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CURRENT RESEARCH INTERESTS

- Policy-relevant engineering and economic analysis of advanced clean-energy systems for electricity, transport, and cooking applications
- Advanced process design and simulation for thermochemical conversion of carbonaceous fuels, especially biomass and coal.
- Sustainable energy technologies and strategies for China.
- Biomass energy technologies and strategies for the US and other regions.

CURRENT POSITIONS

- 1999 – **Research Engineer and Associated Faculty**, Princeton Environmental Institute, Princeton University, Princeton, New Jersey.
- 2008 (July) – **Senior Research Scientist**, Climate Central, Inc., Princeton, New Jersey.

PREVIOUS POSITIONS

- 1991 – 1999: **Research Engineer**, Center for Energy and Environmental Studies, School of Engineering and Applied Sciences, Princeton University
- 1983 – 1991: **Research Staff**, Center for Energy and Environmental Studies, School of Engineering and Applied Sciences, Princeton University
- 1988-1989 – **Visiting Research Engineer**, Department of Environmental & Energy Systems Analysis, Lund University, Sweden.

EDUCATION

- Ph.D., 1983, University of Minnesota, Minneapolis, Mechanical Engineering (Heat Transfer)
- MSE, 1981, University of Minnesota, Minneapolis, Mechanical Engineering (Heat Transfer)
- BSE, 1979, Washington University, St. Louis.

CAREER SKETCH

Larson is a senior member of the Energy Systems Analysis Group at the Princeton Environmental Institute (PEI) at Princeton University and (since 2004) an affiliated faculty in the University's Science, Technology, and Environmental Policy Program of the Woodrow Wilson School of Public and International Affairs. Since July 2008, Larson has also been spending some of his time with Climate Central, a non-profit, non-partisan science and media organization created to provide clear and objective science-based information to diverse audiences about climate change and its potential solutions.

Larson's research interests include engineering, economic, and policy-related assessments of advanced clean-energy systems, especially for electric power and transport fuels production from carbonaceous fuels (biomass, coal, natural gas) and for efficient end use of energy. His work addresses technologies of relevance to developed and developing countries. He has participated in collaborative research efforts with colleagues across the United States, and in Brazil, China, Cuba, India, Italy, Jamaica, Sweden, and elsewhere.

He currently co-leads a program on low-emission energy strategies and technologies with carbonaceous fuels for China, involving a collaboration with colleagues at Tsinghua University (Beijing). This program aims to describe least-cost energy futures for China for the long term based on carbonaceous fuels and characterized by near-zero emissions of both local air pollution and greenhouse gases and to define critical technology paths to realizing such long-term futures, including identifying key near-term enabling R&D, technologies, strategies, and policies.

He is also involved in research efforts focusing on analysis of production and conversion systems for modernizing renewable-biomass as an energy source, including advanced gasification-based technologies for power generation (various advanced gas turbine cycles) and for production of transportation fuels. These efforts have included assessments of potential gas-turbine based biomass electricity supply and use in sugarcane industries, in pulp and paper industries, and in stand-alone electric power generation.

Larson supervises graduate and undergraduate thesis research and occasionally teaches courses in the engineering and in the public policy schools at Princeton.

PUBLICATIONS (chronological in sections)

Books and book chapters

1. E.D. Larson and R.H. Williams, "Technical and Economic Analysis of Steam-Injected Gas-Turbine Cogeneration," in *Energy Sources: Conservation and Renewables*, D. Hafemeister, H. Kelly, and B. Levi (eds.) American Institute of Physics, New York, NY, 1985, pp. 402-25.

2. E.D. Larson, P. Svenningsson and I. Bjerle, "Biomass Gasification for Gas Turbine Power Generation," in *Electricity: Efficient End-Use and New Generation Technology, and Their Planning Implications*, T.B. Johansson, B. Bodlund, and R.H. Williams (eds.), Lund University Press, Lund, Sweden, 1989, pp. 697-739.
3. R.H. Williams and E.D. Larson, "Expanding Roles for Gas Turbines in Power Generation," in *Electricity: Efficient End-Use and New Generation Technology, and Their Planning Implications*, T.B. Johansson, B. Bodlund, and R.H. Williams (eds.), Lund University Press, Lund, Sweden, 1989, pp. 503-53.
4. R.H. Williams and E.D. Larson, "Power Generation with Natural Gas-Fired Gas Turbines," Chapter 5 in *Natural Gas: Its Role and Potential in Economic Development*, Vergara, Hay, and Hall (eds.), Westview Press, 1990.
5. R.H. Williams and E.D. Larson, "Advanced Gasification-Based Biomass Power Generation," in *Renewable Energy: Sources for Fuels and Electricity*, T.B. Johansson, H. Kelly, A.K.N. Reddy, and R.H. Williams (eds.), Island Press, Washington, DC, 1993, pp. 729-85.
6. E.D. Larson and R.H. Williams, "Biomass Plantation Energy Systems and Sustainable Development," in *Energy as an Instrument for Socio-Economic Development*, J. Goldemberg and T.B. Johansson (eds.), United Nations Development Program, New York, NY, 1995, pp. 91-106.
7. E.D. Larson, "Modernized Biomass Energy," in L. Gomez-Echeverri (ed.), *Climate Change and Development*, The Yale School of Forestry and Environmental Studies, Yale University, New Haven, CT, 2000, pp. 271-291.
8. S. Kartha and E.D. Larson, *Bioenergy Primer: Modernized Biomass Energy for Sustainable Development*, United Nations Development Program, New York, NY, 2000, 133 pages.
9. E.D. Larson and T.B. Johansson, "Future Demands on Forests as a Source of Energy," chapter 9 in *Forests in a Full World*, G.M. Woodwell (ed.), Yale University Press, New Haven, CT, 2001, pp. 111-160.
10. E.D. Larson, *Biofuel Production Technologies: Status, Prospects, and Implications for Trade and Development*, United Nations Conference on Trade and Development, New York and Geneva, 2008.
11. S. Consonni, R.E. Katofsky, and E.D. Larson, *Gasification-Based Power and Synfuels Production at Kraft Pulp and Paper Mills*, TAPPI Press, forthcoming 2009.

Peer-reviewed articles

1. E.D. Larson, "Heat Transfer From Pin Fins Situated in an Oncoming Longitudinal Flow Which Turns to Crossflow," MS Thesis, Mechanical Engineering Dept., University of Minnesota, Minneapolis, MN, April 1981.
2. E.M. Sparrow, E.D. Larson, and J.W. Ramsey, "Freezing on a Finned Tube for Either Conduction-Controlled or Natural-Convection-Controlled Heat Transfer," *International Journal of Heat and Mass Transfer*, Vol. 24, pp. 273-284, 1981.
3. E.M. Sparrow and E.D. Larson, "Heat Transfer from Pin Fins Situated in an Oncoming Longitudinal Flow Which Turns to Crossflow," *International Journal of Heat and Mass Transfer*, Vol. 25, pp. 603-14, 1982.
4. E.D. Larson and E.M. Sparrow, "Performance Comparisons Among Geometrically Different Pin-Fin Arrays Situated in an Oncoming Longitudinal Flow," *International Journal of Heat and Mass Transfer*, Vol. 25, pp. 723-25, 1982.

5. E.D. Larson, "Freezing Inside a Circular Cylindrical Capsule at Various Angular Inclinations, Initial Liquid Superheats, and Cylinder Wall Subcoolings," Ph.D. Thesis, Mechanical Engineering Dept., University of Minnesota, Minneapolis, MN, June 1983.
6. E.D. Larson and E.M. Sparrow, "Effect of Inclination on Freezing in a Sealed Cylindrical Capsule," *ASME Journal of Heat Transfer*, Vol. 106, pp. 394-401, May 1984.
7. E.D. Larson, D. Abrahamson, and P. Ciborowski, "Effects of Atmospheric Carbon Dioxide on US Peak Electrical Generating Capacity," *IEEE Technology and Society Magazine*, December 1984.
8. M. Ross, E.D. Larson, and R.H. Williams, "Energy Demand and Materials Flows in the Economy," *Energy, The International Journal*, 12(10/11), 1987, pp. 953-67 (special issue: Proceedings of the 1985 Soviet-American Symposium on Energy Conservation). (Also: CEES Report 193, Princeton University, July 1985.)
9. E.D. Larson, M. Ross, and R.H. Williams, "Beyond The Era of Materials," *Scientific American*, 254(6), June 1986, pp. 34-41.
10. R.H. Williams, E.D. Larson, and M.H. Ross, "Materials, Affluence, and Industrial Energy Use," *Annual Review of Energy*, 12, 1987, pp. 99-144. (Also: PU/CEES Report 214, Princeton University, Jan. 1987.)
11. E.D. Larson and R.H. Williams, "Steam-Injected Gas Turbines," Paper No. GT-47-86, *ASME Journal of Engineering for Gas Turbines and Power*, 109(1), 1987, pp. 55-63.
12. R.H. Williams and E.D. Larson, "Steam-Injected Gas Turbines and Electric Utility Planning," *IEEE Technology and Society Magazine*, March 1986.
13. E.D. Larson, J.M. Ogden, R.H. Williams, and M.G. Hylton, "Biomass-Fired Steam-Injected Gas Turbine Cogeneration for the Cane Sugar Industry," in *Proceedings of Research in Thermochemical Biomass Conversion*, Bridgewater and Kuester (eds.), Elsevier Applied Science, London, UK, 1988.
14. E.D. Larson and R.H. Williams, "Biomass-Fired Steam-Injected Gas Turbine Cogeneration," *Proceedings, Cogen-Turbo: Second International Symposium on Turbomachinery, Combined Cycle Technology and Cogeneration*, American Society of Mechanical Engineers, New York, NY, 1988.
15. R.H. Williams and E.D. Larson, "Aeroderivative Turbines for Stationary Power," *Annual Review of Energy*, 13, 1988, pp. 429-89.
16. E.D. Larson, R.H. Williams, J.M. Ogden, and M.G. Hylton, "Biomass Gas Turbine Cogeneration for the Cane Sugar Industry," *Proceedings, XX Congress of the International Society of Sugar Cane Technologists*, São Paulo, Brazil, October 1989.
17. L.J. Nilsson and E.D. Larson, "Liquid Pumping," "Electric Motors," "Variable Speed Drives," and "Pumps" in *The Technology Menu for Efficient End-Use of Energy, Vol. 1: Movement of Material*, Department of Environmental and Energy Systems Studies, Lund University, Lund, Sweden, 1989.
18. E.D. Larson, R.H. Williams, J.M. Ogden, and M.G. Hylton, "Biomass Gas Turbine Cogeneration for the Cane Sugar Industry," *International Sugar Journal*, March/April 1990.
19. E.D. Larson and R.H. Williams, "Biomass-Gasifier Steam-Injected Gas Turbine Cogeneration," *ASME Journal of Engineering for Gas Turbines and Power*, 112(2), 1990, pp. 157-63.
20. E.D. Larson and L.J. Nilsson, "Electricity Use and Efficiency in Pumping and Air-Handling Systems," *ASHRAE Transactions*, Vol. 97, Pt. 2 (paper 3530) 1991. (Awarded Crosby Field Award for best paper published by ASHRAE in 1991.)
21. E.D. Larson, "Biomass-Gasifier/Gas Turbine Cogeneration in the Pulp and Paper Industry," *Journal of Engineering for Gas Turbines and Power*, 114(4): 665-675, 1992.

22. A.E. Carpentieri, E.D. Larson, and J. Woods, "Future Biomass-Based Electricity Supply in Northeast Brazil," *Biomass and Bioenergy*, 4(3), 1993.
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25. E.D. Larson and R.E. Katofsky, "Production of Methanol and Hydrogen via Biomass Gasification," in *Advances in Thermochemical Biomass Conversion*, A.V. Bridgwater (ed.), Balckie Academic & Professional Press, London, 1994, Vol. 1, pp. 495-510.
26. R.H. Williams, E.D. Larson, R.E. Katofsky, and J. Chen, "Methanol and Hydrogen from Biomass for Transportation," *Energy for Sustainable Development: The Journal of the International Energy Initiative*, 1 (5), Jan. 1995, pp. 18-34.
27. R.H. Williams and E.D. Larson, "Biomass-Gasifier/Gas Turbine Power Generating Technology," *Biomass and Bioenergy*, Vol. 10, Nos. 2-3, pp. 149-166, 1996.
28. S. Consonni and E.D. Larson, "Biomass-Gasifier/Aeroderivative Gas Turbine Combined Cycles, Part A: Technologies and Performance Modeling," *ASME Journal of Engineering for Gas Turbines and Power*, Vol. 118, July 1996, pp. 507-515.
29. S. Consonni and E.D. Larson, "Biomass-Gasifier/Aeroderivative Gas Turbine Combined Cycles, Part B: Performance Calculations and Economic Assessment," *ASME Journal of Engineering for Gas Turbines and Power*, Vol. 118, July 1996, pp. 516-525.
30. C.I. Marrison and E.D. Larson, "A Preliminary Estimate of the Biomass Energy Production Potential in Africa in 2025 Considering Projected Land Needs for Food Production," *Biomass and Bioenergy*, Vol.10, Nos. 5-6, pp. 337-351, 1996.
31. E.D. Larson, E. Worrell, and J.S. Chen, "Clean Fuels from Municipal Solid Waste for Fuel Cell Buses in Metropolitan Areas," *Resources, Conservation, and Recycling*, Vol. 17, 1996, pp. 273-298.
32. E.D. Larson and C.I. Marrison, "Economic Scales for First-Generation Biomass-Gasifier/Gas Turbine Combined Cycles Fueled from Energy Plantations," *ASME Journal of Engineering for Gas Turbines and Power*, Vol. 119, April 1997, pp. 285-290.
33. E.D. Larson and D.R. Raymond, "Commercializing Black Liquor and Biomass Gasifier/Gas Turbine Technology," *TAPPI Journal*, 80(12), December 1997, pp. 50-57.
34. S. Consonni, E.D. Larson, T.G. Kreutz, and N. Berglin, "Black Liquor-Gasifier/Gas Turbine Cogeneration," *ASME Journal of Engineering for Gas Turbines and Power*, Vol. 120, July 1998, pp. 442-449.
35. W.E.M. Hughes and E.D. Larson, "Effect of Fuel Moisture Content on Biomass-IGCC Performance," *ASME Journal of Engineering for Gas Turbines and Power*, Vol. 120, July 1998, pp. 455-459.
36. E.D. Larson, T.G. Kreutz, and S. Consonni, 1999, "Combined Biomass and Black Liquor Gasifier/Gas Turbine Cogeneration at Pulp and Paper Mills," *ASME Journal of Engineering for Gas Turbines and Power*, 121: 394-400.
37. E.D. Larson, S. Consonni, and T.G. Kreutz, 2000, "Preliminary Economics of Black Liquor Gasifier/Gas Turbine Cogeneration at Pulp and Paper Mills," *ASME Journal. of Engineering for Gas Turbines and Power*, 122: 255-261.

38. E.D. Larson, G.W. McDonald, W. Yang, W.J. Frederick, K. Lisa, T.G. Kreutz, E.W. Malcom, and C.A. Brown, "A Cost-Benefit Assessment of Black Liquor Gasifier/Combined Cycle Technology Integrated into a Kraft Pulp Mill," *Tappi Journal*, 83(6): 57-75, June 2000.
39. C. Azar and E.D. Larson, "Bioenergy and Land Use Competition in Northeast Brazil," *Energy for Sustainable Development*, IV(3), 2000, pp. 64-71.
40. E.D. Larson and S. Kartha, "Expanding Roles for Modernized Biomass Energy," *Energy for Sustainable Development*, IV(3), 2000, pp. 15-25.
41. E.D. Larson, R.H. Williams, M.R.L.V. Leal, "A Review of Biomass Integrated-Gasifier/Gas Turbine Combined Cycle Technology and its Application in Sugarcane Industries, with an Analysis for Cuba," *Energy for Sustainable Development*, V(1), March 2001, pp 54-76.
42. L.C. Schneider, A.P. Kinzig, E.D. Larson, and S.A. Solorzano, "Method for Spatially-Explicit Calculations of Potential Biomass Yields and Assessment of Land Availability for Biomass Energy Production in Northeastern Brazil," *Agriculture, Ecosystems, and Environment*, 84(3): 207-226, 2001.
43. Z. Wu, P. DeLaquil, E.D. Larson, W. Chen, and P. Gao, "Future Implications of China's Energy-Technology Choices: Summary of a Report to the Working Group on Energy Strategies and Technologies," *Energy for Sustainable Development*, V(4), December 2001, pp. 19-31.
44. J. Li, X. Zhuang, P. DeLaquil, and E.D. Larson, "Biomass Energy in China and its Potential," *Energy for Sustainable Development*, V(4), December 2001, pp. 66-80.
45. E.D. Larson, Z. Wu, P. DeLaquil, W. Chen, and P. Gao, "Future Implications of China's Energy-Technology Choices," *Energy Policy*, 31(12): 1149-1204, 2003.
46. P. DeLaquil, W. Chen, and E.D. Larson, "Modeling China's Energy Future," *Energy for Sustainable Development*, VII(4): 40-56, December 2003.
47. Zheng, H., Li, Z., Ni, W., Larson, E.D., and Ren, T., "Case Study of a Coal Gasification-Based Energy Supply System for China," *Energy for Sustainable Development*, VII(4): 63-78, December 2003.
48. E.D. Larson and T. Ren, "Synthetic Fuels Production by Indirect Coal Liquefaction," *Energy for Sustainable Development*, VII(4): 79-102, December 2003.
49. R.H. Williams and E.D. Larson, "A Comparison of Direct and Indirect Liquefaction Technologies for Making Fluid Fuels from Coal," *Energy for Sustainable Development*, VII(4): 103-129, December 2003.
50. J.M. Ogden, R.H. Williams, and E.D. Larson, "Societal Lifecycle Costs of Cars with Alternative Fuels/Engines," *Energy Policy*, 32: 7-27, 2004.
51. E.D. Larson and H. Yang, "Dimethyl ether (DME) from coal as a household cooking fuel in China," *Energy for Sustainable Development*, VIII(3): 115-126, September 2004.
52. X. Wang, D.L. Mauzerall, Y. Hu, A.G. Russell, E.D. Larson, J-H. Woo, D.G. Streets, and A. Guenther, "A High-Resolution Emission Inventory for Eastern China in 2000 and Three Scenarios for 2020," *Atmospheric Environment*, 39(32): 5917-5933, October 2005.
53. C. Azar, K.Lindgren, E.D. Larson, and K. Möllersten, "Carbon capture and storage from fossil fuels and biomass – Costs and potential role in stabilizing the atmosphere," *Climatic Change*, 74(1-3): 47-79, January 2006.
54. E.D. Larson, "A Review of LCA Studies on Liquid Biofuel Systems for the Transport Sector," *Energy for Sustainable Development*, X(II): 109-126, 2006.

55. E.D. Larson, S. Consonni, R.E. Katofsky, K. Lisa, and J. Frederick, "An Assessment of Gasification-Based Biorefining at Kraft Pulp and Paper Mills in the United States, Part A: Background and Assumptions," *TAPPI Journal*, 7(11): 8-14, November 2008.
56. E.D. Larson, S. Consonni, R.E. Katofsky, K. Lisa, and J. Frederick, "An Assessment of Gasification-Based Biorefining at Kraft Pulp and Paper Mills in the United States, Part B: Results," *TAPPI Journal*, 7(12): 4-12, January 2009.
57. S. Consonni, R.E. Katofsky, and E.D. Larson, "A Gasification-Based Biorefinery for the Pulp and Paper Industry," *Chemical Engineering Research and Design*, forthcoming 2009 (accepted November 2008).
58. L.R. Lynd, E. Larson, N. Greene, M. Laser, J. Sheehan, B.E. Dale, S. McLaughlin, and M. Wang, "The Role of Biomass in America's Energy Future: Framing the Analysis," *Biofuels, Bioproducts, and Biorefining*, 3(2): 113-123, March/April 2009.
59. H. Jin, E.D. Larson, and F.E. Celik, "Performance and Cost Analysis of Future, Commercially-Mature Gasification-Based Electric Power Generation from Switchgrass," *Biofuels, Bioproducts, and Biorefining*, 3(2): 142-173, March/April 2009.
60. E.D. Larson, H. Jin, and F.E. Celik, "Large-Scale Gasification-Based Co-Production of Fuels and Electricity from Switchgrass," *Biofuels, Bioproducts, and Biorefining*, 3(2): 174-194, March/April 2009.
61. M. Laser, E. Larson, B. Dale, M. Wang, N. Greene, and L.R. Lynd, "Comparative Analysis of Efficiency, Environmental Impact, and Process Economics for Mature Biomass Refining Scenarios," *Biofuels, Bioproducts, and Biorefining*, 3(2): 247-270, March/April 2009.

Edited works

1. E.D. Larson and R.H. Williams (eds.), *Report on the (April 3, 1986) NJECL Workshop on Steam-Injected Gas Turbines for Central Station Power Generation*, Center for Energy and Environmental Studies, Princeton University, Princeton, NJ, September 1986.
2. E.D. Larson, L.J. Nilsson, and T.B. Johansson (eds.), *The Technology Menu for Efficient End-Use of Energy, Vol. 1: Movement of Material*, Environmental and Energy Systems, Lund University, Lund, Sweden, 1989.
3. E.D. Larson (ed.), *Report on the 1989 Thailand Workshop on End-Use-Oriented Energy Analysis*, International Institute for Energy Conservation, Washington, DC and Bangkok, April 1990.
4. E.D. Larson and D.R. Raymond (eds.), *Report on the Workshop on Commercialization of Black Liquor and Biomass Gasification for Gas Turbine Applications in the Pulp and Paper Industry*, Center for Energy and Environmental Studies, Princeton University, Princeton, NJ, 20 March 1997.
5. E.D. Larson (guest editor), 2000, *Energy for Sustainable Development*, special issue on modernized biomass energy, **IV**(3), October, 92 pp.
6. E.D. Larson (guest editor), 2001, *Energy for Sustainable Development*, second special issue on modernized biomass energy, **V**(1), March, 82 pp.
7. E.D. Larson and Li Zheng, Tsinghua University (guest co-editors), 2003, *Energy for Sustainable Development*, **VII**(4), December (150 pages), special issue based on the Workshop on Coal Gasification for Clean and Secure Energy (convened by the Task Force on Energy Strategies and Technologies, China Council for International Cooperation on Environment and Development, Beijing, 25-26 August 2003).
8. E.D. Larson and I.C. Macedo, University of Campinas (guest co-editors), 2004, *Energy for Sustainable Development*, **VIII**(3), September (130 pages), special issue on Fuels for Clean Cooking.

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2. E.D. Larson, "Developing-Country Competitiveness in the Global Marketplace," Report 175, Center for Energy and Environmental Studies, Princeton University, February 1985.

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7. E.D. Larson, "Menu of Fuel-Saving Technologies," PU/CEES Working Paper 76, Princeton University, Princeton, NJ, April 1985.

8. E.D. Larson, "Producer Gas, Economic Development, and the Role of Research," Report 187, Center for Energy and Environmental Studies, Princeton University, April 1985.

9. E.D. Larson and R.H. Williams, "A Primer on the Thermodynamics and Economics of Steam-Injected Gas-Turbine Cogeneration," Report 192, Center for Energy and Environmental Studies, Princeton University, June 1985.

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12. R.H. Williams and E.D. Larson, "Steam-Injected Gas Turbines and Electric Utility Planning," *Energy Technology XIII: Energy in Transition*, Government Institutes Inc., Washington, DC, March 1986.

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2. "Energy and Development," Woodrow Wilson National Fellowship Foundation Summer Workshop on Global Interdependence, Princeton, NJ, July 9-27, 1984.

3. "Material Consumption Patterns and Industrial Energy Demand in Industrialized Countries," special seminar at the Guangzhou Institute for Energy Conversion, Chinese Academy of Science, Guangzhou, China, Dec. 25, 1984.

4. "Some Basic Issues in the Gasification of Biomass and Its Connection to Economic Development," seminar series on the Future Role of Biomass as an Energy Source, School of Forestry and Environmental Studies, Yale University, New Haven, CT, February 6, 1985.

5. "The Use of Biomass for Energy in China," Tuesday Seminar Series, Center for Energy and Environmental Studies, Princeton University, Princeton, NJ, February 26, 1985.

6. "The Thermodynamics and Economics of Steam-Injected Gas-Turbine Cogeneration," American Physical Society Short-Course on Energy Conservation, Washington, D.C., April 27-28, 1985.

7. "The Quiet Revolution in Power Generating Technology: Steam-Injected Gas Turbines," Tuesday Seminar Series, Center for Energy and Environmental Studies, Princeton University, Princeton, NJ, October 15, 1985.

8. "Overview of Steam-Injected Gas Turbines: Cogeneration and Utility Applications," Energy Policy/Technology Assessment Seminar Series, Center for Energy and Environmental Studies, Princeton University, Princeton, NJ, September 17, 1985.

9. "Steam-Injected Gas Turbines," special seminar at the Department of Mechanical Engineering, University of Minnesota, Minneapolis, MN, October 25, 1985.

10. "Biomass Gasification: Research, Development and Application," Energy Policy/Technology Assessment Seminar Series, Center for Energy and Environmental Studies, Princeton University, Princeton, NJ, November 22, 1985.

11. "Steam-Injected Gas Turbines," ASME International Gas Turbine Conference, Dusseldorf, Germany, June 8-12, 1986.

12. "Gas Turbine Cycle Concepts for Bagasse-Fueled Cogeneration in Sugar Factories," Eastern Headquarters, Bechtel Power Corp., Gaithersburg, MD, Oct. 15, 1986.

13. "Gas Turbine Options for Bagasse-Fueled Cogeneration in Sugar Factories," Sugar Industry Research Institute, Kingston, Jamaica, Oct. 29, 1986.

14. "Global Potential for Gas Turbine Power Generation in Sugar Factories," Engineering Systems Laboratory, General Electric Corp. Research and Development, Schenectady, NY, Jan. 28, 1987.
15. "Progress at CEES in the Assessment of Biomass-Fueled Gas Turbine Power Generation," Bechtel National, Inc. and of the US Agency for International Development, Princeton, NJ, Feb. 17, 1987.
16. "Steam-Injected Gas Turbine Cogeneration for the Cane Sugar Industry," meeting of Jamaican sugar and petroleum-refining industries, Kingston, Jamaica, March 18, 1987.
17. "New Prospects for Cogeneration in the Cane Sugar Industry," Second Pacific Basin Biofuel Workshop, Kauai, HI, April 22-24, 1987.
18. "Gas Turbine Cogeneration in the Cane Sugar Industry," presentation to representatives of the World Bank, the US Department of Energy, the Inter-American Development Bank, the US Agency for International Development, Bechtel National, and others, Washington, D.C., May 21, 1987.
19. "Biomass-Fired Steam-Injected Gas Turbine Cogeneration for the Cane Sugar Industry," presentation to representatives of the World Bank, US Department of Energy, Inter-American Development Bank, the US Agency for International Development, USTDP, General Electric, Bechtel, and others, Washington, DC, June 19, 1987.
20. "Biomass-Fired Steam-Injected Gas Turbine Cogeneration for the Jamaican Cane Sugar Industry," presentation to representatives of the Jamaican Sugar Industry Authority, Sugar Industry Research Institute, Jamaica Sugar Holdings, Jamaica Public Service Utility, Ministry of Mining, Energy and Tourism, and Petrojam, Kingston, Jamaica, June 30, 1987.
21. "Biomass-Fired Gas-Turbine Cogeneration at Efficient Cane-Sugar Factories: A Jamaican Case Study," Meeting of the Jamaican Association of Sugar Technologists, Ocho Rios, Jamaica, Nov. 6, 1987.
22. "Biomass-Fired Steam-Injected Gas Turbine Cogeneration," special seminar at the Energy Systems Analysis Program, University of Lund, Lund, Sweden, January 14, 1988.
23. "Gas Turbine Cogeneration with Agricultural Residues," Convocation on Rice Residue Utilization Technology, Louisiana State University, Baton Rouge, LA, Jan. 28, 1988.
24. "Biomass-Fired Gas Turbine Cogeneration for the Cane Sugar Industry," West Indies Sugar Technologists Conference, Bridgetown, Barbados, April 21, 1988.
25. "Biomass-Fired Gas Turbine Cogeneration for the Cane Sugar Industry," Research in Thermochemical Biomass Conversion Conference: An International Conference, Phoenix, AZ, May 6, 1988.
26. "Biomass-Fired Aeroderivative Turbines," seminar at the World Bank to representatives of the Household and Renewable Energy and Energy Efficiency Strategies Departments, Washington, DC, May 23, 1988.
27. "Aeroderivative Turbines for Power from Natural Gas and Biomass Fuels in Developing Countries," seminar at Shell International Petroleum Co. to Group Planning, Natural Gas, Non-traditional Business Divisions, London, UK, July 19, 1988.
28. "Biomass-Fired Steam-Injected Gas Turbine Cogeneration," Second International ASME Symposium on Turbomachinery, Combined-Cycle Technologies, and Cogeneration, Montreux, Switzerland, Aug. 30, 1988.
29. "Biomass-Fired Aeroderivative Turbines," seminar at ASEA Brown-Boveri Corporate Research Center, Baden, Switzerland, Sept. 2, 1988.

30. "Advanced Gasifier Gas Turbine Power Systems," special seminar at the Technical Research Center of Finland, Helsinki, May 4, 1989.
31. "Biomass Gasification for Gas Turbine Power Generation," Electricity Congress, sponsored by Vattenfall, the Swedish State Power Board, Gothenburg, Sweden, May 31, 1989.
32. "Biomass Gas Turbine Cogeneration for the Cane Sugar Industry," XX Congress of the International Society of Sugar Cane Technologists, São Paulo, Brazil, October 19, 1989.
33. "Development of Biomass Gasification Systems for Gas Turbine Cogeneration in the Cane Sugar Industry," XX Congress of the International Society of Sugar Cane Technologists, São Paulo, Brazil, October 19, 1989.
34. "Biomass-Fired Gas Turbines at Cane Sugar Factories: A Major Electricity Supply Option," seminar at the State Energy Company of São Paulo (CESP), São Paulo, Brazil, Oct. 17, 1989.
35. "The Technology Menu for Efficient End-Use of Energy," seminar at the State Energy Company of São Paulo, São Paulo, Brazil, Oct. 17, 1989.
36. "Biomass-Fired Gas Turbines at Cane Sugar Factories: A Major Electricity Supply Option," seminar at the Ferdinand Braudel Institute of World Economics, São Paulo, Brazil, Oct. 18, 1989.
37. "Biomass-Fired Gas Turbines at Cane Sugar Factories: A Major Electricity Supply Option," seminar for engineering staff at the Electricity Generating Authority of Thailand, Bangkok, Thailand, Nov. 1, 1989.
38. "Biomass-Gasifier Steam-Injected Gas Turbine Cogeneration for the Cane Sugar Industry," Conference on Energy from Biomass and Wastes XIV, Buena Vista, FL, Jan. 29-Feb. 2, 1990.
39. "Development of Biomass Gasification Systems for Gas Turbine Power Generation," Conference on Energy from Biomass and Wastes XIV, Buena Vista, FL, Jan. 29-Feb. 2, 1990.
40. "A Renewable Electricity Future for Sweden After Nuclear Power?" Tuesday Seminar Series, Center for Energy and Environmental Studies, Princeton University., Princeton, NJ, Feb. 13, 1990.
41. "Biomass-Gasifier Gas Turbine Applications in the Pulp and Paper Industry: An Initial Strategy for Reducing Electric Utility CO₂ Emissions," Ninth EPRI Conference on Coal Gasification Power Plants, Palo Alto, CA, Oct. 17-19, 1990.
42. "Biomass-Gasifier Gas Turbine Applications in the Pulp and Paper Industry: An Initial Strategy for Reducing Electric Utility CO₂ Emissions," Conference on Biomass for Utility Applications, Tampa, FL, Oct. 23-25, 1990.
43. "R&D Issues for Pressurized Fixed-Bed and Fluidized-Bed Biomass Gasifiers for Gas Turbine Applications," Biomass Power Long Range Plan Meeting, Solar Energy Research Institute, Golden, CO., Jan. 22, 1991.
44. "Advanced Biomass-Gasifier/Gas Turbine Cogeneration Systems," Energy Planning for the 90s: Matching Energy Sources to Energy Needs with Concerns for Efficiency, Economics, and the Environment, Bucknell University, Lewisburg, PA, Jan. 25, 1991.
45. "Energy Conservation and the Technology Menu for Efficient End-Use of Energy: A Discussion in the Indian Context," Center for Energy Studies, Indian Institute of Technology, New Delhi, India, April 23, 1991.
46. "Biomass-Gasifier/Gas Turbine Cogeneration in the Pulp and Paper Industry," International Gas Turbine Conference, Orlando, FL, June 5, 1991.

47. "Advanced Gasification-Based Biomass Power Generation and Cogeneration," ESETT'91: International Symposium on Environmentally Sound Energy Technologies and Their Transfer to Developing Countries and European Economies in Transition, Milan, Italy, Oct. 22, 1991.
48. "Trends in the Consumption of Energy-Intensive Basic Materials in Industrialized Countries and Implications for Developing Regions," ESETT'91: International Symposium on Environmentally Sound Energy Technologies and Their Transfer to Developing Countries and European Economies in Transition, Milan, Italy, Oct. 22, 1991.
49. "Environmental and Economic Issues of Biomass-Gasifier/Gas Turbine Cogeneration," Course on Cogeneration Systems: Economic and Environmental Assessment, Test Procedures, Dipartimento di Energetica, Politecnico di Milano, Milan, Italy, Oct. 23, 1991.
50. "Workshop on the Technology Menu for Efficient End-Use of Energy in Indian Industry," National Productivity Council Headquarters, New Delhi, India, Jan. 10, 1992.
51. "Fuels and Electricity from Biomass," 3rd US Hydrogen Meeting, Arlington, VA, Mar. 18-20, 1992.
52. "Production of Methanol and Hydrogen via Biomass Gasification," Conference on Advances in Thermochemical Biomass Conversion, Interlaken, Switzerland, May 1992.
53. "India Technology Menu for Efficient Use of Energy," (with K.K. Chakarvarti and D. Pawan Kumar), Office of Energy and Infrastructure, US Agency for International Development, August 12, 1992.
54. "Fuels and Electricity from Biomass," Dept. of Environmental and Energy Systems Studies, Lund University, Lund, Sweden, Sept. 14, 1992.
55. "Demand-Side Management and Least-Cost Electricity Planning," International Energy Initiative Workshop on Integrated Electricity Planning, Bangalore, India, March 8-12, 1993.
56. "The India Technology Menu for Efficient Energy Use," Technology Menu Workshops, Bangalore, Calcutta, Ahmedabad, and New Delhi, India, March 15-22, 1993.
57. "Biomass-Gasifier/Gas Turbine Power Generating Technology," Electric Power Research Institute's Conference on Strategic Benefits of Biomass and Waste Fuels, Washington, March 1993.
58. "Hydrogen and Methanol for Fuel Cell Vehicles: Availability and Economics," US Department of Energy's Annual Automotive Technology Development Contractors' Coordination Meeting, Dearborn, MI, Oct. 18-21, 1993.
59. "Development of Sustainable Biomass Energy Production in Northeast Brazil," at workshop of same title, Brasilia, Brazil, May 3, 1994.
60. "The Potential for Sugarcane Electric Power in Cuba," guest lecture at ISPJAE (Instituto Superior Politecnico Jose Antonio Echeverria), Havana, Cuba, June 22, 1994.
61. "Advanced Biomass Power Generation," Energy Research Corp., Danbury, CT, August 29, 1994.
62. "Farm Forestry in Brazil," Bioresources '94: Biomass Resources: a Means to Sustainable Development, Bangalore, India, Oct. 4, 1994.
63. "Biomass-Gasifier/Aeroderivative Gas Turbine Combined Cycle Power Generation," Bioresources '94: Biomass Resources: a Means to Sustainable Development, Bangalore, India, Oct. 4, 1994.
64. "Biomass-Gasifier/Aeroderivative Gas Turbine Combined Cycles," Weyerhaeuser Corporate Technology Center, Seattle, WA, Oct. 24, 1994.

65. "Methanol and Hydrogen from Biomass for Transportation," at the Biofuels Analysis Technical Review Meeting, White House Conference Center, Washington, DC, Oct. 28, 1994.
66. "Methanol and Hydrogen from Biomass and MSW," Air Products and Chemicals, Inc., Princeton, NJ, Dec. 6, 1994.
67. "Long-Term Strategies for Expansive Growth in Advanced, Sustainable Biomass Energy Systems," World Bank and GEF, World Bank, Washington, DC, Dec. 8, 1994.
68. "Biomass Integrated-Gasifier/Gas Turbine Power Generating Systems," Jose Carlos Medeiros, CEPEL [Brazilian Electric Power Research Institute], Princeton, NJ, Jan. 27, 1995.
69. "Market Opportunities for Hydrogen in Developing Regions," 6th Annual National Hydrogen Association Meeting, Alexandria, Virginia, March 9, 1995.
70. "Advanced Gas Turbine Power Generation with Natural Gas and Biomass as Fuel," guest lecture in MAE 221, Thermodynamics, Engineering School, Princeton University, Princeton, NJ, April 7, 1995.
71. "Electricity Cogeneration in Sugar/Alcohol Industries," Workshop on Perspectives of Ethanol Fuel in Brazil, São Paulo, Brazil, June 28, 1995.
72. "Low GHG Emitting Technologies," Meeting on Future Programming in the Context of the GEF Climate Change Operational Strategy, United Nations Development Program, New York, NY, Nov. 22, 1995.
73. "Research, Development, and Commercialization Needs for Biomass Electricity Systems," Workshop on Energy from Biomass and Wastes, Dublin, Ireland, Dec. 5-7, 1995.
74. "Advanced Technologies for Biomass-Energy Utilization in the Pulp and Paper Industry," Office of Industrial Technologies, US Department of Energy, Washington, DC, Dec. 19, 1995.
75. "Advanced Technologies for Biomass-Energy Utilization in the Pulp and Paper Industry," NOELL, Inc., Herndon, VA, Feb. 15, 1996.
76. "Advanced Gas Turbine Power Generation," guest lecture in MAE 221, Thermodynamics, Engineering School, Princeton University, Princeton, NJ, February 23, 1996.
77. "Biomass Energy," Workshop on Sustainable Energy, United Nations Development Program, New York, NY, April 18, 1996.
78. "Biomass Energy Case Studies," Workshop on Sustainable Energy, United Nations Development Program, New York, NY, April 18, 1996.
79. "Future Prospects for Biomass as a Major Global Energy Source," invited seminar, Dartmouth College, Hanover, NH, May 2, 1996.
80. "International Market Opportunities for Gas Turbine Power Generation with Natural Gas and Biomass Fuels," Energy Daily 3rd Annual Conference on Advanced Combustion Turbines: New Strategies and Business Opportunities, Washington, DC, May 9-10, 1996.
81. "Advanced Technologies for Biomass-Energy Utilization in the Pulp and Paper Industry," Union Camp Research and Development Center, Princeton, NJ, May 14, 1996.
82. "Performance Modeling of Aeroderivative Steam-Injected Gas Turbines and Combined Cycles Fueled from Fixed or Fluid-Bed Biomass Gasifiers," ASME Turbo Expo, Birmingham, UK, June 10-13, 1996.
83. "Economic Scales for First-Generation Biomass-Gasifier/Gas Turbine Combined Cycles Fueled from Energy Plantations," ASME Turbo Expo, Birmingham, UK, June 10-13, 1996.

84. "Technical Advances in Biomass Conversion for Energy," the Woods Hole-Princeton Workshop on Competing Uses of the Planet's Photosynthetic Product for Food, Fuel, Fiber, Feedstock, and Ecosystem Function, Woods Hole Research Center, Woods Hole, MA, June 27-28, 1996.
85. "GEF Climate Change Activities," Seminario de Disseminacao de Informacoes sobre o GEF, organized by the GEF (World Bank and United Nations Development Program) and government of Brazil, Brasilia, July 3-5, 1996.
86. "Advanced Technologies for Biomass-Energy Utilization in the Pulp and Paper Industry," Air Products and Chemicals, Inc., Princeton, NJ, July 23, 1996.
87. "GEF Operational Strategy for Climate Change," United Nations Development Program Environment Focal Points Workshop, Margarita Island, Venezuela, Nov. 18-20, 1996.
88. "Gasification of Municipal Solid Waste," Meeting on MSW Gasification/Fuel Cells held at the Natural Resources Defense Council Office, New York, NY, Nov. 25, 1996.
89. "Overview of Black Liquor and Biomass Gasification/Gas Turbine Systems," Workshop on Commercialization of Black Liquor and Biomass Gasification for Gas Turbine Applications in the Pulp and Paper Industry, School of Engineering, Princeton University, Princeton, NJ, Jan. 16-17, 1997.
90. "Advanced Technologies for Biomass-Energy Utilization in the Pulp and Paper Industry," Workshop on Commercialization of Black Liquor and Biomass Gasification for Gas Turbine Applications in the Pulp and Paper Industry, School of Engineering, Princeton University, Princeton, NJ, Jan. 16-17, 1997.
91. "GEF Operational Strategy for Climate Change," United Nations Development Program Workshop, Bogota, Colombia, May 21, 1997.
92. "Climate Change and Mitigation Strategies," Seminario Internacional Desarrollo Sostenible, Ministry of the Environment, Bogota, Colombia, 22-23 May 1997.
93. "Effect of Fuel Moisture Content on Biomass-IGCC Performance," Turbo-Expo '97, 42nd ASME Gas Turbine and Aeroengine Conference, Orlando, FL, June 2-5, 1997.
94. "Black Liquor-Gasifier/Gas Turbine Cogeneration," Turbo-Expo '97, 42nd ASME Gas Turbine and Aeroengine Conference, Orlando, FL, 2-5 June, 1997.
95. "Performance of Black Liquor-Gasifier/Gas Turbine Combined Cycle Cogeneration in the Kraft Pulp and Paper Industry," Third Biomass Conference of the Americas, Montreal, Canada, August 25-29, 1997.
96. "Biomass and Black Liquor Gasifier/Gas Turbine Cogeneration at Pulp and Paper Mills," Third Biomass Conference of the Americas, Montreal, Canada, August 25-29, 1997.
97. "GEF Operational Strategy for Climate Change," Taller Nacional del Fondo para el Medio Ambiente Mundial, Ministerio del Medio Ambiente, Bogota, Colombia, 29 Sept. - 1 Oct. 1997.
98. "The Role of Biomass in the World Context: Potential and Perspectives," invited plenary talk, Conference on Biomass for Electricity Production: Experiences and Perspectives in the European Union and Brazil, Brasilia, Brazil, October 6-8, 1997.
99. "Hydrogen Production, Storage, and End-Use," National Academy of Science, Havana, Cuba, October 24, 1997.
100. "Advanced Technologies for Biomass-Energy Utilization in the Pulp & Paper Industry," US Department of Energy contractors' review meeting, Chicago, IL, December 1, 1997.

101. "Assessing Prospective Costs and Benefits of Black Liquor Gasifier/Combined Cycle Technology," US Department of Energy/Agenda 2020 poster review session, Chicago, IL, December 2, 1997.
102. "Assessment of Gasifier/Fuel Cell Powerplant Systems for Biomass By-Products Utilization in the Forest Products Industry," US Department of Energy/Agenda 2020 poster review session, Chicago, IL, December 2, 1997.
103. "Gasification of Municipal Solid Waste to Run Fuel Cell Buses," Department of Environmental Protection, State of New Jersey, Trenton, NJ, Dec. 16, 1997.
104. "Small-Scale Gasification-Based Biomass Power Generation," Workshop on Small-Scale Electricity Generation from Biomass, Energy Strategies Working Group, China Council for International Cooperation on Environment and Development, Changchun, Jilin Province, China, January 12-13, 1998.
105. "Transport Fuels from MSW for New Jersey," presentation to Commissioner Robert Shinn and others at the Department of Environmental Protection, State of New Jersey, Trenton, Feb. 25, 1998.
106. "Fuel Cell Vehicles and New Jersey," presented at a briefing on Hydrogen Energy for New Jersey Transportation, New Jersey State House, Trenton, NJ, March 11, 1998.
107. "Biomass Energy," guest lecture, Geosciences 524, Princeton University, Princeton, NJ, April 21, 1998.
108. "Preliminary Economics of Black Liquor Gasifier/Gas Turbine Cogeneration at Pulp/Paper Mills," 43rd ASME Gas Turbine & Aeroengine Congress, Stockholm, Sweden, June 3, 1998.
109. "Combined Biomass and Black Liquor Gasifier/Gas Turbine Cogeneration at Pulp/Paper Mills," 43rd ASME Gas Turbine & Aeroengine Congress, Stockholm, Sweden, June 3, 1998.
110. "Transport Fuels from MSW in New Jersey, Division of Solid Waste," NJ Dept. of Environmental Protection, Trenton, NJ, July 9, 1998.
111. "Advanced Technologies for Biomass-Energy Utilization in the Pulp & Paper Industry," project review meeting, US Department of Energy, Washington, DC, Oct. 20, 1998.
112. "Preliminary Cost Assessment of Black Liquor Gasification," Babcock and Wilcox R&D Center, Barberton, OH, May 25, 1999.
113. "Biomass Gasification in the USA," Brazil Biomass Gasification Project Expert Workshop, The World Bank, Washington, DC, June 3, 1999.
114. "Advanced Technologies for Biomass Conversion to Energy," keynote talk, Second Olle Lindström Symposium on Renewable Energy: Bioenergy, Royal Institute of Technology, Stockholm, Sweden, June 9, 1999.
115. "Biomass Conversion to Fischer-Tropsch Liquids: Preliminary Energy Balances," 4th Biomass Conference of the Americas, Oakland, CA, Aug. 29- Sept. 2, 1999.
116. "A Preliminary Assessment of Biomass Conversion to Fischer-Tropsch Cooking Fuels for Rural China," 4th Biomass Conference of the Americas, Oakland, California, Aug. 29- Sept. 2, 1999.
117. "Crop-Residue Fueled Trigeneration with Microturbines in Rural China," Technical Training Workshop of the Jilin Biomass Energy Modernization Project, Changchun, Jilin Province, China, 27-28 March 2000.
118. "Commercialization Prospects for Fuel Cell Buses," Workshop on Commercialization of Fuel Cell Buses: Potential Roles for the GEF, United Nations Headquarters, New York, 27-28 April 2000.

119. "Biomass Integrated-Gasifier/Gas Turbine Combined Cycle Technology for Sugarcane Processing Industries: Possibilities for Cuba," International Workshop on Sugarcane Energy, Havana, Cuba, 7-9 November 2000.
120. "Ethanol from Biomass," Atmospheric Environment Institute, Chinese Research Academy of Environmental Sciences, State Environmental Protection Agency, Beijing, China, 14 Dec. 2000.
121. "Creating a Village Biomass-CHP Industry in Jilin Province," Jilin Biomass Energy Modernization Project, Business Seminar, Changchun, Jilin Province, China, 16 December 2000.
122. "Polygeneration Strategies for Clean, Low-Carbon Energy Futures for China," invited lecture, Chalmers Technical University/Goteborg University, Gothenburg, Sweden, 1 February 2001.
123. "Polygeneration: a Fundamental Strategy for Environmentally-Sustainable Future Energy for China?" presented at China headquarters of BP (British Petroleum), Beijing, 19 June 2001.
124. "The Carbon Challenge," presented at the Community Learning Day session on Environmental and Societal Tradeoffs in Meeting Society's Demand for Electrical Power, The College of New Jersey, Ewing, NJ, 17 October 2001.
125. "Socio-Economic and Environmental Impact Assessment for the Jilin Modernized Biomass Energy Project," (presented with John Young), Business Enterprise Workshop, Yanji City, Jilin Province, China, 7 December 2001.
126. "The Carbon Mitigation Initiative at Princeton University and the Tsinghua-Princeton Collaboration," Department of Thermal Engineering, Tsinghua University, Beijing, China, 12 December 2001.
127. "The Princeton-Tsinghua Collaboration on Low Emission Energy Technologies and Strategies for China," Hydrogen Meeting, Carbon Mitigation Annual Review, Princeton University, Princeton, NJ, 16 January 2002.
128. "Future Implications of China's Energy Technology Choices," (presented with Pat Delaquil), invited seminar, US Department of Energy, Washington, DC, 22 January 2002.
129. "Technology Strategies for Addressing China's Energy Challenges," Associated Faculty Forum, Princeton Environmental Institute, Princeton University, 9 April 2002.
130. "Energy Strategies for China," Group Meeting, Carbon Mitigation Initiative, Princeton University, 29 April 2002.
131. "Exploring Implications to 2050 of Energy-Technology Options for China," 6th International Conference on Greenhouse Gas Control Technologies (GHGT-6), Kyoto, Japan, 1 Oct, 2002.
132. "Production of Hydrogen and Electricity from Coal with CO₂ Capture," (presentation of paper by Kreutz, Williams, Socolow, Chiesa, and Lozza), 6th International Conference on Greenhouse Gas Control Technologies (GHGT-6), Kyoto, Japan, 2 Oct, 2002.
133. "A Cost Benefit Analysis of Black Liquor Gasification in the Southeast United States," (presented with Ryan Katofsky) to the Steering Committee and Review Board of the BLGCC Analysis Project, American Forest and Paper Association, Washington, DC, 5 November 2002.
134. "Global Renewable Energy Resource Estimates for the SAGE Model," (presented with Pat Delaquil), invited seminar, Energy Information Administration, US Department of Energy, Washington, DC, 13 November 2002.
135. "Polygeneration Analysis at Princeton University, 2002," presented at meeting of the Task Force on Energy Strategies and Technologies of the China Council for International Cooperation on Environment and Development, Tsinghua University, Beijing, 10-11 December 2002.

136. "Clean Energy Technologies and Strategies for China," Center for Environmental Research and Technology, Bourns College of Engineering, University of California, Riverside, 3 March 2003.
137. "Synthetic Fuels Production by Indirect Coal Liquefaction," Workshop on Coal Gasification for Clean and Secure Energy (convened by Task Force on Energy Strategies and Technologies, China Council for International Cooperation on Environment and Development), Beijing, 25-26 Aug. 2003.
138. "Cost-Benefit Assessment of Black Liquor Gasification Combined Cycle (BLGCC)," Black Liquor Program Review, U.S. Department of Energy, Morgantown, WV, 21 October 2003.
139. "A Cost-Benefit Analysis of Black Liquor Gasification Combined Cycle Systems," Fall Technical Conference, Technical Association of the Pulp and Paper Industry, Chicago, IL, 29 October 2003.
140. "A Cost-Benefit Analysis of Black Liquor Gasification Combined Cycle Systems," Oak Ridge National Laboratory, 8 December 2003.
141. "Thermochemical Processing of Non-Grain Biomass for Energy," Non-Grain Biomass Meeting, Cargill, Inc., Minneapolis, MN, 22 January 2004.
142. "Production of Electricity and/or Fuels from Biomass by Thermochemical Conversion," Public Meeting of the project, Renewable Biomass Energy for America's Energy Future, American Association for the Advancement of Science, Washington, DC, 23 February 2004.
143. "Biomass Gasification Systems for Electric Power, Cogeneration, Liquid Fuels, and Hydrogen," Global Climate and Energy Project (GCEP) Energy Workshops, Stanford University, Stanford, California, 27 April 2004.
144. "Environmental and Economic Implications of Phasing Out Solid Fuels Used for Cooking in China," Workshop on Mitigation of Air Pollution and Climate Change in China, Norwegian Academy of Science and Letters, Oslo, 17-19 October 2004.
145. "Future Energy Technologies and Strategies for China," Industrial Performance Center, Massachusetts Institute of Technology, Cambridge, Massachusetts, 22 February 2005.
146. "New Value from Residuals and Spent Liquor," American Institute of Chemical Engineers, Spring Meeting, Atlanta, 11 April 2005.
147. "Gasification-based Liquid Fuels and Electricity from Biomass with Carbon Capture and Storage," 4th Annual Conference on Carbon Capture and Sequestration, US Dept. of Energy, Alexandria, VA, 2-5 May 2005.
148. "Gasification-based Liquid Fuels and Electricity from Biomass with Carbon Capture and Storage," UOP Research Headquarters, Des Plaines, Illinois, 3 June 2005.
149. "Energy Systems Analysis (Bioenergy Focus) and Related Policy Issues," special seminar, Joint Graduate School of Energy and Environment, King Mongkut's University of Technology Thonburi, Bangkok, Thailand, 6 July 2005.
150. "Development and Deployment of Biomass Power Generation Systems: a Global Perspective," Conference on Power Generation from Renewable Energy: Practical Approaches, Bangkok, Thailand, 8 July 2005.
151. "Review of LCA Studies on Liquid Biofuel Systems for the Transport Sector," Workshop on Biofuels for the Transport Sector, Science & Technology Advisory Panel, Global Environmental Facility, New Delhi, India, August 30, 2005.

152. "Transportation Energy and Environmental Concerns at Home and Abroad," Physic Department Colloquium, Rutgers University, New Brunswick, 2 November 2005.
153. "The Role of Biomass in America's Energy Future," ECON Analysis, Oslo, Norway, 8 November 2005.
154. "Toward a Global Clean Cooking Initiative," Norwegian Ministry of Foreign Affairs, Oslo, Norway, 8 November 2005.
155. "Evaluating the Impact of Air Pollution on Agriculture and Human Health in China: Implications for future air pollution and energy policies," presented on behalf of X. Wang at D. Mauzerall at A Policy Workshop on Mitigation of Air Pollution and Climate Change in China: co-benefits and co-control, Beijing, 22-23 November 2005.
156. "Low-Carbon Transport Fuels from Coal and Biomass for China and the U.S.," Civil, Architectural, and Environmental Engineering Department, Drexel University, Philadelphia, PA, 30 November 2005.
157. "Lifecycle Analyses of GHG Impacts of Biofuels for Transport," Energy Week, The World Bank, 7 March 2006.
158. "Hydrogen and Electricity from Biomass With and Without Carbon Capture and Storage," Fifth Annual Conference on Carbon Capture and Sequestration, Alexandria, VA, 8-11 May 2006.
159. "DME from Biomass (USA) and Coal (China)," Second International DME Conference, London, 15-17 May 2006.
160. "Low-Carbon Liquid Transportation Fuel from Coal and Biomass," Argonne National Laboratory, Chicago, IL, 2 June 2006.
161. "Fuels and Electricity from Biomass with CO₂ Capture and Storage," poster presentation by R.H. Williams on behalf of Larson, 8th International Conference on Greenhouse Gas Control Technologies, Trondheim, Norway, 19-22 June 2006.
162. "Gasification in the Pulp and Paper Industry," Georgia Bioenergy Conference, Tifton, GA, 2 Aug. 2006.
163. "Cost-Benefit Analysis of Gasification-Based Biorefining at U.S. Kraft Pulp Mills," TAPPI 2006 Engineering, Pulping and Environmental Conference, Atlanta, GA 7 Nov. 2006.
164. "Liquid Biofuel Technologies and Technology Issues," Biofuels Workshop, United Nations Conference on Trade and Development, Geneva, Switzerland, 30 Nov 2006.
165. "Cost-Benefit Analysis of Gasification-Based Biorefining at U.S. Kraft Pulp Mills," presentation to the AFPA Agenda 2020 CTO Committee, American Forest & Paper Association, Washington, DC, 7 Dec. 2006.
166. "Making Liquid Biofuels at Kraft Pulp/Paper Mills in the USA: Results of a Detailed Cost-Benefit Assessment," invited lecture, Dept. of Thermal Engineering, Chalmers University, Gothenburg, Sweden, 11 Jan. 2007.
167. "Biofuel Technologies Overview," testimony to Committee on Environment and Natural Resources Finance, Minnesota State House of Representatives, St. Paul, MN, 1 Feb 2007.
168. "Biofuel Technologies Overview," Symposium on Pathways Toward a Renewable Energy Future: Environmental Sustainability Through Technology and Policy, Initiative for Renewable Energy and The Environment, University of Minnesota, St. Paul, 1 Feb 2007.

169. "Making Liquid Biofuels at U.S. Kraft Pulp and Paper Mills," Dept. of Bioproducts and Biosystems Engineering, University of Minnesota, St. Paul, MN, 2 Feb 2007.
170. "Gasification-Based Liquid Biofuels Production," meeting on Coal/Biomass to Liquids Technology, National Energy Technology Laboratory, Pittsburgh, PA, 13 March 2007.
171. "Advanced Gasification-Based System Concepts for Biorefining," Advanced Bioenergy Technologies and Biofuels from Municipal Solid Waste, California Biomass Collaborative 4th Annual Forum, Sacramento, California, 28-29 March 2007.
172. "Gasification-Based Biorefineries Integrated with Pulp Mills," First Wednesday Seminar, Resources for the Future, Washington, DC, 4 April 2007.
173. "Gasification-Based Production of Electricity and/or Liquid Transportation Fuels," Seminar on Technologies for Future Production of Ethanol in Brazil, Instituto de Tecnologia Promon, Sao Paulo, Brazil, 17 April 2007.
174. "CO₂ for EOR from Coal Gasification," PetroChina – BP CCS/EOR Seminar, Research Institute of Petroleum Exploration and Development (RIPED), Beijing, 24-25 April 2007.
175. "Pulp Mill Integrated Gasification-Based Liquid Biofuels Production," TAPPI International Conference on Renewable Energy, Atlanta, GA, 10-11 May 2007
176. "Synfuels from Coal and Coal/Biomass: Greenhouse Gas Emissions and Policy Implications," Gasification Technologies Council Spring Meeting, Williamsburg, VA, 17-18 May 2007.
179. "Biofuel Production Technologies: Status and Prospects," Ad hoc expert group meeting on Biofuels: Trade and Development Implications of Present and Emerging Technologies, United Nations Conference on Trade and Development, Geneva, 19 June 2007.
180. "Making Better Use of Biomass for Energy," D.W. Brooks Lecture, College of Agricultural and Environmental Sciences, University of Georgia, Athens, GA, 2 October 2007.
181. "Low-GHG Liquid Fuels from Coal + Biomass," Chewonki Carbon Capture and Storage Seminar, Wiscasset, Maine, 24 October 2007.
182. "Prospects for Second Generation Biofuels Technologies," Conference on Biofuels: An Option for a Less Carbon-Intensive Economy, organized by the United Nations Conference on Trade and Development and the Energy Planning Agency of the Ministry of Mines and Energy of Brazil, Rio de Janeiro, 4-5 December 2007.
183. "China's Energy Challenges," guest lecture in Global Environmental Governance (WWS586d, taught by Michael Oppenheimer), Woodrow Wilson School of Public and International Affairs, Princeton University, 3 April 2008.
184. "China's Energy Challenges," guest lecture in Global Environmental Governance (ORF571, taught by Gregory Chow), Department of Operations Research and Financial Engineering, Princeton University, 3 April 2008.
185. "Low GHG Liquid Fuels (and Electricity) from Coal + Biomass," CTLtec Americas 2008, 23 June 2008, Pittsburgh, PA.
186. "Analysis of Fischer-Tropsch Fuels from Coal and Biomass," Commercial Aviation Alternative Fuels Initiative (CAAFI) Business Team Meeting and Workshop, 8-9 September 2008, Washington, DC
187. "Co-production of synfuels and electricity from coal + biomass with zero net carbon emissions: an Illinois case study," poster presentation at 9th International Greenhouse Gas Control Technologies Conference (Elsevier Energy Procedia), Washington DC, 17-18 November 2008.

188. "Biomass-Energy Technologies: Perspectives for Brazil's Sugarcane Industry," presented to the Technical Advisory Committee of the Centro de Tecnologia Canavieira, Piracicaba, Brazil, 24 Nov 2008.

189. "Biomass-Energy Technologies: Perspectives for Brazil's Sugarcane Industry," presented to the Board of Directors of the Centro de Tecnologia Canavieira, Sao Paulo, Brazil, 26 Nov 2008.

190. "Design/Simulation/Costing of Gasoline from Coal and Biomass (work in progress!)," presentation at ExxonMobil Research and Engineering Company, Annandale, NJ, 17 Feb 2009.

191. "Biofuels," commentary as a member of the "Bioenergy Panel" at the Massachusetts Institute of Technology Energy Conference, Boston, MA, 7 March 2009.

OTHER PROFESSIONAL ACTIVITIES (chronological in sections)

Reviewing and editing for journals

- Peer reviewer for manuscripts submitted to *Applied Energy*, *Biomass and Bioenergy*, *Bioresources Technology*, *Combustion Science and Technology*, *Energy*, *the International Journal*, *Energy Policy*, *Energy for Sustainable Development*, *Environmental Science & Technology*, *Industrial & Engineering Chemistry Research*, *Journal of Engineering for Gas Turbines and Power*, *Journal of Solar Energy Engineering*, *Resources, Conservation, and Recycling*, and other journals.
- Guest editor for special issues of *Energy for Sustainable Development* on topic of Biomass Energy Modernization, I (October 2000); Biomass Energy Modernization, II (March 2001); Coal Gasification for China, co-edited with Li Zheng, Tsinghua University, Beijing (Dec 2003); Clean Cooking Fuels, co-edited with Isaias Macedo, University of Campinas, Brazil (Sept 2004); Liquid Biofuels for Transport, co-edited with Thomas B. Johansson, University of Lund, Sweden, and Anjali Shanker, Innovation Energie Developpement, France (June 2006)..
- Member of the Board of Associate Editors, *Revista Brasileira de Bioenergia (Brazilian Review of Bioenergy)*, published quarterly in English and Portuguese, June 2002 –
- Associate Editor, *Energy for Sustainable Development*, 2004 –

PhD thesis committees

- Member of MSE thesis committee for Sean Casten, "Advanced Processes for Ethanol and Electricity Co-Production from Lignocellulosic Biomass," Thayer School of Engineering, Dartmouth College, Hanover, NH (defended, 18 December 1997).
- Member of Ph.D. thesis grading committee for Pål Börjesson, "Biomass in a Sustainable Energy System," Department of Environmental and Energy Systems Studies, Lund University, Lund, Sweden (defended 5 June 1998).
- "Opponent" for defense by Goran Berndes of Ph.D. thesis, "Biomass in the Energy System: Resource Requirements and Competition for Land," Department of Physical Resource Theory, Chalmers Technical University/Goteborg University, Gothenburg, Sweden, 2 Feb. 2001.
- "Opponent" for defense by Kenneth Molestrom of Ph.D. thesis, "Opportunities for CO₂ Reductions and CO₂-Lean Energy Systems in Pulp and Paper Mills," Department of Chemical Engineering and Technology, Royal Institute of Technology, Stockholm, Sweden, 27 Sept. 2002.
- Member of PhD thesis committee for Xiaoping Wang, "Evaluating Impacts of Air Pollution in China on Agriculture and Public Health: Implications for Air Pollution and Energy Policies," Woodrow Wilson School of Public and International Affairs, Princeton University, June 2004.
- Member of the "Promotion Committee" evaluating Ph.D. dissertation of Carlo Hamelink, "Outlook for Advanced Biofuels," Department of Science, Technology and Society, Utrecht University, Utrecht, The Netherlands, June 2004.
- "First Opponent" for defense by Heidi Mestl of Ph.D. thesis, "Air Pollution in China. Impacts on Population Exposure and Health from Industrial and Domestic Energy Use," Faculty of Mathematics and Natural Sciences, Department of Chemistry, University of Oslo, Norway, 3 November 2006.

- "Opponent" for defense by Eva Andersson of Ph.D. thesis, "Benefits of Integrated Upgrading of Biofuels in Biorefineries," Heat and Power Technology Division, Department of Energy and Environment, Chalmers University of Technology, Gothenburg, Sweden, 12 January 2007.

Committee memberships

- American Society of Mechanical Engineers' Committee on Coal, Biomass and Alternative Fuels Utilization, 1996 –
- Scientific Committee for the World Bioenergy Conference and Exhibition, Jonkoping, Sweden, 2-4 June 2004.
- Selection Committee for Link Energy Fellowships (administered by Dartmouth College), 2004 – 2006.
- Scientific Committee for the World Bioenergy Conference and Exhibition, Jonkoping, Sweden, June 2006.
- U.S. Federal Biomass R&D Technical Advisory Committee to the Departments of Energy and Agriculture, December 2005 - .
- Scientific Committee constituted to review the Swedish Environmental Research and Development Foundation (MISTRA) program on black liquor gasification, 17-19 May 2006.
- Scientific Advisory Committee constituted to review a major proposal to Swedish Energy Agency for R&D support for the Varnamo gasification facility to develop technology for liquid fuels production from biomass, 26-28 September 2006.

Activities with the International Energy Initiative (IEI)

(The International Energy Initiative is an international, non-governmental, non-profit organization working for efficient production and use of energy in developing countries in support of sustainable development.)

- Invited participant at the IEI Workshop on Catalyzing South/North and South/South Collaborations on Energy Strategies for Sustainable Development, Center for Energy and Environmental Studies, Princeton University, Princeton, NJ, Dec. 3-5, 1998.
- IEI Treasurer from July 1999 to present.
- IEI President from February 2004 – January 2006.
- IEI Board of Directors, member *ex officio* from July 1999 to present

Activities in support of the Global Environment Facility (GEF)

- Assisted government of Chile in preparing proposal to the UNDP/GEF for reducing Chilean emissions of greenhouse gases, May 1992/93.
- Reviewer for the government of Brazil of Phase I of the GEF-supported biomass-gasifier/gas turbine demonstration project ongoing in Brazil, Sept. 1992.
- Assisted government of Cuba in preparing proposal to the UNDP/GEF relating to energy strategies for the sugarcane industry, Nov. 1994.
- Reviewer for UNDP/GEF of Phase II of the GEF-supported biomass-gasifier/gas turbine demonstration project ongoing in Brazil, Nov. 1994.
- Invited speaker at Seminario de Disseminacao de Informacoes sobre o GEF, organized by the GEF (World Bank and UNDP) and government of Brazil, Brasilia, July 3-5, 1996.
- Invited participant at the UNDP Environment Focal Points Workshop on the GEF, Margarita Island, Venezuela, Nov. 18-20, 1996.
- Assisted governments of Brazil, Colombia, Cuba, India, and Mexico in the development and implementation of proposals to the Global Environment Facility on energy efficiency, fuel cell bus demonstration, efficient production of energy from sugarcane residues, and biomass power generation, 1997- present.
- Invited participant at the Brazil Biomass Gasification Project Expert Workshop, The World Bank, Washington, DC, June 3-4, 1999.
- Co-organizer of the Workshop on Commercialization of Fuel Cell Buses: Potential Roles for the GEF, United Nations Headquarters, New York, NY, April 27-28, 2000.
- Reviewer for World Bank/GEF biomass technology proposal for Brazil, 2005.

- Invited background paper prepared for the Workshop on Biofuels for Transportation, organized by the Science & Technology Advisory Panel, GEF, New Delhi, 29 Aug – 1 Sep, 2005.
- Assisted government of Brazil in developing proposal to GEF for commercialization of the use of sugarcane trash for energy, May-August, 2007.

Invited workshop/conference speaker/participant

- *Workshop on Energy Technology Transfer to China*, US Office of Technology Assessment, Washington, D.C., April 18-19, 1985.
- *Workshop on Energy Technology for Developing Countries: Issues for the US National Energy Strategy*, US Dept. of Energy, Wash., DC, June 20, 1990.
- *Conference on Biomass for Utility Applications*, organized by Electric Power Research Institute, Tampa, Florida, Oct. 23-25, 1990 (summary-panel participant).
- *Energy Efficiency Fellowship Meeting*, sponsored by the Pew Charitable Trust, hosted by International Institute for Energy Conservation, Washington, DC, Jan. 11, 1991.
- *Global Energy Efficiency Meeting*, sponsored by the Rockefeller Foundation, Geneva, Jan. 19-20, 1991 (invited background-paper contributor).
- *Biomass Power Long Range Plan Meeting*, Solar Energy Research Institute, Department of Energy Golden, CO, Jan. 22, 1991.
- *ESETT'91: International Symposium on Environmentally Sound Energy Technologies and Their Transfer to Developing Countries and European Economies in Transition*, Milan, Italy, Oct. 21-25, 1991 (invited overview-paper contributor).
- *International Workshop: Design of a Data System on Technologies That Can Limit Greenhouse Gas Emissions*, Center for Strategic and International Studies, Washington, DC, Feb. 18-19, 1992.
- *Workshop on Forests and Wood-Based Biomass Energy as Rural Development Assets*, co-organized by Winrock International and Yale University School of Forestry & Environmental Studies, Old Saybrook, Connecticut, Feb. 23-27, 1992.
- *Third US Hydrogen Meeting*, National Hydrogen Association, Arlington, VA, March 18-20, 1992 (Invited plenary speaker).
- *Workshop on Perspectives of Ethanol Fuel in Brazil*, São Paulo, Brazil, June 27-28, 1995 (invited speaker).
- *TAPPI Industry Needs Workshop*, organized by the Technical Association of the Pulp and Paper Industry, Raleigh, NC, April 22-24, 1996.
- *Working Group on Impacts on the U.S. Paper and Allied Products Industry of Increased Fuel Prices Resulting from Global Commitments to Mitigate Greenhouse Gas Emissions*, organized by Argonne National Laboratory, Washington, DC, June 20, 1996.
- *Conference on Biomass for Electricity Production: Experiences and Perspectives in the European Union and Brazil*, Brasilia, 6-8 October 1997 (invited plenary speaker).
- *Workshop on Small-Scale Biomass Electricity Generation*, organized by the Working Group on Energy Strategies and Technologies, China Council on International Cooperation on Environment and Development, Changchun, Jilin Province, China, 12-13 Jan. 1998.
- *Second Olle Lindström Symposium on Renewable Energy: Bioenergy*, Royal Institute of Technology, Stockholm, Sweden, 9-11 June 1999 (invited keynote speaker).
- *A Policy Workshop on Mitigation of Air Pollution and Climate Change in China: Co-Benefits and Co-Control*, organized by China State Environmental Protection Agency and Norwegian CICERO, 22-23 November, 2005.
- *IAC International Energy Workshop, Inter-Academy Council, Rio de Janeiro, Brazil, 26-27 March 2006*.
- *Briefing Governor Schweitzer (Montana) on coal/biomass to liquid fuels production technologies*, State House, Helena, Montana, 15 November, 2006.
- Testimony on liquid biofuels before *Committee on Environment and Natural Resources Finance, Minnesota State House of Representatives*, St. Paul, MN, 1 Feb 2007.

- *Symposium on Pathways Toward a Renewable Energy Future: Environmental Sustainability Through Technology and Policy*, Initiative for Renewable Energy and The Environment, University of Minnesota, St. Paul, 1 Feb 2007.
- *Advanced Bioenergy Technologies and Biofuels from Municipal Solid Waste*, California Biomass Collaborative 4th Annual Forum, Sacramento, California, 28-29 March 2007.
- *Seminar on Technologies for Future Production of Ethanol in Brazil*, Instituto de Tecnologia Promon, Sao Paulo, Brazil, 17 April 2007.
- *Gasification Technologies Council Spring Meeting*, Williamsburg, VA, 17-18 May 2007.
- *Chewonki Foundation Carbon Capture and Storage Seminar*, Wiscasset, Maine, 24 October 2007.
- *Conference on Biofuels: An Option for a Less Carbon-Intensive Economy*, organized by the United Nations Conference on Trade and Development and the Energy Planning Agency of the Ministry of Mines and Energy of Brazil, Rio de Janeiro, 4-5 December 2007.

Workshops organized

- *New Jersey Energy Conservation Laboratory Workshop on Steam-Injected Gas Turbines for Central Station Power Generation*, Princeton, NJ, April 3, 1986 (co-organizer).
- *International Workshop on Biomass-Gasifier Steam-Injected Gas Turbines for the Cane Sugar Industry*, Washington, DC, June 19, 1987 (co-organizer).
- *Thailand Training Workshop on End-Use-Oriented Energy Analysis*, Bangkok, Oct. 24-Nov. 3, 1989 (principal organizer and instructor).
- *Workshop on Development of Sustainable Biomass Energy Production in Northeast Brazil*, Brasilia, May 3, 1994 (organizer).
- *Workshop on Commercialization of Black Liquor and Biomass Gasification for Gas Turbine Applications in the Pulp and Paper Industry*, Princeton University, Princeton, NJ, Jan. 16-17, 1997 (organizer).

Other

- Assisted the European Community's "Thermie" program in preparing a call for proposals for the demonstration of advanced technology for producing electricity from plantation-derived biomass, winter 1992/93.
- Organizer of all Coal, Biomass, and Alternative Fuel Sessions for the 45th ASME International Gas Turbine and Aeroengine Congress, Munich, Germany, May 8-11, 2000.
- Invited member, New Jersey Board of Public Utilities' Advisory Council on Renewable Electric Generation Facilities for New Jersey, January 2002.
- Invited peer reviewer of the US Department of Energy's Microturbine Technology and Industrial Gas Turbine Technology Programs, March 2002.
- Invited resource person to the Task Force on Energy Strategies and Technologies of the China Council for International Cooperation on Environment and Development, 2002-2003.
- Visiting Professor, Joint Graduate School of Energy and Environment, King Mongkut's University of Technology Thonburi, Bangkok, Thailand, 4-8 July 2005.

TEACHING

Lecturer at Princeton University:

- MAE 423 - Heat Transfer (1987, 1990)
- PA 592 - Agro-Energy and Third World Development (1988)
- MAE 319 - Renewable Energy Technology (1991, 1993, 1995, 1999)
- MAE 554 - The Greenhouse Problem and Hydrogen Energy Solutions (1999, 2000)
- WWS591b – Graduate policy workshop on Deploying Clean Energy in Rural China (2004)

SERVICE TO PRINCETON UNIVERSITY

1. Member of the selection committee for PEI-RISE graduate fellowships, 2002/2003.

2. Elected representative of the Research Staff on the Council of the Princeton University Community (CPUC), 2003/2004. (Member of the CPUC Executive Committee)

3. Exploratory design/discussion of joint graduate certificate program between Princeton and Tsinghua University (Beijing), 2004/2005.

GRADUATE STUDENT RESEARCH SUPERVISED

<i>Name (Level) (project period)</i>	<i>Dept.*</i>	<i>Project Description</i>
Saiby Wong (summer '85)	Chem.	Development of experiments in biomass gasification.
Anna Protopapas (fall '86)	ChemE	Biomass gasification experiments.
Simone Hochgreb (summer '86 + 86/87)	MAE	Biomass-gasifier gas turbine cogeneration in cane sugar factories.
Angel Abbud-Madrid (summer '86 + 86/87)	MAE	Modeling steam turbine cogeneration at a cane sugar factory.
Lars Nilsson (1988-89 in Sweden)	Energy Analysis	Analysis of efficient industrial electricity-using technologies
Alistair Lloyd (1989/90)	MAE	Modeling biomass-gasifiers for gas turbine applications.
Ryan Katofsky (1991-93)	MAE (MSE thesis)	The production of fluid fuels from biomass.
Chris Marrison (1992-1995)	MAE (indep. research)	Cost study of biomass energy systems in Iowa; Biomass energy potential in Africa.
Jeff Chen (1992-1995)	MAE (MSE thesis)	Production of methanol and hydrogen from municipal solid waste.
Niklas Berglin (Spring 1996)	ChemE (indep. Research)	Spreadsheet models of energy use in pulp and paper mills.
Wendy Hughes (1992-1998)	MAE (PhD thesis)	Biomass integrated gasification/gas (turbine power generation in Zimbabwe.
Luis Solorzano (1993-1999)	EEB (indep. Research)	Regional land use analysis relating to biomass plantations in Northeast Brazil.
Paul Henderick (1997-1999)	MAE (MSE thesis)	An assessment of biomass-powered micro-turbines and potential application in rural China.
Huiyan Yang (2002-2004)	Geosciences (PEI-STEP certif.)	Chinese household energy usage and the black carbon emissions.
Fuat Celik (Fall 2002)	ChemE (Research credit)	Aspen Modeling and Cost Analysis of Co-Producing Dimethyl Ether, Acetic Acid, and Electricity from Coal
Zheng Hongtao (2002-2003)	Tsinghua Univ. (Beijing)	Analysis of future energy scenarios for "Syncity", China.
Xiaoping Wang (2000-2004)	WWS (PhD thesis)	Evaluating Impacts of Air Pollution in China on Agriculture and Public Health: Implications for Air Pollution and Energy Policies
Cathy Kunkel ('06-'07 in China)	PU physics ('06) Independent work	Grassland and crop residue biomass to energy in China.
Loek Eerhart (9/07-3/08)	Utrecht U., Holland (Master's thesis)	Modeling of Fischer-Tropsch Liquids Production from Coal and Biomass

* CE = Civil Eng; Chem. = Chemistry; ChemE. = Chemical Eng.; EE = Electrical Eng.; MAE = Mechanical and Aerospace Eng.; MoBio = Molecular Biology; WWS = Woodrow Wilson School; EEB = Ecology and Evolutionary Biology; Econ = Economics.

UNDERGRADUATE INDEPENDENT RESEARCH SUPERVISED

<i>Name (Level) (project period)</i>	<i>Dept. *</i>	<i>Project Description</i>
Gilberte Sumyeun (Jun) (fall '83-spring '84))	MAE	Bagasse-fired gas-turbine cogeneration for sugar factories in Mauritius.
Drew Bienkowski (Soph) (summer '84)	Politics	A database of basic materials consumption in the U.S.
Ali Reza (Jun)	MAE	Design of a rice hull producer gas generator suitable for cooking use.
Ali Reza (Sen) (fall '85-spring '86)	MAE	Experiments in downdraft biomass gasification.
Anna Protopapas (Sen) (fall '85-spring '86)	ChemE	Thermochemical gasification of biomass: modelling and experiments.
Kaveh Sheibani (Sen) (summer '86)	MechE	Gasifier design and computerized producer – gas database development.
Jocelyn Kaiser (Sen) (summer '86)	ChemE	Design of diagnostic procedures for biomass gasification experiments
Stefan Hamblad (Sen) (spring '90)	ChemE	Analysis of efficient kraft pulp production.
Pramote Piriyaopoksombut (Fr) (spring '90)	EE	End-use electricity analysis for Thailand.
Jason Mark (Sen) (Summer '90)	MAE	Cogeneration analysis of efficient kraft pulping
Jason Mark (Sen) (fall '90)	MAE	Efficient kraft pulp production.
Robert Gansler (Sen) (summer '91)	MAE	Thermodynamics of hydrogen and methanol production from biomass.
Samta Khandelwal (Sen) ('91-'92 academic yr)	WWS	ESCO's: Promoting energy conservation in Indian Industry.
Todd Butterfield (Sen) ('91-'92 academic yr)	MoBio	Biotechnology and eucalyptus energy plantations.
Jennifer Leslie (Sen) ('92-'93 academic yr)	MAE	Wind-assisted methanol production from biomass.
David Teal (Sen) ('92-'93 academic yr)	ChemE	Study of scale effects in hydrogen production from biomass and natural gas.
Felipe Valdes-Arrieta (Sen) ('92-'93 academic yr)	MAE	Technology assessment of electricity conservation in the Chilean copper industry.
Federico Frigerio (Soph) (summer '93)	MAE	Thermodynamic analysis of a Brayton air bottoming cycle.
Howard Shih (Sen) ('93-'94 academic yr)	MAE	Assessment of a Brayton air bottoming cycle.
Garth Grover (Sen) (summer & fall '94)	MAE	Modeling biomass-gasifier/gas turbine air bottoming cycles and biomass-fired heated gas turbine cycles.
Chris Jones (Sen) ('94-'95 academic yr)	ChemE	Analysis of ethanol production by enzymatic hydrolysis of biomass.
Chris Larsen (Sen) ('94-'95 academic yr)	Econ	Economics of biomass energy systems in South-Central Iowa.
David Matheu (Sen) (summer 1995)	ChemE	Analysis of energy use at a kraft pulp mill.
Claus Lorenz (Sen) ('95-96 academic yr)	MAE	Renewable energy district heating system design.

* CE = Civil Eng; Chem. = Chemistry; ChemE. = Chemical Eng.; EE = Electrical Eng.; MAE = Mechanical and Aerospace Eng.; MoBio = Molecular Biology; WWS = Woodrow Wilson School; EEB = Ecology and Evolutionary Biology; Econ = Economics.

Prem Vadlamudi (Sen) (‘95-‘96 academic yr)	MAE	Modeling biomass-gasifier/gas turbine cogeneration for an advanced ethanol plant.
Davin Peterson (Sen) (‘95-‘96 academic yr)	MAE	Design of MSW-hydrogen production and use in New York City bus fleet.
Robert Wright (Sen) (summer 1996)	MAE	Modeling energy use in pulp and paper mills and gas turbine cycle modeling.
Jason Mullins (Sen) (‘96-‘97 academic yr)	CE	Modeling energy use in linerboard production.
Roselle Safran (Jun) (Summer 1997)	CE	Developing a help manual for GS process modeling software.
Rebecca Blackwell (Sen) (‘97-‘98 academic yr)	ChemE	An assessment of black liquor gasification for the kraft pulp industry.
Amelia Kaufman (Jun) (Summer 1998)	Chemistry	Assessment of New Jersey’s MSW resources.
Ben Urquhart (Sen) (‘97-‘98 academic year)	EEB	GIS analysis of biomass energy plantations in Northeast Brazil.
Brad Morgan (Soph) (‘99-‘00 academic year)	CE	MSW resources of New Jersey.
Emily Johnson (Sen) (‘00-‘01 academic year)	Geology	Carbon sequestration with alternative land uses in Maranhao state, Brazil.
Laurie Williams (Sen) (‘05-‘06 academic year)	WWS	Chinese Energy Policies: Implications for U.S. Policy
Eugene Franco (Jun) (‘06-‘07 academic year)	Geosciences	The energy balance of corn ethanol; The energy balance of cellulosic ethanol.
Joe Vogel (Sen) (‘07-08 academic year)	MAE	A Kinetic Model of Cobalt-based Fischer-Tropsch Synthesis
Jimmy Nowicke (Sen) (‘07-‘08 academic year)	WWS	Potential Economic Impacts of Carbon Policies in the United States