

WTS 2023

Wireless Telecommunications Symposium 2023

Global Wireless Communications: Now and in the Future

April 18 - 21, 2023



California State Polytechnic University, Pomona

WELCOME TO WTS 2023

Welcome to the twenty-second annual Wireless Telecommunications Symposium, WTS 2023, “Global Wireless Communications: Now and in the Future.” We hope that WTS 2023 will be a stimulating and rewarding experience for you. During the next three days of invited speakers’ presentations, accepted paper sessions, panel discussions and tutorial, WTS 2023 will explore a wide range of multidisciplinary wireless communications, mobile computing, and related topics in depth.

The WTS 2023 Technical Program Committee received paper submissions from authors around the world, covering a wide area of topics. We thank all the authors who submitted papers and proposals to WTS 2023, the many reviewers who reviewed them, and the co-chairs, track chairs and technical program committee members for coordinating the paper and proposal evaluation and selection process. We also thank the WTS support personnel for their tireless efforts and contributions behind the scene. Producing an event like WTS 2023 is not an easy task, and they did a masterful job. In addition, the WTS Committee is grateful to the IEEE Communications Society, and its Communications & Information Security Technical Committees for their technical support for WTS 2023, and to the distinguished invited speakers representing the global wireless telecommunications industry for having taken time to participate in the conference and help us organize it.

Many organizations have contributed to the conference or lent it financial support. Notable among the contributors and donors are Cal Poly Pomona’s College of Business Administration and College of Engineering, Cal Poly Pomona’s Computer Information Systems, Electrical & Computer Engineering, and the IEEE Xplore Digital Library Group.

Finally, special thanks go to the members of the WTS Committee who spent many hours over the past couple of months organizing WTS 2023, the third virtual conference in the history of WTS.

On behalf of the WTS 2023 Committee -- Welcome to WTS 2023!

Dr. Steven Powell, WTS General Chair

Dr. Thomas Ketseoglou, WTS Assistant Chair

WTS 2023 Program April 18-21, 2023

WTS 2023 Program April 18-21, 2023
(As of April 3, 2023)

Tuesday, April 18	
6:00 pm – 9:00 pm	WTS Organizers' Reception & Meeting
Wednesday, April 19	
8:00 am – 9:00 am	Registration
9:15 am – 9:30 am	Welcoming Remarks
9:30 am – 10:15 am	“Will ChatGPT and AI change telecoms?” Dr. William Webb Chief Technology Officer, Access Partnership
10:15 am – 10:30 am	Break
10:30 am – 11:15 am	Dr. Manzoor Khan Head of Autonomous Systems Research Department Software and Data Systems Research, Nokia Bell Labs
11:15 am – 12:00 pm	Dr. Henning Schulzrinne Julian Clarence Levi Professor of Computer Science, Columbia University
12:00 pm – 2:00 pm	Lunch

2:00 pm – 2:45 pm	Dr. Vincent W. S. Chan Joan and Irwin Jacobs Professor of EECS, MIT
2:45 pm – 3:00 pm	Break
3:00 pm – 3:45 pm	“Teleportation: Quantum Communication for a Quantum Internet” Dr. Jeffrey Shapiro Julius A. Stratton Professor of EECS, MIT
3:45 pm – 5:15 pm	Panel Discussion: Current Topics in Wireless Communications & Security Moderator: Dr. Qing-An Zeng , North Carolina Agricultural & Technical State University Dr. Tamer Omar , California State Polytechnic University, Pomona Dr. Carlos Navarrete , California State Polytechnic University, Pomona Dr. Upkar Varshney , Georgia State University
5:15 pm – 5:45 pm	Poster Paper Session
6:00 pm – 9:00 pm	Welcoming Reception & Dinner WTS Organizers Recognition Ceremony
Thursday, April 20	
9:15 am – 10:00 am	“Solutions for end-to-end security in heterogenous 5G networks” Prof. Dr. Pejanović-Djurišić Former United Nations Ambassador/Permanent Representative from Montenegro Professor in Telecommunications and Wireless Communications, University of Montenegro
10:00 am – 10:15 am	Break

10:15 am – 11:00 am	"Broadband Connectivity in Digital Age; Necessity, Availability, and Pursuit of Ubiquity" Dr. Habib Riazi Spectrum, Technology, and Wireless Management Consultant
11:00 am – 11:45 am	"Enhanced Pseudonym Changing in VANETs: How Privacy is Impacted Using Factitious Beacons" Junchao Wang, Dr. Yan Sun and Dr. Chris Phillips (Queen Mary University of London, United Kingdom (Great Britain))
11:45 am - 1:15 pm	Lunch
1:30 pm – 5:30 pm	Tour of MIT and Labs (Limited to 40 People)
Friday, April 21 (On-Site)	
8:00 am – 10:00 am	Paper Presentation Session (I)
10:00 am – 10:20 am	Break
10:20 am – 11:40 pm	Paper Presentation Session (II)
11:40 pm – 1:00 pm	Lunch Best Paper Awards Ceremony
1:00 pm – 3:00 pm	Paper Presentation Session (III)
3:00 pm –	Break

3:20
pm

3:20
pm –
5:20
pm

Paper Presentation Session (IV)

WTS 2023 Paper Presentation Program (as of March 28, 2023)

Wednesday, April 19

4:30
pm –
5:00
pm

Doctoral Students' Session

1570881140 *Enhanced Pseudonym Changing in VANETs: How Privacy is Impacted Using Factitious Beacons*

Junchao Wang, Yan Sun and Chris Phillips (Queen Mary University of London, United Kingdom (Great Britain))
IEEE Xplore

5:00
pm –
5:30
pm

Poster Paper Session

Cooperative Jamming for Implantable Medical Device Security

K. Lytle, T. Talty, A. Michaels, and J. Reed
Virginia Polytechnic Institute and State University

Splitting-Load Inductive Peaking LNA with Noise Cancellation

Yu-Chen Cheng, Chih-Feng Yang and Hsiao-Chin Chen
National Taiwan University of Science and Technology

A Case Study of 5G Spectrum Combinatorial Clock Auction in Korea

Deok-Joo Lee and Donghyun An
Dept. of Industrial Engineering, Seoul National University,

Friday, April 21

Paper Presentation Session I

1570882267 *An Efficient Fast Walsh-Hadamard Transform Based OFDM-IM Scheme with Lower PAPR*

Yuhao Lian (CQUPT, China); Mingjun Ying, Shuyu Wang and Yuhua Wang (Chongqing University of Posts and Telecommunications, China
IEEE Xplore

1570844157 *Performance Analysis of Large Intelligent Surfaces with Phase Estimation Error*

Mridul Saraogi, Sabyasachi Bhattacharyya and G Aruna (Indian Institute of Information Technology Guwahati, India); Ehsan Sheybani (University of South Florida, USA)

IJMNDI

1570878901 *Concurrent Transmitting LiDAR Sensor with Bipolar Optical Codes*

Gunzung Kim, Jeongsook Eom and YongWan Park (Yeungnam University, Korea (South))

IEEE Xplore

8:00
am –
10:00
am

1570878902 *Auto-focusing LiDAR Sensor based on Optical Orthogonal Frequency Division Multiplexing* Jeongsook Eom, Gunzung Kim and YongWan Park (Yeungnam University, Korea (South))

IJMNDI

1570887215 *Valuation of 5G Spectrum in Korea Using Real option* Deok-joo Lee and Donghyun An (Seoul National University, Korea (South))

IJMNDI

1570878056 *A comparison of power allocation mechanisms for 5G D2D mobile communication networks*

Dimitris Georgiadis (Harokopio University of Athens, Greece)

IEEE Xplore

1570877649 *Towards Generating True Random Numbers using Magnetoresistive RAM*

Julian Dreyer (University of Applied Sciences Osnabrueck, Germany); Ralf Tönjes (University of Applied Sciences Osnabrück, Germany); Nils Aschenbruck (Osnabrück University, Germany)

IEEE Xplore

10:00
am –
10:20
am

Break

Paper Presentation Session II

1570879545 *Elbow estimation -based source enumeration method for LPI/LPD signals*

Risto Sarjonen (VTT Technical Research Centre of Finland, Finland);
Marko Höyhtyä (VTT Technical Research Centre of Finland Ltd, Finland
IEEE Xplore

1570879537 *Novel Bluetooth 5.1 location services for indoor asset tracking using multilateration*

Miguel Roque Soares, Tiago Rocha, Duarte Oliver and Vânia Guimarães
(Fraunhofer Portugal AICOS, Portugal); Ricardo Santos (Associação
Fraunhofer Portugal Research & FCT NOVA, Portugal)

10:20
am –
11:40
am

IJMNDI

1570883064 *LEAST: a Low-Energy Adaptive Scalable Tree-based routing protocol for Wireless Sensor Network*

Amirmohammad Farzaneh, Mihai-Alin Badiu and Justin P Coon
(University of Oxford, United Kingdom (Great Britain))

IJMNDI

1570883156 *Transceiver Design in Dynamic TDD with Reduced-Rank MIMO Interference Channels*

Amel Tibhirt and Dirk Slock (EURECOM, France); Yi Yuan-Wu (Orange
Labs, France)

IJMNDI

11:40
am –
1:00
pm

Lunch
Best Paper Awards Ceremony

1:00
pm –
3:00
pm

Paper Presentation Session III

1570879366 *VLC Indoor Positioning Using RFR and SVM Reduced Features Machine Learning Techniques*

Affan Affan (University of Louisville, USA); Hafiz Asif and Naser

Tarhuni (Sultan Qaboos University, Oman) IEEE Xplore

1570878798 *BER Analysis of Cross-QAM Uncoded Space-Time Labeling Diversity with Three Transmit Antennas in Nakagami-m Fading Channels*

Dauda Olayinka Ayanda (Sidia Institute of Science and Technology, Brazil); Marcello G. Costa (Instituto Tecnológico de Aeronáutica, Brazil); Bruno Sátiro Silva and Dércio M. Mate (SIDIA Institute of Science and Technology, Brazil); Shaheen Solwa (University of KwaZulu-Natal, South Africa)

IEEE Xplore

1570879632 *Demonstration of Open Radio Access Network Intelligent Controllers*

Paulo Ricardo Branco da Silva (Instituto Tecnológico de Aeronáutica & CPQD, Brazil); Michelle Soares Pereira Facina (State University of Campinas, Brazil); Eduardo Melao (Federal University of Juiz de Fora, Brazil); Luiz Henrique Martani e Silva, João Paulo Sales Henriques Lima and Vitalii Afanasiev (CPQD, Brazil)

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1570883159 *Analysis of Resource Allocation Algorithms in OFDMA Systems*

Alex Rosa (SiDi, Brazil); Daniely Gomes Silva and Mariana Mello (Inatel, Brazil); Rausley Adriano Amaral de Souza (National Institute of Telecommunications (INATEL), Brazil); Luciano Leonel Mendes (Inatel, Brazil)

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1570870910 *Towards 5G Zero Trusted Air Interface Architecture*

Sheng Sun and Morris Repeta (Dell Technologies, Canada); Michael Healy (Dell Technologies & Dell Technologies, Inc., USA); Vishwamitra Nandlall (Dell, USA); Eddy Fung (Dell Technologies, Canada); Chris Thomas (Dell Technologies, USA)

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1570878971 *Unsupervised Primary-Secondary User Identification Using DTW and DFW in Dynamic Wireless Environments*

Stephen G. Miller and Paul M Kump (ArrowSlate, USA)

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1570879232 *Encryption-Aware PHY Security for Wiretap Channels with Multiple Jammers*

Tarig Sadig (The University of Akron, USA); Mehdi Maleki (The University of Akron, USA); Nghi H Tran (University of Akron, USA); Hamid Reza Bahrami (The University of Akron, USA)

	IEEE Xplore
2:10 pm – 2:30 pm	Break
	<p>Paper Presentation Session IV</p> <p>1570877891 <i>Performance Analysis of Commercial Standalone Private 5GC using UE and gNB Emulator</i> Mugahed Izzeldin Osman (University of Utah & Celona Inc., USA); Lyutianyang Zhang (University of Washington, USA); Vanlin Sathya (University of Chicago, USA); Mohit Goyal (University of the Cumberlands, USA & Celona Inc, USA); Mehmet Yavuz (Celona, USA) IJMNDI</p> <p>1570883131 <i>Federated/Deep Learning in UAV Networks for Wildfire Surveillance</i> Ahmed I ElHoffy (California State University - Long Beach, USA); Sean (Seok-Chul) Kwon and Hen-Geul Yeh (California State University Long Beach, USA) IEEE Xplore</p> <p>3:20 pm – 5:20 pm</p> <p>1570879647 <i>Methods of Automating Power Swapping Mechanisms for Extending UAV Flight Missions</i> Christopher Lai, Minh Tri Chau, Ryan Thai, Sandor Souvannakoumane, Chathurya Watagoda, Kaye Oda, Shanthi Robinson and Gabriel Gourmet Razungles (California State Polytechnic University Pomona, USA); Steven Dobbs and Zhen Yu (California State Polytechnic University at Pomona, USA); Maggie Hoang (California State Polytechnic University Pomona, USA) IEEE Xplore</p> <p>1570884572 <i>Demonstration of Wireless Synchronization Methods in Autonomously Controlled Fleet of Drones</i> Christopher Lai (California State Polytechnic University Pomona, USA); Harris Song (Walnut High School, USA); Aaron Madrigal (California State Polytechnic University Pomona, USA); Michael Youssef (California State Polytechnic University, Pomona, USA); Borick Lieng, Mohamed Hamida, Quyen Tran, Phu Ngo and Bethany Chang (California State Polytechnic University Pomona, USA); Steven Dobbs and Zhen Yu (California State Polytechnic University at Pomona, USA) IJMNDI</p> <p>1570879325 <i>Implementation and Investigation of High Endurance UAVs</i></p>

in a 4G LTE Network for Monitoring Powerlines

Shadman Ahmed and Do Gyu Lee (California State Polytechnic University, Pomona, USA); Jimmy Vong and Matthew Cha (California State Polytechnic University Pomona, USA); Steven Dobbs and Zhen Yu (California State Polytechnic University at Pomona, USA)
IEEE Xplore

1570880136 *Deployable 5G Emergency Network using SDRs*

Tamer Omar (California State Polytechnic University - Pomona, USA);
Adrien Placentia (Cal Poly Pomona, USA)
IJMNDI

Speaker Biographies

Vincent W. S. Chan, the Joan and Irwin Jacobs Professor of EECS, MIT, received his BS(71), MS(71), EE(72), and Ph.D.(74) degrees in EE all from MIT. From 1974 to 1977, he was an assistant professor, EE, at Cornell University. He joined MIT Lincoln Laboratory in 1977 and had been Division Head of the Communications and Information Technology Division until becoming the Director of the Laboratory for Information and Decision Systems (1999–2007). He is currently a member of the Claude E. Shannon Communication and Network Group at the Research Laboratory of Electronics of MIT.

In July 1983, he initiated the Laser Intersatellite Transmission Experiment Program and in 1997, the follow-on GeoLITE Program. In 1989, he formed the All-Optical-Network Consortium among MIT, AT&T and DEC. He also formed and served as PI the Next Generation Internet Consortium, ONRAMP among AT&T, Cabletron, MIT, Nortel and JDS, and a Satellite Networking Research Consortium formed between MIT, Motorola, Teledesic and Globalstar. He has served in many US/non-US government advisory boards/committees and the Board of Governors of the Communication Society including VP of Publications. He also has been active with several start-ups and was a director of a Fortune-500 company and chaired its technical advisory board. He is a Member of the Corporation of Draper Laboratory and is a member of Eta-Kappa-Nu, Tau-Beta-Pi and Sigma-Xi, and the Fellow of the IEEE and the Optical Society of America. He is currently the Chair of the Strategic Planning Committee and the Past President of the IEEE Communication Society.

Throughout his career, Professor Chan has spent his research focus on communication and networks, particularly on free space and fiber optical communication and networks and satellite communications. His work has led the way to a successful laser communication demonstration in space and early deployment of WDM optical networks. His recent research emphasis is on algorithmically-optimized heterogeneous network architectures with stringent performance demands.

Manzoor Khan is head of Autonomous Systems Research Department at Software and Data Systems Research, Nokia Bell Labs, Murray Hill, USA. Prior to joining Nokia Bell Labs, Dr. Khan served as head of Connected and Autonomous Mobility research group at Emirates Center of Mobility Research Center and Assistant Professor at Collage of Computer & Network Engineering, Collage of IT, UAEU. He has also served as the Research Director, Director of Network and Mobility Competence Center, and Privatdozent at Distributed Artificial Intelligence Laboratory of Technical University Berlin, Germany. He led various large and medium scale R&D projects in Europe and UAE. Amongst others he served as the technical lead of one of Germany's flagship research projects towards autonomous driving in Berlin. He was country (Germany)trial site leader for an EU large-scale project focusing on Intelligent vehicles and smart communication. He led various large scale industry research projects on the topics of autonomous network management and intelligent mobility. He also served in key roles in various EU, EIT-Digital, Celtic Next research activities. Dr. Khan's research interests include implanting intelligence in future mobile networks, AI/ML enabled services for different verticals, Quality of Experience, and User-centric networks. He has been involved in designing and development of large-scale demonstrators. Dr. Khan is the recipient of several best paper awards and appreciation certificates. He is the author of several scientific publications including conference papers, journal articles, and book chapters.

Prof.dr Milica Pejanović-Djurišić is former Ambassador/Permanent Representative of Montenegro to UN. She served as Minister of Defence in the Government of Montenegro from March 2012 to November 2016. Previously, she had various diplomatic and political engagements working at strengthening the stability and security in the Western Balkan Region. With the PhD in Telecommunication Engineering, Milica Pejanović-Djurišić has continuously pursued her academic carrier, being full professor in Telecommunications and Wireless Communications at the Faculty of Electrical Engineering, University of Montenegro. Prof. Pejanović-Djurišić's role in fostering digital transformation of Montenegro and the region has been widely recognized, through a number of initiatives

focusing on development and deployment of info-communication infrastructures and applications. She has also achieved significant research results that have been published in over 200 scientific papers in international journals and at international conferences, as well as in three books, and she has been leading and coordinating many international and national research projects. She also has considerable industry experience being President of the Board of „Telekom Montenegro“ (1999-2002), as well as President of the Board of the first Montenegrin Internet provider (2001-2002). She has been working as a consultant in the field of telecommunications, being engaged as an expert for European Commission, ITU and participating in a number of global professional associations and initiatives in the field of info-communication technologies.

Dr. Habib Riazi has been a contributor to the telecom industry for more than 30 years. He has been the RF and Systems Engineering Director at Corning Optical Communications Wireless Ltd, a major manufacturer of active Distributed Antenna System (DAS). His previous tenure includes positions at both wireless service providers and equipment manufacturers. Prior to Corning, Habib was the Technology Strategist at Nextel, Sprint, and Clearwire, where he was responsible for assessing and recommending Radio Access Technology and products for network deployment. Prior to Nextel, he led the team for system design and simulation of the Satellite Digital Audio Receiver, now a commercially available product, at Bell Labs Advanced Technologies. Prior to Bell Labs, Habib served as the Radio Access Network Manager for Verizon for one of the first CDMA commercial network deployments. Habib did doctoral studies in Electrical Engineering at the George Washington University in Washington DC. He is a life senior member of IEEE ComSoc, a registered Professional Engineer in the state of Virginia, has served on Virginia State University Industrial Advisory Board, and holds a number of US and EU patents.

Prof. Henning Schulzrinne is Julian Clarence Levi Professor of Computer Science at Columbia University and former Chief Technology Officer at the US Federal Communications Commission (FCC). He is co-author of the Real-Time Protocol (RTP) for real-time Internet services, the signaling protocol for Internet multimedia conferences and telephony (SIP) and the stream control protocol for Internet media-on-demand (RTSP).

Prof. Schulzrinne received his undergraduate degree in economics and electrical engineering from the Darmstadt University of Technology, Germany, his MSEE degree as a Fulbright scholar from the University of

Cincinnati, Ohio and his Ph.D. from the University of Massachusetts in Amherst, Massachusetts. He was a member of technical staff at AT&T Bell Laboratories, Murray Hill and an associate department head at GMD-Fokus (Berlin), before joining the Computer Science and Electrical Engineering departments at Columbia University, New York. From 2004 to 2009, he served as chair of the Department of Computer Science, and Engineering Fellow, Technology Advisor and Chief Technology Officer at the US Federal Communications Commission (FCC) from 2010 to 2017.

He is editor of the "Computer Communications Journal", the "ACM Transactions on Multimedia Computing", the "ComSoc Surveys & Tutorials" and a former editor of the "IEEE Transactions on Image Processing", "Journal of Communications and Networks", "IEEE/ACM Transactions on Networking" and the "IEEE Internet Computing Magazine".

He has been a member of the Board of Governors of the IEEE Communications Society and is vice chair of ACM SIGCOMM, former chair of the IEEE Communications Society Technical Committees on Computer Communications and the Internet and has been technical program chair of Global Internet, IEEE Infocom 2000, ACM NOSSDAV, IEEE IM, IPTComm 2008, IFIP Networking 2009 and IPTel and general co-Chair of ACM Multimedia 2004 and ICNP 2009. He serves on the Internet2 Applications, Middleware and Services Advisory Council and has led a working group in the NSF GENI project. He also has been a member of the IAB (Internet Architecture Board). He serves on a number of conference and journal steering committees, including for the IEEE/ACM Transactions on Networking.

Prof. Schulzrinne has published more than 250 journal and conference papers, and more than 70 Internet RFCs. Protocols co-developed by him are now Internet standards, used by almost all Internet telephony and multimedia applications. His research interests include Internet multimedia systems, quality of service, and performance evaluation.

He served as Chief Scientist for FirstHand Technologies and Chief Scientific Advisor for Ubiquity Software Corporation. He is a Fellow of the IEEE, has received the New York City Mayor's Award for Excellence in Science and Technology, the VON Pioneer Award, TCCC service award and the IEEE Region 1 William Terry Award for Lifetime Distinguished Service to IEEE.

Professor Jeffrey H. Shapiro is the former Director of the Research Laboratory of Electronics (RLE) at the Massachusetts Institute of Technology (MIT). He received the S.B., S.M., E.E., and Ph.D. degrees in Electrical Engineering from MIT in 1967, 1968, 1969, and 1970, respectively. As a graduate student he was a National Science Foundation Fellow, a Teaching Assistant, and a Fannie and John Hertz Foundation Fellow. His doctoral research was a theoretical study of adaptive techniques for improved optical communication through atmospheric turbulence.

From 1970 to 1973, Dr. Shapiro was an Assistant Professor of Electrical Sciences and Applied Physics at Case Western Reserve University. From 1973 to 1985, he was an Associate Professor of Electrical Engineering at MIT, and in 1985, he was promoted to Professor of Electrical Engineering.

From 1989 until 1999 Dr. Shapiro served as Associate Department Head of MIT's Department of Electrical Engineering and Computer Science. In 1999 he became the Julius A. Stratton Professor of Electrical Engineering. From 2001 until 2011 Dr. Shapiro served as Director of RLE.

From 2007 through 2011 Dr. Shapiro served as Co-Director of the W.M. Keck Foundation Center for Extreme Quantum Information Theory (xQIT). He is presently Co-Director of the NSF IGERT Program "Interdisciplinary Quantum Information Science and Engineering (iQuISE)".

Dr. Shapiro's research interests have centered on the application of communication theory to optical systems. He is best known for his work on the generation, detection, and application of squeezed-state light beams, but he has also published extensively in the areas of atmospheric optical communication, coherent laser radar, and quantum information science.

Dr. Shapiro is a fellow of the Institute of Electrical and Electronics Engineers, of the Optical Society of America, of the American Physical Society, and of the Institute of Physics, and he is a member of SPIE (The International Society for Optical Engineering). He has been an Associate Editor of the IEEE Transactions on Information Theory and the Journal of the Optical Society of America, and was the Principal Organizer of the Sixth International Conference on Quantum Communication, Measurement and Computing (QCMC'02).

In 2008 Dr. Shapiro was co-recipient of the Quantum Electronics Award from the IEEE Lasers and Electro-Optics Society (now the IEEE Photonics Society), and he received the Quantum Communication Award for Theoretical Research from Tamagawa University.

William Webb is one of the world's leading wireless communications experts. William is Chief Technology Officer, Access Partnership. He was one of the founding directors of Neul, a company developing machine-to-machine technologies and networks, which was formed at the start of 2011 and subsequently sold to Huawei and became CEO of the Weightless SIG, a body standardizing IoT technology. Prior to this William was a Director at Ofcom where he managed a team providing technical advice and performing research. He has worked for a range of communications consultancies and spent three years providing strategic management across Motorola's entire communications portfolio, based in Chicago. He was IET President 2014-2015.

William has published 17 books, 100 papers, and 18 patents. He is a Visiting Professor at Southampton University, a Fellow of the Royal Academy of Engineering, the IEEE and the IET. He has been awarded multiple honorary doctorates by the UK's leading universities and in 2018 was awarded the IET's prestigious Mounbatten Medal for technology entrepreneurship. William has a first class honours degree in electronics, a PhD and an MBA.

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Neetu Singh, University of Illinois Springfield
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Hengky Susanto, Hong Kong University of Science and Technology
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