

Scott Hottovy

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U.S. citizen

Academic Appointments

2016–present	United States Naval Academy , Department of Mathematics. 2022–present: Associate Professor with tenure. 2016–2022: Assistant Professor.
2022–2023	Sabbatical: Visiting Fellow, University of New South Wales and Basque Center of Applied Mathematics .
2013–2016	University of Wisconsin–Madison , Department of Mathematics. Postdoctoral Researcher. Principal investigator: Professor Sam Stechmann.

Education

May 2013	Ph.D. in Applied Mathematics , University of Arizona. Dissertation: <i>The Smoluchowski–Kramers Approximation with State-Dependent Friction: A Framework for the Small-Mass Limit</i> . Advisor: Professor Jan Wehr.
2010	M.S. in Applied Mathematics , University of Arizona.
2008	B.S. in Mathematics , University of Nebraska at Lincoln.

Research Interests

- Stochastic differential equations and applications in the atmosphere, biology, and physics.
- Limit theorems of stochastic processes.
- Interacting particle systems, phase transitions, and critical phenomena.

Research Funding

2023–2026	ONR , N0001423WX00746. Principal investigator. <i>Improving Prediction of Tropical Weather with Reduced Order Models</i> . \$300,000 .
2018–2022	NSF , DMS-1815061. Principal investigator. <i>Simple Stochastic Models of Tropical Atmospheric Waves</i> . \$100,000 .

Publications

Peer-Reviewed Journal Articles

1. **Hottovy, S.**, & Sherwood, S. (2026). Analysis of a simple Madden–Julian Oscillation model using a moisture variable with memory. *Quarterly Journal of the Royal Meteorological Society*, e70232.
2. Fiorese, A., **Hottovy, S.**, Pugno, N. M., & Pagnini, G. (2026). Noise effect on swarming in self-propelled particle systems with long-range alignment. *Physica A: Statistical Mechanics and its Applications*, 131895.

3. **Hottovy, S.**, Paradisi, P., & Pagnini, G. (2025). Nondimensionalisations of the Langevin equation and small-parameter limits. *Physics of Fluids*, 37(3), 037101.
4. **Hottovy, S.**, & Pagnini, G. (2024). Linear combinations of iid strictly stable variables with random coefficients and their application to anomalous diffusion processes. *Physica A: Statistical Mechanics and its Applications*, 647, 129912.
5. **Hottovy, S.**, & Stechmann, S. N. (2023). Rain process models and convergence to point processes. *Nonlinear Processes in Geophysics*, 30(1), 85–100.
6. Stechmann, S. N., & **Hottovy, S.** (2020). Asymptotic Models for the Madden–Julian Oscillation and Tropical Geostrophic Balance. *Journal of Climate*, 33(11), 4715–4737.
7. Ogrosky, H. R., Stechmann, S. N., & **Hottovy, S.** (2019). Instability and nonlinear evolution of the MJO in a model with vertically-varying convective adjustment. *Theoretical and Computational Fluid Dynamics*, 1–17.
8. **Hottovy, S.**, McDaniel, A., & Wehr, J. (2019). A small delay and correlation time limit of stochastic differential delay equations with state-dependent colored noise. *Journal of Statistical Physics*, 1–28.
9. Stechmann, S. N., & **Hottovy, S.** (2017). Unified spectrum of tropical rainfall and waves in a simple stochastic model. *Geophys. Res. Lett.*, 44(20).
10. Stechmann, S. N., & **Hottovy, S.** (2016). Cloud regimes as phase transitions. *Geophys. Res. Lett.*, 43, 6579–6587.
11. Birrell, J., **Hottovy, S.**, Volpe, Giovanni, & Wehr, J. (2016). Small Mass Limit of Langevin Equation on a Manifold. *Annales Henri Poincaré*, 18(2), 707–755.
12. Herzog, D. P., **Hottovy, S.**, & Volpe, G. (2016). The Small-Mass Limit for Langevin Dynamics with Unbounded Coefficients and Positive Friction. *Journal of Statistical Physics*, 163(3), 659–673.
13. **Hottovy, S.**, & Stechmann, S. N. (2015). A spatiotemporal stochastic model for tropical precipitation and water vapor dynamics. *Journal of the Atmospheric Sciences*, 72(12), 4721–4738.
14. **Hottovy, S.**, & Stechmann, S. N. (2015). Threshold models for rainfall and convection: deterministic versus stochastic triggers. *SIAM Journal on Applied Mathematics*, 75(2), 861–884.
15. **Hottovy, S.**, McDaniel, A., Volpe, G., & Wehr, J. (2014). The Smoluchowski–Kramers limit of stochastic differential equations with arbitrary state-dependent friction. *Communications in Mathematical Physics*, 336(3), 1259–1283.
16. Pesce, G., McDaniel, A., **Hottovy, S.**, Wehr, J., & Volpe, G. (2013). Stratonovich-to-Itô transition in noisy systems with multiplicative feedback. *Nature Communications*, 4, 2733.
17. **Hottovy, S.**, Volpe, G., & Wehr, J. (2012). Thermophoresis of Brownian Particles Driven by Coloured Noise. *EPL (European Physics Letters)*, 99(6), 60002.
18. **Hottovy, S.**, Volpe, G., & Wehr, J. (2012). Noise-Induced Drift in Stochastic Differential Equations with Arbitrary Friction and Diffusion in the Smoluchowski–Kramers Limit. *Journal of Statistical Physics*, 146(4), 762–773.
19. Avalos, G., Gunderson, M., & **Hottovy, S.** (2009). Computation of Minimal Norm Control Asymptotics Relative to the Null Controllability of Non-Standard Parabolic-Like Dynamics. *Nonlinear Analysis: Theory, Methods & Applications*, 71(12), e2674–e2689.

Doctoral Dissertation

Hottovy, S. (2013). *The Smoluchowski–Kramers approximation for stochastic differential equations with arbitrary state-dependent friction*. Doctoral dissertation, The University of Arizona.

Technical Reports

Cui, Y., Gao, M., **Hottovy, S.**, Rajapakshe, C., & Zhang, Z. (2018). *The impacts of 3D radiative transfer effects on cloud radiative property simulations and retrievals*. Technical report. <https://userpages.umbc.edu/~gobbert/papers/CT2018Team5.pdf>

Honors and Awards

2023	Visiting Professor, Climate Change Research Centre, Sydney, Australia.
2023	Research in Pairs Fellow, Centre de Recerca Matemàtica, Barcelona, Spain.
2022–2023	Visiting Fellow, Basque Center of Applied Mathematics, Bilbao, Spain.
2012–2013	University of Arizona G-TEAMS Fellowship (NSF GK-12).
2012	University of Arizona College of Science Galileo Scholar.
2010–2011	University of Arizona NSF VIGRE Fellowship.
2008–2009	University of Arizona Fellowship.
2008	University of Nebraska Chair's Prize in Mathematics.
2006–2008	University of Nebraska MCTP Undergraduate Scholar.

Research Mentoring

Graduate Research

2023	Andrea Fiorese , master's degree in Mathematical Engineering, Politecnico di Torino. Thesis: <i>Stochastic processes for collective dynamics of self-propelled particles</i> . Co-advised with Gianni Pagnini (BCAM) and Luigi Preziosi (PdT).
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Undergraduate Honors Research

2025	MIDN Thomas Jennings . <i>Noise-Induced Bifurcations in Stochastic Dynamical Systems</i> .
2025	MIDN Aurora Sandoval . <i>Comparison of MJO Predictions Using Simple, Linear Regression, and Neural Network Models</i> .
2024–2025	MIDN Michael Magee . <i>Interactions Between Madden–Julian Oscillation Variability and Equatorial Waves</i> .
2024	MIDN Jake Cubbler . <i>Methods for Parameter Selection in Simple MJO Model</i> .
2023	MIDN Sean Lee . <i>Data Assimilation and Atmospheric Waves</i> .
2022	MIDN Moira Camacho . <i>Describing the Effects of Diurnal Forcing on the Kelvin Wave</i> .
2021	MIDN Lillian Baker . <i>Exploring Links Between Climate Shocks and Migration</i> .
2019–2021	MIDN Elana Kozak . <i>Monte Carlo Search Methods</i> .
2020	MIDN Shaun Rodock . <i>Classification of Linear Models of the MJO</i> .
2019	MIDN Jacob Santer . <i>Probabilistic Models of Lightning Leaders</i> .

Undergraduate Research Groups

Spring 2010, 2011, 2012 Mentored three separate undergraduate research groups through MATH 485, Mathematical Modeling, University of Arizona.

Sponsored Undergraduate Publication

Chernobelskiy, A., Dixit, V., Cala, A., Pandya, S., & Rosas, H. J. (2013). Modeling Learning and Cooperation in Iterative Games. *SIAM Undergraduate Research Online (SIURO)*, 6, 42–53. Sponsor: **Hottovy, S.**

Presentations

Invited Talks

Feb 2023	Centre de Recerca Matemàtica (CRM) Seminar (Barcelona, Spain).
Apr 2022	Navy Research Labs, Seminar (Monterey, CA, USA).
Oct 2021	University of Nebraska-Lincoln, Mathematics Colloquium (Lincoln, NE).
Jan 2021	University of Colorado, Colorado Springs, Mathematics Colloquium (Online).
Jan 2021	Clarkson University, Mathematics Colloquium (Online).
Aug 2020	SIAM-Mathematics of Planet Earth (Online).
Jan 2020	Marquette University, Mathematics and Statistics Colloquium (Milwaukee, WI, USA).
Aug 2019	University of Wisconsin-Madison, Probability Seminar (Madison, WI, USA).
Aug 2019	Navy Research Labs, Seminar (Monterey, CA, USA).
Feb 2019	Oberwolfach Mathematical Institute, “Moist processes in the atmosphere,” (Oberwolfach, Germany).
Feb 2019	University of Victoria, Math Colloquium (Victoria, BC, Canada).
Mar 2018	Wake Forest University, Math Colloquium (Winston-Salem, NC, USA).
Mar 2018	SIAM-SEAS Sectional Meeting (Chapel Hill, NC, USA).
Oct 2017	Metro State University of Denver, Math Colloquium (Denver, CO, USA).
May 2017	Navy Research Labs, Seminar (Monterey, CA, USA).
Feb 2017	Virginia Commonwealth University (VCU), Mathematical Biology Seminar (Richmond, VA, USA).
Nov 2016	University of Maryland (College Park), Probability Seminar (College Park, MD, USA).
Oct 2016	SIAM Conference on Mathematics of Planet Earth (Philadelphia, PA, USA).
Feb 2016	University of Central Florida, Math Colloquium (Orlando, FL, USA).
Feb 2016	United States Naval Academy, Math Colloquium (Annapolis, MD, USA).
Jan 2016	Montana State University, Math Colloquium (Bozeman, MT, USA).
Sep 2015	Iowa State University, Probability Seminar (Ames, IA, USA).
May 2015	Turbulent and Coherent Convection (Madison, WI, USA).
Sep 2012	Université de Genève, Theoretical Physics Seminar (Geneva, Switzerland).
Oct 2011	Frontiers in Nonlinear Waves (Tucson, AZ, USA).

Seminar Talks

21 Mar 2026	University of Arizona Mathematics Seminar, Tucson, AZ, USA.
21 Feb 2024	UMD Probability Seminar, College Park, MD, USA.
10 Nov 2023	UMBC Mathematics Colloquium, Baltimore, MD, USA.
13 Sep 2023	USNA Basic Notions Seminar, Annapolis, MD, USA.
Jun 2023	UNSW Statistics Seminar, Sydney, Australia.
Apr 2023	Climate Change Research Centre (CCRC) Seminar, Sydney, Australia.
Jan 2023	UPV, Leioa, Spain, Bilbao Analysis and PDE Seminar.
Oct 2018	United States Naval Academy, USA, Applied Mathematics Seminar.
Aug 2018	United States Naval Academy, USA, Teaching Seminar.
Oct 2017	United States Naval Academy, USA, Basic Notions Seminar.
Feb 2017	United States Naval Academy, USA, Teaching Seminar.
Apr 2015	University of Wisconsin, USA, Probability Seminar.
Feb 2014	University of Wisconsin, USA, Applied and Computational Mathematics Seminar.
Feb 2014	University of Wisconsin, USA, Probability Reading Seminar.
Dec 2013	University of Wisconsin, USA, Probability Seminar.
Nov 2012	University of Arizona, USA, Mathematical Physics Seminar.
Oct 2012	University of Arizona, USA, Analysis Seminar.
Apr 2012	University of Arizona, USA, Mathematical Physics Seminar.
Mar 2012	University of Arizona, USA, Analysis Seminar.
Apr 2011	University of Arizona, USA, Mathematical Physics Seminar.

Conference and Meeting Presentations

28 Apr 2025	EGU General Assembly Conference (Vienna, Austria).
8 May 2024	AMS 36th Conference on Hurricanes and Tropical Meteorology (Long Beach, CA, USA).
Feb 2023	14th Conference on Dynamical Systems Applied to Biology and Natural Sciences (Bilbao, Spain).
Sep 2022	Weather and Climate Extremes and their Predictability CAFE Final Conference (Barcelona, Spain).
May 2018	Symposium on Big Data + High-Performance Computing + Atmospheric Sciences (Baltimore, MD).
May 2018	American Meteorological Society Conference on Hurricanes and Tropical Meteorology (Ponte Vedre, FL).
Sep 2017	SIAM Geosciences (GS) (Erlangen, Germany).
Jan 2017	Joint Mathematics Meetings (Atlanta, GA, USA).
Apr 2016	American Meteorological Society Conference on Hurricanes and Tropical Meteorology (San Juan, PR).
Jan 2016	Joint Mathematics Meetings (Seattle, WA).
Jul 2015	Young Research Symposium at ICMP (Santiago, Chile).
Mar 2015	Probability Theory and Combinatorial Optimization (Durham, NC, USA).
Dec 2014	AGU Fall Meeting (San Francisco, CA, USA).
May 2014	Frontier Probability Days (Tucson, AZ, USA).

Apr 2014	AMS 31st Conference on Hurricanes and Tropical Meteorology [poster] (San Diego, CA, USA).
Jul 2013	Conference of Stochastic Processes and Applications (Boulder, CO, USA).
Jan 2013	Joint Mathematics Meetings (San Diego, CA, USA).
Aug 2012	International Congress on Mathematical Physics (Aalborg, Denmark).
Aug 2012	Young Research Symposium at ICMP (Aalborg, Denmark).
May 2012	Statistical Mechanics (Rutgers, NJ, USA).
Oct 2011	APS Sectional Meeting [poster] (Tucson, AZ, USA).
Oct 2011	National Alliance Field of Dreams [poster] (Phoenix, AZ, USA).
Apr 2011	Arizona Days (Tucson, AZ, USA).
Oct 2006	Regional Workshop in Mathematics (Lincoln, NE, USA).

Teaching Experience

Courses as Primary Instructor

Fall 2026	SA320: Stochastic Models. USNA.
Spring 2026	SM364: Scientific Computing. USNA.
Fall 2025	SM121: Calculus I. USNA. <i>Course coordinator.</i>
Summer 2025	MATH404: Partial Differential Equations. UMBC.
Spring 2025	SM473A: Mathematics Capstone Course. USNA. <i>Course coordinator.</i>
Fall 2024	SM221: Calculus III, SM315: Partial Differential Equations. USNA.
Spring 2024	SM364: Scientific Computing. USNA.
Spring 2024	SM239: Introduction to Probability and Statistics. USNA.
Fall 2023	SM212: Differential Equations. USNA. <i>Course coordinator.</i>
Fall 2023	SM221: Calculus III with Vector Fields. USNA.
Fall 2022–	<i>Sabbatical.</i>
Spring 2023	
Spring 2022	SM474: Modeling with Differential Equations with Noise (Capstone). USNA.
Spring 2022	SM222: Differential Equations with Matrices. USNA. <i>Course coordinator.</i>
Fall 2021	SM212: Differential Equations. USNA.
Fall 2021	SM222: Differential Equations with Matrices. USNA. <i>Course coordinator.</i>
Spring 2021	SM212P: Differential Equations. USNA.
Spring 2021	SM426: Numerical Method of ODEs. USNA.
Fall 2020	SM222: Differential Equations with Matrices. USNA. <i>Course coordinator.</i>
Fall 2020	SM121: Calculus I. USNA.
Fall 2019	SM222: Differential Equations with Matrices. USNA. <i>Course coordinator.</i>
Fall 2019	SM121: Calculus I. USNA.
Spring 2019	SM316: Engineering Math with Probability and Statistics. USNA. <i>Course coordinator.</i>
Fall 2018	SM221P: Calculus III with Vector Fields (for freshmen). USNA.
Spring 2018	SM473: Randomness in the Real World (Capstone). USNA.
Spring 2018	SM212: Differential Equations. USNA.
Fall 2017	SM212: Differential Equations. USNA.

Spring 2017	SM221: Calculus III with Vector Fields. USNA.
Fall 2016	SM261: Matrix Theory. USNA.
Fall 2016	SM221P: Calculus III with Vector Fields (for freshmen). USNA.
Spring 2015	Math 276: Topics in Calculus II (Honors). University of Wisconsin.
Spring 2014	Math 431: Introduction to Probability. University of Wisconsin.
Fall 2011	Math 124: Calculus I. University of Arizona.
Fall 2010	Math 112: College Algebra. University of Arizona.
Spring 2010	Math 109C: College Algebra with Data Analysis. University of Arizona.

Short-Course Instruction

3–7 Oct 2022	<i>Convergence of stochastic integrals and their application.</i> Ten-hour short course, Basque Center of Applied Mathematics (BCAM), Bilbao, Spain.
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Additional Teaching Experience

Fall 2012– Spring 2013	G-TEAMS Fellow, University of Arizona. Led discussions and projects at St. Michael's Parish Day School (grades 6–8), Tucson, AZ; at least 10 hours per week of classroom experience. Used technology including Smart Board and a 1:1 integration of iPads in the school. Served as a resource for science and mathematics students and instructor Jennifer Gould.
Fall 2010– Spring 2011	Graduate Teaching Assistant, University of Arizona, Applied Methods course. Led review sessions for the first-year Applied Mathematics graduate core course and lectured two classes.
Spring 2007; Fall 2007; Spring 2008	Teaching Assistant, University of Nebraska. Discussion leader for Calculus I and II; participated in the Mathematics Resource Center.

Professional and Institutional Service

Conference and Session Organization

Jun 2027	Organizing Committee, SIAM Geosciences 2027 (SIAM GS27), Baltimore, MD.
Oct 2026	Co-organized special sessions on “Data Assimilation and Inverse Problems: Theory and Applications,” AMS Sectional Meeting, Washington, DC, USA, with Joshua Hudson and Reza Malek-Mandani.
Apr 2026	Organized the Service Academies Student Research Conference (SASMC), Annapolis, MD, USA.
Mar 2018	Co-organized sessions on “Modeling developments in atmospheric and oceanic science,” SIAM-SEAS, Chapel Hill, NC, USA, with H. Reed Ogrosky.
Jan 2017	Co-organized a session on “How to structure a semester-long course around active classroom ideas,” JMM, Atlanta, GA, USA.

Journal Refereeing

Journal of Mathematical Physics; Journal of Statistical Physics; Acta Physica Polonica B; Euro Physics Letters; Physica A; Statistics and Probability Letters; Mathematics of Climate and Weather Forecasting; Nonlinearity; Journal of the Atmospheric Sciences; CHAOS; Journal of Stochastic Processes and their Applications; AMS Notices.

Departmental Service

AY 2026–present	Department Mentor.
AY 2025–present	Chair, Midshipmen Research Committee.
AY 2023–2024	Major Curriculum Design Committee.
AY 2022–2026	Applied Math Seminar organizer.
AY 2018–present	Majors advisor.
AY 2017–2022	Midshipmen Research Liaison.
AY 2017–2022	Founder and coach, Differential Equations Modeling Competition Team.
AY 2016–2022	Midshipmen Group Study Program mentor.
AY 2019–2021	Performance Evaluation Committee.
AY 2019–2021	Faculty Senate member.

University Service

AY 2026	Service Academies Student Mathematics Conference Organizer
AY 2025–present	Admissions Board member.
AY 2019–2020	Faculty Senate member.
AY 2017–present	Capstone Day organizer.
2015	Teaching Circle speaker.
2014	Math Circle speaker.
2012	Volunteer, Arizona Math Counts Competitions.
2010–2011	University of Arizona Applied Mathematics graduate representative.
2009–2011	University of Arizona SIAM Student Chapter vice president.
2005–2007	University of Nebraska Math Day volunteer.

Workshop Participation

Oct 2026	2nd Workshop on Organisation and Maintenance of Tropical Convection and the Madden Julian Oscillation (ICTP, Trieste, Italy).
Sep 2022	Weather and Climate Extremes and their Predictability CAFE Final Conference (Barcelona, Spain).
Feb 2019	Moist Processes in the Atmosphere (Oberwolfach, Germany).
Aug 2018	MAA MathFest, Project NExT (Denver, CO).
Jan 2017	JMM, Project NExT (Atlanta, GA).
Aug 2016	MAA MathFest, Project NExT (Columbus, OH).
Jul 2015	Disordered Models in Mathematical Physics (Valparaiso, Chile).
Oct 2014	Midwest Probability Colloquium (Evanston, IL, USA).
Oct 2013	Frontier in Probability Days (Tucson, AZ, USA).
Oct 2013	Midwest Probability Colloquium (Evanston, IL, USA).
Oct 2012	Random Dynamical Systems (Institute of Mathematics and its Applications, MN, USA).
Mar 2012	Arizona School of Analysis and Mathematical Physics (Tucson, AZ, USA).
Mar 2012	Institute of Mathematical Education (Tucson, AZ, USA).