

David Popp**Caroline Rapping Faculty Scholar in Public Administration and Policy**

Center for Policy Research

Syracuse University

The Maxwell School

426 Eggers Hall

Syracuse, NY 13244-1020

Ph: 315-443-2482

Fax: 315-443-1081

E-mail: dcpopp@syr.eduHome page: <https://dcpopp.expressions.syr.edu/>**Date of Birth:** October 30, 1970**Citizenship:** U.S.A.**Education:** Ph.D.–Yale University, Department of Economics, 1997*Fields of Concentration:* Economics of Natural Resources and the Environment,
Public Finance*Dissertation Title:* *Induced Innovation, Energy Prices, and the Environment**Dissertation Committee:* William Nordhaus, Robert Evenson, Joel Waldfogel

BA–Williams College, 1992 Major: Political Economy

Professional Experience:Professor of Public Administration and International Affairs, Syracuse University, May 2014-present
(Associate Professor May 2006-May 2014; Assistant Professor August 2000-May 2006)Research Associate, National Bureau of Economic Research (NBER) Environmental and Energy
Economics Program, May 2007-present

Research Associate, NBER Productivity Program, September 2006–present

Research Network Member, Energy & Climate Economics Research Group, CESifo, Feb. 2009-present

Senior Research Associate, Center for Policy Research, Syracuse University, January 2006-present

Senior Research Associate, Center for Environmental Policy Administration, SU, August 2000-present

Senior Research Associate, Center for Technology and Information Policy, SU, August 2000-2015

Consultant, World Bank, 2011-2012

Consultant, Organisation for Economic Co-operation & Development, Environment Directorate, 2005-11

Faculty Research Fellow, NBER Productivity Program, March 2001–Aug. 2006

Assistant Professor of Economics, The University of Kansas, August 1997–August 2000

Research Assistant for William Nordhaus, Yale University, summer 1994–summer 1996

Research Interests: Technological Change & Environmental Policy, Economics of Climate Change,
Economics of Technological Change**Teaching Experience & Awards (most recent student evaluations in parenthesis):**

2022 Executive MPA@Syracuse Excellence in Teaching Award

Named Best Professor of the 2020 Defense Comptrollership program

2018 William Wasserstrom Price for Graduate Teaching (Syracuse University)

2005 Syracuse University Meredith Professors Teaching Recognition Award

Fundamentals of Policy Analysis (Syracuse University) (3.87/4)

Economics for Public Decisions (Syracuse University) (3.86/4)

Quantitative Methods II (Syracuse University) (3.60/4)

Economics of Environmental Policy (Syracuse University) (3.91/4)

Economics of Science and Technology (Syracuse University) (4.0/4)

Undergraduate Resource Economics and Environmental Policy (University of Kansas) (4.72/5)

Undergraduate Public Finance (University of Kansas) (4.67/5)

Graduate Public Finance (University of Kansas) (4.63/5)

Intermediate Microeconomics (University of Kansas) (4.35/5)

Instructor Introductory Microeconomics (Yale University), Fall 1995

Teaching Assistant for Introductory Microeconomics (Yale University), Spring 1995

Teaching Assistant for Intermediate Microeconomics (Yale University), Fall 1994

Participant in ASTUTE Workshop on Technology & Teaching (University of Kansas, May 1998)

Published Papers:

Popp, David, Francesco Vona, Myriam Gregoire-Zawilski, and Giovanni Marin, “The Next Wave of Energy Innovation: Which Technologies? Which Skills?,” forthcoming in *Review of Environmental Economics and Policy*. (also available as *NBER Working Paper #30343*).

Grégoire -Zawilski, Myriam and **David Popp**. “Do technology standards induce innovation in environmental technologies when coordination is important?” *Research Policy*, January 2024, 53(1), 104888.

van den Heuvel, Matthias and **David Popp**, “The Role of Venture Capital and Governments in Clean Energy: Lessons from the First Cleantech Bubble,” *Energy Economics*, August 2023, 124, 106877.

Popp, David and Myriam Grégoire-Zawilski. “Powering the next wave of green energy innovation,” *PLOS Climate* 2(1): e0000119, January 2023. <https://doi.org/10.1371/journal.pclm.0000119>.

Popp, David, Francesco Vona, Giovanni Marin, and Ziqiao Chen. “The Employment Impact of Green Fiscal Push: Evidence from the American Recovery Act”, *Brookings Papers on Economic Activity*, Fall 2021, 1-49.

Grubb, Michael; Paul Drummond, Alexandra Poncia, Will McDowall, **David Popp**, Sascha Samadi, Cristina Peñasco, Kenneth Gillingham, Sjak Smulders, Matthieu Glachant, Gavin Hassall, Emi Mizuno, Edward Rubin, Antoine Dechezleprêtre, Giulia Pavan, “Induced innovation in energy technologies and systems: a review of evidence and potential implications for CO2 mitigation” *Environmental Research Letters* 16(4), 043007. <https://iopscience.iop.org/article/10.1088/1748-9326/abde07/meta>.

Popp, David, “Promoting Clean Energy Innovation at the State and Local Level,” *Agricultural and Resource Economics Review*, August 2020, 49(2), 360-373.

Chen, Ziqiao, Giovanni Marin, **David Popp**, and Francesco Vona, “Green Stimulus in a Post-pandemic Recovery: the Role of Skills for a Resilient Recovery,” *Environmental and Resource Economics*, August 2020, 76(4), 901-911.

Popp, David, "Environmental Policy and Innovation: A Decade of Research", *International Review of Environmental and Resource Economics*, 2019, 13(3-4), 265-337.
<http://dx.doi.org/10.1561/101.00000111>

Vona, Francesco, Giovanni Marin, Davide Consoli, and **David Popp**, “Environmental Regulation and Green Skills: an empirical exploration,” *Journal of the Association of Environmental and Resource Economists*, October 2018, 5(4), 713-753.

Verdolini, Elena, Francesco Vona, and **David Popp**, “Bridging the Gap: Do Fast Reacting Fossil Fuel Technologies Facilitate Renewable Energy Diffusion?” *Energy Policy*, May 2018, 116, 242-256.

Hepburn, Cameron, Jacquelyn Pless, and **David Popp**, “Encouraging Innovation that Protects Environmental Systems: Five Policy Proposals,” *Review of Environmental Economics and Policy*, Winter 2018, 12(1), 154-169.

Johnstone, Nick, Ivan Hascic and **David Popp**, “Erratum To: Renewable Energy Policies and Technological Innovation: Evidence Based on Patent Counts,” *Environmental and Resource Economics*, October 2017, 68(2), 441-444.

- Santen, Nidhi R., Mort D. Webster, **David Popp**, and Ignacio Pérez-Arriaga “Inter-temporal R&D and Capital Investment Portfolios for the Electricity Industry’s Low Carbon Future,” *Energy Journal*, 2017, 38(6), 1-24.
- Luo, Siping, Mary E. Lovely, and **David Popp**, “Intellectual Returnees as Drivers of Indigenous Innovation: Evidence from the Chinese Photovoltaic Industry” *World Economy*, November 2017, 40(11), 2424-2454.
- Popp, David**, “From Science to Technology: The Value of Knowledge From Different Energy Research Institutions,” *Research Policy*, November 2017, 46(9), 1580-1594.
- Webster, Mort D., Karen Fisher-Vanden, **David Popp**, and Nidhi R. Santen, “Should We Give Up After Solyndra? Optimal Technology R&D Portfolios under Uncertainty,” *Journal of the Association of Environmental and Resource Economists*, September 2017, 4(S1), S123-S151.
- Popp, David**, “Economic Analysis of Scientific Publications and Implications for Energy Research and Development,” *Nature Energy*, April 2016, 1(4), 1-8, DOI: 10.1038/nenergy.2016.20.
- Tang, Tian and **David Popp**, “The Learning Process and Technological Change in Wind Power: Evidence from China’s CDM Wind Projects,” *Journal of Policy Analysis and Management*, Winter 2016, 35(1), 195-222.
- Fisher-Vanden, Karen, **David Popp**, and Ian Sue Wing, “Introduction to the Special Issue on Climate Adaptation: Improving the connection between empirical research and integrated assessment models,” *Energy Economics*, November 2014, 46, 495-499.
- Miao, Qing and **David Popp**, “Necessity as the Mother of Invention: Innovative Responses to Natural Disasters,” *Journal of Environmental Economics and Management*, September 2014, 68(2), 280-295.
- Popp, David**, Nidhi Santen, Karen Fisher-Vanden and Mort Webster, “Technology Variation vs. R&D Uncertainty: What Matters Most for Energy Patent Success?” *Resources and Energy Economics*, November 2013, 35(4), 505-533.
- Kim, Jung Eun, **David Popp**, and Andrew Prag, “The Clean Development Mechanism and Neglected Environmental Technologies,” *Energy Policy*, April 2013, 55, 165-179.
- Fisher-Vanden, Karen, Ian Sue Wing, Elisa Lanzi, and **David Popp**, “Modeling climate change feedbacks and adaptation responses: recent approaches and shortcomings,” *Climatic Change*, April 2013, 117(3), 481-495.
- Popp, David** and Richard Newell, “Where Does Energy R&D Come From? Examining Crowding out from energy R&D,” *Energy Economics*, July 2012, 34(4), 980-991.
- Popp, David**, Tamara Hafner, and Nick Johnstone, “Environmental Policy vs. Public Pressure: Innovation and Diffusion of Alternative Bleaching Technologies in the Pulp Industry,” *Research Policy*, November 2011, 40(9), 1253-1268.
- Popp, David**, Ivan Hascic and Neelakshi Medhi, “Technology and the Diffusion of Renewable Energy,” *Energy Economics*, July 2011, 33(4), 648-662.
- Popp, David**, “International Technology Transfer, Climate Change, and the Clean Development Mechanism,” *Review of Environmental Economics and Policy*, Winter 2011, 5(1), 131-152.

Lovely, Mary and **David Popp**, “Trade, Technology, and the Environment: Does Access to Technology Promote Environmental Regulation,” *Journal of Environmental Economics and Management*, January 2011, 61(1), 16-35.

- Reprinted in *Recent Developments in Trade and the Environment*, Brian R. Copeland, ed., Edward Elgar Publishing, 2014.

Driesen, David M. and **David Popp**, “Meaningful Technology Transfer for Climate Disruption,” *Journal of International Affairs*, 64(1), Fall/Winter 2010, 1-15.

Popp, David, “Exploring the Links Between Innovation and Diffusion: Adoption of NOX Control Technologies at U.S. Coal-fired Power Plants,” *Environmental and Resource Economics*, March 2010, 45(3), 319-352.

Johnstone, Nick, Ivan Hascic and **David Popp**, “Renewable Energy Policies and Technological Innovation: Evidence Based on Patent Counts,” *Environmental and Resource Economics*, January 2010, 45(1), 133-155.

Bae, Hyunhoe, Peter Wilcoxon, and **David Popp**, “Information Disclosure Policy: Does States’ Data Processing Efforts Help More than the Information Disclosure Itself?” *Journal of Policy Analysis and Management*, Winter 2010, 29(1), 163-182.

Fleishman, Rachel, Rob Alexander, Stuart Bretschneider, and **David Popp**, “Does Regulation Stimulate Technical Productive Efficiency? The Effect of Air Quality Policies on the Efficiency of U.S. Power Plants,” *Energy Policy*, November 2009, 37(11), 4575-4582.

Pizer, William A. and **David Popp**, “Endogenizing Technological Change: Matching Empirical Evidence to Modeling Needs,” *Energy Economics*, November 2008, 30(6), 2754-2770.

Wu, Yonghong, **David Popp**, and Stuart Bretschneider, “The Effects of Innovation Policies on Private R&D Investment: A Cross-national Empirical Study,” *Economics of Innovation and New Technology*, June 2007, 16(4), 237–253.

Popp, David, “They Don’t Invent Them Like They Used To: An Examination of Energy Patent Citations Over Time,” *Economics of Innovation and New Technology*, 15(8), November 2006, 753-776.

Popp, David, “Innovation in Climate Policy Models: Implementing Lessons from the Economics of R&D,” *Energy Economics*, 28(5-6), November 2006, 596-609.

Popp, David, “R&D Subsidies and Climate Policy: Is there a ‘Free Lunch’?” *Climatic Change*, 77(3-4), August 2006, 311-341.

Popp, David, “Comparison of Climate Policies in the ENTICE-BR Model”, *Energy Journal*, Special Issue: Endogenous Technological Change and the Economics of Atmospheric Stabilisation, 2006, 163-174.

Köhler, Jonathan, Michael Grubb, **David Popp**, and Ottmar Edenhofer, “The Transition to Endogenous Technical Change in Climate-Economy Models: A Technical Overview to the Innovation Modeling Comparison Project,” *Energy Journal*, Special Issue: Endogenous Technological Change and the Economics of Atmospheric Stabilisation, 2006, 17-55.

Popp, David, “ENTICE-BR: Backstop Technology in the ENTICE Model of Climate Change,” *Energy Economics*, 28(2), March 2006, 188-222.

Popp, David, “International Innovation and Diffusion of Air Pollution Control Technologies: The Effects of NO_x and SO₂ Regulation in the U.S., Japan, and Germany,” *Journal of Environmental Economics and Management*, 51(1), January 2006, 46-71.

Popp, David, Lessons From Patents: Using Patents To Measure Technological Change in Environmental Models,” *Ecological Economics*, 54(2-3), August 2005, 209-226.

Popp, David, “Uncertain R&D and the Porter Hypothesis,” *Contributions to Economic Analysis & Policy* Vol. 4: No. 1, Article 6 <http://www.bepress.com/bejeap/contributions/vol4/iss1/art6/>.

Dai, Yixin, **David Popp**, and Stuart Bretschneider, “Institutions and Intellectual Property: The Influence of Institutional Forces on University Patenting,” Summer 2005, *Journal of Policy Analysis and Management*, 24(3), 579-598.

Popp, David, Ted Juhl and Daniel K.N. Johnson, “Time In Purgatory: Determinants of the Grant Lag for U.S. Patent Applications,” *Topics of Economic Analysis & Policy* Vol. 4: No. 1, Article 29, 2004. <http://www.bepress.com/bejeap/topics/vol4/iss1/art29>.

Popp, David, “ENTICE: Endogenous Technological Change in the DICE Model of Global Warming,” *Journal of Environmental Economics and Management*, 48(1), July 2004, 742-768.

Popp, David, “Pollution Control Innovations and the Clean Air Act of 1990,” *Journal of Policy Analysis and Management*, 22(4), Fall 2003, 641-660.

Johnson, Daniel K.N. and **David Popp**, “Forced Out of the Closet: The Impact of the American Inventors Protection Act on the Timing of Patent Disclosure,” *RAND Journal of Economics*, 34(1), Spring 2003, 96-112.

Popp, David, “Induced Innovation and Energy Prices,” *American Economic Review*, 92(1), March 2002, 160-180.

- 2017 Association of Environmental and Resource Economists Publication of Enduring Quality

Popp, David, “Altruism and the Demand for Environmental Quality,” *Land Economics*, 77(3), August 2001, 339-349.

Popp, David, “The Effect of New Technology on Energy Consumption,” *Resource and Energy Economics*, 23(3), July 2001, 215-239.

Nordhaus, William D. and **David Popp**, “What is the Value of Scientific Knowledge? An Application to Global Warming Using the PRICE Model,” *The Energy Journal*, 18(1), January 1997, 1-45.

Book Chapters:

Greaker, Mads and **David Popp**. 2023. “Environmental Economics, Regulation, and Innovation,” Chapter 8 in *Handbook of Innovation and Regulation*, Pontus Braunerhjelm, Martin Andersson, Knut Blind, and Johan E. Eklund, eds. Edward Elgar Publishing, pp. 141-162 (also available as *NBER Working Paper #30415*).

Popp, David, Jacquelyn Pless, Ivan Hašičič and Nick Johnstone. 2022. “Innovation and Entrepreneurship in the Energy Sector, Chapter 4 in *The Role of Innovation and Entrepreneurship in Economic Growth*, A. Chatterji, J. Lerner, S. Stern, and M.J. Andrews, eds. University of Chicago Press, pp. 175-248.

Dechezleprêtre, Antoine and **David Popp** 2017. “Fiscal and Regulatory Instruments for Clean Technology Development in the European Union,” Chapter 6 in *Energy Tax and Regulatory Policy in Europe: Reform Priorities*, edited by Ian Parry, Karen Pittel, and Herman Vollebergh, MIT Press, pp. 167-213.

Popp, David, “Climate-Friendly Technological Change for Developing Countries,” 2015, in *Oxford Handbook of Macroeconomics of Global Warming*, edited by Lucas Bernard and Willi Semmler, Oxford University Press, pp. 321-348.

Popp, David, “Innovation and Climate Policy,” *Annual Review of Resource Economics*, vol. 2., 2010, Gordon C. Rausser, V. Kerry Smith and David Zilberman eds., Annual Reviews, Palo Alto, CA, 275-298.

Popp, David, “Technology Transfer: Alternative Perspective,” *Smart Solutions to Climate Change*, Bjørn Lomborg ed., Cambridge University Press, 2010, 371-378.

Popp, David, Richard Newell and Adam Jaffe, “Energy, the Environment, and Technological Change,” *Handbook of the Economics of Innovation: vol. 2*, Bronwyn Hall and Nathan Rosenberg, eds., Academic Press/Elsevier, 2010, 873-937.

Popp, David, “Innovation and Energy Prices,” in *Encyclopedia of Energy*, vol 3, Academic Press/Elsevier, 2004, 451-458.

Popp, David and Tamara Hafner, “Policy vs. Consumer Pressure: Innovation and Diffusion of Alternative Bleaching Technologies in the Pulp Industry,” in *Environmental Policy, Technological Innovation, and Patents*, Nick Johnstone and Ivan Hascic eds., OECD, Paris, 107-138, 2008. (also appears as Organisation for Economic Co-operation and Development Environmental Directorate report # ENV/EPOC/WPNEP(2007)3).

Conference Papers:

Popp, David, “Innovation in Climate Policy Models: Implementing Lessons from the Economics of R&D,” prepared for presentation at the 2003 Energy Modeling Forum Workshop on Climate Change Impacts and Integrated Assessment, Snowmass, CO, August 5, 2003.

Popp, David, “Using Patents To Measure Technological Change: Lessons for Climate Policy” prepared for presentation at the Sustainable Technologies for the 21st Century Workshop, Delmenhorst, Germany, December 13, 2002.

General Audience Publications:

Van den Heuvel, Matthias and **David Popp**, “The role of venture capital and governments in clean energy: Lessons from the first cleantech bubble” *VoxEU*, July 30, 2022, <https://voxeu.org/article/role-venture-capital-and-governments-clean-energy>.

Vona, Francesco, **David Popp** and Giovanni Marin “Who’s ready for the green economy? Measuring skills for the low-carbon transition” OECD Forum Network, October 18, 2021, <https://www.oecd-forum.org/posts/who-s-ready-for-the-green-economy-measuring-skills-for-the-low-carbon-transition>

Popp, David, Ziqiao Chen, and Hossein Hosseini, “What role can green investments play in a pandemic-related recovery?” Smart Prosperity Institute Guest Blog, July 20, 2020, <https://institute.smartprosperity.ca/PandemicRelatedRecovery>.

- Popp, David**, Francesco Vona, and Joëlle Noailly, “Green stimulus, jobs and the post-pandemic green recovery” *VoxEU*, July 4, 2020, <https://voxeu.org/article/green-stimulus-jobs-and-post-pandemic-green-recovery>.
- Popp, David**, “Government investments can smooth worker transitions in a green economy, but must be used carefully” Smart Prosperity Institute Guest Blog, June 25, 2020, <https://institute.smartprosperity.ca/WorkerTransitions>.
- Popp, David**, “Promoting Clean Energy Innovation,” *ifoDICE Report*, Winter 2019, 17(4), 30-35.
- Popp, David**, “Promoting Innovation for Low-Carbon Technologies” Policy Proposal 2019-14, The Hamilton Project, Brookings Institution, Washington, DC.
- Popp, David**, “It’s Time to Convince Both Liberals and Conservatives: The Time for a Carbon Tax is Now” *Newsweek*, September 18, 2019, <https://www.newsweek.com/republicans-democrats-carbon-tax-now-1459915>.
- Popp, David**, “Clean Technology Investment Begins with a Price on Greenhouse Gas Emissions” *C.D. Howe Institute Intelligence Brief*, February 20, 2018, <https://cdhowe.org/intelligence-memos/david-popp-clean-technology-investment-begins-price-greenhouse-gas-emissions>
- Popp, David** and Benjamin Dachis, “A Blueprint for Going Green” *Environment & Economy Review*, June 2017, vol. 2, 6-8.
- Popp, David**, “The Future of Clean Energy Innovation in a Changing U.S. Policy Environment” Scholars Strategy Network, January 2017, <http://www.scholarsstrategynetwork.org/brief/future-clean-energy-innovation-changing-us-policy-environment>.
- Popp, David**, “Investing in clean tech not enough, governments need optimal policy” *Toronto Globe and Mail* op-ed, August 2, 2016, <http://www.theglobeandmail.com/report-on-business/rob-commentary/investing-in-clean-tech-not-enough-governments-need-optimal-policy/article31219435/>
- Popp, David**, “A Blueprint for Going Green: The Best Policy Mix for Promoting Low-Emission Technology,” *C.D. Howe Institute E-Brief*, July 19, 2016.
- Popp, David**, “Energy and Environmental Technology,” *NBER Reporter*, 2015 Number 4, 13-16.
Consoli, Davide, Giovanni Marin, **David Popp** and Francesco Vona, “Green Skills” *VoxEU*, May 22, 2015, <https://voxeu.org/article/green-skills>.
- Popp, David**, “How Effective is Government-Funded Energy Research?” *Innovation* magazine, April/May 2012, 10(2), <http://www.innovation-america.org/how-effective-government-funded-energy-research>.
- Popp, David**, “Where does energy R&D come from?” *VoxEU*, November 26, 2009, <https://voxeu.org/article/where-does-energy-rd-come>

Reports:

- Popp, David**, “The Role of Technological Change in Green Growth” report prepared for the World Bank Green Development Knowledge Platform, December 2011. Also available as *NBER Working Paper #18506* and *World Bank Policy Research Paper #6239*. An edited version appears as “Climate-Friendly Technological Change for Developing Countries,” 2015, in *Oxford Handbook*

of Macroeconomics of Global Warming, edited by Lucas Bernard and Willi Semmler, Oxford University Press, pp. 321-348.

Popp, David, Kim, Jung Eun and Andrew Prag, “The Clean Development Mechanism and Neglected Environmental Technologies” report prepared for the Environment Directorate, Organisation for Economic Co-operation and Development, August 2011.

Contributing author, Intergovernmental Panel on Climate Change Special Report on Renewable Energy and Climate Change Mitigation, June 2011.

Popp, David, “Policies for the Development and Transfer of Eco-Innovations: Lessons From the Literature” report prepared for the OECD Global Forum on Environment on Eco-innovation, September 2009.

Contributing author, Intergovernmental Panel on Climate Change Mitigation of Climate Change report, chapter 11, “Mitigation from a cross-sectoral perspective”, May 2007.

Sue Wing, Ian and **David Popp**, “Representing Endogenous Technological Change in Models for Climate Policy Analysis: Theoretical and Empirical Considerations” chapter 7 in *The Berkeley Climate Policy Study: Potential Economic Costs And Benefits Of Climate Change Policy In California* November 2005 (with Ian Sue Wing).

Popp, David, “Using the Triadic Patent Family Database to Study Environmental Innovation,” prepared for the Organisation for Economic Co-operation and Development Environmental Directorate, report # ENV/EPOC/WPNEP/R&D(2005)2.

Working Papers & Other Unpublished Work:

Touboul, Simon, Qing Miao, and **David Popp**. 2023. “Innovation in Climate Adaptation Technologies in Response to Extreme Weather Events: Evidence from Patent Data,” Under review at *Environmental and Resource Economics*.

Fu, Wangcong, Chong Li, Jan Ondrich and **David Popp**, “Technological Spillover Effects of State Renewable Energy Policy: Evidence from Patent Counts” *NBER Working Paper #25390*, December 2018.

Hafner, Tamara and **David Popp**, “China and India as Suppliers of Affordable Medicines to Developing Countries” *NBER Working Paper #17249*, July 2011.

Ahn, Michael, Anna Yi, Cynthia Searcy and **David Popp**, “An Analysis of Scientists and Engineers: Wages, R&D Expenditures, and Patents” November 2005.

Wu, Yonghong, **David Popp**, and Stuart Bretschneider, “Knowledge Spillovers in Interdependent Economies” May 2001.

Popp, David, “Environmental Taxation in a Second-Best Setting” unpublished manuscript, Yale University, May 1995.

Grants, Fellowships, Honors, and Awards:

Sloan Foundation, “Does Government Funding Change What You Do? The Effects of Funding on the Direction and Impact of Academic Energy Research” June 2020-May 2024.

Sloan Foundation, “Economics of Innovation in the Energy Sector” July 2019-September 2022.

Smart Prosperity Institute Research Network, “Can Green Government Spending Facilitate Employment Transitions in a Low Carbon Economy?” April 2019-March 2020.

2017 Association of Environmental and Resource Economists Publication of Enduring Quality Award

US Department of Energy, “Research in Integrated Assessment Inter-Model Development, Testing, and Diagnostics” subcontract with Penn State University, August 2013-July 2016.

National Science Foundation grant # SMA-1064161: “Using Scientific Publications to Evaluate Government R&D Spending: The Case of Energy” June 2011-May 2014.

US Department of Energy, “Integrated Assessment Model Development, Comparison, and Diagnostics Project” subcontract with Penn State University, September 2010-August 2013.

National Science Foundation grant #SES- 0825932: “DRU: An Improved Model of Endogenous Technical Change Considering Uncertain R&D Returns and Uncertain Climate Response” September 2008-August 2011 (with Karen Fisher-Vanden and Henry Jacoby).

Daniel Patrick Moynihan Award for Outstanding Teaching, Research and Service, The Maxwell School, Syracuse University, May 2006.

US Environmental Protection Agency, “Environmental & Resource Economics Workshop: ‘Climate Policy Without Cost? Can Technology Solve the Climate Problem?’” 2005-2006 (with Peter Wilcoxon).

US Department of Energy grant #DE-FG02-04ER63927: “Knowledge Spillovers and the Opportunity Cost of Climate Mitigation R&D” September 2004 - August 2007 (with Richard Newell).

US Department of Energy grant DE-FG02-ER63467: “International Innovation and Diffusion of Environmental Technologies: The Case of NO_x” September 2002-August 2004.

National Science Foundation grant SES-0001679: “Induced Innovation in the DICE model of Global Warming” August 2000-July 2002.

US Department of Energy grant 593A3140217: “Induced Technological Change with Applications to Modeling of Climate-Change Policies” 1995-97 (with William Nordhaus).

Syracuse University, The Maxwell School, Appleby-Mosher Fund: “International Innovation and Diffusion of Environmental Technologies: The Case of NO_x”, 2002-2003.

University of Kansas New Faculty Research Grant: “The Timing of Disclosure and the Size of Innovation,” 1998-99.

University of Kansas IPPBR Grant Fellow, June 1998.

Yale University Tuition Fellowship & Stipend, 1993-1997.

Yale University Economics Department Dissertation Fellowship, 1993-1997.

Williams College Class of 1960 Scholar in Political Economy 1991-1992.

Williams College Sloan Grant in Political Economy 1991.

Graduated from Williams with Highest Honors for Senior Thesis: “Strategies for Reducing Gasoline Consumption in the United States,” May 1992.

Phi Beta Kappa

Public Testimony:

Canadian Parliament Standing Committee on Natural Resources, February 2017

Presentations & Seminars:

Workforce Futures Initiative Session VII, Retraining and Reskilling for Incumbent and Displaced Workers, Workforce Futures Initiative, online (September 2023).

US Environmental Protection Agency Environmental Economics seminar, online (October 2022)

OECD Expert Workshop on Environmental Policies: Social and Economic Outcomes, online (June 2022)

OECD Employment, Labour And Social Affairs Department seminar, online (May 2022)

Cornell University Sustainable Environment, Energy, and Resource Economics seminar, Ithaca, NY (April 2022)

Brookings Papers on Economic Activity Fall 2021 conference online (September 2021)

Danish Conference on Environmental Economics Keynote Address, online (August 2021)

Tracking Clean Energy Innovation Performance through Patent Indicators: Merits, Limitations and Policy Needs panel, organized by Mission Innovation and the European Commission, online (May 2021)

CESifo Energy & Climate Economics workshop, online (March 2021)

CEPR-RIETI joint conference panel on Green Growth, online (March 2021)

Duke Kunshan University Economics seminar, online (November 2020)

London School of Economics Climate Change and Environment Research Seminar Series, online (October 2020)

Harvard University Seminar on Environmental Economics, online (October 2020)

Resources for the Future workshop: Evaluating Climate-oriented Economic Recovery Programs: Buildings / End Use Efficiency, online (September 2020)

Greening Growth Partnership & Economics and Environmental Policy Research Network Annual Symposium, Ottawa, ON (February 2020)

Economics of Environmental Policy and Innovation workshop, Keynote Speaker, Ottawa, ON (July 2019)

Northeast Workshop on Energy Policy and Environmental Economics, Cambridge MA (June 2019)

Northeast Agricultural and Resource Economics workshop, Keynote Speaker, Portsmouth, NH (June '19)

St. Lawrence University Economics Department Seminar, Canton, NY (April 2019)

National Academy of Sciences, Evaluation of SBIR at the Department of Energy (May 2018)

Syracuse University, Technology & Policy Responses to Climate Change Symposium (April 2018)

MIT Center for Energy and Environmental Policy Research (CEEPR) Fall Research Workshop (November 2017)

University of New Hampshire Department of Economics Seminar (October 2017)

Manlius Informed, “The Future of Clean Energy in a Changing Policy Environment” Manlius, NY (June 2017)

Greening USA Green Bag Lunch, “A Blueprint for Going Green: Promoting Clean Energy Innovation in a Changing Policy Environment” Syracuse, NY (January 2017)

Georgia Tech School of Public Policy, Atlanta, GA (November 2016)

Canada-US Climate Policy Forum, Ottawa, Ontario (June 2016).

Triangle Resource and Environmental Economics (TREE) seminar, Research Triangle Institute, Durham, NC (March 2016).

Ontario Ministry of Environment and Climate Change, Toronto, Ontario (November 2015)

Green Economy conference, Toronto, Ontario (November 2015)

Keynote Speaker, “Economics of Innovation, Diffusion, Growth and the Environment” Conference, London, UK (September 2015)

University of Texas Austin Energy Symposium (September 2015)

London School of Economics, Grantham Research Institute on Climate Change and the Environment Research Seminar Series (May 2015)

National Bureau of Economics Environmental and Energy Economics Summer Institute (July 2014).

Workshop on “China, the West, and the Challenge of Alternative Energy Innovation” Peterson Institute, Washington, DC (June 2014).

Resources for the Future Academic Seminar Series, Washington, DC (April 2014).

Syracuse University Center for Policy Research Seminar (October 2013).

International Consortium on Applied Bioeconomy Research Conference, Ravello, Italy, Keynote Speaker (June 2013)

World Bank Workshop on Green Growth, Competitiveness, and Innovation, Washington, DC (May 2013)

Carnegie Mellon Study of Entrepreneurship, Innovation, & Technology Seminar (April 2013)

Oslo Centre for Research on Environmentally friendly Energy Research Workshop, Oslo, Norway (September 2012)

The Green Growth Knowledge Platform (GGKP) inaugural conference: Green Growth: Addressing the Knowledge Gaps, Mexico City, Mexico (January 2012)

Syracuse University Public Finance Seminar (November 2011)

Colorado College Department of Economics (April 2011)

World Bank Development Research Group, Environment & Energy Team, Washington, DC (Nov. 2010)
Association for Public Policy Analysis and Management Fall meeting (November 2010)
Sanford School of Public Policy, Duke University (September 2010)
World Congress of Environmental and Resource Economics, Montreal, Quebec (June 2010)
Binghamton University Department of Economics (April 2010)
Economics of Climate Change Conference, New York, NY (April 2010)
OECD Global Forum on Environment focused on eco-innovation, Paris, France (November 2009)
Copenhagen Consensus on Climate (August 2009)
Economics of Technologies to Combat Global Warming workshop, Snowmass, CO (August 2009)
International Risk Governance Council workshop: Regulation and the enabling and constraint of technological innovation – Two sides of the same coin, Washington DC (June 2009)
Gosnell Lecture, Rochester Institute of Technology (March 2009)
American Economic Association Winter Meetings (January 2009)
EPA National Center for Environmental Economics Climate Change Economics Seminar (June 2008)
Searle Center on Law, Regulation, and Economic Growth, *Research Roundtable on Alternative Energy*, Northwestern University Law School (April 2008)
National Bureau of Economics Productivity Program Meeting (March 2008)
ERB Institute, University of Michigan (January 2008)
Association of Environmental & Resource Economics Winter Meetings, New Orleans, LA (January 2008)
Association for Public Policy Analysis and Management Fall meeting (November 2007)
Energy Modeling Forum, Snowmass, CO (August 2007)
Centre for Economic Performance, London School of Economics (June 2007)
Organized panel for APPAM Fall Research conference: “How Do We Get There From Here? Examining the Links Between Environmental Policy and Clean Technologies,” Madison, WI, (November 2006)
International Monetary Fund, Washington, DC (September 2006)
EPA Workshop: Climate Policy Without Cost? Can Technology Solve the Climate Problem?, Washington, DC (July 2006)
Sustainable Resource Use and Economic Dynamics: SURED 2006, Keynote Speaker, Ascona, Switzerland (June 2006)
Technological Change and the Environment Workshop, Rockefeller Center for Public Policy, Dartmouth College (March 2006)
University of Calgary Department of Economics (March 2006)
University of Maryland Department of Agricultural and Resource Economics (February 2006)
University of California at Berkeley Energy Institute (January 2006)
Association for Public Policy Analysis and Management Fall meeting (November 2005)
University of Ottawa Economics Department Seminar (October 2005)
Organisation for Economic Co-operation and Development Working Party on National Environmental Policy Meeting, Washington, DC (June 2005).
National Bureau of Economics Environmental Economics Working Group meeting (April 2005)
Yale University Environmental Economics Seminar (November 2004)
Association for Public Policy Analysis and Management Fall meeting (November 2004)
Stanford University Environmental Economics Seminar (May 2004)
Georgia Tech School of Public Policy (February 2004)
American Economic Association Winter Meetings (January 2004)
Rensselaer Polytechnic Institute Department of Economics Seminar (November 2003)
The Economic Dynamics of Environmental Law and Static Efficiency Conference, Syracuse NY (October 2003)
Energy Modeling Forum Workshop on Climate Change Impacts and Integrated Assessment, Snowmass, CO (August 2003)
American Economic Association Winter Meetings (January 2003)
Sustainable Technologies for the 21st Century Workshop, Delmenhorst, Germany (December 2002)

Harvard University, John F. Kennedy School of Government Seminar in Environmental Economics and Policy (October 2002)
 American Environmental Economics Association Winter Meetings (January 2002)
 Syracuse University Department of Economics (April 2001)
 American Economic Association Winter Meetings (January 2001)
 National Bureau of Economics Summer Workshop on Public Policy and the Environment (August 2000)
 American Environmental Economics Association Winter Meetings (January 2000)
 Heartland Environmental Workshop, Ames, IA (September 1999)
 Massachusetts Institute of Technology Joint Program on the Science & Policy of Global Change (July 1999)
 National Bureau of Economics Summer Workshop on Patents and Public Policy (July 1999)
 National Bureau of Economics Summer Workshop on Productivity and R&D (July 1998)
 National Bureau of Economics Summer Workshop on Public Policy and the Environment (August 1998)
 University of Missouri at Columbia (October 1998)
 National Bureau of Economics Summer Workshop on Public Policy and the Environment (August 1997)

Doctoral Students Advised:

Syracuse University Public Administration Ph.D. Students (main or co-advisor only):

Yonghong Wu (co-advisor)	Qing Miao
Yixin Dai (co-advisor)	Tian Tang
Tamara Hafner	Brian Ohl (co-advisor)
Hyunhoe Bae (co-advisor)	Ziqiao Chen
Lance Cooper (co-advisor)	Myriam Grégoire-Zawilski
Alejandro Amezcua	Jingni Zhang
Jung Eun Kim	

Syracuse University Social Sciences Ph.D. Students:

Neelakshi Medhi

Professional Service:

Editorial:

Co-Editor, Journal of the Association of Environmental and Resource Economists 2014-2020
 Co-Editor, *Environmental and Resource Economics* 2010-2020
 Co-Editor, *Journal of Environmental Economics and Management* 2011-2013
 Associate Editor, *Energy Economics* 2004-2022
 Editorial Council, *Journal of Environmental Economics and Management*, 2007-2011
 Editorial Board, *Environmental Innovation and Societal Transitions*, 2011
 Co-Editor, *Energy Economics* special issue on Climate Adaptation, 2012-2013

Expert panel/review boards:

Scientific Advisory Board, “Evaluating Policy Instruments for the Transformation to a Low Carbon Economy: Causal Evidence from Administrative Micro Data (TRACE)”, 2019-
 National Science Foundation review panel, 2012
 Porter Hypothesis Meta-analysis Expert Panel, Ottawa, ON, November 2012
 Member, Advisory Committee of the Green Growth Knowledge Platform, 2012-2016
 GAO Expert Panel on Climate Change Economics, 2007
 Member, Environmental Protection Agency’s Advisory Council on Clean Air Compliance Analysis, November 2006-2009

Workshop/session organizer:

Co-organizer, NBER Workshop “Economics of Innovation in the Energy Sector”, Sept.2020, April 2021, March 2022 and September 2022.
 Panel co-organizer for APPAM Fall Research conference: “Energy and Environmental Policy and Governance in China and the U.S.,” Washington, DC, (November 2013)

Workshop co-organizer and *Energy Economics* special issue co-editor, “Climate Adaptation: Improving the connection between empirical research and integrated assessment models,” Cambridge, MA, May 17-18, 2012.

Co-organizer, NBER Energy and Environmental Economics & Productivity Economics joint meeting, March 2010

Organized panel for APPAM Fall Research conference: “How Do We Get There From Here? Examining the Links Between Environmental Policy and Clean Technologies,” Madison, WI, (November 2006)

Discussant/Panel Chair:

APPAM Fall Research Conference Panel Chair, “Preparing Infrastructure for a Clean Energy Future,” November 2022

NBER Summer Institute Environmental and Energy Economics Program, July 2018

2nd Northeast Workshop on Energy Policy and Environmental Economics, Cornell University, April 2013

World Congress of Environmental and Resource Economics, Montreal, Quebec, June 2010

National Bureau of Economic Research (NBER) Agricultural Economics Meeting, March 2010

NBER “Accelerating Innovation in Energy: Lessons from other Sectors?” April 2009

“An Innovation Strategy for Climate Change Mitigation” The Hamilton Project, Brookings Institution, June 2008

American Economic Association Annual Meeting, January 2006, January 2009

National Bureau of Economic Research Productivity Meeting, March 2004

NBER Summer Institute Environmental Economics Program, July 2003

NBER Summer Institute Productivity Program, July 2001, July 2004

Session Chair, Association for Public Policy Analysis and Management Fall meeting, Nov. 2007

Global Economic Symposium session expert, “Energy Crisis versus Climate Change,” 2009

Referee for:

American Economic Journal: Economic Policy, American Economic Review, American Economic Review: Insights, American Journal of Agricultural Economics, Annals of Economics and Statistics, Applied Economics, Australian Journal of Agriculture and Resource Economics, B.E. Journals in Economic Analysis and Policy, CESifo Economic Studies, Climate Change Economics, Climatic Change, Economic Journal, Economic Letters, Economics of Innovation and New Technology, Ecological Economics, Energy Economics, Energy Policy, Environment and Development Economics, Environment and Planning C, Environmental and Resource Economics, Environmental Innovation and Societal Transitions, European Economic Review, GAEL Conference on Environment, Innovation and Performance, International Environmental Agreements: Politics, Law and Economics, IZA World of Labor, Journal of Agricultural and Resource Economics, Journal of Development and Social Transformation, Journal of Economic Dynamics and Control, Journal of Economics and Management Strategy, Journal of Economic Surveys, Journal of Environment and Development, Journal of Environmental Economics and Management, Journal of Industrial Ecology, Journal of Industrial Economics, Journal of Policy Analysis and Management, Journal of Political Economy, Journal of Public Economics, Journal of Technology Transfer, Journal of the Association of Environmental and Resource Economists. Management Science, Marine Resource Economics, MIT Press, National Academies of Science, National Science Foundation, Nature Climate Change, Nature Energy, Oxford University Press, Pew Climate Change, PLOSOne, Proceedings of the National Academies of Science, Quarterly Journal of Economics, RAND Journal of Economics, Research Evaluation, Research Policy, Resource and Energy Economics, Review of Economics and Statistics, Review of Environmental Economics and Policy, Review of International Organizations, Scandinavian Journal of Economics, Science, Science Advances, Sloan Foundation, Social Sciences and Humanities Research Council of Canada, The Energy Journal, UK Economic and Social Research Council, U.S. DOE Office of Science: Office of Biological and Environmental Research (BER), U.S.

Environmental Protection Agency National Center for Environmental Economics, University of California Energy Institute, World Bank Economic Review, World Patent Information

University Service:

Syracuse University:

University Committee on Intellectual Property, 2023-

Public Administration MPA committee, 2022-2023

Policy Process professor search committee, 2022-2023

Panel member, “What’s at Stake for U.S. Climate Goals? Prospects in the Wake of WV v. EPA and the Inflation Reduction Act” (11/1/2022).

Environmental Finance professor search committee, 2020-2021

Autonomous Systems professor search committee, 2019-2021

Public Administration EMPA committee chair, 2017-2020

Maxwell School faculty interviewer for Academic Integrity panels, 2017-

Public Administration PhD director, 2010-2015, 2016-2017

Public Administration Online EMPA committee, 2016-2017

Public Administration Executive Committee, 2010

Public Administration PhD Committee, 2007-2010, 2017-2018, 2021-

Speaker, Maxwell School Earth Day symposium, April 2006

Public Administration committee on Academic Integrity, 2006-2007

Public Administration MPA Faculty Admissions Review Committee, 2006-2007

Ad hoc committee on the direction of the Public Administration program, 2005-2006

Reviewer, ENSPIRE seed grant proposals, 2003

Environmental Economist Search Committee, 2001-2002

Steering committee overseeing The Maxwell School's Environmental Policy Speaker Series, 2001

Moderator for Career Services Network panel on public service jobs in the environmental field (3/23/01)

Outside member for Economics Department Search Committee, 2000-2001

University of Kansas:

Department of Economics Undergraduate Program Committee, 1997–2000

Department of Economics Resources and Information Committee, 1998–2000

Economics Department liaison to School of Business Technology Committee, 1999–2000