

TODD ALLAN WATKINS

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EDUCATION

Ph.D. Harvard University, Public Policy, 1995
M.P.P. Harvard University, Public Policy, 1986
B.S. University of Rochester, Optics (with high distinction), 1984

Dissertation: The Evolution of European Technological Cooperation: The Institutional Economics of Collaborative R&D.

Advisors: Lewis Branscomb, Harvey Brooks, Bennett Harrison & F.M. Scherer

Master's thesis, "International Participation in the Space Station Program: A Management Framework," honored as one of the school's top three of 1986.

CURRENT POSITION

LEHIGH UNIVERSITY

Bethlehem, PA

College of Business & Economics, Department of Economics, 1992-date.
Director, Institute for the Study of Regional Political Economy & Associate Professor (with tenure).
Research & teaching areas: Policies and Economics of Technological Innovation, Managerial Economics, New Product Development and Technology Entrepreneurship. Distance learning. As Faculty Fellow to the Provost, 1999-2002, was responsible for the *Ventures* initiative, promoting inquiry-based, active learning curriculum across all four of Lehigh's colleges. Program leadership, for Integrated Product Development (IPD) Program and for Entrepreneurship program. IPD has been featured in *US News & World Report's America's Best Colleges*, the *Chronicle of Higher Education*, the *Washington Post*, ABC News, Fox News, *BusinessWeek TV*, multiple times in the *New York Times* & was national winner of the 1996 ASME curriculum innovation award. More than \$6 million in external funding for IPD and more than a quarter million in external research funding.

EXPERIENCE

COMMISSION OF THE EUROPEAN COMMUNITIES

Brussels, Belgium

Directorate-General for Science, Research & Development, Research Evaluation Unit. Compared management, evaluation & policy development in European & American cooperative science & technology programs, Feb.-Aug. 1987.

U.S. GENERAL ACCOUNTING OFFICE

Washington, DC

Program Evaluation & Methodology Division. Analyzed the statistical methodology of national cancer survival data. Prepared a legislative history of the National Cancer Program. Interviewed cancer experts & health program administrators. Authored section of GAO report, *Cancer Patient Survival: What Progress Has Been Made?* (GAO/PEMD-87-13), summer 1985.

ARTHUR D. LITTLE, INC.

Cambridge, MA

Economics Development & Management Division. Evaluated the economic & technical feasibility of Research & Development Limited Partnerships in Integrated Optics, spring 1985.

EASTMAN KODAK CO.

Rochester, NY

Optical Design & Manufacturing Engineering Departments. Designed & tested optical & opto-electronic test equipment. Programmed extensively in FORTRAN, CODE V, & BASIC. Designed lenses with optical design software. Wrote computer-aided design & analysis programs incorporating graphics software. Adopted design programs to drive computer automated prototype machining. Conducted quality control statistical analysis of production data, 1982-84.

HARVARD UNIVERSITY

Cambridge, MA

Research Assistant, Professors Maryellen Kelley & Harvey Brooks. Survey design & econometric analysis of a questionnaire sent to more than 1300 manufacturing plants, for their NSF-funded project, "Inter-Firm Linkages and the Diffusion of Process Innovations," & their book *The State of Computerized Automation in US Manufacturing*, 1988-91.

Research Assistant, Professors Lewis Branscomb, Ashton Carter & Harvey Brooks, Dual-Use Technology Project, 1986-89.

OTHER TEACHING EXPERIENCE

Instructor, Microeconomics, Harvard University, Summer Program for Public Administrators, 1988-91.

Economics Coordinator in 1990 & 1991. Hired & oversaw ten other instructors. Redesigned the economics & mathematics curricula.

Seminar Leader, The Policy & Politics of the US Space Program, Institute of Politics, Harvard University, spring 1988.

Head Teaching Fellow

Microeconomics & Public Policy, fall 1989 & fall 1990.

Applied Microeconomics, fall 1988.

Data Analysis for Managers, spring 1989, spring 1990 & fall 1990.

Teaching Fellow

Data Analysis for Public Managers, spring 1988.

Applied Microeconomics, fall 1986 & fall 1987.

Teaching Assistant

Public Management, spring 1986.

Statistics, fall 1985.

Calculus, University of Rochester, fall 1983 & spring 1984.

AREAS OF SPECIALIZATION

Economics of Innovation; Technology Entrepreneurship; Technology Management;

Science, Technology & Public Policy;

Photonics & Opto-Electronics Industries; Defense Industries;

Industrial Policy; Business-Government Relations;

Survey Design

HONORS

Outstanding Instructor Award, National Technological University, 2002.

Faculty Fellow to the Provost, Lehigh University, 1999-2002.

Outstanding Instructor Award, National Technological University, 1999, 2000 and again in 2001.

Nominated by Lehigh for national 1999 Thomas Ehrlich Faculty Award for Service-Learning, Campus Compact.

Named to "Class of 1961" endowed professorship, Lehigh University, 1998.

Alfred Noble Robinson Award, Lehigh University, 1997, for "outstanding performance in the service of the University and unusual promise of professional achievement."

Kane Faculty Fellow, Lehigh University, 1996-7.

National Winner, 1996 ASME Curriculum Innovation Award, American Society of Mechanical Engineers.

1996 MBA Excellence in Teaching Award, Lehigh University College of Business & Economics.

Nominated by Lehigh University for 1996 & 1997 Boeing Outstanding Educator Award. Top 6 finalist in 1997, top 10 in 1996.

Named one of eight "Rising Scholars and Practitioners" of Science & Technology Policy in the US, MIT Japan Science & Technology Program, 1993

Research Fellow, Center for Science & International Affairs, Harvard University, 1991-92 & 1986-87.

Elected Outstanding Teaching Fellow by MPA students, Harvard University Kennedy School of Government, 1991.

Pre-Doctoral Fellow, Science, Technology & Public Policy Program, Harvard, 1989-90.

Littauer Prize for Distinguished Writing in Public Policy, 1987.

Kennedy Fellow, Kennedy School of Government, 1985-86.

Tau Beta Pi Fellow, national award, 1984-85.

Elected Outstanding Senior Engineering Student, 1984, University of Rochester.

1984 Dutton Student Life Prize, University of Rochester, for "exemplary contribution to campus life"

President, Tau Beta Pi, National Engineering Honor Society, 1983-84.

President, University of Rochester Men's Glee Club, 1983-84.

Phi Beta Kappa as junior.

Tau Beta Pi as junior.

University of Rochester Alumni Regional Scholarship, 1980-1984.

National Merit Scholarship, 1980-84.

Ohio All-State Orchestra, violin, 1980.

GRANTS & CONTRACTS

<u>Title</u>	<u>Source</u>	<u>Amount</u>	<u>Term</u>	<u>Co-PI</u>
Linking Entrepreneurially-Oriented Students with Pennsylvania Companies IV	Pennsylvania Infrastructure Technology Alliance (PITA), PA DCED	\$67,000	2007-8	John B. Ochs
National Collegiate Inventors & Innovators Alliance Advanced E-Team Support Grant (Ecotech Nanosystems)	Lemelson Foundation	\$19,492	2007-8	
Linking Entrepreneurially-Oriented Students with Pennsylvania Companies III	Pennsylvania Infrastructure Technology Alliance (PITA), PA DCED	\$77,887	2006-7	John B. Ochs
International Social Entrepreneurship through Multidisciplinary Student E-Team Projects with Microfinance Partners	Lemelson Foundation-NCIIA	\$36,500	2006-7	Hannah Stewart-Gambino, John B. Ochs

National Collegiate Inventors & Innovators Alliance Advanced E-Team Support Grant (Orion Security)	Lemelson Foundation	\$16,500	2006-7	
Student Entrepreneurship Competition (SEC): Support of Student Start-ups.	South Bethlehem Keystone Innovation Zone	\$7,500	2006	John B. Ochs Graham Mitchell
IPD Corporate Project Grants for 2006	25 sponsor companies	\$125,000	2006	Pat Costa, John Ochs, IPD Program
Linking Entrepreneurially-Oriented Students with Pennsylvania Companies II	Pennsylvania Infrastructure Technology Alliance (PITA), PA DCED	\$70,000	2005-6	John B. Ochs
National Collegiate Inventors & Innovators Alliance Advanced E-Team Support Grant (VorTech)	Lemelson Foundation	\$18,738	2005-6	
Partnership for Research in Innovation Commercialization and Entrepreneurship (PRICE)	NSF – Partnerships for Innovation (PFI)	\$600,000 split between partners	4/05 - 6/08	Florida Tech - lead, USC, Lehigh (Ochs & Watkins), Rice, Rose Hullman, Santa Clara, Worcester Poly
National Collegiate Inventors & Innovators Alliance Advanced E-Team Support Grant (Soda Sentry)	Lemelson Foundation	\$9,241	2005-6	
IPD Corporate Project Grants for 2005	19 sponsor companies	\$100,000	2005	Pat Costa, John B. Ochs, IPD Program
Linking Entrepreneurially-Oriented Students & Faculty with Pennsylvania Companies	Pennsylvania Infrastructure Technology Alliance (PITA), PA DCED	\$50,000	2004-5	John B. Ochs
IPD Corporate Project Grants for 2004	15 sponsor companies	\$100,000	2004	Pat Costa, John B. Ochs, IPD Program
Infrastructure to Support Linking PA Biotech Companies, Faculty, Students and Alumni through Lehigh's Integrated Product Development (IPD) and Bioengineering Programs	Pennsylvania Infrastructure Technology Alliance (PITA), PA DCED	\$35,000	2004	John B. Ochs, Daniel Ou'Yang
National Collegiate Inventors & Innovators Alliance Advanced E-Team Support Grant (FreeFeet)	Lemelson Foundation	\$13,500	4/04-5/06	
IPD Corporate Project Grants for 2003	15 sponsor companies	\$115,000	2003	Pat Costa, John Ochs, IPD Program
Lehigh Entrepreneurs Network	Ewing Marion Kauffman Foundation	\$50,000	2003-4	John B. Ochs
National Collegiate Inventors & Innovators Alliance Advanced E-	Lemelson Foundation	\$8,380	7/03-12/04	

Team Support Grant (EcoTech Marine: Easy Ionizer)				
National Collegiate Inventors & Innovators Alliance Advanced E-Team Support Grant (New Design Painting)	Lemelson Foundation	\$13,600	3/03-6/04	
National Collegiate Inventors & Innovators Alliance Advanced E-Team Support Grant (Glow Friends.)	Lemelson Foundation	\$13,500	3/03-6/04	
Demonstration Project Linking Academic Entrepreneurial Courses with Dislocated & New Entrant Workers for Self Employment and New Company Start-ups	US Department of Labor AN11632-01-60	\$556,000	7/01-12/03	John B. Ochs, IPD Program, William Michalerya, Office of Public Affairs
Payment to Lehigh for GEco 402 Distance Course	National Technological University	Approx. \$12,000	2003	
Skill & Organizational Complementarities to CAD/CAM Technology Use in Small & Medium Sized Manufacturing Firms	Philadelphia Accelerated Manufacturing Education, Inc. (PhAME)	\$26,003	2002-3	
Skill & Organizational Complementarities to CAD/CAM Technology Use in Small & Medium Sized Manufacturing Firms	Small Business Development Center	\$5,000	2002	Antonio Gallardo
National Collegiate Inventors & Innovators Alliance Advanced E-Team Support Grant (Syrup Out Signal)	Lemelson Foundation	\$13,900	8/02-5/04	
Lehigh University's Integrated Product, Project and Process Development Initiative	US Department of Education	\$350,000	2001-3	John B. Ochs, IPD Program, William Michalerya, Office of Public Affairs
Payment to Lehigh for GEco 402 & GEco 404 Distance Courses	National Technological University	Approx. \$20,000	2002	
National Collegiate Inventors & Innovators Alliance Advanced E-Team Support Grant (F.L.I.)	Lemelson Foundation	\$14,220	9/01-8/02	
Industrial Design Career Awareness	Alcoa Foundation	\$30,000	2001-2	Ochs, Boothe, Buss
Estimating Net Social Returns to a Case Study Cluster of ATP Photonics & Opto-Electronics Projects	US Department of Commerce	\$145,896	9/99-1/02	Theodore W. Schlie
Lehigh University's Integrated Product Development Educational Program	US Department of Education	\$370,000	2000-2	John B. Ochs, Berrisford Boothe, IPD Program, William Michalerya,

				Office of Public Affairs
IPD Corporate Project Grants for 2001	9 sponsor companies	\$78,000	2001	Ochs, IPD Program
Payment to Lehigh for GEco 402 & GEco 404 Distance Courses	National Technological University	Approx. \$20,000	2001	
IPD Funding For Start Up Companies	Ben Franklin Technology Partnership	\$30,000	2001	John B. Ochs
National Collegiate Inventors & Innovators Alliance Advanced E-Team Support Grant (Digi-me)	Lemelson Foundation	\$10,000	6/00-6/01	John B. Ochs
Payment to Lehigh for GEco 402 & GEco 404 Distance Courses	National Technological University	Approx. \$15,000	2000	
IPD Funding For Start Up Companies	Ben Franklin Technology Partnership	\$30,000	2000	John B. Ochs
Industrial Design Career Awareness	Alcoa Foundation	\$40,000	2000-1	John B. Ochs, Berrisford Boothe, Sherry Buss
Integrating Community & Curriculum: An Evaluation of Lehigh University's Community Research & Policy Service (Lehigh CORPS)	Ford Foundation via Brown University Campus Compact	\$2,500	1999	Thomas J. Hyclak
IPD Funding For Start Up Companies	Ben Franklin Technology Partnership	\$30,000	1999	John B. Ochs
National Collegiate Inventors & Innovators Alliance E-Team Support Grant	Lemelson Foundation	\$7,200	1999	John B. Ochs
National Collegiate Inventors & Innovators Alliance Advanced E-Team Support Grant (Obsidian)	Lemelson Foundation	\$20,000	1999	John B. Ochs
IPD Corporate Project Grants for 1999	11 sponsor companies	\$100,000	1999	Ochs, IPD Program & Lehigh University Development Office
Industrial Design Career Awareness	Alcoa Foundation	\$30,000	1999-2000	John B. Ochs, Berrisford Boothe, Corporate Relations
General Motors 5 year IPD Grant	GM Foundation	\$400,000	1996-2001	Ochs, Berrisford W. Boothe, Harvey G. Stenger & Developmnet Office
Payment to Lehigh for GEco 402 & GEco 404 Distance Courses	National Technological University	Approx. \$20,000	1999	
IPD Funding For Start Up Companies	Ben Franklin Technology	\$30,000	1998	Ochs & Boothe

	Partnership			
National Collegiate Inventors & Innovators Alliance E-Team Support Grant	Lemelson Foundation	\$15,000	1998	Ochs & Boothe
IPD Program Grant	Vincent Bell	\$50,000	1998	IPD Program, Development Office
IPD Program Grant	Charles Strauch	\$50,000	1998	IPD Program, Development Office
IPD Corporate Project Grants for 1998	Knoll, Black & Decker, Chrysler, Lutron, Armstrong, NJ Rivet, Kulicke & Soffa	\$35,000	1998	IPD Program
Payment to Lehigh for GEco 402 & GEco 404 Distance Courses	National Technological University	Approx. \$20,000	1998	
Integrated Learning Experience Pilot: Lehigh CORPS: Regional Economic Development Practicum	Lehigh University ILE Support Fund	\$10,500	8/97-5/98	Thomas J. Hyclak
IPD Program Grant	Vincent Bell	\$60,000	1997	Ochs, Boothe, Stenger, Dev. Office
IPD Corporate Project Grants for 1997	Lucent, Knoll, Chrysler, Exxon, Lutron, Armstrong	\$55,000	1997	IPD Program
IPD Equipment Donation	Black & Decker	Approx. \$20,000	1997	IPD Program
Payment to Lehigh for GEco 402 & GEco 404 Distance Courses	National Technological University	Approx. \$20,000	1997	
Integrated Learning Experience Pilot: Theater Design & Business Planning	Lehigh University ILE Support Fund	\$13,600	1997	Jeffrey R. Milet & Ochs
Applied Silicon Research & Semiconductor Research Policies in Europe	Monterey Institute of International Studies	\$10,000	8/96-2/97	
IPD Program Grant	Vincent Bell	\$60,000	1996	Ochs, Boothe, Stenger, Dev. Office
IPD Program Development Grant	AT&T Foundation	\$10,000	1996	Ochs, Boothe, Stenger
IPD Corporate Project Grants for 1997	Alcoa, Johnson & Johnson, Chrysler	\$23,500	1996	IPD Program
Supplier Development & Management in the Aircraft Industry	MIT Lean Aircraft Initiative	\$85,259	1/94-5/95	
Summer Research Travel Grant, Program for the Study of Germany	German Marshall	\$5,000	1990	

& Europe	Foundation			
Collaborative R&D Management Practices in Esprit- & Eureka-funded Consortia	US Congress, Office of Technology Assessment	\$2,500	1990	
Sheldon Traveling Fellowship, for Research in Europe	Harvard University	\$10,000	1987	

REFEREED JOURNALS AND PROCEEDINGS

“Absorptive Capacity and R&D Tax Policy: Are In-house and External Contract R&D Substitutes or Complements?” with Lolita Paff. Forthcoming, *Small Business Economics*.

“Do Workforce and Organizational Practices Explain the Manufacturing Technology Implementation Advantage of Small Defense Contractors over Non-Defense Firms?” *Defence and Peace Economics* 18(4), 2007.

“Innovation Facilitators and Accelerators for Aeronautics,” principal author (unattributed), in *Aeronautics Innovation: NASA’s Challenges and Opportunities*, Stephen A. Merrill, ed., Committee on Innovation Models for Aerospace Technologies, Board on Science, Technology, and Economic Policy, National Research Council of The National Academies, The National Academies Press, Washington, D.C., 2006.

“A Comprehensive Model for Integrating Entrepreneurship Education and Capstone Projects while Meeting ABET Requirements,” with John B. Ochs, Gerard P Lennon and Graham Mitchell, *Proceedings of the 2006 American Society for Engineering Education Annual Conference & Exposition*, Chicago, June 2006.

“Do Workforce and Organizational Practices Explain the Manufacturing Technology Implementation Advantage of Small Defense Contractors over Non-Defense Firms?,” *Proceedings of the Pennsylvania Economic Association 2005 Conference*, Millersville University, June 2-4, 2005. Revised version in *Defence and Peace Economics*, 2007.

“Integration of Lehigh’s Entrepreneurship Minor into the Undergraduate Engineering Curricula,” with John B. Ochs and Graham Mitchell, *Proceedings of the 2005 American Society for Engineering Education Annual Conference & Exposition*, Portland, Oregon, June 2005.

“Lehigh’s Entrepreneurial Network (LEN) of Alumni: Resources for Student Entrepreneurs,” with John B. Ochs, *Proceedings of the 2004 American Society for Engineering Education Annual Conference & Exposition*, Salt Lake City, Utah, June 2004.

“A Case Study in Assessing Team-Based Project Courses: Lehigh University’s IPD Program,” with John B. Ochs, Drew M. Snyder, Jean Russo and Lisa-Getzler-Linn, *Proceedings of the 2004 American Society for Engineering Education Annual Conference & Exposition*, Salt Lake City, Utah, June 2004.

“Leveraging What Freshmen Don’t Know: Product Development in an Integrated Business and Engineering Freshman Workshop,” with John B. Ochs and Drew M. Snyder, *Proceedings of the 2003 American Society for Engineering Education Annual Conference & Exposition*, 2003.

“Lessons Learned in Building Cross-Disciplinary Partnerships in Entrepreneurship Education through Integrated Product Development (IPD),” with John B. Ochs and Drew M. Snyder, *Proceedings of the 2003 American Society for Engineering Education Annual Conference & Exposition*, 2003.

“Cultivating an Entrepreneurial Spirit through Cross-Disciplinary Student Teams in Freshmen Projects Course.” with John B. Ochs & Berrisford W. Boothe, *Proceedings of the 2002 American Society for Engineering Education Annual Conference & Exposition*.

“Manufacturing Scale, Lot Sizes and Product Complexity in Defense and Commercial Manufacturing,” with Maryellen R. Kelley, *Defence and Peace Economics* 12(3), 2001.

“Creating a Truly Multidisciplinary Entrepreneurial Educational Environment,” with John B. Ochs & Berrisford W. Boothe, *Journal of Engineering Education* 90(4), 2001.

---, reprinted in P. Vilarinho, ed., *Leading International Practices in Engineering Entrepreneurship Education*. Lisbon: COTEC, 2006.

---, also in *Proceedings of the 2001 American Society for Engineering Education Annual Conference and Exposition*. Revised version of paper above.

“Learning Across Functional Silos: Lehigh University’s Integrated Product Development Program,” with John B. Ochs, Berrisford W. Boothe & Heather Beam, in Richard G. Milter, John E. Stinson & Wim H. Gijssels, eds., *Educational Innovation in Economics and Business III: Innovative Practices in Business Education*, Kluwer Academic Publishers, 1998.

“Lehigh University’s Educational Program in Integrated Product Development (IPD),” with John B. Ochs & Berrisford W. Boothe, *Proceedings of the 1996 ABET Annual Meeting*, San Diego, October 31-November 1, 1996.

---, reprinted in *Innovations in Mechanical Engineering Curricula for the 1990s: The 1996 Curriculum Innovation Awards*, American Society of Mechanical Engineers, New York, 1996.

---, also in: *UPCADEM '96*, reviewed proceedings of the conference on University Programs in Computer Aided Engineering, Design & Manufacturing, University of Virginia, Charlottesville, June 27-29, 1996.

“In From the Cold: Prospects for Conversion of the Defense Industrial Base,” with Maryellen R. Kelley, *Science* 268, No. 5210, 28 April, 1995.

---, reprinted in: Tarek Khalil, ed., *Management of Technology*, McGraw Hill, 2000.

“A Technological Communications Costs Model of R&D Consortia as Public Policy,” *Research Policy* 20, April 1991.

“Beyond Guns and Butter: Managing Dual-Use Technologies,” *Technovation: The International Journal of Technological Innovation and Entrepreneurship* 10(6), September 1990.

---, reprinted in: *IEEE Engineering Management Review* 19, Summer 1991.

“A Management Framework for the Space Station Program,” *Governance*, Winter 1987. Article won the Lucius N. Littauer Prize for Distinguished Writing in Public Policy.

"From the Ashes of ISTC: U.S. Foreign Technical Assistance Since 1979," *Governance*, Summer 1986.

ARTICLES IN BOOKS AND POPULAR JOURNALS

"Glide Path to Irrelevance: Federal Funding for Aeronautics," with Alan Schriesheim and Stephen Merrill, *Issues in Science and Technology* 23(1) 69-78, Fall 2006.

"Extending Case Study Methodologies for Technology Policy Evaluation," *The Advanced Technology Program: Assessing Outcomes*, Charles Wessner, ed., National Academy of Sciences, National Academy Press, Washington D.C., 2001.

"Regional Economic Development Practicum," with Thomas J Hyclak, in *After the Votes Are Counted: A Post-Election Guide to Maintaining College Student Civic Engagement*, Michael Gregory ed., Campus Compact, Brown University, Providence RI, 2001.

"Dual-Use Supplier Management and Strategic International Sourcing in Aircraft Manufacturing," in *Trends and Challenges in Aerospace Offsets*, Charles Wessner, ed., National Academy of Sciences, National Academy Press, Washington D.C., 1999.

"Are Defense and Non-Defense Manufacturing Industries Really all That Different?," with Maryellen R. Kelley, in Gerald I. Susman & Sean O'Keefe, eds., *The Defense Industry in the Post-Cold War Era: Corporate Strategies and Public Policy Perspectives*, Pergamon, 1998.

"Applied Semiconductor Research in Europe," in William Keller et al. (eds.), *Global Access to Applied Research: Implications for the Semiconductor Industry*, Center for Trade & Commercial Diplomacy, Monterey Institute of International Studies, Monterey CA, March 1997.

"The Myth of the Specialized Military Contractor," with Maryellen R. Kelley, *Technology Review* 98(3), April, 1995.

"The Myth of the Defense Ghetto," Invited response to Bruce D. Berkowitz's "Why Defense Reinvestment Won't Work," *Technology Review*, Vol. 97, No. 7, October 1994.

"Working Together to Soar Far Into Space," (Opinion) *The Christian Science Monitor*, Vol. 79, No. 12, December 11, 1986.

GOVERNMENT RESEARCH MONOGRAPHS

Direct and Spillover Effects of ATP-Funded Photonics Technologies, with Theodore W. Schlie, NIST GCR06-893, Economic Assessment Office, Advanced Technology Program, National Institute of Standards and Technology, Technology Administration, U.S. Department of Commerce, Washington DC, December 2006.

"Diffusion Pathways for ATP-Funded Photonics Technologies," with Theodore W. Schlie, *Highlights from ATP's Economic Studies*, ATP Factsheet 1.F2, Economic Assessment Office, Advanced Technology Program, National Institute of Standards and Technology, Technology Administration, U.S. Department of Commerce, Washington DC, September 2001.

“The Effects of Commercial Offsets on Aerospace Subcontractors,” in *Status Report of the Presidential Commission on Offsets in International Trade*, Executive Office of the President, Washington, DC, January 2001.

The Defense Industrial Network, with Maryellen R. Kelley, Office of Technology Assessment, US Congress, August, 1992.

Cancer Patient Survival: What Progress Has Been Made? (contributing author), GAO/PEMD-87-13, Program Methodology and Evaluation Division, United States General Accounting Office, Washington DC, 1987.

PAPERS & ABSTRACTS IN OTHER PUBLISHED CONFERENCE PROCEEDINGS

Abstract: “Intellectual Property Agreements for Entrepreneurial and Industry-Sponsored Undergraduate Projects,” with Lisa Getzler-Linn, Proceedings of the *National Collegiate and Innovators Alliance Annual Conference*, Tampa, March 2007.

“Program and Student Performance Assessment in Team-Based Project Courses with Focus on Technical Entrepreneurship and Product Development,” with Lisa Getzler-Linn and John B. Ochs, US Association for Small Business and Entrepreneurship/Small Business Institute, *The Changing Entrepreneurial Landscape: USASBE/SBI 2006 Joint Conference Proceedings*, Tucson, Arizona, January 12-15, 2006.

“Integrating Engineering, Design Arts and Entrepreneurship Education through New Product Development Projects” (paper and poster), with John B. Ochs and Anna Chupa, *Proceedings of the PACE 2005 Annual Forum*, Mexico City, July 27-29, 2005.

Abstract: “Lehigh’s Interdisciplinary Capstone Courses in Integrated Product Development,” with John B. Ochs, *2004 Annual Conference of the American Society for Engineering Education*, Liberal Education Division, Salt Lake City, UT, June 2004.

Abstract: “Do Workforce and Organizational Practices Explain the Manufacturing Technology Implementation Advantage of Small Defense Contractors over Non-Defense Firms?”, *2004 Hawaii International Conference on Business*, Proceedings, East West Council for Education, Honolulu, and the Asia-Pacific Research Institute, Peking University, 2004.

“Implementation, Evaluation and Lessons Learned from (Very) Cross-Disciplinary Technology Entrepreneurship Programs at Lehigh University,” with John B. Ochs, *AASCB Associate Deans Conference Proceedings*, Orlando, FL, December 7-9, 2003.

“Problems Typical of the Case-Study Approach to Technology Impact Assessment and Techniques of Overcoming Them,” *Benchmarking Evaluation of Public Science And Technology Programs In The United States, Canada, Israel, And Finland*, Proceedings, Tekes—National Technology Agency Of Finland, Embassy Of Finland, Washington DC, September 25, 2002, TEKES Reports of R&D Impacts, January 15, 2003.

Abstract: “Attracting Under Represented Students to Engineering through Career Awareness Programs,” with John B. Ochs & Barrisford W. Boothe, for the *2002 American Society of Engineering Educators (ASEE) Annual Conference & Exposition*, Montreal, June 16-19, 2002.

“Creating a Truly Multidisciplinary Entrepreneurial Educational Environment,” with John B. Ochs & Berrisford W. Boothe, *Proceedings of the 2001 Annual Meeting of the National Collegiate Inventors and*

Innovators Alliance, Washington DC, March 6-9, 2001. Revised version published in *Journal of Engineering Education* 90(4), 2001.

Abstract: "Obsidian Suspension Systems Cyclops Mountain Bike Suspension," in *Creative Connections: Innovation & Entrepreneurship in Higher Education*, National Collegiate Inventors & Innovators Alliance Annual Conference, Smithsonian Institution, Washington DC, March 1999.

"Integrating Design Arts, Engineering and Business Curricula through Multidisciplinary Product Design Projects," with John B. Ochs & Berrisford W. Boothe, *Second International Workshop on Integrated Product Development*, Magdeburg/Barleben Germany, Sept 17-18, 1998.

Abstract: "Learning Across Functional Silos: Lehigh University's Integrated Product Development Program," with John B. Ochs, Berrisford W. Boothe & Heather Beam, *Program Book of Abstracts: Third EDINEB Conference*, Educational Innovation in Economics and Business: Innovative Practices in Business Education, Orlando, FL, December 4-7, 1996.

"Squeezing the US Aerospace Supply Base: Global Sourcing and Lean Supplier Management," in *Next Generation Manufacturing: Agility, Intelligence, Process Reengineering*, Proceedings of the 10th Conference With Industry, Lehigh University Center for Manufacturing Systems Engineering, Bethlehem, PA, April 22-3, 1996.

"Collaborative R&D in Theory and in the European Community," in *Linking Innovation Policy and Innovation Management*, Proceedings of the International Conference for Rising Scholars & Practitioners in Science & Technology Policy, East-West Center, University of Hawaii, Honolulu, January 7-9, 1993, MIT Japan Program, Massachusetts Institute of Technology.

Abstract: "Fostering Cooperation: The Role of Esprit in Shaping Industrial Behavior," *European Community Studies Association: Conference Abstracts*, George Mason University, May 22-24, 1991.

OTHER CONFERENCE PAPERS

"What is the After-Tax Price of R&D? An Inter-State Comparison based on R&D Tax Credits, Corporate Tax Rates, and Income Apportionment, using Firm-Level Data," with Lolita Paff, Eastern Economic Association Conference, Philadelphia, February 24-26, 2006.

"Can Students Help Entrepreneurs? An Evaluation of Linking Academic Technology Entrepreneurship Courses With Dislocated and New Entrant Workers to Foster Start-ups," with M. Jean Russo and John B. Ochs, 12th Annual EDINEB International Conference, Innovating the Dynamics of Organizing Learning in Business and Business Education, Antwerp, Belgium, June 15-17, 2005.

"A Test for R&D Complementarities in Bio-Pharmaceutical Industries Using R&D Tax Price Changes," with Lolita Paff, Eastern Economic Association Conference, Washington, DC, February 20-22, 2004.

"Diffusion Pathways for Advanced Photonics and Optoelectronics Technologies," with Theodore W. Schlie, Western Economics Association, Vancouver, July 1, 2000.

"Integrating Design Arts, Engineering and Business Curricula through Multidisciplinary Product Design Projects," with John B. Ochs & Berrisford W. Boothe, for the Second Annual NCIIA National Conference, National Collegiate Inventors & Innovators Alliance, Washington, DC, March 13-15, 1998.

"Integrated Supplier Management and Strategic Sourcing at Vought Aircraft," MIT Lean Aircraft Initiative, Supplier Systems and Relationships Workshop, Massachusetts Institute of Technology, Cambridge, MA, April 4-5, 1995.

"Social Capital as a Policy Goal in the EC Cooperative R&D Programs," invited paper for the International Studies Association 34th Annual Convention, Acapulco, Mexico, March 23-27, 1993.

"Defense and Non-Defense Production Networks and the Diffusion of Modern Manufacturing: Preliminary Econometric Results," with M.R. Kelley, American Economic Association, Jan. 3-5, 1992.

"The E.C. and Institutions of Cooperative Industrial R&D," Association for Public Policy Analysis & Management, Washington, D.C., Oct. 24-26, 1991.

"Fostering Cooperation: The Role of Esprit in Shaping Industrial Behavior," for the conference "Western Europe at the Crossroads," Columbia University, Institute on Western Europe, April 6-8, 1991.

"R&D Consortia as Technology Policy in Europe," Association for Public Policy Analysis & Management, Arlington, Va., Nov. 2-4, 1989.

"Research Collaboration in the EC: Innovation, Technology Diffusion, and Political Support," European Community Studies Association, George Mason University, May 24-25, 1989.

OTHER PUBLICATIONS

"Absorptive Capacity and R&D Tax Policy: Are In-house and External Contract R&D Substitutes or Complements?" with Lolita Paff. Working Paper No. 116, National University of Ireland, Galway. May 2007. Revised version forthcoming in *Small Business Economics*.

"A North American Vagrant Lands in Galway," *Cairde Eanlaith Na Gaillimbe (Birdwatch Galway) Quarterly Newsletter* 57/07, May 2007.

"Why are Labor Quit Rates Lower among Defense Contractors", with Thomas Hyclak.. Working Paper No. 121, National University of Ireland, Galway. April 2007. Under review at *Industrial Relations*.

"NASA Needs Funds," Letters, *USA Today*, October 4, 2006.

"A Seven Step Program to Teaching Creatively," *Lehigh Lab Notes* 3(1), February 2006.

"On the Existence of Gentrification in Southside Bethlehem as Expressed in Rents", with M. Garrett Roth, *Economic Notebook*, Martindale Center for the Study of Private Enterprise, Lehigh University, August 2005.

Management of Technology in Europe 2003: Comparing Strategies and Tools in 17 High Technology Organizations, with Dominic Busher, et al., Todd A. Watkins, contributing ed., National Technological University, Minneapolis, MN, May 2003.

Volume Editor: *Contradictions and Challenges in 21st Century Italy*, Vol. 23 of the journal *Perspectives on Business and Economics*, Todd A. Watkins and Nancy B. Watkins, eds., 2003.

Lehigh Valley Technology Network - Survey Results, Lehigh Valley Economic Development Corp., Bethlehem, PA, April 2002. <http://www.lvtechnet.com/results.pdf>.

American Practitioners' Views of Technology Management in European High Technology Organizations, Todd A. Watkins, contributing ed., National Technological University, Fort Collins, CO, May 2001.

Applied Silicon Research and Semiconductor Research Policies in Europe, Comparative Country Case Study for the Impact of Foreign Research Program, Center for Trade & Commercial Diplomacy, Monterey Institute of International Studies, November 1996.

"In from the Cold: Prospects for Conversion of the Defense Industrial Base," with Maryellen R. Kelley, Lehigh University, Martindale Center for the Study of Private Enterprise, Discussion Paper No. 6, 1994. [Substantially reduced & revised version published in *Science*, 1995]

"In from the Cold: Prospects for Conversion of the Defense Industrial Base," with Maryellen R. Kelley, Massachusetts Institute of Technology, Industrial Performance Center, Working Paper 94-0010WP, December 1994. [Substantially revised version of above, & second substantially reduced & revised version published in *Science*, 1995]

"Think of How US Could Spend \$118 Billion Allotted to Space," Letters, *Boston Globe*, July 1, 1991.

"War of Games," Letters, *Financial Times*, January 30, 1991.

"Military and Civilian Technology: A Changing Relationship," Harvard University, Science, Technology & Public Policy Program (STPP) Workshop Report, November 1989.

"Dual-Use Technologies: Diffusion Structures and International Policy Convergence," Harvard University, STPP Discussion Paper 89-04.

"America's Space Program," *National Defense*, Vol. 74, March 1989.

"Oil Import Tax," Letters, *Science*, January 30, 1987.

"Engineering Code of Ethics," *Arcanii Imperii, Journal of Philosophy & Politics*, Vol. 2, No. 3, March 1984.

WORKS IN PROGRESS

"What is the After-Tax Price of R&D? An Inter-State Comparison," with Lolita Paff. Under review at the *National Tax Journal*.

"Can Students in Technology Entrepreneurship Courses Help Foster Start-ups by the Unemployed?" with M. Jean Russo and John B. Ochs. Under review at the *Journal of Small Business and Enterprise Development*.

"Citations as Proxies for Technology Flows: Are Corporate Publications Less Noisy or Biased than Patents?"

Degrees of Separation: Dual-Use Manufacturing and Defense Industry Restructuring. Book manuscript working title.

Fueling the Engine of Economic Growth: How Non-Market Institutions Matter to Innovation, with Maryellen R. Kelley. Early formative book idea, working title.

INVITED LECTURES, SEMINARS, OTHER PRESENTATIONS

“Empirical Evidence of Technology Use and Human Resource Management in the Defense Industrial Base,” Research Seminar, Penn State University, Berks, October 8, 2007.

“A Dream Model of Technical Entrepreneurship Education: Envisioning an Ideal Educational Environment for the Next Generation of Global Business Creators” with John B. Ochs, Gerard P Lennon, for the *2007 American Society for Engineering Education Annual Conference and Exposition*, Honolulu, Hawaii, June 24-7, 2007.

“Absorptive Capacity and R&D Tax Policy: Are In-house and External Contract R&D Substitutes or Complements?” Department of Economics Research Seminar, University of Limerick, Ireland, March 23, 2007.

“Defence Procurement’s Effects on Technology Use, Human Resource Practices, Labor Skills and Voluntary Quits in Small Manufacturers,” Department of Economics Research Seminar, National University of Ireland, Galway, February 9, 2007.

“Infusing Principles of Business and Entrepreneurship into the Curriculum,” with John B. Ochs, Plenary Session, Electrical and Computer Engineering Department Heads Association, *ECEDHA 2007 Meeting*, St Augustine, Florida, March 16-20, 2007

“Tools for Assessing Program and Student Performance within Multidisciplinary Teams in Experiential Learning Courses,” with Lisa Getzler-Linn and John B. Ochs, *AACSB Graduate Programs Conference*, Tampa, Florida, November 18-20, 2005.

“Teaching Creatively: Disciplinary Perspectives-Business and Economics” Lehigh University Faculty Development Seminar, September 29, 2005.

“Developing Technology Entrepreneurship Curricula,” College of Business, University of Missouri, Columbia MO, April 14, 2003.

"Current Issues in Technology Management in Europe," National Technological University Management of Technology Residency, Vail, CO, August, 2002

“Does ATP Pick High Economic Spillover Technologies? Comparing ATP Winners and Non-Winners in Photonics”, with Theodore W. Schlie, National Institute of Standards and Technology, US Commerce Department, November 26, 2001.

“The Effects of Commercial Offsets on Aerospace Subcontractors”, Testimony before the Presidential Commission on Offsets, White House Conference Center, December 4, 2000.

“Case Studies of Technology Economics in Corporate Strategy,” National Technological University Management of Technology Residency, Miami, FL, January 6-10, 2000. Repeated 2001.

“Lehigh University Undergraduate Research and Partnering Opportunities” for the Lehigh Valley Partnership, October 7, 1999.

“Five Field Studies of European R&D Management, circa 1999” National Technological University Management of Technology Residency, August 16-20, 1999.

- “Dual-Use Technologies and The Structure of the Defense Industry” distance learning talk for the NTU's Science & Technology Institutions program, July 1998. Repeated July 1999 & July 2001.
- “Introduction to Technology, Trade and Economic Growth,” National Technological University Management of Technology Residency, Vail, CO, August 17-21, 1998. Repeated August 1999, 2000, 2001.
- "Cooperative R&D Policies in Europe," National Technological University Management of Technology Residency, Vail, CO, August 17-21, 1998.
- "Dual-Use Supplier Management and Strategic International Sourcing in Aircraft Manufacturing," National Academy of Sciences, Washington, DC, January 1998.
- "Technology, Trade and Economic Growth," National Technological University Management of Technology Residency, San Diego, January 5-9, 1998. Repeated January 1999, 2000 & 2001.
- “Technology and Economic Systems,” Diamond Center for Economic Education, Teacher Intern Program, Lehigh University, Bethlehem, PA, June 24, 1997.
- “Tips for Effective Teaching and Learning,” with Darlene Chisholm, Lehigh University Department of Economics Colloquium, February 21, 1997.
- "Management of Technology in the European Community," for the conference on Managing Technology in the Global Economy: A Professional Development Program for Technical Managers, Beaver Run Conference Center, Breckenridge, CO, August 22-24, 1996.
- “Lehigh University’s Educational Program in Integrated Product Development (IPD),” with John B. Ochs & Berrisford W. Boothe, Spring 1996 Meeting of the Unigraphics Users Group, Newport Beach, CA, March 1996.
- , with John B. Ochs & Berrisford W. Boothe, for the Lehigh University College of Engineering & Applied Sciences Dean’s Council, April 1996.
- , with John B. Ochs & Berrisford W. Boothe, International Integrated Product Development Workshop, Otto von Guericke University, Madgenburg, Germany, September 1996
- , with John B. Ochs & Berrisford W. Boothe, 1996 Ohio Aerospace Institute Pathfinders Conference & Workshop. Cleveland, OH, October 1996.
- , with John B. Ochs & Berrisford W. Boothe, American Society of Mechanical Engineers, Annual Meeting, Atlanta, November 1996.
- “The Distance Learning Classroom,” with Peter Poole, Lehigh University Faculty Development Series, October 22, 1996.
- “Lehigh University Integrated Product Development Program,” with Heather Beam, Business-Higher Education Forum Winter Meeting, Dana Point, CA, February 8-10, 1996.
- , with Heather Beam, for the Lehigh University Board of Trustees, April 1996.

“Economics in the Business World,” Diamond Center for Economic Education, Teacher Intern Program, Lehigh University, Bethlehem, PA, June 21, 1995 & June 27, 1996.

“Survey Evidence on Dual-Use Manufacturing,” Texas Instruments, Richardson Texas, March 21, 1994.

“Customer-Supplier Relations in the US Machining Intensive Durable Goods Industries,” with Maryellen R. Kelley, Supplier Systems & Relations Workshop, Massachusetts Institute of Technology, Cambridge MA, December 7-9, 1993.

“The Myth of the Defense Ghetto: Dual-Use in US Manufacturing,” Martindale Center for the Study of Private Enterprise, Faculty Research Seminar, Lehigh University, October 22, 1993.

“Technology Transfer Management in Federal Laboratories,” with Bruce Smackey, organized & facilitated three-day case discussion workshop, National Technology Transfer Center (NTTC), Wheeling, West VA, June 15-17, 1993.

“Federal Dual-Use Technology Policies,” Panel Moderator & Organizer, National Technological University Residency Workshop, Georgetown University, May 20, 1994.

UNIVERSITY SERVICE

Leadership

Director, Wilbur Powerhouse, 2006-date

Chair, Wilbur Powerhouse Building Oversight Committee, 2004-date

Chair, Entrepreneurship Curriculum Oversight Committee, 2004-2006

Chair, Campbell Social Science Research Prizes Selection Committee, 2005-2006

Integrated Product Development Program Committee, CBE Lead, 1994-date

Director, Institute for the Study of Regional Political Economy, 2001-date

Chair, Creativity Professor of Practice Search & Strategy Committee, 2004-2005

Chair, Entrepreneurship Minor Curriculum Committee, 2003-2004

Directed Ventures initiative as Faculty Fellow to the Provost, 1999-2002

Chair, Ventures Faculty Advisory Group, 1999-2001

Chair, CBE Distance Learning Committee, 1998.

Co-chair, Integrated Learning Experiences (ILE) faculty working group, 1996-1997

Co-chair, CBE Integration Task Force, 1997

Undertook census of all Department Chairs, identifying all existing Undergraduate Original

Inquiry opportunities across campus, 1999 and again 2001

Co-authored White Paper for Deans and Provost on Supporting Cross College Curricular Initiatives, 2001

Helped found the Lehigh Valley CEO Forum, 2001.

Drafted "Ventures" & Faculty Fellow White Paper for Provost, 1998

Committees

Provost's Entrepreneurship Task Force, 2006-date.

Middle States Reaccreditation, Technology Subcommittee, 2007.

Design Arts Advisory Committee, 2004-date

Creativity Task Force, 2005-2006

Product Design Professor of Practice Search Committees 2004-2006

Environmental Risk Analysis & Communication Faculty Search Committee, 2004-2005

Entrepreneurship Minor Director Search Committee, 2004

Teaching & Learning Technology Laboratory Advisory Committee, 2002-date

Environmental Policy Senior Faculty Search Committee, 2003-4
Wilbur Powerhouse Building Oversight Committee, 2003-date, chair 2004-date
Design Arts Director Search Committee, 2003-4
Economics Junior Faculty Search Committee, 2002-3
Faculty Development Advisory Committee, 2001-2
Design Career Awareness Program Planning Committee, 2000-3
McGowan Scholarship Selection Committee, 2001-date
Tauck Scholars Selection Committee, 2000-date
Martindale Scholar Selection Committee, 1998-date
Campbell Social Science Research Prizes Selection Committee 2001-2006, chair 2005-6
International Research Trip Planning Committee, Martindale Center, 1998-date
Wilbur Powerhouse Renovations Committee, 1997-2003
CBE faculty representative to the College of Engineering and Applied Science, 1995-2004
2020 Design Arts Program Proposal Committee, 2001-2
Industrial Engineering Faculty Search Committee, 2001
Committee to Redesign Graduate Microeconomics Sequence in MS & PhD Program, 2001
Committee to Redesign Quantitative topics in UG Eco courses. 2001
Engineering Career Awareness Program Planning Committee, 2001
Luce Endowed Professorship Proposal Committee, 2000-2001
Kenan Chair Search Committee, 2000
BIS Junior Faculty Search Committee, 2000
Committee to draft Business Economics Major, 2000
Integrated Learning Experiences (ILE) faculty working group, 1996-1999,
MOT program advisory committee, 1993-1999
CBE distance learning committee, 1995-1998
CBE representative to a university working group for developing a revenue sharing scheme for
distance learning, 1997
Undergraduate core objectives working group, 1997
Working group for recommendations on teaching development process, 1997
CBE LAN committee, 1995-1997
Business communications task force, 1996
Engineering College TRP Grant Proposal Committee, 1995

Other Significant Service

B.A. Economics Major Advisor, 2002-date
Non-major undergraduate Business advisor, 1993-2004
Presented IPD more than 120 times to potential corporate sponsors, potential alumni donors,
and other visitors 1994-date
CBE freshman pre-registration advising in August. 1998-2003
Developed first Freshman Integrated Business & Engineering Workshop Course, 2001
MBA economics advisor, 1996-2001
Football Recruiting CBE Rep., 1999-2000, 2004
Developed w/ Tom Hyclak New Economic Development Practicum course, the first new
Urban studies related course at Lehigh in at least a decade, 1999
Co-organized IPD industrial advisory board meeting, 1998 and again 1999
Invited, organized & hosted Lehigh campus visit and IPD introduction/tour for Northeastern
University College of Engineering Dean Al Soyster, 1998
Presented IPD to PA State Senator and staff, 1999
Drafted now-passed proposal to add Consulting Requirement to Eco. Major, 1999
Presented IPD to Senator Spector's DC staff, 1998
Presented IPD to Senator Santorum's DC staff, 1998

Peer teaching evaluator for Vince Munley, Darlene Chisholm & John McNamara, 1998
2X CBE Strategic Planning Retreats, 1998
Mentor for Iacocca scholars, 1995, 1997
Faculty advisor to ODE, the economics honor society. 1995-1997
Interviewed candidates for women's volleyball coach, 1996
Led Faculty Development Brown Bag Lunch on the Distance Learning Classroom, 1996
Presented IPD Program to Norm Augustine, CEO of Lockheed Martin, 1996.
"Internet Advisor" for Martindale Center, setting up Internet discussion group, 1995
Several talks every year to Pre-Freshman Days, Family Weekend Events, Alumni Events, etc.
I write dozens of student recommendations annually and go to as many student functions as I
can work into my schedule, my family commitments, and my waistline.

PROFESSIONAL ACTIVITIES

Visiting Scholar, National University of Ireland, Galway, Department of Economics, 2007.
The National Academies' Committee on Innovation Models for Aerospace Technologies, 2004-2006.
Editorial Board, *Technovation, the International Journal of Technological Innovation and Entrepreneurship*, 1996-date.
Editorial Review Board, *International Journal of e-Collaboration*, 2004-date
Editorial Advisory Board, *Advances in E-Collaboration (AECOB) Book Series*, 2007-date
Review Board, National Collegiate Inventors & Innovators Alliance, 1998-9, 2005-date.
Report review panel, National Research Council, SBIR Program assessment project methodology, 2003.
Advisory Board and founding member, Lehigh Valley CEO Forum, 2001-2006.
Visiting Scholar, University of York (UK), Centre for Defence Economics, 2000.
Task Force Member, U.S. Department of Commerce, Office of Technology Policy, U.S.-Israel Science &
Technology Commission Task Force on Commercialization of Military Technology, 1996-1999.
Management of Technology Program Faculty, National Technological University, 1996-2003.
Center Associate, Center for Trade & Commercial Diplomacy, Monterey Institute of International
Studies, 1996-7.
Research Team Member, Massachusetts Institute of Technology Lean Aircraft Initiative, 1994-5.
Advisory Board, Defense Conversion Systems Synthesis Project, Carnegie Mellon University, 1993-4.
Advisory Board, Technology Transfer Systems Synthesis Project, Carnegie Mellon University, 1992-3.