

# Curriculum Vitae

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

Apr. 2, 2024

## Contents

<b>1</b>	<b>Contact Information</b>	<b>2</b>
<b>2</b>	<b>Degrees Earned</b>	<b>2</b>
<b>3</b>	<b>Employment History</b>	<b>2</b>
<b>4</b>	<b>Honors and Awards</b>	<b>3</b>
<b>5</b>	<b>Research &amp; Creative Expression</b>	<b>3</b>
5a.	Citations and H-Index . . . . .	3
5b.	Book . . . . .	3
5c.	Articles . . . . .	3
5d.	Book Chapters . . . . .	9
5e.	Articles in Conference Proceedings . . . . .	9
5f.	Patents . . . . .	11
5g.	Software and other products . . . . .	11
5h.	Invited Presentations . . . . .	12
5i.	Research Grants . . . . .	15
5i.i.	Current Grants . . . . .	15
5i.ii.	Previous Grants . . . . .	15
5j.	Creative Expression . . . . .	16
<b>6</b>	<b>Teaching-Related Activities</b>	<b>17</b>
6a.	New courses introduced . . . . .	17
6b.	Current Graduate Students . . . . .	18
6b.i.	Advisor: . . . . .	18
6b.ii.	Member of Dissertation/Thesis Committee: . . . . .	19
6c.	Former Graduate Students . . . . .	19
6c.i.	Advisor: . . . . .	19
6c.ii.	Member of Dissertation/Thesis Committee: . . . . .	19
6d.	Undergraduate Advisees . . . . .	20
6e.	Undergraduate Research Projects Supervised . . . . .	21
<b>7</b>	<b>Service</b>	<b>22</b>
7a.	Service to Department . . . . .	22
7b.	Service to College . . . . .	22
7c.	Service to University . . . . .	23
7d.	Service to Profession . . . . .	24
7e.	Service to Community . . . . .	26

## 1 Contact Information

Department of Earth & Environmental Sciences, jonathan.gilligan@vanderbilt.edu  
Vanderbilt University MOBILE: 615.414.5750  
PMB 351805 DEP'T OFFICE: 322.2976  
2301 Vanderbilt Place ORCID: 0000-0003-1375-6686  
Nashville, TN 37235-1805 SSRN ID: 954061  
PRONOUNS: they/them/theirs 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

**2023–present** Professor, Dept. of Earth & Environmental Sciences, Vanderbilt University.

**2023–present** Professor, Dept. of Civil & Environmental Engineering (secondary), Vanderbilt University.

**2022–2023** The Alexander Heard Distinguished Service Professor, Vanderbilt University

**2016–2023** Associate Professor, Dept. of Civil & Environmental Engineering (secondary), Vanderbilt University.

**2009–2023** 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

- 2023–2024** Fulbright Scholar Award, supporting a sabbatical leave as Fulbright Canada Research Chair in Digital Technologies and Sustainability at the University of Calgary.
- 2023** The Margaret Cuninggim Women's Center mentorship award, recognizing my mentorship, support, and advocacy for women at Vanderbilt, especially in STEM. Vanderbilt University.
- 2023** 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.
- 2022** The Alexander Heard Distinguished Service Professor Award, Vanderbilt University, recognizing distinctive contributions to the understanding of problems of contemporary society. (\$5000 cash prize)
- 2021** Outstanding Reviewer Award, Winter Simulation Conference.
- 2018** The Chancellor's Award for Research, Vanderbilt University, recognizing "excellence on the part of faculty for published research, scholarship or creative expression" published in the previous three years. (\$2000 cash prize)
- 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. (\$10,000 cash prize divided equally between Vandenbergh and myself)
- 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. 2 2024, Google Scholar lists 7,800 citations (2,925 since 2019 and 600 new citations in 2023), an h-index of 38 (24 counting only citations since 2019), and 14 papers with 100+ citations, including 5 papers with 300+.

### 5b. Book (✓ denotes peer-reviewed book)

1. ✓ M.P. Vandenbergh and **J.M. Gilligan**. (2017). *Beyond Politics: The Private Governance Response to Climate Change*. New York, NY: Cambridge University Press. ISBN: 978-1107181229. 494 pp.

### 5c. Articles (✓ denotes peer-reviewed article, \* denotes student author)

1. ✓ M.D. Caballero\*, M.P. Vandenbergh, **J.M. Gilligan**, and E.O. Currier\*. (2024). "Incentivizing Household Action: Exploring the Behavioral Wedge in the 2021 Infrastructure Investment and Jobs Act and the 2022 Inflation Reduction Act," *Energy Policy*, **186**, 113992. DOI: 10.1016/j.enpol.2024.113992.
2. ✓ M.G. Burgess, L. Van Boven, G. Wagner, G. Wong-Parodi, K. Baker, M. Boykoff, B.A. Converse, L. Dilling, **J.M. Gilligan**, Y. Inbar, E. Markowitz, J.D. Moyer, P. Newton, K.T. Raimi, T. Shrum, and M.P. Vandenbergh. (2024). "Supply, demand, and polarization challenges facing U.S. climate policies," *Nature Climate Change*. DOI: 10.1038/s41558-023-01906-y.

3. ✓ B. He\*, **J.M. Gilligan**, and J.V. Camp. (2023). "An index of social fabric for assessing community vulnerability to natural hazards: Model development and analysis of uncertainty and sensitivity," *International Journal of Disaster Risk Reduction*, **96**, 103913. DOI: 10.1016/j.ijdr.2023.103913.
4. ✓ J. Raff\*, S. Goodbred Jr., J. Pickering, R. Sincavage, J. Ayers, S. Hossain, C. Wilson, C. Paola, M. Steckler, D. Mondal, J.-L. Grimaud, C.J. Grail, K. Rogers, K. Ahmed, S.H. Akhter, B. Carlson, E. Chamberlain, M. Dejtter, **J. Gilligan**, R. Hale, M. Khan, G. Mukhtadir, M. Rahman, and L. Williams. (2023). "Sediment delivery to sustain the Ganges-Brahmaputra delta under climate change and anthropogenic impacts," *Nature Communications*, **14**, 2429. DOI: 10.1038/s41467-023-38057-9.
5. ✓ M.D. Sweitzer, T. Gunda, and **J.M. Gilligan**. (2023). "Water narratives in local newspapers within the United States," *Frontiers in Environmental Science*, **11**. DOI: 10.3389/fenvs.2023.1038904.
6. ✓ K. Best\*, **J. Gilligan**, H. Baroud, A. Carrico, K. Donato, and B. Mallick. (2022). "Applying machine learning to social datasets: A study of migration in southwestern Bangladesh using random forests," *Regional Environmental Change*, **22**, 52. DOI: 10.1007/s10113-022-01915-1.
7. ✓ F. Schenuit\*, **J. Gilligan**, and A. Viswamohanan. (2021). "A scenario of solar geoengineering governance: Vulnerable states demand, and act," *Futures*, **132**, 102809. DOI: 10.1016/j.futures.2021.102809.
8. ✓ **J.M. Gilligan**. (2021). "Expertise across disciplines: Establishing common ground in interdisciplinary disaster research teams," *Risk Analysis*, **41**, 1171–1177. DOI: 10.1111/risa.13407.
9. ✓ K.J. Ding\*, **J.M. Gilligan**, Y.E. Yang, P. Wolski, and G.M. Hornberger. (2021). "Assessing food-energy-water resources management strategies at city scale: An agent-based modeling approach for Cape Town, South Africa," *Resources, Conservation and Recycling*, **170**, 105573. DOI: 10.1016/j.resconrec.2021.105573.
10. ✓ K.B. Best\*, **J.M. Gilligan**, H. Baroud, A.R. Carrico, K.M. Donato, B.A. Ackerly, and B. Mallick. (2021). "Random forest analysis of two household surveys can identify important predictors of migration in Bangladesh," *Journal of Computational Social Science*, **14**, 77–100. DOI: 10.1007/s42001-020-00066-9.
11. M.P. Vandenbergh and **J.M. Gilligan**. (2020). "Climate law and policy: Forks in the road," *Duke Environmental Law and Policy Forum*, **31**, 163–173. DOI: 10.2139/ssrn.3543639.
12. **J.M. Gilligan** and M.P. Vandenbergh. (2020). "Beyond wickedness: Managing complex systems and climate change," *Vanderbilt Law Review*, **73**, 1177–1810.
13. ✓ A.R. Carrico, K.M. Donato, K. Best\*, and **J. Gilligan**. (2020). "Extreme weather and marriage among girls and women in Bangladesh," *Global Environmental Change*, **65**, 102160. DOI: 10.1016/j.gloenvcha.2020.102160.
14. ✓ K.S. Nielsen\*, P.C. Stern, T. Dietz, **J.M. Gilligan**, D.P. van Vuuren, M.J. Figueroa, C. Folke, W. Gwozdz, D. Ivanova, L.A. Reisch, M.P. Vandenbergh, K.S. Wolske, and R. Wood. (2020). "Improving climate change mitigation analysis: A framework for examining feasibility," *One Earth*, **3**, 325–336. DOI: 10.1016/j.oneear.2020.08.007.
15. M.P. Vandenbergh, **J.M. Gilligan**, and H. Feuerman\*. (2020). "The new revolving door," *Case Western Reserve Law Review*, **70**, 1121–1149. DOI: 10.2139/ssrn.3570889.
16. ✓ S. Elsayah, T. Filatova, A.J. Jakeman, A.J. Kettner, M.L. Zellner, I.N. Athanasiadis, S.H. Hamilton, R.L. Axtell, D.G. Brown, **J.M. Gilligan**, M.A. Janssen, D.T. Robinson, J. Rozenberg, I.I.T. Ullah, and S.J. Lade. (2020). "Eight grand challenges in socio-environmental systems modeling," *Socio-Environmental Systems Modeling*, **2**, 16226. DOI: 10.18174/sesmo.2020a16226.

17. ✓ **J.M. Gilligan** and M.P. Vandenbergh. (2020). “A framework for assessing the impact of private climate governance,” *Energy Research & Social Science*, **60**, 101400. DOI: 10.1016/j.erss.2019.101400.
18. **J.M. Gilligan**. (2019). “Modelling diet choices,” *Nature Sustainability*, **2**, 661–662. DOI: 10.1038/s41893-019-0354-7. Invited “News and Views” commentary.
19. **J.M. Gilligan**. (2018). “Carrots and sticks in private climate governance,” *Texas A&M Law Review*, **6**, 179–198.
20. J.B. Ruhl, J. Nay\*, and **J.M. Gilligan**. (2018). “Topic modeling the president: Conventional and computational methods,” *George Washington Law Review*, **86**, 1243–1315.
21. ✓ A. Maki, E. McKinney\*, M.P. Vandenbergh, M.A. Cohen, and **J.M. Gilligan**. (2018). “Employee energy benefits: what are they and what effects do they have on employees?” *Energy Efficiency*, **12**, 1065–1083. DOI: 10.1007/s12053-018-9721-x.
22. ✓ **J.M. Gilligan**, C.A. Wold\*, S.C. Worland\*, J.J. Nay\*, D.J. Hess, and G.M. Hornberger. (2018). “Urban water conservation policies in the United States,” *Earth’s Future*, **6**, 955–967. DOI: 10.1029/2017EF000797.
23. **J.M. Gilligan**. (2018). “Climate modeling: accounting for the human factor,” *Nature Climate Change*, **8**, 14–15. DOI: 10.1038/s41558-017-0038-0. Invited “News and Views” commentary.
24. ✓ J.J. Nay\*, E.K. Burchfield\*, and **J.M. Gilligan**. (2018). “A Machine-Learning Approach to Forecasting Remotely Sensed Vegetation Health,” *International Journal of Remote Sensing*, **39**, 1800–1816. DOI: 10.1080/01431161.2017.1410296.
25. C. Phillips, **J.M. Gilligan**, S. Harper, J. Roberts, and M.P. Vandenbergh. (2018). “Dialogue: Beyond politics: The private governance response to climate change,” *Environmental Law Reporter*, **48**, 11049–11062.
26. ✓ C. Wilson, S. Goodbred, C. Small, **J. Gilligan**, S. Sams\*, B. Mallick, and R. Hale. (2017). “Widespread infilling of tidal channels and navigable waterways in the human-modified tidal delta plain of southwest Bangladesh,” *Elementa*, **5**, 78. DOI: 10.1525/elementa.263.
27. **J.M. Gilligan**. (2017). “Are cops on the science beat?” *Issues in Science and Technology*, **34**, 6–8. Commentary invited by the editor.
28. ✓ T. Gunda\*, G.M. Hornberger, and **J.M. Gilligan**. (2016). “Spatiotemporal patterns of agricultural drought in Sri Lanka: 1881–2010,” *International Journal of Climatology*, **36**, 563–575. DOI: 10.1002/joc.4365.
29. ✓ L. Benneyworth\*, **J. Gilligan**, J.C. Ayers, S. Goodbred, G. George\*, A. Carrico, M.R. Karim\*, F. Akter\*, D. Fry\*, K. Donato, and B. Piya\*. (2016). “Drinking water insecurity: water quality and access in coastal south-western Bangladesh,” *International Journal of Environmental Health Research*, **26**, 508–524. DOI: 10.1080/09603123.2016.1194383. **NOTE:** Featured by Taylor & Francis publishers as part of their observance of World Water Day 2017. T&F opened free access to the article and published an accompanying “Research Story” with background on the article: <https://web.archive.org/web/20170915110349/http://authorservices.taylorandfrancis.com/world-water-day-2017-2/>.
30. ✓ E. Burchfield\*, J.J. Nay\*, and **J. Gilligan**. (2016). “Application of machine learning to the prediction of vegetation health,” *ISPRS—International Archives of the Photogrammetry, Remote Sensing and Spatial Information Sciences*, **XLI-B2**, 465–469. DOI: 10.5194/isprs-archives-XLI-B2-465-2016.
31. ✓ E.K. Burchfield\* and **J. Gilligan**. (2016). “Agricultural adaptation to drought in the Sri Lankan dry zone,” *Applied Geography*, **77**, 92–100. DOI: 10.1016/j.apgeog.2016.10.003.

32. ✓ D.J. Hess, C.A. Wold\*, E. Hunter\*, J. Nay\*, S. Worland\*, **J. Gilligan**, and G.M. Hornberger. (2016). "Drought, risk, and institutional politics in the American Southwest," *Sociological Forum*, **31**, 807–827. DOI: 10.1111/socf.12274.
33. L.W. Auerbach\*, S.L. Goodbred Jr, D.R. Mondal\*, C.A. Wilson, K.R. Ahmed\*, K. Roy, M.S. Steckler, C. Small, **J.M. Gilligan**, and B.A. Ackerly. (2015). "Reply to 'Tidal river management in Bangladesh'," *Nature Climate Change*, **5**, 492–493. DOI: 10.1038/nclimate2620.
34. ✓ L.W. Auerbach\*, S.L. Goodbred Jr, D.R. Mondal\*, C.A. Wilson, K.R. Ahmed\*, K. Roy, M.S. Steckler, C. Small, **J.M. Gilligan**, and B.A. Ackerly. (2015). "Flood risk of natural and embanked landscapes on the Ganges-Brahmaputra tidal delta plain," *Nature Climate Change*, **5**, 152–157. DOI: 10.1038/nclimate2472.
35. ✓ G.M. Hornberger, D.J. Hess, and **J. Gilligan**. (2015). "Water conservation and hydrological transitions in cities in the United States," *Water Resources Research*, **51**, 4635–4649. DOI: 10.1002/2015WR016943.
36. M.P. Vandenberg and **J.M. Gilligan**. (2015). "Beyond gridlock," *Columbia Journal of Environmental Law*, **40**, 217–303. DOI: 10.2139/ssrn.2533643. **NOTE:** This paper won the 2017 Morrison Prize for the highest-impact paper on sustainability law and policy in 2015.
37. **J.M. Gilligan** and M.P. Vandenberg. (2014). "Accounting for political feasibility in climate instrument choice," *Virginia Environmental Law Journal*, **32**, 1–26. DOI: 10.2139/ssrn.2220788.
38. M.P. Vandenberg, K.E. Toner, and **J.M. Gilligan**. (2014). "Energy and climate change: A climate prediction market," *UCLA Law Review*, **61**, 1962–2017.
39. A.R. Carrico, M.P. Vandenberg, P.C. Stern, G.T. Gardner, T. Dietz, and **J.M. Gilligan**. (2011). "Energy and climate change: Key lessons for implementing the behavioral wedge," *Journal of Energy & Environmental Law*, **2**, 61–67.
40. M.P. Vandenberg and **J.M. Gilligan**. (2011). "Macro-risks: The challenge for rational risk regulation," *Duke Environmental Law and Policy Forum*, **21**, 401–431.
41. **J. Gilligan**, T. Dietz, G. Gardner, P. Stern, and M. Vandenberg. (2010). "The behavioural wedge," *Significance*, **7**, 17–20. DOI: 10.1111/j.1740-9713.2010.00405.x. **NOTE:** Invited paper; subsequently named one of the best papers of 2009 by *Significance*.
42. ✓ P.C. Stern, G.T. Gardner, M.P. Vandenberg, T. Dietz, and **J.M. Gilligan**. (2010). "Design principles for carbon emissions reduction programs," *Environmental Science & Technology*, **44**, 4847–4848. DOI: 10.1021/es100896p.
43. M.P. Vandenberg, P.C. Stern, G.T. Gardner, T. Dietz, and **J.M. Gilligan**. (2010). "Implementing the behavioral wedge: Designing and adopting effective carbon emissions reduction programs," *Environmental Law Reporter*, **40**, 547–554. **NOTE:** Selected by Environmental Law Institute to reprint as the featured cover story of the 2010 summer reading issue for policymakers of Environmental Forum.
44. ✓ A.R. Carrico\*, P. Padgett, M.P. Vandenberg, **J. Gilligan**, and K.A. Wallston. (2009). "Costly myths: an analysis of idling beliefs and behavior in personal motor vehicles," *Energy Policy*, **37**, 2881–2888. DOI: 10.1016/j.enpol.2009.03.031.
45. ✓ T. Dietz, G. Gardner, **J. Gilligan**, P. Stern, and M. Vandenberg. (2009). "Household actions can provide a behavioral wedge to rapidly reduce U.S. carbon emissions," *PNAS*, **106**, 18452–18456. DOI: 10.1073/pnas.0908738106.
46. ✓ M.R. Holcomb\*, M.C. Woods\*, I. Uzelac, J.P. Wikswo, **J.M. Gilligan**, and V.Y. Sidorov. (2009). "The potential of dual camera systems for multimodal imaging of cardiac electrophysiology and metabolism," *Experimental Biology and Medicine*, **234**, 1355–1372. DOI: 10.3181/0902-RM-47. **NOTE:** Selected by the editors as the feature article of the month.

47. M.P. Vandenberg, J. Barkenbus, and **J.M. Gilligan**. (2008). "Individual carbon emissions: The low-hanging fruit," *UCLA Law Review*, **55**, 1701–1758.
48. ✓ D.N. Mashburn\*, S.J. Hinkson\*, M.C. Woods\*, **J.M. Gilligan**, M.R. Holcomb\*, and J.P. Wikswo. (2007). "A high-voltage cardiac stimulator for field shocks of a whole heart in a bath," *Review of Scientific Instruments*, **78**, 104302–104309. DOI: 10.1063/1.2796832.
49. **J.M. Gilligan**. (2006). "Flexibility, clarity, and legitimacy: Considerations for managing nanotechnology risks," *Environmental Law Reporter*, **36**, 10924–10930.
50. ✓ E. Sobol, A. Sviridov, M. Kitai, **J.M. Gilligan**, G.S. Edwards, and N.H. Tolk. (2003). "Time-resolved light scattering measurements of cartilage and cornea denaturation due to free-electron laser radiation," *Journal of Biomedical Optics*, **8**, 216–222.
51. ✓ A. Cricenti, R. Generosi, M. Luce, P. Perfetti, G. Margaritondo, D. Talley, J.S. Sanghera, I.D. Aggarwal, **J.M. Gilligan**, and N.H. Tolk. (2002). "Surface characterisation by near-field microscopy and atomic force microscopy," *Advances in Science and Technology*, **32**, 183–192.
52. ✓ G. Mensing\*, **J. Gilligan**, P. Hari\*, E. Hurt\*, G. Lüpke, S. Pantelides, N. Tolk, and P.C. Taylor. (2002). "Defect transition energies and the density of electronic states in hydrogenated amorphous silicon," *Journal of Non-Crystalline Solids*, **299**, 621–625.
53. ✓ A. Cricenti, R. Generosi, M. Luce, P. Perfetti, G. Margaritondo, D. Talley, J.S. Sanghera, I.D. Aggarwal, **J.M. Gilligan**, and N.H. Tolk. (2001). "Spectroscopic scanning near-field optical microscopy with a free electron laser: CH<sub>2</sub> bond imaging in diamond films," *Journal of Microscopy*, **202**, 446–450.
54. ✓ G. Lupke, C.P. Cheney\*, J. Sturman\*, J.C. Keay\*, **J.M. Gilligan**, L.C. Feldman, and N.H. Tolk. (2000). "Materials science at the WM Keck free electron laser: Infrared wavelength selective materials modification," *Condensed Matter Theories*, **14**, 349–364.
55. ✓ D.B. Talley, L.B. Shaw, J.S. Sanghera, I.D. Aggarwal, A. Cricenti, R. Generosi, M. Luce, G. Margaritondo, **J.M. Gilligan**, and N.H. Tolk. (2000). "Scanning near field infrared microscopy using chalcogenide fiber tips," *Materials Letters*, **42**, 339–344.
56. ✓ A. Cricenti, R. Generosi, P. Perfetti, G. Margaritondo, J. Almeida, **J.M. Gilligan**, N.H. Tolk, C. Coluzza, M. Spajer, D. Courjon, and I.D. Aggarwal. (1999). "Interface applications of scanning near-field optical microscopy with a free electron laser," *Physica Status Solidi A: Applied Research*, **175**, 317–329.
57. ✓ A. Cricenti, R. Generosi, G. Herold, P. Chiaradia, P. Perfetti, G. Margaritondo, **J.M. Gilligan**, and N.H. Tolk. (1999). "Chemical contrast observed at a III-V heterostructure by scanning near-field optical microscopy," *Physica Status Solidi A: Applied Research*, **175**, 345–349.
58. ✓ Z. Marka\*, C.P. Cheney\*, W. Wang\*, G. Lupke, **J. Gilligan**, Y. Yao\*, and N.H. Tolk. (1999). "Non-linear energy-selective nanoscale modifications of materials and dynamics in metals and semiconductors," *Soviet Physics: Technical Physics*, **44**, 1069–1072.
59. ✓ D.T. Schaafsma, R. Mossadegh, J.S. Sanghera, I.D. Aggarwal, **J.M. Gilligan**, N.H. Tolk, M. Luce, R. Generosi, P. Perfetti, A. Cricenti, and G. Margaritondo. (1999). "Singlemode chalcogenide fiber infrared SNOM probes," *Ultramicroscopy*, **77**, 77–81.
60. ✓ D.T. Schaafsma, R. Mossadegh, J.S. Sanghera, I.D. Aggarwal, M. Luce, R. Generosi, P. Perfetti, A. Cricenti, **J.M. Gilligan**, and N.H. Tolk. (1999). "Fabrication of single-mode chalcogenide fiber probes for scanning near-field infrared optical microscopy," *Optical Engineering*, **38**, 1381–1385.
61. ✓ A. Cricenti, R. Generosi, C. Barchesi, M. Luce, M. Rinaldi, C. Coluzza, P. Perfetti, G. Margaritondo, D.T. Schaafsma, I.D. Aggarwal, **J.M. Gilligan**, and N.H. Tolk. (1998). "First experimental results with the free electron laser coupled to a scanning near-field optical microscope," *Physica Status Solidi A: Applied Research*, **170**, 241–247.

62. ✓ A. Cricenti, R. Generosi, P. Perfetti, **J.M. Gilligan**, N.H. Tolk, C. Coluzza, and G. Margaritondo. (1998). "Free-electron-laser near-field nanospectroscopy," *Applied Physics Letters*, **73**, 151–153.
63. ✓ J. Sturmann\*, R.G. Albridge, A.V. Barnes, J.L. Davidson, **J.M. Gilligan**, G. Lupke, A. Ueda\*, and N.H. Tolk. (1998). "Infrared wavelength-selective photodesorption on diamond surfaces," *Applied Surface Science*, **129**, 59–63.
64. ✓ N.H. Tolk, Z. Hargitai\*, Y. Yao\*, B. Pratt-Ferguson\*, M.M. Albert\*, R.G. Albridge, A.V. Barnes, **J.M. Gilligan**, V.D. Gordon\*, G. Lupke, A. Puckett\*, J. Tully, G. Betz, and W. Husinsky. (1998). "Molecular effects in measured sputtering yields on gold at near threshold energies," *Izvestiya Akademii Nauk: Seriya Fizicheskaya*, **62**, 676–679.
65. ✓ W. Wang\*, G. Lupke, M. Di Ventra, S.T. Pantelides, **J.M. Gilligan**, N.H. Tolk, I.C. Kizilyalli, P.K. Roy, G. Margaritondo, and G. Lucovsky. (1998). "Coupled electron-hole dynamics at the Si/SiO<sub>2</sub> interface," *Physical Review Letters*, **81**, 4224–4227.
66. ✓ Y. Yao\*, Z. Hargitai\*, M. Albert\*, R.G. Albridge, A.V. Barnes, **J.M. Gilligan**, B.P. Ferguson\*, G. Lupke, V.D. Gordon\*, N.H. Tolk, J.C. Tully, G. Betz, and W. Husinsky. (1998). "New molecular collisional interaction effect in low-energy sputtering," *Physical Review Letters*, **81**, 550–553.
67. ✓ J. Sturmann\*, R.G. Albridge, A.V. Barnes, **J. Gilligan**, M.T. Graham\*, J.T. McKinley, W. Wang\*, X. Yang\*, N.H. Tolk, J.L. Davidson, and G. Margaritondo. (1997). "Photoexcitation spectroscopy and material alteration with free-electron laser," *Acta Physica Polonica A*, **91**, 689–696.
68. ✓ C.M. Volk\*, J.W. Elkins, D.W. Fahey, G.S. Dutton, **J.M. Gilligan**, M. Loewenstein, J.R. Podolske, K.R. Chan, and M.R. Gunson. (1997). "Evaluation of source gas lifetimes from stratospheric observations," *Journal of Geophysical Research: Atmospheres*, **102**, 25543–25564.
69. ✓ J.W. Elkins, D.W. Fahey, **J.M. Gilligan**, G.S. Dutton, T.J. Baring, C.M. Volk\*, R.E. Dunn, R.C. Myers, S.A. Montzka, P.R. Wamsley, A.H. Hayden, J.H. Butler, T.M. Thompson, T.H. Swanson, E.J. Dlugokencky, P.C. Novelli, D.F. Hurst, J.M. Lobert, S.J. Ciciora, R.J. McLaughlin, T.L. Thompson, R.H. Winkler, P.J. Fraser, L.P. Steele, and M.P. Lucarelli. (1996). "Airborne gas chromatograph for *in situ* measurements of long-lived species in the upper troposphere and lower stratosphere," *Geophysical Research Letters*, **23**, 347–350.
70. ✓ C.M. Volk\*, J.W. Elkins, D.W. Fahey, R.J. Salawitch, G.S. Dutton, **J.M. Gilligan**, M.H. Proffitt, M. Loewenstein, J.R. Podolske, K. Minschwaner, J.J. Margitan, and K.R. Chan. (1996). "Quantifying transport between the tropical and mid-latitude lower stratosphere," *Science*, **272**, 1763–1768.
71. ✓ E.L. Woodbridge, J.W. Elkins, D.W. Fahey, L.E. Heidt, S. Solomon, T.J. Baring, T.J. Gilpin, W.H. Pollock, S.M. Schauffler, E.L. Atlas, M. Lowenstein, J.R. Podolske, C.R. Webster, R.D. May, **J.M. Gilligan**, S.A. Montzka, K.A. Boering, and R.J. Salawitch. (1995). "Estimates of total organic and inorganic chlorine in the lower stratosphere from *in situ* measurements during AASE II," *Journal of Geophysical Research*, **100**, 3057–3064.
72. ✓ U. Eichmann, J.C. Bergquist, J.J. Bollinger, **J.M. Gilligan**, W.M. Itano, D.J. Wineland, and M.G. Raizen. (1993). "Young's interference experiment with light scattered from two atoms," *Physical Review Letters*, **70**, 2359–2362.
73. ✓ W.M. Itano, J.C. Bergquist, J.J. Bollinger, **J.M. Gilligan**, D.J. Heinzen, F.L. Moore, M.G. Raizen, and D.J. Wineland. (1993). "Quantum measurements of trapped ions," *Vistas in Astronomy*, **169**–183.
74. ✓ W.M. Itano, J.C. Bergquist, J.J. Bollinger, **J.M. Gilligan**, D.J. Heinzen, F.L. Moore, M.G. Raizen, and D.J. Wineland. (1993). "Ultra-high precision spectroscopy for fundamental physics," *Hyperfine Interactions*, **78**, 211–220.



75. ✓ W.M. Itano, J.C. Bergquist, J.J. Bollinger, **J.M. Gilligan**, F.L. Moore, and M.G. Raizen. (1993). "Quantum projection noise: population fluctuations in two-level systems," *Physical Review A*, **47**, 3554–3570.
76. ✓ D. Shiner, **J.M. Gilligan**, B.M. Cook\*, and W. Lichten. (1993). "H<sub>2</sub>, D<sub>2</sub>, and HD ionization potentials by accurate calibration of several iodine lines," *Physical Review A*, **47**, 4042–4045.
77. ✓ **J.M. Gilligan** and E.E. Eyler. (1992). "Precise determinations of ionization potentials and *EF* state energy levels of H<sub>2</sub>, HD, and D<sub>2</sub>," *Physical Review A*, **46**, 3676–3690.
78. ✓ M.G. Raizen, **J.M. Gilligan**, J.C. Bergquist, W.M. Itano, and D.J. Wineland. (1992). "Ionic crystals in a linear Paul trap," *Physical Review A*, **45**, 6493–6501.
79. ✓ M.G. Raizen, **J.M. Gilligan**, J.C. Bergquist, W.M. Itano, and D.J. Wineland. (1992). "Linear trap for high-accuracy spectroscopy of stored ions," *Journal of Modern Optics*, **39**, 233–242.
80. ✓ **J.M. Gilligan** and E.E. Eyler. (1991). "High-resolution three-photon spectroscopy and multi-photon interference in molecular hydrogen," *Physical Review A*, **43**, 6406–6409.
81. ✓ E. McCormack, **J.M. Gilligan**, C. Cornaggia, and E.E. Eyler. (1989). "Measurement of high Rydberg states and the ionization potential of H<sub>2</sub>," *Physical Review A*, **39**, 2260–2263.
82. ✓ E.E. Eyler, **J.M. Gilligan**, E. McCormack\*, A. Nussenzweig\*, and E. Pollack. (1987). "Precise two-photon spectroscopy of  $E \leftarrow X^*$  intervals in H<sub>2</sub>," *Physical Review A*, **36**, 3486–3489.

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

1. ✓ B.A. Ackerly, M. Anam\*, **J. Gilligan**, and S. Goodbred. (2017). "Climate and community: The human rights, livelihood, and migration impacts of climate change." In: *Climate Change, Migration, and Human Rights*. D. Manou, A. Baldwin, D. Cubie, A. Mijr, and T. Thorp, eds. New York: Routledge, pp. 189–202. ISBN: 9780367136161.
2. **J. Gilligan**. (2017). "Nature of Collaboration across Disciplines." In: *Pathways to Collaboration*. R. Holowsinsky, A. Channell, O.J. Crocomo, J.P. Kreier, and W.R. Sharp, eds. Vol. 1. CreateSpace Independent Publishing, pp. 433–457. ISBN: 9781973944379.
3. B.A. Ackerly, M. Anam\*, and **J. Gilligan**. (2015). "Environment, political economies, and livelihood change." In: *Environment, Migration and Adaptation: Evidence and Politics of Climate Change in Bangladesh*. B. Mallick and B. Etzold, eds. Dhaka, Bangladesh: AH Development Publishing House, pp. 27–39. ISBN: 9789849103790.
4. **J. Gilligan**. (2010). "People should behave ethically for the sake of future generations." In: *Opposing Viewpoints: Ethics*. R. Espejo, ed. Vol. 2. Gale, pp. 20–32.

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

1. ✓ C.M. Tasich\*, **J.M. Gilligan**, and G.M. Hornberger. (2024). "Modeling the Dynamics of Sediment Transport, Tides, and Sea-Level Rise: Implications for the Resilience of Coastal Bengal." In: *Proceedings of the 2023 Winter Simulation Conference*. C.G. Corlu, S.R. Hunter, H. Lam, B.S. Onggo, J. Shortle, and B. Biller, eds. Piscataway, NJ, USA: IEEE Press, pp. 946–957. ISBN: 9798350369663.
2. ✓ K.B. Best\*, A. Qu\*, and **J.M. Gilligan**. (2021). "Modeling multi-level patterns of environmental migration in Bangladesh: An agent-based approach." In: *Proceedings of the 2021 Winter Simulation Conference*. S. Kim, B. Feng, K. Smith, S. Masoud, Z. Zhang, C. Czabo, and M. Lopez, eds. Piscataway, NJ, USA: IEEE Press. DOI: 10.1109/WSC52266.2021.9715380.
3. ✓ J. Martinez\*, A. Mukhopadhyay, A. Ayman, M. Wilbur, P. Pugliese, D. Freudberg, **J. Gilligan**, A. Laszka, and A. Dubey. (2021). "Predicting public transportation load to estimate the probability of social distancing violations." In: *Proceedings of the Workshop on AI for Urban Mobility at the 35th AAAI Conference on Artificial Intelligence*.

4. ✓ K. Ding\*, J.M. Gilligan, and G.M. Hornberger. (2019). "Avoiding "day-zero": A testbed for evaluating integrated food-energy-water management in Cape Town, South Africa." In: *Proceedings of the 2019 Winter Simulation Conference*. N. Mustafee, K.-H.G. Bae, S. Lazarova-Molnar, M. Rabe, C. Szabo, P. Haas, and Y.-J. Son, eds. Piscataway, NJ, USA: IEEE Press, pp. 866–877. DOI: 10.1109/WSC40007.2019.9004889.
5. ✓ E.K. Burchfield\* and J.M. Gilligan. (2016). "Dynamics of individual and collective agricultural adaptation to water scarcity." In: *Proceedings of the 2016 Winter Simulation Conference*. T.M.K. Roeder, P.I. Frazier, R. Szechtman, E. Zhou, T. Huschka, and S.E. Chick, eds. Piscataway, NJ, USA: IEEE Press, pp. 1678–1689. DOI: 10.1109/WSC.2016.7822216.
6. ✓ J.J. Nay\*, M. Van der Linden\*, and J.M. Gilligan. (2016). "Betting and belief: prediction markets and attribution of climate change." In: *Proceedings of the 2016 Winter Simulation Conference*. T.M.K. Roeder, P.I. Frazier, R. Szechtman, E. Zhou, T. Huschka, and S.E. Chick, eds. Piscataway, NJ, USA: IEEE Press, pp. 1666–1677. DOI: 10.1109/WSC.2016.7822215.
7. ✓ J.M. Gilligan, C. Brady, J.V. Camp, J.J. Nay\*, and P. Sengupta. (2015). "Participatory simulations of urban flooding for learning and decision support." In: *Proceedings of the 2015 Winter Simulation Conference*. L. Yilmaz, W.K.V. Chan, I. Moon, T.M.K. Roeder, C. Macal, and M.D. Rossetti, eds. Piscataway, NJ, USA: IEEE Press, pp. 3174–3175. ISBN: 978-1-4673-9741-4. DOI: 10.1109/WSC.2015.7408456. 00000.
8. ✓ J.J. Nay\* and J.M. Gilligan. (2015). "Data-driven dynamic decision models." In: *Proceedings of the 2015 Winter Simulation Conference*. L. Yilmaz, W.K.V. Chan, I. Moon, T.M.K. Roeder, C. Macal, and M.D. Rossetti, eds. Piscataway, NJ, USA: IEEE Press, pp. 2752–2763. ISBN: 978-1-4673-9741-4. DOI: 10.1109/WSC.2015.7408381. 00000.
9. J.M. Gilligan, B.A. Ackerly, and S.L. Goodbred. (2013). "Building resilience to environmental stress in coastal Bangladesh: An integrated social, environmental, and engineering perspective." In: *Bridging the Policy-Action Divide: Challenges and Prospects for Bangladesh*. Bangladesh Development Initiative. Berkeley, CA.
10. ✓ K.G. Rogers, J.P.M. Syvitski, I. Overeem, S. Higgins\*, and J.M. Gilligan. (2013). "Farming practices and anthropogenic delta dynamics." In: *Deltas: Landforms, Ecosystems and Human Activities*. Vol. 358. IAHS Publ. Int'l. Assoc. Hydrolog. Sci. Gothenberg SE, pp. 133–142.
11. J. Sturmman\*, Z. Marka\*, M.M. Albert\*, R.G. Albridge, J.M. Gilligan, G. Luepke, S.K. Singh, J.L. Davidson, W. Husinsky, and N.H. Tolk. (2001). "Infrared free-electron laser photoablation of diamond films." In: *Nonresonant Laser-Matter Interaction (NLMI-10)*. International Society for Optics and Photonics, pp. 206–211.
12. E. Sobol, A. Sviridov, M. Kitai, J.M. Gilligan, and G.S. Edwards. (2000). "Alteration of absorption coefficients of tissue water as a result of heating under IR FEL radiation with different wavelengths." In: *International Biomedical Optics Symposium*. Vol. 3925. SPIE, p. 78.
13. E. Sobol, A. Sviridov, M. Kitai, G.S. Edwards, J.M. Gilligan, and N.H. Tolk. (1999). "Effect of wavelength on threshold and kinetics of tissue denaturation under laser radiation." In: *International Biomedical Optics Symposium*. Vol. 3601. SPIE, pp. 122–129.
14. J.M. Gilligan, J.W. Elkins, D.W. Fahey, G.S. Dutton, C.M. Volk, T.J. Baring, R.E. Dunn, and R.C. Myers. (1994). "Refinement of the total organic and inorganic chlorine budgets in the atmosphere with a new *in situ* instrument, airborne chromatograph for atmospheric trace species (ACATS-IV)." In: *Atmospheric Effects of Aviation Project Workshop*.
15. ✓ U. Eichmann, J.C. Bergquist, J.J. Bollinger, J.M. Gilligan, W.M. Itano, J.G. Raizen, and D.J. Wineland. (1993). "Interference in the resonance fluorescence of two trapped atoms." In: *Proceedings of the 11<sup>th</sup> International Conference on Laser Science*, pp. 43–48.

16. W.M. Itano, U. Eichmann, J.C. Bergquist, J.J. Bollinger, **J.M. Gilligan**, M.G. Raizen, and D.J. Wineland. (1993). "Light scattered from two atoms." In: *Proceedings of the 11<sup>th</sup> International Conference on Laser Science*, pp. 410–419.
17. D.J. Wineland, J.C. Bergquist, J.J. Bollinger, W.M. Itano, F.L. Moore, **J.M. Gilligan**, M.G. Raizen, D.J. Heinzen, C.S. Weimer, and C.H. Manney. (1991). "High-resolution spectroscopy of laser-cooled ions." In: *Proceedings of the Enrico Fermi Summer School on Laser Manipulation of Atoms and Ions, July 1991, Varenna, Italy*, pp. 539–551.
18. D.J. Wineland, J.C. Bergquist, J.J. Bollinger, W.M. Itano, F.L. Moore, **J.M. Gilligan**, M.G. Raizen, D.J. Heinzen, C.S. Weimer, and C.H. Manney. (1991). "Recent experiments on trapped ions at the National Institute of Standards and Technology." In: *Proceedings of the Enrico Fermi Summer School on Laser Manipulation of Atoms and Ions, July 1991, Varenna, Italy*, pp. 553–567.
19. E.E. Eyler, J.M. Gilligan, and E. McCormack. (1988). "Precise multiphoton spectroscopy of H<sub>2</sub>." In: *Advances in Laser Spectroscopy III*.
20. E.E. Eyler and **J.M. Gilligan**. (1987). "Precise multiphoton spectroscopy of excited states of H<sub>2</sub>." In: *Advances in Laser Spectroscopy II*. Vol. 160. AIP Conference Proceedings, pp. 388–390.
21. E. McCormack, E.E. Eyler, and **J.M. Gilligan**. (1987). "Precise photodissociation and multiphoton spectroscopy of H<sub>2</sub>." In: *Proceedings of the XV International Conference on Quantum Electronics*. Vol. 21. Technical Digest Series. Optical Society of America, pp. 58–60.

## 5f. Patents

1. D. Cliffler, F.J. Baudenbacher, J.P. Wikswo, S. Eklund, R.R. Balcarcel, and **J.M. Gilligan**. (2010). "Device and Methods for Detecting the Response of a Plurality of Cells to at Least One Analyte of Interest." 7,713,733 B2. (May 11, 2010).
2. F.J. Baudenbacher, J.P. Wikswo, R.R. Balcarcel, D. Cliffler, S. Eklund, **J.M. Gilligan**, O. McGuinness, T. Monroe, A. Prokop, M. Stremmer, and A. Werdich. (2010). "Apparatus and Methods for Monitoring the Status of a Metabolically Active Cell." 7,704,745 B2. (Apr. 27, 2010).

## 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>
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>
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/>
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>

## 5h. Invited Presentations

1. "Connecting Climate Science with People," University of Calgary. Invited, university-wide and public presentation. Jan. 10, 2024.
2. "Modeling the Dynamics of Sediment Transport, Tides, and Sea-Level Rise: Implications for the Resilience of Coastal Bengal." Invited talk at the Winter Simulation Conference, San Antonio, TX. Dec. 12, 2023.
3. "Climate Change at the Nexus of Society and Environment: Empirical Methods and Simulation Modeling." Invited talk at the University of Waterloo. Waterloo, CA. Co-sponsored by the Waterloo Climate Institute, TRANSFORM project on Sustainable Innovation and Urban Transformation, and the department of Geography and Environmental Management in the Faculty of Environment. Nov. 14, 2023.
4. Panelist, "Navigating Big Questions in a Transdisciplinary Environment," Werklund School of Education, University of Calgary. Panel discussion among three Fulbright Scholars about transdisciplinarity in scholarship and teaching. Nov. 9, 2023.
5. "The Greenhouse Gas Emissions Reductions Arising Provisions Targeting Individual Actions in the Inflation Reduction Act." Invited panel presentation, National Academies of Science, Engineering, and Medicine, Spring meeting of Board on Environmental Change and Society, May 18, 2023.
6. "The Race Towards Climate Justice." Invited panel presentation, Clinton Global Initiative University Annual Meeting 2023. Mar. 4, 2023.
7. "Modeling Behavior Change in Socio-Environmental Systems." Invited talk, Second Coastlines and People Workshop on Identifying Interoperability and Data Needs of Interdisciplinary Models for Understanding Vulnerability of Coastal Systems. Florida International University (Sponsored by National Science Foundation). Oct. 4, 2022.
8. "Incorporating Human Behavior into Coupled Socio-Environmental Systems Models." Keynote talk, National Socioenvironmental Synthesis Center webinar on Methods in Socio-Environmental Systems Modeling. June 20, 2022. A professionally produced video of my talk, together with a recording of the panel discussion that followed, has been posted to the SESYNC YouTube channel at <https://www.youtube.com/watch?v=rI994KY7ftE>
9. "Climate Change in Bangladesh: A Coupled Natural-Human Systems Approach," Invited talk, Howard H. Baker, Jr. Center for Public Policy, University of Tennessee Knoxville. October 14, 2021.
10. "Integrating Machine Learning with Agent-Based Modeling to Understand Human Impacts of Climate Change." Invited seminar, Florida International University. May 25, 2021.
11. "Beyond Politics: The Private Governance Response to Climate Change," Grand Rounds lecture in Radiology, Vanderbilt Medical Center. March 29, 2021.
12. "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.
13. "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).
14. "Managing Sediment for Sustainability," Invited virtual seminar, International Centre for Climate Change and Development, Dhaka, Bangladesh, July 20, 2020.

15. "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.
16. "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.
17. "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.
18. "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.
19. Invited panelist, "What Can an Individual Do to Help Limit Climate Change," public panel discussion at Copenhagen Business School, Aug. 29, 2018.
20. Invited participant, Workshop on Household Actions to Reduce Greenhouse Gas Emissions, Copenhagen Business School, Copenhagen Denmark, August 27-28 2018
21. Invited panelist, "Re-envisioning 'Sustainable' Deltas through Critical Geography," American Association of Geographers Annual Conference, April 2018.
22. "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.
23. "Private Governance Approaches to Climate Policy: Pragmatic Responses to Government Inaction," Department colloquium, Department of Environmental Studies, University of Colorado, Boulder, February 7, 2018.
24. "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.
25. "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.
26. "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.
27. "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.
28. "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. My talk is online at [https://www.youtube.com/watch?v=v6i5\\_P\\_00cU](https://www.youtube.com/watch?v=v6i5_P_00cU).
29. "Dynamics of Individual and Collective Agricultural Adaptation to Water Security," invited talk, Winter Simulation Conference 2016, Arlington, VA, December 12, 2016.
30. "Understanding Drought and Decision-Making," Workshop on Agricultural Drought and Policy, American Institute for Sri Lankan Studies, Colombo, Sri Lanka, March 10, 2015.

31. "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.
32. "In the Tide Country: Live on an Active Delta in Bangladesh," Department of Geography, University of Georgia, October 20, 2014
33. "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
34. "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.
35. "Climate Change and Disaster Management," Ministry of Disaster Management, Colombo, Sri Lanka, June 5, 2013.
36. "From the Laboratory to the Legislature: Transdisciplinary Perspectives on Global Climate Change" Nashville State Community College, Nashville TN, March 30, 2012.
37. "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).
38. "The Behavioral Wedge: Reducing Greenhouse Gas Emissions by Individuals and Households," Joint Statistical Meetings (American Statistical Association, Statistical Society of Canada, etc.), Vancouver 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).
39. Panelist, Pew Charitable Trusts Forum on the Law of the Sea Treaty, Belmont University, Nashville TN, November 18, 2009.
40. "Global Climate Change: Earth Science, Behavioral Science, and Public Policy," Middle Tennessee State University, Murfreesboro TN, October 16, 2009.
41. "From the Laboratory to the Legislature: Why Climate Change is Fundamentally a Transdisciplinary Issue," Belmont University, Nashville TN, February 6, 2009 (Host paid honorarium)
42. "Individual Behavior and Climate Change: The Low-Hanging Fruit," Keynote Address, Summit for a Sustainable Tennessee, David Lipscomb University, Nashville TN, November 13, 2008.
43. "From the Laboratory to the Legislature: Transdisciplinary Perspectives on Environmental Science and Policy," Distinguished Panel Speaker, 10<sup>th</sup> Beckman Scholars Symposium, Irvine CA, July 26, 2008. (Host covered travel & lodging and paid an honorarium).
44. "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).
45. "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).
46. "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

47. “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.
48. “*Et in Arcadia Ego*: Reflections on the Future of Tenure,” Symposium on Promoting Scientific Freedom and Responsibility, AAAS Annual Meeting, Philadelphia PA (1998).
49. “Smart Modification of Surfaces with Free-Electron Lasers,” ASM Materials Week ’97, Indianapolis IN (1997).
50. “Modification of Diamond Films using Free-Electron Lasers,” ASM Materials Week ’96, Cincinnati OH (1996).
51. “Quantum Mechanical Measurements with Single Atoms,” April Meeting of the American Physical Society, Washington DC (1992).

## 5i. Research Grants

### 5i.i. Current Grants

1. National Science Foundation: NSF CRISES 2334272, “Planning: CRISES: Collaborative Research and Education Center for Transformative Water Solutions.” Oct. 1, 2023–Sept. 30, 2024. Total funds: \$100,000 over one year. Principal Investigator: Don Nelson (University of Georgia).
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–Feb. 29, 2024. Total funds: \$150,000 over one year. Direct costs: \$105,890. Indirect costs: \$44,110. Principal Investigator Janey Camp.

### 5i.ii. Previous 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, 2023 Total funds: \$149,573 over one year. Direct costs: \$110,215. Indirect costs: \$39,358. Principal Investigator Jonathan Gilligan.
2. National Science Foundation: NSF CNH 1716909, “Socioecological System Dynamics Related to Livelihood, Human Migration, and Landscape Evolution.” Sept. 1, 2017–Aug. 31, 2023. 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).
3. 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, 2023. Total funds: \$100,000 over three years (direct costs: \$100,000, indirect costs: \$0). Principal Investigator Jonathan Gilligan
4. Vanderbilt College of Arts & Science, “Global Ecology and Health Grand Challenge Initiative.” Jul. 1, 2020–June 30, 2023. Total funds: \$75,000 over 3 years (direct costs: \$75,000, indirect costs: \$0). Principal Investigator John McLean.
5. 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.
6. 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 Ledeczki.

7. 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.
8. 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.
9. 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.
10. Vanderbilt TIPS grant: "Private Governance Approaches to Climate Change" \$190,000 over 2 years (direct costs: \$190,000; indirect costs: \$0). Principal Investigator Michael Vandenberg.
11. "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.
12. 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 extension through May 2017. Total funds \$7.50 million (direct costs \$5.55 million, indirect costs \$1.95 million). Principal Investigator Steven Goodbred (VU EES).
13. 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.

## 5j. 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:

- 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. “Bayesian Statistical Methods,” EES 5891-03. Introduced Fall 2022. A graduate course on Bayesian statistical methods, to fill a need for more training in advanced statistical methods for graduate students in Earth & Environmental Sciences. The course begins with an introduction to Bayesian methods, and progresses to more sophisticated analysis, including multilevel regression and methods for spatiotemporal analysis.
2. “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).
3. “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).
4. “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<sub>2</sub> emissions to assess different emission-mitigation policies. Course and laboratory materials are available at <https://ees3310.jgilligan.org>.
5. “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/>

6. “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.
7. “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.
8. “Science, Risk, and Policy,” EES2150 (formerly EES 205, GEOL 205). Introduced Spring 2004. Created interdisciplinary course on how society manages deadly risks.
9. “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.
10. “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 repository 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.
11. “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.
12. “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.
13. “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.
14. “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. Fernanda “Ferna” Alvarez-Carrascal (Ph.D. Student, Earth & Environmental Sciences).

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

1. Bryce Belanger (Ph.D. student, Earth & Environmental Sciences).
2. Vinay Dhanvada (Ph.D. Student, Civil & Environmental Engineering).
3. Pamela Hoover (Ph.D. student, Civil & Environmental Engineering).
4. Joshua McDuffie (Ph.D. Student, Civil & Environmental Engineering).
5. Michaela Peterson (Ph.D. Student, Earth & Environmental Sciences).
6. Erica Scarpitti (Ph.D. Student, Earth & Environmental Sciences).
7. Hannah Wolf (Ph.D. Student, Earth & Environmental Sciences).

**6c. Former Graduate Students****6c.i. Advisor:**

1. Christopher Tasich (Ph.D. 2023, Earth & Environmental Sciences) Principal dissertation advisor, with co-advisor George Hornberger. Current position: U.S. Presidential Management Fellow at Environmental Protection Agency.
2. Wenwen “Bowen” He (Ph.D. 2023, Civil & Environmental Engineering) Principal dissertation advisor, with co-advisor Janey Camp. Current position: Solar power analyst.
3. Juan Martínez (M.S. 2023, Civil & Environmental Engineering). Thesis advisor.
4. Kelsea Best (Ph.D. 2022, Earth & Environmental Sciences). Dissertation advisor. Current position: Assistant Professor, Department of Civil, Environmental, & Geodetic Engineering and Department of City & Regional Planning, The Ohio State University.
5. David Knorr (M.S. 2019, Earth & Environmental Sciences). Thesis advisor. Current position: Data Scientist, Home Depot, Atlanta, GA.)
6. Emily Burchfield (Ph.D. 2017, Environmental Engineering). Dissertation advisor. Current position: Tenure-track Assistant Professor, Emory University, Department of Environmental Sciences).
7. John Nay (Ph.D. 2017, Integrated Computational Decision Science). Dissertation advisor. Current position: Founder and CEO, Brooklyn Artificial Intelligence Research and Brooklyn Investment Group, LLC..
8. Rachel Shumaker (M.S. 2017, Earth & Environmental Sciences). Thesis advisor. Current position: Environmental Scientist, Dewberry Engineers, Blanch, NC.
9. Laura Benneyworth (Ph.D. 2016, Environmental Management and Policy). Dissertation advisor. Current position: Retired.
10. John Jacobi (Ph.D. 2014, Environmental Engineering). 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. Current position: Managing Director, Reinsurance Solutions, Aon, PLC).

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

1. Moyo Ajayi (Ph.D. 2023, Earth & Environmental Sciences).
2. Madeline Allen (M.S. 2023, Civil & Environmental Engineering).
3. Ishita Dash (Ph.D. 2022, Civil & Environmental Engineering, Dissertation committee).

4. Charles Doktycz (Ph.D. 2022, Civil & Environmental Engineering, Dissertation committee).
5. Paul Johnson (Ph.D. 2021, Civil & Environmental Engineering, Dissertation committee).
6. Matthew Dietrich (Ph.D. 2021, Earth & Environmental Sciences, Dissertation committee).
7. Thomas Rechtman (M.S. 2021, Earth & Environmental Sciences, Dissertation committee).
8. Ke “Jack” Ding (Ph.D. 2020, Environmental Engineering, Dissertation committee).
9. George Duffy (Ph.D. 2020, Earth & Environmental Sciences, Dissertation committee).
10. Rachel McKane (Ph.D. 2020, Sociology, Dissertation committee).
11. Jennifer Bradham (Ph.D. 2019, Earth & Environmental Sciences, Dissertation committee).
12. Leslie Gillespie-Marthaler (Ph.D. 2019, Environmental Engineering, Dissertation committee).
13. Kate Nelson (Ph.D. 2018, Environmental Engineering, Dissertation Committee, Dissertation committee).
14. Scott C. Worland (Ph.D. 2018, Environmental Engineering, Dissertation committee).
15. Christian Hung (former Ph.D. Student, Economics, Dissertation committee).
16. Brooke Patton (M.S. 2017, Earth & Environmental Sciences, committee).
17. Leslie Duncan (Ph.D. 2017, Environmental Engineering, Dissertation committee).
18. Thushara Gunda (Ph.D. 2017, Environmental Engineering, Dissertation committee).
19. Jennifer Pickering (Ph.D. 2016, Earth & Environmental Science, Dissertation committee).
20. Elena Wilmot (former Ph.D. student, Earth & Environmental Sciences, Dissertation committee).
21. Kendra Abkowitz (Ph.D. 2015, Environmental Engineering, Dissertation committee).
22. Elizabeth Stone (M.S. 2015, Earth & Environmental Science, Committee).
23. Gregory George (M.S. 2014, Earth & Environmental Science, Committee).
24. Shelley Donohue (M.S. 2013, Earth & Environmental Science, Committee).
25. Courte Voorhees (Ph.D. 2012, Community Research & Action, Dissertation committee).
26. Ryan Haupt (M.S. 2012, Earth & Environmental Science, Committee).
27. Patricia Conway (former Ph.D. student, Community Research & Action, Dissertation committee).
28. Luis Fong (Ph.D. 2005, Physics, Dissertation committee).
29. Andrew Rose (Ph.D. 2001, Physics, Dissertation committee).
30. 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, Independent 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. 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.
3. 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.
4. Ellie Miller (2021, EES major): Supervised research on extreme heat and humidity in climate model simulations.
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 residents 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

**2021–present** Co-chair, Climate Studies Program Committee. Developed a new interdisciplinary major in Climate Studies, which was adopted by the College of Arts and Science.

**2022–2023** College Working Group on the Future of the Undergraduate Curriculum, developed a new curriculum structure for College of Arts & Science. The new curriculum introduces a novel interdisciplinary core to provide undergraduates with a shared experience, introduces them to the purpose and value of a liberal arts education, and reduces the burden of general education distribution requirements, to make it more straightforward for students to navigate the new curriculum. College faculty approved the new curriculum 70% to 30%.

**2020–2023** 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.

**2020–2022** 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

**2024–present** Executive Committee, Vanderbilt Center for Sustainability, Energy, and Climate

**2023–2024** Vice-Chair, Steering Committee, Vanderbilt Climate, Energy, and Sustainability Committee. Appointed by the Provost's office to develop recommendations to the Chancellor, Provost, and Dean of Engineering for a Discovery Vanderbilt Center for Climate, Energy, and Sustainability Research, Teaching, Innovation, and Community-Engagement.

**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 Erdős 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

**2024–2025** American Geophysical Union Voices for Science. Selected for the 2024 cohort on the Science Policy track. Receive training from AGU in communicating with policymakers about policy implications of my research and conduct monthly public outreach events over the following year.

**2023–2025** Advisory Board/Technical Advisory Group, Southwest Urban Corridor Integrated Field Laboratory (SW-IFL), a collaboration between Arizona State University, University of Arizona, Northern Arizona University, Oak Ridge National Laboratory, Brookhaven National Laboratory, and IBM.

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

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

**2016–2023** Program Committee, Environmental and Sustainability Applications track, Winter Simulation Conference, IEEE and INFORMS.

**2023** Panel and *ad-hoc* grant proposal review for National Science Foundation.

**2016–2021** External Advisory Committee, Urban Water Innovation Network, an NSF-sponsored sustainability research network (\$12.5 million funding).

**2022** Candidate for President of the Global Environmental Change section of the American Geophysical Union. Nominated by President-elect Andrew Dessler. I was not elected.

**2022** Grant proposal review panel, National Science Foundation.

**2022** Presubmission “red-team” review and feedback on grant proposals, by University of Texas, Austin and Colorado State University.

**2021** External tenure review for Northeastern University

**2021** Grant proposal 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, 5<sup>th</sup> 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

- 2020–present** Advising Nashville Mayor’s Sustainability Advisory Committee on quantitative analysis of climate actions plans for the City of Nashville.
- 2023** Featured speaker, “An Opening Goodbye,” a chamber-music concert by the ensemble Chatterbird, co-sponsored by Vanderbilt’s Curb Center for Art, Enterprise, and Public Policy. The concert featured four new pieces by Vanderbilt faculty, each addressing an issue of contemporary social and political concern and paired with remarks from writers, political activists, and scholars. I commented on Professor Molly Herron’s piece, “An Opening Goodbye,” which engaged musically with climate change. April 12.
- 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 webinar organized by AllianceBernstein to inform the Nashville business community about challenges and opportunities associated with climate change. April 21, 2021.
- 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 Vandenberg 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** Interviewed 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 Vandenberg) 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).