

JAMES M. UTTERBACK
David J. McGrath jr (1959) Professor of Management and Innovation
M. I. T. Sloan School of Management
Professor of Engineering Systems M.I.T. School of Engineering

Education:

Northwestern University B.S.,	Industrial Engineering	June 1963
Northwestern University M.S.,	Industrial Engineering	August 1965
M.I.T.	Ph.D., Industrial Management	June 1968

Principal Field of Interest:

The process of technological innovation, and factors that influence innovation including organizational behavior, corporate strategy and government policy

Non-M.I.T. experience

	<i>Beginning</i>	<i>Ending</i>
Indiana University School of Business Assistant Professor	December 1968	June 1972
Indiana University School of Business Associate Professor	June 1972	June 1976
Harvard Business School Visiting Associate Professor *	September 1974	July 1976
Chalmers Technical University Visiting Professor*	September 1980	June 1982

History of M.I.T. appointments:

<i>Rank</i>	<i>Beginning</i>	<i>Ending</i>
Research Associate	July 1974	Nov 1979
Associate Professor of Engineering	November 1979	July 1993
Director of Industrial Liaison	July 1983	June 1989
Leaders for Manufacturing Professor	March 1989	Dec 2000
David J. McGrath jr (1959) Professor of Management and Innovation	January 2001	Present
Professor of Engineering Systems	May 2004	Present

Professional appointments:

- Research Policy*, United States Editor, 1979-1998
- Research Policy*, Associate Editor, 1998-Present
- IEEE Transactions on Engineering Management*, 1978-2010
- Technology Forecasting and Social Change*, 1989-2004
- Production and Operations Management*, Area Editor, 1991-1993

- Board of Governors, Argonne National Laboratory*, 2004 through 2010

Honors:

Chalmers University, D.Sc. (Honorary), May 1997.

Elected a foreign member of the Royal Swedish Academy of Engineering Sciences (IVA) in 1999.

Lifetime Achievement Award, Technology Management Education Association, June 2004.

Elected a Life Member of Clare Hall, University of Cambridge, 2007.

Katholieke Universiteit Leuven, Honorary Doctorate, June 2012.

Leadership in Technology Management Award from PICMET, July 2013.

Elected a Fellow of the American Association for the Advancement of Science, November 2013.

Publications:

Books

Christopher T. Hill and James M. Utterback (eds.), *Technological Innovation for a Dynamic Economy*, New York: Pergamon Press, 1979. Author of Chapters 2 and 9, pp. 40-65 and 318-330.

Robert T. Lund, Marvin A. Sirbu, Jr., James M. Utterback with Michael J. Brand, Matthew L. Lazarewicz, Clinton S. Stanovsky, John C. Stewart, *Microprocessor Applications - Cases and Observations*, London: Her Majesty's Stationery Office, 1980. Author of Chapters 8 and 10, pp. 125-134 and 150-166.

James M. Utterback, *Mastering The Dynamics of Innovation*, Boston, Massachusetts: Harvard University Business School Press, 1994. Paperback 1996.

James M. Utterback and Bengt-Arne Vedin with Eduardo Alvarez, Sten Ekman, Susan Sanderson, Bruce Tether and Roberto Verganti, *Design-Inspired Innovation*, Singapore: World Scientific Publishing, 2006. Paperback 2006.

Papers in Refereed Journals

James M. Utterback, "The Process of Technological Innovation Within the Firm," *Academy of Management Journal*, Vol. XIV, March 1971, pp. 75-88.

James M. Utterback, "The Process of Innovation: A Study of the Origination and Development of Ideas for New Scientific Instruments," *IEEE Transactions on Engineering Management*, Vol. EM-18, No. 4, November 1971, pp. 124-131.

- Charles R. O'Neal, Hans B. Thorelli, and James M. Utterback, "Adoption of Innovations by Industrial Organizations," *Industrial Marketing Management*, Vol. 2, 1973, pp. 235-250.
- James M. Utterback, "Innovation and the Diffusion of Technology," *Science*, Vol. 183, No. 4125, February 1974, pp. 620-626.
- James M. Utterback, "Successful Industrial Innovation: A Multivariate Analysis," *Decision Sciences*, Vol. 6, No. 1, January 1975, pp. 65-77.
- Robert L. Taylor and James M. Utterback, "A Longitudinal Study of Communication in Research: Technical and Managerial Influences," *IEEE Transactions on Engineering Management*, Vol. EM-22, No. 2, May 1975, pp. 80-87.
- James M. Utterback, "The Role of Applied Research Institutes in the Transfer of Technology to Latin America," *World Development*, Vol. 3, No. 6, September 1975, pp. 665-673.
- James M. Utterback and William J. Abernathy, "A Dynamic Model of Product and Process Innovation," *Omega*, Vol. 3, No. 6, 1975, pp. 639-656.
- James M. Utterback and Elmer H. Burack, "Identification of Technological Threats and Opportunities by Firms," *Technological Forecasting and Social Change*, Vol. 8, 1975, pp. 7-21.
- James M. Utterback, Thomas J. Allen, J. Herbert Hollomon, and Marvin A. Sirbu, Jr., "The Process of Innovation in Five Industries in Europe and Japan," *IEEE Transactions on Engineering Management*, Vol. EM-23, No. 1, Feb. 1976, pp. 3-9.
- Thomas J. Allen, James M. Utterback, Marvin A. Sirbu, Jr., Nicholas A. Ashford, and J. Herbert Hollomon, "Government Influence on the Process of Innovation in Europe and Japan," *Research Policy*, Vol. 7, No. 2, April 1978, pp. 124-149.
- Lynn Bollinger, Katherine Hope, and James M. Utterback, "A Review of Literature and Hypotheses on New Technology-Based Firms," *Research Policy*, Vol. 12, No. 1, February 1983, pp. 1-14.
- Linsu Kim and James M. Utterback, "The Evolution of Organizational Structure and Technology in a Developing Country," *Management Science*, Vol. 29, No. 10, October 1983, pp. 1185-1197.
- Yar M. Ebadi and James M. Utterback, "The Effects of Communication on Technology Innovation," *Management Science*, Vol. 30, No. 5, May 1984, pp. 572-585.
- James W. Brown and James M. Utterback, "Uncertainty and Technical Communication Patterns," *Management Science*, Vol. 31, No. 3, March 1985, pp. 301-311.
- James M. Utterback, "Innovation and Corporate Strategy," *International Journal of Technology Management*, Vol. 1, No. 1, 1986, pp. 119-132.

- James M. Utterback, Marc Meyer, Edward Roberts, and Göran Reitberger, "Technology and Industrial Innovation in Sweden: A Study of Technology-Based Firms Formed Between 1965 and 1980," *Research Policy*, Vol. 17, 1988, pp. 15-26.
- James M. Utterback, "Corporate Renewal," *International Journal of Technology Management*, Vol. 4, No. 6, 1989, pp. 625-630.
- Henry Montrey and James Utterback, "Current Status and Future of Structural Panels in the Wood Products Industry," *Technological Forecasting and Social Change*, Vol. 39, No. 4, December 1990, pp. 15-35.
- Alan Afuah and James Utterback, "The Emergence of a New Supercomputer Architecture," *Technological Forecasting and Social Change*, Vol. 40, No. 4, December 1991, Pp. 315-328.
- James Utterback, Marc Meyer, Timothy Tuff and Lisa Richardson, "When Speeding Concepts to Market Can Be A Mistake," *TIMS Interfaces*, Vol. 22, No. 4, July-August 1992, pp. 7-13.
- James M. Utterback and Fernando F. Suárez, "Innovation, Competition and Industry Structure," *Research Policy*, Vol. 22, No. 1, February 1993, pp. 1-21.
- Marc H. Meyer and James M. Utterback, "The Product Family and the Dynamics of Core Capability," *Sloan Management Review*, Vol. 34, No. 3, Spring 1993, pp. 29-47.
- Carl W. J. Pistorius and James M. Utterback, "The Death Knells of Mature Technologies," *Technological Forecasting and Social Change*, Vol. 50, 1995, pp. 133-151.
- Fernando F. Suárez and James M. Utterback, "Dominant Designs and the Survival of Firms," *Strategic Management Journal*, Vol. 16, 1995, pp. 415-430.
- Marc H. Meyer and James M. Utterback, "Product Development Cycle Time and Commercial Success," *IEEE Transactions on Engineering Management*, Vol. 42, No. 4, November 1995, pp. 297-304.
- Marc H. Meyer, Peter Tertzakian and James M. Utterback, "Metrics for Managing Product Development," *Management Science*, Vol. 43, No. 1, January 1997, pp. 88-111.
- Carl W. J. Pistorius and James M. Utterback, "Multi-Mode Interaction Among Technologies," *Research Policy*, Vol. 26, No. 1, March 1997, pp. 67-84.
- Allan N. Afuah and James M. Utterback, "Responding to Structural Industry Changes: A Technological Evolution Perspective," *Industrial and Corporate Change* 1997, Vol. 6, No. 1, pp. 183-202.
- Clayton M. Christensen, Fernando F. Suárez, and James M. Utterback, "Strategies for Survival in Fast-Changing Industries," *Management Science*, Vol. 44, No. 12, December 1998, pp. S207-S220.

Jonell Kerkhoff, Thomas Eagar and James Utterback, "A Systematic Strategy for Optimizing Manufacturing Operations," *Production and Operations Management*, Vol. 7, No. 1, Spring 1998, pp. 67-85.

James M. Utterback and Allan N. Afuah, "The Dynamic 'Diamond': A Technological Innovation Perspective," *Economics of Innovation and New Technology* Winter 1998, Vol. 6, Pp. 183-199.

James M. Utterback and Happy J. Acee, "Beyond Disruptive Technology," *International Journal of Innovation Management*, Vol. 9, No. 1, March 2005, pp. 1-17.

Maine, Elicia, V.J. Thomas, Martin Bliemel, Armstrong Murira and James M. Utterback, "The emergence of the nanobiotechnology industry," *Nature Nanotechnology*, Vol. 9, January 2014, pp. 2-5.

Maine, E., Thomas, V.J., and Utterback, J. (2013). Radical Innovation from the Confluence of Technologies: Innovation Management Strategies for the Emerging Nanobiotechnology Industry, *Journal of Engineering and Technology Management (JET-M)*, Vol. 32, April-June 2014, pp. 1-25.

James M. Utterback, "Technology Cycles," in *Palgrave Encyclopedia of Strategic Management*, David Teece and Mia Augier (Eds.), London: Palgrave Macmillan, 2015. (In press).

Papers in Other Journals

James M. Utterback and James W. Brown, "Monitoring for Technological Opportunities," *Business Horizons*, October 1972, pp. 5-15.

William J. Abernathy and James M. Utterback, "Patterns of Innovation in Industry," *Technology Review*, Vol. 80, No. 7, June-July 1978, pp. 40-47.

J. Herbert Hollomon, *et al.*, "Government and the Innovation Process," *Technology Review*, Vol. 81, No. 6, May 1979, pp. 30-41.

James M. Utterback, "Innovation in American Industry: What Went Wrong?" *The Center Magazine*, Vol. 12, No. 6, November/December 1979, pp. 17-24.

Christopher T. Hill and James M. Utterback, "The Dynamics of Product and Process Innovation," *Management Review*, January 1980, pp. 14-20.

James M. Utterback and Linsu Kim, "Invasion of a Stable Business by Radical Innovation," *Asian Economies*, No. 69, Seoul, Korea: Research Institute of Asian Economies, June 1989, pp. 5-39.

Sarah Slaughter and James Utterback, "U.S. Research and Development: an International Comparative Analysis," *Business in the Contemporary World*, Winter 1990, pp. 27-34.

James M. Utterback, "Developing Technologies: the Eastman Kodak Story," *The McKinsey Quarterly*, 1995, No. 1, pp. 131-143.

James M. Utterback, "The Dynamics of Innovation," in *The Internet and the University*, Aspen Institute Forum 2002, Educause, Pp. 81-103. Published in 2003.

M.I.T. Working Papers

Elicia Maine, Martin Bliemel, Armstrong Murira, and James Utterback, "Knowledge Diversity in the Emerging Global Bio-Nano Sector," MIT ESD Working Paper, 2012.

Chapters in Edited Volumes

- James M. Utterback, "The Process of Innovation: A Review of Some Recent Findings," in George A. Wilson (ed.), *Technological Development and Economic Growth*, Bloomington, Indiana: Indiana University, Graduate School of Business, Division of Research, 1971, pp. 139-160.
- James M. Utterback, "The Process of Technological Innovation Within the Firm," in Lloyd A. Rowe and William B. Boise (eds.), *Organizational and Managerial Innovation: A Reader*, Pasadena, California: Goodyear Publishing Company, Inc., 1973, pp. 241-252. (Reprinted from *Academy of Management Journal*)
- James M. Utterback, "Innowacje w przemyśle a upowszechnianie techniki," *Przegląd Zagadnień*, Zagadnienia Naukoznawstwa, Vol. 3, No. 39, 1974, pp. 416-438. (Translated and reprinted from *Science*)
- James M. Utterback, "Recent Findings and Hypotheses About the Dynamics of Product and Process Change," in Karl A. Stroetmann (ed.), *Innovation, Economic Change, and Technology Policies*, Basel, Switzerland: Birkhauser Verlag, 1977, pp. 251-265 (reprinted from *IEEE Transactions on Engineering Management*).
- James M. Utterback, "Management of Technology," in Arnaldo Hax (ed.), *Studies in Operations Management*, Amsterdam, The Netherlands: North-Holland Publishing Co., 1978, pp. 137-160.
- James M. Utterback, "Environmental Analysis and Forecasting," in Dan Schendel and Charles Hofer (eds.), *Business Policy and Planning: A New View*, Boston, Massachusetts: Little-Brown and Co., 1978, pp. 134-143.
- James M. Utterback, "A General Model: Innovation and Process Change in a Productive Unit," (with William J. Abernathy) in Abernathy, William J., *The Productivity Dilemma: Roadblock to Change in the Auto Industry*, Baltimore, Maryland: The John Hopkins University Press, 1978, pp. 68-87 and pp. 147-182.
- James M. Utterback, "Product and Process Innovation in a Changing Competitive Environment," in Michael Baker, *Industrial Innovation: Technology, Policy, Diffusion*, London: MacMillan Press, 1979, pp. 135-147.
- James M. Utterback, "Systems of Innovation: MACRO/MICRO," in W. Novis Smith and Charles F. Larson (eds.), *Innovation and U. S. Research*, Washington, D.C.: American Chemical Society, No. 129, 1980, pp. 73-94.
- James M. Utterback, "Innovation in Industry and the Diffusion of Technology," in M. L. Tushman and W. L. Moore, *Readings in the Management of Technology*, Ballinger: Cambridge, Massachusetts, 1982, pp. 29-41. (Reprinted from *Science*)

- James M. Utterback, "Patterns of Industrial Innovation," in M. L. Tushman and W. L. Moore, *Readings in the Management of Technology*, Ballinger: Cambridge, Massachusetts, 1982, pp. 97-108. (Reprinted from *Technology Review*)
- James M. Utterback, "Environmental Analysis and Forecasting," in M. L. Tushman and W. L. Moore, *Readings in the Management of Technology*, Ballinger: Cambridge, Massachusetts, 1982, pp. 299-310. (Reprinted from Schendel and Hofer, 1978)
- J. Herbert Hollomon, *et al.*, "Government and the Innovation Process," in M. L. Tushman and W. L. Moore, *Readings in the Management of Technology*, Ballinger: Cambridge, Massachusetts, 1982, pp. 29-41. (Reprinted from *Technology Review*)
- James M. Utterback and Linsu Kim, "Invasion of a Stable Business by Radical Innovation," in Paul Kleindorfer (ed.), *The Management of Productivity and Technology in Manufacturing*, New York: Plenum Press, 1986, pp. 113-151.
- James M. Utterback, "Innovation and Industrial Evolution in Manufacturing Industries," in Bruce R. Guile and Harvey Brooks (eds.) *Technology and Global Industry: Companies and Nations in the World Economy*, Washington, D.C.: National Academy of Engineering - Series on Technology and Social Priorities, 1987, pp. 16-48.
- Linsu Kim and James M. Utterback, "The Evolution of Organization Structure and Technology in a Developing Country," in Dong-Ki Kim and Linsu Kim (eds.), *Management behind Industrialization: Readings in Korean Business*, Seoul, Korea: Korea University Press, 1989, Chapter 9, pp. 194-214.
- James M. Utterback and Fernando F. Suárez, "Patterns of Industrial Evolution, Dominant Designs, and Firms' Survival," in Robert Burgelman and Richard Rosenbloom (eds.) *Research on Technological Innovation, Management and Policy*, Greenwich, Connecticut: JAI Press, Volume 6, 1993, pp. 47-87.
- Allan N. Afuah and James M. Utterback, "Sources of Innovative Environments: a Technological Evolution Perspective," In Zoltan J. Acs (Ed.), *Regional Innovation, Knowledge and Global Change*, London: Pinter Publishers, 2000, Pp. 169-186.
- James M. Utterback, "The Dynamics of Innovation," in *The Internet and the University*, Aspen Institute Forum 2002, Educause, Pp. 81-103. Republished in *Educause Review*, January-February 2004, Pp. 42-51.
- James M. Utterback, "Technology Cycles," *The Palgrave Encyclopedia of Strategic Management*, David Teece and Mie Augier (Eds.), 2015 (in press).

Conference Proceedings (Since 1994)

Keynote speaker with Marc H. Meyer, "Product Development: Reducing Cycle Times," **Annual Meeting of the Industrial Research Institute**, Williamsburg, Virginia, October 1994.

Co-chair of the **Third International Product Development Management Association Conference**, INSEAD, Fontainebleau, France, April 15-16, 1996.

Carl W. J. Pistorius and James M. Utterback, "A Lotka-Volterra Model for Multi-Mode Technological Interaction," **Proceedings of the Fifth International Conference on the Management of Technology**, The University of Miami, Feb. 1996, Pp. 62-71.

Clayton M. Christensen, Fernando F. Suárez and James M. Utterback, "A Survival Analysis of Firms in the Rigid Disk Drive Industry," **Sixth Annual Conference of the Joseph A. Schumpeter Society**, Stockholm, Sweden, June 2-5, 1996.

Co-chair of the **Fourth International Product Development Management Association Conference**, Stockholm School of Economics, Stockholm, Sweden, May 26-27, 1997.

Co-chair of the **Fifth International Product Development Management Association Conference**, University of Bologna, Como, Italy, May 24-26, 1998.

James M. Utterback, "Disruptive Technology: Predator or Prey?" invited "Distinguished Lecture" presented at the **Academy of Management**, Seattle, Washington, August 4, 2003.

Eduardo Alvarez and James M. Utterback, "Sources of Creativity for Product Innovation," presented at the CORS-INFORMS International Meeting, May 16-19, 2004, Banff, Canada.

J. Peter Zelten and James M. Utterback, "Digital Photography and the Dynamics of Technological Innovation," presented at the CORS-INFORMS International Meeting, May 16-19, 2004, Banff, Canada.

Session Chair, "Teaching Programs in Biomedical Entrepreneurship," the CORS-INFORMS International Meeting, May 16-19, 2004, Banff, Canada.

Session Chair, "Organizing for Product Development," 11th International Product Development Management Conference, June 20-22, 2004, Trinity College Dublin, Ireland.

James M. Utterback and Elizabeth Garnsey "Firm Growth and Evolution," presented at the Academy of Management Annual Meeting, August 11, 2004, New Orleans, Louisiana.

Annika Rickne and James M. Utterback, "Critical Events in Early Phases of Firm Development," 2004 International Schumpeter Society Conference in Milan (9-12 June 2004

Annika Rickne and James M. Utterback, “Policies for Emerging Markets: Scrutinizing Regenerative Medicine in Sweden and Massachusetts,” 4th Movements in Entrepreneurship Workshop in Iceland May 21st - 24th, 2005 organized by the Entrepreneurship and Small Business Research Institute and Reykjavik University.

Henry B. Weil and James M. Utterback, “The Dynamics of Innovative Industries,” The Twenty-third International Conference of the System Dynamics Society, Boston, Massachusetts, July 17-21, 2005.

Elicia Maine and James M. Utterback, “Synthesis and Experimentation in Firm Creation: The Confluence of Biotechnology and Nanotechnology,” PICMET’05 (Portland International Conference on Management of Engineering and Technology), Portland, Oregon, July 31-August 4, 2005.

Visiting Fellow and Lecturer, Innovation Master Class series funded by the Advanced Institute of Management Research (AIM), United Kingdom.

- Talk and commentary at AIM Innovation subgroup, London Business School, June 23, 2006.
- Workshop with Innovation and Productivity Grand Challenge Fellows. Based on the IJM paper on Discontinuous Innovation, with a short presentation followed by discussion, Imperial College, Tanaka Business School, London, June 27, 2006.
- Distinguished Lecturer, External Seminar Series, *Design-Inspired Innovation*, Imperial College, Tanaka Business School, London, June 28, 2006.
- Invited seminar on, *Synthesis and Experiment in New Firm Creation: the Confluence of Biotechnology and Nano-technology*, Science Policy Research Unit (SPRU), Sussex University, United Kingdom, June 30, 2006.

Invited lecturer, Module on Management of Innovation, Alta Scuola Politecnica, Venice, Italy, August 28-30, 2006.

SPRU 40th Anniversary Conference, The Future of Science, Technology and Innovation Policy: Linking Research And Practice, 11th-13th September 2006.

- *The Direction of Innovation: a New Research and Policy Agenda*, Keynote welcoming address.
- *Sources of Creativity for Product Innovation*, refereed paper.

Design-Inspired Innovation, invited lecture presented at Malardalen University, Eskilstuna, Sweden, October 24, 2006.

How Do New Industries Emerge? Invited seminar presented at Forum for Innovation Management, Stockholm, Sweden, October 25, 2006

Contributor, Firm and Industry Evolution and Entrepreneurship (FIVE) Conference, Tuck School of Management, Dartmouth College, Hanover, NH, May 11-12, 2007. (Sponsored by the Kauffman Foundation).

Design-Inspired Innovation, a featured panel discussion at the Mass Customization World Conference at MIT, October 9, 2007. (Panel organizer and contributor)

Synthesis and Experiment in New Firm Creation: the Confluence of Biotechnology and Nano-technology, invited lecture presented at Malardalen University, Eskilstuna, Sweden, October 22, 2007.

Synthesis and Experiment in New Firm Creation: the Confluence of Biotechnology and Nano-technology invited contribution to Wallenberg Symposium on Medicine Technology and Economics, at The Royal Academy of Engineering Sciences, Stockholm, Sweden, October 26, 2007.

INFORMS Panel on "Innovation and Product Development: Engineering, Organizational and Technology Perspectives." INFORMS Annual Meeting, Seattle, WA, November 5, 2007.

Participant, University of Karlsruhe 2007 Technology Conference at MIT, November 10, 2007.

Presentation on "Innovative and Revolutionary Concepts for the Naval Enterprise," by invitation of the Chief of Naval Operations - Strategic Studies Group (CNO-SSG) at the Naval War College in Newport, Rhode Island, November 29, 2007.

Discussant, Strategy and Innovation, Sumatra Ghoshal Conference at London Business School, May 18-19, 2008.

Design-Inspired Innovation, a featured presentation for the Design Council of Singapore by video link at National University of Singapore, August 18, 2008.

Panelist, Council on Competitiveness, *Midwest Energy Summit on Energy Security, Innovation and Sustainability*, May 13-14, 2009, The University of Chicago.

Keynote speaker on *Design-Inspired Innovation* and session chair for *User-driven Innovation*, at the 12th Annual Conference on Technology Policy and Innovation, Porto, Portugal, July 12-14, 2009.

Participant, Council on Competitiveness National Energy Summit & International Dialogue: Driving Competitiveness through Sustainable Energy, September 23-24, 2009, Washington, D.C.

Invited lecture on *Design-Inspired Innovation* and faculty seminar on *Synthesis and Experimentation in Firm Creation: the Confluence of Biotechnology and Nanotechnology*, The Royal Institute of Technology, Stockholm, Sweden, November 2, 2009.

Invited lecture on *Design-Inspired Innovation* and visiting fellows seminar on *The Dynamics of Innovation*, The Norwegian Institute of Technology, Trondheim, Norway, November 5-6, 2009.

James M. Utterback, "An Ecology of Innovation," invited distinguished lecture presented at the **INFORMS Annual Meeting**, Phoenix, Arizona, October 15, 2012.

James M. Utterback, "Explorations in Technology, Innovation and Entrepreneurship," invited Keynote address presented at the **PICMET Annual Meeting**, San Jose, California, July 29, 2013.

A symposium at the annual meeting of *AAAS* in Boston on the “Confluence of Streams of Knowledge: Biotechnology and Nanotechnology” co-organized by Elicia Maine and James Utterback, February, 2013.

James M. Utterback, “Design-Inspired Innovation,” invited Keynote address presented at the *PICMET Annual Meeting*, Portland, Oregon, August 4, 2015.

Discussant, Academy of Management Symposium on “Commercializing Science: Strategies, Frameworks, Organizational Innovation,” *Academy of Management Annual Meeting*, August 10, 2015, Vancouver, British Columbia, Canada.