

JONATHAN M. GILLIGAN

Dept. Earth and Environmental Sciences
Vanderbilt University
Nashville, TN 37235-1805

615-322-2420
jonathan.gilligan@vanderbilt.edu
www.vanderbilt.edu/ees/jonathangilligan

Degrees

- Ph.D. 1991, Yale University (Physics). *Precise Multiphoton Spectroscopy of the H₂, HD, and D₂ Molecules and a New Determination of the Ionization Potential of HD.*
B.A. 1982, Swarthmore College (Physics and Philosophy), with Honors.

Employment

- 2009– Associate Professor of Earth & Environmental Sciences, Vanderbilt University.
2003–2009 Senior Lecturer in Earth & Environmental Sciences, Vanderbilt University.
2000–2003 The Robert T. Lagemann Assistant Professor of Living State Physics, Vanderbilt University.
1996–1998 Associate Director, Center for Molecular and Atomic Studies at Surfaces, Vanderbilt University.
1995–2000 Research Assistant Professor of Physics, Vanderbilt University.
1994–1995 Lecturer in Physics, Vanderbilt University.
1993–1994 Research Associate, Cooperative Institute for Research in Environmental Science: NOAA and University of Colorado.
1991–1993 National Research Council Postdoctoral Associate, National Institute for Standards and Technology.
1985–1991 Graduate Student/Teaching Assistant/Research Assistant, Yale University.
1983–1985 High school teacher, Commonwealth School, Boston MA.

Honors and Awards

- 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.

Invited Talks

- 2015 “Understanding Drought and Decision-Making,” Workshop on Agricultural Drought and Policy, American Institute for Sri Lankan Studies, Colombo, Sri Lanka, March 10.
2014 “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 “In the Tide Country: Live on an Active Delta in Bangladesh,” Department of Geography, University of Georgia, October 20.
2014 “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.
2013 “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 “Climate Change and Disaster Management,” Ministry of Disaster Management, Colombo, Sri Lanka, June 5.
2012 “From the Laboratory to the Legislature: Transdisciplinary Perspectives on Global Climate Change” Nashville State Community College, Nashville TN, Mar. 30.
2011 “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, Mar. 23.
2010 “The Behavioral Wedge: Reducing Greenhouse Gas Emissions by Individuals and Households,” Joint Statistical Meetings (American Statistical Association, Statistical Society of Canada, etc.), Vancouver BC, Aug. 1, 2010. **NOTE:** Part of a special session to highlight the best papers published in the journal *Significance* during the previous year.

Invited Talks (continued)

- 2009 Panelist, Pew Charitable Trusts Forum on the Law of the Sea Treaty, Belmont University, Nashville TN, Nov. 18.
- 2009 "Global Climate Change: Earth Science, Behavioral Science, and Public Policy," Middle Tennessee State University, Murfreesboro TN, Oct. 16.
- 2009 "From the Laboratory to the Legislature: Why Climate Change is Fundamentally a Transdisciplinary Issue," Belmont University, Nashville TN, Feb. 6.
- 2008 "Individual Behavior and Climate Change: The Low-Hanging Fruit," Keynote Address, Summit for a Sustainable Tennessee, David Lipscomb University, Nashville TN, Nov. 13.
- 2008 "From the Laboratory to the Legislature: Transdisciplinary Perspectives on Environmental Science and Policy," Distinguished Panel Speaker, 10th Beckman Scholars Symposium, Irvine CA, Jul. 26.
- 2008 "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, Apr. 12.
- 2008 "Ethics in Geological Time: Should We Care about Distant Future Generations?," The Berry Lecture, Dept. of Philosophy, Vanderbilt University, Nashville TN, Mar. 24.
- 2007 "Individual Behavior and Greenhouse Gas Emissions," Behavior, Energy, and Climate Change conference, American Council for an Energy Efficient Economy, Sacramento CA, Nov. 7-9.
- 2006 "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.
- 1998 "*Et in Arcadia Ego*: Reflections on the Future of Tenure," Symposium on Promoting Scientific Freedom and Responsibility, AAAS Annual Meeting, Philadelphia PA.
- 1997 "Smart Modification of Surfaces with Free-Electron Lasers," ASM Materials Week '97, Indianapolis IN.
- 1996 "Modification of Diamond Films using Free-Electron Lasers," ASM Materials Week '96, Cincinnati OH.
- 1992 "Quantum Mechanical Measurements with Single Atoms," April Meeting of the American Physical Society, Washington DC.

Funding

- 2014-2017 National Science Foundation: NSF-EAR 1416964 "Water Conservation and Hydrological Transitions in American Cities" (PI George Hornberger). \$717,000 over 3 years. Co-PI and leader of agent-based modeling team.
- 2012-2017 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" (PI George Hornberger). \$3.7 million over 5 years. Co-PI and leader of agent-based modeling team.
- 2011-2016 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" (PI Steven L. Goodbred, Jr.). \$7.5 million over 5 years. Co-Principal Investigator; leader of Integrative Group; member of management team; acting project leader June-December 2011.
- 2011-2013 Vanderbilt Discovery Grant, "Climate Adaptation, Water-Energy Impacts, Perceptions, and Behavior." (PI George Hornberger). \$99,532. Co-PI, focusing on use of agent-based modeling to integrate behavioral and natural science research on drought stress, competition for water resources, and adaptations by rice farmers in Sri Lanka.

Patents

- 2010 "Device and Methods for Detecting the Response of a Plurality of Cells to at Least One Analyte of Interest," D. Cliffl, F.J. Baudenbacher, J.P. Wiksw, S. Eklund, R.R. Balcarcel, and J.M. Gilligan, U.S. Patent #7,713,733 B2, issued May 11, 2010.
- 2010 "Apparatus and Methods for Monitoring the Status of a Metabolically Active Cell," F.J. Baudenbacher, J.P. Wiksw, R.R. Balcarcel, D. Cliffl, S. Eklund, J.M. Gilligan, O. McGuinness, T. Monroe, A. Prokop, M. Stremmler, and A. Werdich, U.S. Patent #7,704,745 B2, issued Apr. 27, 2010.

Current Graduate Students

Laura Benneyworth (Ph.D. student, Environmental Management, & Policy, Dissertation Advisor)
Emily Burchfield (Ph.D. student, Environmental Management, & Policy, Dissertation Advisor)
John Nay (Ph.D. student, Integrated Computational Decision Science, Dissertation Advisor)

Teaching Highlights

- 2015- "Agent- and Individual-Based Computational Modeling" EES 4760/5760, Developed new course on agent-based computational modeling with emphasis on emergent phenomena and applications in environmental science, ecology, economics, public health, and urban planning.
- 2010-2014 "Water and Social Justice in Bangladesh" EES 390, 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.
- 2008- "Global Climate Change" EES 201, 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.
- 2008- Supervising honors thesis in Medicine, Health, & Society by Kelley Coffman on risk communication and environmental contamination at Oak Ridge National Laboratory.
- 2008- Advising interdisciplinary major in Environmental Economic Policy by Jeremy Doochin.
- 2006-2008 "Deep Geological Disposal of High-Level Radioactive Waste" CE 299. 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.
- 2006- Coordinator, "Transdisciplinary Initiative on Environmental Systems" graduate program, Vanderbilt University. Coordinated interdisciplinary courses and activities to bring together graduate students and faculty from humanities, social sciences, natural sciences, and engineering to study environmental issues.
- 2005 "New Global Crisis: Energy and Water Resources in the 21st Century" HUM161, Vanderbilt University. Co-taught a multidisciplinary undergraduate course on the science, politics, and ethics of energy and water resources.
- 2004- "Earth and the Atmosphere," EES108, Vanderbilt University. Created new course covering the atmosphere both 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.
- 2004- "Science and Democracy," EES115F First-year writing seminar, Vanderbilt University. Created freshman 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.
- 2002-2003 Supervised senior undergraduate research project by Megan O'Grady, who subsequently won an NSF fellowship and attended graduate school at Harvard.
- 2000-2003 "Nonlinear Dynamics and Chaos," PHYS361, Vanderbilt University. Created new course on chaos and nonlinear dynamics in the natural sciences.
- 2000 "Science in a Democracy," HONS189.02, Vanderbilt University (with L. Branscomb).
- 1997-2003 Dissertation committees: Served on five dissertation committees in Physics. Currently on committees for Luis Fong and Andreas Werdich.
- 1996- "Science, Risk, and Policy," STH205 (later, PHYS205, GEOL205) Vanderbilt University (with B. Walter). Created interdisciplinary course on how society manages lethal risks.
- 1995-1998 "Atmospheric Physics," PHYS108, Vanderbilt University. Revitalized atmospheric physics course with focus on the science, economics, and politics of global environmental change.

Professional Activities

- 2015- Collaboration with University School of Nashville teacher Wilson Hubbell to incorporate scientific literacy about mathematical and computational modeling into high-school science curricula (Funding to USN from Edwin E. Ford Foundation).
- 2007- Associate director for Research, Vanderbilt Climate Change Research Network.
- 2003- Communication of Science and Technology Committee, Vanderbilt University.
- 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," Center for Teaching/Writing Studio/Heard Library, Vanderbilt University. Aug. 29.
- 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.
- 2009 Briefed representatives of Senators Corker and Alexander on environmental aspects of the UN Convention on the Law of the Sea. Nov. 18.
- 2008 Invited panelist, Public Policy Forum with Tennessee State Legislature on "Health in Tennessee: The Impact of Climate Change." (organized by Papasan Institute for Government Relations, U. Memphis), June 3.
- 2008 Co-chair, Faculty Seminar on "Technology, Commonweal, and the Transformation of Humanity" Center for Ethics, Vanderbilt University (May 12-15 2008)
- 2008 Session organizer & chair, "Quantifying Individual Emissions" session, Consumption, Law, & Environment Conference, Vanderbilt Law School (Apr. 17-19 2008).
- 2008 Testimony on climate change, Tennessee House Committee on Conservation and Environment, Feb. 28.
- 2007-2009 Member, Advisory Board on Environment, The Tennessean newspaper, Nashville TN.
- 2007 Oak Ridge National Laboratory University Liaisons Meeting: Opportunities for Collaborative Research on Climate Change. Represented Vanderbilt University climate research, Sept 26.
- 2006 Co-organizer, Nashville Forum on Christianity and the Environment, Scarritt-Bennett Center, Nashville TN, Sept. 30.
- 2006 Session chair, "Intra- and Inter-Generational Equity," Consumption, Law, & Environment Roundtable, Vanderbilt Law School, Oct. 19-20.
- 2006 Panelist, Genetically Modified Food, Belcourt Theatre, Nashville TN. Apr. 6.
- 2005 Co-leader, Faculty seminar on Threats to Environmental Sustainability, Vanderbilt Center for the Study of Religion and Culture.
- 2004-2007 Fellow, Center for the Study of Religion and Culture and core member, Ecology and Spirituality research group.
- 2004-2009 Writing Advisory Board, Vanderbilt University.
- 1999-2000 Vanderbilt Working Group on Amide Resonances in Laser Surgery, Vanderbilt University.
- 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.
- 1995-1996 Environmental Studies Committee, Vanderbilt University.

Creative and Artistic Activities

- 2013 *Pearl*, Concert performance of the opera. Music by Amy Scurria, libretto by Carol Gilligan and Jonathan Gilligan. Maureen O'Flynn, soprano; John Bellemer, Tenor; Marnie Breckenridge, soprano; John Cheek, Bass-Baritone; Michael Corvino, Bass; Olivia Marchione, Child Soprano. Sara Jobin, Conductor, and Producer. At Shakespeare & Company, Lenox MA, Aug. 5.
- 2013 *Pearl*, Excerpts from opera performed at University of Shanghai for Science and Technology as part of a cultural exchange program. John Bellemer, Tenor; Li Xin, Soprano; Wang Yang, Bass-Baritone; Lin Shu, Soprano; Charmaine, Child Soprano. March 21.

Creative and Artistic Activities (continued)

- 2012 *Pearl*, Concert performance of the opera. Music by Amy Scurria, libretto by Carol Gilligan and Jonathan Gilligan. 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. At Shakespeare & Company, Lenox MA, Aug. 13.
- 2011 *The Scarlet Letter*, by Carol Gilligan and Jonathan Gilligan. The Prime Stage (Pittsburgh, PA), Katie Mueller director. 9 performances.
- 2011 South-Central Graduate Music Consortium Composer's Concert, Univ. N. Carolina Chapel Hill. *Pearl*, performance of opera as work-in-progress (Amy Scurria, music; Carol Gilligan and Jonathan Gilligan, libretto). Emily Siar, Soprano; Noelle Harb, Soprano; Ping Fu, Soprano; Tim Hambourger, Piano.
- 2010-2011 *The Scarlet Letter*, by Carol Gilligan and Jonathan Gilligan. The National Players 61st season. 31 performances.
- 2009 "Prima le Parole:" staged reading of work in progress, libretto excerpt from *Pearl*, an opera inspired by Hawthorne's *The Scarlet Letter*, by Carol Gilligan and Jonathan Gilligan. Center for Contemporary Opera and New York Society Library, Nov. 9.
- 2007 *The Scarlet Letter* by Carol Gilligan and Jonathan Gilligan staged reading starring Marisa Tomei, Ron Cephas Jones, Bobby Cannavale, and Marin Ireland, directed by Leigh Silverman. Produced by The Culture Project as part of the "Women Center Stage" festival, New York City July 10-11. 2 performances.
- 2006 *The Scarlet Letter* by Carol Gilligan and Jonathan Gilligan 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 Stage adaptation of *The Scarlet Letter* by Carol Gilligan and Jonathan Gilligan, staged reading starring Marisa Tomei, directed by Weir Harman. Produced by The Culture Project, as part of the "Women Center Stage" festival, New York City Aug. 7-8. 2 performances.

Citation Statistics (Google Scholar as of May. 14, 2015)

Citation count: 2,832 (1,125 since 2010)

h-index: 21 (13 since 2010)

7 papers with more than 100 citations, 4 with more than 300.

Scholarly Publications (not including short abstracts)

1. "Spatiotemporal patterns of agricultural drought in Sri Lanka: 1881–2010," by T. Gunda, G. M. Hornberger, and J. M. Gilligan, *International Journal of Climatology* (in press, 2015).
2. "Water conservation and hydrological transitions in cities in the United States," by G. M. Hornberger, D. J. Hess, and J. M. Gilligan, *Water Resources Research* (in press, 2015).
3. "Beyond gridlock," by M. P. Vandenbergh and J. M. Gilligan, *Columbia Journal of Environmental Law* (in press, 2015).
4. "Environment, political economies, and livelihood change," by B. A. Ackerly, M. Anam, and J. Gilligan, in B. Mallick and B. Etzold, eds., *Environment, Migration and Adaptation: Evidence and Politics of Climate Change in Bangladesh*, pp. 27–39 (Dhaka: AHDPH, 2015).
5. "Flood risk of natural and embanked landscapes on the Ganges-Brahmaputra tidal delta plain," by 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, *Nature Climate Change* **5**, 152–157 (2015).
6. "Accounting for political feasibility in climate instrument choice," by J. M. Gilligan and M. P. Vandenbergh, *Virginia Environmental Law Journal* **32**, 1–26 (2014).
7. "Energy and climate change: A climate prediction market," by M. P. Vandenbergh, K. E. Toner, and J. M. Gilligan, *UCLA Law Review* **61**, 1962–2017 (2014).
8. "Building resilience to environmental stress in coastal Bangladesh: An integrated social, environmental, and engineering perspective," by J. M. Gilligan, B. A. Ackerly, and S. L. Goodbred, in *Bridging the Policy-Action Divide: Challenges and Prospects for Bangladesh* (Berkeley, CA: Bangladesh Development Initiative, 2013).
9. "Farming practices and anthropogenic delta dynamics," by K. G. Rogers, J. P. Syvitski, I. Overeem, S. Higgins, and J. M. Gilligan, in *Deltas: Landforms, Ecosystems and Human Activities*, vol. 358 of *IAHS Publ.*, pp. 133–142 (Gothenburg SE: Int'l. Assoc. Hydrolog. Sci., 2013).
10. "Energy and climate change: Key lessons for implementing the behavioral wedge," by A. R. Carrico, M. P. Vandenbergh, P. C. Stern, G. T. Gardner, T. Dietz, and J. M. Gilligan, *Journal of Energy & Environmental Law* **2**, 61–67 (2011).
11. "Implementing the behavioral wedge," by M. P. Vandenbergh, P. C. Stern, G. T. Gardner, T. Dietz, and J. M. Gilligan, *Environmental Forum* **28**, 54–63 (2011). **NOTE:** *Reprint of Vandenbergh et al., Environ. L. Rep.* **40**, 10 547 (2010) as featured cover story for summer reading issue.
12. "Macro-risks: The challenge for rational risk regulation," by M. P. Vandenbergh and J. M. Gilligan, *Duke Environmental Law and Policy Forum* **21**, 401–431 (2011).
13. "The behavioral wedge: best policies to promote voluntary greenhouse gas reductions by individuals and households," by J. Gilligan, T. Dietz, G. Gardner, P. Stern, and M. Vandenbergh, *Significance* **7**, 17–20 (2010). **NOTE:** *Invited paper, subsequently named one of the best papers of 2009 by Significance.*
14. "Design principles for carbon emissions reduction programs," by P. C. Stern, G. T. Gardner, M. P. Vandenbergh, T. Dietz, and J. M. Gilligan, *Environmental Science & Technology* **44**, 4847–48 (2010).

Scholarly Publications (not including short abstracts) (continued)

15. "Implementing the behavioral wedge: Designing and adopting effective carbon emissions reduction programs," by M. P. Vandenbergh, P. C. Stern, G. T. Gardner, T. Dietz, and J. M. Gilligan, *Environmental Law Reporter* **40**, 547-554 (2010).
16. "Costly myths: an analysis of idling beliefs and behavior in personal motor vehicles," by A. R. Carrico, P. Padgett, M. P. Vandenbergh, J. Gilligan, and K. A. Wallston, *Energy Policy* **37**, 2881-2888 (2009).
17. "Household actions can provide a behavioral wedge to rapidly reduce U.S. carbon emissions," by T. Dietz, G. Gardner, J. Gilligan, P. Stern, and M. Vandenbergh, *PNAS* **106**, 18452-18456 (2009).
18. "The potential of dual camera systems for multimodal imaging of cardiac electrophysiology and metabolism," by M. R. Holcomb, M. C. Woods, I. Uzelac, J. P. Wikswo, J. M. Gilligan, and V. Y. Sidorov, *Experimental Biology and Medicine* **234**, 1355-1372 (2009).
19. "Individual carbon emissions: The low-hanging fruit," by M. P. Vandenbergh, J. Barkenbus, and J. M. Gilligan, *UCLA Law Review* **55**, 1701-1758 (2008).
20. "A high-voltage cardiac stimulator for field shocks of a whole heart in a bath," by D. N. Mashburn, S. Hinkson, M. C. Woods, J. M. Gilligan, M. R. Holcomb, and J. P. Wikswo, *Rev. Sci. Instrum.* **78**, 104302-104309 (2007).
21. "Flexibility, clarity, and legitimacy: Considerations for managing nanotechnology risks," by J. M. Gilligan, *Environmental Law Reporter* **36**, 10924-10930 (2006).
22. "Time-resolved light scattering measurements of cartilage and cornea denaturation due to free-electron laser radiation," by E. Sobol, A. Sviridov, M. Kitai, J. M. Gilligan, G. S. Edwards, and N. H. Tolk, *J. Biomed. Opt.* **8**, 216-222 (2003).
23. "Surface characterisation by near-field microscopy and atomic force microscopy," by A. Cricenti, R. Generosi, M. Luce, P. Perfetti, G. Margaritondo, D. Talley, J. Sanghera, I. Aggarwal, J. Gilligan, and N. Tolk, *Adv. Sci. Technol.* **32**, 183-192 (2002).
24. "Defect transition energies and the density of electronic states in hydrogenated amorphous silicon," by G. Mensing, J. Gilligan, P. Hari, E. Hurt, G. Lüpke, S. Pantelides, N. Tolk, and P. Taylor, *J. Non-Cryst. Solids* **299**, 621-625 (2002).
25. "Spectroscopic scanning near-field optical microscopy with a free electron laser: CH₂ bond imaging in diamond films," by A. Cricenti, R. Generosi, M. Luce, P. Perfetti, G. Margaritondo, D. Talley, J. Sanghera, I. Aggarwal, J. M. Gilligan, and N. H. Tolk, *J. Microsc.* **202**, 446-50 (2001).
26. "Infrared free-electron laser photoablation of diamond films," by J. Sturmann, Z. Marka, M. Albert, R. G. Albridge, J. M. Gilligan, G. Luepke, S. Singh, J. L. Davidson, W. Husinsky, and N. H. Tolk, in *Nonresonant Laser-Matter Interaction (NLMI-10)*, pp. 206-211 (International Society for Optics and Photonics, 2001).
27. "Materials science at the WM Keck free electron laser: Infrared wavelength selective materials modification," by G. Luepke, C. P. Cheney, J. Sturman, J. Keay, J. Gilligan, L. Feldman, and N. Tolk, *Condensed matter theories* **14**, 349-364 (2000).
28. "Alteration of absorption coefficients of tissue water as a result of heating under IR FEL radiation with different wavelengths," by E. Sobol, A. Sviridov, M. Kitai, J. M. Gilligan, and G. S. Edwards, in *International Biomedical Optics Symposium*, vol. 3925, p. 78 (SPIE, 2000).
29. "Scanning near field infrared microscopy using chalcogenide fiber tips," by D. Talley, L. Shaw, J. Sanghera, I. Aggarwal, A. Cricenti, R. Generosi, M. Luce, G. Margaritondo, J. Gilligan, and N. Tolk, *Mater. Lett.* **42**, 339-344 (2000).

Scholarly Publications (not including short abstracts) (continued)

30. "Chemical contrast observed at a III-V heterostructure by scanning near-field optical microscopy," by A. Cricienti, R. Generosi, G. Herold, P. Chiaradia, P. Perfetti, G. Margaritondo, J. M. Gilligan, and N. H. Tolk, *Phys. Stat. Solidi a-Appl. Res.* **175**, 345-9 (1999).
31. "Interface applications of scanning near-field optical microscopy with a free electron laser," by A. Cricienti, R. Generosi, P. Perfetti, G. Margaritondo, J. Almeida, J. M. Gilligan, N. H. Tolk, C. Coluzza, M. Spajer, D. Courjon, and I. D. Aggarwal, *Phys. Stat. Solidi a-Appl. Res.* **175**, 317-29 (1999).
32. "Nonlinear energy-selective nanoscale modifications of materials and dynamics in metals and semiconductors," by S. Marka, C. P. Cheney, W. Wang, G. Lupke, J. Gilligan, Y. Yao, and N. H. Tolk, *Sov. Phys. Tech. Phys.* **44**, 1069-72 (1999).
33. "Fabrication of single-mode chalcogenide fiber probes for scanning near-field infrared optical microscopy," by D. T. Schaafsma, R. Mossadegh, J. S. Sanghera, I. D. Aggarwal, M. Luce, R. Generosi, P. Perfetti, A. Cricienti, J. M. Gilligan, and N. H. Tolk, *Opt. Eng.* **38**, 1381-5 (1999).
34. "Singlemode chalcogenide fiber infrared SNOM probes," by D. T. Schaafsma, R. Mossadegh, J. S. Sanghera, I. D. Aggarwal, J. M. Gilligan, N. H. Tolk, M. Luce, R. Generosi, P. Perfetti, A. Cricienti, and G. Margaritondo, *Ultramicroscopy* **77**, 77-81 (1999).
35. "Effect of wavelength on threshold and kinetics of tissue denaturation under laser radiation," by E. Sobol, A. Sviridov, M. Kitai, , G. S. Edwards, J. M. Gilligan, and N. H. Tolk, in *International Biomedical Optics Symposium*, vol. 3601, pp. 122-9 (SPIE, 1999).
36. "First experimental results with the free electron laser coupled to a scanning near-field optical microscope," by A. Cricienti, 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, *Phys. Stat. Solidi a-Appl. Res.* **170**, 241-7 (1998).
37. "Free-electron-laser near-field nanospectroscopy," by A. Cricienti, R. Generosi, P. Perfetti, J. M. Gilligan, N. H. Tolk, C. Coluzza, and G. Margaritondo, *Appl. Phys. Lett.* **73**, 151-3 (1998).
38. "Infrared wavelength-selective photodesorption on diamond surfaces," by J. Sturmann, R. G. Albridge, A. V. Barnes, J. L. Davidson, J. M. Gilligan, G. Lupke, A. Ueda, and N. H. Tolk, *Appl. Surf. Sci.* **129**, 59-63 (1998).
39. "Molecular effects in measured sputtering yields on gold at near threshold energies," by 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, *Izv. Akad. Nauk. Ser. Fiz.* **62**, 676-9 (1998).
40. "Coupled electron-hole dynamics at the Si/SiO₂ interface," by 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, *Phys. Rev. Lett.* **81**, 4224-7 (1998).
41. "New molecular collisional interaction effect in low-energy sputtering," by 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, *Phys. Rev. Lett.* **81**, 550-3 (1998).
42. "Photoexcitation spectroscopy and material alteration with free-electron laser," by 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, *Act. Phys. Polon. A* **91**, 689-96 (1997).
43. "Evaluation of source gas lifetimes from stratospheric observations," by 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, *J. Geophys. Res. Atmos.* **102**, 25 543-64 (1997).

Scholarly Publications (not including short abstracts) (continued)

44. "Airborne gas chromatograph for *in situ* measurements of long-lived species in the upper troposphere and lower stratosphere," by 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, *Geophys. Res. Lett.* **23**, 347-50 (1996).
45. "Quantifying transport between the tropical and mid-latitude lower stratosphere," by 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, *Science* **272**, 1763-8 (1996).
46. "Estimates of total organic and inorganic chlorine in the lower stratosphere from *in situ* measurements during AASE II," by 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. Loewenstein, J. R. Podolske, C. R. Webster, R. D. May, J. M. Gilligan, S. A. Montzka, K. A. Boering, and R. J. Salawitch, *J. Geophys. Res.* **100**, 3057-64 (1995).
47. "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)," by 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, in *Atmospheric Effects of Aviation Project Workshop* (1994).
48. "Interference in the resonance fluorescence of two trapped atoms," by U. Eichmann, J. C. Bergquist, J. J. Bollinger, J. M. Gilligan, W. M. Itano, J. G. Raizen, and D. J. Wineland, in *Proc. 11th Int'l. Conf. Laser Science*, pp. 43-8 (1993).
49. "Young's interference experiment with light scattered from two atoms," by U. Eichmann, J. C. Bergquist, J. J. Bollinger, J. M. Gilligan, W. M. Itano, D. J. Wineland, and M. G. Raizen, *Phys. Rev. Lett.* **70**, 2359-62 (1993).
50. "Ultra-high precision spectroscopy for fundamental physics," by 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, *Hyperfine Interactions* **78**, 211-20 (1993).
51. "Quantum projection noise: Population fluctuations in two-level systems," by W. M. Itano, J. C. Bergquist, J. J. Bollinger, J. M. Gilligan, F. L. Moore, and M. G. Raizen, *Phys. Rev. A* **47**, 3554-70 (1993).
52. "Quantum measurements of trapped ions," by 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, *Vistas in Astronomy* pp. 169-83 (1993).
53. "Light scattered from two atoms," by W. M. Itano, U. Eichmann, J. C. Bergquist, J. J. Bollinger, J. M. Gilligan, M. G. Raizen, and D. J. Wineland, in *Proc. 11th Int'l. Conf. Laser Science*, pp. 410-9 (1993).
54. " H_2 , D_2 , and HD ionization potentials by accurate calibration of several iodine lines," by D. Shiner, J. M. Gilligan, B. M. Cook, and W. Lichten, *Phys. Rev. A* **47**, 4042-5 (1993).
55. "Precise determinations of ionization potentials and *EF* state energy levels of H_2 , HD, and D_2 ," by J. M. Gilligan and E. E. Eyler, *Phys. Rev. A* **46**, 3676-90 (1992).
56. "Ionic crystals in a linear Paul trap," by M. G. Raizen, J. M. Gilligan, J. C. Bergquist, W. M. Itano, and D. J. Wineland, *Phys. Rev. A* **45**, 6493-501 (1992).
57. "Linear trap for high-accuracy spectroscopy of stored ions," by M. G. Raizen, J. M. Gilligan, J. C. Bergquist, W. M. Itano, and D. J. Wineland, *J. Modern. Opt.* **39**, 233-42 (1992).

Scholarly Publications (not including short abstracts) (continued)

58. *Precise Multiphoton Spectroscopy of the H₂, HD, and D₂ Molecules and a New Determination of the Ionization Potential of HD* by J. M. Gilligan, Ph.D. thesis, Yale University (1991).
59. "High-resolution three-photon spectroscopy and multiphoton interference in molecular hydrogen," by J. M. Gilligan and E. E. Eyler, *Phys. Rev. A* **43**, 6406-9 (1991).
60. "Recent experiments on trapped ions at the National Institute of Standards and Technology," by 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, in *Proc. Enrico Fermi Summer School on Laser Manipulation of Atoms and Ions, July 1991, Varenna, Italy*, pp. 553-67 (1991).
61. "High-resolution spectroscopy of laser-cooled ions," by 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, in *Proc. Enrico Fermi Summer School on Laser Manipulation of Atoms and Ions, July 1991, Varenna, Italy*, pp. 539-51 (1991).
62. "Measurement of high Rydberg states and the ionization potential of H₂," by E. McCormack, J. M. Gilligan, C. Cornaggia, and E. E. Eyler, *Phys. Rev. A* **39**, 2260-3 (1989).
63. "Precise multiphoton spectroscopy of H₂," by E. E. Eyler, J. M. Gilligan, and E. McCormack, in *Advances in Laser Spectroscopy III*, vol. 172 of *AIP Conference Proceedings*, pp. 331-3 (1988).
64. "Precise two-photon spectroscopy of $E \leftarrow X^*$ intervals in H₂," by E. E. Eyler, J. M. Gilligan, E. McCormack, A. Nussenzweig, and E. Pollack, *Phys. Rev. A* **36**, 3486-89 (1987).
65. "Precise multiphoton spectroscopy of excited states of H₂," by E. E. Eyler and J. M. a. Gilligan, in *Advances in Laser Spectroscopy II*, vol. 160 of *AIP Conference Proceedings*, pp. 388-90 (1987).
66. "Precise photodissociation and multiphoton spectroscopy of H₂," by E. McCormack, E. E. Eyler, and J. M. Gilligan, in *XV Int'l Conf. Quantum Electronics*, vol. 21 of *Technical Digest Series*, pp. 58-60 (Optical Society of America, 1987).