Monday, 25 September 2017 11:00-17:30

W10: Innovations in Sustainable Spectrum Management for 5G and Beyond

Sustainable spectrum management is an emerging multi-disciplinary field of research with a long-term vision towards agile spectrum assignment and real-time monetization, assisted by the use of spectrum intelligence. Organized by the Communications Research Centre (CRC), Government of Canada, the objective of this one-day workshop is to share and discuss different views on how technology innovations to support agile spectrum assignment could impact and evolve the regulatory vision towards sustainable spectrum management, and how regulatory changes may drive technology innovations in this domain. Comprising a series of keynote talks and a panel, this workshop will bring together prominent leaders who are influencing the direction of future spectrum management, to examine and debate the way forward, as we move into 5G and beyond.

For researchers attending VTC2017-Fall, this workshop will provide forward looking views of the wireless ecosystem stakeholders towards the realization of agile spectrum assignment, with an emphasis on the interdisciplinary research in spectrum monitoring, data science and spectrum monetization. For all participants, this workshop additionally provides a unique forum to obtain the broad perspective of wireless ecosystem stakeholders with respect to the future of spectrum management.

Organizer:
Shalini Periyalwar, CRC, Govt. of Canada
Technical Program Committee:
John Lodge, CRC, Govt. of Canada
Louise Lamont, CRC, Govt. of Canada
Veena Rawat, GSMA
Cindy-Lee Cook, Govt. of Canada
Michael Christensen, Govt. of Canada
Halim Yanikomeroglu, Carleton University, Canada

Program

Monday, 25 September 2017 11:00-12:30

1 Next Generation Spectrum Management
Philip Marnick, OFCOM

Current Advances in Spectrum Management – Views on Spectrum Sharing Technologies

2 Spectrum Sharing in Action: An Update on CBRS and Beyond
Lee Pucker, WINNFORUM

3 Multi-RAT Coordination Challenges
Kumar Balachandran, Ericsson

Monday, 25 September 2017 14:00-15:30

Future Spectrum Management - Spectrum Monitoring and Research Platforms

4 DARPA's Spectrum Collaboration Challenge
Paul Tilghman, DARPA

5 Data Science to Support Spectrum Management
Michael Cotton, NTIA

6 A Cloud-Based, Low-Cost Spectrum Monitoring Solution
Nelson Costa, Cognitive Systems

Monday, 25 September 2017 16:00-16:30

Panel Session

Moderator: Shalini Periyalwar, CRC
Panelists: Philip Marnick, Lee Pucker, Kumar Balachandran, Paul Tilghman, Michael Cotton, Nelson Costa, Yvo de Jong, Mathieu Gemme

Monday, 25 September 2017 16:30-17:30

Future Spectrum Management – Regulator Views

7 Innovations in Sustainable Spectrum Management
Yvo de Jong, CRC, Government of Canada

8 Spectrum Management 2.0
Mathieu Gemme, Spectrum and Telecommunications Sector, Government of Canada

Speakers

Philip Marnick is Group Director, Spectrum at Ofcom, where he is responsible for setting and implementing the strategy for managing spectrum including clearing, awarding, licensing, monitoring and enforcement. Philip is also Chairman of the EU's Radio Spectrum Policy Group (RSPG) bringing together all the EU's national spectrum authorities and the Commission. Philip has over 30 years' experience within the wireless communications industry. He has held senior executive positions covering technology, operations and strategy. Philip has worked in both start-ups (from initial concept to sale) and large corporates in companies ranging from UK Broadband, O2, Orange, BT, J-Phone in Japan (now Softbank Mobile), Extreme Mobile and SpinVox (now Nuance).

Lee Pucker is the Chief Executive Officer of The Wireless Innovation Forum, a non-profit "mutual benefit" organization dedicated to advancing technologies supporting the innovative utilization of spectrum and the development of wireless communications systems, including essential or critical communications systems. Prior to joining the Forum, Lee spent 25 years in the development, management, marketing and production of embedded signal processing and advanced wireless systems in organizations that include Spectrum Signal Processing, Stanford Telecom, and Nichols Research Corporation. Lee is the named inventor on multiple patents, holds a Bachelor of Science degree in Electrical Engineering from the University of Illinois, a Master of Science Degree from The Johns Hopkins University and is a certified Project Management Professional.

Kumar Balachandran has twenty-five years of professional experience in the wireless industry in radio systems engineering, algorithm development and performance evaluation. He holds an Bachelor's degree with honors in Electronics and Communications Engineering from Tiruchi, India, and completed his masters and doctorate in Computer and Systems Engineering from Rensselaer Polytechnic Institute in Troy, NY. He has been with Ericsson Research since 1995 and currently holds the position of Principal Researcher. Kumar's work has focused on "radio access concepts and performance," in areas such as spectrum policy, coexistence analysis, receiver design, algorithm development, performance analysis, spectrum flexibility, and research on millimeter wave systems. He has worked on all generations of mobile networks, and has extensive experience on infrastructure and terminals. His current focus has been in dynamic spectrum access, M2M and fifth generation wireless architectures. He was active in pre-standardization research studies that have led up to Ericsson's standards activities on NR for 5G, including work on extreme mobile broadband in centimeter and millimeter waves. Kumar is prominent in technical outreach to the Federal Communications Commission on spectrum matters, and has previously participated in the Commerce Spectrum Management Advisory Committee (CSMAC) to the NTIA. He is also a delegate to the Spectrum Sharing Committee of the WInnForum and participates in the CBRS Alliance, where standardization of the Citizen's Broadband Radio Service (CBRS) is proceeding. Until 2016, he served on

the FCC Technological Advisory Council and contributed to working groups on Advanced Spectrum Sharing topics and Future Game Changing Technologies respectively. He is an active inventor, well published, and has contributed to several books. He is a frequent keynote speaker and panelist at conferences.

Paul Tilghman joined the Defense Advanced Research Projects Agency (DARPA) in December 2014. His research interests focus on intelligent and adaptive RF systems which combine digital signal processing, AI, and machine learning to allow autonomy in fields like wireless communications, radar, and electronic warfare. Prior to joining DARPA Mr. Tilghman was a senior research engineer at Lockheed Martin's Advanced Technology Laboratories where he led programs in adaptive electronic warfare, signals intelligence, and non-cooperative geolocation. He is a prior recipient of Lockheed Martin's highest award, the NOVA award. Mr. Tilghman received his B.S. in Computer Engineering from Rochester Institute of Technology and his M.S. in Electrical Engineering from Drexel University.

Michael Cotton is Division Chief of the Telecommunications Theory Division and program leader of NTIA's Spectrum Monitoring Program at the Institute for Telecommunication Sciences in Boulder, Colorado. Michael joined NTIA/ITS in 1992. He has been involved in a broad range of research topics including applied electromagnetics, atmospheric effects on radiowave propagation, radio channel measurement and theory, interference effects on digital receivers, ultrawideband technologies, spectrum sharing with Federal systems, and spectrum occupancy measurements. Michael has received DOC Gold Medal Awards for research and engineering achievement in the development of national policies for UWB technologies in 2002 and 3.5 GHz spectrum sharing in 2015. In 2010 and 2011, Mr. Cotton was the General Chair for the International Symposium on Advanced Radio Technologies (ISART) on Developing Forward-Thinking Rules and Processes to Fully Exploit Spectrum Resources. Michael has authored or co–authored over thirty technical publications. He received a B.S. degree in Aerospace Engineering in 1992 and an M.S. degree in Electrical Engineering with an emphasis on electromagnetics in 1999, both from the University of Colorado at Boulder.

Dr. Nelson Costa is a Solution Architect for Spectrum Analytics at Cognitive Systems Corp. in Waterloo. He helps to define Cognitive's suite of spectrum analytics tools. Nelson has over 17 years' experience in wireless. He holds a Ph.D in Electrical Engineering from McMaster University in the area of wideband MIMO channel modeling. He completed his studies under the supervision of Simon Haykin. During his graduate work, he was involved in completing the world's first 16x16 narrowband radiometer, and constructing one of the world's first 4x4 wideband SDR, which was subsequently used in extensive outdoor measurement campaigns. Since then, Nelson has played key roles at Accipiter Radar, BlackBerry, and now at Cognitive Systems. He is the author of the textbook "Multiple-Input, Multiple-Output Channel Models: Theory and Practice", from Wiley.

Mathieu Gemme is the Business Lead for the Promoting Regulatory Innovation in Spectrum Management (PRISM) project initiative with Innovation, Science and Economic Development Canada. Over the past 10 years, he has been involved in various activities within the Department's Spectrum Management Program including the Communication Research Centre's Spectrum Environment Awareness program, spectrum policy development, auctions, and operations. In his current role, he is part of the team responsible for transforming spectrum management in Canada to a sustainable model to prepare Canada for the introduction of 5G and other new technologies. He holds a Bachelor's degree in Administration from Concordia University.