AMANDA N. LAUBMEIER

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RESEARCH INTERESTS

Modelling, Population Ecology, Parameter Estimation, Management Strategies, Experimental Design

EDUCATION

North Carolina State University August 2014 - May 2018
Ph.D. Applied Mathematics
A Model-Driven Approach to Experimental Validation of Predator-Prey
Dynamics in a System of Terrestrial Arthropods, advised by H.T. Banks

University of Arizona August 2010 - May 2014
B.S. Mathematics, Physics Minor

PROFESSIONAL EXPERIENCE

Assistant Professor August 2020 - current
Texas Tech University *Department of Mathematics*

Ongoing population modelling research, primarily concerning competition between insects, and efficient use of ecological data alongside mathematical models. Instruction of courses and internal service.

Marilyn M. Hitz Postdoctoral Faculty Fellow August 2018 - July 2020
University of Nebraska – Lincoln *Department of Mathematics*

Model-based investigation of optimal predator composition for biological control. Analysis of continuous competition models with discrete birth pulses. Instruction of courses with minor internal service.

Graduate Research Assistant January 2015 - May 2018
North Carolina State University *Mathematical Biology RTG*

Parameter estimation for a predator-prey model of insect interactions in an agricultural field. Model development for bumblebee dynamics. Design of experiments and collection of data in a wet lab.

August T. Larsson Guest Researcher "Tag-Along" June 2017
Swedish University of Agricultural Sciences *Department of Ecology*

Development of optimal experimental design and hands-on experience setting up and conducting mesocosm experiments in a greenhouse, including insect identification and collection in the field.

AWARDED GRANTS

Davis College of Agricultural Sciences and Natural Resources 2023
$249,368 for *"Advancing biodiversity research to support transdisciplinary*
conservation innovation in Texas' ecosystems"
Role: Investigator, with lead PI Scott Longing

Davis College of Agricultural Sciences and Natural Resources 2023
$50,000 for *"Math & Ecology Synthesis for Agriculture Network"*
Role: co-PI, with lead PI Matt Barnes

NSF LEAPS-MPS 2021
$192,908 for *"Predator Competition in Systems with Seasonal Birth"*
Role: sole PI

Banks and **Laubmeier**. Modeling the effects of trap crop attraction strength, patch dispersion, and biological control on pest suppression. *Arthropod-Plant Interactions*, 2024.

Saucedo, **Laubmeier**, Tang, Levy, Asik, Pollington, and Prosper. Comparative Analysis of Practical Identifiability Methods for an SEIR Model. *AIMS Mathematics*, 2024.

Stell, Bommarco, **Laubmeier**, Meiss, and Therond. From a local descriptive to a generic predictive model of cereal aphid regulation by predators. *Journal of Animal Ecology*, 2024.

Laubmeier, Tabassum, Tenumberg. Temperature fluctuation alters optimal predator community composition for anticipated biological control. *Frontiers in Ecology and Evolution*, 2023.

Banks and **Laubmeier**. Compatibility of biological control and pesticides mediated by arthropod movement behavior and field spatial scale. *Biological Control*, 2023.

Wootton, Curtsdotter, Jonsson, Banks, Bommarco, Roslin, and **Laubmeier***. Beyond body size — new traits for new heights in trait-based modelling of predator-prey dynamics. *PLOS*, 2022.

Ledder, Pendleton, Rebarber, **Laubmeier**, and Weisbrod. Continuous competition model between trout species with discrete birth pulses. *Journal of Biological Dynamics*, 2021.

Laubmeier, Cazelles, Cuddington, Erickson, Fortin, Ogle, Wikle, and Zhu. Bridging analytic, statistical, and empirical methods in ecology. *Trends in Ecology & Evolution*, 2020.

Laubmeier, Rebarber, and Tenhumberg. Towards understanding factors influencing the benefit of diversity in predator communities for prey suppression. *Ecosphere*, 2020.

Banks, Banks, Myers, **Laubmeier**, and Bommarco. Lethal and sublethal effects of toxicants on bumble bee populations: a modelling approach. *Ecotoxicology*, 2020.

Banks, **Laubmeier**, Banks. Modelling the effects of field spatial scale and natural enemy colonization behavior on pest suppression in diversified agroecosystems. *Agricultural and Forest Entomology*, 2019.

Curtsdotter, Banks, Banks, Jonsson, Jonsson, **Laubmeier**, Traugott, and Bommarco. Ecosystem functioning in predator-prey food webs - confronting dynamic food web models with population empirical data. *Journal of Animal Ecology*, 2018.

Laubmeier, Wootton, Banks, Bommarco, Curtsdotter, Jonsson, Roslin, Banks. From theory to experimental design - quantifying a trait-based theory of predator-prey dynamics. *PLOS ONE*, 2018.

Banks, Banks, Bommarco, Laubmeier**, Myers, Rundlöf, Tillman. Analysis of nonlinear delay systems with applications in bumblebee population models. *Communication in Applied Analysis*, 2017.

Banks, Banks, Bommarco, Curtsdotter, Jonsson, Laubmeier**. Parameter estimation for an allometric food web model. *International Journal of Pure and Applied Mathematics*, 2017.

Banks, Banks, Bommarco, Laubmeier**, Myers, Rundlöf, Tillman. Modeling bumble bee population dynamics with delay differential equations. *Ecological Modelling*, 2017.

ACTIVE PROJECTS

Asik, Bono, Laubmeier**, Mattamira, Prosper, Saucedo, Tang. Identifiability tools for selection of viable transmission pathways in avian influenza spillover events.

Laubmeier** and Peace. Terminal investment strategy in frogs exposed to amphibian chytrid fungus.

Gallardo, Longing, **Laubmeier***. Competition in resource-pollinator interactions.

Awoyemi, Rebarber, **Laubmeier***. Discrete-continuous hybrid models with intraguild predation.

Tabassum, Awoyemi, Dahlin, **Laubmeier***, McMillan*. Temperature-dependent competition between mosquito larvae.

Mata, **Laubmeier**, Bergamo, Zhang, Crabtree. A complex systems approach to study the feedbacks between social and ecological networks.

TEACHING AND MENTORING

Instructor of Record, Texas Tech University

Graduate: Biomathematics I, Biomathematics II, Technical Writing
Undergraduate: Differential Equations, Calculus III

Instructor of Record, University of Nebraska – Lincoln

Graduate crosslisted: Mathematical Biology
Undergraduate: Linear Algebra, Calculus III, Differential Equations

Graduate Advising - Texas Tech University

Kassandra Gallardo (PhD student)	Spring 2024-current
Effect of landscape on resource-pollinator interactions	
Boluwatife Awoyemi (PhD student)	Summer 2022-current
Continuous competition models with discrete birth pulses	
Nusrat Tabassum	Ph.D. 2024
Temperature-dependence in competition interactions between insects	
Morgan Beetler	M.S. 2024
Educational outreach modelling pollination services in agriculture	
Nathan Holtman	M.S. 2024
Economic tradeoff model with ecological interactions between wolves and cattle	
*Alexis Hardesty (PhD student)	2022-2023
*No research affiliation, supervised work developing core course materials	

Undergraduate Mentoring

Kassandra Gallardo (Texas Tech University)	Summer 2023
Bridgette Epps, Nina Pyron, Emily Svetlik (Texas Tech University)	Summer 2022
Kaila Uyeda (Haverford College, co-mentor Rebecca Everett)	Fall 2021
Marc Wade (University of Nebraska-Lincoln, co-mentor Glenn Ledder)	Fall 2019

BROADER IMPACTS

Historically underserved communities

Organizer for SIAM annual meeting WCD	2023-2026
Math Alliance Annotated REU List	2022-
Developed course respository for lower-level math (support from NSF LEAPS)	2021-2023
Mentor through "Mentor-Tech" program at Texas Tech University	2021-2022
Reviewer for SACNAS annual meeting scientific presentations	2019-2020
Consultant for *Científico Latino Graduate School Mentorship Initiative*	2019
Pen-pal in *Letters to a Pre-Scientist* program serving high-poverty middle schools	2019
Volunteer at "Lighthouse" afterschool program serving at-risk youth in Lincoln, NE	2018-2020
Founder of mentoring program for self-identified underserved undergraduates at NCSU	2015-2017
Volunteer at "n2n" afterschool program serving high-poverty district in Raleigh, NC	2014-2018

Science Communication

Supervised insect modelling outreach activities (high school students)	2023, 2024
"Mathematical Biology and Population Ecology" presentation (undergraduates)	2023
Co-organizer for "SciPop" speaker series through TTU Libraries (local adults)	2020-2023
Panelist discussing careers in STEM for TTU EN Day (middle school girls)	2021
"Snap! The Math Behind Why Thanos was Wrong" presentation (local adults)	2021
Minicourse on infectious disease modelling (high school girls)	2020
"Bee Strategic" modelling and optimization game (K-6 museum attendees)	2019
"Zombie Networks" workshop activity (middle school girls)	2018
"Guess the Predator" inverse problem game (K-6 museum attendees)	2017
Developed "Zombie Outbreak" middle school lesson plan on epidemics (educators)	2017
"Black Box" inverse problem and experimental design game (K-8 museum attendees)	2017
Displayed and discussed current research on water fleas (adult museum attendees)	2015
Discussed water fleas and hosted hands-on microscope activity (child museum attendees)	2015

INTERNAL SERVICE

Texas Tech University

Member of Graduate Committee	2024-
Chair of Emmy Noether Day Organizing Committee	2022-
Member of Awards Committee	2021-2022
Member of PhD/MS Committees	
Mihrab Chowdhury (Ph.D., Chair: Angela Peace)	2024
Jerod Jones (M.S., Chair: Brock Williams)	2023
Bridget Mann (M,S., Chair: Angela Peace)	2023
Chathuri Edirisinghe (Ph.D., Chair: Wenjing Zhang)	2023
Ramiro Ramirez (Ph.D., Chair: Angela Peace)	2021
Casey Mills (Ph.D., Chair: Raegan Higgins)	2021

University of Nebraska – Lincoln

Organizing committee for "All Girls All Math" camp for high school girls	2018-2020
Faculty sponsor for undergraduate AWM student chapter	2018-2020
Coach and instructor for undergraduate modelling competitions	2018-2019
Volunteer for Nebraska State Math Day high school competition	2018-2019

North Carolina State University

Linux technical support in Center for Research in Scientific Computing	2016-2018
Volunteer for AWM's Kovalevsky Day workshop for local girls	2016-2017
Organizing committee for AMS-funded regional graduate student conferences	2014-2015
Webmaster for graduate chapter of the AMS	2014-2016

PROFESSIONAL SERVICE

Proposal review: NSF Mathematical Biology, Banff International Research Station

Journal review: Theoretical Biology, Animal Ecology, Difference Equations and Applications

Student presentation judge: Joint Mathematics Meetings, Society for Mathematical Biology, Mathematical Association of America, TTU Undergraduate Conference

PROFESSIONAL DEVELOPMENT

Weekly Pedagogy Discussion Series, STEP Program, Texas Tech University	2021-
Learning Assistant Training Seminar, TLPDC, Texas Tech University	2021
STEM Teaching, Engagement & Pedagogy Program, Texas Tech University	2020-2021
Project NExT, Mathematical Association of America	2020
Postdoc Leadership Institute, SACNAS	2019
Professorial Advancement Initiative Workshop, Big Ten Academic Alliance	2019
Grant Writing Workshop, University of Nebraska–Lincoln	2019
Science Communication Workshop, University of Nebraska Museum of Natural History	2019
Weekly Teaching Seminar, University of Nebraska–Lincoln	2019
K-12 Outreach Workshop, SciREN Triangle Network	2017

OTHER PUBLICATIONS

Burns, Laubmeier, Weiner, Awasom. "Science Meets Pop Culture Speaker Series": A Texas Tech University Libraries Outreach Initiative. *Integrating Pop Culture into the Academic Library*, 2021.

Bergamo, Laubmeier, Mata, Srivasta, Zhang. Food and social webs. *Panoramas* (art exhibit), 2021.

Curtsdotter and Laubmeier. "Understanding Ecosystem Function (and Eachother)." Blog post for *Animal Ecology in Focus*, September 2018.

ORGANIZATIONAL AND WORKSHOP ACTIVITY

Society for Mathematical Biology Annual Meeting	July 2023
Co-organizer, *Population-level impacts of ecological interations across scales*	Columbus, OH
Global Amphibian & Reptile Disease Conference	August 2022
Workshop facilitator, *Infectious Disease Modelling of Amphibian Populations*	Knoxville, TN
AWM Research Symposium	June 2022
Co-organizer, *Recent Developments in Ecological and Epidemiological Modeling*	Minneapolis, MI
Join Mathematics Meetings	June 2022
Co-organizer, *AWM Special Session on Women in Mathematical Biology.*	online - covid
Mathematical Association of America's Mathfest	August 2021
Co-organizer, *Project NExT session on equitable teaching and inclusivity*	online - covid
Mathematical Association of America's Mathfest	August 2021
Co-organizer, *Project NExT session on equitable teaching and inclusivity*	online - covid
Dynamics of Infectious Diseases: Ecological Models Across Multiple Scales	July 2021
AMS Mathematical Research Community (working groups)	online - covid
Society for Mathematical Biology Annual Meeting	June 2021
Co-organizer, *Ecological models at the interface of empirical and theoretical research*	online - covid
Complexity Interactive at the Santa Fe Institute	October 2020
Workshop participant (working groups)	online - covid
Joint Mathematics Meetings	January 2020
Co-organizer, *AMS-AWM Special Session on Women in Mathematical Biology*	Denver, CO

INVITED PRESENTATIONS

* indicates minisymposium presentations (~20min)

*Entomological Society of America Pacific Branch Meeting   April 2024
Modelling larval competition between Ae. aegypti and Ae. albopictus at varying temperatures   Waikoloa, HI

*Joint Mathematics Meeting   January 2024
Modelling ecosystem services by arthropods in agricultural landscapes   San Francisco, CA

Cesar Australia Presentation Series   August 2023
Mathematical models for arthropod interactions in agroecosystems   online

*Advances in Mathematical Ecology   June 2023
Modelling the effect of temperature-dependent activity on pest consumption   Pittsburgh, PA

*SIAM Dynamical Systems   May 2023
Effects of data availability on assessments of identifiability for an SEIR model   Portland, OR

Virginia Tech MathBio Seminar   November 2022
Competition between two species with seasonal birth and intraguild predation   online

*European Conference on Mathematical and Theoretical Biology   September 2022
Ecosystem impacts of feedback between social and ecological networks   Heidelberg, BW

*SIAM Life Sciences   July 2022
Practical identifiability of SEIR parameters for different types of data availability   online

*AWM Research Symposium   June 2022
Modelling feedback between ecological foodwebs and social decisions   Minneapolis, MI

UC Merced Mathematical Biology Seminar   April 2022
Incorporating temperature-dependence in biological control by generalist insect predators   online

*4th Annual Meeting of the SIAM Texas-Louisiana Section   November 2021
Identifying importance of predator traits and behavior from prey abundance data   South Padre Island, TX

Society for Mathematical Biology Annual Meeting   June 2021
Application-driven projects in differential equation and modelling courses.   online - covid

Cameron University Math Seminar Series   April 2021
Interplay between pesticides and natural predator mobility in determining pest control   online - covid

*Society for Mathematical Biology Education and REU Workshop   April 2021
Big and small projects for learning in differential equations and modelling courses.   online - covid

University of the Incarnate Word Mathematics and Statistics Seminar   February 2021
Modelling the effects of insecticides on natural predator mobility   online - covid

*3rd Annual Meeting of the SIAM Texas-Louisiana Section   October 2020
An annual model for Astragalus scaphoides and its parameterization   online - covid

Virginia Commonwealth University Math Department Colloquium   November 2019
Ecological insight from the synthesis of mathematical models and data   Richmond, VA

Texas Tech University Math Department Colloquium   November 2019
Integrating mathematical models and data to understand ecological processes   Lubbock, TX

*SIAM Annual Meeting Workshop Celebrating Diversity   July 2018
Data-driven validation of predator-prey dynamics in an agroecosystem   Portland, OR

*SIAM Southeast Sectional Conference — March 2018
Mechanisms driving predator-prey interactions between terrestrial arthropods — Chapel Hill, NC

JMM Natural Resource Modelling Session — January 2018
Validating a trait-based model for predator-prey dynamics in a system of arthropods — San Diego, CA

Sandia National Laboratories Neural Computing Group — December 2017
A model-driven approach to experimental validation of ecological mechanisms — Albuquerque, NM

CONTRIBUTED PRESENTATIONS

Biology and Medicine through Mathematics Conference — May 2022
Talk, *Effects of temperature fluctuation on interactions between generalist insect predators* — Richmond, VA

Society for Mathematical Biology Annual Meeting — June 2021
Poster, *Modelling the effects of insecticides on natural predator mobility* — online - covid

Joint Mathematics Meetings — January 2020
Talk, *Applying observers to track Astragalus dynamics with reduced population counts* — online - covid

SACNAS Annual Meeting — October 2019
Talk, *When does predator diversity improve prey suppression? Optimizing pest control as a function of predator traits* — Honolulu, HI

ICMA VII: Populations in Biological Systems — October 2019
Talk, *Interplay between predator traits impacts benefits to biological control from predator biodiversity* — Tempe, AZ

BAMM!: Biology and Medicine Through Mathematics Conference — May 2019
Talk, *Effects of predator diversity on optimal communities for prey suppression* — Richmond, VA

Ecological and Biological Systems Workshop at IMA — June 2018
Poster, *Landscape-level Interactions between Pests and Biological Control Agents* — Minneapolis, MN

ICMA VI: Populations in Biological Systems — October 2017
Poster, *Evaluating the importance of body mass and habitat use in a trait-based model of foodweb dynamics* — Tucson, AZ

Sensor Location in Distributed Parameter Systems Workshop at IMA — September 2017
Poster, *Experimental design for parameter estimation in a system of arthropods* — Minneapolis, MN

BAMM!: Biology and Medicine Through Mathematics Conference — May 2017
Talk, *Experimental design for parameter estimation in an allometric foodweb model* — Richmond, VA

Western Alliance to Expand Student Opportunities — March 2017
Poster, *Experimental design for parameter estimation in an allometric foodweb model* — Tempe, AZ