AMANDA N. LAUBMEIER

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RESEARCH INTERESTS

Modelling, Population Ecology, Parameter Estimation, Control 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 research concerning predator-prey interactions in agricultural fields 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

JOURNAL PUBLICATIONS

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

Kate Wootton, Alva Curtsdotter, Tomas Jonsson, H.T. Banks, Riccardo Bommarco, Tomas Roslin, and **Amanda N. Laubmeier***. Beyond body size — new traits for new heights in trait-based modelling of predator-prey dynamics. *PLOS*, 2022.   *supervisory authorship*

Amanda N. Laubmeier and J.E. Banks. Interplay between pesticides and predator movement in agricultural landscapes. *Biological Control*, 2022.

Glenn Ledder, Terrance Pendleton, Richard Rebarber, **Amanda N. Laubmeier**, Jonathan Weisbrod. Continuous competition model between trout species with discrete birth pulses. *Journal of Biological Dynamics*, 2020.

Amanda N. Laubmeier, Bernard Cazelles, Kim Cuddington, Kelley D. Erickson, Marie-Josee Fortin, Kiona Ogle, Christopher K. Wikle, Kai Zhu. Bridging analytic, statistical, and empirical methods in ecology. *Trends in Ecology & Evolution*, 2020.

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

J.E. Banks, H.T. Banks, N. Myers, **Amanda N. Laubmeier**, Riccardo Bommarco. Lethal and sublethal effects of toxicants on bumble bee populations: a modelling approach. *Ecotoxicology*, 2020.

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

Alva Curtsdotter, H.T. Banks, J.E. Banks, Mattias Jonsson, Tomas Jonsson, **Amanda N. Laubmeier**, Michael Traugott, Riccardo Bommarco. Ecosystem functioning in predator-prey food webs - confronting dynamic food web models with population empirical data. *Journal of Animal Ecology*, 2018.

Amanda N. Laubmeier, Kate Wootton, J.E. Banks, Riccardo Bommarco, Alva Curtsdotter, Tomas Jonsson, Tomas Roslin, H.T. Banks. From theory to experimental design - quantifying a trait-based theory of predator-prey dynamics. *PLOS ONE*, 2018.

H.T. Banks, J.E. Banks, Riccardo Bommarco, **Amanda N. Laubmeier***, N.J. Myers, Maj Rundlöf, Kristen Tillman. Analysis of nonlinear delay systems with applications in bumblebee population models. *Communication in Applied Analysis*, 2017.   *alphabetical authorship*

H.T. Banks, J.E. Banks, Riccardo Bommarco, Alva Curtsdotter, Tomas Jonsson, **Amanda N. Laubmeier***. Parameter estimation for an allometric food web model. *International Journal of Pure and Applied Mathematics*, 2017.   *alphabetical authorship*

H.T. Banks, J.E. Banks, Riccardo Bommarco, **Amanda N. Laubmeier***, N.J. Myers, Maj Rundlöf, Kristen Tillman. Modeling bumble bee population dynamics with delay differential equations. *Ecological Modelling*, 2017.   *alphabetical authorship*

SUBMITTED FOR PUBLICATION

Eric Stell, Riccardo Bommarco, **Amanda N. Laubmeier**, Helmut Meiss, and Olivier Therond. From a local descriptive to a generic predictive model of cereal aphid regulation by predators. Submitted to *Journal of Animal Ecology*.

Omar Saucedo, **Amanda N. Laubmeier**, Tingting Tang, Benjamin Levy, Lale Asik, Tim Pollington, and Olivia Prosper. Comparative Analysis of Practical Identifiability Methods for an SEIR Model. Submitted to *Mathematical Biosciences*.

ACTIVE PROJECTS

Amanda N. Laubmeier, Boluwatife Awoyemi, Richard Rebarber. Long-term dynamics of discrete-continuous hybrid models with intraguild predation.

Nusrat Tabassum, Boluwatife Awoyemi, Kyle Dahlin, **Amanda N. Laubmeier***, JR McMillan*. Temperature-dependent competition between mosquito larvae. **supervisory authorship*

Luis Mata, **Amanda N. Laubmeier**, Marilia Bergamo, Fanqi Zhang, Stefani Crabtree. A complex systems approach to study the feedbacks between social and ecological networks.

OTHER PUBLICATIONS

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

Marilia Bergamo, Amanda N. Laubmeier, Luis Mata, Naveen Srivasta, Fanqi Zhang. Food and social webs. *Panoramas* (art exhibit), 2021.

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

TEACHING AND MENTORING

Instructor of Record, Texas Tech University

Graduate: Biomathematics I, Biomathematics II
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

Nusrat Tabassum (PhD Student) — Spring 2021-current
Temperature-dependence in predator-prey interactions between insects
Boluwatife Awoyemi (PhD Student) — Summer 2022-current
Continuous competition models with discrete birth pulses
Morgan Beetler (MS Student) — Fall 2023-current
Educational outreach modelling pollination services
Nathan Holtman (MS Student) — Spring 2023-current
Ecological interactions between wolves and cattle in an economic tradeoff model

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

Graduate Committees

Mihrab Chowdhury (Texas Tech University, PhD. Chair: Angela Peace)	Spring 2024
Bridget Mann (Texas Tech University, MS. Chair: Angela Peace)	Spring 2023
Chathuri Edirisinghe (Texas Tech University, PhD. Chair: Wenjing Zhang)	Spring 2023
Ramiro Ramirez (Texas Tech University, PhD. Chair: Angela Peace)	Fall 2021
Casey Mills (Texas Tech University, PhD. Chair: Raegan Higgins)	Fall 2021

INVITED TALKS

* indicates minisymposium presentations (∼20min)

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

*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 terrestrial 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 terrestrial 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

OTHER CONFERENCE AND WORKSHOP ACTIVITY

Society for Mathematical Biology Annual Meeting — July 2023
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*	zoom - covid
Mathematical Association of America's Mathfest	August 2021
Co-organizer, *Project NExT session on equitable teaching and inclusivity*	zoom - covid
Dynamics of Infectious Diseases: Ecological Models Across Multiple Scales	July 2021
AMS Mathematical Research Community (working groups)	zoom - covid
Society for Mathematical Biology Annual Meeting	June 2021
Co-organizer, *Ecological models at the interface of empirical and theoretical research*	zoom - covid
Mathematical and Computational Methods for Complex Social Systems	January 2021
AMS Tutorial attendee	zoom - covid
Complexity Interactive at the Santa Fe Institute	October 2020
Workshop participant (working groups)	zoom - covid
Joint Mathematics Meetings	January 2020
Co-organizer, *AMS-AWM Special Session on Women in Mathematical Biology*	Denver, CO
Transients in Biological Systems Workshop at NIMBioS	May 2019
Workshop attendee (working groups)	Knoxville, TN

BROADER IMPACTS

Historically excluded communities

Math Alliance Annotated REU List	2022-
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 servicing high-poverty middle schools	2019
Volunteer at "Lighthouse" afterschool program servicing at-risk youth in Lincoln, NE	2018-2020
Founder of mentoring program for self-identified minority undergraduates at NCSU	2015-2017
Volunteer at "n2n" afterschool program servicing minority students in Raleigh, NC	2014-2018

Science Communication

Co-organizer for "SciPop" speaker series through TTU Libraries	2020-2023
"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
Hosted by University of Nebraska State Museum for *InvestiGate* event	
"Zombie Networks" workshop activity (middle school girls)	2018
"Guess the Predator" inverse problem game (K-6 museum attendees)	2017
Hosted by North Carolina Museum of Natural History for *BugFest* event	
Developed "Zombie Outbreak" classroom-ready lesson plan on epidemics	2017
Hosted by *SciREN Triangle Network* for event with middle school educators	
"Black Box" inverse problem and experimental design game (K-8 museum attendees)	2017
Hosted by North Carolina State University for *State of the Sciences* event	

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

Chair of Emmy Noether Day Organizing Committee	2022-
Diversity Committee for Department of Mathematics & Statistics	2021-2022
Panelist for Emmy Noether High School Day	2021
Reviewer for TTU Undergraduate Research Conference	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 DEVELOPMENT

Weekly Pedagogy Discussion Series, STEP Program, Texas Tech University	2021-2023
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
"Going Beyond Show and Tell" Outreach Workshop, North Carolina State University	2017

PROFESSIONAL SERVICE

Grant review: NSF Mathematical Biology	2021, 2023
Joint Mathematics Meetings graduate poster judge	2022
Society for Mathematical Biology graduate talk judge	2021
Mathematical Association of America student poster judge	2021
Journal review: Journal of Theoretical Biology, Journal of Animal Ecology, Journal of Difference Equations and Applications	