Promoting Economic Efficiency in Spectrum Use:
The economic and policy R&D Agenda
April 23-24, 2013
MIT, Cambridge, MA

Participant Biographies

Byron Barker

Byron Barker serves within the Department of Commerce's National Telecommunications and Information Administration (NTIA) Office of Spectrum Management as Chief of its Strategic Planning Division. His office has the responsibility to develop the long range strategic plans, policies and comprehensive strategies that will provide for a continuous, ongoing regulatory transition to ensure spectrum access for our nation's vital interests of national security, public safety, and economic opportunity, now and in the future.

Previous to coming to NTIA, Mr. Barker served in Defense Information Systems Agency's (DISA) Defense Spectrum Organization (DSO). His responsibilities were concentrated on the development of the department's long-term spectrum strategies and comprehensive plans to include the development of the department's first enterprise architecture for spectrum management, serving as the framework in transforming spectrum management for the Department's future.

Mr. Barker, originally an Oklahoma native, has spent the last twelve years within the Washington DC area. He earned a Bachelor of Science Degree in Electrical Engineering from the University of Oklahoma and completed his post-graduate studies earning a Master's of Art in Computer Resources and Database Management at Webster University, St. Louis, MO.

Mr. Barker began government service in 1987 serving as an electronics engineer for the Air Force located at Tinker AFB, OK where he worked on various ground-based satellite and terrestrial communications systems.

Stuart Benjamin

Stuart Benjamin is the Douglas B. Maggs Chair in Law at Duke Law School. He specializes in telecommunications law, the First Amendment, and administrative law. From 2009 to 2011, he was the first Distinguished Scholar at the Federal Communications Commission. He is a coauthor of Telecommunications Law and Policy (1st ed. 2001, 2nd ed. 2006, 3rd ed. 2012), has written numerous law review articles, and has provided testimony to the Senate as a legal expert.

Yochai Benkler

Yochai Benkler is the Berkman Professor of Entrepreneurial Legal Studies at Harvard, and faculty co-director of the Berkman Center for Internet and Society. Since the 1990s he has played a part in characterizing the role of commons and decentralized collaboration to innovation, information production, wireless communications and democratic participation in the networked economy and society. His books include The Wealth of Networks: How social production transforms markets and freedom (Yale University Press 2006), which won academic awards from the American Political Science Association, the American Sociological Association, and the McGannon award for social and ethical relevance in communications, and was cited as "perhaps the best work yet about the fast moving, enthusiast-driven Internet" by the Financial Times and named best business book about the future in 2006 by Strategy and Business. Benkler is the author of several articles on the comparative advantages of spectrum commons or open wireless techniques and property-like exclusive licenses, including Overcoming Agoraphobia, (Harv. J. L & Tech 1998); Some Economics of Wireless Communications (Harv. J. L & Tech 2002); Open Wireless vs. Licensed Spectrum: Evidence from Market Adoption (Harv. J. L & Tech 2012). Benkler was among the advisors to the 2012 PCAST Report on spectrum policy.

Randall Berry

Randall Berry is a Professor in the Department of Electrical Engineering and Computer Science at Northwestern University. His research interests include wireless networks, network economics and information theory.

Dr. Berry has served as an editor for the IEEE Transactions on Wireless Communications (2006-2009) and the IEEE Transactions on Information Theory (2009-2011). He has also been a guest editor for special issues of the IEEE Journal on Selected Topics in Signal Processing and the IEEE Transactions on Information Theory. He is the recipient of a 2003 NSF CAREER award.

Stacey Black

Stacey Black is Assistant Vice President, Federal Regulatory Affairs for AT&T in Washington DC. In this role, Mr. Black is responsible for managing AT&T's wireless interests before federal regulatory authorities, including the Federal Communications Commission. He is engaged with many spectrum-related issues including those bands identified by the NTIA for potential mobile broadband use.

Mr. Black has been with AT&T since 2002, serving in various capacities involving the development and management of wireless products and applications.

Mr. Black has over 30 years' experience in the private land mobile radio and cellular communications industries, and has held executive positions in Motorola, AirTouch, Sony Electronics, and Siemens Communications. Mr. Black resides in Washington, DC.

Vanu Bose

Vanu Bose is CEO of Vanu, Inc. Founded in 1998, Vanu, Inc. pioneered the commercialization of software-defined radio and was the first company to receive FCC certification of a software-defined radio in 2004. Vanu, Inc. has been the recipient of numerous awards including the Software-Defined Radio Forum Achievement Award, IEEE Spectrum Magazine's Wireless Winner, and the GSM Association Technology Award for Most Innovative Infrastructure Product. Dr. Bose has been granted the personal distinctions of being named a World Economic Forum Technology Pioneer and a ComputerWorld Honors Program Laureate. Dr. Bose is currently serving as a Commissioner to the UN Broadband Commission for Digital Development, as a member of the Army Science Board, and as a member of the MIT Corporation. Dr. Bose was a technical expert for the President's Council of Advisors (PCAST) report: "Realizing the full potential of government-held spectrum to spur economic growth", and is the founder of the National Spectrum Consortium. Dr. Bose received his B.S, M.S. and PhD degrees in Electrical Engineering and Computer Science from MIT.

Dean Brenner

Dean Brenner is Senior Vice President, Government Affairs for Qualcomm Incorporated. He directs Qualcomm's global spectrum acquisitions and strategy and is responsible for global technology policy. He represents Qualcomm before the Federal Communications Commission and other agencies of the United States and Canadian governments responsible for spectrum and telecommunications policy and interacts with spectrum regulators around the world. He also leads Qualcomm's policy initiatives relating to mobile healthcare.

Mr. Brenner led Qualcomm's bidding team in recent spectrum auctions in India (the 2.3 GHz band), the United States (the 700 MHz band), and the United Kingdom (the L Band). In addition, he was responsible for obtaining the regulatory approvals for Qualcomm's sale of 700 MHz spectrum to AT&T in 2011. In 2006, he obtained the regulatory approvals to launch FLO TV, a mobile TV service. He has spoken at conferences on spectrum policy in the United States, Canada, South Korea, Belgium, Great Britain, and elsewhere around the world. He joined Qualcomm in November 2003.

Mr. Brenner received his A.B. degree, magna cum laude with distinction in public policy studies, from Duke in 1982. He won a prize for the best paper on communications policy, and he was a recipient for four years of a CBS Scholarship. He received his J.D., cum laude, from Georgetown University in 1985. He is admitted to the Bars of the District of Columbia, Maryland, and the

U.S. Supreme Court, the U.S. Courts of Appeal for the D.C., Third, and Eleventh Circuits, and the U.S. District Court for the District of Columbia.

Mr. Brenner is a member of the Federal Advisory Board for Space-Based Positioning, Navigation, & Timing, which advises the Executive Branch on policy matters impacting the Global Positioning System. He is also a member of the Board of Governors of 4G Americas, the Board for Jewish Life at Duke University, and the Board of Trustees of the Field School. He lives in Washington, DC with his wife Robin Shaffert and their two sons, Michael and Steven.

Michael Calabrese

Michael Calabrese is Director of the Wireless Future Project and a Senior Research Fellow at the New America Foundation, a non-profit think tank based in Washington, D.C. As part of the Foundation's Open Technology Initiative, he develops and advocates policies to promote ubiquitous broadband connectivity and more efficient spectrum use, including the reallocation of more prime spectrum for shared and unlicensed access.

Mr. Calabrese currently serves as an appointed Member of the U.S. Department of Commerce Spectrum Management Advisory Committee (CSMAC) since 2009, and as an Invited Expert on the President's Council of Advisors on Science and Technology (PCAST) spectrum reform working group (2011-2012). Mr. Calabrese has previously served as General Counsel of the Congressional Joint Economic Committee, as Vice President of the New America Foundation and as a clerk to California Supreme Court Justice Allen E. Broussard. Calabrese is a graduate of Stanford Business and Law Schools, where he earned a JD/MBA degree; and a graduate of Harvard College, where he earned a B.A. in Economics and Government.

John Chapin

Dr. John Chapin is a Program Manager in the Strategic Technology Office of the Defense Advanced Research Projects Agency (DARPA). He joined DARPA in August 2011. His areas of focus include advanced wireless systems and associated spectrum access and spectrum sharing technologies, and advanced networking technology for dynamically changing and heterogeneous communications systems. Dr. Chapin most recently served as Visiting Scientist at the Research Laboratory of Electronics of the Massachusetts Institute of Technology and concurrently as Chief Scientist at TV Band Service, LLC. He earlier spent 9 years in technical leadership roles at Vanu, Inc., a provider of software-designed radio (SDR) based cellular radio access networks. His work there on SDR and cognitive radio earned multiple awards including Institute of Electrical and Electronics Engineers, Dynamic Spectrum Analysis best paper, SDR Forum best paper, and SDR Forum Industry Achievement Award. Prior to Vanu he was on the faculty of the Electric Engineering and Computer Science department of MIT, where his research earned the Presidential Early Career Award for Scientists and Engineers (PECASE). He served as chairman of the SDR Forum from 2007 to 2009 and has been a member of the Federal Communications

Commission Technological Advisory Council. He earned a Doctor of Philosophy in Computer Science from Stanford University in 1997.

Andrew Clegg

Andrew Clegg is the program director for the Enhancing Access to the Radio Spectrum (EARS) program at the National Science Foundation. He holds a PhD in radio astronomy and electrical engineering from Cornell University, and a BA in physics and astronomy from the University of Virginia. Since 1990, he has been involved in spectrum-related regulation and R&D in the commercial and government (civilian and military) sectors. He has represented the U.S. at the 2007 and 2012 ITU World Radiocommunication Conferences, and is the representative to the IRAC for the National Science Foundation. He has also served two terms as president of the National Spectrum Managers Association. He has been with the National Science Foundation since 2003.

Mark Cooper

President, Citizens Research, 1983 - present; Research Director, Consumer Federation of America, 1983-present

Associated Fellow, Columbia Institute on Tele-Information, 2003-present; Fellow, Donald McGannon Communications Research Center, Fordham University, 2005-present; Senior Fellow for Economic Analysis, Institute for Energy and the Environment, Vermont Law School, 2009-present; Fellow, Silicon Flatirons, University of Colorado, 2009-present

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Donald R. Denning

Donald R. Denning, Jr. is the Chief Information Officer for Public Safety for the City of Boston and has been working in this role since May 2008. Donald is currently leading the development of a new, state of the art computer-aided dispatch and records management system for the city's 911 operation. He also is focusing on interoperability within public safety and is further developing new standards for radio and network communications between City public safety offices and State and Federal agencies. Donald serves as a member of the Statewide Interoperability Executive Committee, the Department of Homeland Security's Regional Emergency Communications Coordination Working Group (RECCWG) and is a member of the National Public Safety Telecommunications Council's Broadband Task Force and the Assessment of Future Spectrum and Technology Working Groups. He has presented numerous papers to public safety and technology groups including the Institute of Electrical and Electronics Engineers (IEEE) Conference on Technologies for Homeland Security. Donald transitioned to the public sector after working for two decades in the private sector as a Member

of the Research Staff at HP Labs, Intel, Compaq and Digital Equipment Corporation where he secured several patents in communications and medical technology. Some of the products and tools are currently being used in the public and medical sectors. Donald is also a member of the Association of Former Intelligence Officers, the International Association of Chiefs of Police and the Association of Public-Safety Communications Officials.

Pierre de Vries

Pierre de Vries is a Senior Adjunct Fellow of the Silicon Flatirons Center for Law, Technology and Entrepreneurship at the University of Colorado, Boulder, and co-Director of its Spectrum Policy Initiative. He works at the intersection between information technology and government policy, and is currently focused on ways to maximize the value of wireless services by improving the clarity of radio operating rights and responsibilities. De Vries is a former Chief of Incubation and Senior Director of Advanced Technology and Policy at Microsoft Corp. He holds a D. Phil. in physics from the University of Oxford.

Peter Ecclesine

Peter Ecclesine is Co-Technical Editor of IEEE 802.11 and Technical Editor of 802.11af TV White Spaces Operation

I worked on 70/80/90 GHz Loea Petition that became FCC 05-45 Order

I was chair and technical editor of 802.11y 3650-3700 MHz Operation in USA

I work on Spectrum and Regulatory in Cisco's Wireless Networking Group.

Gerald Faulhaber

Gerald R. Faulhaber is Professor Emeritus of Business and Public Policy, and of Management at the Wharton School of the University of Pennsylvania; he also holds a faculty appointment at the Law School of the University of Pennsylvania, retiring January 1, 2009. He served as Chief Economist at the Federal Communications Commission from July 1, 2000 to June 30, 2001, where he worked on many telecommunications and Internet issues, including the AOL-Time Warner merger. Professor Faulhaber's current research includes the wireless market, broadband public policy and markets, spectrum policy, public safety radio, file sharing and music copyright, and network neutrality. He has published widely in professional journals, both in economics and the law, and is the author of several books, including European Economic Integration: Technological Perspectives and Telecommunications in Turmoil: Technology and Public Policy. He has served on numerous scholarly boards and review committees and was Vice-President of

the Board of Directors of the Telecommunications Policy Research Conference in Washington, D.C. He was an Associate Editor of the Journal of Industrial Economics, and serves on the Board of Editors of Information Economics and Policy. He has served on the National Research Council's Committee for the Study on Issues in the Transborder Flow of Data. He was the founding director of Wharton's Fishman-Davidson Center for the Study of the Service Sector, from 1984 to 1989. Prior to his academic career, Professor Faulhaber was Director of Strategic Planning and Financial Management at AT&T, after holding the position of Head, Economics Research at Bell Laboratories. Professor Faulhaber was a Visiting Scholar at INSEAD, Fountainebleau, France, where he engaged in research on political economy issues in the US and EU; he was also a Visiting Scholar at the Institut Analisi Economica in Barcelona, Spain, also engaged in political economy research. He held an appointment at Tsinghua University School of Economics and Management, Beijing, China as a Visiting Professor, where he lectured on technology management.

Xavier Fernando

Xavier Fernando (http://www.ee.ryerson.ca/~fernando) is an IEEE Communications Society Distinguished Lecturer. He has delivered invited talks worldwide and received many awards and honors. He is a member in the IEEE Communications Society (COMSOC) Education Board Working Group on Wireless Communications. He was an ABET program evaluator as well. Currently he serves as the Chair of the IEEE Toronto Section. Xavier is a Professor at Ryerson University, Toronto and the Director of the Ryerson Communications Lab. He has co-authored close to 100 research articles. He is part of the Canadian team that does spectrum policy research in Canada (http://canadianspectrumpolicyresearch.org/).

Fred Frantz

Fred Frantz has been working in R&D for military and civilian applications for over 35 years, and specifically in public safety communications for over 14 years. As a Portfolio Manager for Engility Corporation in Rome, New York, Mr. Frantz is responsible for support to several government R&D organizations. In support of the National Institute of Justice, Mr. Frantz has led a team responsible for operational evaluations and technology integration pilot programs. Mr. Frantz was named Director of the NIJ's Communications Technology Center of Excellence program which was awarded to Engility in October, 2010, under a competitively-solicited cooperative agreement.

Mark Gibson

Mark Gibson: With over 30 years of spectrum management experience, Mark is responsible for developing domestic and international business opportunities for Comsearch. In addition to

leading Comsearch's technical and business development efforts for AWS, 3.5 GHz and TV White Space products and services, he has led efforts to address spectrum sharing between Federal government and commercial users. He is a co-chair of the Commerce Spectrum Management Advisory Committee, where he has also co-chaired working groups related to spectrum sharing and data exchange issues. He has led Comsearch's spectrum management efforts including the development of spectrum sharing analysis protocols and sharing criteria, as well as development of Comsearch's engineering services and software products. He has led Comsearch's efforts in working with the American Society for Healthcare Engineering as their technical partner for WMTS frequency coordination. He has authored several papers on spectrum sharing and relocation and has advised numerous wireless participants in their system design. He received his BSEE from the University of Maryland.

Sharon Gillett

Sharon Gillett is Executive Director of Wireless@MIT, a research center developing the next generation of wireless networks and apps, and a Senior Consultant with Communications Media Advisors, a Boston-based telecommunications strategy consulting firm. From 2009-12, Sharon served as Chief of the Federal Communications Commission's Wireline Competition Bureau. Previously, she served in state government as Commissioner of the Massachusetts Department of Telecommunications and Cable and Director of the Massachusetts Broadband Institute; at MIT as a Principal Research Associate focusing on Internet and telecommunications technology, economics and policy; and as a software engineer and manager in technology companies.

Philip Harris

I have almost 30 years experience in various engineering roles to include; commercial telecommunication network design, RF engineering, support for standards development, and support for communications research & development programs. Career roles include engineer, engineering management, program management and support for technology pilot programs. Progressive responsibilities include aspects of project system engineering, project cost compilation, customer sales support, and project coordination; concept through activation encompassing all aspects of project engineering and implementation.

I currently serve as Technology Director for the NIJ Communications Center of Excellence (a contract support role via Engility Corporation.) I have spent most of the last eleven years working primarily in the field of Public safety and Criminal Justice related wireless communications technology, on behalf of NIJ providing support for State, Local and Tribal law enforcement and public safety agencies. This includes technology analysis, technology R&D program support, investigating the potential for software defined radio, cognitive radio applications and technical standards in regard to development Public Safety communications tasks and needs.

Thomas Hazlett

Thomas W. Hazlett is Professor of Law & Economics at George Mason University, where he also directs the Information Economy Project. He has written widely, in academic journals and popular publications, on the economics of wireless markets, spectrum allocation, and government regulation. He formerly served as Chief Economist of the Federal Communications Commission.

Michael Honig

Michael Honig is a Professor in the Department of Electrical Engineering and Computer Science at Northwestern University. Prior to joining Northwestern he worked in the Systems Principles Research Division at Bellcore in Morristown, NJ, and at Bell Laboratories in Holmdel, NJ. His research has focused on wireless networks, including interference mitigation and resource allocation, and market mechanisms for dynamic spectrum allocation. He is a Fellow of IEEE and is currently serving a third term as a member of the Board of Governors for the IEEE Information Theory Society.

Carolyn Kahn

Carolyn Kahn is Principal Economics and Business Analyst at The MITRE Corporation, a not-for-profit organization that operates research and development centers sponsored by the Federal government. For over 15 years, Ms. Kahn has worked in partnership with the government and across MITRE to provide advice and analysis on spectrum economics-related topics to address complex issues of critical national importance. Ms. Kahn led the Business and Investment Analysis core competency area within MITRE's Center for Acquisition and Management Sciences. She also served as the Lead Economic Advisor to the International Consortium for Telemetry Spectrum. Ms. Kahn holds an MBA in Finance and Marketing from McGill University and a BA in Economics and International Studies from Brandeis University.

Barlow Keener

Barlow Keener focuses on helping telecom, cable and Internet companies navigate the heavily regulated communications industry. He negotiates complex agreements related to interconnected networks, provides counsel for wired and wireless communications companies arising under those agreements and under state and federal communications laws, and helps shape and interpret state and federal communications regulatory rules and policies.

Brett Kilbourne

Mr. Kilbourne is currently Vice President of Government & Industry Affairs and Deputy General Counsel at the Utilities Telecom Council ("UTC") where he provides legal guidance to utilities on telecommunications issues both pending before federal and state agencies and being considered in Congress.

UTC is the national representative on telecommunications matters for its electric, gas and water utilities and natural gas pipeline company members, which range in size from large combination electric-gas-water utilities which serve millions of customers, to smaller, rural electric cooperatives and water districts which serve only a few thousand customers each.

Prior to joining UTC in October 1998, Mr. Kilbourne was employed at BellSouth Corporation from 1994-1998 in its Washington, D.C. office where he assisted the legal department on a variety of common carrier, wireless and cable issues. He was also employed at the law firm of Baker & Hostetler from 1991-1994 where he assisted the communications practice, primarily on broadcast and cable television matters. Mr. Kilbourne graduated in 1987 with a Bachelor of Arts degree in History from the University of the South in Sewanee, Tennessee. He received his Juris Doctor degree in 1998 from The Catholic University, Columbus School of Law and is licensed to practice law in the State of Maryland.

Paul Kolodzy

Dr. Paul Kolodzy has over 25 years of experience in technology development for advanced communications, networking, electronic warfare, and spectrum policy for government, commercial, and academic clients. He is currently a Communications Technology Consultant in Advanced Wireless and Networking Technology based near Washington DC. Current areas include communications, electronic warfare, and ISR, commercial and public safety spectrum policy, and interference mitigation and coexistence, and adaptive spectrum resource management. He has been active with spectrum studies with PCAST and the National Research Council. Formerly with: Stevens Institute of Technology; the FCC; DARPA; Sanders (now BAE); and MIT Lincoln Laboratory.

Nick Laneman

J. Nicholas Laneman is Founding Director of the Wireless Institute in the College of Engineering, an Associate Professor of Electrical Engineering, and a Fellow of the John J. Reilly Center for Science, Technology, and Values at the University of Notre Dame. He joined the faculty in August 2002 shortly after earning a Ph.D. in Electrical Engineering and Computer Science from the Massachusetts Institute of Technology (MIT). His research and teaching

interests are in communications architecture—a blend of information theory, error-control coding, signal processing for communications, network protocols, and hardware design—with current emphasis on wireless systems. Laneman has initiated collaborations with other engineers, economists, and policy makers to help shape spectrum regulation and innovation policy.

Laneman has received a 2006 Presidential Early-Career Award for Scientists and Engineers (PECASE), a 2006 National Science Foundation (NSF) CAREER Award, a 2003 Oak Ridge Associated Universities (ORAU) Ralph E. Powe Junior Faculty Enhancement Award, and the 2001 MIT EECS Harold L. Hazen Graduate Teaching Award. He is an IEEE Senior Member and has served as an Associate Editor for IEEE Transactions on Communications, as a Guest Editor for Special Issues of IEEE Transactions on Information Theory and IEEE Journal on Selected Areas in Communications, and as the first Online Editor for the IEEE Information Theory Society.

Laneman is author or co-author on over 100 publications, including 34 journal articles and 3 invited book chapters, and has been recognized by Thomson Reuters as an ISI Highly Cited Researcher (2010). He is co-inventor on 5 U.S. patents and has several patents pending. He currently advises six Ph.D. students; five Ph.D. degrees, ten M.S. degrees, and one B.S. honors degree have been earned under his supervision. All of these research efforts have been supported in part by over $9M in research funding, with Laneman serving as principal investigator on just under $3M.

Mitchell Lazarus

Mitchell Lazarus is a partner with the telecommunications law firm of Fletcher, Heald & Hildreth. He has worked for thirty years on spectrum issues, particularly the introduction of new radio technologies.

Lazarus's work includes airport body scanners, surveillance robots, through-the-wall security radar, industrial measurement radar, and ultra-wideband, along with Wi-Fi, software-defined and cognitive radios, wireless power transmission, millimeter-wave communications, and broadband-over-power-line. He has long represented the fixed microwave industry.

Lazarus holds a law degree from Georgetown University Law Center; bachelor's and master's degrees in electrical engineering from McGill University and MIT, respectively; and a Ph.D. in experimental psychology from MIT.

William Lehr

William Lehr is a Research Scientist in the Massachusetts Institute of Technology Computer Science and Artificial Intelligence Laboratory. Dr. Lehr is an economist whose specialty is the regulatory and industrial economics of the Internet infrastructure industries. He participates in

the MIT Communications Futures Program, where his current research focuses on the evolution of wireless networking, broadband Internet access, and spectrum policy. Prior to coming to MIT in 1996, Dr. Lehr was an assistant professor in the Graduate School of Business at Columbia University. In addition to his academic teaching and research, Dr. Lehr provides business strategy and litigation consulting services to public and private sector clients in the U.S. and abroad. Dr. Lehr holds a PhD in Economics from Stanford (1992), an MBA from the Wharton Graduate School (1985), and MSE (1984), BS (1979) and BA (1979) degrees from the University of Pennsylvania.

John Leibovitz

John Leibovitz is Deputy Chief, Wireless Telecommunications Bureau & Special Advisor to the Chairman for Spectrum Policy at the FCC, where he plays an instrumental role in driving spectrum and wireless policy for the agency. Mr. Leibovitz was the spectrum team lead in the creation of the National Broadband Plan, which outlined a comprehensive spectrum strategy for the United States. As Deputy Chief of the Wireless Bureau, he is responsible for implementing this strategy and other strategic wireless policies.

Mr. Leibovitz oversees the Broadband and Mobility divisions within the Wireless Bureau. These two divisions consist of approximately 100 attorneys, engineers, and other professionals who administer a wide range of wireless services. These include bands used by the cellular industry, microwave backhaul, and numerous other wireless services. Mr. Leibovitz also leads many interactions with other Bureaus and federal agencies on strategic spectrum matters.

Prior to joining the FCC, Mr. Leibovitz worked on the Presidential Transition Team, where he helped to launch the Technology, Innovation, and Government Reform working group. Before that, he worked as an entrepreneur and strategy consultant in telecom with an emphasis on the wireless sector. He started his business career with McKinsey & Company in New York.

Mr. Leibovitz has written about technology and communications policy in the Yale Law Journal and the Yale Journal of Law and Technology. He received his B.A. from the University of Pennsylvania, an M.Phil. from Cambridge University, and a J.D. from Yale Law School.

Mark Lowenstein

As Managing Director of Mobile Ecosystem, Lowenstein advises C-level executives on corporate, product, market, and industry strategy across the value chain of the wireless, communications, and digital media industries. Clients include wireless operators, equipment suppliers, device manufacturers, application and content developers, marketing and advertising firms, corporate end-users, and key members of the investment and venture capital communities.

From 2006-2007, Lowenstein was Vice President of Market Planning and Strategy at Verizon Wireless, where he led the company's efforts in long-term business planning, national pricing, market segmentation, and customer intelligence for the consumer and enterprise markets.

Lowenstein's consulting career began at the Yankee Group, where he founded and led the company's top-ranked global wireless practices. As Executive Vice President, he supervised a global team of analysts, authored dozens of influential reports, and headed large-scale strategy consulting projects. As a member of the Yankee Group's executive management committee, Lowenstein also oversaw the growth of the company's Canada, Latin America, and Asia-Pacific practices, and led early stage electronic content and commerce initiatives.

As one of the wireless industry's senior thought leaders, Lowenstein is a frequent keynote speaker at corporate and industry events worldwide and is broadly quoted in the print and broadcast media. He writes a monthly opinion column, Lowenstein's View, for Fierce Wireless, the leading on-line publication for the wireless industry with a circulation of 85,000. His Lens on Wireless newsletter is read by more than 10,000 industry executives and enterprise decision-makers. Mr. Lowenstein has provided testimony to the FCC and has been retained as an expert witness in several cases pertaining to the wireless industry.

Lowenstein has served on the advisory boards of several prominent firms, including Telephia (acquired by Nielsen), Advanced Technology Ventures, and Seapoint Ventures. He has been lecturer at Tufts University, and has served as a judge in numerous business plan competitions. He founded and leads the Boston Wireless Braintrust, a group of the 20 senior-most executives and thought leaders related to the wireless industry in New England.

Mark Luker

Dr. Mark A. Luker is the Associate Director of the National Coordination Office for the Networking and Information Technology Research and Development Program (NITRD). His appointment comes after joining the National Institute of Standards and Technology (NIST), Information Technology Laboratory (ITL). Prior to joining NIST, he served as a Telecommunications Policy Specialist at the National Telecommunications and Information Administration in the U.S. Department of Commerce on the Broadband Technology Opportunities Program (BTOP).

Dr. Luker has served as the Vice President (VP) of EDUCAUSE, an association of over 2,000 universities and colleges that promotes the transformation of higher education through innovative applications of information technology. As the VP, he led the Washington DC-based EDUCAUSE policy program as well as Net@EDU, a thought-leadership coalition of university Chief Information Officers (CIOs) and state network directors who work to advance national networking for both research and education.

Dr. Luker also served as the Program Director for advanced networking at the National Science Foundation and as the CIO of the University of Wisconsin-Madison campus. In this role, he was

very active in several national projects including the National Learning Infrastructure Initiative and the Coalition for Networked Information.

Dr. Luker received his Ph.D. in Mathematics from the University of California, Berkeley. He served as a faculty member in Computer Science and as Acting Dean of Science and Engineering at the University of Minnesota, Duluth, before moving into information technology management.

Michael Marcus

Michael Marcus received S.B. and Sc.D. degrees in electrical engineering from MIT.

Working at FCC nearly 25 years, his work focused on proposing and developing policies for cutting edge radio technologies such as spread spectrum/CDMA and millimeterwaves. Wi-Fi is one outcome of his early leadership. He had an exchange assignment with the FCC's Japanese counterpart and has been a consultant to the European Union and Singapore regulator on spectrum policy. He is now Director of Marcus Spectrum Solutions LLC, an independent consulting firm based in the Washington DC area and focusing on wireless technology and policy, teaches at Virginia Tech, chairs the IEEE-USA Committee on Communications Policy, and is a blogger on spectrum policy.

Preston F. Marshall

Preston F. Marshall is the Deputy Director of the Information Sciences Institute (ISI) of University of Southern California's Viterbi School of Engineering, and a Research Professor at USC's Ming Hsieh Department of Electrical Engineering.

For seven years, he was Program Manager with the Defense Advanced Research Projects Agency (DARPA) for many of the DARPA Wireless, Cognitive Radio, and networking programs. These programs include development of the XG Dynamic Spectrum Access technology, and the Wireless Networking after Next (WNAN) cognitive radio program. These programs collectively provided development and demonstration of the technology base for adaptive wireless and spectrum technology.

Dr. Marshall has written many articles, book chapters and conference presentations on the subject of cognitive radio and spectrum issues. He is author of the recently released "Quantitative Analysis of Cognitive Radio and Network Performance" by ARTECH House and the upcoming "Scalability, Density, Decision-Making in Cognitive Wireless Networks" by Cambridge University Press. He is Executive Chair of the IEEE DYSPAN Dynamic Spectrum conference, and was guest editor for IEEE Communications several times. Dr. Marshall holds a B.S.E.E and M.S. Information Science from Lehigh University, and a Ph.D in Electrical Engineering from Trinity College, Dublin, IE.

Giulia McHenry

Giulia McHenry is an associate at The Brattle Group with primary areas of expertise in telecommunication and media, as well as antitrust litigation. She has consulted on economic research related to telecommunication matters, and prepared numerous expert reports related to spectrum management and valuation, broadband deployment, regulatory proceedings and Universal Service Fund, and competition policy.

Prior to joining Brattle, she was a senior economist at the Government Accountability Office (GAO), where she conducted economic analysis related to U.S. international policy, including trade and trade promotion, global financial linkages, and international development. Dr. McHenry received her Ph.D. in economics from the University of Maryland in 2009, and she received her BA from Wesleyan University in 2001. She enjoys the art of cooking, reading about tech policy, and translating economics into human language.

Nancy Merritt

Dr. Nancy Merritt is Senior Policy Advisor with the National Institute of Justice, U.S. Department of Justice. In this capacity she oversees research efforts in both the social and technical sciences; coordinates outreach; and leads agency policy and planning teams. Dr. Merritt is currently co-Director of the NIJ Technology Operations Evaluation Program (TOEP). She has held research positions with the RAND Corporation as well as the Virginia, Pennsylvania and Ohio State Governments. Through this work, Dr. Merritt has designed and managed a wide variety of criminal justice research studies and aided in the analysis and modification of criminal justice policy in several states. Dr. Merritt, a former faculty member with the California State University Los Angeles, received her Ph.D. from Rutgers University and her M.S. and B.S. from the Pennsylvania State University.

J. Armand Musey

J. Armand Musey is president and founder of Summit Ridge Group, LLC where he provides valuation and financial advisory services to the communications sector. Armand has particular expertise in spectrum-related issues. Previously, he was president of a boutique investment bank also focused on the communications sector. He also spent several years as a top-ranked Wall Street research analyst following the satellite industry. Armand holds a BA from the University of Chicago, an MA from Columbia University and JD/MBA from Northwestern University. His is also a Chartered Financial Analyst (CFA).

Eric Nelson

Eric Nelson is the Chief of the Spectrum and Propagation Measurements Division at NTIA's Institute for Telecommunication Sciences (ITS). He received his M.S. in Electrical Engineering from the University of Washington in 1993. He has held systems engineering and supervisory positions in metropolitan, rural, and airborne cellular communications companies. After joining ITS in 2002 he oversaw Project 25 digital land mobile radio testing and spearheaded the formation of a Project 25 conformity assessment program. ITS currently supports NTIA's Spectrum Sharing Test-bed and numerous other system compatibility testing efforts including dynamic frequency selection (DFS). ITS is presently engaged in cooperative research with major cellular carriers to explore spectrum sharing in the 1755 MHz band.

Tom Power

Tom Power is the U.S. Deputy Chief Technology Officer for Telecommunications at the White House Office of Science and Technology Policy where he helps develop and coordinate Administration policy on telecom and technology issues. Before joining OSTP, Tom served as Chief of Staff of the National Telecommunications and Information Administration at the U.S. Department of Commerce. Earlier Tom served as General Counsel of Fiberlink Communications, Senior Legal Adviser to FCC Chairman William Kennard, and as a partner at the law firm of Winston & Strawn. He received his undergraduate and law degrees from the University of Virginia.

John Quinlan

John Quinlan is a program examiner in the Commerce branch of the Office of Management and Budget (OMB), where he currently works on policy and budgetary issues affecting the telecommunications and technology sector. John has worked at OMB since 2006 and, in this position, has also served as OMB's staff lead for small business, intellectual property, export controls and other policy areas. Prior to OMB, John worked at the State of Maryland's Department of Legislative Services and the Congressional Budget Office. He received an undergraduate degree in economics and political science from the University of Washington and a Master's degree in Public Policy from Johns Hopkins University.

Gregory Rosston

Gregory Rosston is a Senior Fellow and Deputy Director of the Stanford Institute for Economic Policy Research, Deputy Director of the Public Policy program at Stanford University and Professor of Economics (by courtesy). He currently serves as the co-chair of the Department of Commerce Spectrum Management Advisory Committee.

Dr. Rosston served as Deputy Chief Economist at the Federal Communications Commission working on the implementation of the Telecommunications Act of 1996 and helped to design and implement the first ever spectrum auctions in the United States. In 2011, he was Senior Economist for Transactions for the Federal Communications Commission for the proposed AT&T – T-Mobile transaction. Dr. Rosston received his Ph.D. in Economics from Stanford University and his A.B. in Economics from University of California at Berkeley. He serves as an Advisory Board member for the Stanford Federal Credit Union, Sustainable Conservation, and on the Board for the Nepal Youth Foundation.

Peter Rysavy

Peter Rysavy is the president of Rysavy Research LLC, a consulting firm that has specialized in wireless technology since 1993. His projects have included analysis of spectrum requirements for mobile broadband, reports on the evolution of wireless technology, evaluation of wireless technology capabilities, test reports, and involvement in multiple patent-litigation cases. Clients include more than seventy-five organizations. Peter has written more than a hundred and forty articles, reports, and white papers. He has also taught forty public wireless courses and webcasts. Peter Rysavy graduated with BSEE and MSEE degrees from Stanford University in 1979. More information is available at http://www.rysavy.com.

Paul Sadowski

NC State Highway Patrol -IT Manager -15 years supporting data communications, special communications projects, and information security at 300+ locations. Also supports multiple voice radio systems including the VIPER (Voice Interoperability Program for Emergency Responders) system (65,000 radios and 200+ tower sites). Allan is retired from the USAF with a BSEE from NCSU and MSIST from HPU. Past projects include: XML Facial Images for Law Enforcement (XFILES), NexRAD RADAR R&D, 5D Image Dissemination System, first DoD real-time "Over the Horizon" Airborne Literal Imaging System, designed the first CGI Alpha Channel hardware, and originated a micro-Doppler RADAR Location/ID transponder.

Anant Sahai

Anant Sahai got his B.S. in EECS from UC Berkeley in '94. After that, he was a graduate student at MIT studying Electrical Engineering and Computer Science and was based in the Laboratory for Information and Decision Systems, receiving his PhD in 2001. In 2001 he was on the theoretical/algorithmic side of a team at the wireless startup Enuvis, Inc. developing new adaptive software radio techniques for GPS in very low SNR environments (such as those encountered indoors in urban areas). He joined the Berkeley faculty in 2002 and has been there ever since.

He has previously served as the Treasurer for the IEEE Information Theory Society ('07-'09 inclusive). Last year, along with his students Pulkit Grover and Kristen Ann Woyach, he won the IEEE Communication Society's Leonard G. Abraham Prize in the Field of Communications Systems for his work on power consumption. His students have also won best paper prizes at IEEE DySpAN (in both the Policy and Technology tracks) as well as in the IEEE's Conference on Decision and Control.

His research interests span information theory, decentralized control, and wireless communication --- with a particular interest at the intersections of these fields. Within wireless communication, he is particularly interested in Spectrum Sharing and Cognitive Radio, especially in bringing together ideas of architecture, economics, and regulation.

Jeff Schmidt

As Vice President of Engineering, Mr. Schmidt leads Spectrum Bridge's product and technology development strategy. He has over 20 years of experience in the wireless communications industry at firms including Motorola, MeshNetworks, Comsat, and Lockheed Martin. As an innovator, Mr. Schmidt has been instrumental in developing new broadband communications technologies, obtained FCC certification on wireless products, deployed large scale networks and received numerous patents in this field. He holds MSEE and BSE (Magna Cum Laude) degrees from the University of Central Florida and published papers on antenna design and spectrum policy.

Steve Sharkey

Steve Sharkey is Director, Chief Engineering and Technology Policy in T-Mobile's Government affairs office in Washington, DC. He has overall responsibility for T-Mobile's technical policy agenda. A priority focus is policies that ensure that T-Mobile has access to sufficient spectrum as it deploys the next generation of broadband services. Prior to joining T-Mobile, Mr. Sharkey was Senior Director, Regulatory and Spectrum Policy for Motorola with overall responsibility for Motorola's global regulatory and advocacy efforts. Prior to joining Motorola, Mr. Sharkey was the lead regulatory technical representative for AirTouch Communications. In Prior to AirTouch, Mr. Sharkey served in a variety of roles at the Federal Communications Commission.

Mr. Sharkey has a Bachelor of Science in Electrical Engineering from the University of Delaware.

Douglas C. Sicker

Doug is the DBC Endowed Professor in the Department of Computer Science at the University of Colorado at Boulder with a joint appointment in, and director of, the Interdisciplinary Telecommunications Program. Doug recently was the Chief Technology Officer and Senior Advisor for Spectrum at the National Telecommunications and Information Administration (NTIA). Doug also served as the Chief Technology Officer of the Federal Communications Commission (FCC) and prior to this he served as a senior advisor on the FCC National Broadband Plan. Prior to this he was Director of Global Architecture at Level 3 Communications, Inc. Doug also served as Chief of the Network Technology Division at the Federal Communications Commission (FCC). Doug has also held faculty and industry positions in the field of medical sciences. Doug is a senior member of the IEEE, as well as a member of the ACM and the Internet Society. He has also served as chair of various program committees and on various federal advisory committees. His research and teaching interests include network security, wireless systems and network policy. For additional details please go to http://spot.colorado.edu/~sicker

Min Song

Dr. Min Song is a Professor in the Electrical Engineering and Computer Science Department at the University of Toledo. Professor Song is currently serving NSF as a Program Director. His research interests include design, analysis, and evaluation of cognitive radio networks, wireless sensor networks, wireless mesh networks, cyber physical systems, and wireless ad-hoc networks. Over the years, he has secured more than $2 million research funding from NSF, DOE, and NASA. Professor Song is the recipient of the NSF CAREER Award. He is an IEEE Senior member.

John Stine

Dr. John A. Stine, P.E. (Acting Department Head, Operations Research and Systems Analysis, The MITRE Corporation) Prior to joining MITRE, John served 20 years in the U.S. Army. At MITRE, he has led internally funded research in mobile ad hoc networking, consulted with the DoD on spectrum management issues authoring "Spectrum Management 101," consulted with Army analysis agencies on modeling and analysis of tactical networks specializing on operational effectiveness, and is currently leading two projects: the network design of the DoD's Future Narrowband Waveform (FNB) and MITRE's internal research in Model-Based Spectrum Management.

Rangam Subramanian

Dr. Subramanian is a Chief of Wireless Technology and Business Strategy, National and Homeland Security Directorate, Idaho National Laboratory, Idaho Falls, ID. His primary

responsibilities include developing and executing on secure wireless technology strategy; delivering on wireless technology leadership for research and testing programs of national importance; building collaborations across the stakeholders in the government, industry, entrepreneurial community and the academia; and defining the direction and roadmap for the INL wireless research center. Dr. Subramanian delivered a Testimony to the United States Congress on, "Avoiding the Spectrum Crunch: Growing the Wireless Economy through Innovation", in April 2012. He is currently serving the White House/ OSTP (Office of the Science and Technology Policy) Senior Steering Group (SSG) on Wireless Spectrum Sharing R&D (WSRD).

Dr. Subramanian has more than 20 years of international R&D and business management experience across multiple Telecommunications OEMs, carriers, investors, government and the academic community. His extensive experience spans across wireline, wireless, satellite and converged multimedia Telecommunication technologies. He has contributed in several functional areas, including Telecommunications research, technology development and deployment, mergers & acquisitions, technology strategy and innovation, business development and global partnerships. Dr. Subramanian holds an MBA from the Kellogg School of Management, Northwestern University, Evanston, IL, USA; a PhD in Computer & Systems Engineering from the School of Computer Science, Oakland University, Rochester, Michigan, USA; a MS in Telecommunications from the Asian Institute of Technology, Bangkok, Thailand; and a BS in Electronics Engineering from the National Institute of Technology, Calicut, India.

Peter Tenhula

Peter Tenhula is a Senior Advisor at the National Telecommunications and Information Administration (NTIA) in the Department of Commerce. Peter joined NTIA in April 2012 where he advises the Assistant Secretary of Commerce, the Office of Spectrum Management (OSM), and the Institute for Telecommunication Sciences (ITS) on spectrum policy matters. Prior to joining NTIA, Peter worked at Shared Spectrum Company in Vienna, Virginia, for six years, serving as the company's Vice President and General Counsel. Peter was also a member of the Board of Directors of the Wireless Innovation Forum (formerly the SDR Forum) and chaired the Forum's Regulatory Committee. From 1990 to 2006, Peter served at the U.S. Federal Communications Commission, where he held several positions including Acting Deputy Chief of the Wireless Telecommunications Bureau, Director of the Spectrum Policy Task Force, Senior Legal Advisor to Chairman Michael Powell, Special Counsel to General Counsel William Kennard and staff attorney in the Office of General Counsel and the Mass Media Bureau. He received his undergraduate degree in Telecommunications from Indiana University, Bloomington, and earned a law degree from Washington University in St. Louis, Missouri.

Rakesh Vohra

Rakesh Vohra is the John L. & Helen Kellogg Professor of Managerial Economics & Decisions Sciences at the Kellogg School of Management, Northwestern University. He also directs the Center for Mathematical Studies in Economics and Management Science. He has written widely, in academic journals on the economics of wireless markets and the design of markets.

Scott Wallsten

Scott Wallsten is an economist with expertise in industrial organization and public policy. His research focuses on telecommunications, regulation, competition, and technology policy. His research has been published in numerous academic journals and his commentaries have appeared in newspapers and news magazines around the world. He holds a PhD in economics from Stanford University.

He is currently vice president for research and a senior fellow at the Technology Policy Institute (TPI) and a senior fellow at the Georgetown Center for Business and Public Policy. He has been a lecturer in Stanford University's public policy program, director of communications policy studies and senior fellow at the Progress & Freedom Foundation, a senior fellow at the AEI – Brookings Joint Center for Regulatory Studies and a resident scholar at the American Enterprise Institute, an economist at The World Bank, a scholar at the Stanford Institute for Economic Policy Research, and a staff economist at the U.S. President's Council of Economic Advisers.

Martin Weiss

Martin B.H. Weiss is the Associate Dean for Academic Affairs and Research at the School of Information Sciences at the University of Pittsburgh, where he also holds a faculty appointment in telecommunications. He earned his PhD. in Engineering and Public Policy from Carnegie Mellon University where he studied the standards development process under Professor Marvin A. Sirbu. He also earned an MSE in Computer, Control, and Information Engineering from the University of Michigan and a BSE in Electrical Engineering from Northeastern University. His overall research themes are the analysis of situations where competing firms must cooperate, dynamic spectrum access systems and the evolution of telecommunications industry.

Scott Wilder

For over 25 years, Officer Scott Wilder has served as a police officer for the Brookline Police Department. Officer Wilder is currently Director of Technology and Communications for the Brookline Police Department. In this capacity, Officer Wilder is responsible for designing, installing, and maintaining the software/hardware and communications networks for the Public Safety systems, serving a metropolitan Town with a population of 58,000.

Advocated and managed the Town of Brookline's deployment of a wireless public safety network, (border to border) as the first public safety department to implement a full 2.4 & 4.9 GHz wireless mesh technology in the nation.

Officer Wilder currently serves as the Vice Chair, Metro Boston Homeland Security Region's Interoperability Committee, Chairmen for the PSnet Executive Committee, and Chairmen for the Technology and Wireless Data Subcommittee, for the Boston UASI-Region, member of the Regional Catastrophic Planning Team-Cyber Working Group, and a member of Technology Working Group for the National Institute of Justice.

Officer Wilder holds a B.S. degree in criminal justice from Western New England College.