Maryann Hohn | Curriculum Vita

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Research Interests

Applied mathematics, dynamical systems with biological applications, data science. Current projects include:

- Creating models to describe locust movement and subsequent resource depletion (agent-based and PDE models)
- Exploring the impact of parasite load on interactions of individuals in social groups (ODE and dynamic network models)
- Modeling pattern formations during cell motility (ODE and PDE models)
- Interactions between messenger RNA and microRNA in cells and tissue (coupled PDEs and stochastic models)

Education

Ph.D. Mathematics
University of California, San Diego *2013*

M.A. Mathematics
University of California, San Diego *2010*

B.S. Mathematics, B.A. Italian Studies
University of California, Santa Barbara *2005*

PhD Thesis

Title: *Partial Differential Equation Models and Numerical Simulations of RNA Interactions and Gene Expression*

Advisor: Dr. Bo Li

Description: Modeled the interaction of two (or more) chemical species, specifically focusing on the interactions between messenger RNA (mRNA) and small, non-coding RNAs such as micro RNA (miRNA). The coupled reaction-diffusion PDE model attempts to give insight into our understanding of how mRNA and miRNA molecules interact at the tissue level and the effects of this interaction on gene regulation as seen in Hohn et. al. 2015 [JA3] (see Publications).

Publications

Journal Articles

[JA1] N. D. Williams, H. Z. Brooks, M. E. Hohn, C. R. Price, A. E. Radunskaya, S. S. Sindi, S. N. Wilson, and N. H. Fefferman. *Understanding Complex Biological Systems in Mathematics*, volume 14 of *Association for Women in Mathematics Series*, chapter How Disease Risks Can Impact the Evolution of Social Behaviors and Emergent Population Organization, page forthcoming. Springer International Publishing, 2018.

[JA2] H. Z. Brooks, M. E. Hohn, C. R. Price, A. E. Radunskaya, S. S. Sindi, N. D. Williams, S. N. Wilson,

and N. H. Fefferman. *Understanding Complex Biological Systems in Mathematics*, volume 14 of *Association for Women in Mathematics Series*, chapter Mathematical analysis of the impact of social structure on ectoparasite load in allogrooming populations, page forthcoming. Springer International Publishing, 2018.

[JA3] M. E. Hohn, B. Li, and W. Yang. Analysis of coupled reaction–diffusion equations for RNA interactions. *Journal of Mathematical Analysis and Applications*, 425(1):212 – 233, 2015.

In Preparation

[IP4] S. S. Sindi, S. N. Wilson, H. Z. Brooks, M. E. Hohn, C. R. Price, A. E. Radunskaya, N. D. Williams, and N. H. Fefferman. Do increasingly complex social systems require increasingly efficient allogrooming to mitigate the risk of parasitic outbreaks? In preparation, November 2018.

[IP5] A. J. Bernoff, M. Culshaw-Maurer, R. Everett, M. E. Hohn, C. Strickland, and J. Weinburd. Modeling australian plague locust hopper bands. In preparation, November 2018.

Active Research

- Maryann E. Hohn, Juliet Lee. *ODE Model of Patterns in Keratocyte Motility*.
- Suzanne S. Sindi, Shelby N. Wilson, Heather Z. Brooks, Maryann E. Hohn, Candice R. Price, Ami E. Radunskaya, Nakeya D. Williams, Nina H. Fefferman. *Does Grooming in Dominance Hierarchies Just Benefit those at the Top?*.

Honors, Awards, and Grants

Summer Collaborators Program
Grant provided by the Institute for Advanced Study *2019*
Awarded by the School of Mathematics at the Institute for Advanced Study to advance research activities in Princeton, NJ.

NSF-AWM Travel Grant
Grant provided by the National Science Foundation and the Association for Women in Mathematics *2019*
Awarded by the Association for Women in Mathematics to advance research activities at the SIAM Conference on Applied Dynamical Systems 2019 in Snowbird, UT.

Mathematics Research Communities (MRC) Collaboration Travel Grant
Grant provided by the National Science Foundation *2018*
Awarded by the AMS to MRC participants to travel for research collaborations following the MRC workshop on agent-based modeling for biological and social systems.

OVPR/AAUP Travel Award
University of Connecticut *2015*
Awarded by University of Connecticut to attend Workshop 2: Multiple Faces of Biomolecular Electrostatics at the Mathematical Biosciences Institute (MBI), Ohio State University, OH.

AWM Travel Grant – Association for Women in Mathematics (AWM)
Grant provided by the Department of Energy *2013*
Awarded by AWM to present at the AWM Workshop: Mathematics of Planet Earth at the 2013 SIAM Annual

Meeting.

Junior Research Fellow, Center for Theoretical Biological Physics
Center for Theoretical Biological Physics (CTBP) *2010 – 2013*
The Center for Theoretical Biological Physics (CTBP) fosters interdisciplinary collaboration between the studies of physics, chemistry, biology, and mathematics at the University of California, San Diego and the Salk Institute for Biological Studies.

San Diego Fellowship
UC San Diego *2010 – 2012*
Fellowship offered by the University of California, San Diego to support those students whose presence would enhance diversity to the benefit of the entire campus community. Award includes a stipend and payment of tuition and fees.

Phi Beta Kappa Member
UC Santa Barbara *2004 – present*
Phi Beta Kappa aims to promote and advocate excellence in the liberal arts and sciences. Membership awarded in 2004.

Talks & Conferences

Invited Talks & Participation

- *How to Start Research Projects with Undergraduates.* Seminar at UCLA, CA, July 2019.
- *Individual Choice and Group Success.* Seminar at Santa Clara University, CA, February 2019.
- *A parasite for sore eyes: Living together in a social network.* AMS Fall Western Sectional Meeting in San Francisco, CA, October 2018.
- *Agent-based Modeling in Biological and Social Systems*. Participated in the AMS Mathematics Research Communities program, June 2018.
- *Research with Undergraduates - Successes and Pitfalls.* Math colloquium at University of California, Irvine, January 2018.
- *Games and Markov Chains.* Seminar for undergraduates at University of California, Irvine, January 2018.
- *RNA Interactions - a PDE Story.* Applied Math Seminar at Claremont Center for the Mathematical Sciences, Pomona College, September 2017.
- *Women Advancing Mathematical Biology: Understanding Complex Biological Systems with Mathematics.* Participated in the Mathematical Biosciences Institute (MBI) workshop, April 2017.
- *Women in STEM Mentorship Program.* Participated by invitation as a panelist supported by Women in Science and Engineering (WiSE) at UCSB, March 2017.
- *Dynamic Zombie Control.* Early College Experience Re-Certification Workshop, University of Connecticut, May 2016.
- *Multiple Faces of Biomolecular Electrostatics.* Participated by invitation at the Mathematical Biosciences Institute (MBI) workshop, October 2015.
- *The Futurama Theorem*. Social / Intellectual Graduate Mathematics Activities (S.I.G.M.A.) Seminar, University of Connecticut, April 2015.
- *A PDE Model of RNA Interactions*. Center for Cell Analysis & Modeling/Center for Quantitative Medicine Joint Seminar, University of Connecticut Health, February 2015.
- *Preparing for Math Graduate School*. On the discussion panel. UConn Math Club, University of Connecticut,

Storrs. April 2014.

- *Express Your Cells*. PDE and Differential Geometry Seminar, University of Connecticut, Storrs, November 2013.
- *Living with Mathematics*. UConn Math Club, University of Connecticut, Storrs, November 2013.
- *Partial Differential Equation Models and Numerical Simulations of RNA Interactions*. Math Bio Seminar, Worcester Polytechnic Institute, October 2013.
- *Mean-field models and Numerical Simulations of RNA Interactions and Gene Expression*. Biochemistry and Biophysics Center's Guest Speaker Seminar Series, National Institutes of Health (NIH), May 2013.
- *Numerical Simulations of Gene Expression*. CTBP Journal Club, University of California, San Diego, May 2012.
- *Numerical Simulations of Gene Expression*. Southern California Undergraduate Math Day, May 2012.
- *Diffusion Equation Models and Numerical Simulations of Gene Expression*. Informal Seminar on Mathematics and Biochemistry-Biophysics (MBB), University of California, San Diego, November 2010.

Conference Presentations & Posters

- *A Wave of Locusts.* Poster presentation at the SIAM Conference on Applications of Dynamical Systems (DS19) in Snowbird, UT, May 2019.
- *Gene Expression: Diffusion Equation Models and Numerical Simulations.* Poster presentation at the Association for Women in Mathematics (AWM) Workshop, 2013 SIAM Annual Meeting in San Diego, July 2013.
- *Diffusion Equation Models and Numerical Simulations of Gene Expression*. Poster presentation at the International Conference on Biological Physics in La Jolla, June 2011.

Outreach & Mentorships

Speaker organizer

Special session co-organizer
Joint Mathematics Meetings 2019 in Baltimore, MD *2018-2019*

- Co-organized the special session titled *AMS Special Session on Agent-based Modeling in Biological and Social Systems (a Mathematics Research Communities Session)*

Postdoctural Mentorships

Postdoc Mentor
UC Santa Barbara *2018-present*

- Helped incoming postdocs setup syllabi, troubleshoot issues with students, and facilitate department needs

Undergraduate & Graduate Mentorships

Undergraduate Student Mentor
UC Santa Barbara *2017-present*

- Attended UCSB Academic Initiatives program Faculty Nights where faculty and students interact outside the classroom and discuss various topics such as gender inequality and discrimination

Senior Thesis Advisor
UC Santa Barbara *2017–2018*

- College of Creative Studies student senior thesis advisor in mathematics

FYE Mentor
University of Connecticut *2016*

- Mentored and facilitated projects for students in the First Year Experience program which is aimed at freshman undergraduates who are interested in doing research with faculty members

Undergraduate Student Mentor
University of Connecticut *2014 – 2016*

- Advised and supervised undergraduates interested in research

Graduate Student Mentor
University of Connecticut *2014*

- Supported and mentored incoming graduate students in teaching

K-12 Mentorships & Outreach

GEAR UP Mathematics Mentor
Manchester Community College, Manchester, CT *2013*

Mentored seventh grade students in mathematics at East Hartford Middle School.

- Gaining Early Awareness and Readiness for Undergraduate Programs (GEAR UP) aims to increase the number of low-income students who are prepared to enter and succeed in postsecondary education by providing services at high-poverty middle and high schools.

EYH Mentor
Expanding Your Horizons *2011*

- Mentored young women for Expanding Your Horizons, a workshop that encourages young women to pursue careers in science, technology, engineering, and mathematics (STEM).

AWM Member
UC San Diego *2010 – 2012*

- Actively participated in the student chapter of the Association for Women in Mathematics (AWM) at UCSD which promotes equal opportunity and the equal treatment of women and girls in the mathematical sciences.

Employment

Research and Teaching Postdocs

Visiting Assistant Professor of Mathematics
Pomona College *2019 – present*
Research and teaching duties

Visiting Assistant Professor of Statistics and Applied Probability
University of California, Santa Barbara *2016 – 2019*
Research and teaching duties

Visiting Assistant Professor of Mathematics
University of Connecticut, Storrs *2013 – 2016*
Teaching postdoc: taught 3 courses per semester - see classes in Teaching

Graduate School Research & Teaching

Associate Instructor
University of California, San Diego *2011*
Instructor of record with full course responsibilities including supervising TAs and graders.
Taught Precalculus for Science and Engineering (MATH 4C)

Teaching Assistant
University of California, San Diego *2010 – 2012*
See classes in Teaching

Graduate Student Researcher
University of California, San Diego *2010*
Worked for Professor Bo Li on coupled PDEs regarding the behavior of mRNA and miRNA in cells.

Graduate Research Assistant
University of California, San Diego *2010*
Worked for the Mathematics Diagnostic Testing Project (MDTP)

Teaching

Experience teaching a variety of courses and class sizes including small, upper division classes with about 25 students and large, lower-division courses with approximately 150+ students.

Designed Courses

- Elementary Discrete Mathematics (UConn MATH 1030Q): Developed course materials which included designing course objectives and obtaining a new textbook.

Classes Taught

See www.pstat.ucsb.edu/faculty/hohn/teaching.html for semesters/quarters taught, class websites, and student evaluations.

- Differential equations (UConn MATH 2410Q)
- Elementary Discrete Mathematics (UConn MATH 1030Q)
- Multivariable calculus (Pomona College MATH 32, UConn MATH 2110Q)
- Precalculus (UConn MATH 1060Q)
- Precalculus for Science and Engineering (UCSD MATH 4C)
- Probability (UCSB PSTAT 120A, UConn MATH 3160)
- Stochastic processes (UCSB PSTAT 160A, UConn MATH 3170)
- Transition to Advanced Mathematics (UConn MATH 2710)

TAed Courses

Duties included grading exams, hosting review sections, creating practice midterms, holding weekly office hours, and tutoring in the Calculus Lab.

- Multivariable calculus (UCSD MATH 10C)

- Precalculus for Science and Engineering (UCSD MATH 4C)
- Single variable calculus (UCSD MATH 20A)
- Statistical Methods (UCSD MATH 183)

Mathematics Education – Skills Development

- Worked for the Mathematics Diagnostic Testing Project (MDTP) as a Graduate Research Assistant. MDTP develops tests that provide students and teachers with diagnostic information about student readiness in mathematics. Typed and created exams, assisted professors during a conference, and scored and recorded MDTP exams.

Honors Student Projects

- Numerical modeling of differential equations relating to interactions of animal populations in Connecticut

Other Experiences

- Studied abroad in Italy for one year. Attended classes with Italian students at Università degli Studi di Padova, IT.