WSRD Workshop IX

Radio Receiver Systems:
R&D Innovation Needs and Impacts on Technology and Policy

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Participant Biographies

Jeffrey Boksiner is the Senior Research Scientist (Electronic Warfare Technology) at US Army Communications-Electronics Research, Development and Engineering Center (CERDEC) Intelligence & Information Warfare Directorate (I2WD) where he is responsible for helping to plan, implement research and develop new concepts for military application of Cyber Electromagnetic Activity with a focus on electronic warfare, offensive cyber, and intelligence operations techniques. Previously, Dr. Boksiner was the Chief Engineer for the RF Communications Division at CERDEC Space & Terrestrial Communications Directorate where he led R&D focused on spectrum efficiency and effectiveness, and electronic protection of communications systems, as well as research on meta-materials and their application to tactical RF. Prior to joining CERDEC, Dr. Boksiner was with Telcordia Technologies specializing in Spectrum Management and Electromagnetic Compatibility. Dr. Boksiner holds a PhD in Physics from Rutgers University, and a MS and BS in Electrical Engineering from Polytechnic University (now NYU Tandon School of Engineering).

Stanley E. Causey, currently works as Senior Engineer at the Drug Enforcement Administration (DEA), Department of Justice, in the Office of Investigative Technology. Previously he has worked on electronic surveillance, phenomenology, R&D for passive sensors, as a Subject Matter Expert with the Communications for Law Enforcement Act (CALEA), and to develop L-Site a secure Web Site portal for exchange of lawful court orders and data. Mr. Causey returned to the Federal Government as a Senior Engineer for the Department of Justice, Drug Enforcement Administration, and worked on the APCO P-25 Project for land mobile radio standards and the NIST effort for the new LTE Public Safety Broadband. Mr. Causey was able to obtain funding to develop a new waveform, WSCOMM, for Dynamic Spectrum Access so Federal agencies. Mr. Causey is participating with the Federal Project for Interoperable Communications (FPIC) to understand LTE's impacts on public safety communications.

John Chapin is Vice President, Advanced Technologies for Roberson and Associates with 17 years' experience in the industry, focusing on challenging problems at the boundary between technical and policy concerns. Dr. Chapin most recently served as Program Manager in the Defense Advanced Research Projects Agency (DARPA), where he initiated and led programs in spectrum access and spectrum sharing technology. Dr. Chapin previously served as Visiting Scientist at the Research Laboratory of Electronics of the Massachusetts Institute of Technology (MIT) and concurrently as Chief Scientist at TV Band Service, LLC. Earlier, he spent nine years in technical leadership roles at Vanu, Inc., a provider of software-designed radio (SDR) based cellular radio access networks. Prior to Vanu he was on the faculty of the Electric Engineering and Computer Science department of MIT. Dr. Chapin earned a Ph.D. in Computer Science from Stanford University in 1997.

Young-Kai (Y.K.) Chen, is a director at Bell Laboratories, Nokia, Murray Hill, New Jersey. He received his Ph.D. degree from Cornell University in 1988. Since 1988, Dr. Chen has been with Bell Laboratories,

Murray Hill, New Jersey. Before joined, he was with General Electric Company from 1980-1988, working on MMICs for satellite applications. He was an Adjunct Professor at Columbia University, and is an Adjunct Chair Professor at National Taiwan University and National Chiao Tung University. Dr. Chen is a Fellow of Bell Labs, IEEE and OSA, and a member of the US National Academy of Engineering.

Pierre de Vries is Co-director of the Spectrum Policy Initiative at the Silicon Flatirons Center of the University of Colorado, Boulder. His current work focuses on maximizing the value of radio operation by better managing potential and actual interference, both before and after rulemaking. He is also Visiting Senior Scientist at the Institute for Networked Systems of RWTH Aachen University. He was a Technology Advisor to Harris Wiltshire & Grannis LLP, Washington DC (2007–2010) and a Senior Fellow at the Annenberg Center for Communication of the University of Southern California (2006–2007). Prior to this he held various positions at Microsoft including Chief of Incubation, and Senior Director of Advanced Technology and Policy. He holds a D.Phil. in theoretical physics from the University of Oxford.

Joseph A. Downey received a B.S. in Electrical Engineering from the University of Toledo in 2008, and the M.S. in Electrical and Computer Engineering from the Georgia Institute of Technology in 2013. Since 2008 he has worked at the NASA Glenn Research Center in the Information and Signal Processing Branch. At NASA he has primarily worked with advancing software-defined radio technology, including a flight experiment on the ISS (the Space Communication and Navigation Testbed). His current work includes high-rate satellite communications, adaptive waveforms, and cognitive radio applications.

Mike Fitton received his PhD from the University of Bristol, UK in the domain of wireless communications, spread spectrum and software defined radio. He has wide expertise in planning, strategy and wireless systems research and development. Dr. Fitton has broad experience over 25 years in the wireless telecommunications domain, including product line management, system architecture, algorithm development, and semiconductors across wireless operators, terminal development and most recently in radio infrastructure. He is currently the Director of the Wireless and Access Business Division at Intel's Programmable Solution Group. Intel PSG's programmable solution portfolio makes us a market leader in supporting wireless infrastructure across radio, baseband and networking.

Michael Fitz serves as the Chief Technical Officer at Silvus Technologies and leads Silvus efforts in wireless research and development. He has nearly three decades of experience in wireless communication systems in both academia and in the private sector. He was elected a Fellow of the IEEE, has the usual bevy of papers and books reflective of an academic career, and was awarded the 2001 IEEE Communications Society Paper Award in the Field of Communications Systems for his work on space-time signaling and channel modeling. Before working at Silvus Technologies Dr. Fitz has held several tenured positions in academia and leadership positions in industry with his most recent being as a full professor at the University of California Los Angeles, the Waveforms and Components Business Area Lead at TrellisWare Technologies, and as an Engineering Fellow and Advanced Systems Manager at Northrop Grumman in Redondo Beach.

Monisha Ghosh is currently a Research Professor at the University of Chicago, researching wireless technologies for the Internet of Things, 5G cellular and next generation Wi-Fi systems. Prior to this, she worked at Interdigital, Philips Research and Bell Laboratories on the research and development of various communication systems such as the HDTV broadcast standard, cable standardization and on cognitive radio for the TV White Spaces. She has been an active contributor to many industry standards and was recognized with a Certificate of Appreciation for her outstanding contributions to IEEE 802.22. Her research interests are broadly in the area of signal processing and communications, with particular emphasis on spectrum sharing. She received her Ph.D. in Electrical Engineering from the University of

Southern California in 1991, and her B. Tech from the Indian Institute of Technology, Kharagpur in 1986. She is a Fellow of the IEEE.

Mark Gibson has over 30 years of spectrum management experience and is responsible for developing domestic and international business opportunities for Comsearch. In addition to leading Comsearch's technical and business development efforts numerous wireless and spectrum-related products and services, he has led efforts to address spectrum sharing between Federal government and commercial users. He leads efforts on Comsearch's Spectrum Access System and is on the board of the Wireless Innovation Forum. 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 Hospital Association as their technical partner for WMTS frequency coordination. He received his BSEE from the University of Maryland.

Michael Ha is the Deputy Chief of Policy and Rules Division, Office of Engineering and Technology at the Federal Communications Commission. Since joining the Commission in 2010, he has been engaged in various proceedings on spectrum allocations for advanced wireless services, mobile satellite services, and public safety services. He has also been engaged in federal/non-federal spectrum sharing activities and the Commission's efforts to explore the use of innovative technologies in upper microwave and millimeter wave bands. Michael is the FCC's liaison to the Interdepartmental Radio Advisory Committee (IRAC). His other areas of interests include innovative technologies to enhance the spectrum efficiency and enable spectrum sharing. Michael received a Sc.Bs. degree in Electrical Engineering from University of California, San Diego and Masters of Engineering degree in Electrical Engineering from Cornell University.

Dale Hatfield is a senior fellow at the Silicon Flatirons Center for Law, Technology and Entrepreneurship and an adjunct professor in the Interdisciplinary Telecommunications Program – both at the University of Colorado Boulder. Prior to joining CU Boulder, Dale was the chief of the Office of Engineering and Technology at the Federal Communications Commission (FCC). He retired from the FCC and government service in December 2000. Before joining the FCC in 1997, Dale was founder and CEO of Hatfield Associates Inc., a Boulder-based multidisciplinary telecommunications consulting firm. Dale holds a BS in electrical engineering from Case Institute of Technology and an MS in industrial management from Purdue University. In 2008, Dale was awarded an honorary doctorate by CU Boulder for his commitment to the development of interdisciplinary telecommunications studies.

William D. Horne is a senior spectrum technology advisor and communication systems engineer at NASA Headquarters. During his career, Mr. Horne has developed system designs and conducted research and development for wireless and satellite systems including broadband (Ka-Band) satellite and adaptive spectrum systems. In addition, he has extensive experience conducting system and wireless analyses for both standards and spectrum policy development. Mr. Horne has a BSEE from Lehigh University and an MSEE from Princeton University.

Garry M. Jacyna is a MITRE Fellow in the Washington Center for National Security (CNS). He is a recognized expert in signal processing and systems engineering, specializing in the development of system performance and effectiveness models for several Department of Defense (DOD) and Department of Homeland Security (DHS) programs. He is currently working with DARPA on the Shared Spectrum Access for Radar and Communications Program (SSPARC), where he is overseeing and

developing spectrum sharing technologies resulting in joint spectrum access for radar and communications systems. In addition to providing technical expertise and direction for DOD and DHS, he has chaired several high-level working groups. Dr. Jacyna and his team have also developed novel complexity-based algorithms for the analysis of Big Data problems associated with agent-based combat warfare simulation models and commercial/military spectrum management problems.

Chaitanya "Chet" Kanojia is founder and CEO of Starry, Inc., a Boston- and New York-based technology company focused on re-imagining and revolutionizing how consumers connect to the internet by developing an eco-system of products designed to make broadband access simple and affordable. Prior to Starry, Chet was the founder and CEO of Aereo, Inc., the groundbreaking online television platform that enabled consumers to record and watch live HD broadcast television on virtually any type of Internet-connected device via a cloud-based OTA antenna and DVR. Chet holds more than 31 patents in fields ranging from robotics to data communications systems and is an innovative leader known for pushing beyond the conventional and developing breakthrough solutions. Chet holds a master's degree in Computer Systems Engineering from Northeastern University in Boston and a bachelor's degree in Mechanical Engineering from the National Institute of Technology in Bhopal, India. He resides in Newton, Massachusetts with his wife and two children.

Tom Kidd is the Director of Strategic Spectrum Policy for the Department of the Navy. Before joining the Office of the Secretary of the Navy, Mr. Kidd served over 20 years in the United States Air Force. He completed DoD's Interservice Radio Frequency Management School; Naval Postgraduate School's Information Professional Senior Officer Course; Federal Executive Institute's Leadership for a Democratic Society; Georgetown University's Capitol Hill Workshop; and has a Bachelor of Science in Liberal Arts. Tom teaches Military Spectrum Management at the National Telecommunication and Information Administration and United States Telecommunications Training Institute Spectrum Management Courses. He served as Federal Agency Vice-Chairman of the Interdepartmental Radio Advisory Committee; United States delegate to United Nation's International Telecommunications Union World Radiocommunication Conference 2007, 2012, and 2015; and United States Spokesman at World Radiocommunication Conference 2012.

John Kim is Director of Technology Development at DISH Network where he is leading wireless standardization, regulatory and technology evaluation activities. Before joining DISH, John held engineering and product development positions at various companies, including Time Warner Cable, Clearwire, and Nextel. John holds a Ph. D. in Electrical Engineering at Georgia Institute of Technology.

Paul Kolodzy is currently an independent telecommunications consultant to commercial and Government clients. His areas of expertise include the development of advanced component, device, and system technology; advanced architectures; interference analysis; and spectrum policy, regulation and acquisition. Clients include start-up companies, large telecommunications service providers, equipment providers, and component developers. He has been active in broadcast; cellular; and public safety spectrum policy and regulation. Current research includes the development of interference metrics for communication systems, interoperability between wideband data systems and DTV signals within US TV spectra, physical limitations of current device technologies and impact for spectrum policy, and dynamic spectrum policy. Paul was formerly at Stevens Institute of Technology; Federal Communications Commission (FCC); Defense Advanced Projects Agency (DARPA); Lockheed Martin Sanders, and MIT Lincoln Laboratory. He participated in three National Research Council Studies on spectrum technology and access and cofounder of the IEEE DySPAN Symposium.

Jenshan Lin currently serves as a Program Director in NSF Electrical, Communications and Cyber Systems (ECCS) Division. He is also a Professor in the University of Florida. Previously, he worked for AT&T/Lucent Bell Laboratories and its spin-off Agere Systems from 1994 to 2003. His research area is RF circuits and systems, and the past research topics include biomedical radar, wireless power, wireless sensor systems, RFIC/MMIC for communications and sensing, high-speed circuits, and active integrated antennas. He has authored or co-authored over 260 technical publications in refereed journals and conference proceedings, and has 15 patents. Dr. Lin is a Fellow of IEEE, and recently served as the Editor-in-Chief of IEEE Transactions on Microwave Theory and Techniques in 2014-2016. He was the General Chair of 2008 RFIC Symposium and Technical Program Chair of 2009 Radio and Wireless Symposium.

Xiaoli Ma, IEEE Fellow, received the B.S. degree from Tsinghua University, China, in 1998, the M.S. degree from the University of Virginia, in 2000, and the Ph.D. degree from the University of Minnesota, in 2003. Since January 2006, she has been with the School of Electrical and Computer Engineering, Georgia Tech., where she is currently a Professor. Her research interests focus on wireless networking and communications, including transceiver designs for wireless channels, channel estimation and equalization algorithms, carrier frequency synchronization, and cooperative designs for wireless networks. Dr. Ma actively serves for society such as a Senior Area Editor for the IEEE SIGNAL PROCESSING LETTERS, Elsevier Digital Signal Processing, the IEEE TRANSACTIONS ON WIRELESS COMMUNICATIONS, and many IEEE/ACM conferences. Dr. Ma was a co-director for Georgia Tech Center of Excellence in UWB Technology (2012-2015). Dr. Ma is also co-founder of Ratrix Technologies, LLC, which focuses on realizing low-complexity wireless receivers.

Brian L. Mark has been on the faculty of George Mason University since 2000, where is currently Professor of Electrical and Computer Engineering and Acting Chair of the Department of Bioengineering. Prior to joining George Mason University, he was a Research Staff Member at NEC Laboratories America. He received the Ph.D. in Electrical Engineering from Princeton University in 1995 and the Bachelor of Applied Science in Computer Engineering with an option in Mathematics in 1991 from the University of Waterloo. His research interests lie in the design, modeling, and performance evaluation of communication systems and computer networks, with a focus on wireless networks. He received a National Science Foundation CAREER award in 2002. From 2006-2009, he served as an Associate Editor of IEEE Transactions on Vehicular Technology. He is a Member of the IFIP 7.3 Working Group on Computer System Modeling and a Senior Member of IEEE.

Hussein Moradi joined Idaho National Laboratory (INL) in November 2009 as chief wireless scientist for National &Homeland Security. He brings more than 30 years of experience in corporate research and development leadership. Dr. Moradi earned his doctorate and master's degrees from Southern Methodist University, Dallas Texas, and his bachelor's degree from University of Texas at Arlington. Dr. Moradi was a winner of a 2012 R&D 100 Award for his Wireless Spectrum Communication system innovation. As a recognized national thought leader in telecommunications; Dr. Moradi has authored more than 15 internationally peer-reviewed technical papers. He has been awarded 14 international patents and has three pending in wireless communications systems shaping the next generation wireless global standardization. Prior to joining INL, Dr. Moradi held director position for wireless research & development at Kyocera Wireless, VeriFone Inc. and NEC America, advancing state-of-the-art wireless devices.

Amir Mortazawi received the Ph.D. degree in electrical engineering from The University of Texas at Austin, in 1990. He is currently a Professor of electrical engineering with The University of Michigan at Ann Arbor. His research interests include microwave and millimeter-wave circuits, phased arrays, power amplifiers, ferroelectric thin film based devices and frequency-agile microwave circuits. Mortazawi was

the Editor-in-Chief for the IEEE TRANSACTIONS ON MICROWAVE THEORY AND TECHNIQUES from 2006-2010. He served on the IEEE Microwave Theory and Techniques Society (IEEE MTT-S) Administrative Committee (AdCom) for eight years. Mortazawi served as the Associate Editor for the IEEE TRANSACTIONS ON ANTENNAS AND PROPAGATION (1998–2001) and IEEE TRANSACTIONS ON MICROWAVE THEORY AND TECHNIQUES (2005). Mortazawi is a Fellow of IEEE.

Jeremy Muldavin received his BSE, MSE, and PhD Degrees from the Univeristy of Michigan, where he studied high-energy spin physics, nuclear and biomedical engineering, communications, electromagnetics, and radio frequency micro-electro-mechanical systems. He was worked at MIT Lincoln Laboratory since 2001 researching advanced microeloectronics, semiconductor fabrication, embedded systems, and open and distributed architectures, before taking an IPA assignment to ODASD(SE).

Krishna Narayanan is currently the Eric D. Rubin'06 professor of Electrical and Computer Engineering at Texas A&M University. His research interests are in the PHY and MAC layers of wireless communications and receiver signal processing. His current research projects include the design of uncoordinated multiple access schemes for IoT, interference-aware cooperation and relaying strategies in wireless networks, interference-resilient A/D and receiver front end design for cognitive radio, design of universal codes for multiple access, coding for optical communication, and exploring connections between sparse signal processing and coding. He currently serves as an associate editor for coding techniques for the IEEE Transactions on Information Theory and he has served in several editorial positions in the past. He was elected as Fellow of the IEEE for contributions to coding for wireless communications and data storage.

Bob Pavlak is a Senior Engineer in the Office of Engineering and Technology at the Federal Communications Commission, where he is supporting the agency's work on the efficient use of spectrum, including the development of new technical service rules for spectrum sharing and interference protection. He has also facilitated FCC Technological Advisory Council working group activities on topics such as spectrum management and receiver performance. Prior to the FCC, he managed the development of a variety of high capacity network wireless cellular systems at Bell Laboratories, and later at several start-up companies. He is a senior member of the IEEE and he has a BSEE degree from Rensselaer Polytechnic Institute and MS EECS from the University of California, Berkeley.

Alex Pidwerbetsky is an experienced researcher and project leader (Principal Investigator, Program Manager, and Technical Manager), currently working for LGS Innovations on projects in advanced communications and networking covering from HF to W-band and beyond. Most recently, he was the Principal Investigator for DARPA's Mobile Network MIMO Phase 1 and 1B Programs. He has extensive experience in modeling, data analysis, system analysis, simulation, and concept development and has also developed a number of models and simulations of propagation, scattering and system performance. He has 9 patents awarded in the area of wireless communications. His patents in the area of RFID are referenced in an additional 100+ patents. He holds a Ph.D. in Applied Physics from Cornell University.

Jeff Reed is the founder of Wireless @ Virginia Tech, and served as its Director until 2014. He is the Founding Faculty member of the Hume Center for National Security and Technology and co-founder of three companies, Cognitive Radio Technologies (CRT), Federated Wireless, and PFP Cybersecurity. Dr. Reed's many awards and achievements include: named an IEEE Fellow for contributions to software radio and communications signal processing and for leadership in engineering education; awarded the International Achievement Award by the Wireless Innovations Forum; served on the President's Council

of Advisors of Science and Technology Working Group that examine ways to transition federal spectrum to allow commercial use and improve economic activity, and CSMAC a group that provides advice to the NTIA on spectrum issues. His publications include the book, *Software Radio: A Modern Approach to Radio Design,* and his latest textbook *Cellular Communications: A Comprehensive and Practical Guide.*

Frank Sanders (BA Physics and Electrical Engineering, CU Boulder 1987) is a Senior Technical Fellow at the Institute for Telecommunication Sciences (ITS) in Boulder, Colorado. In his 38 years at the Institute, he has focused on spectrum occupancy, spectrum sharing and interference studies with emphasis on radar system involvement. He is a subject matter expert on radar system design, radar spectrum emissions and radar receiver sensitivity to interference. He is also a subject matter expert on the analysis and resolution of electromagnetic compatibility problems between systems, as well as on methodologies and best practices for monitoring and measuring spectrum usage by radio systems. He has authored or co-authored over 60 NTIA Technical Reports and related publications that are widely used, including primary authorship of ITU-R Recommendation M.1177, the international best-practices reference for measuring radar emissions for spectrum compliance purposes.

Craig Scott is a Senior Technology Analysist at Ofcom in the United Kingdom. He has been involved in Ofcom's efforts to improve RF performance through implementation of the new European Radio Equipment Directive. He has worked closely with industry sectors to facilitate standardization through the European Technical Standards Institute (ETSI), particularly in regards to receivers. Craig has 14 years of experience working in radio spectrum management and regulation. He has dealt with a wide range of regulatory issues including; forming spectrum policy, forming regulation, co-existence studies and band re-planning. He has been involved in the CEPT, European Standards Technical Institute, European Commission, International Telecommunication Union, Asia Pacific Telecommunity and the World Radio Conference.

Bob Schneider is the Technical Director of the DISA Defense Spectrum Organization (DSO). His prior assignment was as Chief of the DSO Spectrum Enterprise Systems Division where he was responsible for spectrum tools, services, GEMSIS, supporting databases and emerging spectrum technologies research. He has worked 27 years at the DSO, most of it within the Joint Spectrum Center (JSC) division, having completed a wide variety assignments and projects supporting virtually all of the organization's mission areas. Prior to joining the DSO, Bob worked for 10 years at the IIT Research Institute (IITRI), providing technical and project management support to DoD. Bob received a Masters in National Resource Strategy from National Defense University, Industrial College of the Armed Forces (ICAF), June 1996; a Masters in Engineering Administration, George Washington University, February 1988; and his BS in Electrical Engineering, Ohio University, August 1979.

Tony Soltyka is a Senior Principal Engineer at MITRE Corporation (FFRDC) in the Electronic System & Technologies Technical Center. Mr. Soltyka has over 33 years' experience with radar, communications, defense, and EW systems. Mr. Soltyka currently supports the DoD CIO Spectrum Directorate, NTIA, and DARPA research programs covering spectrum operations and spectrum management systems development. He has pursued technology development for electromagnetic spectrum sharing and co-existence across Commercial and Federal/DoD stakeholders. His background includes Radar and Communications systems development and test, and technology development for transmitters and receivers. He has contributed to key technology development programs of several Navy and Airforce radar systems Mr. Soltyka completed his M.S. Degree in Electrical Engineering in 1990, and a B.S. degree in E.E. in 1984. His career endeavors include Calspan, Technology Service Corporation, Loral, SAIC, and MITRE.

Rangam Subramanian has over 25 years of experience in Telecommunications both in and out of government. He is currently working at the National Telecommunications Information Administration (NTIA) as a Lead Technology and Spectrum Policy Strategist. Prior to joining the NTIA, Dr. Subramanian was the Chief of Technology and Business Strategy at the Idaho National Laboratory. Earlier in his career he worked at Alcatel-Lucent and Nokia Telecommunications in roles ranging from technology innovation and R&D to business strategy and international customer management. In 2012, Dr. Subramanian testified before Congress on, "Avoiding the Spectrum Crunch: Growing the Wireless Economy through Innovation". He is a co-chair for the NITRD Wireless Spectrum Sharing R&D (WSRD), Interagency Working Group (IWG). He received his MBA from the Kellogg School of Management, Northwestern University, and a PhD in Computer Science & Systems Engineering from Oakland University.

Thomas J. Taylor serves as the Deputy Director for Policy, Technology and EMS Operations for the Spectrum Policy and International Engagement Directorate within the Department of Defense (DoD)/Chief Information Officer (CIO). In this position, he is responsible for transforming DoD's capabilities in electromagnetic spectrum (EMS) use in order to ensure technology development can meet the Department's ever increasing demand for the EMS and improve DoD EMS operations. His responsibilities include oversight of the DoD EMS Strategy, development of the Strategy's Roadmap and Action Plan, the development of a DoD EMS Technology Roadmap, directing the activities for DoD in the National Advanced Spectrum and Communications Test Network (NASCTN) inter-agency partnership, and overseeing the Spectrum Access R&D Program in coordination with the National Spectrum Consortium, as well as many other innovative programs.

Robert Weller is Vice President for Spectrum Policy at the National Association of Broadcasters (NAB) where he is responsible for developing and implementing spectrum policy. Previously, Mr. Weller served in a number of technical and management roles at the Federal Communications Commission (FCC) and as an engineering consultant to the telecommunications industry. He played lead roles in the development of rules and policies pertaining to spectrum sharing, such as the television white spaces and modernization of interference analysis software. As a senior consulting engineer he advised clients on the regulated use of radio and designed broadcast, satellite, and wireless facilities to technically implement their business plans. He also provided expert assistance to local governments to implement provisions of the Telecommunications Act of 1996 among other things. Mr. Weller earned his Master's Degree in Electromagnetics from The George Washington University and his undergraduate degree in Electrical Engineering and Computer Science from the University of California at Berkeley.

Donald Witters is a senior Biomedical Engineer/Regulatory Review Scientist in the Office of Science and Engineering Laboratories, CDRH. He has over 40 years of experience in the areas of medical devices electromagnetic compatibility (EMC), device wireless technology, and microwave calibration. He performs regulatory review for EMC and wireless medical devices, performs and publishes laboratory research, and is an FDA technical expert liaison for national and international standards addressing EMC of active medical devices such as implantable cardiac pacemakers, neuro-stimulators, and powered wheelchairs. Mr. Witters is the primary author of the FDA Guidance for RF Wireless Medical Devices and the guidance for EMC information in regulatory submission. He chairs the CDRH EMC and wireless working group and is co-chair of the Association for the Advancement of Medical Instrumentation (AAMI) working group SM/WG-06 on Wireless Medical Device Coexistence. The AAMI group just published the Technical Information Report AAMI TIR69:2017: Risk management of radio-frequency wireless coexistence for medical devices and systems.