Ben Nolting, Ph.D.
Applied Mathematician

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Areas of Expertise

- Mathematical modeling in fields including ecology, epidemiology, physiology, hydrology, economics, demography, and physics.
- Stochastic differential equations
- Partial differential equations
- Dynamical systems
- Spatial point processes
- Statistical analysis
- Scientific programming (*Mathematica)*

Degrees

Ph.D. Mathematics, University of Nebraska-Lincoln 2013
Dissertation Advisors: J. David Logan and Chad E. Brassil
Dissertation: *Random search models of foraging behavior: theory, simulation, and observation*
M.S. Mathematics, University of Nebraska-Lincoln 2009
B.S. Mathematics, University of Alaska-Anchorage 2006
Magna Cum Laude and University Honors Scholar

Professional Experience

Assistant Professor of Mathematics and Statistics
Nevada State College 08/18-09/19
Assistant Professor of Mathematics and Statistics
California State University, Chico 08/16-08/18
Research Associate, Case Western Reserve University 02/14-08/16
Supervisor: Dr. Karen C. Abbott, Department of Biology

Technical Experience

- Expert in *Mathematica* programming language
- Some experience with C++, R, MATLAB, and other programming languages
- Ability to rapidly learn and use new programming languages

Publications

Lerch, B., **Nolting, B. C**., and Abbott, K.C. 2018. Why are demographic Allee effects so rarely seen in social animals? *The Journal of Animal Ecology*, 87: 1547-1559.
Available at: https://besjournals.onlinelibrary.wiley.com/doi/abs/10.1111/1365-2656.12889

Abbott, K. C., and **Nolting, B. C.** 2016. Alternative (un)stable states in a stochastic predator-prey model. *Ecological Complexity.*
Available at: http://www.sciencedirect.com/science/article/pii/S1476945X16301039.

Moore, C., Stieha, C., **Nolting, B. C.**, Cameron, M. K., and Abbott, K. C. 2016. QPot: An R package for stochastic differential equation quasi-potential analysis. *The R Journal*, 8/2: 19-39.
Available at: https://journal.r-project.org/archive/2016-2/moore-stieha-nolting-etal.pdf.

Nolting, B. C. and Abbott, K. C. 2016. Balls, cups, and quasi-potentials: quantifying stability in stochastic systems. *Ecology*, 97: 850-864.
Available at: http://onlinelibrary.wiley.com/doi/10.1890/15-1047.1/full.

Nolting, B. C., Hinkelman, T., Brassil, C. E., and Tenhumberg, B. 2015. Composite random search strategies based on non-directional sensory cues. *Ecological Complexity* 22: 126-138.
Available at: http://www.sciencedirect.com/science/article/pii/S1476945X15000355.

Nolting, B. C., Paullet, J. E., and Previte, J. P. 2008. Introducing a scavenger onto a predator-prey population model. *Applied Mathematics E-Notes*, 8: 214-222.

Nolting, B. C. In preparation. Composite random search strategies: optimal criteria for switching between ballistic and Brownian motion.

Grants

James S. McDonnell Foundation, Program for Studying Complex Systems 2013
Grant Title: *Alternative Stable States and Stochasticity in Ecological Dynamics*
Grant P.I.: Karen C. Abbott Grant Amount: $450,000

Reviewer

- Proceedings of the National Academy of Sciences
- Differential Equations and Dynamical Systems
- Scientific Reports (Nature)
- Journal of Hydrology
- The American Naturalist
- Journal of Biological Systems
- International Journal of Modern Physics B
- Methodology and Computing in Applied Probability
- Chaos, Solitons, and Fractals
- Theoretical Ecology
- Journal of Mathematical Biology
- Theoretical Population Biology
- Ecological Complexity
- Ecosphere
- The PUMP Journal of Undergraduate Mathematics Research (editor)

Talks

A new perspective on measuring stability in biological systems
Department of Biological Sciences Seminar, California State University, Chico 2017

Quasipotentials: A framework for analyzing stochastic dynamical systems in ecology.
Michael Stifel Center, Jena, Germany Autumn School on
Dynamics of natural (eco)systems: theory and applications 2016

Computational challenges in stochastic dynamical systems.
Wolfram Research, Inc., Champaign, IL 2015

Large deviation theory in biological models.
Applied Research Associates, Inc., Arlington, VA 2015

Best practices for stochastic differential equation modeling in ecology.
At the Ecological Society of America Annual Meeting 2014

Using Mathematica to make interactive projects and assignments. 2013
Graduate student seminar at the University of Nebraska

A spatially explicit analogue of Charnov's Marginal Value Theorem 2012
At the Society for Mathematical Biology annual meeting in Knoxville, TN

Goldilocks and Environmental Stochasticity: Special ranges of noise intensity delay transitions to catastrophe. 2010
At the Ecological Society of America annual meeting in Pittsburgh, PA

Phylogenetic Comparative Methods 2010
Special seminar at the University of Nebraska

Stochastic Differential Equations: A seminar series 2008
Five lectures at the University of Nebraska

Software Development

QPot: Quasi-Potential Analysis for Stochastic Differential Equations
Available on the Comprehensive R Archive Network (CRAN).
Further information in the paper:
https://journal.r-project.org/archive/2016-2/moore-stieha-nolting-etal.pdf

Teaching Experience

Principal Instructor:

Course	Name (# of sections)	Description
Math 96A	Intermediate Algebra (1)	
Math 101	College Algebra (1)	Pre-calculus course
Math 118	Trigonometry (3)	
Math 120	Fundamentals of College Mathematics (1)	
Math 203	Contemporary mathematics (4)	Course for liberal arts majors
Math 221/821	Differential Equations (1)	Introductory ordinary DE's
Math 230	Introduction to Computational Mathematics (1)	Introduction to *Mathematica*
Math 300	Mathematics Matters (3)	Course for future K-6 teachers
Math 300 incl.	Mathematics Matters (2)	Course for future K-3 teachers
Math 314/814	Matrix Theory (1)	Introductory linear algebra
Math 330	Linear Algebra (1)	Introductory linear algebra
Math/Bios 316	Theoretical Ecology (2)	Course for students interested in interdisciplinary research. Co-ins.
Math 354	Probability and Statistics (1)	
Math 360	Ordinary Differential Equations (1)	A second course in DEs
Math 361	Partial Differential Equations (1)	
Math 489	Advanced Mathematical Topics	Topics including dynamical systems, signal processing, and computational mathematics.
Stats 391	Biostatistics (3)	

Other teaching:

Grader, Math 826 (Mathematical Analysis II); Grader, Math 843 (Methods of Applied Mathematics); Grader, Math 104 (Business Calculus); Graduate student mentor, Intensive Mathematics: a Mentoring and Research Summer Experience (IMMERSE) program.

Supervised Undergraduate Research Projects

A socio-epidemiological model of measles transmission with vaccine hesitancy. 2019. Student: Harrison Brown

Classifying popular songs using Fourier analysis. 2019. Student: Bailey Evans.

Soil-transmitted Helminth SIR models. 2017 Chico State Summer REUT program. Students: Llasmin Lopez (CSU San Bernardino), Francisco Martinez (CSU Chico), Yaneth Reyes (CSU Chico).

Quantifying the Spatiotemporal Effects of Bark Beetle Dispersal Across Different Forest Models. 2017 Chico State Summer REUT program. Students: Lauren Hassett (Texas Woman's University), Branden Newberg-Cuellar (CSU Chico).

Directional and non-directional sensory cues in stochastic search strategies. 2017 Chico State Summer REUT program. Student: Qinyi Zeng (UCLA).

Spatial point analysis of racially segregated communities and environmental justice factors. 2017 Chico State Summer REUT program. Student: Rajita Chandak (Brown University).

One-Zone Model for Stellar Pulsation. 2017 Chico State Summer REUT program. Student: Aria Radick (CSU Chico).

Modeling Allee effects in social animals. 2015-2017. Student: Brian Lerch (Case Western Reserve University)

A new statistical framework for analyzing pollinator behavior. 2012. Students: Jocelyn Olney, Jillian Scheider, Anthony Duren, Megan Friessen, and Cale Haden.

Measuring spatial structure in prairie plant communities: an information theoretic approach. 2010-2011. Students: Matthew Wynn, Wesley Botham, Lauren Weber, and Brianna Pinquoch.

Other Service and Mentorship:

Organized portfolio for Masters of Science in Mathematics Education degree program, CSU-Chico	2018
Department of Mathematics and Statistics Hiring Committee	2017
Department of Mathematics and Statistics Equipment Committee	2017
Department of Mathematics and Statistics Scholarship Committee	2017
Textbook affordability group (PI: Edward Roualdes, grant AB798)	2017
Hispanic Serving Institute Faculty Learning Community	2017
Department of Mathematics and Statistics Colloquium Committee	2016-2017
Department of Mathematics and Statistics Learning Resources Committee	2016-2017
Mentored five mathematics honors projects at the University of Nebraska	2010-2013
Served as thesis reader for one student in biology at the University of Nebraska	2013
Mentored two undergraduate biology research projects at Case Western Reserve University	2014-2107
Workshop leader for All Girls All Math (AGAM) 2008, a summer mathematics camp for high school girls	2009
Volunteer for Nebraska Math Day, a statewide high school mathematics competition and celebration	2008-2013
Volunteer for the National Conference for Undergraduate Women in Mathematics	2009

Other Experience

Wolfram Research Community Ambassador	2016-2017
Principal Mathematician, Datavore Consulting	2012
Participant, special working group of free-roaming cats and rabies National Institute for Mathematical and Biological Synthesis at Knoxville, TN	2011
Organizer, EcoChat seminar Organized interdepartmental journal club at the University of Nebraska	2011

References available upon request