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Current Position

2009- **Columbia University, School of International and Public Affairs & Earth Institute.**
Lenfest-Earth Institute Professor of Natural Resource Economics.
Vice Dean, SIPA, 2010-2012, 2018-

Previous Academic Positions

1999-09 **Johns Hopkins University School of Advanced International Studies, Washington, DC.**
Professor of Environmental Economics & International Political Economy
Director, International Policy Program
Director, Global Health & Foreign Policy Initiative, 2006-2009.

1988-99 **London Business School, University of London.**
Associate Professor of Economics, 1993-1999.
Dean, Executive MBA Programme, 1992-1995.
Assistant Professor of Economics, 1988-1993.

1991-95 **Centre for Social and Economic Research on the Global Environment, University College London.**
Research Director, International Environmental Agreements.

Education

1989 **London School of Economics.**
Ph.D., Economics.

1983 **University of British Columbia, Vancouver.**
M.A., Economics.

1979 **University of Massachusetts, Amherst.**
B.S., *summa cum laude*, Resource Economics.

Honors, Awards, and Prizes

- 2019 Fellow, Association of Environmental and Resource Economists (for "outstanding contributions to the advancement of the profession of environmental and resource economics").
- 2016 Doctor of Laws, *honoris causa*, University of Bath.
- 2015 Publication of Enduring Quality Award, Association of Environmental and Resource Economists ("for publications based on their seminal nature and enduring value")
- 2011 Distinguished Teaching Award, School of International and Public Affairs, Columbia University.
- 1996 Erik Kempe Prize ("awarded biannually to the best paper in the field of environmental and resource economics, published in a refereed journal by an author affiliated with a European research institution"), European Association of Environmental and Resource Economists.
- 1990 Resources for the Future Dissertation Prize for "the doctoral dissertation that makes the most significant contribution to the field of environmental and resource economics."
- 1986-88 Overseas Research Student Award, LSE.
- 1985-86 American Friends of the LSE Scholarship.

Visiting Positions

- 2021-24 **London School of Economics.**
Centennial Professor.
- 2022 **Sciences Po, Paris School of International Affairs, Alliance Visiting Professor**
(January-May).
- 2017 **École Polytechnique, Department of Economics, Paris.**
Alliance Visiting Professor, Department of Economics (May-June).
- 2016 **Institute for Advanced Study, Berlin (Wissenschaftskolleg zu Berlin)**
Fellow (September-December).
- 2015 **Université de Paris 1 Panthéon-Sorbonne.**
Visiting Professor, Department of Economics (June-July).
- 2012-13 **Princeton University Institute for International and Regional Studies.**
Visiting Research Scholar.
- 2007 **Harvard University Center for the Environment**
Visiting Scholar (May).
- 2006 **Yale University Center for the Study of Globalization**

Distinguished Visiting Fellow (January-May).

2006 **Centre for Advanced Study, Norwegian Academy of Science and Letters**
Visiting Scholar (January).

Other Research Affiliations

2009- CESifo Research Network Fellow (Munich).

2007- Beijer Fellow, Beijer International Institute of Ecological Economics (Stockholm).

2001- International Research Fellow, Kiel Institute of World Economics.

Current External Activities

2018- Member, Expert Group, High Level Panel for a Sustainable Ocean Economy

2018- Member, Rockefeller Foundation Economic Council on Planetary Health

2015- Member, Expert Advisory Board, Mercator Research Institute on Global Commons and Climate Change, Berlin.

2010- Member, Conseil Scientifique, Institut du Developpement Durable et des Relations Internationales, Paris.

Current Editorial Positions

2010- Editorial Board, *Climate Change Economics*.

2009- Editorial Board, *Strategic Behavior and the Environment*.

2008- Scientific Advisory Board, *Environmental and Resource Economics*.

2007- Editorial Board, *International Review of Environmental and Resource Economics*.

2006- Associate Editor, *economics*.

2006- Editorial Board, *Review of Environmental Economics and Policy*.

2000- Scientific Advisory Board, *International Environmental Agreements: Politics, Law, and Economics*.

Some Past Professional Activities

2018-20 Member, Strategic Advisory Group on Malaria Eradication, World Health Organization

2019 Member, External Review Committee, Harvard University Center for the Environment.

2016-19 Member, International Jury, BBVA Foundation Frontiers of Knowledge Award (Climate Change), Madrid.

- 2014-18 Associate Editor, *Science Advances*.
- 2009-14 Editorial Board, *World Bank Economic Review*.
- 2014 Member, Harvard Visiting Committee on International and Area Studies.
- 2011-14 Chairman of the Advisory Board, Beijer International Institute of Ecological Economics, Royal Swedish Academy of Sciences, Stockholm.
- 2006-12 Member, Global Science Advisory Council, EarthSky.
- 2004-12 Member, National Academy of Sciences National Committee for the International Institute for Applied Systems Analysis (IIASA).
- 2005-11 US Representative, European Association of Environmental and Resource Economists.
- 2002-11 Member, Advisory Board, Beijer Institute of Ecological Economics, Royal Swedish Academy of Sciences, Stockholm.
- 2010 Lecturer, European Summer School in Resource and Environmental Economics, Venice.
- 2010 Lecturer, Game Theory and the Environment, Beijer Institute, World Congress of Environmental and Resource Economics, Montreal.
- 2004-08 Member, Board of Directors, Climate Policy Center, Washington, DC.
- 2004-08 Member, Advisory Board, Donald Bren School of Environmental Science and Management, University of California, Santa Barbara.
- 1995-07 Editorial Board, *International Yearbook of Environmental and Resource Economics*.
- 2001-07 Member, Policy Board, *Environment and Development Economics*.
- 2005-07 Member, Publication of Enduring Quality Committee, Association of Environmental and Resource Economists; Chair, 2007.
- 2004-06 Advisor, Earth & Sky radio series.
- 2005 Member, "Super Panel," Woodrow Wilson International Center for Scholars.
- 2004 Member, External Review Committee, Donald Bren School of Environmental Science and Management, University of California, Santa Barbara.
- 2004 Lecturer, American Meteorological Society Summer Colloquium, Washington, DC.
- 2004 Lecturer, Centre for European Economic Research (ZEW), University of Mannheim.
- 2003-04 Member, What Works Working Group on Global Health, Center for Global Development.

- 2003-04 Advisor, Climate Policy Center, Washington, DC.
- 2000-02 Member, Scientific Steering Committee, Core Project, Institutional Dimensions of Global Environmental Change.
- 1999-01 Council member (elected), Board of the European Association of Environmental & Resource Economists.
- 1995-01 Associate Editor, *Environment and Development Economics*.
- 1991-00 Scientific Advisory Board, "Economy & Environment" series, Kluwer Academic Publishers.
- 1992-00 Lecturer, Beijer Institute Workshops in Environmental Economics.
- 1992-99 Member, Academic Panel of Environmental Economists, UK Department of the Environment.
- 1992-99 Lecturer, Foreign and Commonwealth Office, Westminster.
- 1999 Lecturer, Advanced Studies Program in International Economic Policy Research, Kiel Institute of World Economics.
- 1998- Member, Programme Committee, World Congress of Environmental and Resource Economists.
- 1995-97 Council member (elected), Board of the European Association of Environmental & Resource Economists.
- 1995 Lecturer, Royal Economic Society Easter School, University of Birmingham.
- 1993-95 Lead Author, Second Assessment Report, Working Group III, Intergovernmental Panel on Climate Change; contributing author, Third Assessment Report, 2000.
- 1993-95 Member, Scientific Committee, Regulation/Innovation/Competition (ERIC) Project, Commission of the European Communities.
- 1990-95 Member, Task Force on International Environmental Problems, European Science Foundation, Program on Environment and Society.
- 1994- Member, Programme Committee, European Association of Environmental and Resource Economists Annual Conferences.
- 1988-94 Associate Fellow, London Environmental Economics Centre.
- 1990-91 Member, Scientific Committee, Autumn Workshops on Environmental Economics, Istituto Veneto di Scienze Lettere ed Arti, Fondazione ENI Enrico Mattei, Venice; Lecturer, 1991.
- 1989 Member, United Nations Environment Programme Ad Hoc Senior Advisory Panel of Experts on Biological Diversity.

Outside Professional Activities

- 2017-18 **World Health Organization**, Geneva.
- 2018 **Asian Development Bank**, Manila, Philippines.
- 2015-16 **Fondation pour les Études et Recherches sur le Développement International**, Clermont-Ferrand, France.
- 2010- **International Sustainable Seafood Foundation**, Washington, DC.
- 2010 **Inter-American Tropical Tuna Commission**, La Jolla, CA.
- 2009-12 **Bertlesmann Foundation**, Washington, DC.
- 2003-06 **International Task Force on Global Public Goods**, Stockholm.
- 2002 **Climate Policy Center**, Washington, DC.
- 1998-06 **United Nations Development Programme (UNDP)**, New York.
Office of Development Studies
- 1997 **Independent World Commission on the Oceans**, Geneva.
- 1997 **IUCN Commission on Environmental Law**, Bonn.
- 1997-99 **HM Treasury**, London.
- 1993-97 **Intergovernmental Panel on Climate Change**, with funding from the UK Department of Trade and Industry.
- 1991-96 **United Nations Conference on Trade and Development**, Geneva.
- 1996-99 **Global Environment and Trade Study**, Yale University (with funding from the MacArthur Foundation).
- 1990-98 **Organisation for Economic Co-operation and Development (OECD)**, Paris.
Environment Directorate
Development Centre.
- 1995 **Overseas Development Administration**, London.
Environment Policy Department.
- 1992- **World Bank**, Washington, DC.
Country Economics Department
Global Environment Facility
Environment Department
Office of the Vice President, Development Economics & Chief Economist
World Development Report 2000 and 2002
World Bank Institute

Independent Evaluation Group 2008.
Office of the Chief Economist 2012, 2019.

1992-95 **United Nations Food & Agriculture Organisation**, Rome.

1991-94 **United Nations Environment Programme**, Nairobi.
Information Unit on Climate Change, Geneva.

1991 **Commission of the European Communities**, Brussels.
Directorate-General for Economic and Financial Affairs.

1989-90 **BP International**, London.

1987-89 **World Conservation Union (IUCN)**, Gland, Switzerland.

1987-88 **African Development Bank**, Abidjan, Ivory Coast.

1985-89 **National Economic Research Associates**, London.

Current Research

“Property Rights on the (Linear) Ocean Commons,” in preparation.

“The Malaria Eradication Game,” in preparation

with Astrid Dannenberg, “The Decision to Link Trade Agreements to the Supply of Global Public Goods,” resubmitted.

with Danny Bressler, “The Multilateral Nuclear Non-Proliferation Game,” in preparation.

“Rethinking Ocean Fisheries Governance,” in preparation

Publications

Books

Why Cooperate? The Incentive to Supply Global Public Goods, Oxford: Oxford University Press, 2007.
(Paperback edition with new afterword published in 2010.)

Environment & Statecraft: The Strategy of Environmental Treaty-Making, Oxford: Oxford University Press, 2003. (Paperback edition with new afterword published in 2005.)

Edited books

with Carlo Carraro and Jaime de Melo, *Towards a Workable and Effective Climate Regime*, VoxEU.org eBook, CEPR and FERDI, 2016.

with Karl-Göran Mäler and Eric S. Maskin, *Environment and Development Economics: Essays in Honor of Sir Partha Dasgupta*, Oxford: Oxford University Press, April 2014.

Monographs

Economic Development and Environmental Policy, FAO Economic and Social Development Paper No. 138, Rome: Food & Agriculture Organization of the United Nations, 1996.

The Economics of International Environmental Agreements for the Protection of Environmental and Agricultural Resources, FAO Economic and Social Development Paper 132, Rome: Food & Agriculture Organization of the United Nations, 1995.

The Strategy of 'Joint Implementation' in the Framework Convention on Climate Change, New York and Geneva: United Nations (UNCTAD/GID/10), 1995.

Convention on Climate Change: Economic Aspects of Negotiations, Paris: OECD, 1992.

Edited Journal Special Issues

with I. Bateman and E. Barbier, Special Issue in Honour of David W. Pearce, *Environmental and Resource Economics*, May 2007.

Special Issue on Trade and Environment, *Environment and Development Economics*, October 2000.

Articles & Chapters by Topic

Climate Change

"Dikes versus Windmills: Climate Treaties and Adaptation," *Climate Change Economics*, 11(4): 20400005, <https://doi.org/10.1142/S2010007820400059>, 2020.

"Choices in the Climate Commons," *Science* 362(6420): 1217, 2018.

With Astrid Dannenberg, "An Experimental Investigation into 'Pledge and Review' in Climate Negotiations," *Climatic Change* 138(1): 339-352, 2016.

with Juan Moreno-Cruz, "The Alternatives to Unconstrained Climate Change: Emission Reductions versus Carbon and Solar Geoengineering," in S. Barrett, C. Carraro, and J. de Melo (eds.), *Towards a Workable and Effective Climate Regime*, VoxEU.org eBook, CEPR and FERDI, 2016, pp. 353-365, 2016.

"Solar Geoengineering's Brave New World: Thoughts on the Governance of An Unprecedented Technology," *Review of Environmental Economics and Policy*, 8(2): 249-269, 2014.

with Timothy M. Lenton, Antony Millner, Alessandro Tavoni, Stephen Carpenter, John M. Anderies, F. Stuart Chapin III, Anne-Sophie Crépin, Gretchen Daily, Paul Ehrlich, Carl Folke, Victor Galaz, Terry Hughes, Nils Kautsky, Eric F. Lambin, Rosamond Naylor, Karine Nyborg, Stephen Polasky, Marten Scheffer, James Wilen, Anastasios Xepapadeas, and Aart de Zeeuw, "Climate Engineering Reconsidered," *Nature Climate Change*, 4: 527-529, 2014.

"Negotiating to Avoid 'Dangerous' Climate Change," in Nicholas Stern, Alex Bowen, and John Whalley (eds.), *Development of Policy Regimes to Combat Climate Change*, London: World Scientific, pp. 159-

180, 2014.

with Astrid Dannenberg, “Sensitivity of Collective Action to Uncertainty about Climate Tipping Points,” *Nature Climate Change*, 4: 36-39, 2014.

with Astrid Danneberg, “Negotiating to Avoid 'Gradual' versus 'Dangerous' Climate Change: An Experimental Test of Two Prisoners' Dilemmas,” in Todd Cherry, Jon Hovi, and David M. McEvoy (eds.), *Towards a New Climate Agreement: Conflict, Resolution, and Governance*, London: Routledge, 2014.

Why Have Climate Negotiations Proved So Disappointing?“ *Sustainable Humanity, Sustainable Nature: Our Responsibility*, Pontifical Academy of Sciences, Extra Series 41, Vatican City 2014; available at <http://www.pass.va/content/scienze-sociali/en/publications/acta/sustainable.html>.

“Climate Treaties and Approaching Catastrophes,” *Journal of Environmental Economics and Management*, 66(2): 235-250, 2013.

with Astrid Dannenberg, “Climate Negotiations Under Scientific Uncertainty,” *Proceedings of the National Academy of Sciences*, 109(43): 17372-17376, 2012.

“A Primer on the Economics of Solar Radiation Management,” in IPCC, 2012: Meeting Report of the Intergovernmental Panel on Climate Change Expert Meeting on Geoengineering [O. Edenhofer, R. Pichs-Madruga, Y. Sokona, C. Field, V. Barros, T.F. Stocker, Q. Dahe, J. Minx, K. Mach, G.-K. Plattner, S. Schlömer, G. Hansen, M. Mastrandrea (eds.)]. IPCC Working Group III Technical Support Unit, Potsdam Institute for Climate Impact Research, Potsdam, Germany, pp. 33-34.

“Climate Treaties and Backstop Technologies,” *CESifo Economic Studies*, 58(1): 31-48, 2012.

“Credible Commitments, Focal Points, and Tipping: The Strategy of Climate Treaty Design,” in R.W. Hahn and A. Ulph (eds.), *Climate Change and Common Sense: Essays in Honour of Tom Schelling*, Oxford: Oxford University Press, 2012.

“Avoiding Disastrous Climate Change is Possible but Not Inevitable,” *Proceedings of the National Academy of Sciences* 108(29): 11733-11734, 2011.

“A Portfolio System of Climate Treaties,” in J.E. Aldy and R.N. Stavins (eds.), *Post-Kyoto International Climate Policy: Implementing Architectures for Agreement*. Cambridge: Cambridge University Press, pp. 240-270., 2010.

with Michael Toman, “Contrasting Future Paths for an Evolving Climate Regime,” *Global Policy* 1(1): 64-74, 2010.

“The Coming Global Climate-Technology Revolution,” *Journal of Economic Perspectives*, 23(2): 53-75. 2009.

“Rethinking Global Climate Change Governance,” *Economics: The Open-Access, Open-Assessment E-Journal*, Vol. 3, 2009-5. <http://www.economics-ejournal.org/economics/journalarticles/2009-5>.

“Climate Treaties and the Imperative of Enforcement,” *Oxford Review of Economic Policy*, 24(2): 239-258, 2008. Reprinted in A. Kellow and S. Boehmer-Christiansen (eds.), *The International Politics of*

Climate Change, Cheltenham, UK: Edward Elgar, 2010.

“The Incredible Economics of Geoengineering,” *Environmental and Resource Economics*, **39**: 45-54, 2008.

“A Multi-Track Climate Treaty System,” in Joseph E. Aldy and Robert N. Stavins (eds.), *Architectures for Agreement: Addressing Global Climate Change in the Post-Kyoto World*, Cambridge: Cambridge University Press, 2007.

“Climate Change Negotiations: Past and Future,” in D. Helm (ed.), *The New Energy Paradigm*, Oxford: Oxford University Press, 2007, pp. 422-437.

“Climate Treaties and ‘Breakthrough’ Technologies.” *American Economic Review (Papers and Proceedings)*, **96**(2): 22-25, 2006. Reprinted in Michael Finus and Alejandro Caparros (eds.), *Game Theory and International Environmental Cooperation*, Cheltenham UK: Edward Elgar, forthcoming.

“Kyoto Plus,” in D. Helm (ed.), *Climate Change Policy*, Oxford: Oxford University Press, 2005.

with Joseph Aldy and Robert Stavins, “Thirteen Plus One: A Comparison of Global Climate Policy Architectures,” *Climate Policy*, **3**(4): 373-397, 2003.

with Robert Stavins, “Increasing Participation and Compliance in International Climate Change Agreements,” *International Environmental Agreements: Politics, Law, and Economics*, **3**(4): 349-376, 2003.

“Towards a Better Climate Treaty,” *World Economics*, **3** (2): 35-45, April-June 2002; appeared previously in AEI-Brookings Joint Center for Regulatory Studies, *Policy Matters* 01-29, November 2001; translated in Italian and appeared in *La Questione Agraria*.

“The Crucial Role of Economic Incentives and Enforcement,” in R.J. Kopp and J.B. Thatcher (eds.), *The Weather-vane Guide to Climate Policy*, Washington, DC: Resources for the Future, pp. 42-47, 2000.

“Political Economy of the Kyoto Protocol,” *Oxford Review of Economic Policy*, **14**: 20-39, 1998. Reprinted in D. Helm (ed.), *Environmental Policy: Objectives, Instruments, and Implementation*, Oxford: Oxford University Press, 2000, pp. 111-141; reprinted in M. Toman and B. Sohngen, eds., *Climate Change*, Aldershot, UK: Ashgate, 2004; reprinted in A. Kellow and S. Boehmer-Christiansen (eds.), *The International Politics of Climate Change*, Cheltenham, UK: Edward Elgar, 2010.

with B. Fisher, P. Bohm, J.K.E. Mubazi, A. Shah and R.N. Stavins, "An Economic Assessment of Policy Instruments for Combatting Climate Change," in J.P. Bruce, H. Lee, and E.F. Haites (eds.), *Climate Change 1995: Economic and Social Dimensions of Climate Change*, Cambridge: Cambridge University Press, 1996, pp. 397-439.

"European Carbon Tax," in A.R. Beckenstein, F.J. Long, M.B. Arnold and T.N. Gladwin (eds.), *Stakeholder Negotiations: Exercises in Sustainable Development*, Chicago: Irwin, 1996, pp. 69-91; see also teaching note in the accompanying *Instructor's Manual*, pp. 85-91.

"Climate Change Policy and International Trade," in *Climate Change: Policy Instruments and their Implications*, Proceedings of the Tsukuba Workshop of IPCC Working Group III, Tsukuba, Japan: Intergovernmental Panel on Climate Change, 1994

"Reaching a CO₂ Emission Limitation Agreement for the Community: Implications for Equity and Cost-Effectiveness," *European Economy*, Special Edition No. 1, 1992, pp. 3-24.

"'Acceptable' Allocations of Tradeable Carbon Emission Entitlements in a Global Warming Treaty," in UNCTAD (ed.), *Combating Global Warming: Study on a Global System of Tradeable Carbon Emission Entitlements*, New York: United Nations, 1992, pp. 85-113.

"Transfers and the Gains from Trading Carbon Emission Entitlements in a Global Warming Treaty," in UNCTAD (ed.), *Combating Global Warming: Study on a Global System of Tradeable Carbon Emission Entitlements*, New York: United Nations, 1992, pp. 115-125.

"Economic Instruments for Climate Change Policy," in OECD, *Responding to Climate Change: Selected Economic Issues*, Paris: OECD, 1991.

"Economic Analysis of International Environmental Agreements: Lessons for a Global Warming Treaty," in OECD, *Responding to Climate Change: Selected Economic Issues*, Paris: OECD, 1991.

"Global Warming: Economics of a Carbon Tax," in D. Pearce (ed.), *Blueprint 2: Greening of the World Economy*, London: Earthscan, 1991.

"The Economic and Environmental Consequences of a Carbon Tax," *Economic Outlook*, February 1990.

Infectious Diseases

"Economic Considerations for the Eradication Endgame," *Philosophical Transactions of the Royal Society B*, 368(1623). doi: 10.1098/rstb.2012.0149, 2013.

"Stop!: The Polio Vaccination Cessation Game," *World Bank Economic Review*, 24(3): 361-385, 2010.

with O. Sabot, J. M. Cohen, M.S. Hsiang, J.G. Kahn, S. Basu, L. Tang, B. Zheng, Q. Gao, L. Zou, A. Tatarsky, S. Aboobakar, J. Usas, J.L. Cohen, D.T. Jamison, R.G.A. Feachem, "Costs and Financial Feasibility of Malaria Elimination," *The Lancet*, 29 October 2010.

"Polio Eradication: Strengthening the Weakest Links," *Health Affairs*, 28(4): 1079-1090, July 2009.

with Bruno Moonen, Jim Tulloch, and Dean T. Jamison, "Making the Decision," in Richard G.A. Feachem, Allison Phillips, and Geoffrey A. Targett (eds.), *Shrinking the Malaria Map: A Prospectus on Malaria Elimination*, San Francisco: The Global Health Group, Global Health Sciences, University of California, San Francisco, pp. 1-18, 2009.

"Emerging Infectious Diseases: Are We Prepared?" in F. Fukuyama (ed.), *Blindside*, Washington, DC: Brookings Institution, pp. 82-90, 2007.

with Michael Hoel, "Optimal Disease Eradication," *Environment and Development Economics*, **12**: 1-26, 2007.

"The Smallpox Eradication Game," *Public Choice*, **130**: 179-207, 2006.

with M. Miller and D.A. Henderson, "Control and Eradication," in D.T. Jamison *et al.* (eds.), *Disease*

Control Priorities in Developing Countries, 2nd edition, Oxford: Oxford University Press, pp. 1163-1176, 2006.

“Eradication vs. Control: The Economics of Global Infectious Disease Policy,” *Bulletin of the World Health Organization*, **82**: 683-688, 2004.

“Health as a Global Public Good: Lessons from International Environmental Law,” *Proceedings of the 98th Annual Meeting of the American Society of International Law*, pp. 13-16, 2004.

“Global Disease Eradication,” *Journal of the European Economic Association*, **1**: 591-600, 2003.

International Environmental Agreements

with Astrid Dannenberg, “Tipping versus Cooperating to Supply a Public Good,” *Journal of the European Economic Association*, 15(4): 910-941, 2017.

“Coordination vs. Voluntarism and Enforcement in Sustaining International Environmental Cooperation,” *Proceedings of the National Academy of Sciences*, 113(51): 14515-14522, 2016.

“Comment on ‘Equity, Heterogeneity and International Environmental Agreements,’” *B.E. Journal of Economic Analysis and Policy*, 2010.

“An Economic Theory of International Environmental Law,” in D. Bodansky, J. Brunnée, and Ellen Hey (eds.), *Oxford Handbook of International Environmental Law*, Oxford: Oxford University Press, pp. 231-261, 2007.

“The Theory of International Environmental Agreements,” in K.-G. Mäler and J. Vincent (eds.), *Handbook of Environmental Economics*, Vol. 3, Amsterdam: Elsevier, pp. 1457-1516, 2005.

“Consensus Treaties,” *Journal of Institutional and Theoretical Economics*, **158** (4): 529-547, December 2002.

“The Strategy of Treaty Negotiation: ‘Broad but Shallow’ versus ‘Narrow but Deep,’” in P. Dasgupta, B. Kristrom, and K-G. Löfgren (eds.), *Economic Theory for the Environment*, Cheltenham: Edward Elgar, 2002, pp. 26-40.

“International Cooperation for Sale,” *European Economic Review*, **45**(10): 1835-1850, 2001. Reprinted in C. Carraro (ed.), *Governing the Global Environment*, Cheltenham, UK: Edward Elgar, pp. 135-150, 2003.

“International Environmental Agreements: Feasibility, Efficiency, Stability,” in H. Siebert (ed.), *The Economics of International Environmental Problems*, Tübingen: Mohr Siebeck, pp. 111-124, 2000.

“International Cooperation and the International Commons,” *Duke Environmental Law and Policy Forum*, 10 (1): 131-145, 1999.

"A Theory of Full International Cooperation," *Journal of Theoretical Politics*, **11**: 519-41, 1999. Reprinted in J. Trachtman (ed.), *International Law and Politics*, Aldershot: Ashgate, forthcoming 2008.

"The Credibility of Trade Sanctions in International Environmental Agreements," in P. Fredriksson (ed.),

Trade, Global Policy, and the Environment, World Bank Discussion Paper No. 402, pp. 161-172, 1999.

"On the Theory and Diplomacy of Environmental Treaty-Making," *Environmental and Resource Economics*, **11**: 317-33, 1998.

"Toward a Theory of International Environmental Cooperation," in C. Carraro and D. Siniscalco (eds.), *New Directions in the Economic Theory of the Environment*, Cambridge: Cambridge University Press, 1997, pp. 239-280. Reprinted in C. Carraro (ed.), *Governing the Global Environment*, Cheltenham: Edward Elgar, pp. 294-335, 2003.

"Heterogeneous International Environmental Agreements," in C. Carraro (ed.), *International Environmental Negotiations*, Cheltenham: Edward Elgar, 1997, pp. 9-25.

"Building Property Rights for Transboundary Resources," in S. Hanna, C. Folke, and K.-G. Mäler (eds.), *Rights to Nature*, Washington, DC: Island Press, 1996, pp. 265-284.

"Cooperation and Competition in International Environmental Protection," in E. Bacha, *Economics in a Changing World, Volume 4: Development, Trade and the Environment*, Proceedings of the Tenth World Congress of the International Economics Association, Moscow, London: Macmillan, 1994, pp. 34-47.

"Self-Enforcing International Environmental Agreements," *Oxford Economic Papers*, **46**: 878-894, 1994; reprinted in A.A. Batabyal (ed.), *The Economics of International Environmental Agreements*, Aldershot, UK: Ashgate, 1999; reprinted in C. Carraro (ed.), *Governing the Global Environment*, Cheltenham: Edward Elgar, pp. 199-215, 2003; reprinted in M. Hoel (ed.), *Recent Developments in Environmental Economics*, Cheltenham: Edward Elgar, 2004.

"Conflict and Cooperation in Managing International Water Resources," World Bank Policy Research Working Paper 0-860.

"International Environmental Agreements as Games," in R. Pethig (ed.), *Conflicts and Cooperation in Managing Environmental Resources*, Springer-Verlag, 1992, pp. 11-35.

"The Problem of Global Environmental Protection," *Oxford Review of Economic Policy*, **6**: 68-79, 1990; reprinted in D. Helm (ed.), *Economic Policy Towards the Environment*, Oxford: Blackwell, 1991, 137-155; reprinted in R. Dorfman and N. Dorfman (eds.), *The Economics of the Environment*, 3rd ed., New York: W.W. Norton & Co, 1993, 445-463; reprinted in T. Jenkinson (ed.), *Readings in Microeconomics*, Oxford: Oxford University Press, 1996, pp. 131-140; reprinted in T. Tietenberg (ed.), *The Economics of Global Warming*, Aldershot: Edward Elgar, 1996; reprinted in A. Batabyal (ed.), *The Economics of International Environmental Agreements*, Aldershot, UK: Ashgate, 1999; reprinted in P.M. Haas, *Environment in the New Global Economy*, Cheltenham, UK: Edward Elgar, 2003.

Global Public Goods

with Astrid Dannenberg, "Cooperating to Avoid Catastrophe," *Nature Human Behavior* **2**: 435-437, 2018.

with Karine Nyborg, John M. Anderies, Astrid Dannenberg, Therese Lindahl, Caroline Schill, Maja Schlüter, W. Neil Adger, Kenneth J. Arrow, Stephen Carpenter, F. Stuart Chapin III, Anne-Sophie Crépin, Gretchen Daily, Paul Ehrlich, Carl Folke, Wander Jager, Nils Kautsky, Simon A. Levin, Ole Jacob Madsen, Stephen Polasky, Marten Scheffer, Brian Walker, Elke U. Weber, James Wilen,

Anastasios Xepapadeas, Aart de Zeeuw, "Social Norms as Solutions: Policies May Influence Large-Scale Behavioral Tipping," *Science* 354(6308): 42-43, 2016.

"Critical Factors for Providing Transnational Public Goods," in I. Kaul (ed.), *Global Public Goods*, Cheltenham UK: Edward Elgar, 2016.

"Collective Action to Avoid Catastrophe: When Countries Succeed, When they Fail, and Why," *Global Policy* 7(S1): 45-55, 2016.

"The Problem of Averting Global Catastrophe," *Chicago Journal of International Law*, 6(2): 1-26, 2006.

"Making International Cooperation Pay: Financing as a Strategic Incentive," in I. Kaul (ed.), *Public Finance in a Globalizing World: Innovations in Theory and Practice*, New York: Oxford University Press, pp. 357-370, 2006.

"Creating Incentives for International Cooperation: Strategic Choices," in I. Kaul, P. Conceição, K. Le Goulven, and R. U. Mendoza (eds.), *Providing Global Public Goods: Managing Globalization*, New York: New York: Oxford University Press, 2002, pp. 308-328. Reprinted in R.N. Stavins (ed.), *Economics of the Environment: Selected Readings*, New York: W.W. Norton & Company, 2005.

"Supplying International Public Goods: How Can Nations Cooperate?" in A. Mody and M. Ferroni (eds.), *International Public Goods: Incentives, Measurement, and Financing*, Dordrecht: Kluwer and Washington, DC: World Bank, pp. 47-79, 2002.

"Financing Global Public Goods," in C.D. Gerrard, M. Ferroni, and A. Mody (eds.), *Global Public Policies and Programs: Implications for Financing and Evaluation*, Washington, DC: World Bank, pp. 193-203, 2001.

"Montreal v. Kyoto: International Cooperation and the Global Environment," in I. Kaul, I. Grunberg, and M.A. Stern (eds.), *Global Public Goods: International Cooperation in the 21st Century*, New York: Oxford University Press, 1999, pp. 192-219. Reprinted in C. Carraro, *Governing the Global Environment*, Cheltenham, UK: Edward Elgar, pp. 505-532, 2003.

Trade and Environment

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Book Reviews

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Short Articles

Published in *The American Interest*, *The Economists' Voice*, *The Financial Times*, *The Independent*, *Issues in Science and Technology*, *The Sunday Times*, YaleGlobal Online, and elsewhere.

Written Evidence

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Selected Previous Presentations, Lectures, and Speeches

American Enterprise Institute; American Meteorological Society; American Public Health Association; Arctic Research Consortium of the United States; Beijer Institute, Royal Swedish Academy of Sciences; Bertelsmann Foundation, Berlin; British Academy; Brookings Institution; Carnegie Council for Ethics and International Affairs; Center for Advanced Study, Norwegian Academy of Science and Letters, Oslo; Center for Discrete Mathematics and Theoretical Computer Science, Rutgers University; Center for Global Development; Center for International Climate and Energy Research, Oslo; The Centre, Brussels; Chamber of Commerce of the USA; Climate Policy Center; Club of Madrid; Colby College (Grossman Lecture); Columbia University; CORE, Université Catholique de Louvain, Belgium; Council on Foreign Relations; Duke University; Earth Institute, Columbia University; Ecole Polytechnique; Electric Power Research Institute; Environmental Defense Fund Board; Exeter University; Fondazione ENI Enrico Mattei, Venice; European Commission, Brussels; Fletcher School of Law and Diplomacy, Tufts University; Friedrich Ebert Stiftung, Bonn; Frisch Centre, Oslo; Gates Foundation; Georgetown School of Law; Global Industrial and Social Progress Research Institute, Tokyo; Graduate Institute of International Studies, Geneva; Institute for Globalization and Sustainable Development, Tilburg University; Harvard Institute for International Development Executive Program on Climate Change; Harvard School of Public Health; Harvard Kennedy School of Government; Harvard University; Harvard University Center for the Environment; HEC Montréal; Institut du Développement Durable et des Relations Internationales; Instituto Veneto de Scienze Lettere ed Arti, Venice; Inter-American Development Bank; Institute for Economic Research, University of Munich; International Institute for Applied Systems Analysis (IIASA), Laxenburg, Austria; International Monetary Fund; International Peace Institute; IUCN

(World Conservation Union) General Assembly, San José, Costa Rica; Johns Hopkins School of Public Health; Kiel Institute of World Economics (Leading Thinkers in Global Economic Affairs Series); Laboratoire d'Econometrie de l'Ecole Polytechnique; Liberal Democrats Policy Unit; London School of Economics; London School of Hygiene and Tropical Medicine; Max Planck Institute for Comparative Public Law and International Law, University of Heidelberg (keynote); MIT; National Academies of Science, Washington, DC; National Building Museum, Washington, DC; National Bureau of Economic Research (NBER); NBER-Yale Global Change Workshop, Snowmass, CO; National Council for Science and the Environment; National Institute of Economic and Social Research; National Institutes of Health; National Security Agency; Nederlandse Organisatie voor Wetenschappelijk Onderzoek; Netherlands Competition Authority, The Hague; New College, Oxford; New York University School of Law, Florence; North Carolina State University; Norwegian School of Economics and Business; OECD, Paris; Oslo Academy of Global Governance; Ostrom Workshop, Indiana University; Oxford University; Pacific Northwest National Laboratory; Pan American Health Organization; Papandreaou Foundation, Sympo- sium, Greece; Parliamentary Alternative Energy Group, House of Commons; Pew Center on Global Climate Change; Pontifical Academy of Sciences-Pontifical Academy of Social Sciences, Vatican City; Princeton University; Progressive Governance Conference and Summit, London, April 2008 (at invitation of Prime Minister's office); Potsdam Institute for Climate Impact Research (PIK); Public Economics Group, Institute of Fiscal Studies; Research Institute of Innovative Technology, Tokyo; Resource Policy Consortium; Resources for the Future; Rochester Institute of Technology; Rockefeller Foundation, Bellagio, Italy; Roundtable on Sustainable Development, OECD Paris; Royal Institute of International Affairs; Royal Swedish Academy of Sciences, Stockholm; Scripps Institution of Oceanography; Stanford University; State Secretariat for Economic Affairs, Switzerland; Statistics Norway; Stockholm School of Economics; Swedish Environmental Protection Agency; Swedish Foreign Ministry; Tilburg University; Trades Union Congress; Transatlantic Dialogue on Climate Change, Villa Vigoni, Itali; United Kingdom Foreign and Commonwealth Office; UNCTAD, Geneva; United Nations, New York; United Nations Conference on Environment and Development, Rio de Janeiro; UNICEF, New York; United States-Asia Environmental Partnership; United States Institute of Peace; Universidad de Concepcion; University of British Columbia; University of Calgary; University of California, San Diego; University of California, San Francisco; University of California, Santa Barbara; University College London; University of Connecticut, Storrs (Edwin Way Teale Lecture); University of Exeter; University of Gothenburg; University of Manchester; University of Maryland; University of Maryland School of Law; University of Massachusetts, Amherst; University of Oslo; University of Pennsylvania; University of Siegen, Germany; University of Southampton; University of Stockholm; University of Surrey; University of Sussex; University of Texas School of Law, Austin; University of Toronto (keynote speech); University of Tsukuba, Japan; University of Umeå; University of York; Wageningen Agricultural University, the Netherlands; Washington Interest in Negotiation; Wellcome Trust, London; Wissenschaftskolleg, Berlin; Woods Hole Oceanographic Institution; World Bank; World Institute for Development Economics Research, Helsinki; World Trade Organization; Yale University; ZEW, Mannheim.

Previous Non-Academic Experience

- 1983-85 **National Economic Research Associates**, New York.
Senior Economist.
- 1980-82 **Data Resources, Inc.**, Lexington, MA.
Economist.
- 1979 **U.S. Environmental Protection Agency**, Washington, DC.
Summer Intern.

Some recent and forthcoming talks

- 2020 Steps Towards Climate Change Governance, American Academy of Arts & Sciences, 9 December (via zoom).
Keynote, ClimRisk 2020: Time for Action!, Italian Society for Climate Sciences, 22 October (via zoom).
Keynote, SURED Conference on Sustainable Resource Use and Economic Dynamics, Ascona, Switzerland, 21 October (via zoom).
Department of Economics, Uppsala University, 10 September (via zoom).
Resources for the Future, Solar Radiation Dialogue, 29 July (via zoom).
American Meteorological Society, 100th Anniversary Meeting, Boston, MA, 13 January (Presidential Forum speaker).
- 2019 Norwegian Academy of Science and Letters, 28 October.
Department of Economics, University of Oslo, 28 October.
Annual Bank Conference on Development Economics (ABCDE), World Bank, Washington, DC 17-18 June (keynote).
Ecole Polytechnique, 225th Anniversary Symposium, Palaiseau, France, 6 June.
French National Institute for Agricultural Research (INRA), Paris, conference, 4 June (keynote).
Strategic Advisory Group on Malaria Eradication, World Health Organization, Geneva, 3-4 June.
Association of Environmental and Resource Economists conference, Lake Tahoe, May 30-31.
- 2018 Workshop on Scientific Findings and Democratic Ideals, Columbia University, 6-7 December.
World Health Organization, Geneva, 28-29 November.
Governance of Solar Geoengineering, Harvard University, 27-28 September.
WCERE Conference, Gothenburg, Sweden, 25-29 June.
Northeast Workshop on Energy Policy and Environmental Economics, Columbia University, 17-18 May.
Towards Optimal Provision of Regional Public Goods in Asia and the Pacific, Asian Development Bank, Tokyo, 10-11 May (keynote).
Rockefeller Foundation Economic Council on Planetary Health, Oxford, UK, 8-9 February.
Political Economy of the Environment workshop, Oslo, 26-27 April.
Linkage Diplomacy Workshop, Columbia University, 23 February.
Sackler Colloquium, National Academy of Sciences, Irvine, CA, 17-18 January.
- 2017 University of California, Berkeley, 15 February.
American Association for the Advancement of Science, Boston, 19 February
Harvard University, 1 March.
Forum on Geoengineering Research, Washington, DC, 24 March.
University of Oslo, 6 April.
World Health Organization, Geneva, 13-15 June.
EAERE Conference, Athens, 28 June to 1 July.
Strategic Advisory Group on Malaria Eradication, World Health Organization, New Delhi, 30 November to 1 December 2017.
- 2016 Sackler Colloquium, National Academy of Sciences, Washington, DC, 15 March.
Yale University, 6 April.
ETH, Zurich, 3-4 May.
IDDRI Conference, Paris, 10-11 May.

AERE Summer Conference, Breckenridge, CO, 9-11 June.
IAEE Conference, Bergen, Norway, 22 June.
EAERE Conference, Zurich, 22-25 June.
University of Bath, public lecture, 12 October.
ZEW Mannheim, 21 October.
Institute for Advanced Study, Berlin, 7 December.

2015 MIT, 5 February
Institute for Advanced Sustainability Studies, Potsdam, 12 February.
Mercator Research Institute, Berlin, 13 February.
IDDRI, Paris, 16 March.
University of Bath, Towards Global Agreements, 9-10 April (keynote).
Yale University, 27-28 May.
Université de Paris 1 Panthéon-Sorbonne, 18 June.
EAERE Conference, Helsinki 27 June.
Centre for Global Cooperation Research, Lehmbruck Museum, Duisburg, Germany 1 July (keynote).
David W. Pearce Memorial Lecture, London School of Economics, 10 September.
Université de Paris 1 Panthéon-Sorbonne, 28 June.
College de France, Paris 29 October.
Global Ocean Commission, High Seas Governance Conference, Oxford University, 12-13 November.
Harvard University, 18 November.
COP21 Paris 8-9 December 2015.