

Dr. Kevin M. Hannay

*Assistant Professor
Department of Mathematics
Schreiner University*

Academic Appointments

Institution	Time Period	Position
Schreiner University	2017-Current	Assistant Professor
University of Michigan	2010, 2013-2017	Graduate Student

Education

University of Michigan, Ann Arbor

PhD	Applied and Interdisciplinary Mathematics	2017
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University of Texas at Austin

B.S.	Mathematics (Honors)	2009
B.S.	Biology (Honors)	2009

Publications

Peer-Reviewed Journal Articles

1. K.Hannay, D.B. Forger, V.Booth, "Seasonality and Light Phase-Resetting in Mammalian Circadian Rhythms", (in prep).
2. K. Hannay, V.Booth, D.B. Forger, "Macroscopic Models for Human Circadian Rhythms", (in prep).
3. K.Hannay, D.B. Forger, V. Booth, "Macroscopic Models for Networks of Coupled Biological Oscillators", Science Advances, Vol. 4, Num. 8, e1701047, 2018
4. K.Hannay, V. Booth, D. Forger, "Collective phase response curves for heterogeneous coupled oscillators", Physical Review E 92, 022923.
5. K. Hannay, C. Vogel, E. Marcotte, "Buffering by gene duplicates: an analysis of molecular correlates and evolutionary conservation" BMC Genomics, Vol. 8, 2008. (Highly Accessed)

Other Scholarly Publications

1. K.Hannay, "Macroscopic Models and Phase Resetting of Coupled Biological Oscillators", Doctoral Thesis, 2017
2. National Security Agency, Internal Publication, August 2015
3. K. Hannay, T. Keitt, "Invasibility, Coexistence and Spatial Structures in Networks of Competing Species", Senior Honors Thesis, 2009
4. K. Hannay, O. Gonzalez, "Reaction-Diffusion Models of Ecological Interactions", Senior Honors Thesis, 2009

External Research Grants

1. "Nonsmooth maps, coupled oscillators and seasonal variation of sleep and circadian rhythms, V. Booth, C. Diniz Behn, K. Hannay, National Science Foundation, (2018: Pending)

Talks and Presentations

Presentations

1. "Biological Clocks: Synchrony and Circadian Rhythms", Trinity University, Undergraduate Mathematics Seminar (Oct 2018) (invited talk)
2. "Macroscopic Models for Human Circadian Rhythms", Society for Industrial and Applied Mathematics (SIAM), Annual Meeting (July,2018). (contributed talk)
3. "Low Dimensional Models for Human Circadian Rhythms", Society for Research on Biological Rhythms (SRBR), (May, 2018) (contributed poster)
4. "Macroscopic Models for Coupled Biological Oscillators", Applied and Interdisciplinary Mathematics seminar, (April, 2018) (invited talk)
5. "Macroscopic Models of Networks of Coupled Biological Oscillators", Society for Industrial and Applied Mathematics (SIAM), Workshop on Network Science (July, 2017). (contributed talk)
6. "Back to the Basics: A Simplified Model of Mammalian Circadian Rhythms", Society for Research on Biological Rhythms, (May, 2016). (contributed poster)
7. "Uncovering the Nature of Circadian Coupling in Mammals", Society for Industrial and Applied Mathematics-Great Lakes, (May, 2016).
8. "Collective phase response curves for heterogeneous coupled oscillators", Dynamics of Coupled Oscillators: 40 years of the Kuramoto Model (August, 2015) (contributed poster)
9. NSA Multimedia Processing Research Organization, July 2015 (talk)
10. "Phase Resetting in Biological Oscillators", Student Applied and Interdisciplinary Mathematics Seminar (March, 2015)
11. "Phase Resetting in Biological Oscillators: Application of the Ott-Antonsen Technique", Coupled Oscillator Graduate Seminar, (March,2015)
12. "The Importance of Having a Paralog", Molecular Biology Poster Session (July, 2006), contributed poster
13. "The Importance of Having a Paralog", Penn State Functional Genomics Conference (July, 2005), contributed poster

Workshops/Summer Schools

1. Recent Advances in Applied and Computational Mathematics: A Workshop in Memory of Professor Peter Smereka, 2018
2. Inquiry-Based Learning Workshop, University of Michigan, 2016
3. Rhythms and Oscillations Summer School, Mathematical Biology Institute, Ohio State University, 2014
4. Multiscale Modeling and Analysis, University of Texas, 2008
5. System Biology Dynamics: From Genes to Organisms, McGill University, 2006

Work Experience

Academic Research

1. *Danny Forger and Victoria Booth: University of Michigan* Graduate studies on the phase response curve of coupled oscillators with applications to circadian biology.
2. *Marcotte Lab: University of Texas* Studied the contribution of gene duplication to genetic buffering in various model organisms in collaboration with Dr. Christine Vogel and Prof. Edward Marcotte.
3. *Fiete Lab: University of Texas* Spatial learning in rat grid cells using neural networks.

4. *Keitt Lab: University of Texas* Studied how spatial heterogeneity affects the preservation of biodiversity in a simple two species competition model embedded in a complex network with Prof. Tim Keitt.
5. *Oscar Gonzalez: University of Texas* Studied spatial effects on ecological competition via reaction-diffusion equations.
6. *Orly Alter: University of Texas* Studied matrix and tensor decomposition techniques for the analysis of high dimensional gene microarray data.
7. *Summer REU: University of Texas Medical Branch Galveston 2004* Characterized the binding sites of numerous antibodies to the Jun A1 allergen found in *Juniperus scopulorum* (Mountain Juniper) pollen. Supervised by Dr. Randall Goldblum.

Non-Academic Experience

1. *National Security Agency, Graduate Mathematics Program, 2015*
 - Approved for Top Secret // Special Compartmented Information security clearance with full-scope polygraph examination
 - Collaborated with top researchers and visiting mathematicians across the agency.
 - Applied expertise in statistics and applied mathematics toward data mining project.
 - Designed, developed and evaluated algorithms in Python/C for large scale data analysis.
 - Briefed Admiral Michael S. Rogers, Director of National Security Agency, Chief of Central Security Service.
 - Presented results in a peer-reviewed technical paper published internally.
2. *United States Marine Corps (2010-2013: Active Duty, 2013-2017: Drilling Reserves)*
 - Officer Candidate School (OCS), 2010
 - The Basic School (TBS), 2010-2011
 - Combat Engineer Officer Course (CEOC), 2011
 - Logistic Planner, 15th Marine Expeditionary Unit, 2012-2013, *Deployment*
 - Platoon Commander, Marine Wing Support Squadron 471 (Reserves) , 2013-2015
 - Executive Officer (XO), Engineer Company, Marine Wing Support Squadron 471 (Reserves), 2016
 - Company Commander (CO), Engineer Company, Marine Wing Support Squadron 471 (Reserves), 2017
3. *Department of Homeland Security Scholar, 2006*
 - Developed a modeling toolbox for the simulation of an avian influenza epidemic with stochastic differential equations and kinetic monte carlo techniques. Supervised by Professor Michael Ward and supported by the Department of Homeland Security.

Teaching Experience

Schreiner University

Differential Calculus	2 Courses
Vector Calculus	2 Courses
Applied Statistics	6 Courses
Linear Algebra	1 Courses
Complex Variables	1 Course

University of Michigan

Differential Calculus (Instructor)	4 Courses
Integral Calculus (Instructor)	1 Course
Partial Differential Equations	Guest Lecture

Awards and Honors

1. Co-winner Smereka Prize for the best doctoral thesis in applied and interdisciplinary mathematics, 2017
2. Faculty Development Grants, Schreiner University, 2018 (2 Grants: \$4000 Total)
3. Merit Award for Research: Society for Research on Biological Rhythms, 2016
4. National Security Agency, Graduate Mathematics Program, 2015
5. Mathematics Alumni/Alumnae Scholarship (2014)
6. University Honors 2004-2006, Fall 2007-Spring 2009
7. Computational and Applied Mathematics REU with Tim Keitt and Oscar Gonzalez (2008)
8. Research Training Group Grant in Computational and Applied Mathematics (2008-2009)
9. Unrestricted Presidential Scholarship (2008)
10. Undergraduate Research Fellowship (2005,2007)
11. Cailloux Foundation Scholarship (2003-2005)
12. Department of Homeland Security Scholar (2005-2007)
13. Dean's Choice award for summer research (2004)
14. Dean's Scholars Honors Program (2004-2009)

Community Involvement

Schreiner University Service

Faculty Search Committee	3 Times
Online Learning Taskforce	2017-2018
Faculty Research Taskforce	2017-2019

Professional Affiliations

1. Society for Industrial and Applied Mathematics (SIAM)
2. Society for Research on Biological Rhythms (SRBR)

Computing

1. Programming Languages: Python, R, C/C++, Matlab, Mathematica, Perl
2. Libraries: numpy, scipy, pandas, scipy, dplyr, scikit-learn, odeint
3. High Performance Computing: OpenMP, MPI, GPU Programming (CUDA)