

Curriculum Vitae: Erica R.H. Fuchs

1. Biographical Data

1.A Education

Degree	Discipline	University	Date
Ph.D.	Engineering Systems	M.I.T.	2006
S.M.	Technology Policy	M.I.T.	2003
S.B.	Materials Science & Engineering	M.I.T.	1999

1.B Academic Positions

2007-Present

Assistant Professor, Department of Engineering and Public Policy
Carnegie Mellon University, Pittsburgh, PA

2006-2007

Postdoctoral Fellow, Microphotonics Center and Industrial Performance Center
Massachusetts Institute of Technology, Cambridge, MA
Advised Technology Policy masters student Shan Liu on research on the economic viability of silicon photonics, developed the technical and economic framework for the 2006 Industry Roadmap, brought in \$25,000 funding from Kotura Corporation

1999-2000

Research Fellow
United Nations Industrial Development Organization, Beijing, China
Initiated and led field research on institutional barriers to innovation in state-owned industrial boiler manufacturers.

1.C Other Positions

June-August 2001

Internal Consultant to the Executive Team, Intern
Nanogram Corporation, Fremont, CA
Modeled the economic viability of the start-up's new, photonic deposition technology against the prevailing alternatives on the market.

June-August 1998

Technical Failure Analysis Engineer, Intern

Bayer Corporation, Cologne, Germany
Assessed the cause of microbial corrosion in Bayer's steel coolant piping system.
Research results published as part of my undergraduate M.I.T. thesis.

June-August 1997

Researcher, Intern

OVAKO Steel / Royal Institute of Stockholm, Hofors / Stockholm, Sweden

Analyzed inclusion characteristics in high-performance ball bearing steel using optical and SEM microscopy. Presented at 1998 Society for Mining, Metallurgy, and Exploration Annual Meeting and published in the journal of *High Temperature Materials and Processes*.

1.D Consulting Assignments

March, 2011 – September 2011

Expert

Invited speaker and expert for day-long discussion and subsequent formulation of policy white papers by West-Coast industry and regional economic leaders on "Innovation and Production: Reviving U.S. Prosperity," CONNECT Innovation Institute.

November 5, 2010

Executive Educator

Led half-day workshop on "The Automotive Setting in 2025." Advanced Development. Product Design and Development. Alcoa Technology Center. Alcoa, Inc.

September 19, 2008

Executive Educator

Chris Kubasik, Sr. VP, Electronic Systems Business Area, Lockheed Martin Corporation, Senior Executive Engineering Program, Carnegie Mellon University

2. Publications

2.A Archival Papers Critically Reviewed Before Publication

Published Papers

1. Woolley, A. and **Fuchs, E.** 2011. Collective Intelligence in the Organization of Science, Invited Paper. Special Issue on New Directions in Organization Science. *Organization Science*. 22(5): 1359-1367.
2. **Fuchs, E.**, Kirchain, R., and Liu, S. 2011. The Future of Silicon Photonics – Not So Fast?: Insights from 100G Ethernet LAN Transceivers. *Journal of Lightwave Technology*. 29(15): 2319-2326.

3. **Fuchs, E.**, Field, F., Roth, R., and Kirchain, R. 2011. Plastic Cars in China? The Significance of Production Location over Markets for Technology Competitiveness in the United States versus the People's Republic of China. *International Journal of Production Economics*. 132(2011): 79-92.
4. **Fuchs, E.**, and Kirchain, R. 2010. Design for Location?: The Impact of Manufacturing Off-Shore on Technology Competitiveness in the Optoelectronics Industry. *Management Science*, 56(12): 2323-2349.
5. **Fuchs, E.** 2010. Rethinking the Role of the State in Technology Development: DARPA and the Case for Embedded Network Governance, **Lead article**. *Research Policy*, 39(2010): 1133-1147.
6. **Fuchs, E.** 2009. Cloning DARPA Successfully. *Issues in Science and Technology*. Volume XXVI. Number 1. Fall 2009.
7. **Fuchs, E.**, Field, F., Roth, R., and Kirchain, R. 2008. Strategic Materials Selection in the Automotive Body: Economic Opportunities for Polymer Composite Design. *Composite Science and Technology*. 68(9): 1989-2002.
8. **Fuchs, E.**, Bruce, E., Ram, R., and Kirchain, R. 2006. Process-Based Cost Modeling of Photonics Manufacture: The Cost-Competitiveness of Monolithic Integration of a 1550nm DFB Laser and an Electro-Absorptive Modulator on an InP Platform. *Journal of Lightwave Technology*. 24(8): 3175-3186.
9. Veloso, Francisco and **Fuchs, E.** 2002. The Future of the Asian Auto Industry: Regional Integration, Alternative Designs, and Chinese Leadership. *International Journal of Vehicle Design*. 35(1): 111-136.
10. **Fuchs, E.** and Johnsson, P. 2000. Inclusion Characteristics in Bearing Steel and During Ingot Casting. *High Temperature Materials and Processes*. 19(5): 333-344

Working Papers

11. **Fuchs, E.** 2011. The Impact of Offshoring on Technological Competitiveness: Implications for U.S. Policy.
12. **Fuchs, E.** 2011. Platform Leaders, True Believers and Coordinated Innovation: The Role of Key Architects in Influencing Technology Trajectories for Moore's Law.

13. Yang, C., Nugent, R., and **Fuchs, E.** 2011. Gains from Other's Losses: Technology Trajectories and the Global Division of Firms.
14. Akinsanmi, W., Reagans, R., and **Fuchs, E.** 2011. Economic Downturns, Technology Trajectories, and the Careers of Scientists.

2.C Sections or Chapters in Edited Monographs or Similar Volumes

15. Argote, L. Denzom, C. and **Fuchs, E.** 2011. Organization Learning across Boundaries: The Effect of Geographic Distribution on Organizational Learning and Knowledge Transfer. *Handbook on Organizational Learning and Knowledge Management*. Wiley-Blackwell. Forthcoming.
16. **Fuchs, E.** 2011. DARPA Does Moore's Law: The Case of DARPA and Optoelectronic Interconnects. Invited chapter in *State of Innovation: The U.S. Government's Role in Technology Development*. Ed. by Fred Block and William Keller. Paradigm Publishers.
17. **Fuchs, E.** 2009. Remembering Comparative Advantage: Leveraging National Differences in Technology Competitiveness. Invited Contribution. Report by CMU and the Atlantic Council to the G-20 Leaders. Forthcoming as a chapter in a book by the same name with C.M.U. Press.

2.D Other Writings (Technical Reports and Testimony)

18. **Fuchs, E.** Moore's Law: Platform Leaders, True Believers and Coordinated Innovation – Implications for the Upcoming Decade. MIT Microphotonics Consortium White Paper: April 2007.
19. Liu, S. and **Fuchs, E.** 2007. Envisioning the Future of Optoelectronic Interconnects: Production Economics of InP and Si Platforms for 100G Ethernet LAN Transceivers. MIT Microphotonics Consortium White Paper: April 2007.
20. **Fuchs, E.**, and Kirchain, R. Consolidate, Integrate, Go East, or Get Out?: Mapping Cost Drivers in Optoelectronics Production. MIT Microphotonics Consortium White Paper: December 2004.
21. **Fuchs, E.**, and Kirchain, R. Understanding the Economics of Integration: Process-Based Cost Modeling of Optoelectronics Production. MIT Microphotonics Consortium White Paper: November 2003.

3. Grants and Contracts Awarded to Date

3.A Principal Investigator

1. CAREER: Rethinking National Innovation Systems – Economic Downturns, Offshoring, and the Global Evolution of Technology. **NSF Science of Science and Innovation Policy Program**, May 2011 – May 2016, \$624,517.
2. With co-PIs J. Michalek and Y. Liu. GOALI: Think Globally, Act Locally: China and the Future of Energy-Saving Vehicle Technologies. **NSF Science of Science and Innovation Policy Program** and **NSF Grants Opportunities for Academic Liason with Industry (GOALI)**. June 2011 – June 2013. \$192,816.
3. With co-PIs L. Argote, and D. Epple. Learning Across Product, Workgroup, and Geographic Boundaries, **NSF Science of Science and Innovation Policy Program** and **NSF Innovation and Organization Science Program**, January 2010 – January 2013, \$707,807
4. The Role of DARPA in Seeding and Encouraging New Technology Trajectories, Robert W. Gore Materials Innovation Case Study Project, **Chemical Heritage Foundation**, June 2009 – May 2010, \$9000
5. Quantifying the Resilience of Innovation Ecosystems: The Impact of Manufacturing Offshore on Firm Technology Trajectories and the Institutional Locus of Innovation, **NSF Science of Science and Innovation Program**, September 2008 – September 2010, \$208,068; *2009 NSF Research Highlight; August 2010 Feature in SciSIP newsletter.*
6. The Global Disintegration of Firm Activities: Understanding the Managerial and Technological Underpinnings of Firm Outsourcing, **Berkman Faculty Development Fund**, June 2008 – May 2010, \$10,000
7. An Innovation Ecosystem in Flux: Innovation Trajectories and Institutional Shifts in the Optoelectronics Industry, **Oak Ridge Associated Universities (ORAU) Ralph E. Powe Junior Faculty Enhancement Award**, June 2008 – May 2010, \$10,000
8. The Global Disintegration of Firm Activities: Understanding the Managerial and Technological Underpinnings of Firm Outsourcing, **Sloan Industry Studies Site Visit Grant**, The Sloan Foundation, June 2008 - May 2009, \$5000
9. INFORMS 2008 Session on Knowledge Networks and the Emergence of New Technologies, **Sloan Industry Studies Travel Grant**, The Sloan Foundation, October 12-15, 2008, Funding for all speakers' travel.
10. Decision Tools for Engineering Design and Entrepreneurship, **Corporate Sponsorship. RHM International**, January 2008 – May 2010, \$5000 gift plus all-expense trip for three-student project team to collect data on-site at the company in China (~\$10,000).

3.B Co-Principal Investigator

11. E. Fuchs, and J. Michalek, (PI: F. Veloso) Decision Tools for Engineering Design and Entrepreneurship, Course Outreach to Carnegie Mellon University's Technology Transfer Office, **R.K. Mellon Foundation**, August 2008 – August 2009, \$25,000

4. Teaching and Education

4.A Courses Taught at CMU

	Course Title	Units	Class	Offered	Num of Students	Num Resp	FCE Crse*	FCE Instr*
19-741	Global Entrepreneurship	12	Sr, Gr	Spring 11	17	15	4.4	4.4
19-611, 84-415 94-809	Global Competitiveness (b)	12	Sr, Gr	Fall 10	9	8	5.0	5.0
19-484, 19-784, 24-484, 24-784	Decision Tools for Engineering Design and Entrepreneurship (a)	12	Sr/Gr	Spring 10	40	37	3.9	3.8
19-684 84-415 94-809	Global Competitiveness	12	Sr, Gr	Fall 09	19	15	4.5	4.8
19-484, 19-784, 24-484, 24-784	Decision Tools for Engineering Design and Entrepreneurship (a)	12	Sr/Gr	Spring 09	37	31	4.4	4.1
19-611 84-415	Global Competitiveness (b)	12	Sr, Gr	Fall 09	9	4	4.5	4.2
19-484, 19-784, 24-484, 24-784	Decision Tools for Engineering Design and Entrepreneurship (a, b)	12	Sr/Gr	Spring 08	18	16	4.2	3.6

(a) Team taught with Professor Jeremy Michalek, (b) New course

* Faculty Course Evaluations (FCEs) are scored by students on a scale of 1 (worst) to 5 (best).

4.B Student Research Projects

(a) Undergraduate Projects

1. Derek Lessard, "Careers of optoelectronic inventors post-bubble," Sept 2011-present.
2. Neha Nandakumar, "The quality of inventor disambiguation of patenting algorithms." June 2011-present.
3. Carl Glazer, "Careers of optoelectronic inventors post-bubble," April 2011-present.
4. Farjad Zaim, "Careers of optoelectronic inventors post-bubble," April 2011-August 2011
5. Dan Murby, "Careers of optoelectronic inventors post-bubble," April 2011-May 2011
6. Willis Chang, "Careers of optoelectronic inventors post-bubble," Fall '10 - Spring '11
7. Jane Sun, "Technology directions in monolithic versus hybrid integration photonic patenting," Fall 2010-Spring 2011.
8. Sandeep Patel, "The Resiliency of the Innovation Ecosystem," Fall 2009-Fall 2010 (became a MISM masters student in Fall 2010.)
9. Jack Wang, "The Relationship between Manufacturing and Jobs," Spring 2010
10. Alex Chrichton, EPP-CMU Patent Inventor Matching System, Spring 2010
11. Peter Pong, "The Resiliency of the Innovation Ecosystem," Fall 2008-Spring 2009
12. Jason Mirra, "Learning in Geographically Distributed Organizations," Fall 2008
13. Tubtim Eawchoowongse, "Learning in Geographically Distributed Organizations," Fall 2008
14. Luke Kryznowski, "The Role of DARPA in Seeding and Encouraging New Technology Trajectories," Summer 2008

(b) Master's Students

15. Edward Lynch-Bell, "Process-Based Cost Modeling of Stationary Battery Production," Summer 2009 (co-advised with Jay Whitacre).

(c) Ph.D. Students

16. John Helveston, "Think Globally, Act Locally: China and the Future of Energy Savings Vehicle Technologies" (50-50 co-advised with Jeremy Michalek)
17. Apurba Sakti, "Cost modeling of Electric Vehicle Battery Production." March 2011-present. (lead advisors: Jeremy Michalek and Jay Whitacre.)
18. Samuel Ventura, "Inventor Disambiguation in Optoelectronic Patents." June 2010-Present. (Lead advisor: Rebecca Nugent, Dept. of Statistics)
19. Eyiwunmi Akinsanmi, "The Resiliency of the Innovation Ecosystem: Technology Directions and Productivity During Economic Downturn," August 2009-Present (Lead advisor. Co-advised with Ray Reagans, M.I.T. Sloan School of Management)
20. Chia-Hsuan, "The Resiliency of the Innovation Ecosystem: The Impact of Offshoring on Firm vs. Individual Technology Trajectories," July 2009-Present (Lead advisor. Co-advised with Rebecca Nugent, Dept. Statistics)
8. Carolyn Denomme, "The Impact of Employee Turnover and Product Mix on Organizational Learning," August 2007-present (Lead advisor. Co-advised with Linda Argote, and Dennis Epple, both from Tepper School of Business)
9. Timothee Doutriaux, "The Resiliency of the Innovation Ecosystem: The Impact of Offshoring on Firm vs. Individual Technology Trajectories," August 2007-May 2009 (Lead advisor. Co-advised Sept 2008 – Jan 2009 with Francisco Veloso)

4.C Educational Contributions

In the past three and a half years I have developed three new classes. The first – Decision Tools for Engineering Design and Entrepreneurship, co-taught with Jeremy Michalek (Dept. Mechanical Engineering) – teaches students a computational modeling toolset with which to assess the economic viability of a new technology prior to large-scale investment. For Spring 2008, we received \$5000 in course sponsorship and approximately \$10,000 in student travel funds from RHM International, a company commercializing technology originating in the Chinese Academy of Sciences. The three students on the RHM team spent spring break collecting data for their project at the company’s manufacturing facility in China. At the end of the term, the company offered jobs to all three students, two of whom are now in permanent positions at the company’s headquarters in China. In Spring 2009, we received \$25,000 from the R.K. Mellon Foundation to bring into our course emerging technology projects from Carnegie Mellon’s Center for Technology Transfer. At the end of this second year, two students received job offers as a direct consequence of the course, and four CMU-based start-ups are now using the students’ models and technology assessments in their business plans. These four start-ups are nanoGriptech™ (founded by Professor Metin Sitti), 44Tech™ (founded by Professor Jay Whitacre), a company seeking to commercialize nanofiber air filters for respirator systems (led by CMU post doctoral student Amrinder Nain), and a company seeking to create new home energy monitoring solutions (led by CMU undergraduate student Ethan Goldman). In Spring 2010, we continued to work closely with the CMU Center for Technology Transfer. In this year, company involvement continued to expand such that all eight of the projects were supported by real-world start-ups, with seven of the eight projects involving technologies developed at CMU.

My second new course – Global Competitiveness: Firms, Nations, and Technological Change – introduces students to the historical and contemporary intellectual foundations from economics, sociology, and political science of our current understandings of national innovation systems and technological change. It is now an approved elective in many of the innovation curricula, including CIT’s masters program in E&TIM and H&SS’s new undergraduate minors in Innovation, Entrepreneurship, and Economic Development (IEE) and Global Politics, Science, and Technology (GPST). In fall 2010, it completed its third year.

My third new course – Global Entrepreneurship and the Future of Advanced Manufacturing – had its inaugural term in Spring 2011. This project course was executed in collaboration with the Science and Technology Policy Institute (STPI) of the Institute of Defense Analysis. Working with real-world start-ups, students developed computational production models to quantify the technical developments necessary for four “green” technologies – one each in fuel cells, stationary grid batteries, solar cells, and environmental sensors – to become economically viable in today’s marketplace. They then interviewed firms industry-wide in the same technical space and compared the economic viability of manufacturing their team’s “green” technology in the United States according to their computational models, with the companies’ stated reasons for their manufacturing location. They conclude their final reports with an analysis of the economics versus other forces influencing manufacturing location decisions. Outcomes from the class may be used by STPI to inform future manufacturing policy in the United States.

Finally, in Spring 2009 I taught and participated in the weekend course *China Today*, held jointly by the University of Pittsburgh and CMU. This course was attended by students, faculty, and staff from both CMU and University of Pittsburgh, as well as by K-12 teachers receiving credit for continuing education.

5. Professional Activities

5.A Seminars

1. Economic Downturns, Technology Trajectories, and the Careers of Scientists. INFORMS Annual Meeting. Charlotte, North Carolina. November 14, 2011.
2. Rethinking the Role of Government in Technology Development: DARPA and the Case for Embedded Network Governance. Leaders Program. 21st New Generation Seminar. East-West Center. Washington, D.C. October 14, 2011.
3. Reflections on an Interdisciplinary Ph.D. Academic Panel. M.I.T. Engineering Systems Division First 50 Ph.D.s Alumni Symposium. September 16, 2011.
4. The Future of Photonics: Implications from and for Telecommunications. Finisar Corporation. Santa Clara, CA. June 16, 2011.
5. Economic Downturns, Technology Trajectories, and the Careers of Scientists. Industry Studies Association Annual Meeting. Pittsburgh, PA. June 1-2, 2011.
6. The Impact of Offshoring on Firm versus Individual Technology Trajectories. Industry Studies Association Annual Meeting. Pittsburgh, PA. June 1-2, 2011.
7. Rethinking Distributed R&D Management: DARPA and the Case for Embedded Network Governance. Intel Corporation. Video Conference to Santa Clara, CA. May 26, 2011.
8. End-of-Day Summarizing Comments. Workshop on The Department of Defense as a Catalyst for Energy Technology Innovation. Consortium for Science, Policy, & Outcomes. Washington, D.C. May 25, 2011.
9. Economic Downturns, Technology Trajectories, and the Careers of Scientists. Invited Presentation. Production and Operations Management Society (POMS) Annual Meeting. Reno, NV. April 29 – May 2, 2011.
10. The Future of Photonics: Implications from and for Telecommunications. National Research Council. Harnessing Light II. Second Committee Meeting. Washington, D.C. April 7, 2011.
11. The Impact of Offshore Manufacturing on Technology Competitiveness: Implications for U.S. Policy. Invited Briefing. Secretary Gary Locke. National Advisory Council on Innovation and Entrepreneurship. Department of Commerce. December 8, 2010.
12. The Impact of Offshore Manufacturing on Technology Competitiveness: Implications for U.S. Government Investment. Invited Seminar. ARPA-E. December 8, 2010.

13. The Future of Photonics: Implications From and For the Telecommunications Industry. Invited Talk. Optoelectronics Industry Development Association Annual Forum. November 16, 2010.
14. Economic Downturns, Technology Trajectories, and the Careers of Scientists. INFORMS Annual Meeting. Austin, TX. November 10, 2010.
15. The Impact of Offshoring on Firm versus Individual Technology Trajectories. INFORMS Annual Meeting. Austin, TX. November 6, 2010
16. The Impact of Offshoring on Innovation: Implications for U.S. Policy. AAAS Science and Policy Programs NSF SciSIP Grantees Workshop: Towards a Community of Practice. Washington, D.C. October 19, 2010
17. Rethinking the Role of Government in Technology Development: DARPA and the Case for Embedded Network Governance. Global Innovation and Development Lecture Series. The Nunn School of International Affairs. Georgia Institute of Technology. September 14, 2010
18. Rethinking the Role of Government in Technology Development: DARPA and the Case for Embedded Network Governance. China Institute for Science and Technology Policy. School of Public Policy. Tsinghua University. August 17, 2010
19. Rethinking the Role of Government in Technology Development: DARPA and the Case for Embedded Network Governance. Defense Advanced Research Projects Agency (DARPA). Washington, D.C., June 7, 2010
20. The Impact of Manufacturing Offshore on Technology Competitiveness. Stanford University, Social Science and Technology Seminar Series. Stanford, CA. June 2, 2010.
21. Design for Location: The Impact of Manufacturing Offshore on Technology Competitiveness in the Optoelectronics Industry. Sumantra Ghoshal Strategy Conference. London, U.K. May 16, 2010.
22. Moore's Law, Technology Mafias, and Radical Architectural Change. Industry Studies Association Annual Conference. May 6, 2010.
23. Organizational Learning in a Multi-Product Overseas Manufacturing Environment. Industry Studies Association Annual Conference. May 6, 2010.
24. The Impact of Product Mix and Employee Turnover on Organizational Learning. Organization Science Winter Conference. Steamboat Springs, CO. February 4-7, 2010.
25. The Impact of Manufacturing Offshore on Innovation: Implications for U.S. Policy. Information Technology Innovation Foundation Forum. Rayburn Office Building, United States House of Representatives. Washington, D.C. February 3, 2010.

26. The Impact of Manufacturing Offshore on Technology Competitiveness: Implications for U.S. Policy. Science Technology Policy Institute Seminar Series. Institute for Defense Analysis. Washington, D.C. February 2, 2010.
27. The Impact of Manufacturing Offshore on Technology Competitiveness. Engineering, Science, and Technology Policy (ESTeP) Committee Meeting. Photonics West. SPIE. San Francisco, CA. January 25-27, 2010.
28. The Impact of Manufacturing Offshore on Technology Competitiveness. Invited Talk. M.I.T. Sloan Technology Innovation and Entrepreneurship Seminar. Cambridge, MA. December 7, 2009.
29. From Ph.D. to Prof. (In Under 20 Minutes). Invited Talk. M.I.T. Course on Academic Careers: ESD.944. Cambridge, MA. December 24, 2009.
30. The Impact of Employee Turnover and Product Mix on Organizational Learning in Offshore Manufacturing. INFORMS Annual Meeting. San Diego, CA. October 11, 2009
31. Design for Location: The Impact of Manufacturing Offshore on Technology Competitiveness. Atlanta Conference on Science and Innovation Policy. Atlanta, GA. October 2-3, 2009
32. Rethinking the Role of the State in Technology Development: The Case of DAPRA and Embedded Network Governance. Atlanta Conference on Science and Innovation Policy. Atlanta, GA. October 2-3, 2009
33. Remembering Comparative Advantage: Leveraging National Differences in Technology Competitiveness. Conference by CMU and the Atlantic Council in Preparation for the G-20 Summit. Pittsburgh, PA. September 23, 2009
34. The Impact of Manufacturing Offshore on Technology Competitiveness: Implications for U.S. and China Policy. The Cosmos Club. Washington, D.C. September 10, 2009
35. Rethinking the Role of the State in Technology Development: The Case of DAPRA and Embedded Network Governance. Annual Meeting of the Academy of Management. Chicago, IL. August 7-11, 2009
36. Rethinking the Role of the State in Technology Development: The Case of DAPRA and Embedded Network Governance. International Risk Governance Society. Washington, D.C., June 30, 2009
37. The Impact of Manufacturing Offshore on Technology Competitiveness: Lessons from Automobiles and Semiconductors. Algorithmic Automation Workshop. Robotics Science and Systems 2009. Seattle, WA. June 28, 2009

38. The Impact of Employee Turnover and Product Mix on Organizational Learning in Offshore Manufacturing. Interactive Session. Sloan Industry Studies Annual Meeting. May 28, 2009.
39. Emerging Trends in Organization Science: Commentary on Common Themes. Organization Science Senior Editors Conference. Pittsburgh, PA. May 22, 2009
40. Design for Location: The Impact of Manufacturing Offshore on Technology Competitiveness. AAAS. Workshop on Science of Science and Innovation Policy. Washington, D.C. March 24, 2009
41. The Impact of Manufacturing Offshore on Technology Competitiveness: Implications for U.S. and China Policy. China Today. University of Pittsburgh. Pittsburgh, PA. March 20-22, 2009
42. The Impact of Manufacturing Offshore on Technology Competitiveness: Implications for U.S. and China Policy. Development Students Organization. Carnegie Mellon University. Pittsburgh, PA. March 20, 2009
43. The Role of DARPA in Seeding and Encouraging New Technology Trajectories: Pre- and Post Tony Tether in the Innovation Ecosystem. Chemical Heritage Foundation. Philadelphia, PA. February 27, 2009
44. The Geography of Design: Lessons from Automobiles and Optoelectronics. Center for Product Strategy and Innovation Corporate Members Meeting. CMU Pittsburgh, PA. February 18, 2009
45. The Role of DARPA in Seeding and Encouraging New Technology Trajectories: Pre- and Post Tony Tether in the Innovation Ecosystem. Council on Foreign Relations. New York, NY. November 25, 2008
46. Modeling the Economics of Photonics Manufacture: Strategic Trade-offs in Integration, Offshoring, and Material Platforms. Workshop on 10GPON, MIT Center for Integrated Photonics, Cambridge, MA, November 18, 2008
47. The Geography of Design: Lessons from Automobiles and Optoelectronics. Center for Product Strategy and Innovation Monthly Seminar, CMU, Pittsburgh, PA. November 11, 2008
48. The Global Competitiveness Lab: The Impact of National Diversity on Technology Change. Department of Engineering and Public Policy, CMU, Pittsburgh, PA. October 24, 2008
49. The Role of DARPA in Seeing and Encouraging New Technology Trajectories: Pre- and Post Tony Tether in the Innovation Ecosystem. Information Technology and Innovation Foundation. Washington, D.C. October 14, 2008

50. The Role of DARPA in Seeing and Encouraging New Technology Trajectories: Pre- and Post Tony Tether in the Innovation Ecosystem. INFORMS Annual Meeting, Washington, D.C. October 13, 2008
51. The Role of DARPA in Seeing and Encouraging New Technology Trajectories: Pre- and Post Tony Tether in the Innovation Ecosystem. Panel on Science and Technology Policy. Annual Meeting of the Society for the Advancement of Socio-Economic Research (SASE). San Jose, Costa Rica. July 21-23, 2008
52. Modeling the Economics of Photonics Manufacture: Strategic Trade-offs in Integration, Offshoring, and Material Platforms. Integrated Photonics & Nanophotonics Research Applications Topical Meeting, Optical Society of America. Boston, MA, July 13-16 2008
53. The Role of DARPA in Seeing and Encouraging New Technology Trajectories: Pre- and Post Tony Tether in the Innovation Ecosystem. Sloan Industry Studies Annual Meeting. Boston, MA. April 30, 2008
54. The Impact of Manufacturing Offshore on Technology Competitiveness. Innovation and Manufacturing in the 21st Century. Optoelectronics Industry Development Association. San Jose, CA. April 16-17, 2008
55. Platform Leaders, True Believers, and Coordinated Innovation: The Role of Key Architects in Influencing Technology Trajectories. INFORMS Annual Meeting 2007 Seattle, WA, November 4-7, 2007
56. Modeling the Economics of Photonics Manufacture: Strategic Trade-Offs in Integration, Offshoring, and Materials Platforms. Invited Talk. Photonics North. Ottawa, Canada, June 4-7, 2007
57. Changing Paths: The Impact of Manufacturing Offshore on Technology Trajectories. Sloan Industry Studies Annual Conference. Cambridge, MA April 26-27, 2007.
58. Moore's Law: Platform Leaders, True Believers, and Coordinated Innovation – Implications for the Upcoming Decade. Bi-Annual Microphotonics Center Industry Consortium Meeting. April 17-18, 2007
59. Innovation Strategies for a Global Economy: The Role of DARPA in Seeding and Encouraging Technology Trajectories. Invited Seminar. Engineering and Public Policy. Carnegie Mellon University. Pittsburgh, PA, December 18, 2006
60. The Impact of Manufacturing Off-shore on Technology Trajectories. Invited Presentation. INFORMS Annual Meeting 2006 Pittsburgh, PA, November 5-8, 2006
61. Innovation Strategies for a Global Economy: The Role of Government Initiatives in Technology Trajectories. Bi-Annual Microphotonics Center Industry Consortium Meeting. October 19-20, 2006
62. The Geography of Design: Insights from Automobile Bodies and Optoelectronic Components. Invited Presentation. TMS Annual Meeting. Materials Science & Technology 2006. Cincinnati, OH, October 15-19, 2006

63. Modeling Photonics Manufacture: Economic Insights into Design, Process, and Production Strategy. Invited Talk. Optoelectronics Industry Association Forum – Micropackaging for the Next Generation of Optical and Electrical Components. San Jose, CA, August 30, 2006.
64. Innovation Myopia: Beyond Labor Savings in Off-shore Manufacturing. The Innovation Research Network. Boston, MA, May 13, 2006
65. Innovation Myopia: Beyond Labor Savings in Off-shore Manufacturing. Invited Seminar. Engineering and Public Policy. Carnegie Mellon University. Pittsburgh, PA, March 8, 2006
66. Innovation Myopia: Beyond Labor Savings in Off-shore Manufacturing. Technology and Operations Management Seminar. Harvard Business School. Harvard University. Pittsburgh, PA, February 23, 2006
67. Innovation Myopia: Beyond Labor Savings in Off-shore Manufacturing. Operations Management Seminar. Sloan School of Management. Massachusetts Institute of Technology. Cambridge, MA, February 16, 2006
68. Changing Paths: The Impact of Manufacturing Off-shore on Technology Development Incentives. Invited Presentation. INFORMS Annual Meeting 2005 New Orleans, November 13-16, 2005
69. Challenges for Emerging Technologies in Mature Industries: The Case of Polymer Composite Vehicles in China. Panel on The Future of the Car – The Car of the Future. M.I.T. International Science and Technology Initiative. Cambridge, MA, September 22, 2005
70. Innovation Myopia: Beyond Labor Savings in Off-shore Manufacturing. 4th Annual Technology Management and Policy Consortium. Cambridge, MA, June 26-28, 2005
71. Modeling Photonics Manufacture: Economic Insights into Design, Process, and Production Strategy. Invited Presentation. Intel Corporation. Santa Clara, CA, June 5, 2005
72. Structural Shackles: The Importance of Maintaining a Problem-Oriented Approach in the Early Development Stages of Engineering Systems. Student Panel. Engineering Systems Division Department Off-site. Dedham, MA, May 27, 2005
73. Modeling Photonics Manufacture: Economic Insights into Design, Process, and Production Strategy. Microphotonics Center Industry Consortium Meeting. May 16, 2005
74. Consolidate? Integrate? Go East? Or Get Out?: Mapping the Drivers of Optoelectronics Production Costs. Photonic Systems Graduate Series, M.I.T. Center for Integrated Photonics, Cambridge, MA, March 17, 2005
75. Device-Enabled Network Architectures: The Economic Implications of Emerging Optoelectronic Device Technologies in Network Architectures. M.I.T. Communications Futures Program. Cambridge, MA, March 16, 2005
76. Consolidate? Integrate? Go East? Or Get Out?: Mapping the Drivers of Optoelectronics Production Costs. Bi-Annual Microphotonics Center Industry Consortium Meeting. Cambridge, MA, December 4, 2004
77. Process-Based Cost Modeling of Photonics Manufacture. Bi-Annual Microphotonics Center Industry Consortium Meeting. Cambridge, MA, November 3, 2003
78. The Significance of Production Cost Inputs in Regional Technology Choice: Composite Automotive Body-In-Whites in the U.S. versus China. 2nd Annual Technology Management and Policy Consortium. Arlington, VA, July 7-8, 2003

5.B Government Committees, Civic Appointments, and Board Memberships

Chair, Subcommittee on Economic Impact and General Committee Member. National Research Council Committee on *Harnessing Light: Capitalizing on Optical Science Trends and Challenges for Future Research*. Board of Manufacturing and Engineering Design, National Materials Advisory Board, National Academy of Sciences. February 2011 – July 2012.

Invited 30-minute brief on the future of advanced manufacturing to Secretary Gary Lock's National Advisory Committee on Innovation and Entrepreneurship. Department of Commerce. December 8, 2011.

One of 23 Invited Participants. President's Council of Advisors on Science and Technology (PCAST) Advanced Manufacturing "Discussion Workshop". Led by PCAST members Eric Schmidt, Chairman and CEO of Google, Inc. and Shirley Ann Jackson, President of Rensselaer Polytechnic Institute. Washington, D.C. March 19, 2010.

5.C Membership and Activities in Honorary Organizations, Professional Societies

Activities:

Advisor. Photonics community letter to the President's Council of Advisors on Science and Technology and the Office of Science and Technology Policy: "Recommendations for Federal Support of Photonics to Advance U.S. Manufacturing, April 19, 2010." Initiated and created the first draft of the letter. Revisions and completion of the letter were subsequently led by SPIE (International Society for Optics and Photonics). The letter was signed by all three of the major photonics professional society presidents.

Committees:

Member. SPIE (International Society for Optics and Photonics) Data Collection Task Force. Goal: Providing recommendations to the National Academies on their plans for a revised edition of the 1998 publication, *Harnessing Light: Optical Science and Engineering for the 21st Century*

Membership:

1. INFORMS
2. Academy of Management
3. Sloan Industry Studies
4. AAAS

5.D Editorial Roles on Publications, Major Activities in Professional Meetings

Ad-hoc Reviewer:

Journals –

Research Policy
Journal of Policy Analysis and Management
Industry and Innovation
International Journal of Production Economics
Management Science and Operations Management (MSOM)
Research in Engineering Design

Conferences –

Atlanta 2009 Conference on Science and Technology Policy (Globalization Track)

By Special Invitation –

Atkinson, R. and Wial, H. Boosting Productivity, Innovation, and Growth through a National Innovation Foundation. Blueprint for American Prosperity. Brookings Institution. October 2007

Activities in Professional Meetings:

Committee Member:

Industry Studies Early Career Development Committee

Committee Member:

Best Paper Committee, Technology and Innovation Management (TIM) Division, 2011 Annual Academy of Management (AOM) Conference

Committee Chair (Inaugural Year):

Best Paper Award, Technology Management Division, INFORMS 2011 Annual Meeting

Best Dissertation Award Reviewer:

Technology Management Division, INFORMS 2010 Annual Meeting.

Session Chair:

INFORMS 2011 Annual Meeting. Technology Management Division
INFORMS 2010 Annual Meeting. Technology Management Division
INFORMS 2009 Annual Meeting. Technology Management Division.
INFORMS 2008 Annual Meeting. Technology Management Division. P.I. on Sloan
Travel Grant to cover flight and hotel expenses for all '08 session speakers.
INFORMS 2007 Annual Meeting. Technology Management Division.

5.E Service on CMU Committees

- 2011-present Member. CMU committee supporting the Advanced Manufacturing Partnership “Policy Workstream” (Chaired by President Jared Cohen and Prof. Gary Fedder.)
- 2011-present Member. Ad-Hoc Carnegie Institute of Technology (CIT) Committee on ways to enhance CIT undergraduate education in the areas of innovation and internationalization.
- 2011-present First-round Ph.D. admissions reviewer. “Other Technology Policy,” “International” and “Strategy, Entrepreneurship, and Technological Change” Ph.D. Applicant Categories. Department of Engineering and Public Policy.
- 2008-present Admissions Committee Member. Engineering and Technology Innovation Management Masters Program, Department of Engineering and Public Policy
- 2008-present Graduate Education Committee Member. Ph.D. Program. Department of Engineering and Public Policy.
- 2008-present Co-organizer. Junior Faculty Rotating Home Get-togethers. Department of Engineering and Public Policy
- 2008-2010 Co-organizer. Carnegie Institute of Technology Women’s Monthly Junior Faculty Lunches
- 2008-2010 Seminar Coordinator. Strategy Entrepreneurship and Technological Change (SETChange) B-Monthly Seminar

6. Awards, Prizes, Honors

- 2011 Greeted President Barack Obama on behalf of Carnegie Mellon University along with Carnegie Mellon President Jared Cohon during President Obama’s visit to announce the Advanced Manufacturing Partnership. Provided a brief synopsis of my offshoring research.
- 2011 National Science Foundation (NSF) Faculty Early Career Development (CAREER) Award
- 2010 SPIE (Society for the Advancement of Light) 2010 “Women in Optics”
- 2010 Participant, President’s Council of Advisors on Science and Technology (PCAST) Workshop on the Future of Advanced Manufacturing in the U.S.
- 2008 Oak Ridge Associated Universities Ralph E. Powe Junior Faculty Enhancement Award
- 2006 Finalist, Sloan Industry Studies Dissertation Award
- 2005-2006 Alfred P. Sloan Industrial Performance Center Fellowship
- 2005 Best Doctoral Presentation, 4th Annual Technology Management and Policy Consortium
- 2004 Anthony Sun Fellowship
- 2003 Best Masters Thesis, MIT Technology and Policy Program

7. Press

On The Future of Advanced Manufacturing:

Rotman, D. Location Matters in Manufacturing. Business Section. *Technology Review Online*. July 22, 2011.

American Society for Engineering Education (ASEE) Newsletter. Study Emphasizes Importance of Location to Manufacturing. July 22, 2011.

On Emerging Research Trends in Science and Innovation Policy:

Lane, J. “Feature” article highlighting my design for location research in the annual Science of Science and Innovation Policy newsletter (only grant recipient highlighted), August 2010.

Lane, J. *Science*. Policy Forum. June 5, 2009

On DARPA Pre- and Post- Tony Tether:

Matthews, Bill. *Defense News*. February 13, 2009.

Reppert, Barton. *IEEE Today's Engineer*. November 8, 2008.

Norr, Melissa. *Computing Research Association's Policy Blog*. October 14, 2008.

On Decision Tools for Engineering Design and Entrepreneurship:

Swaney Chris. *The Piper Newsletter*. June 2008.

On Professional Achievement:

M.I.T. Engineering Systems Division Department Brochure: Research Spotlight