoid System July 2019 - Present

- · Dissertation work sponsored by a USDA NIFA Predoctoral Fellowship
- · Investigated the effects of Aphidius ervi parasitoids and ladybeetles on pea aphid behavior
- · Conducted caged-plant field study in alfalfa and laboratory mesocosm experiments on fava bean

SJU Honors Thesis September 2014 - May 2015 "The Induced Heart Rate Response to Fish Kairomones in Daphnia pulex" Collegeville, MN

- · Investigated the effects of predatory fish kairomones on Daphnia pulex heart rate across varying size classes
- Utilized slow-motion videomicroscopy to measure heart rates

SJU Undergraduate Research Fellow	May 2013 – August 2013
"Shallow Lakes and Wetlands Research"	Collegeville, MN

- · Studied several aspects of the interconnected lakes, streams, and wetlands on the St. John's campus
- Measured nutrient levels, temperature gradients, water depth, and macrophyte growth

Undergraduate Independent Study	January 2013 – May 2013
"The Effects of Tap Size on Sap Yield in Sugar Maples"	Collegeville, MN

- · Worked with Dr. Stephen Saupe, St. John's Outdoor University, and members of St. John's Abbey to determine the effects of tap size on maple sap yield in a 1500+ tap, gravity-fed system
- · Utilized volunteers for data collection, integrated study into daily syrup operation

OTHER RELEVANT EXPERIENCE

EcoData Technology

0,				1	
Consulting Data Scientist					Remo
THT 1	1	1 . 11.	• • • •	1 •	

- · Working part-time on several ecological data science projects for nonprofit and research institutions · Utilizing geospatial weather data and abundance data to develop geographically-specific phenology models
- · Building pipelines to programatically access public APIs, clean data, build models, and display results
- · Developing Shiny apps as decision-support and model communcation tools

Group Behavior of Mosquitofish

- · Collaborating with researchers from UC Davis to study the behavior of mosquitofish groups
- · Designed hierarchical Bayesian generalized models to analyze complex group-structured data

August 2019 - Present

July 2018 - Present

July 2015 - Present

April 2022 - Present ote

 $\cdot\,$ Collected data from mescocosm experiments and behavioral assays

Bayesian Modeling of Potato Nitrogen Use

- \cdot Collaborating with researchers from the University of Minnesota to study critical nitrogen concentration in potato
- · Developed hierarchical, nonlinear Bayesian model incorporating variation across potato varieties and geographic locations
- · Created visualizations for complex comparisons of nonlinear model results

MN Dept. Natural Resources Stream Habitat Program

Intern 2014, Student Worker 2015

- $\cdot\,$ As a student worker, trained new interns in field and office skills
- Field work included electroshocking and identifying fish, assessing habitat types, using geodimeter to map river cross-sections
- $\cdot\,$ Analyzed historical stream gauge data for geomorphology group
- $\cdot\,$ Assisted in trout stream restoration project, stream-crossing surveys, and mussel propagation project
- \cdot Taught fishing skills to inner-city students through the Fishing in the Neighborhood program

TEACHING EXPERIENCE

The Carpentries	April 2021 - Present
Postdoctoral Researcher	Remote
\cdot Revamping the R for Ecology curriculum, the most-taught Data Carpentry workshop	

- Leading a task force on lesson publication cycles and authorship assignment
- Managing The Carpentries Incubator, a collection of community-developed Carpentries lessons
- · Acting as Editor for The Carpentries Lab, a repository for peer-reviewed lessons developed in the Carpentries Incubator
- · Certified as a Carpentries Trainer, have taught Carpentries Instructor Training workshop

CyVerse, University of Arizona	April 2021 - Present
Postdoctoral Researcher	Remote

- · Leading development and teaching of 10-week Foundational Open Science Skills workshop for graduate students, postdoctoral researchers, and research faculty
- $\cdot\,$ Developing tools for cloud-based Bayesian analysis using RStudio and Stan
- Collaborating with researchers from University of Graz (Austria) on an asynchronous massive open online course (MOOC) teaching Open Science with CyVerse
- Establishing collaborations between The Carpentries and CyVerse to deliver instruction and cloud-computing capabilities to students, researchers, and educators

UC Davis

Instructor, ECL 298: R-DAVIS

- $\cdot\,$ Co-instructed course on R, RStudio, and Git with another graduate student
- · Developed curriculum, maintained course website, taught using live-coding technique, live streamed course for remote students
- · Course is required for all UC Davis Ecology graduate students

UC Davis

Instructor, ENT 198: Gentle Intro to R/RStudio

 $\cdot\,$ Created and co-instructed course on R, RStudio, with another graduate student

December 2020 - Present

May-August 2014, May-July 2015

St. Paul, MN

Winters 19,20 Davis, CA

Winters 19,20 Davis, CA

- $\cdot\,$ Developed curriculum, maintained course website, taught using live-coding technique
- Course was developed for students in the Research Scholars in Insect Biology Program who are conducting research in entomology labs

UC Davis

BIS 2B Teaching Assistant

- · Taught and graded laboratory sections
- · Lectured on concepts in ecology and evolution and guided laboratory exercises
- · Received a mean 4.75/5 rating from end-of-quarter student evaluation

SERVICE EXPERIENCE

 Consultant Served as a mentor and consultant to a highly selective program for PhD candidates in environment programs 	Tucson, AZ tal research
 Served as a mentor and consultant to a highly selective program for PhD candidates in environment programs 	tal research
\cdot Provided guidance on data science, open science, and reproducibility topics	
U. of Arizona Data Science Resources and Training Steering Committee April 202 Committee Member	21 - Present Tucson, AZ
 Serving on committee alongside other leaders in data science research and training to coordinate ca initiatives 	mpus-wide
· Acting as liasion between University of Arizona and The Carpentries to coordinate delivery of cor workshops	nputational
UC Davis Quantitative Courses Working Group Spring 2019 - S Committee Member	Spring 2021 Davis, CA
 Provided input on newly created quantitative coursework tracks 	
\cdot Helped ensure cohesion between computational and quantitative courses	
\cdot Worked with faculty to identify gaps in ecological quantitative education	
Davis R Users GroupSpring 2018 - SCo-coordinator	Spring 2021 Davis, CA
\cdot Organized weekly meetings and presented on data cleaning, analysis, visualization, and other topics i	n R
Actively maintained the group website	
\cdot Provided assistance and guidance to undergraduates, graduate students, and postdocs seeking help v	vith R
Graduate Group in Ecology Stats Support GroupSpring 2019 - SCo-founder and Co-coordinatorSpring 2019 - S	Spring 2021 Davis, CA
\cdot Organized weekly meetings, including lectures, group discussions, and group activities	
\cdot Provided guidance on statistics and data analysis to graduate students	
\cdot Created a welcoming community to discuss topics related to ecological data analysis and statistics	
SELECTED PRESENTATIONS	

University of Arizona R Users Group	February 2022
"Iteration with for loops and map functions in R"	Virtual
Bureau of Labor Statistics	July 2020
"Working with BLS Time Series Data in R"	Virtual

Entomological Society of America National Meeting	November 2020
"Bugs scaring bugs: enemy risk effects in biocontrol systems"	Virtual
Predator-Prey Ecology Gordon Research Conference	February 2020
"Zombie Bugs: an agent-based model of disease and cannibalism in a beneficial insect"	Ventura, CA
UC Davis oSTEM LGBTQIA+ Science Club	May 2018
"Zombie Bugs"	Davis, CA
Davis R Users Group	Feb 2018
"Code Optimization in R"	Davis, CA
Chabot Space and Science Center	May 2017
"Zombie Bugs"	Oakland, CA
UC Davis Ecology Brown Bag Seminar	May 2017
"Disease and Cannibalism in a Beneficial Insect"	Davis, CA