Nina H. Fefferman

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Education

2005	PhD in Mathematical Biology from the Department of Biology, Tufts University. Advisor: J. Michael Reed
2001	MS in Mathematics from the Department of Mathematics, Rutgers University. Advisor: J. Beck
1999	AB in Mathematics from Princeton University

Positions

2026-2027	Guest Affiliate, International Institute for Applied Systems Analysis (IIASA)
2025 -	Director & Professor, School of Mathematical and Natural Sciences, New College of Interdisciplinary Arts and Sciences, Arizona State University
2024 -	Director, NSF Center for Analysis and Prediction of Pandemic Expansion (APPEX), University of Tennessee, Knoxville
2021 - 2025	Director, National Institute for Mathematical and Biological Synthesis, University of Tennessee, Knoxville
2020 - 2025	Associate Director, UT One Health Initiative, University of Tennessee, Knoxville
2019 -	Director of Development, Enhancing Diversity in Graduate Education (EDGE) Foundation
2018 - 2025	Professor, Dept. of Mathematics, University of Tennessee, Knoxville
2018 - 2025	Professor, Dept. of Ecology and Evolutionary Biology, University of Tennessee, Knoxville
2018 - 2021	Director, Mathematical Modeling Consulting Center, University of Tennessee, Knoxville
2016 - 2018	Associate Professor, Dept. of Ecology and Evolutionary Biology, University of Tennessee, Knoxville
2015 - 2016	Program Director, Graduate Program in Ecology and Evolution, Rutgers University
2012 - 2016	Associate Professor, Dept. of Ecology, Evolution, and Natural Resources, Rutgers University
2011 - 2016	Assistant/Associate Professor, School of Public Health, University of Medicine and Dentistry of New Jersey
2008 - 2012	Assistant Professor, Dept. of Ecology, Evolution, and Natural Resources, Rutgers University
2007 - 2016	Research Assistant/Associate Professor, The Center for Discrete Mathematics and Theoretical Computer Science, Rutgers University
2005 - 2019	Co-Director, Tufts University Initiative for the Forecasting and Modeling of Infectious Disease (InForMID), Tufts University School of Medicine
2005 - 2007	Visiting Research Associate, Center for Discrete Math and Theoretical Computer Science (DIMACS), Rutgers University

2005 Short Term Visitor, School of Natural Sciences, Institute for Advanced Study

Honors/Awards

2025 University of Tennessee, College of Arts and Sciences Award for Senior Excellence in Research
2024 Intercollegiate Biomathematics Alliance (IBA) Distinguished Senior Fellowship
2024 Invited Participant - White House Roundtable on Emerging Technology for Preventing Health Emergencies, US White House Office of Science and Technology Policy (OSTP)
2024 Peter de Jánosi Fellowship, Friends of IIASA
2023 University of TN, College of Arts and Sciences Academic Outreach Award for Service
2022 NSF CISE Monthly Newsletter "Highlighted Researcher", September
2021 University of TN, Chancellor's Academic Honor Banquet, Success in Multidisciplinary Research Award
2020 University of TN, College of Arts and Sciences Outstanding Service Award
2019 Invited Participant of the 11th.Triennial Invitational Choice Symposium
2019 Invited Performer/Participant, Stand Up Science – a public performance featuring stand-up comics and scientists discussing their work
2017 Invited Research Team Leader: Association for Women in Mathematics (AWM)'s Women in Mathematical Biology Workshop
2016 Invited Speaker at the National Academy of Sciences Sackler Colloquium
2015 Coauthored an article chosen for the cover of *Phil Trans Roy Soc B* (issue 370.1665)
2012 Invited to Health Foo 2012
2011 Shared the Virginia Governor's Technology Award in the category of 'Cross-Boundary Collaboration in Modeling & Simulation' for our study 'Strategic Default in the Context of a Social Network: An Epidemiological Approach'.
2010 Speaker at TEDx Midatlantic
2009 Rutgers University Packard Fellow Nominee
2007 Coauthored an article chosen for the cover of *The Lancet Infectious Diseases* (vol. 7)
- Invited to give 28 Keynote, Plenary, or Public Lectures (see Invited Talks for details), over three continents and various disciplines

Media Coverage (interviews and coverage):

Television/Online Video Broadcasts:

WVLT, 2024
WVLT, 2020
CGTN, 2020
BBC World News, 2020
The Washington Post, 2020
BBC International, 2020
WBIR News, 2019
NJTV News, 2015
Discovery Channel "How Stuff Works" (Season 2: "Games Unboxed"), 2011
BBC World News, 2007
CBS News Aug 22, 2007
Canada Television (CTV) Aug 21, 2007
AT&T Tech Channel Sept, 2007

Online Podcasts / Radio Broadcasts:

KUNC, July 2023
Here We Are, Dec 2022
Here We Are, Dec 2020
Here We Are, Aug 2020
The Gist (Slate.com), May 2020
You Made it Weird, Apr 2020
NPR Marketplace, Mar 2020
Here We Are, Mar 2020
NPR WUOT Knoxville, Mar 2017
PRI Studio 360, Sept 2016
New Tech City, WNYC, Oct 2014
The Gist (Slate.com), Oct 2014
PRI Studio 360, Sept 2014
PRI Studio 360, Jan 2013
BBC UK News, Aug 2007
National Public Radio Podcast "Science Friday", Sept 2007
AM900 CHML, Sept 2007
National Public Radio "All Things Considered", Oct 2005

Print/Online Media (2005-present)**:**

ABC News, ABS CBN News, ARS Technical, Canadian Press (via CBC), Cell, The Daily Mail (UK), The Daily Telegraph (Australia), The Economist, Forbes, Fox News, G1.com.br (Brazil), Slate.com, O Globo (Brazil), Gazet Van Antwerpen (Belgium), La Jornada (Mexico), KevinMD, Knox News, Medical News Today, New Scientist, NU.nl (Netherlands), PC Gamer, Politico.com, Reuters, TIME, The Washington Post, Science News, Slate.com, the Smithsonian Magazine, the South African Star, Tech News World, Wired, Yahoo! Entertainment, *and many more…*

Research Support (reverse chronological order by start date)

Active

2024-2031	$18,000,000	NSF DBI Center for Analysis and Prediction of Pandemic Expansion (APPEX)	PI
2024-2028	$729,936	NSF IOS The causes and consequences of Higher Order Interactions	ASU-PI
2023-2027	$1,103,927	NSF ECR Developing an early understanding of contagion in preschool- and kindergarten-aged children	Co-PI
2022-2028	$2,755,617	NSF EEID Socioeconomic and Epidemiological Drivers of Pathogen Dynamics in Wildlife Trade Networks	Co-PI

Completed

2022-2026	$991,566	NSF DMS IHBEM: Understanding and Predicting Behavioral Responses to Epidemic Risks and Control Policies: Implications for Epidemiological Models and Policy Design	Senior Personnel
2022-2025	$999,790	NSF CISE PIPP Phase I: Predicting Emergence in Multidisciplinary Pandemic Tipping-points	PI

2021-2024	$32,500	Burroughs Wellcome Fund - A Tasting Menu of Quantitative Modeling for Researchers in the Life and Earth Sciences	PI
2021-2024	$1,199,129	NSF CPS Bio-socially Adaptive Control of Robotics-Augmented Building-Human Systems	Co-PI
2017-2023	$2,498,876	NSF EEID – Co-evolutionary Epidemiology of Avian Malaria	UT-PI
2017-2023	$1,025,381	NSF IOS - Melding Mathematical and Theoretical Models of Stress	UT-PI
2022-2023	$99,996	DoD ARL Multi Modal Anomaly Detection using Bio-Driven Artificial Attention Networks	Co-PI
2021-2023	$75,000	UT OHI Seed Grant - Transdisciplinary investigation of freshwater mussel mortality	Co-PI
2021-2023	$125,000	UT OHI Seed Grant - Socio-Economic Epidemiology of Disease Risk in Wildlife Trade Networks	Co-PI
2021-2023	$81,83	NSF DEB - A Workshop on Predictions of Rare Events in Multiscale, Complex, Dynamical Systems	PI
2020-2022	$359,849	DoD Minerva DECUR - The Topology of Interdependent Multi-Domain Behavioral Systems	PI
2021-2022	$581,563	IARPA – Bio-Inspired Robustness/Resilience in Dynamic Supply Chain Distribution Networks	PI
2020-2022	$198,932	NSF RAPID – DEB Coupled Social and Epidemiological Networks and COVID-19	PI
2020-2021	$25,000	John's Hopkins Applied Physics Lab IRAD Fundamentals of Resilient Complex Networks	PI
2018-2020	$196,628	SESYNC/NIMBioS Modeling Risk Perception, Vector-borne Diseases, and Environmental Integrity	PI
2018-2019	$2,000	Haines Morris Grant – Internal UTK Competition	Co-PI
2017	$30,000	Syngenta – Workshop Grant – Math of Agribusiness	Co-I
2016-2019	$99,938	NSF EAGER – CISE – Distributed Anomaly Detection	PI
2016-2018	$50,000	US - Israel Binational Science Foundation (BSF)	Co-PI
2016-2018	$190,000	NSF RAPID – DEB – Modeling Zika Virus Control	PI
2016-2017	$75,000	US START Center – Leadership in Social Networks	PI
2016-2017	$100,000	National Academies Keck Futures Initiative	Co-PI
2015-2018	$292,804	USFWS – White-Nose Syndrome Open Grant	Co-PI
2015-2017	$21,003	NSF RAPID – Information & Intelligent Systems – Virtual Worlds and Experiential Learning	PI
2015-2017	$130,000	NSF EAGER – DEB – Machine Learning for Co-Evolutionary Systems	Co-PI
2014-2016	$100,000	Dept. of Homeland Security – Next Generation Communications and Interoperability	Project PI
2012-2016	$1,228,053	Dept. of Homeland Security – Nature Inspired Algorithms for Anomaly Detection in Cyber Settings	PI
2011-2014	$3,853,332	NSF EASM – Ocean Sciences – SocioEconomic Systems and Climate Change	Co-PI
2011-2012	$22,500	UCDPER – Emergency Preparedness	Co-PI
2010-2012	$384,000	Dept. of Homeland Security – Virtual Worlds and Experiential Education	Project PI

2010-2011	$99,944	Dept. of Homeland Security – Self-Organizing Surveillance Systems	Project PI
2010	$22,500	Dept. of Homeland Security – BioSecurity	Co-PI
2009-2012	$299,886	NSF – DEB – ULTRA-Ex	Co-PI
2009-2011	$89,318	UCDPER – Emergency Preparedness	PI
2009-2010	$10,000	USDA CSREES Multi-State Research Fund – Vector-borne Disease Control	Co-I
2008	$99,990	NIH NAID SBIR – Epidemiological Surveillance	PI
2008	$5,000	Rutgers Climate and Environmental Change Initiative	PI
2008	$75,000	Rutgers Academic Excellence Fellowship, Climate and Health Research Initiative	Co-I
2007	$22,500	Dept. of Homeland Security – BioSecurity	PI
2007	$22,500	Dept. of Homeland Security – BioSecurity	PI
2006	$5,000	Tufts Summer Scholars Award – Epidemiology	PI
2003-2004	$42,000	NIH R01 Supplement - Epidemiology	Co-PI
2003-2004	$1,500	Tufts Institute of the Environment	Co-I
2003	$500	MASI Student Travel Award	PI
2003	$1,500	TIES Student Travel Award	PI

Consultancies

2024	Expert Witness in Court Case (details under NDA)
2023-present	University of Pittsburgh
2022-present	University of Wyoming
2020, 2022	University of Pennsylvania
2020-2022	American Civil Liberties Union (ACLU)
2020	The Vera Institute of Justice
2020	The State of Vermont, Department of Education
2018	Ogilvy
2017-2019	Humane Society International
2009-present	US Centers for Disease Control and Prevention
2011-2012	Research Institute for Housing America Trust Fund
2006-2007	New Jersey, Department of Corrections
2004-2009	NIH U19 (Center PI: Gorski) T-cell Mediated Immunity
2004	National Defense University
2004	DARPA

Participation in US Research Centers

Center	Position	Description of Role
APPEX *(Center for Analysis and Prediction of Pandemic Expansion)*	Director	Oversees all activities of a national research center, heading a multi-person leadership team
UT OHI *(One Health Initiative)*	Associate Director	Contributed to all aspects of running the Initiative, but with special focus on basic and translational research
NIMBioS *(National Institute for Mathematical and*	Director	Oversaw all activities of a national research center, heading a multi-person leadership team

Biological Synthesis)		
InForMID *(Tufts University Initiative for the Forecasting and Modeling of Infectious Diseases)*	Founding Co-Director	Researcher and Administrative lead in the area of mathematical modeling of infectious disease epidemiology
CCICADA *(US Dept of Homeland Security Command, Control, and Interoperability Center for Advanced Data Analysis)*	Project PI	Principle Investigator into data analysis relating to social behavior in virtual/technologically enable environments, bio-security, and bio-inspired algorithms in cyber-security
DIMACS *(The Center for Discrete Mathematics and Theoretical Computer Science)*	Member	Active participant in working groups, collaborations, and conferences (including acting as organizer for multiple workshops/conferences/tutorials) in all areas of mathematical macrobiology
START *(US Dept of Homeland Security Center for the Study of Terrorism and Responses to Terrorism)*	Project PI	Principle Investigator working on understanding social behavior and algorithms driving the emergence of extremism and leadership in

Publications (peer reviewed)**:**

** = a student or post-doctoral researcher advised by Fefferman during the research effort reported*

Journal Articles:

Published or In Press

139. Leotti, L., M. Callahan, N.H. **Fefferman**, E. Bonawitz, and V. LoBue. (*In Press*) The Codevelopment of Children's general causal reasoning and their causal reasoning of illness transmission. *Developmental Psychology.*
138. Wright*, J., J.S. McAlister*, R. Almeida, M. Bletz, M.J. Gray, J.L. Lockwood, S. Masecar, J. Piova-Scott, A. Warwick, and N.H. **Fefferman**. (*In Press*) Trade Network Surveillance Strategies. *Ecosphere.*
137. **Hasenjager***, M., M. Bailey, and N.H. **Fefferman**. 2026. Social learning within groups: hypernetworks capture effects of within-group dynamics on social contagions. *Behavioral Ecology and Sociobiology*, 80(10), 126.
136. Dadlani*, R., J.S. McAlister*, A.C. Schwarze, M. Kawakatsu, S. Iams, T.L. Eissa, and N.H. **Fefferman.** 2026. Planned behavior, perceptual biases, and the dynamics of collective action. *Physical Reviews E.*114(4), 044308.
135. Ashworth, M., L. Thunström, T. Cherry, N. **Fefferman**, D. Finnoff, S.C. Newbold, and J.F. Shogren. 2026. From Hesitation to Action: The Role of Primary Care Physicians in COVID-19 Antiviral Uptake. *Ethics, Medicine and Public Health.* 34, 101327.

134. Walker, R., A. White, X. O'Neill, N.H. **Fefferman**, and M.J. Silk. 2026. Animal Social Network Structures Across the Fast-Slow Continuum. *Ecology Letters.* 29(8), e70449.
133. McAlister*, J., J.L. Brunner, D.J. Galvin, and N.H. **Fefferman**. 2026. A Game Theoretic Treatment of Contagion in Trade Networks. *PLoS Computational Biology*. 21(12), e1013845.
132. Hasenjager*, M., M. Bailey, and N.H. **Fefferman**. 2026. Group composition influences diffusion dynamics via impacts on behavioral production. *Animal Behaviour.* 233, 123482.
131. Sisk, A.*, M.J. Silk*, N.D. Williams*, and N.H. **Fefferman**. 2026. A typology of rules for knowledge exchange in higher-order interactions. *PLoS Complex Systems.* 3(1), e0000080.
130. M.J. Silk* and N.H. **Fefferman**. 2026. Multilayer contagions in animal groups. *Animal Behaviour.* 235, 123525.
129. Surrell, E., J.S. Miller, N.H. **Fefferman**, and N. Pinter-Wollman. 2026. Higher-order interactions facilitate food dissemination in ant colonies. *Animal Behaviour.* 236,123579.
128. Beattie, U.K., J. Kittilson, B. Heidinger, N.H. **Fefferman**, and LM Romero. 2025. Chronic stress intensity does not affect corticosterone or DNA damage in adult and juvenile house sparrows. *Journal of Experimental Zoology Part A*. https://doi.org/10.1002/jez.70020
127. Sullens*, M. and N.H. **Fefferman**. 2025. Budget allocation and illegal fishing: a game-theoretic approach. *Mathematical Biosciences and Engineering*. 22(6).1307-1341.
126. **Fefferman**, N.H., M.J. Blum, L. Bourouiba, N.L. Gibson, Q. He, D.L. Miller, M. Papeș, D.K. Pasquale, C. Verheyen, and S.J. Ryan. 2025. Identifying outbreak risk factors through case-controls comparisons. *Nature Communications Medicine*. 5(210) https://doi.org/10.1038/s43856-025-00916-5
125. McAlister*, J.S., M. Blum, Y. Bromberg, N.H. **Fefferman**, Q. He, E.T. Lofgren, D. Miller, C. Schreiner*, K.S. Candan, H. Szabo-Rogers, and J. Reed. 2025. An interdisciplinary perspective of the built-environment microbiome. *FEMS Microbiology Ecology.* 101(1), fiae166.
124. McAlister*, J.S., and N.H. **Fefferman**. 2025. Insights into the Structured Coordination Game with Neutral Options through Simulation. *Dynamic Games and Applications.* https://doi.org/10.1007/s13235-024-00612-4.
123. Zia, A., K. Lacasse, N.H. **Fefferman**, L.J. Gross, and B. Beckage. 2024. Machine Learning a Probabilistic Structural Equation Model to Explain the Impact of Climate Risk Perceptions on Policy Support. *Sustainability*. 16(23), 10292.
122. Guo, X., M.J. Hasenjager*, N.H. **Fefferman**, and N. Pinter-Wollman. 2024. Social interactions are impacted by food availability and group size. *Biology Open.* 13 (10).
121. Hasenjager*, M.J., X. Guo, G. Derryberry, N. Pinter-Wollman, and N.H. **Fefferman**. 2024. Nature-Inspired Design Principles Promote Supply Network Resilience. *Physica A*. 654, 130133.
120. Hasenjager*, M.J., and N.H. **Fefferman**. 2024. Social ageing and higher-order interactions: Social selectivity enhances older individuals. *Philosophical Transactions of the Royal Society B.* 379 (1916), 20220461.
119. Canizares, J., J.M. Reed, and N.H. **Fefferman**. 2024. Network theory and migration: Avoiding misapplications and misinterpretations. *Ecological Modelling*. 496, 110849.
118. Story, B., P. Gillespie, G. Derryberry, E. Derryberry, N.H. **Fefferman**, and V. Maroulas. 2024. DialectDecoder: Human/Machine Teaming for Bird Song Classification and Anomaly Detection. *Ecological Informatics*. 82, 102657.
117. Iacopini, I., J.R. Foote, N.H. **Fefferman**, E.P. Derryberry, and M.J. Silk. 2024. Not your private tête-à-tête: leveraging the power of higher-order networks to study animal communication. *Philosophical Transactions B.* 379 (1905), 20230190.

116. Eichenwald, A., N.H. **Fefferman**, and J.M. Reed. 2024. Potential extinction cascades in a desert ecosystem: linking food web interactions to community viability. *Ecology and Evolution.* 14(2): e10930.

115. Hasenjager*, M.J., X. Guo, N. Pinter-Wollman, and N.H. **Fefferman** (2023) Designing sustainable systems using nature's toolbox. *Sustainability Science*. 18:2787–2793.

114. **Fefferman**, N.H., J.S. McAlister*, B.S. Akpa, K. Akwataghibe, F.T. Azad, K. Barkley, A. Bleichrodt, M.J. Blum, L. Bourouiba, Y. Bromberg, K.S. Candan, G. Chowell, E. Clancey, F.A. Cothran, S.N. DeWitte, P. Fernandez, D. Finnoff, D.T. Flaherty, N.L. Gibson, N. Harris, Q. He, E.T. Lofgren, D.L Miller, J. Moody, K. Muccio, C.L. Nunn, M. Papes, I.C. Paschalidis, D.K. Pasquale, J.M. Reed, M.B. Rogers, C.L. Schreiner, E.B. Strand, C.S. Swanson, H.L. Szabo-Rogers, S.J. Ryan. (2023) A New Paradigm for Pandemic Preparedness. *Current Epidemiology Reports.* doi.org/10.1007/s40471-023-00336-w

113. Beattie, U., L. Mikolajczak, N.H. **Fefferman**, and L.M. Romero. 2023. Neophobia, but not perch hopping, is sensitive to long-term chronic stress intensity. *Journal of Experimental Zoology Part A.* 339(10):1036-1043. https://doi.org/10.1002/jez.2752.

112. Wright*, J., K.R. Buch*, U.K. Beattie, B.M.G. Gormally, L.M. Romero, and N.H. **Fefferman**. 2023. A Mathematical Representation of the Reactive Scope Model. *Journal of Mathematical Biology*. 87(3):51. https://doi.org/10.1007/s00285-023-01983-9.

111. Hoyer-Leitzel, A., S.M. Iams, A.J. Haslam, M.L. Zeeman, and N.H. **Fefferman**. 2023 An immuno-epidemiological model for transient immune protection: A case study for viral respiratory infections. *Infectious Disease Modelling*. 8(3):855-864.

110. Young*, M.J., M.J. Silk*, A.J. Pritchard*, and N.H. **Fefferman**. 2023. The interplay of social constraints and individual variation in risk tolerance in the emergence of superspreaders. *Journal of the Royal Society Interface.* 20 (205):20230077.

109. Beattie, U., N.H. **Fefferman**, and M.L. Romero. 2023. Varying intensities of chronic stress induce inconsistent responses in weight and plasma metabolites in house sparrows (*Passer domesticus*). *PeerJ* 11, e15661.

108. Sisk*, A. K. Rappazzo, T. Luben, and N.H. **Fefferman**. 2023. Connecting People to Food: A Network Approach to Alleviating Food Deserts. *Journal of Transport & Health.* 31:101627.

107. Beattie, U., E.S. Rosen, N.H. **Fefferman**, and M.L. Romero. 2023. House sparrows prioritize skin repair over constitutive innate immunity during long-term chronic stress. *Journal of Experimental Zoology Part A.* 339(5):464-473.

106. Grandison*, B., H. Yin*, A Kilgore*, M. Young*, J. Jiao*, and N.H. **Fefferman**. 2023. Epidemiology, Game Theory, and Evolutionary Rescue: Understanding how Outbreaks Impact Population Viability. *Letters in Biomathematics.* 10(1):75-86.

105. Young*, M. and N.H. **Fefferman**. 2023. A 'Portfolio of Model Approximations' Approach to Understanding Invasion Success with Vector-borne Disease. *Mathematical Biosciences*. 358: 108994.

104. Shen, Z., C.F. Chen, H. Zhou, N.H. **Fefferman**, and S. Shrestha. 2023. Community vulnerability is the key determinant of diverse energy burdens in the United States. *Energy Research & Social Science.* 97:102949.

103. Buch*, K.R. and N.H. **Fefferman**. 2023. Mathematical Model of Basal Sprout Production in Vector-Borne Tree Disease. *Forests*. 14(2):349.

102. Pritchard*, A.J. and N.H. **Fefferman**. 2023. Trade-offs in resource access and health by avoidance of self-fouling, motivated via disgust. *Ecological Modelling.* 476:110225.

101. LoBue, V., E. Bonawitz, L. Leotti, and N.H. **Fefferman** 2023. How Children Develop Healthy Behavioral Choices to Promote Illness Prevention. *Current Directions in Psychological Science.* 32(1):3-9.

100. Pritchard*, A.J., M.J. Silk*, and N.H. **Fefferman**. 2023. Influence of Lived Experiences on Public Responses to Future Diseases via (De) Sensitization of Concern. *Disaster Medicine and Public Health Preparedness.* 17:e251.

99. Sisk*, A.H., P. Bamwine, J. Day, and N.H. **Fefferman** 2022. Linking Immuno-Epidemiology Principles to Violence. *BMC Public Health.* 22(1):1-8.

98. Roosa*, K. and N.H. **Fefferman**. 2022. A general modeling framework for exploring the impact of individual concern and personal protection on vector-borne disease dynamics. *Parasites and Vectors.* 15:361.

97. Pritchard*, A.J., M.J. Silk*, S. Carrignon, R.A. Bentley, and N.H. **Fefferman**. 2022. How Reported Outbreak Data Can Shape Individual Behavior in a Social World. *Journal of Public Health Policy.* 43: 360–378.

96. Silk*, M., M. Wilber, and N.H. **Fefferman**. 2022. Capturing Complex Interactions in Disease Ecology with Simplicial Sets. *Ecology Letters.* 25(10):2217-2231.

95. Sisk*, A.H. and N.H. **Fefferman**. 2022. A Network Theoretic Method for Calculating the Basic Reproductive Number for Infectious Disease. *Methods in Ecology and Evolution.*13(11):2503-2515.

94. **Fefferman**, N.H., C.A. Price, and O.C. Stringham. 2022. Considering Humans as Habitat Reveals Evidence of Successional Disease Ecology among Human Pathogens. *PLoS Biology.* 20(9): e3001770.

93. Lofgren, E., E.N. Naumova, J. Gorski, Y. Naumov, and N.H. **Fefferman.** 2022. How drivers of seasonality in respiratory infections may impact vaccine strategy: a case study in how COVID-19 may help us solve one of influenza's biggest challenges. *Clinical Infectious Diseases*, 75(S1): S121-S129.

92. Wilber, M., J. DeMarchi, **N.H. Fefferman**, and M. Silk*. 2022. High prevalence does not necessarily equal maintenance species: Avoiding biased claims of disease reservoirs when using surveillance data. *Journal of Animal Ecology*. 91(9): 1740-1754.

91. Lofgren, E., K. Lum, A. Horowitz, B. Madubuonwu, K. Myers*, and N. H. **Fefferman**. 2022. Carceral Amplification of COVID-19: Impacts for Community, Corrections Officer and Incarcerated Population Risks. *Epidemiology*. 33(4):480-492.

90. Nguyen*, D., T. Wakhare*, J. Jiao*, K. Myers*, O. Udiani*, and N.H. **Fefferman**. 2022. Seasonality in multi-host disease systems. *Ecological Modelling*. 470:109973.

89. Pritchard*, A.J., M.J. Silk*, S. Carrignon, R.A. Bentley, and N.H. **Fefferman**. 2022. Balancing timeliness of reporting with increasing testing probability for epidemic data. *Infectious Disease Modelling.* 7(2):106-116.

88. Young*, M., M.J.Silk*, A.J. Pritchard*, and N.H. **Fefferman**. 2022. Diversity in Valuing Social Contact and Risk Tolerance Lead to the Emergence of Homophily in Populations Facing Infectious Threats. *Physical Reviews E.* 105(4):044315.

87. Young*, M. and N.H. **Fefferman**. 2022. The Dynamics of Disease mediated Invasions by Hosts with Immune Reproductive Tradeoff. *Nature Scientific Reports*. 12(1):1-12.

86. **Fefferman**, N.H., K.A. Blacker, C.A. Price, and V. LoBue. 2022. When do children avoid infection risks: Lessons for schools during the COVID-19 pandemic. *iScience*. 103989.

85. Carrignon, S., R.A. Bentley, M.J. Silk*, and N.H. **Fefferman**. 2022. How Social Learning Shapes the Efficacy of Preventative Health Behaviors in an Outbreak. *PLoS One.* 17(1): e0262505.

84. Silk*, M.J., S. Carrignon, R.A. Bentley, and N.H. **Fefferman**. 2022. Observations and conversations: how communities learn about infection risk can impact the success of non-pharmaceutical interventions against epidemics. *BMC Public Health.* 22(1):1-12.
83. Chen, C., T. Deitz, N.H. **Fefferman**, J. Greig, K. Cetin, C. Robinson, L. Arpan, M. Schweiker, B. Dong, W. Wu, Y. Li, H. Zhou, J. Wu, J. Wen, J. Fu, T. Hong, D. Yan, H. Nelson, Y. Zhu, X. Li, L. Xie, R. Fu. 2022. Extreme events, energy security and equality through micro- and macro-levels: Concepts, challenges and methods. *Energy Research & Social Science.* 85:102401.
82. Lemanski*, N.J., M.J. Silk*, N.H. **Fefferman**, and O. Udiani*. 2021. How territoriality reduces disease transmission among social insect colonies. *Behavioral Ecology and Sociobiology*. 75(12):1-13.
81. **Fefferman**, N.H., C. Chen, G. Bonilla, H. Nelson, and C.P. Kuo. 2021. How limitations in energy poverty and socioeconomic disparities compromise health interventions for COVID outbreaks in urban settings. *iScience.* 24(12103389).
80. Hobson, E.A., M.J. Silk, N.H. **Fefferman**, D.B. Larremore, P. Rombach, S. Shai, and N. Pinter-Wollman. 2021. A guide to choosing and implementing reference models for social network analysis. *Biological Reviews.* 96(6):2716-2734.
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4. Fields, D. A., Kafai, Y. B., Sun, J., **Fefferman**, N., Ellis, E., DeVane, B., Giang, M. T., & Wong, J. 2016. The great dragon swooping cough: Stories about learning designs in promoting participation and engagement with a virtual epidemic. *In* Barany, A., Slater, S., & C. Steinkuehler *(Eds.), Proceedings of the Games + Learning + Society (GLS) 12.0 Conference* (pp. 419-424). Pittsburgh, PA: ETC Press.
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2. Korczynski*, M., A. Hamieh*, J.H. Huh, H. Holm, S. R. Rajagopalan, and N.H. **Fefferman**. 2015. DIAMoND: Distributed Intrusion/Anomaly Monitoring for Nonparametric Detection. *CCCN 2015: 24th International Conference on Computer Communications and Networks, IEEE*, *2015*. (Note: this is the proceeding of a conference, not a journal, but is equivalent to journal publication for the field of computer science, however in keeping with the conventions of Biology, Fefferman is last author as PI on the sponsoring grant that funded the research.)

1. **Fefferman**, N.H., J. Jagai, and E.N. Naumova. 2004. Two - Stage Wavelet Analysis Assessment of Dependencies in Time Series of Disease Incidence. *Proceedings of the 2004 Conference of the International Environmetrics Society*

Research Mentoring

Undergraduate Researchers (46):

Shyretha Brown, Danika Chari, Kaige Chen, Ian Clark, Rishi Dadlani, Liz Davis, Anne Eaton, Taylor Eisenstein, Brandon Grandison, Derek Hansen, Natalie Harris, David Haycraft, John Huffman, Ana Kilgore, John Kim, Edward Lee, Somair Malik, Andrew McConvey, Jeffrey Mandell, Zain Paracha, Luke Postle, Lauren Prince, Asya Pritsker, Cathy Reis, Jeremiah Rogers, Bolanle Salaam, Nicole Scholtz, Margaret Senese, Briana Sevilla-Quintero, Denysse Sevilla-Quintero, Joshua Smith, Andrew Sohn, Kim Stanek, Johanna Tam, Colleen Thiersch, Elena Tsvetkova, Barton Willage, Immanuel Williams, Nakeya Williams, Barry Walker, Hannah Yin, Yi Ming Yu, Yongqing Yuan, Stefanie Yuen, James Xue, Bobby Zandstra

Graduate Researchers (57):

*(Committee Member, or Advisor for work on funded research projects – not primary dissertation advisor; * = special case)*

Kevin Aagard, Emma Bell, Carissa Bleker, Curtis Burkhalter, Jordan Bush, Jessica Rozek Cañizares, Huilan Chang, Erick Chastain, Fnu Eric Ngang Che, Ashley Cliff, Brittany Coppinger, Ashley Crump, Krista DeCooke, **Joseph DeMarchi**, Kathyrn Fair, Alison Golinski, Stephen Grady**,** Gili Greenbaum, Candice JeanLouis, Hwayoung Jung**,** Ariel Kruger, Di Li, Eric Lofgren*, Nicholas Lorusso, Amy Luo, Nicole Lussier, Adam Marszalek, Benjamin Mcclendon, Anthony Ogbuka, Paul Raff, Orin Robinson, Margaurete Romero, Rajat Roy, Liliana Salvador, Shelby Scott, Tinevimbo Shiri, Brittany Stephenson**,** Clifford Swanson, Alex Thorn, Rafael Valentine, Alex Villiard, Maryrose Weatherton, Orion Weldon, Yifang Xi

(primary research advisor to: ^{M} indicates Master's degree student*)*

Jessica Beck^{M}, Kelly Buch, Hannah Conner^{M}, Caitlin Cox, Ashley DeNegre, Jeff DeSalu^{M}, Brad Greening, Md. Belal Hossain, Natalie Lemanski, John McAlister, Jewel Miles^{M}, Oluwabukunmi Adedeji^{M}, Agnesa Redere, Samantha Schwab, Courtney Schreiner, Anna Sisk, Oliver Stringham^{M}, Maggie Sullens, Karen Wylie

Post-Doctoral Researchers (26):

Dr. Erick Chastain, Dr. Preeti Dubey, Dr. David Flaherty, Dr. Lazaros Gallos, Dr. Manuel Garcia-Quisimondo, Dr. Ali Hamieh, Dr. Matthew Hasenjager, Dr. Karlo Hock, Dr. Cindy Hui, Dr. Jing Jiao, Dr. Amira Kebir, Dr. Maciej Korczynski, Dr. Natalie Lemanski, Dr. Kellen Myers, Dr. Kah Loon Ng, Dr. Alex Pritchard, Dr. Kimberlyn Roosa, Dr. Reed Scott, Dr. Nourridine Siewe (co-advised by Prof. S. Lenhart), Dr. Matthew Silk, Dr. Chris Stone, Dr. Gonzalo Suarez, Dr. Oyita Udiani, Dr. Justin Wright, Dr. Matthew Young, Dr. Peng Zhong

Courses Developed and Taught (all courses developed from scratch)

- STEM Professional Development (EEB 610 – University of Tennessee, Knoxville) Spring 2024
- Introduction to the Design of Mathematical Models (MAT 511/EEB 682 – University of Tennessee, Knoxville) Spring 2021 and 2023
- Advanced Mathematical Ecology II (MAT/EEB 682 – University of Tennessee, Knoxville) Spring 2017 and 2019
- Evolution, Disease, and Medicine (ENR110 – Rutgers University / EEB 310 – UT, Knoxville) Fall each year 2009 – 2014, Spring 2018 and 2020
- Conversational Bio-Mathematical Modeling (ENR 428 – Rutgers University/ EEB 475 – UT, Knoxville) Spring 2011 – 2014, 2020
- Problems in Ecology: Academic Pedagogy (ENR 601 – Rutgers University) Fall 2015
- *(Co-Developed and Taught)* Ethics & Professional Development in Ecology and Evolution (ENR 602 01 – Rutgers University) Spring 2013-2016 (exception – sabbatical Fall 2014-Spring 2015)
- Introduction to Modeling Ecology, Evolution, and Epidemiology (ENR 604 – Rutgers University) Spring each year 2010 – 2016 (exception – sabbatical Fall 2014-Spring 2015)
- Introduction to Epidemiological Modeling (ENR 603 – Rutgers University) Fall each year 2009 – 2012
- Elements of Data Analysis and Epidemiology (CMPH 343 – Tufts University School of Medicine) Spring 2006

Professional Memberships

American Association for the Advancement of Science (AAAS)

Association for Women in Mathematics (AWM)

Association for Women in Science (AWIS)

Society for the Advancement of Chicanos/Hispanics and Native Americans in Science (SACNAS)

Society for Industrial and Applied Mathematics (SIAM)

Society for Mathematical Biology (SMB)

Invited Presentations

2026

"Epidemiology Across Scales: Modeling to integrate the immunological, the organismal, and the ecological", American Mathematical Society Fall Western Sectional Meeting 2026, Special Section on Mathematical Modeling in Medicine, Tempe, AZ

Keynote: "Pandemic Preparedness: The Ultimate One Health Challenge", University of Kentucky 2026 One Health Symposium, Lexington, KY

"Self-organization, Infectious Disease, and Social Behavior – An Evolutionary Tale?" Santa Fe Institute Research Colloquium, Santa Fe, NM.

"Why and How to Build Models that Make a Difference," North Africa Applied Systems Analysis Centre's Professional Diploma on Evidence-Based Decision Making (virtual)

"Having Real-World Impact as a Data-Free Theorist." AWM at ASU Professional Development Series, Tempe, AZ

"The Mathematics of Self-Organizing Networks in Life Sciences and Beyond," School of Mathematical and Statistical Sciences Colloquium, Tempe, AZ

"Conversations on Multidisciplinary Public health Challenges," AIM Workshop on Formal Scientific Modeling, Pasadena, CA

2025

Keynote: "Modeling Self-Organizing Networks in Life Sciences and Beyond", 18th Annual Symposium on Biomathematics & Ecology Education and Research, Fairfax, VA

Plenary: "Moving to a higher plane: how higher order networks can shine new light on emergent collective behavior," Applied Mathematics Intersections Conference, Claremont, CA

"Self-Organizing Networks in Life Sciences and Beyond," International Institute for Applied Systems Analysis, Laxenburg, Austria

"Transmission in multiplex and higher order networks," Social Networks and Health 2025, Duke University, Durham, NC

Public Interview: "APPEX Interdisciplinary Science," Inshanely Curious podcast and YouTube video.

"Applications of Self-Organizing Networks in Life Sciences and Beyond," Institute for Quantitative and Computational Biosciences, UCLA, Los Angeles, CA

"Why and How to Build Models that Make a Difference," North Africa Applied Systems Analysis Centre's Professional Diploma on Evidence-Based Decision Making (virtual)

"Employing Guided Self-Organizing Teaming to Advance Multidisciplinary Success," Virtual Seminar Series of the NSF RCN: A Comprehensive Toolkit for Interdisciplinary Team Science, & its Context-Dependent Application (virtual)

"Using math to understand how disease shapes the success of social systems," Arizona State University, School of Math and Natural Sciences, Phoenix, AZ

2024

"Beyond DIMACS," Conference in Honor of Fred Roberts, Rutgers University, DIMACS, Piscataway, NJ

"Using Mathematical Modeling to Explore the Social Construction of Value," University of Wyoming, Department of Economics, Laramie, WY

Keynote: "Natural Complexity: Can a complex systems approach improve methods for bioinspired design?" Conference on Complex Systems 2024, Exeter, England

"Complex Systems," IIASA Summer School for Systems Modeling 2024, Laxenburg, Austria

"Individual Motivations, Collective Behaviors: Increasing the realism of social psychological theory in models of emergent collective action," SIAM Annual Meeting 2024, Spokane, WA

"Behavior, Infection, and Math: Understanding how disease shapes the success of social systems," Arizona State University, School of Math and Natural Sciences, Phoenix, AZ

"Community, synergy, and opportunity," Arizona State University, School of Math and Natural Sciences, Phoenix, AZ

"Mathematical Frontiers in Social Behavior and Epidemics," American Physical Society (APS) March Meeting 2024, Minneapolis, MN

"The Evolution and Persistence of Self-Organizing Social Systems Under Disease Constraints," Emory University, Department of Biology, Decatur, GA

2023

"Finding an efficient balance between risk and mitigation effort in combating invasive species across sociopolitical landscapes," Workshop on Environmental Conflicts, Social Structures and Invasive Species Control, Nantes Institute for Advanced Study (virtual)

"Capturing Complex Contagion Processes on Higher Order Networks," SIAM Dynamical Systems 2023, Portland, OR

"One Health Multidisciplinarity: Improving our Ability to Understand, Predict, and Prevent Future Pandemics," One Health Rally, Knoxville, TN

"A Template for Responsive Translational Pandemic Science," PanCommunity Conference 2023 (virtual)

2022

Public Interview: "Transdisciplinary Science," Here We Are podcast and YouTube video.

"Predicting Emergence in Multidisciplinary Pandemic Tipping-points," NSF PIPP Program Kick-off, 2022 (virtual)

"The Topology of Interdependent Multi-Domain Behavioral Systems," AFOSR Trust and Influence Program Review 2022 (virtual)

"Emergence," FPR Culture, Mind, and Brain Network, March 2022 (virtual)

2021

"How household economics may compromise efforts to safeguard children during outbreaks," Cold Place Math Seminar (virtual)

"Saving Bats from Fungal Diseases with Linear Algebra," Univ. of TN Department of Mathematics Junior Colloquium (virtual)

Keynote Address: "Networks and the Mathematics of Resilience," BRII Annual Meeting 2021 (virtual)

"A Taxonomy of Communication Functions on Higher-Order Topologies," AFOSR Trust and Influence Program Review 2021 (virtual)

"How Infectious Diseases May Have Shaped the Evolution of Social Organization," Society for Mathematical Biology, Annual meeting, Mini-symposium on Collective Behavior and Social Evolution, (virtual)

Plenary Address: "Network Dynamics and Behavioral Models," NSF Conference on Bridging Disciplinary Divides for Behaviorally Modulated Mathematical Models in Human Epidemiology, (virtual)

"Scientific Triage - How to make strategic choices about prioritizing basic science during developing threats," NIAID Data Science Seminar, (virtual)

"COVID-19 variants and vaccinations: Behavior, disease, and how we fight pandemics," Women's Interfaith Dialogue of Oak Ridge, TN (virtual)

Public Lecture: "Epidemics, Societies, and Math: How Disease Changes Animal Evolution," UT Science Friday (virtual)

"How an old glitch in a video game helped mathematical modelers prepare for COVID-19," Oxford University Student Mathematical Society – The Invariants (virtual)

"Humans as Ecosystem Engineers of the Pathogen Landscape," BIRS workshop: Mathematics of Human Environmental Systems (virtual)

"How Mass Incarceration Affects Outbreaks of Infectious Disease," SIAM Minisymposium on Using Mathematical Models in Epidemiology and Medicine to Outwit Diseases, Joint Mathematics Meetings 2021 (virtual)

2020

Public Interview: "Holiday COVID Update," Here We Are podcast and YouTube video.

Public Lecture: "The Effects of COVID-19: Lessons from Ecology and Evolution," The League of Women Voters, Oak Ridge, TN

"How household economics may compromise efforts to safeguard children during outbreaks", Mathematical Biology Seminar, ASU (virtual)

"The Influence of Topology on Multi-Domain Interactions," 2020 AFOSR Annual Trust and Influence Portfolio Review (conference shifted to virtual meeting)

Public Interview: "Siding with Science," Here We Are podcast and YouTube video.

Session Keynote: "Logic, Equations, Data: From each according to their ability," Intelligent Systems for Molecular Biology (ISMB) 2020, COVID-19 Session (conference shifted to virtual meeting)

Public Webinar: "Invasive Species Policy and COVID-19," Panel Participant, Ecological Society of America, Webinar Series

Public Interview: "Nina Fefferman," You Made it Weird podcast

Public Lecture: "The Role of Applied Math in Real-time Pandemic Response: How Basic Disease Models Work," NIMBioS Webinar Series, Knoxville, TN

Public Interview: "Math + Virus + Us," Here We Are podcast and YouTube video.

2019

Public Lecture: "Vaccine Acceptance and Epidemic Risks," Infinite Futures Event Series, Museum of Science and Industry, Chicago, IL.

"When to Turn to Biology for Inspiration in Systems Design," DIMACS 30th Anniversary Conference, New Brunswick, NJ.

"Patients as patches: Ecological challenges from the epidemiology of healthcare environments," ESA 2019, Louisville, KY.

"Math and Disease," Possibilities in Postsecondary Education and Science (PIPES), UTK, Knoxville, TN.

Keynote Address: "Evolving Efficient Solutions: How simple natural systems solve the most complicated problems," MBI Capstone Conference 2019, Columbus, OH (virtual)

Plenary Address: "How AIDS prevalence impacts the emergence of antibiotic resistance in bacterial infections," SIAM BAMM 2019, Richmond, VA.

Public Lecture: "Math and Disease," Stand Up Science, Farragut, TN.

"Biosurveillance and Homeland Security," Princeton University, NJ.

"Understanding Social Communication Systems with Homology Theory," Complex Systems Seminar, University of Michigan, Ann Arbor, MI.

"Going Against the Grain," Women Empowered in STEM (WeSTEM) 2019, Champaign, IL.

"You're Worth It: Job Negotiations," Women Empowered in STEM (WeSTEM) 2019, Champaign, IL.

2018

"Math: A Critical, Treacherous Bridge Between Scientific Disciplines," American Geophyiscal Union (AGU 2018), Washington DC.

"The Evolution of Social Complexity as Multi-Scale Feedback Control on Networks," Systems Theory Lunch Colloquium, Harvard Medical School, Boston, MA.

"Saving Bats from Fungal Diseases with Linear Algebra," Claremont Center for Mathematical Sciences Colloquium, Claremont, CA.

Plenary Address: "Evolving Efficient Solutions: How simple natural systems solve the most complicated problems," NIMBioS Undergraduate Research Conference 2018, Knoxville, TN.

Plenary Address: "Linking Local Decisions with Global Outcomes in Networks: Case Studies in Behavior and Population Health" SIAM Life Sciences 2018, Minneapolis, MN.

"The mathematical biology of networks: from disease outbreaks to cyber-attacks," TN Governor's School, University of Tennessee, Knoxville, TN.

"Trans-disciplinary adventures in the mathematical biology of networks: from disease outbreaks to cyber attacks," DIMACS REU, Rutgers University, Piscataway, NJ.

Public Webinar: "Social and Biological Networks: The Evolution of Social Systems," US National Academies of Sciences, Engineering, and Medicine: Math Frontiers Webinar Series

2017

"Self-Diagnosing Networks," Data Institute San Francisco Conference (DSCO17), San Francisco, CA.

Keynote Address: "Evolving Efficient Solutions: How simple natural systems solve the most complicated problems," Workshop on Bio-Inspired Security, Trust Assurance, and Resilience (BioSTAR 2017), San Jose, CA.

"Wildlife Disease Management Outcomes May Depend on the Mechanism of Host Immune Response," Distinguished Lecture Series in Immunology and Infectious Diseases, Center for Emerging & Re-emerging Infectious Diseases, School of Medicine, University of Washington, Pullman, WA.

2016

"Evolving Healthy Populations," International Symposium on Biomathematics and Ecology Education and Research 2016, Charlseton, SC.

"Individuals, Societies, and Climate: Modeling motivations to change," Oak Ridge National Laboratory Workshop on Human Activity at Scale in Earth System Models, Oak Ridge, TN.

"Network Models in Epidemiology," US-Canadian Institutes Epidemiology Summer School: Mathematical Modeling of Infectious Disease Spread, MBI, Columbus, OH.

"The Invasion Ecology of Diseases in a Human Environment," Arthur M. Sackler Colloquia of the National Academy of Sciences, Coupled Human and Environmental Systems, Washington DC.

"Global Feedback Control on Centrality in Self-Organizing Systems", Mathematical Biosciences Institute Workshop on the Control and Observability of Network Dynamics, MBI, Columbus, OH.

"Zika Control: More Complicated than Hoped?" Next Einstein Forum, Dakar, Senegal.

2015

"Linear Algebraic Tools in Conservation Ecology," Simon A. Levin Mathematical, Computational and Modeling Sciences Center Seminar, Tempe, AZ.

"Applications of Homology Theory to Animal Communication Systems," Mathematics and Statistics Colloquium, Arizona State Univ., Tempe, AZ.

"Trade-offs Between Collaboration and Infection Risk: Can 'social distancing' improve colony function?" Conference on Complex Systems 2015, Tempe, AZ.

"The Benefits of Ongoing Dynamics in Self-Organizing Social Systems," Conference on Collective Dynamics and Evolving Networks, Bath, UK.

Plenary Address: Exploiting the Complexity of Identity to Infiltrate Clandestine Groups – Lessons from a LARP, CyDentity Conference, CCICADA, New Brunswick, NJ.

"Incorporating Evolutionary Rescue into Population Viability Models," Mathematics of Planet Earth: Workshop on Management of Natural Resources, Washington D.C.

"Distributed Detection Algorithms for Real-Time Maritime CyberSecurity," Joint CCICADA & AMU Conference on Maritime CyberSecurity, New Brunswick, NJ.

"The Definition of Communication: One way biology and math people accidentally talk past each other and what we might be able to do to fix it," Annual Meeting, Society for Integrative and Comparative Biology, West Palm Beach, FL.

2014

"BioInspired Anomaly Detection: Social Insects and Network Security," Dept. of Homeland Security Science and Technology HSARPA CyberSecurity Division Research and Development Showcase and Technical Workshop, Washington D.C.

"n-TANGLE: a new method for comparing networks across scales" Workshop on Advances in Discrete Networks, Dept. of Mathematics, Univ. of Pittsburgh, Pittsburgh, PA.

Keynote Address: "Virtual Worlds Helping Public Health Preparedness," New Jersey Health Care Quality Institute Annual Meeting, Trenton, NJ.

"A Mathematician's Role in Fighting Ebola," Saint Ann's School, Brooklyn, NY.

"Provable Boundaries on Disease Outbreaks in Self-Organizing Social Networks," The Duke University Mathematical Biology Colloquium, Durham, NC.

Keynote Address: "Designing your own role: Women in STEM," Tufts University Graduate Student Luncheon for Women in Science, Medford, MA.

"Division of Labor as an Adaptation to Combat Disease Risks?" The Seventh International Symposium on Biomathematics and Ecology: Education and Research (BEER), Claremont, CA.

"How dynamic networks affect disease transmission," The BioCircuits Institute, UCSD, San Diego, CA.

"The Evolution of Social Complexity," Plant Biology Dept. Seminar, Univ. of Vermont, Burlington, VT.

"Provable Boundaries on Disease Outbreaks in Self-Organizing Social Networks," Math Dept. Seminar, Univ. of Tennessee at Knoxville, TN.

"Mathematics, Optimization, and the Evolution and Behavior of Social Insects," Math Dept. Junior Colloquium, Univ. of Tennessee at Knoxville, TN.

"The Life of a Mathematical Researcher," Saint Ann's School, Brooklyn, NY.

"Mathematics, Optimization, and the Evolution and Behavior of Social Insects," Social Insect Research Group Seminar, School of Life Sciences, Arizona State Univ., AZ.

"N-tangle: A Network Comparison Method," Workshop on Animal Social Networks, NIMBioS, TN

2013

"Evolutionary pressures, Infectious Diseases, and Self-Organizing Social Systems," Evolutionary Studies Seminar, Co-Sponsored by the Collective Dynamics of Complex Systems Research Group, the Undergraduate Math Club, Upsilon Pi Epsilon, and Pi Mu Epsilon, SUNY Binghamton, NY.

"BioInspired Anomaly Detection," DHS CyberSecurity PI Meeting, Arlington, VA.

"Mathematics, Evolutionary Biology, Epidemiology, and National Security", Saint Ann's School, Brooklyn, NY.

"Evolution of Reproductive Timing and Social Organization in Honey Bees," Scientific Learning Forum at FMC, Ewing, NJ.

"Crowd Sourcing WoW: A Case Study in Improving Pandemic Preparedness," Annual George M. Sideris Biology Conference, LIU, Brooklyn, NY.

2012

Public Lecture: "Math, Complexity, and Social Groups: Using math to understand the nature of society," Campus Life Enrichment Committee (CLEC) Lecture, Georgia Southern Univ., GA.

"How and Why Static Approximations Can Fail to Give Adequate Insight into Processes on Dynamic Networks," Math Dept. Colloquium, Georgia Southern Univ., GA.

"Theoretical Worlds: An Exploration of Models and Model Systems," Tufts Univ, Dept. of Civil and Environmental Engineering Seminar Series, Medford, MA.

"Help, my avatar is sick!" Panel Talk, SXSW, Austin, TX.

"WISE – Women, Ignore Silly Expectations!" 2012 WISE Conference, Texas A&M, TX.

2011

"The Evolution of Social Complexity," CUNY Initiative for the Theoretical Sciences Workshop on A Unified Theory of Evolution, CUNY, NY.

"Balancing Workforce Productivity Against Disease Risks for Environmental and Infectious Epidemics," Math Dept. Seminar, Univ. of Ghana, Legon, Ghana.

"Selective Pressures from Disease on Social Behavior in Hosts," DIMACS/MBI US - African BioMathematics Initiative: Workshop on Genetics and Disease Control, Elmina, Ghana.

Plenary Address: "The Future of Technology and Knowledge," Next-Generation Communications Interoperability Workshop, Chicago, IL.

"Virtual Worlds and Real Epidemics - Insights from WoW's Corrupted Blood Plague," E-Virtuoses International Conference on Serious Games, Valenciennes, France.

Plenary Address: "Disease Robustness and Evolutionary Selective Pressures on Social Organization in Eusocial Insects," Mathematical Biosciences Institute Workshop on Insect Self-Organization and Swarming, Ohio State Univ., OH.

"Hakkar's Corrupted Blood Plague: How an Outbreak in WoW is Helping Epidemiologists Create Better Disease Models," Game Developer's Conference 2011, San Francisco, CA

"Exploring the Role of Behavior in Infectious Disease Dynamics: Mathematical Insights from World of Warcraft and other Virtual Worlds," DIMACS/CCICADA Student Workshop on Where the Mathematical and Computational Sciences Meet Society, Rutgers University, NJ

"Multi-Dimensional Data and the Influence of Human Behavior in Biosurveillance for Infectious Disease Outbreaks," Global Biosurveillance Conference: Enabling Science and Technology – 2nd Meeting in the Biological Threat Non-Proliferation Conference Series, Santa Fe, NM

2010

"Distributed Algorithms for Collective Visualization of Data," Visualanalytics Workshop 2010, Imperial College London, UK

"The Importance of Behavioral Dynamics on Disease Burden," Southern African Wildlife College, South Africa

"The Impact of Stress on Populations," DIMACS Advanced Study Institute on Conservation Biology, Limpopo, South Africa

"Social Behavior in Virtual Worlds," Panel Discussant – InPlay 2010, Toronto, Canada

"Self-Organizing Networks, Social Complexity, and Disease Dynamics," Rensselaer Polytechnic Institute, NY

"Playing with Plague: Exploring Disease Dynamics from Within," 2010 AAAS Annual Meeting, San Diego, CA

"Epidemiological Pressures on the Evolution of Social Complexity," Mathematical Methods in Systems Biology, Tel Aviv, Israel

2009

"Information Theoretic Tool for Biosurveillance," CCICADA Kickoff Meeting, Rutgers Univ., NJ

"Perspectives, Challenges, and Creativity in Understanding Behavioral Epidemiology," Workshop on Behavioral Epidemiology, Rutgers Univ., NJ

"Evolutionary Implications of Epidemics on Social Behavior," Evolutionary Genetics and Genomics at Rutgers, Rutgers Univ., NJ

Panel participant and Speaker on Popular Culture and Science, Sheffield Documentary Film Festival '09, Sheffield, United Kingdom

Keynote Address: "Epidemiological Insights from Virtual Worlds," Life Science Dialogue Heidelberg, - Inaugural Conference, Germany

"Social Stability and Success: A new concept in self-organizing systems and preferential attachment," Office of Naval Research Workshop on Complex Systems, Institute for Pure and Applied Mathematics, Los Angeles, CA

"The Impact of Household Capital Models on Targeted Epidemiological Control Strategies for Diseases with Age-Based Etiologies," Makerere Univ., Kampala, Uganda

Keynote Address: "Hakkar's Corrupted Blood Plague: How an Outbreak in World of Warcraft is Helping Epidemiologists Create Better Disease Models," Games for Health – Virtual Worlds, Boston, MA

"Network Representations and the Evolution of Social Complexity," Frontiers in Applied and Computational Mathematics, New Jersey Institute of Technology, NJ

"Mathematical Optimization, Evolutionary Sociobiology, and Eusocial Insects," Conference on The Power of Analysis, Princeton Univ., NJ

"Mathematical Insights into Behavioral Epidemiology," Univ. of Texas Health Science Center, Houston, TX

"Basics of Mathematical Modeling," Mosquito Modeling Made Easy Day, Center for Vector Biology, Rutgers Univ., NJ

"Mathematical and Computational Methods in Epidemiology and BioSurveillance," Jackson State University, MS

"Mathematics, Optimization, and the Evolution and Behavior of Social Insects," UNC, Chapel Hill, Applied Math, NC

"Network models in Epidemiology and Sociobiology: Introduction, Overview, and Recent Advances," Mathematical Sciences, RPI, NY

2008

"Social Behavior and the Dynamics of Corrupted Blood," Rice University/Games for Health, Houston, TX

"Possible Selective Mechanisms for the Evolution of Disease-defensive Social Organizations," Ecology and Evolution Seminar, Boston Univ., MA

"Behavioral Epidemiology in Virtual Worlds: Exploiting the virtual experience," Advanced Technology Applications for Combat Casualty Care 08; Telemedicine and Advanced Technologies Research Center Medical Simulation & Training Technology

"Recent Advances in the What, How and When of Network Models in Infectious Disease Epidemiology," SIAM 2008, CA

"World of Warcraft Corrupted Blood Disease: Epidemiological Observations and Findings," Games for Health, Baltimore, MD

"Computational Ecology: The Evolution of Sociality," Frontiers in Applied and Computational Mathematics, New Jersey Institute of Technology, NJ

Plenary Address: "Self-organizing social behavior and disease-defensive organizational strategies in social species," Complexity 2008, Univ. Illinois Urbana, IL

"From the Individual to the Population: Modeling the many levels of evolutionary fitness in social species," Dept. of Ecology and Evolution and Natural Resources, Rutgers Univ., NJ

"Individual Decisions, Group Efficiency," ExxonMobil, Clinton, N.J.

2007

Public Lecture: "Virtual Games, Real Epidemics: Can We Learn Real-Life Lessons in BioDefense from Online Games?" Biosecurity, Biotechnology and Global Health Seminar Series, Program on Science and Global Security, Princeton Univ., NJ

"Disease on Networks: Can Static Representations Capture the Full Complexity of a Dynamic Process?" NDSSL Seminar Series, Virginia Bioinformatics Institute, Virginia Tech, VA

Public Lecture: "Real People, Virtual Worlds: Watching a Plague Unfold," Institute for Mathematical Sciences, National Univ. of Singapore

"The Continued Mystery of Regular, Old, Annual Flu," Workshop on Mathematical models for the Study of the Infection Dynamics of Emergent and Re-emergent Diseases in Humans, Institute for Mathematical Sciences, National Univ. of Singapore

"Epidemics and the Evolution of Social Complexity," Program in Ecology and Evolution Seminar Series, Rutgers Univ., NJ

"Playing Games at School: Parents, Public Schools, and Children's Health," DIMACS Workshop on Game Theory in Epidemiology and Ecology, Rutgers Univ., NJ

"Analyzing Entropy in Biosurveillance," U.S. Dept. of Homeland Security research briefing, Washington D.C.

"Fantastic Problems in Mathematical Ecology," DIMACS Bio-Math Connection Field Testers Workshop, Rutgers Univ., NJ

"Does Securing Infrastructure Against Workforce-Depletion Depend on Whether the Risk is Environmental or Infectious?" DIMACS Workshop on Mathematical Modeling of Infectious Diseases in Africa, Univ. of Stellenbosch, South Africa

"Social interaction and disease dynamics," Workshop on Analysis of Time Series Data in Epidemiology, Tufts Univ. School of Medicine, Boston, MA

"The Behaviors of Individuals and Populations," Working Group on Spatio-Temporal and Network Modeling of Diseases, ICMS, Edinburgh, Scotland

"The Evolution of Complexity in Already Social Groups," Dept. of Ecology and Evolutionary Biology, Princeton Univ., NJ

"Disease as a Selective Pressure and the Evolution of Social Complexity," Applied Biomathematics, Stony Brook, NY

"Vital Rate Sensitivity Analysis: A new method for population viability analysis - Two examples of its use," Applied Biomathematics, Stony Brook, NY

"Disease as a Selective Pressure and the Evolution of Social Complexity," Morin Lab, Dept. of Ecology, Evolution and Natural Resources, Rutgers Univ., NJ

2006

"The Role of Individual Choice in the Evolution of Social Complexity and its Implications Towards the Emergence of Zoonotic Infections," DIMACS Computational and Mathematical Epidemiology Seminar, Rutgers Univ., NJ

"Preparing Societal Infrastructure Against Disease-Related Workforce Depletion," DIMACS Workshop on Facing the Challenge of Infectious Diseases in Africa, University of the Witswatersrand, South Africa

"Fantastic Problems in Mathematical Ecology," DIMACS Bio-Math Connect Institute for High School Teachers, Denver, CO

"Societal Bio-defense - How Can we Accomplish Safety, Stability and Efficiency?" SIAM Annual Meeting, Boston, MA

"When females should stop supporting lazy males: mathematics and honey bees?" DIMACS REU Seminar Series, Rutgers Univ., NJ

"Selected Problems in Epidemiology." DIMACS Tutorial on Data Mining and Epidemiology, NJ

"How Would Termites Prepare for Pandemic Bird Flu and What Should We Learn From Them?" Joint Dept. of Entomology and Center for Infectious Disease Dynamics Seminar, Penn State Univ., PA

"Different Scales of BioDefense - Can societies be both safe and efficient?" DIMACS Computational and Mathematical Epidemiology Seminar, Rutgers Univ., NJ

2005

"Termites in the Nation′s Service," DIMACS Computational and Mathematical Epidemiology Seminar, Rutgers Univ., NJ

"Applications of Self-Organizing Systems to Epidemiology." DIMACS Mixer Series, Rutgers Univ., NJ

"Disease Signatures: A New Combinatorial Method for Epidemiology," DIMACS Computational and Mathematical Epidemiology Seminar, Rutgers Univ., NJ

"Fantastic Problems in Mathematical Ecology," DIMACS Bio-Math Connect Institute for High School Teachers, Rutgers Univ., NJ

"How Complex Systems Can Simplify a Complex Problem: What Epidemiologists Can Learn From Insects," Institute for Advanced Study, Center for Systems Biology Seminar Series, NJ

2004

"Incorporating Behavior and Social Structure into Pathogen Defense Strategies. Conference on Innate Immunity for Biodefense," National Defense University's Center for Technology and National Security Policy (CTNSP) & the Department of Defense, Washington D.C.

Keynote Address: "Social Insects, Immunocompetence and Epidemiology: A Model System for Systems Modelers," Vanderbilt Medical School, Dept. of Microbiology and Immunology Annual Retreat, TN

"Disease and Immunocompetence in Group-Living Animals: Implications for Human Epidemiology," DARPA/DSO Workshop on Endogenous Defense, VA

Contributed Presentations

2008. "An Interdisciplinary Framework for Defining and Distinguishing Security Desiderata for Personally Sensitive Information," DIMACS/DyDAn Workshop on Internet Privacy: Facilitating Seamless Data Movement with Appropriate Controls

2006. "A Vital Rate Sensitivity Analysis (VRSA) for Non-stable Age Distributions and Short-term Planning," North American Ornithological Conference

2004. "A Mathematical Analysis of Reproductive Fission," North American Section of the International Union for the Study of Social Insects (with published abstract)

2004. "Two-stage Wavelet Analysis Assessment of Dependencies in Time Series of Disease Incidence," The 2004 Conference of the International Environmetrics Society (with published abstract)

2004. "Mathematical Modeling of Behavior and Ecology in Social Insects: Social mechanisms of pathogen control in termite colonies," Departmental Research Seminar, Tufts Univ.

2003. "Modeling Waterborne Infectious Outbreaks: When, where and how bad will they be?" The 2003 Conference of the International Environmetrics Society (with published abstract)

2003. "Modeling Disease Resistance through Social Interactions in Termites," The 2nd Conference on the Mathematics and Algorithms of Social Insects (with published abstract)

Service (external to Home Institution)

Ongoing Referee of papers for *American Naturalist, Annales Zoologici Fennici, Behavioral Ecology and Sociobiology, Biological Conservation, BMC Evolutionary Biology, Bulletin for Mathematical Biology*, *Canadian Biosystems Engineering, Conservation Letters, IMA Journal of Applied Mathematics, Journal of Biological Dynamics,*

Journal of Infectious Diseases, Journal of Insect Science, *Journal of Nonlinear Dynamics, Mathematical Biosciences, Mathematical Biosciences and Engineering. Journal of Medical Internet Research, Journal of the Royal Society Interface, Malaria Journal, Nature, Nature Scientific Reports, Parasites and Vecotrs, PeerJ, Phyiscal Reviews X, PLoS Complex Systems, PLoS Computational Biology, PLoSOne, PloS Medicine, PNAS, Science Advances, Science, Vaccine, Vector-Borne and Zoonotic Diseases* among others…

2026 Organizing Committee IIASA Summer School for Systems Modeling 2026

2025 Local Host Enhancing Diversity in Graduate Education 2025 Summer Program

2025 Co-Organizer DoD Future Directions Workshop in Social Complexity

2025 Organizing Committee IIASA Summer School for Systems Modeling 2025

2025 Co-Organizer Workshop on Multidisciplinary, Collaborative, Formal Scientific Modeling – a joint effort between the US NSF APPEX Center, The Topos Institute, and the American Institute of Mathematics

2024 Organizing Committee IIASA Summer School for Systems Modeling 2024

2024 External Review Advisory Board, Odum School, University of Georgia

2023-2026 Member of the U.S. Committee for the International Institute for Applied Systems Analysis (IIASA)., representing the National Academies of Science, Engineering, and Medicine for the United States and the Chair of Policy and Global Affairs (PGA)'s Board on International Scientific Organizations

2022 Co-Organizer Workshop on Building Networks: Women in Complex & Nonlinear Systems, Banff International Research Station for Mathematical Innovation and Discovery (BIRS)

2021 National Science Center of Poland grant proposal reviewer

2021 Lead Organizer (invited), NSF Workshop on Predicting Pandemics

2020-2023 Reviewer/Fact Checker for Health Feedback (a not-for-profit organization verifying the credibility of influential claims and media coverage that claims to be scientific, most often on topics of climate and health)

2020-2022 Deputy Editor *PLOS Computational Biology*

2019 Guest Editor *PLOS Computational Biology*

2019 Co-Organizer Society for Industrial and Applied Mathematics (SIAM) Network Science Annual Meeting (NS 19)

2018 NSF ad hoc proposal reviewer

2018 Burroughs Wellcome Fund grant proposal reviewer

2018 Co-Organizer IEEE Symposium on Security and Privacy, entitled: 3rd Workshop on Bio-inspired Security, Trust, Assurance and Resilience (BioSTAR 2018)

2017-cont. Member of the Leadership Team of the National Institute for Mathematical and Biological Synthesis

2017 Co-Organizer NIMBioS Workshop on Applying Optimization Techniques to Agricultural Problems

2017 ARO grant proposal reviewer

2016 Co-Organizer MBI (the Mathematical Biosciences Institute at Ohio State) Workshop on Generalized Network Structures and Dynamics

2016 Co-Organizer MBI (the Mathematical Biosciences Institute at Ohio State) Emphasis Semester on Dynamics of Biologically Inspired Networks

2014 ARO grant proposal reviewer

2013- 2016 Member of Scientific Advisory Board for MBI (the Mathematical Biosciences Institute at Ohio State)

2013	NIH grant proposal reviewer
2013-2016	Co-Organizer NIMBioS Working Group on Climate Change and Vector-borne Diseases
2013-2019	Invited Participant Joint NIMBioS-SESYNC Working Group on Human Risk Perception and Climate Change
2012	Invited Grant Proposal Reviewer for the United States – Israel Binational Science Foundation
2012	US Environmental Protection Agency FIFRA Scientific Advisory Panel (SAP) on Pollinator Risk Assessment Framework
2011	Invited Participant - External Expert Review Panel for Bioscience Research and Development at Los Alamos National Laboratory
2011	Program Committee Member, The Third International UKVAC Workshop on Visual Analytics (VAW 2011)
2011	NSF grant proposal reviewer
2011	Co-Organizer DIMACS/MBI US - African BioMathematics Initiative: Advanced Study Institute and Workshop on Genetics and Disease Control
2010	Organizer of the DIMACS Mini-Workshop on 'Emergent Properties of Dynamic Biological Networks'
2010	Lecturer at DIMACS/MBI US - African BioMathematics Initiative: Workshop and Advanced Study Institute on Conservation Biology
2010	Organizer of the DIMACS Mini-Workshop on 'Game-theoretic Approaches to Medical Prognosis'
2010	NSF grant reviewer/panel participant
2010	Invited International Reviewer for Centre of Excellence Grants for the Australian Research Council
2010	Co-Organizer of the DIMACS Workshop on Modeling and Mitigation of the Impacts of Extreme Weather Events to Human Health Risks
2009	Co-Organizer DIMACS Workshop on Economic Epidemiology, Makerere Univ., Kampala, Uganda
2009	NSF grant reviewer/panel participant
2009	Co-Organizer/ Program Co-Chair Workshop on Economic Epidemiology, Makerere Univ., Kampala, Uganda
2009	Co-Organizer Mosquito Modeling Made Easy Day at the N.J. Center for Vector Biology
2008-2010	Member Chief Editorial Committee for the DIMACS Book Series
2008-2010	Member Editorial Board of DIMACS Educational Modules Series
2008	Invited organizer SIAM mini-symposium on Network Models of Infectious Disease
2008	Ran the Reconnect Program on Biosurveillance at DIMACS – a week long short course for teaching faculty at liberal arts institutions on an advanced topic to expand their own and their students research opportunities
2007	Mentor to two teams of researchers for Department of Homeland Security funded Research Experience for those at Minority Serving Institutions
2006-2016	Advisory/Editorial Board Member for the journal *Annales Zoologici Fennici*
2004	Subject Matter Expert on Innate Immunity and Biodefense, National Defense University
2004	Research Consultant, DARPA (via Strategic Analysis, INC.)
2003	Developed algorithm for Managing Endangered Species Habitat in Hawaii - MESHH software package (Reed, J.M., N.H. Fefferman, C.S. Elphick, and M. Silbernagle. 2004)
2000-2002	Technical Editor (Cryptography) to MacMillan Press
1999	Invited Reviewer of AES submission to the National Institute of Standards and Technology, later published as The Twofish Encryption Algorithm, Schneier, et al,

1999, John Wiley & Sons Inc.

Service (internal to Home Institution)

2025	UT Research Conduct Inquiry Committee
2023-2024	Member, EEB Mycelium Committee
2023	UT Research Conduct Review Committee
2022	UT CAS Restructuring Divisional Task-Force
2022	Reviewer of System-wide Cluster Hire Proposals
2021	Reviewer for Ashley Fellowship applicants
2021-2023.	Faculty Director for WiSTAR3
2021	UT Department of Ecology and Evolutionary Biology Search Committee Chair (Wildlife Disease Ecology Search)
2021-cont.	Serve on Faculty Mentoring Committee for Prof. Wang (BCMB)
2020	Member UT COVID Response Tiger Team
2020-cont.	Serve on Faculty Mentoring Committee for Prof. Russo
2020	Advisor to the COVID-19 Re-Imagining Fall Task Force
2019-2020	Head of Graduate Admissions, Program in Ecology and Evolutionary Biology
2019	Research Mentor for the NIMBioS Summer Research Experiences (SRE) for Undergraduates
2019	Co-Organizer Tutorial on Networks at NIMBioS
2018	Serve on departmental Promotion and Tenure Committee for Prof. O'Meara
2018-2023	Serve on Faculty Mentoring Committee for Prof. Kivlin
2017-2019	Served as Departmental Coordinator for University Future Faculty Program
2017	Research Mentor for the NIMBioS Summer Research Experiences (SRE) for Undergraduates
2017	Lecturer for Joint 2017 MBI-NIMBioS-CAMBAM Summer Graduate Program
2016-2017	University of Tennessee, Knoxville Department of Ecology and Evolutionary Biology Search Committee Member and Diversity Advocate (Ecosystem Ecology Search)
2016-2017	University of Tennessee, Knoxville Department of Mathematics Search Committee Member (Mathematical Biology Search)
2016-2017	University of Tennessee, Knoxville Program in Ecology and Evolutionary Biology Graduate Affairs Committee Member
2015-2016	Rutgers University Biological Sciences Area Committee Member
2014	Rutgers University EENR Department Wildlife Biology Faculty Search Committee Member
2010	Co-Mentor to a team of researchers for Department of Homeland Security funded Research Experience for those at Minority Serving Institutions
2009-2010	Organizer of the EENR seminar series
2009	Organizer of the DIMACS Workshop on Behavioral Epidemiology
2009-2010	Member E&E Executive Committee
2008-2012	Member of EENR Curriculum Committee
2008-2010	Member Chief Editorial Committee for the DIMACS Book Series
2008-2010	Member Editorial Board of DIMACS Educational Modules Series
2007-2009	Member of the Rutgers University Advisory Board to the Office for the Promotion of Women in Science, Engineering and Mathematics
2006-2015	Research Advisor for Rutgers Univ. DIMACS REU
2005-2007	Co-organizer DIMACS seminar series Mathematical and Computational Epidemiology