

Information Technology, Automation, and the U.S. Workforce

Committee

Erik Brynjolfsson

Co-Chair

Dr. Erik Brynjolfsson is the Schussel Family Professor at the MIT Sloan School and the director of the MIT Initiative on the Digital Economy, Research associate at the NBER, and Chairman of the MIT Sloan Management Review. His research examines the effects of information technologies on business strategy, productivity and performance, Internet commerce, pricing models and intangible assets. At MIT, he teaches courses on the Economics of Information. Professor Brynjolfsson was among the first researchers to measure the productivity contributions of IT and the complementary role of organizational capital and other intangibles. His research also provided the first quantification of the value of online product variety, often known as the “Long Tail” and developed pricing and bundling models for information goods. His recent work examines the social networks revealed by digital information flows, such as email traffic, and their relationships to information worker productivity. Brynjolfsson’s research has appeared in leading economics, management and science journals. It has been recognized with ten Best Paper awards and five patents. Brynjolfsson is the author or co-editor several books including *The Second Machine Age: Work, Progress, and Prosperity in a Time of Brilliant Technologies*; *Wired for Innovation: How IT is Reshaping the Economy*; and *Understanding the Digital Economy*; editor of SSRN’s Information System Network. He has served on the Editorial Boards of numerous academic journals as well as Time magazine’s Board of Economists and the Academic Advisory Council of the Federal Reserve Bank of Boston. He served on the NRC committee that produced the 1998 report *Fostering Research on the Economic and Social Impacts of Information Technology*. Professor Brynjolfsson holds Bachelors and Masters degrees from Harvard University in Applied Mathematics and Decision Sciences and a Ph.D. from MIT in Managerial Economics.

Tom M. Mitchell

Co-Chair

Dr. Tom Mitchell (NAE) is E. Fredkin University Professor in the School of Computer Science at Carnegie Mellon University and chair of the Machine Learning Department at CMU. His research interests are generally in machine learning, artificial intelligence, and cognitive neuroscience. His recent research has focused both on machine learning approaches to extracting structured information from unstructured text and on studying the neural representation of language in the human brain using functional magnetic resonance imaging. Dr. Mitchell is a past president of the American Association of Artificial Intelligence, past chair of the AAAS Section on Information, Computing, and Communication, and author of the textbook *Machine Learning*. From 1999 to 2000, he served as chief scientist and vice president for WhizBang Labs, a company that employed machine learning to extract information from the web. Dr. Mitchell has served on the NRC's Computer Science and Telecommunication Board and on the committee that produced the report *Information Technology for Counterterrorism: Immediate Actions and Future Possibilities*. He is a member of the United States National Academy of Engineering since 2010. He is also a fellow of the American Association for the Advancement of Science and a fellow of the Association for the Advancement of Artificial Intelligence. Dr. Mitchell received his Ph.D. in electrical engineering with a computer science minor from Stanford University.

Daron Acemoglu

Member

Dr. Daron Acemoglu (NAS) is the Elizabeth and James Killian Professor of Economics in the Department of Economics at the Massachusetts Institute of Technology. He is also affiliated with the National Bureau Economic Research, the Center for Economic Performance, the Center for Economic Policy Research, and Microsoft Research Center. Dr. Acemoglu is a leader in both theoretical and empirical research in political economics, macroeconomics and growth, focusing especially on human capital and the roles and evolution of institutions. His work covers a wide range of areas within economics, including political economy, economic development and growth, human capital theory, growth theory, innovation, search theory, network economics and learning. He is a fellow of the Society of Labor Economists, the American Academy of Arts and Sciences, the Econometric Society, the European Economic Association and the U.S. National Academy of Sciences. Dr. Acemoglu received his Ph.D. in economics from the London School of Economics in 1992.

Stephen R. Barley

Member

Dr. Stephen R. Barley is the Richard W. Weiland Professor of Management Science and Engineering, the Associate Chair of the Department of Management Science and Engineering and the co-director of the Center for Work, Technology and Organization. Prior to coming to Stanford in 1994, Barley served for ten years on the faculty of the School of Industrial and Labor Relations at Cornell University. He was editor of the *Administrative Science Quarterly* from 1993 to 1997 and the founding editor of the *Stanford Social Innovation Review* from 2002 to 2004. Barley serves on the editorial boards of the *Academy of Management Journal*, the *Academy of Management Annals*, *Research in the Sociology of Organizations*, *Information and Organization*, *Engineering Studies* and the *Journal of Organizational Ethnography*. He has been the recipient of the Academy of Management's New Concept Award and was named Distinguished Scholar by the Academy of Management's Organization and Management Theory Division in 2006, Organization Communication and Information Systems Division in 2010 and Critical Management Studies Division in 2010. He has been a fellow at Center for Advanced Study in the Behavioral Sciences and is a Fellow of the Academy of Management. In 2006 the *Academy of Management Journal* named Barley as the author of the largest number of interesting articles in the field of management studies. Barley was a member of the Board of Senior Scholars of the National Center for the Educational Quality of the Workforce and co-chaired National Research Council and the National Academy of Science's committee on the changing occupational structure in the United States. He holds an AB. in English from the College of William and Mary, an M.Ed. from the Ohio State University, and a Ph.D. in Organization Studies from the Massachusetts Institute of Technology.

Barrett S. Caldwell

Member

Dr. Barrett S. Caldwell is a professor in the School of Industrial Engineering and the School of Aeronautics and Astronautics at Purdue University. His research applies human factors and industrial engineering principles to team performance in complex task environments. His group is concerned with analysis, design, and improvement of how humans work with, and share knowledge through, information and communication technology systems on Earth and in space. His early research examined the potential social and technological effects of internet multimedia communications, even before the release of the Mosaic browser in 1993. Dr. Caldwell's discovery of the importance of information delay with increasing bandwidth has been meaningful since the growth of internet file sharing, which demonstrated that delay remains a concern to ensuring satisfactory quality of service. He is a fellow of the Human Factors and Ergonomics Society. Dr. Caldwell received his Ph.D. in Social Psychology in 1990 from the University of California, Davis.

Melissa Cefkin

Member

Dr. Melissa Cefkin is a Principal Scientist and Design Anthropologist at the Nissan Research Center-Silicon Valley, where she will focus on the development of autonomous vehicles from a social and cultural standpoint. Before joining Nissan, she served as manager of the Discovery Practices group in IBM's Accelerated Discovery Lab. At IBM, she focused on reconfigurations of work and labor related to new ways of conceptualizing, designing and executing work using open, crowd, and big data-driven practices. Melissa previously served as Director of User Experience and member of the Advanced Research group at Sapien Corporation. She was also a senior research scientist at the Institute for Research on Learning (IRL). She is the editor of *Ethnography and the Corporate Encounter: Reflections on Research in and of Corporations* (Berghahn Books, 2009) and served as the President of the Board of the Ethnographic Praxis in Industry Conference (EPIC). She is a Fulbright award grantee. Dr. Cefkin received her Ph.D. in anthropology from Rice University in 1993.

Henrik I. Christensen

Member

Dr. Henrik I. Christensen is the KUKA Chair of Robotics at the College of Computing Georgia Institute of Technology. He is also the executive director of the Institute for Robotics and Intelligent Machines (IRIM). Dr. Christensen does research on systems integration, human-robot interaction, mapping and robot vision. The research is performed within the Cognitive Robotics Laboratory. He has published more than 300 contributions across AI, robotics and vision. His research has a strong emphasis on "real problems with real solutions". A problem needs a theoretical model, implementation, evaluation, and translation to the real world. He is actively engaged in the setup and coordination of robotics research in the US (and worldwide). Dr. Christensen received the Engelberger Award 2011, the highest honor awarded by the robotics industry. He was also awarded the "Boeing Supplier of the Year 2012" with 3 other colleagues at Georgia Tech. Dr. Christensen is a fellow of American Association for Advancement of Science (AAAS) and Institute of Electrical and Electronic Engineers (IEEE). He received an honorary doctorate in engineering from Aalborg University in 2014. He collaborates with institutions and industries across three continents. His research has been featured in major media such as CNN, the New York Times, and the BBC. He serves as a consultant to companies and government agencies across the world. Dr. Christensen received his Ph.D. in Electrical Engineering from Aalborg University in 1990.

John C. Haltiwanger

Member

Dr. John C. Haltiwanger is a distinguished university professor in the Department of Economics at the University of Maryland. He is also the first recipient of the Dudley and Louisa Dillard Professorship in 2013. After serving on the faculty of UCLA and Johns Hopkins, he joined the faculty at Maryland in 1987. In the late 1990s, he served as Chief Economist of the U.S. Census Bureau. He is a research associate of the National Bureau of Economic Research, a senior research fellow at the Center for Economic Studies at the U.S. Census Bureau, and a fellow of the Society of Labor Economics. He has played a major role in developing and studying U.S. longitudinal firm-level data. Using these data, he has developed new statistical measures and analyzed the determinants of firm-level job creation, job destruction and economic performance. He has explored the implications of these firm dynamics for aggregate U.S. productivity growth and for the U.S. labor market. The statistical and measurement methods he has helped develop to measure and study firm dynamics have been increasingly used by many statistical agencies around the world. His own research increasingly uses the data and measures on firm dynamics from a substantial number of advanced, emerging and transition economies. His work with the statistical agencies has been recently recognized in his being awarded the Julius Shiskin Award for economic statistics in 2013 and the Roger Herriott Award for innovation in federal statistics in 2014. He has published more than 100 academic articles and numerous books including *Job Creation and Destruction* (with Steven Davis and Scott Schuh, MIT Press). Dr. Haltiwanger received his Ph.D. in economics from the Johns Hopkins University in 1981.

Eric Horvitz

Member

Dr. Eric Horvitz is distinguished scientist and director at the Microsoft Research Lab at Redmond, Washington. He has pursued principles and applications of machine intelligence, with a focus on the use of probability and decision theory in systems that learn and reason. He has made contributions in automated decision support, models of bounded rationality, machine learning, human-computer collaboration, and human computation and crowdsourcing. His research and collaborations have led to fielded systems in healthcare, transportation, human-computer interaction, robotics, operating systems, networking, and aerospace. He was recently awarded the Feigenbaum Prize for sustained and high-impact contributions to the field of artificial intelligence. He has been elected fellow of the Association for the Advancement of Artificial Intelligence (AAAI), the Association for Computing Machinery (ACM), the American Academy of Arts and Sciences, and the National Academy of Engineering (NAE), and he has been inducted into the CHI Academy. He has served on multiple academic and governmental advisory boards, including DARPA's Information and Technology Study Group (ISAT), the Naval Research Advisory Committee (NRAC), the NSF CISE Advisory Committee, and the Computing Community Consortium (CCC). More information can be found at <http://research.microsoft.com/~horvitz>.

Ruth M. Milkman

Member

Dr. Ruth Milkman is a Distinguished Professor of Sociology at the CUNY Graduate Center. She is a sociologist of labor and labor movements who has written on a variety of topics involving work and organized labor in the United States, past and present. Her early research focused on the impact of economic crisis and war on women workers in the 1930s and 1940s. She then went on to study the restructuring of the U.S. automobile industry and its impact on workers and their unions in the 1980s and 1990s; in that period she also conducted research on the labor practices of Japanese-owned factories in California. More recently she has written extensively about low-wage immigrant workers in the U.S., analyzing their employment conditions as well as the dynamics of immigrant labor organizing. She helped lead a multi-city team that produced a widely publicized 2009 study documenting the prevalence of wage theft and violations of other workplace laws in Los Angeles, Chicago and New York. She also recently co-authored a study of California's paid family leave program, focusing on its impact on employers and workers. After 21 years as a sociology professor at UCLA, where she directed the Institute for Research on Labor and Employment from 2001 to 2008, she returned to New York City in 2010. She is currently a Professor of Sociology at the CUNY Graduate Center and at the Joseph F. Murphy Institute for Worker Education and Labor Studies, where she also serves as research director. Dr. Milkman received her Ph.D. in sociology from the University of California, Berkeley in 1981.

Eduardo Salas

Member

Eduardo Salas is a Professor and Allyn R. & Gladys M. Cline Chair in Psychology at Rice University. Previously, he was a Trustee Chair and Pegasus Professor of Psychology at the University of Central Florida where he also held an appointment as Program Director for the Human Systems Integration Research Department at the Institute for Simulation and Training. Before joining IST, he was a senior research psychologist and Head of the Training Technology Development Branch of NAWC-TSD for 15 years. During this period, Dr. Salas served as a principal investigator for numerous R&D programs that focused on teamwork, team training, simulation-based training, decision-making under stress, safety culture and performance assessment. Dr. Salas has co-authored over 450 journal articles & book chapters and has co-edited 27 books. His expertise includes assisting organizations in how to foster teamwork, design and implement team training strategies, facilitate training effectiveness, manage decision making under stress, develop performance measurement tools and create a safety culture. Dr. Salas is a Past President of the Society for Industrial/Organizational Psychology and the Human Factors and Ergonomics Society, a Fellow of the American Psychological Association and a recipient of the Meritorious Civil Service Award from the Department of the Navy. He is also the recipient of the 2012 Society for Human Resource Management Losey Lifetime Achievement Award, and the 2012 Joseph E. McGrath Award for Lifetime Achievement.

Nicole Smith

Member

Dr. Nicole Smith is a research professor and senior economist at the Georgetown University Center on Education and the Workforce where she leads the Center's econometric and methodological work. Dr. Smith has developed a framework for restructuring long-term occupational and educational projections. This framework forms the underlying methodology for Help Wanted, a report that projects education demand for occupations in the U.S. economy through 2020. She is part of a team of economists working on a project to map, forecast and monitor human capital development and career pathways. Dr. Smith was born in Trinidad and Tobago and graduated with honors in economics and mathematics from the University of the West Indies (U.W.I.), St. Augustine campus. She was the recipient of the Sir Arthur Lewis Memorial Prize for outstanding research at the Master's level at the U.W.I. and is co-recipient of the 2007 Arrow Prize for Junior Economists for educational mobility research. Prior to joining the Center, Dr. Smith was a faculty member in economics at Gettysburg College in Pennsylvania, and the University of the West Indies, St. Augustine Campus. Dr. Smith taught Classical and Modern Econometrics, introductory and advanced level courses in Microeconomics, Macroeconomics, Statistics, Mathematics for Economists, and Latin American Economic Development. Her previous macroeconomic research focused on the political economy of exchange rates and exchange rate volatility in the Commonwealth Caribbean, the motivation for her M.S. thesis and a joint-publication at the Inter-American Development Bank. Her current research investigates the role of education and socioeconomic factors in intergenerational mobility. She is a co-author of "The Inheritance of Educational Inequality: International Comparisons and Fifty-Year Trends," published in 2007 by the B.E. Journal of Economic Analysis & Policy. She received her Ph.D. in Economics from American University.

Claire J. Tomlin

Member

Dr. Claire Tomlin is a professor of electrical engineering and computer sciences at the University of California at Berkeley, where she holds the Charles A. Desoer Chair in Engineering. She held the positions of assistant, associate, and full professor at Stanford from 1998-2007, and in 2005 joined Berkeley. She received the Erlander Professorship of the Swedish Research Council in 2009, a MacArthur Fellowship in 2006, and the Eckman Award of the American Automatic Control Council in 2003. She works in hybrid systems and control, with applications to air traffic systems, robotics, and biology. Dr. Tomlin received her Ph.D. in Electrical Engineering and Computer Science at the University of California, Berkeley in 1998.