Curriculum Vitae

Jonathan Mark Gilligan
Associate Professor
Department of Earth & Environmental Sciences
Vanderbilt University

July 28, 2021

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1 Contact Information

Department of Earth & Environmental Sciences,
Vanderbilt University
PMB 351805
2301 Vanderbilt Place
Nashville, TN 37235-1805

jonathan.gilligan@vanderbilt.edu
MOBILE: 615.414.5750
DEP'T OFFICE: 322.2976
ORCID: 0000-0003-1375-6686
SSRN ID: 954061
www.jonathangilligan.org

2 Degrees Earned

Ph.D.: 1991, Yale University (Physics). Dissertation, *Precise Multiphoton Spectroscopy of the H_2, HD, and D_2 Molecules and a New Determination of the Ionization Potential of HD.* Advisor: Edward E. Eyler.

B.A.: 1982, Swarthmore College (Physics & Philosophy), with Honors.

3 Employment History

2022–2023 Alexander Heard Distinguished Service Professor, Vanderbilt University

2016–present Associate Professor, Dept. of Civil & Environmental Engineering (secondary), Vanderbilt University.

2009–present Associate Professor, Dept. of Earth & Environmental Sciences, Vanderbilt University.

2008–2009 Research Assistant Professor, Dept. of Earth & Environmental Sciences, Vanderbilt University.

2003–2009 Senior Lecturer, Dept. of Earth & Environmental Sciences, Vanderbilt University.

2000–2003 The Robert T. Lagemann Assistant Professor of Living State Physics, Dept. of Physics & Astronomy, Vanderbilt University.

1996–1998 Associate Director, Center for Molecular and Atomic Studies at Surfaces, Vanderbilt University.

1995–2000 Research Assistant Professor, Dept. of Physics & Astronomy, Vanderbilt University.

1994–1995 Lecturer, Dept. of Physics & Astronomy, Vanderbilt University.

1993–1994 Postdoctoral Research Associate, Cooperative Institute for Research in Environmental Science, National Oceanic & Atmospheric Administration and the University of Colorado. Mentors: James W. Elkins (NOAA) and David W. Fahey (NOAA).

1991–1993 National Research Council Postdoctoral Associate, National Institute of Standards & Technology. Mentor David J. Wineland.

1985–1991 Graduate Student/Teaching Assistant/Research Assistant, Yale University. Mentor Edward E. Eyler.

1983–1985 High school teacher, Commonwealth School, Boston MA.

4 Honors and Awards

2022 Alexander Heard Distinguished Service Professor Award, Vanderbilt University, recognizing distinctive contributions to the understanding of problems of contemporary society.

2021 Outstanding Reviewer Award, Winter Simulation Conference, recognizing the top 2 percent of reviewers, who go above and beyond to provide exceptionally thorough, rigorous, and insightful reviews of invited and submitted conference papers.

2018 The Chancellor's Award for Research, Vanderbilt University (shared with Michael Vandenbergh), recognizing "excellence on the part of faculty for published research, scholarship or creative expression" published in the previous three years.

2017 The Morrison Prize for the highest impact paper published in 2015–2016 on sustainability law and policy (shared with Michael Vandenbergh). Sandra Day O'Connor School of Law, Arizona State University.

1998 Outstanding Scientific Paper Award, NOAA Environmental Research Labs.

1995 NASA Group Achievement Award for outstanding accomplishments and contributions to the Airborne Southern Hemisphere Ozone Experiment and Measurements to Assess the Effects of Stratospheric Aircraft.

1991–1993 National Research Council Postdoctoral Associate

1985–1986 J.W. Gibbs Fellow, Yale University

5 Research & Creative Expression

5a. Citations and H-Index

As of Apr. 28, 2022, Google Scholar lists 6,465 citations (2,505 since 2017 and 574 new citations in 2021), an h-index of 34 (21 counting only citations since 2017), and 11 papers with 100+ citations, including 4 papers with 300+.

5b. Book (✔ denotes peer-reviewed book)

5c. Articles (* denotes student author, ✔ denotes peer-reviewed article)

5d. Book Chapters (* denotes student author, ✔ denotes peer-reviewed chapter)

5e. Articles in Conference Proceedings (* denotes student author, ✔ denotes peer-reviewed article)

5f. Patents

5g. Software and other products

1. kayadata: Kaya Identity Data for Nations and Regions by **J.M. Gilligan**, Comprehensive R Archive Network (2019): `https://cran.r-project.org/web/packages/kayadata/`

2. kayatool: Interactive Energy and Emissions Policy Analysis Tool by **J.M. Gilligan**, GitHub (2019): `https://github.com/jonathan-g/kayatool`

3. analyzeBehaviorspace: Interactive Analysis of Output from NetLogo Behaviorspace Experiments by **J.M. Gilligan** GitHub (2018): `https://github.com/jonathan-g/analyzeBehaviorspace`

4. forecastVeg: Forecasting Vegetation Health at High Spatial Resolution, by J.J. Nay*, E.K. Burchfield*, and **J.M. Gilligan**, GitHub (2016): `https://github.com/JohnNay/forecastVeg`

   I suggested the line of research that led to this software. The code is entirely Nay's and Burchfield's work. This open-source package automates downloading high-resolution MODIS spectral data, applying machine learning (gradient-boosted machines) to identifying patterns in the data, generating a forecasting model, and assessing the out-of-sample predictive skill using cross-validation. This tool is designed to facilitate the use of machine learning and satellite remote sensing data for decision-support around the world, including in developing nations that do not have large research budgets.

5. predMarket: Agent-based model of trader behavior in a climate prediction market. by J.J. Nay*, M. Van der Linden*, and **J.M. Gilligan**, GitHub (2016): `https://github.com/jonathan-g/predMarket`

   This software model was originated by Nay and Van der Linden based on a paper by Vandenbergh, Raimi, and myself. Van der Linden wrote code for implementing a simultaneous double-auction trading scheme. I wrote the climate prediction code and the code for initializing the social network of the traders. Nay and I wrote the code to run and analyze experiments with the model.

6. datafsm: Estimating Finite State Machine Models from Data by John J. Nay*, and **J.M. Gilligan**, Comprehensive R Archive Network (2015): `https://cran.r-project.org/web/packages/datafsm/`

   This software package was largely Nay's work. He had the original idea and did most of the programming. I contributed significantly to the design by suggesting that finite state machines and genetic algorithms would be the best way to implement Nay's concept. We shared equally in writing the "Introduction to datafsm" manual.

7. Floodpartsim: A Participatory Agent-Based Simulation of Urban Flood Risk Management by **J.M. Gilligan**, C.E. Brady, J.V. Camp, J.J. Nay*, and P. Sengupta, GitHub (2015): `https://github.com/jonathan-g/Floodpartsim`

   Sengupta and I developed the conceptual design and specifications of the model. Camp contributed expertise on hydrological modeling. Brady and Nay wrote most of the code.

5h. Invited Presentations

1. "Climate Change in Bangladesh:L A Coupled Natural-Human Systems Approach," Invited talk, Howard H. Baker, Jr. Center for Public Policy, University of Tennessee Knoxville. October 14, 2021.
2. "Integrating Machine Learning with Agent-Based Modeling to Understand Human Impacts of Climate Change." Invited seminar, Florida International University. May 25, 2021.
3. "Beyond Politics: The Private Governance Response to Climate Change," Grand Rounds lecture in Radiology, Vanderbilt Medical Center. March 29, 2021.
4. "New Directions for Climate Policy in an Age of Political Gridlock," Invited colloquium, co-delivered with Michael P. Vandenbergh. Lehigh University Department of Environmental Science. October 30, 2020.
5. "Accounting for Human Behavior in Models of Coupled Natural & Human Systems," Invited presentation at Workshop on Coastal Observation and Modeling Systems, sponsored by NSF Coastlines and People program. Virtual conference hosted by Florida International University, Miami, FL, September 8, 2020. (98 attendees).
6. "Managing Sediment for Sustainability," Invited virtual seminar, International Centre for Climate Change and Development, Dhaka, Bangladesh, July 20, 2020.
7. "Beyond Wickedness: Managing Complex Systems and Climate Change," Invited presentation, co-delivered with Michael P. Vandenbergh. Vanderbilt University Law Review Symposium on Governing Wicked Problems. Nashville, TN, October 25, 2019.
8. "The New Revolving Door," Invited presentation, co-delivered with Michael P. Vandenbergh. Case-Western Reserve Law School Symposium on Fifty Years of the Environmental Protection Agency. Cleveland, OH, October 18, 2019.
9. "Agent-Based Modeling of Community Resilience and Environmental Non-Migration," Invited presentation, First International Conference on Environmental Non-Migration: Framework, Methods, and Cases, Technical University of Dresden, June 19-21 2019.
10. "Sediment Management and Sea-Level Rise," invited presentation, Fifth Annual Gobeshona International Conference on Climate Knowledge, International Centre for Climate Change and Development, Dhaka, Bangladesh, January 9, 2019.
11. Invited panelist, "What Can an Individual Do to Help Limit Climate Change," public panel discussion at Copenhagen Business School, Aug. 29, 2018.
12. Invited participant, Workshop on Household Actions to Reduce Greenhouse Gas Emissions, Copenhagen Business School, Copenhagen Denmark, August 27–28 2018 (Host paid for travel, lodging, and meals).
13. Invited panelist, "Re-envisioning 'Sustainable' Deltas through Critical Geography," American Association of Geographers Annual Conference, April 2018.

14. "Carrot and Sticks in Private Climate Governance," invited presentation, Joint Conference on Environmental Regulation. The Hagler Institute for Advanced Study at the Texas A&M University School of Law and the Classical Liberal Institute at the New York University School of Law. March 9–10, 2018. (Host paid for travel, lodging, and meals).

15. "Private Governance Approaches to Climate Policy: Pragmatic Responses to Government Inaction," Department colloquium, Department of Environmental Studies, University of Colorado, Boulder, February 7, 2018 (Host covered travel, lodging, meals).

16. "Energy and the Economy of Sri Lanka," invited presentation, Workshop on Assessing Stakeholder Preferences in Planning of Energy Sector in Sri Lanka, Colombo, Sri Lanka, August 11, 2017.

17. "Understanding and Adapting to Water Scarcity at the Community Level," invited keynote presentation, Conference on Recognizing Climate Change Risk of Dry Zone Farmers, Ministry of Disaster Management, Colombo, Sri Lanka, August 10, 2017.

18. "Planning for Environmental Stress and Disasters: The Importance of Interdisciplinary Approaches," invited presentation to the Institute of Town Planners of Sri Lanka and the Organization of Professional Associations of Sri Lanka. Colombo, Sri Lanka, August 9, 2017.

19. "Quantifying the Potential for Greenhouse Gas Emissions Reductions through Private Governance," invited presentation to National Academies Board on Environmental Change and Society. National Academies, Washington, DC, July 11, 2017. (Host covered travel, lodging, & meals).

20. "Connecting Human and Natural Systems: The Role of Agent-Based Simulations," invited keynote talk, CSDMS 2017 Annual Meeting on Modeling Coupled Earth and Human Systems. Boulder, CO. May 23–25 2017. (Host covered travel, lodging, meals, & conference registration). My talk is online at `https://www.youtube.com/watch?v=v6i5_P_OOcU`.

21. "Dynamics of Individual and Collective Agricultural Adaptation to Water Security," invited talk, Winter Simulation Conference 2016, Arlington, VA, December 12, 2016.

22. "Understanding Drought and Decision-Making," Workshop on Agricultural Drought and Policy, American Institute for Sri Lankan Studies, Colombo, Sri Lanka, March 10, 2015.

23. "Land Use, Livelihoods, Vulnerabilities, and Resilience in Coastal Bangladesh," in Session PA010: Livelihoods and Ecosystem Services in Vulnerable Delta Regions: Implications for Policy and Practice, American Geophysical Union Fall Meeting, San Francisco CA, December 2014.

24. "In the Tide Country: Live on an Active Delta in Bangladesh," Department of Geography, University of Georgia, October 20, 2014 (Host covered travel, lodging, & meals).

25. "Integrating Natural and Social Science to Inform Adaptation to Extreme Weather in Bangladesh and Sri Lanka," Symposium on Extreme Weather, Disasters and Indigenous Practices in South Asia, Annual Conference on South Asia, Madison WI October 16, 2014 (American Institute of Sri Lanka Studies covered conference registration and 50% of travel & lodging).

26. "Integrating Social and Natural Science to Understand Vulnerability and Resilience in Coastal Environments," Symposium on Climate Change, Drought, and Agricultural Adaptation, Colombo, Sri Lanka, June 7, 2013.

27. "Climate Change and Disaster Management," Ministry of Disaster Management, Colombo, Sri Lanka, June 5, 2013.

28. "From the Laboratory to the Legislature: Transdisciplinary Perspectives on Global Climate Change" Nashville State Community College, Nashville TN, March 30, 2012.

29. "Don't Raise the Bridge, Lower the River: Geoengineering Technology and Governance" Environmental Governance at the Leading Edge of Technology Conference, George Washington U., Washington DC, March 23, 2011 (Host covered travel, lodging & conference registration).

30. "The Behavioral Wedge: Reducing Greenhouse Gas Emissions by Individuals and Households," Joint Statistical Meetings (American Statistical Association, Statistical Society of Canada, etc.), Vancover BC, August 1, 2010. **NOTE:** Part of a special session to highlight the best papers published in the journal *Significance* during the previous year. (Host covered travel, lodging, & conference registration).

31. Panelist, Pew Charitable Trusts Forum on the Law of the Sea Treaty, Belmont University, Nashville TN, November 18, 2009.

32. "Global Climate Change: Earth Science, Behavioral Science, and Public Policy," Middle Tennessee State University, Murfreesboro TN, October 16, 2009.

33. "From the Laboratory to the Legislature: Why Climate Change is Fundamentally a Transdisciplinary Issue," Belmont University, Nashville TN, February 6, 2009 (Host paid honorarium)

34. "Individual Behavior and Climate Change: The Low-Hanging Fruit," Keynote Address, Summit for a Sustainable Tennessee, David Lipscomb University, Nashville TN, November 13, 2008.

35. "From the Laboratory to the Legislature: Transdisciplinary Perspectives on Environmental Science and Policy," Distinguished Panel Speaker, 10^{th} Beckman Scholars Symposium, Irvine CA, July 26, 2008. (Host covered travel & lodging and paid an honorarium).

36. "Spirituality, Ethics, and the Environment," The Kenan Writers' Encounters: Writers and Artists Engage the Environment, Thomas S. Kenan Institute for the Arts & North Carolina School of the Arts, Winston-Salem NC, April 12, 2008. (Host covered travel, lodging, and paid an honorarium).

37. "Ethics in Geological Time: Should We Care about Distant Future Generations?," The Berry Lecture, Dept. of Philosophy, Vanderbilt University, Nashville TN, March 24, 2008 (honorarium).

38. "Individual Behavior and Greenhouse Gas Emissions," Behavior, Energy, and Climate Change conference, American Council for an Energy Efficient Economy, Sacramento CA, November 7–9, 2007

39. "Flexibility, Clarity, and Legitimacy: Considerations for Managing Nanotechnology Risks," Nanotechnology Governance: Environmental Management from a Global Perspective, Environmental Law Institute and Vanderbilt Center for Environmental Management Studies, Nashville TN, May 19, 2006.

40. "*Et in Arcadia Ego*: Reflections on the Future of Tenure," Symposium on Promoting Scientific Freedom and Responsibility, AAAS Annual Meeting, Philadelphia PA (1998).

41. "Smart Modification of Surfaces with Free-Electron Lasers," ASM Materials Week '97, Indianapolis IN (1997).

42. "Modification of Diamond Films using Free-Electron Lasers," ASM Materials Week '96, Cincinnatti OH (1996).

43. "Quantum Mechanical Measurements with Single Atoms," April Meeting of the American Physical Society, Washington DC (1992).

5i. Published Abstracts

1. K. Best*, **J.M. Gilligan**, K.G. Rogers, A. Carrico, K. Donato, B. Ackerly, and B. Mallick, "A Machine Learning Analysis of Multiple Social Surveys to Understand Environmental Migration in Coastal Bangladesh", Amer. Geophys. Union Fall Meeting 2018
2. A. Witte*, G.M. Hornberger, T. Gunda, and **J.M. Gilligan**, "A Study of the Geographic Variances in Water Salience using Local Newspapers", Amer. Geophys. Union Fall Meeting 2018
3. L.A. Valentine*, C. Wilson, K.G. Rogers, A. Carrico, K. Donato, and **J.M. Gilligan**, "Sediment Accretion and Erosion in Poldered and Non-Poldered Regions within the Ganges-Brahmaputra-Meghna Delta, Bangladesh: Implications for River Channel Migration and Flood Risk", Amer. Geophys. Union Fall Meeting 2018
4. K. Best*, **J.M. Gilligan**, H. Baroud, B. Ackerly, and B. Mallick, "Machine Learning to Identify Drivers of Internal Migration in Coastal Bangladesh", Community Surface Dynamics Modeling System Annual Meeting, 2018.
5. *C.M. Tasich, **J.M. Gilligan**, S.L. Goodbred Jr, R.P. Hale, and C. Wilson, "Modeling Elevation Equilibrium and Human Adaptation in the Ganges-Brahmaputra Delta", Amer. Geophys. Union Fall Meeting 2017
6. C. Tasich*, **J.M. Gilligan**, S. Goodbred, R. Hale, and C. Wilson, "Modeling Elevation Equilibrium and Human Adaptation in Southwest Bangladesh", Community Surface Dynamics Modeling System Annual Meeting, 2017.
7. E.K. Burchfield* and **J.M. Gilligan**, "Dynamics of Individual and Collective Agricultural Adaptation to Water Scarcity", Amer. Geophys. Union Fall Meeting 2016
8. C. Tasich*, **J.M. Gilligan**, S.L. Goodbred, R.P. Hale, and C. Wilson, "Modeling Elevation Equilibrium in the Face of Sea Level Rise ", Amer. Geophys. Union Fall Meeting 2016
9. A. Carrico, **J.M. Gilligan**, and H.B. Truelove, "Actual vs. Perceived Climate Variability among Smallholding Rice Farmers", Amer. Geophys. Union Fall Meeting 2016
10. **J.M. Gilligan**, J.J. Nay*, and M. Van der Linden*, "Prediction Markets and Beliefs about Climate: Results from Agent-Based Simulations", Amer. Geophys. Union Fall Meeting 2015
11. **J.M. Gilligan**, C. Brady, J.V. Camp, J.J. Nay*, and P. Sengupta, "Emotional Engagement with Participatory Simulations as a Tool for Learning and Decision-Support for Coupled Human-Natural Systems: Flood Hazards and Urban Development", Amer. Geophys. Union Fall Meeting 2015
12. M.G. Patrick*, S.L. Goodbred, **J.M. Gilligan**, C.M. Tasich*, S. Hossain, and K.M. Ahmed "Stratigraphic Evolution of the Ganges-Brahmaputra Lower Delta Plain and its Relation to Groundwater Arsenic Distributions", Amer. Geophys. Union Fall Meeting 2015
13. C.M. Tasich*, **J.M. Gilligan**, S.L. Goodbred, C. Wilson, R.P. Hale, and L.W. Auerbach "Rejuvenating Poldered Landscapes: A Numerical Model of Elevation Equilibrium in Coastal Bangladesh", Amer. Geophys. Union Fall Meeting 2015
14. T. Gunda*, **J.M. Gilligan**, and G.M. Hornberger "Forecasts of Agricultural Drought in Sri Lanka", Amer. Geophys. Union Fall Meeting 2015
15. **J. Gilligan**, B. Ackerly, S. Goodbred, and C. Wilson "Land Use, Livelihoods, Vulnerabilities, and Resilience in Coastal Bangladesh," Amer. Geophys. Union Fall Meeting 2014
16. **J. Gilligan** and M. Vandenbergh, "Between Too Little and Too Late: Political Opportunity Costs in Climate Policy Analysis," Amer. Geophys. Union Fall Meeting 2014

17. G.M. Hornberger, **J. Gilligan**, and D. Hess "Water Conservation and Hydrological Transitions in Cities," Amer. Geophys. Union Fall Meeting 2014

18. S. Goodbred, M. Steckler, **J. Gilligan**, B. Ackerly, J. Ayers, C. Wilson, C. Small, and L. Seeber "Dynamic Asia: Coupling of climate, tectonics, rivers, and people defines risk and opportunity for the world's largest human populations," Amer. Geophys. Union Fall Meeting 2014

19. C. Tasich*, S. Goodbred, **J. Gilligan**, and C. Wilson, "Rejuvenating Poldered Landscapes in a Tidally-Dominated, Sediment-Rich Delta: A Numerical Model and Analysis of the Effectiveness of Tidal River Management in Coastal Bangladesh," Amer. Geophys. Union Fall Meeting 2014

20. M. Steckler, S. Goodbred, S. Lowes, **J. Gilligan**, B. Ackerly, K.M. Ahmed, S. Akhter, D. Sousa, C. Wilson, D. Datta, K. Roy, and D. Mondal*, "Enhancing University Courses and Field Schools through Cross-cultural Exchange: Joint US-Bangladeshi Trips to the Ganges-Brahmaputra and Mississippi Deltas," Amer. Geophys. Union Fall Meeting 2014

21. **J. Gilligan**, B. Ackerly, and S. Goodbred, "Integrating social science, environmental science, and engineering to understand vulnerability and resilience to environmental hazards in Bangladesh," Amer. Geophys. Union Fall Meeting 2013.

22. **J. Gilligan**, B. Ackerly, K. Ahmed, L. Auerbach*, L. Benneyworth*, S. Goodbred, J. Jacobi*, D. Mondal*, J. Pickering*, K. Rogers, and K. Roy, "Water and social justice in Bangladesh: A trans-disciplinary and intercultural approach," Amer. Geophys. Union Fall Meeting 2013.

23. L. Auerbach*, S. Goodbred, D. Mondal*, C. Wilson, K. Ahmed, K. Roy, M. Steckler, **J. Gilligan**, and S. Nooner "In the Balance: Natural v. Embanked Landscapes in the Ganges-Brahmaputra Tidal Delta Plain", Amer. Geophys. Union Fall Meeting 2013.

24. S. Goodbred, L. Auerbach*, C. Wilson, **J. Gilligan**, K. Roy, K. Ahmed, M. Steckler, L. Seeber, S. Akhter, and S. Hossain*, "A Tale of Two Deltas: Contrasting Perspectives on the Status of Natural and Human-modified Regions of the Ganges-Brahmaputra River Delta," Amer. Geophys. Union Fall Meeting 2013.

25. **J. Gilligan**, "Integrating social and natural science to understand vulnerability and resilience in coastal environments," Coastal Processes and Environments Under Sea-Level Rise and Changing Climate: Science to Inform Management, Joint Penrose/Chapman Conference, Geol. Soc. Amer. & Amer. Geophys. Soc., Galveston TX, 14-19 Apr. 2013.

26. **J. Gilligan**, B. Ackerly, and S. Goodbred, "Building resilience to environmental stress in coastal Bangladesh: An integrated social, environmental, and engineering perspective," Bridging the Policy-Action Divide: Challenges and Prospects for Bangladesh, Bangladesh Development Initiative, Berkeley CA, 22–24 Feb., 2013.

27. J.H. Jacobi*, **J.M. Gilligan**, A.R. Carrico, H.B. Truelove, and G. Hornberger, "Diffusion of a Sustainable Farming Technique in Sri Lanka: An Agent-Based Modeling Approach," Amer. Geophys. Union Fall Meeting 2012, abstract #1479443.

28. L. Auerbach*, S.L. Goodbred, D. Mondal*, K. Roy, K.R. Ahmed*, **J.M. Gilligan**, and B. Ackerly, "Contrasting Pristine and Human-Modified Deltaic Environments: Severe Consequences from Long-Term Coastal Embankments in Southwest Bangladesh," Amer. Geophys. Union Fall Meeting 2012, abstract #1496486.

29. **J.M. Gilligan**, N.H. Tolk, A. Cricenti, R. Generosi, P. Perfetti, C. Coluzza, and G. Margaritondo, "Infrared near-field spectromicroscopy of buried interfaces using free-electron lasers", by Bull. Amer. Phys. Soc. Mar. 1998, p. 2607.

30. "Infrared Wavelength Selective Modification of Doped Hydrogenated Silicon", by C. Parks Cheney*, G. Lüpke, J.C. Keay, **J.M. Gilligan**, L.C. Feldman, N.H. Tolk, S. Chen, P.C. Taylor, Y. Tung, and D.O. Henderson, Bull. Amer. Phys. Soc. Mar. 1998, p. 2302.

31. G. Mensing*, J.M. Gilligan, E. Hurt*, N. Tolk, and P.C. Taylor, "Photoluminescenc Excitation Spectroscopy of a-Si: H using a Free-Electron Laser", Bull. Amer. Phys. Soc. Mar. 1998, p. 2704.

32. Z. Hargitai*, Y. Yao*, **J.M. Gilligan**, B. Pratt-Ferguson*, V.D. Gordon*, A. Puckett*, N.H. Tolk, J. Tully, G. Betz, and W. Husinsky, "Observation of Enhanced Sputtering by Molecular Ions at Near-Threshold Energies", Bull. Amer. Phys. Soc. Mar. 1998, p. 2813.

33. W. Wang*, G. Lüpke, **J.M. Gilligan**, L.C. Feldman, N.H. Tolk, G. Lucovsky, and I.C. Kiziyalli, "Wavelength-Selective Alteration of the Si (001)/SiO2 Interface by Intense Tunable Infrared Radiation", Bull. Amer. Phys. Soc. Mar. 1998, p. 1510.

34. C. Parks Cheney*, G. Lüpke, J.C. Keay, **J.M. Gilligan**, L.C. Feldman, N.H. Tolk, S. Chen, P.C. Taylor, Y. Tung, and D.O. Henderson, "Infrared Wavelength Selective Modification of Doped Hydrogenated Silicon", Bull. Amer. Phys. Soc. Mar. 1998, p. 2302.

35. **J.M. Gilligan**, N.H. Tolk, A. Cricenti, R. Generosi, P. Perfetti, C. Coluzza, and G. Margaritondo, "Infrared Near-Field Spectromicroscopy of Buried Interfaces using Free-Electron Lasers", Bull. Amer. Phys. Soc. Mar. 1998, p. 2607.

36. Z. Hartigai*, Y. Yao*, **J.M. Gilligan**, B. Pratt-Ferguson*, V.D. Gordon*, A. Puckett*, N.H. Tolk, J. Tully, G. Betz, and W. Husinsky, "Observation of Enhanced Sputtering by Molecular Ions at Near-Threshold Energies", Bull. Amer. Phys. Soc. Mar. 1998, p. 2813.

37. Z. Hargitai*, Y. Yao*, M.M. Albert*, A.V. Barnes, **J.M. Gilligan**, V.D. Gordon*, G. Lüpke, B. Pratt-Ferguson*, A. Puckett*, and N.H. Tolk, "Enhancement of Sputtering Yields by Low-Energy Molecular Ions", APS Southeastern Section Meeting Abstracts (1997), p. 9.

38. J. Sturmann*, R.G. Albridge, **J.M. Gilligan**, G. Lüpke, N.H. Tolk, and J.L. Davidson, "Infrared Wavelength-Selective Photodesorption from Diamond Films", APS Southeastern Section Meeting (1997), p. 8.

39. G. Mensing*, **J. Gilligan**, E. Hurt*, N.H. Tolk, and P.C. Taylor, "Photoluminescence Excitation Spectroscopy of a-si: H Using a Free Electron Laser", Bull. Amer. Phys. Soc. March 1997, p. 1202.

40. G.S. Herold*, M.S. Salib*, A. Petrou, B.D. McCombe, G. Mensing*, **J. Gilligan**, N. Tolk, M. Dutta, J. Pamulapati, and P.G. Newman, "Optically Detected Resonance Spectroscopy of Intersubband Transitions in GaAs/AlAs Multiple Quantum Wells", APS Southeastern Section Meeting (1997), p. 4.

41. **J. Gilligan**, G. Mensing*, N. Tolk, M.S. Salib*, A. Petrou, B.D. McCombe, M. Dutta, J. Pamulapati, and P.G. Newman, "Free Electron Laser Optically Detected Resonance Spectroscopy of Intersubband Transitions in GaAs/AlAs Quantum Wells", Bull. Amer. Phys. Soc. Mar. 1997, p. 1209.

42. G.A. Mensing*, E. Hurt*, **J. Gilligan**, N. Tolk, and P.C. Taylor, "Photoluminescence of a-Si: H using a Free Electron Laser", APS Southeastern Section Meeting (1996), p. 12.

43. M.T. Graham*, R.G. Albridge, A. Barnes, B. Barnes*, A. Beth, J. Davidson, **J. Gilligan**, J. McKinley, S. Pantelides, and N. Tolk, Bull. Amer. Phys. Soc. Mar. 1996, p. 2702. "Nonthermal Diffusion of Impurities in Silicon and Diamond",

44. U. Eichmann, J.C. Bergquist, J.J. Bollinger, and **J.M. Gilligan**, "Young's interference experiment with light scattered from two atoms", Bull. Amer. Phys. Soc. **38**, May 1993, p. 1140 (1993).

45. **J.M. Gilligan**, C. Monroe, and D. Wineland, "A miniature linear RF ion trap", Bull. Amer. Phys. Soc., **38**, May 1993.

5j. Research Grants

5j.i. Current Grants

1. National Science Foundation: NSF SRS-RN 2115392, "SRS RN: Connecting Rural and Urban Environments for Equitable Access to Transportation, Telecommunications and Energy (CREEATTE)." Nov. 1, 2021–Oct. 31, 2022 Total funds: $149,573 over one year. Direct costs: $110,215. Indirect costs: $39,358. Principal Investigator Jonathan Gilligan.

   I am the principal investigator.

2. National Science Foundation: NSF FW-HTF 2129083, " FW-HTF-P: Integrating Practitioner Knowledge and Technology for the Future of Water Treatment" Sept. 15, 2021–Aug. 31, 2022 Total funds: $150,000 over one year. Direct costs: $105,890. Indirect costs: $44,110. Principal Investigator Janey Camp.

   I am co-principal investigator. My role is developing expert systems to identify and automate decision strategies for water treatment, based on the tacit knowledge of experienced water-treatment operators.

3. National Science Foundation: NSF CNH 1716909, "Socioecological System Dynamics Related to Livelihood, Human Migration, and Landscape Evolution." Sept. 1, 2017–Feb. 28, 2022. Total funds: $1,498,721 over four and one half years. Vanderbilt portion: Direct costs: $100,067. Indirect costs: $57,083. Total funds: $157,105. Principal Investigator Amanda Carrico (University of Colorado).

   I am the principal investigator for the Vanderbilt portion of this project and my role is the lead in computational modeling and geospatial statistical analysis.

4. Vanderbilt College of Arts & Science, "Climate and Society Grand Challenge Initiative." 18-month grant to develop interdisciplinary connections between Humanities, Social Sciences, and Natural Sciences around climate change and society. Jul. 1, 2020–June 30, 2022. Total funds: $100,000 over two years (direct costs: $100,000, indirect costs: $0). Principal Investigator Jonathan Gilligan

   I am principal investigator and director of the project.

5. Vanderbilt College of Arts & Science, "Global Ecology and Health Grand Challenge Initiative." Jul. 1, 2020–Dec. 31, 2021. Total funds: $75,000 over 18-months (direct costs: $75,000, indirect costs: $0). Principal Investigator John McLean.

   18-month grant to develop interdisciplinary connections between biological sciences, environmental sciences, and social sciences around climate change and emergent infectious diseases. I am co-investigator.

6. Vanderbilt Trans-Institutional Project Grant, "Vanderbilt Climate Prediction Market," Jul. 1, 2020–Jun. 30, 2022. Total funds: $200,000 over 2 years (direct costs: $200,000, indirect costs: $0). Principal Investigator Mark Cohen.

5j.ii. Previous Grants

1. Vanderbilt Trans-Institutional Project Grant, "Computational Thinking and Learning Initiative," Jul. 1, 2019–Jun. 30, 2021. Total funds: $200,000 over 2 years (direct costs: $200,000, indirect costs: $0). Principal Investigator Akos Ledeczi.

2. NSF Coastal SEES 1600319, "Multiscale Modeling and Observations of Landscape Dynamics, Mass-Balance, and Network Connectivity for a Sustainable Gange-Brahmaputra Delta," Aug. 1, 2016–Jul. 31, 2020. Total funds: $810,211. Direct costs: $532,163. Indirect costs: $278,048. Principal Investigator Steven Goodbred.

I was co-principal investigator and my role is computational modeling, statistical data analysis, and risk analysis.

3. National Science Foundation: NSF-EAR 1416964, "Water Conservation and Hydrological Transitions in American Cities" Aug. 2014–Jul. 2017. Total funds: $717,000 (direct costs: $496,000, indirect costs: $221,000). Principal Investigator George Hornberger.

   I was a co-principal investigator and my role in the project is integration of physical and social science with emphasis on statistical analysis and computer modeling of political and policy responses to water stress.

4. Vanderbilt TIPS grant: "VISOR: Vanderbilt Initiative on Smart-city Operations Research" $199,948 over 2 years (direct costs: $199,948, indirect costs: $0). Principal Investigator Gautam Biswas.

   I was a co-principal investigator and my role is leading a research project studying the impact of gentrification on access to mass-transit in Nashville.

5. Vanderbilt TIPS grant: "Private Governance Approaches to Climate Change" $190,000 over 2 years (direct costs: $190,000; indirect costs: $0). Principal Investigator Michael Vandenbergh.

   I was a co-principal investigator and my role is project design, statistical analysis, and coordinating undergraduate immersive experiences.

6. "Climate Adaptation, Water-Energy Impacts, Perceptions and Behavior," Vanderbilt University Discovery Grant. Direct costs: $99,532. No indirect costs. Period of Award: Mar. 2011–Feb. 2013. Principal Investigator George Hornberger.

   I was co-principal investigator and my role was computer modeling of behavioral responses to water scarcity by farmers. I supervised Prof. Hornberger's Ph.D. student John Jacobi for part of his dissertation project which used agent-based modeling of farmer behavior.

7. Office of Naval Research ONR-MURI-N00014-11-1-0683 "Environmental stress and human migration in a low-lying developing nation: A comparison of co-evolving natural and human landscapes in the physically and culturally diverse context of Bangladesh," June 2011–May 2016; no-cost extention through May 2017. Total funds $7.50 million (direct costs$5.55 million, indirect costs $1.95 million). Principal Investigator Steven Goodbred (VU EES).

   I was one of three co-principal investigators (with Prof. Goodbred and Prof. Brooke Ackerly, Political Science) who share leadership of the project. From June–December 2011 I served as acting project leader while Prof. Goodbred was on leave. The project has three major components: physical science, social science, and integrative science. I am the leader of the integrative science team.

8. National Science Foundation: NSF-EAR 1204685, "Climate, Drought, and Agricultural Adaptations: An Investigation of Vulnerabilities and Responses to Water Stress Among Paddy Farmers in Sri Lanka" Sept. 2012–Aug. 2017. Total funds: $3.7 million (direct costs: $2.4 million, indirect costs: $1.3 million). Principal Investigator George Hornberger.

   I was a co-principal investigator and my role in the project is integration of physical and social science through statistical analysis, analysis of satellite remote sensing imagery, and computer modeling of social networks and interaction between behavior and environmental stress as communities of farmers in Sri Lanka adapt to drought and other climatic change.

5k. Creative Expression

Performances of *The Scarlet Letter*, a stage adaptation of Hawthorne's novel by Carol Gilligan and Jonathan Gilligan and *Pearl*, an opera by Amy Scurria, libretto by Carol Gilligan and Jonathan Gilligan:

The idea of adapting Hawthorne's *Scarlet Letter* to the stage originated with Carol Gilligan. The idea of adapting the play into an opera originated jointly with Sara Jobin, Carol Gilligan, and myself equally.

Writing the script for the play *Scarlet Letter* and the libretto for the opera *Pearl* were joint projects equal contributions from each of us.

Amy Scurria wrote all of the music for *Pearl.* Sara Jobin served as producer both for assembling the librettists and composer and also for casting and organizing the public performances of *Pearl.*

2019 *Scarlet Letter:* Fullerton College Classic Dramatic Series, Fullerton CA, Nov. 10–12. Michael Mueller, director. 3 performances.

2019–2020 *Scarlet Letter:* Classic Repertory Company, Watertown MA, repertory season. Clay Hopper, director.

2016–2017 *Scarlet Letter:* Classic Repertory Company, Watertown MA, repertory season. Clay Hopper, director.

2013 *Pearl:* Concert performance at Shakespeare & Company, Lenox MA, Aug. 5. Maureen O'Flynn, soprano; John Bellemer, Tenor; Marnie Breckenridge, soprano; John Cheek, Bass-Baritone; Michael Corvino, Bass; Olivia Marchione, Child Soprano. Sara Jobin, Conductor, Piano, and Producer.

2013 *Pearl:*, Excerpts performed at University of Shanghai for Science and Technology, March 21, as part of a cultural exchange program sponsored by U.S. Department of State. John Bellemer, Tenor; Li Xin, Soprano; Wang Yang, Bass-Baritone; Lin Shu, Soprano; Charmaine, Child Soprano.

2012 *Pearl:* Concert performance at Shakespeare & Company, Lenox MA, Aug. 13. Maureen O'Flynn, soprano; Marnie Breckenridge, soprano; John Bellemer, Tenor; John Cheek, Bass-Baritone; Olivia Marchione, Child Soprano; John Demler, Baritone; Jack Brown, Baritone; Sara Jobin, Piano, Conductor, and Producer.

2011 *Scarlet Letter:* The Prime Stage, Pittsburgh, PA, Nov. 4–13. Katie Mueller, director. 9 performances.

2011 *Scarlet Letter:* South-Central Graduate Music Consortium Composer's Concert, Univ. N. Carolina Chapel Hill. Emily Siar, Soprano; Noelle Harb, Soprano; Ping Fu, Soprano; Tim Hambourger, Piano.

2010–2011 The National Players produce *The Scarlet Letter* as part of its 61st season. 31 performances.

2009 *Pearl:* Staged reading of the libretto at "Prima le Parole," Center for Contemporary Opera and New York Society Library, Nov. 9.

2007 *Scarlet Letter:* Staged reading at The Culture Project, New York City, as part of the "Women Center Stage" festival, July 10–11. Cast: Marisa Tomei, Ron Cephas Jones, Bobby Cannavale, and Marin Ireland. Leigh Silverman, director. Produced by The Culture Project

2006 *Scarlet Letter:* Workshop performance by The Little Theater of Winston-Salem, as part of New Horizons Performance Series, sponsored by the Thomas S. Kenan Institute for the Arts, North Carolina School of the Arts, Oct. 21–22. 2 performances.

2005 *The Scarlet Letter:* Staged reading at The Culture Project, New York City, as part of the "Women Center Stage" festival, Aug. 7–8. 2 performances. Starring: Marisa Tomei. Weir Harman, director. 2 performances.

6 Teaching-Related Activities

6a. New courses introduced

1. "Climate and Society: Drowning Cities," EES/HART 3333. Introduced Fall 2020. A new interdisciplinary course looking at cities that have grown along coastlines, rivers, and other bodies of water around the world from antiquity to the present. The course studies changing hazards, resources, and opportunities associated with proximity of water and how urban design reflects these resources and hazards. A large focus of the course is a semester-long project developing an interactive GIS-based presentation about a city of the student's choice. With Betsey Robinson (History of Art and Architecture) and Steven Goodbred (Earth & Environmental Sciences).

2. "Data Science Methods for Smart Cities Applications," UNIV 3360/5360. Introduced Spring 2018. A new interdisciplinary University Course with an emphasis on developing applications to make practical use of new data sources associated with smart-city operations. With Abhishek Dubey (Computer Science), Gautam Biswas (Computer Science), Mark Ellingham (Math), David Kosson (Civil and Environmental Engineering), and Claire Smrekar (Public Policy and Education).

3. "Global Climate Change," EES 3310/5310. Introduced Fall 2017. Expanded my course EES 2110/5110 to cover material at a higher level and add a laboratory (increasing from 3 to 4 credit hours). The laboratory is largely computational and introduces students to principles and practices of reproducible research using R and RMarkdown. Laboratory exercises include downloading and analyzing climate data from major online archives; conducting computational experiments using simple models of radiative transfer, geochemical carbon cycle, etc., and analyzing the model output; and analyzing energy demand and CO_2 emissions to assess different emission-mitigation policies. Course and laboratory materials are available at `https://ees3310.jgilligan.org`.

4. "Agent- and Individual-Based Computational Modeling" EES 4760/5760, Introduced Spring 2016. Agent-based computational modeling with emphasis on emergent phenomena and applications in environmental science, ecology, economics, public health, and urban planning. Course materials are available at `https://ees4760.jgilligan.org/`

5. "Water and Social Justice in Bangladesh" EES 390. Introduced Spring 2010. Developed team-taught transdisciplinary graduate capstone seminar (with Steven Goodbred and Brooke Ackerly) combining perspectives from natural sciences, engineering, social sciences, and humanities to study water resources and hazards in Bangladesh with focus on rivers, ground water, and coastal environments. The seminar includes interactions with students and faculty at Bangladeshi universities and field-work in Bangladesh.

6. "Global Climate Change" EES 2110/5110. Introduced Fall 2008. New interdisciplinary course on climate change in earth's with a focus on integrating the science, economics, politics, and ethics of anthropogenic climate change so students leave with a broad perspective on the big picture of the ways different scholarly disciplines contributed to understanding climate change and possible responses to it.

7. "Science, Risk, and Policy," EES2150 (formerly EES 205, GEOL 205). Introduced Spring 2004. Created interdisciplinary course on how society manages deadly risks.

8. "Science and Democracy," EES1111 (formerly EES115F). Introduced Fall 2004. First-year writing seminar on what constitutes science, separating good science from junk science, and how questions of what constitutes good science play into contemporary political and legal disputes.

9. "Deep Geological Disposal of High-Level Radioactive Waste" CE 299. Introduced Spring 2007. Developed team-taught transdisciplinary graduate capstone seminar (with Jim Clarke and Calvin Miller) on disposal of nuclear waste, with a focus on the proposed repository at Yucca Mountain. The seminar combined sociological, ethical, psychological, political, engineering, and geological perspectives on the proposed respository and featured fieldwork in Nevada both to examine

the geology and hydrology of the region and to interact with politicians, public officials, and community activists.

10. ”New Global Crisis: Energy and Water Resources in the 21st Century” HUM161 (with David Furbish). Co-taught a multidisciplinary undergraduate course on the science, politics, and ethics of energy and water resources.

11. “Earth and the Atmosphere,” EES108. Introduced Spring 2004. The atmosphere from the perspective of weather and climate and also as a component of the earth system. Special topics on how weather, pollution, and global change affect human society and how science, economics, and politics interact to manage these impacts.

12. “Nonlinear Dynamics and Chaos,” PHYS361. Introduced Fall 2000. Developed a graduate seminar on nonlinear dynamics and chaos with emphasis on drawing connections between the formal mathematical foundations and applications to laboratory science and students’ research.

13. “Science in a Democracy,” HONS189.02 (team-taught with Lewis Branscomb), Spring, 2000. Developed and co-taught an honors seminar on the interactions of science with public policy, examining issues of fraud and integrity in research, intellectual property, science as an engine of economic growth, technocracy vs. democracy, and environmental regulation. Featured guest lectures and class discussions with Senators Lamar Alexander and William Frist.

6b. Current Graduate Students

6b.i. Advisor:

1. Kelsea Best (Ph.D. student, Earth & Environmental Sciences, Advisor).
2. Chelsee Brumback (Ph.D. student, Civil & Environmental Engineering, Co-Advisor with Prof. Janey Camp).
3. Wenwen “Bowen” He (Ph.D. student, Civil & Environmental Engineering, Co-Advisor with Prof. Janey Camp).
4. Juan Martínez (M.S. student, Civil & Environmental Engineering).
5. Christopher Tasich (Ph.D. student, Earth & Environmental Sciences, Advisor).

6b.ii. Member of Dissertation/Thesis Committee:

1. Moyo Ajayi (Ph.D. Student, Earth & Environmental Sciences).
2. Madeline Allen (Ph.D. Student, Civil & Environmental Engineering).
3. Bryce Belanger (Ph.D. Student, Earth & Environmental Sciences).
4. Ishita Dash (Ph.D. Student, Civil & Environmental Engineering).
5. Charles Doktycz (Ph.D. Student, Civil & Environmental Engineering).
6. Pamela Hoover (Ph.D. student, Civil & Environmental Engineering).
7. Joshua McDuffie (Ph.D. Student, Civil & Environmental Engineering).
8. Michaela Peterson (Ph.D. Student, Earth & Environmental Sciences).
9. Kat Turk (Ph.D. Student, Earth & Environmental Sciences).
10. Sarah Williams (Ph.D. Student, Earth & Environmental Sciences).

6c. Former Graduate Students

6c.i. Advisor:

1. David Knorr (M.S. 2019, Earth & Environmental Sciences, Advisor. Current position: Staff Scientist, NewFields Inc., Atlanta GA.)
2. Emily Burchfield (Ph.D. 2017, Environmental Engineering, Advisor. Current position: Tenure-track Assistant Professor, Emory University, Department of Environmental Sciences).
3. John Nay (Ph.D. 2017, Integrated Computational Decision Science, Advisor. Current position: CEO, Skopos Labs, Inc.).
4. Rachel Shumaker (M.S. 2017, Earth & Environmental Sciences, Advisor. Current position: Science Teacher, Dillard Middle School, Yanceyville, NC).
5. Laura Benneyworth (Ph.D. 2016, Environmental Management and Policy, Advisor. Current position: Tennesee Dep't. of Transportation).
6. John Jacobi (Ph.D. 2014, Environmental Engineering. Current position: Natural Catastrophe Modeling Manager, SCOR Reinsurance). George Hornberger was Jacobi's primary advisor. I supervised research using agent-based modeling of farmer decision-making that formed one third of his dissertation.

6c.ii. Member of Dissertation/Thesis Committee:

1. Paul Johnson (Ph.D. 2021, Student, Civil & Environmental Engineering).
2. Matthew Dietrich (Ph.D. 2021, Earth & Environmental Sciences).
3. Thomas Rechtman (M.S. 2021, Earth & Environmental Sciences).
4. Ke "Jack" Ding (Ph.D. 2020, Environmental Engineering).
5. George Duffy (Ph.D. 2020, Earth & Environmental Sciences).
6. Rachel McKane (Ph.D. 2020, Sociology).
7. Jennifer Bradham (Ph.D. 2019, Earth & Environmental Sciences).
8. Leslie Gillespie-Marthaler (Ph.D. 2019, Environmental Engineering).
9. Kate Nelson (Ph.D. 2018, Environmental Engineering, Dissertation Committee).
10. Scott C. Worland (Ph.D. 2018, Environmental Engineering, Dissertation Committee).
11. Christian Hung (former Ph.D. Student, Economics, Dissertation Committee).
12. Brooke Patton (M.S. 2017, Earth & Environmental Sciences, Committee).
13. Leslie Duncan (Ph.D. 2017, Environmental Engineering, Dissertation Committee).
14. Thushara Gunda (Ph.D. 2017, Environmental Engineering, Dissertation Committee).
15. Jennifer Pickering (Ph.D. 2016, Earth & Environmental Science, Dissertation Committee).
16. Elena Wilmot (former Ph.D. student, Earth & Environmental Sciences, Dissertation Committee).
17. Kendra Abkowitz (Ph.D. 2015, Environmental Engineering, Dissertation Committee).
18. Elizabeth Stone (M.S. 2015, Earth & Environmental Science, Committee).
19. Gregory George (M.S. 2014, Earth & Environmental Science, Committee).
20. Shelley Donohue (M.S. 2013, Earth & Environmental Science, Committee).

21. Courte Voorhees (Ph.D. 2012, Community Research & Action, Dissertation Committee).
22. Ryan Haupt (M.S. 2012, Earth & Environmental Science, Committee).
23. Patricia Conway (former Ph.D. student, Community Research & Action, Dissertation Committee).
24. Luis Fong (Ph.D. 2005, Physics, Dissertation Committee).
25. Andrew Rose (Ph.D. 2001, Physics, Dissertation Committee).
26. Christine Cheney (Ph.D. 2001, Physics, Dissertation Committee).

6d. Undergraduate Advisees

1. Kelsey Kaline (Class of 2014, Independent major in Environmental Policy).
2. Courtney van Stolk (2013, Independent major in Environmental Policy).
3. Jeremy Doochin (2010, Indepdendent major in Environmental Policy).

6e. Undergraduate Research Projects Supervised

1. Julia Tilton (2021–2022, EES major): Supervised research on developing a composite index of climate change.
2. Ao Qu (2020–21, Computer science major): Supervised research on applying machine learning to analyzing agent-based model simulations. Mr. Qu co-authored a peer-reviewed paper based on his research.
3. Ellie Miller (2021, EES major): Supervised research on extreme heat and humidity in climate model simulations.
4. Robin Young (2021–22, EES major): Supervised research on extreme heat and humidity in historical records and climate model simulations, which are part of his immersion project.
5. Margaret Dorhout (2018–2020, EES major): Supervised research on extreme weather patterns in Bangladesh.
6. Asaf Roth (2019, computer science major): Supervised research on time-series analysis of electricity consumption by buildings on Vanderbilt campus.
7. Madeline Allen (2018–2019, EES major): Supervised senior honors thesis research on flood modeling (in collaboration with Professors Mark Abkowitz and Janey Camp in Civil & Environmental Engineering).
8. Emma Rimmer (2018–2019, Environmental Sociology major, EES minor): Supervised research on household energy efficiency in the United States.
9. Umang Chaudhry (2017–2019, EES and Science Communications double-major): Supervised independent research project during academic year, summer research project, and senior honors thesis research on impacts of gentrification on activities of daily life for public-transit users in the Nashville Metropolitan Statistical Area.
10. Miguel Moravec (2017–2018, EES and CSET double-major): Supervised summer research and supervising senior honors thesis research on the impacts of gentrification on mobility among low-income resildents of the Nashville Metropolitan Statistical Area.
11. Marc Chen (2016–2017, Economics major): Co-supervised senior honors thesis research on poverty, access to public-transit, and employment in Nashville, and served as second reader of honors thesis. Mr. Chen's thesis was awarded highest honors.

12. Austin Channell (2015–2017, Civil Engineering major): Supervised immersive undergraduate research project on reducing individual and household greenhouse gas emissions. Mr. Channell won a Vanderbilt Undergraduate Summer Research fellowship to support this work and won a prize for his presentation of this work at the 2016 Vanderbilt Undergraduate Research Fair.
13. Heebong Kim (2016, EES major): Supervised honors enrichment project on science policy.
14. Joshua Timm (2015–2016, Political Science major): Supervised independent research on media bias in reporting on climate and weather and immersive research on corporate energy conservation as part of a TIPs project. Second reader on senior honors thesis.
15. Michael Diamond (2014, EES major): Supervised field research in Bangladesh.
16. Michael Diamond (2012, EES major): Supervised independent honors research project on the feasibility of terraforming Mars.
17. Michael Kofsky (2010–11, Political Science major): Supervised independent research on the environmental footprints of delivering movies for home viewing by mailing DVD's versus streaming broadband.
18. Jeremy Doochin (2008–09, Independent major in Environmental Policy): Supervised independent research project on corporate greenhouse gas emissions reduction.
19. Kelley Coffman (2004–05, Medicine, Health, & Society major): Supervised senior honors thesis on citizen response to environmental contamination by Oak Ridge National Laboratory. Ms. Coffman received high honors for her thesis.
20. Megan O'Grady (2002–03, Physics major): Co-supervised senior research project and honors thesis together with Prof. John Wikswo. Ms. O'Grady subsequently won an NSF Graduate Fellowship.

7 Service

7a. Service to Department

2021–2022 Member, Faculty Search Committee (climate modeling position).

2017–2018 Chair, Seminar and Speaker Committee.

2017–2018 Member, Faculty Search Committee (climate modeling position).

2015–2016 Chair, Subcommittee on Earth Sciences Curriculum.

2006–2014 Coordinator, Transdisciplinary Initiative on Environmental Systems and Doctoral Capstone Seminar.

7b. Service to College

2022–present College Working Group on the Undergraduate Curriculum, developing new curriculum structure for College of Arts & Science.

2021–present Co-chair, Climate Studies Program Committee. Developed a proposal for a new interdisciplinary major in Climate Studies.

2020–present Director, Vanderbilt Climate and Society Grand Challenge Initiative. Lead an interdisciplinary project to build strong ties among Humanities, Social Sciences, and Natural Sciences in research and teaching on the nexus of climate change and society.

2020–present Junior Advisory Review Committee (JARC). Conduct third-year reviews for tenure-track faculty.

2022 Presentation to Arts & Science Board of Advisors about the new Climate Studies major and the Climate & Society Grand Challenge Initiative. Mar. 25.

2022 Keynote talk for Communication of Science, Engineering, and Technology Symposium (sponsored by National Endowment for Humanities grant). Mar. 18.

2021–2022 Faculty Search Committee, Environmental Religious Studies.

2019–2020 Arts & Science Grand Challenges Committee. Evaluated proposals to the college's Grand Challenges Initiative for interdisciplinary projects to address the most pressing problems facing society.

2019–2020 Faculty Search Committee: Environmental Asian Studies, Asian Studies program.

2003–2018 Communication of Science, Engineering, and Technology Committee.

2014–2015 Worked with Prof. Tiffiny Tung (Anthropology) on addressing problems of sexual harassment and hostile work environments for students conducting field research. Sought guidance from EEO and developed recommendations that Prof. Tung presented to Faculty Council.

2004–2009 Writing Advisory Board.

7c. Service to University

2021–2022 Member, University Working Group on Climate, Environment, and Energy Futures. Appointed by Chancellor Diermeier to evaluate Vanderbilt's strengths in climate, environment, and energy research and recommend future actions to enhance the university's prominence in these areas.

2018–2019 Worked with Blue Sky sustainability initiative as part of FutureVU planning process.

2017–2019 Management Committee, The Erdős Institute for Collaborative Research, Innovation, and Entrepreneurship (A joint venture of The Ohio State University and Vanderbilt University).

2018 Organized panel on ethics in data science for Data Science Visions symposium.

2017 Co-chair (with Gail Carr-Williams), Public Transit Working Group, Transportation Planning, Vanderbilt FutureVU land-use planning initiative.

2017 "Climate Science Myth Busters" Public lecture on myths and facts about climate science and global warming. School of Engineering (Apr. 12).

2017 Led the inaugural Digital Salon at the Wond'ry, discussing cross-disciplinary applications of data science and computational modeling from engineering and the natural sciences to digital humanities (Feb. 21).

2016 Panelist, "After Paris, What Next?" Roundtable discussion of climate policy after the Paris accord. Vanderbilt Law School, hosted by Chancellor Zeppos.

2015–2017 Working with the Curb Center and the Wond'ry to build multi-university consortium to foster interdisciplinary faculty collaboration (Vanderbilt and Ohio State, founding members). Worked with Prof. Roman Holowinsky at Ohio State to launch the Erdös Institute at Ohio State and develop university-industry connections to help doctoral students prepare for successful non-academic careers in the private sector.

2015 Panelist, "Grand Challenge: Energy and the Future," (Vanderbilt Board of Trust Meeting, 13 Feb.)

2013 Panelist, "Starting the Conversation: Inspiring Your Students to Write" (Aug. 29, Center for Teaching, Writing Studio, & Heard Library).

2013 Speaker, "Dinner and a draft: Talking about writing and revising" (Mar. 28, Dean of Commons & Writing Studio).

2013 Graduate honor fellowships evaluation committee.

2010–2013 Traffic & Parking Committee.

2008 Co-chair (with Michael Bess), Faculty Seminar on the Future of Humanity, Center for Ethics.

1999–2000 Co-chair (with Lewis Branscomb) Faculty Seminar on Science and Technology Policy.

1996–1997 Chair, Faculty Seminar on Economics of Scientific Research (Vanderbilt Institute for Public Policy Studies).

Ongoing Frequent guest lectures about climate change and science policy in Nursing, Global Public Health, Law, Management, Engineering, and Arts & Science; speaking to student groups, such as Students Promoting Environmental Awareness and Responsibility, Wilderness Skills, McGill Hour, and Commons.

7d. Service to Profession

2021–present Associate Editor for Climate Law and Policy, *Frontiers in Climate*.

2016–present External Advisory Committee, Urban Water Innovation Network, an NSF-sponsored sustainability research network ($12.5 million funding).

2016–present Organizing committee, Annual Conference on Artificial Intelligence and the Law, Vanderbilt Law School.

2016–present Program Committee, Environmental and Sustainability Applications track, Winter Simulation Conference, IEEE and INFORMS.

2022 Grant review panel, National Science Foundation.

2022 Presubmission review and feedback on grant proposal by University of Texas, Austin.

2021 External tenure review for Northeastern University

2021 Grant review for Nederlandse Organisatie voor Wetenschappelijk (Dutch Research Council).

2019–2021 Member, External Advisory Committee, "Water Unaffordability in the United States," an NSF-sponsored research project. Laura Senier, PI.

2019 Member, scientific committee, First International Conference on Environmental Non-Migration, Dresden Germany, June 19–21, 2019.

2019 With Michael Vandenbergh, I co-organized a conference on "The Tenth Anniversary of the Behavioral Wedge" at Vanderbilt Law School, Feb. 29–Mar. 1, 2019.

2018 NSF grant review panel.

2018 Member, Working Group on the Use of Socio-Environmental Systems Modeling in Actionable Science, National Socio-Environmental Synthesis Center (National Science Foundation and University of Maryland).

2018 Co-Chair, Environmental and Sustainability Applications Track, Winter Simulation Conference (Gothenburg, Sweden), Dec. 9–12 2018. Responsible for working with a European counterpart to develop the ESA track, including inviting speakers and session proposals, coordinating peer-review of submitted papers, appointing session chairs, and scheduling session.

2017–2018 Participant, NSF workshop on Interdisciplinary Disaster Research. Developing resources on best practices for interdisciplinary disaster research.

2017–2018 Member, Human Dimensions Working Group, Community Surface Dynamics Modeling System (University of Colorado, Boulder).

2017 Invited reviewer of National Academies report, *The Human Element: Integrating Social and Behavioral Sciences in the Weather Enterprise*

2017 Founding member and member of launch team, The Erdős Institute for Collaborative Research, Innovation, and Entrepreneurship, Columbus, OH. The Erdős Institute is an offshoot of a joint effort by Vanderbilt and Ohio State to foster innovative collaborative interdisciplinary research by faculty, and to stimulate the commercialization of research products through partnerships with private industry and sources of early investment funds.

2015 Organizing Committee: Food, Energy, Water Systems Nexus Challenges Workshop: Technology and Information Fusion (sponsored by NSF, Nov. 5–6, 2015).

2007 Represented Vanderbilt University at Oak Ridge National Laboratory University Liaisons Meeting: Opportunities for Collaborative Research on Climate Change, Sept 26.

2008 Session organizer and chair, "Quantifying Individual Emissions," Consumption, Law, & Environment Conference, Vanderbilt Law School (Apr. 17–19, 2008).

2006 Chair, "Intra- and Inter-Generational Equity" session, Consumption, Law, & Environment Workshop, Vanderbilt Law School (Oct. 19–20, 2006).

1997 Chair, Program Session on Laser and Ion-Beam Processing, ASM Materials Week '97, Indianapolis, IN.

1996 Co-Chair, Program Session on Laser and Ion-Beam Processing, ASM Materials Week '96, Cincinnati, OH.

1996 Organizing Committee, 5th Annual Workshop of the Consortium for Nanostructured Materials, Nashville TN.

Ongoing Review grant proposals for National Science Foundation, U.S. Department of Energy, Dutch Research Council, UK National Environmental Research Council, and Indo-US Science & Technology Forum.

Ongoing Review journal manuscripts for Proceedings of the National Academy of Sciences of the United States, Nature Climate Change, Nature Sustainability, Nature Ecology & Evolution, Nature Communications, ACM Transactions on Autonomous and Adaptive Systems, Computers, Environment, and Urban Systems Climatic Change, Ecological Economics, Energy Policy, Energy Economics, Energy Research & Social Science, Environmental Modeling & Software, Environmental Science & Technology, Land Use Policy, PLOS ONE, Royal Society of Chemistry, Sociological Forum, Sustainability Science, International Journal of Biometeorology, Proceedings of the National Academy of Sciences of India, and International Journal of Sustainable Transportation.

Ongoing Review book proposals and manuscripts for Cambridge University Press, Columbia University Press, Oxford University Press, and Princeton University Press.

7e. Service to Community

2022 Organized two-day workshop on using sustainable infrastructure to address urban-rural disparities in the Southeast. 50 participants represented government, universities, and private sector, including City of Nashville, Tennessee Valley Authority, AT&T, Greater Nashville Regional Council, and Atlanta Regional Commission, Electric Power Research Institute, University of Tennessee Knoxville, Tennessee Tech, and Georgia Tech. Mar. 24–25.

2020–2022 Keynote presentations on climate science for the Nashville Youth Climate Summit. Feb. 8, 2020, Feb. 20, 2021, Mar. 5, 2022.

2021 Panelist, 2021 Nashville Climate Summit, a webinare organized by AllianceBernstein to inform the Nashville business community about challenges and opportunities associated with climate change. April 21, 2021.

2020–present Advising Nashville Mayor's Sustainability Advisory Committee on quantitative analysis of climate actions plans for the City of Nashville.

2019 Presented tutorial on "What Science Can and Cannot Say about Climate Change" as part of a training workshop for journalists from the Southeastern U.S., organized by Inside Climate News at the Freedom Forum First Amendment Center, Nashville TN, Sept. 16.

2019 Michael Vandenbergh and I briefed a team of 13 representatives of the Office of the Inspector General for the U.S. Environmental Protection Agency about private environmental governance relating to toxic substances. Nashville, TN, July 10.

2019 Presented tutorial on "What Science Can and Cannot Say about Climate Change" as part of a training workshop for journalists from the Midwestern U.S., organized by Inside Climate News at the Freedom Forum First Amendment Center, Nashville TN, Mar. 7.

2018 Addressed Rotary Club of McMinnville TN on the impacts of climate change in middle Tennessee. McMinnville TN, Dec. 6.

2018 Intervewed by WCPI, McMinnville TN Public Radio station on the impacts of climate change in middle Tennessee. McMinnville TN, Dec. 6.

2018 Addressed Breakfast Club of Nashville (businesswomen's group) on private-sector responses to climate change. Nashville TN, Nov. 29.

2018 Presented tutorial on "What Science Can and Cannot Say about Climate Change" as part of a training workshop for journalists from the Southeastern U.S., organized by Inside Climate News at the Freedom Forum First Amendment Center, Nashville TN, Sept. 24.

2018 Organized day-long workshop on "Data-Methods for Equitable Development in Nashville," with participants from Metro Nashville government, Metropolitan Planning Organization, and many community groups.

2017–2019 Member, Environmental Public Health Community Advisory Group, Metro Nashville Department of Public Health. Worked with Dr. Sanmi Areola (Deputy Director, Metro Department of Public Health) to establish a research network for monitoring air quality in public housing units and provide research opportunities for Vanderbilt undergraduate and graduate students.

2017 "Beyond Gridlock: The Private Governance Response to Climate Change." Public lecture (with Michael Vandenbergh) at Nashville Public Library as part of the "Thinking out of the Lunch Box" series. (Apr. 5).

2015–2017 Collaboration with University School of Nashville physics teacher Wilson Hubbell to incorporate scientific literacy about mathematical and computational modeling into high-school science curricula (Funding for USN from an Edwin E. Ford Leadership Challenge Grant).

2011–2012 Co-author, *Sustainable Tennessee*, a report to state and local decision makers on the impacts of climate change on Tennessee and possible adaptations. Oak Ridge National Laboratory and Sustainable Tennessee.

2009 Briefed representatives of Senators Corker and Alexander on environmental aspects of the Convention on the Law of the Sea Treaty (organized by the Pew Charitable Trusts), Nov. 18.

2009 Invited panelist, "Health in Tennessee: The Impact of Climate Change," Public Policy Forum with Tennessee State Legislature (organized by Papasan Institute for Government Relations, U. Memphis), June 3.

2007–2009 Advisory Board on Environment, The Tennessean Newspaper.

2008 Testimony about climate change before Tennessee House Committee on Conservation and Environment, Feb. 28.

2006 Co-Organizer, Nashville Forum on Christianity and the Environment, Scarritt-Bennett Center, Sept. 30.

2006 Panelist, Belcourt Theatre discussion of genetically modified food. Apr. 7.

2005 "Democracy in the Age of Science" Public lecture at Nashville Public Library as part of the "Thinking out of the Lunch Box" series. (Sept. 7).