

WTS 2022

Wireless Telecommunications Symposium 2022

Global Wireless Communications: Theory and Practice

April 6 - 8, 2022



California State Polytechnic University, Pomona

WELCOME TO WTS 2022

Welcome to the twenty-first annual Wireless Telecommunications Symposium, WTS 2022, “Global Wireless Communications: Theory and Practice.” Although the coronavirus pandemic has necessitated our meeting virtually, rather than in Pomona, California, we hope that WTS 2022 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 2022 will explore a wide range of multidisciplinary wireless communications, mobile computing, and related topics in depth.

The WTS 2022 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 2022, 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 2022 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 2022, 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 Computer Science Departments, and the IEEE Foothill Section and its Communications Society and MTT Chapters.

Finally, special thanks go the members of the WTS Committee who spent many hours over the past couple of months organizing WTS 2022, the third virtual conference in the history of WTS.

On behalf of the WTS 2022 Committee -- Welcome to WTS 2022!

Dr. Steven Powell, WTS General Chair
Dr. Thomas Ketseoglou, WTS Assistant Chair

WTS 2022 Program April 6-8, 2022

| Tuesday, April 5 | |
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| 4:00 pm – 6:00 pm PT | WTS Organizers' Meeting |
| Wednesday, April 6 | |
| 8:00 am – 8:15 am PT | Welcoming Remarks |
| 8:15 am – 9:00 am PT | "Designing a 6G system users actually want" Dr. William Webb CEO, Webb Search |
| 9:00 am – 9:15 am PT | Break |
| 9:15 am – 10:00 am PT | "Role of New Wireless Technologies in Achieving UN SDGs" Prof.dr Milica Pejanović-Djurišić Former United Nations Ambassador/Permanent Representative from Montenegro Professor in Telecommunications and Wireless Communications at the Faculty of Electrical Engineering, University of Montenegro |
| 10:00 am – 10:15 am PT | Break |
| 10:15 am – 11:00 am PT | "Communication Ecosystem in Smart City Framework" Dr. Habib Riazi Spectrum, Technology, and Wireless Management Consultant |

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| 11:00 am – 1:00 pm PT | Lunch |
| 1:00 pm – 1:45 pm PT | Tutorial: "The need for DevSecOps in a 5G network" Paul Farag Principal Cybersecurity Architect - Focus on telecom technologies T-Mobile USA |
| 1:45 pm – 2:00 pm PT | Break |
| 2:00 pm – 2:45 pm PT | Doctoral Students' Session |
| 2:45 pm – 3:00 pm | Break |
| 3:00 pm – 4:45 pm PT | "Cybersecurity Behavior and Governance" Dr. Srikanth Venkatesan, Dr. Gregory Carlton, Dr. Mehrdad Koohikamali, Dr. Carlos Navarrete CIS Department, Cal Poly Pomona |
| 4:45 pm – 5:00 pm PT | Break |
| 5:00 pm – 6:00 pm PT | WTS Organizers Recognition Ceremony IEEE Foothill Section Recognition |
| Thursday, April 7 | |
| 8:15 am – 9:00 am PT | "Telecom Regulatory Update 2022" Andrew D. Lipman Partner, Morgan Lewis |
| 9:00 am – | Break |

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| 9:15 am PT | |
| 9:15 am – 10:00 am PT | <p>“Causal AI and Telecom” Anne Lee Bell Labs Fellow and CTO Partner in the Technology Leadership Office on Technology Strategy and Architecture Nokia Bell Labs</p> |
| 10:00 am – 10:15 am PT | Break |
| 10:15 am – 11:00 am PT | <p>“5G Update: Successes and Challenges” Chris Pearson CEO, 5G Americas</p> |
| 11:00 am - 1:00 pm PT | Lunch |
| 1:00 pm – 1:45 pm PT | <p>“Leading in a Technology Driven World” Terry Kramer Faculty Director of the Anderson Easton Technology Management Center and Adjunct Professor of Decisions, Operations and Technology Management UCLA</p> |
| 1:45 pm – 2:00 pm PT | Break |
| 2:00 pm – 3:15 pm PT | <p>“Self-Organized Networks in 5G” Dr. Tamer Omar, ECE Department, Cal Poly Pomona Dr. Tom Ketseoglou, ECE Department, Cal Poly Pomona Dr. Abdelfattah Amamra, CS Department, Cal Poly Pomona</p> |
| 3:15 pm – 3:30 pm PT | Break |

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| <p>3:30 pm - 4:45 pm PT</p> | <p>Workshop on Advances in Network Resilience and Security (NetReSec 2022) Dr. Bimal Viswanath, CS Department, Virginia Tech, Blacksburg Dr. Abdelfattah Amamra, CS Department, Cal Poly Pomona Dr. Mounir Hahad, Head of Juniper Threat Labs, Juniper Networks</p> |
| <p>4:45 pm - 5:15 pm PT</p> | <p>Poster Paper Session</p> |
| <p>Friday, April 8</p> | |
| <p>7:00 am - 9:00 am PT</p> | <p>Paper Presentation Session (I)</p> |
| <p>9:00 am - 9:20 am PT</p> | <p>Break</p> |
| <p>9:20 am - 11:00 am PT</p> | <p>Paper Presentation Session (II)</p> |
| <p>11:00 am - 12:10 am PT</p> | <p>Lunch Best Paper Awards Ceremony</p> |
| <p>12:10 am - 2:10 pm PT</p> | <p>Paper Presentation Session (III)</p> |
| <p>2:10 pm - 2:30 pm PT</p> | <p>Break</p> |
| <p>2:30 pm - 6:00 pm PT</p> | <p>Paper Presentation Session (IV)</p> |



Panel Discussions, Workshops & Tutorials

WTS 2022 Workshop on Advances in Network Resilience and Security (NetReSec 2022)

Presenters

Dr. Bimal Viswanath, CS Department, Virginia Tech, Blacksburg
Dr. Saeed Monemi, ECE Department, Cal Poly Pomona
Dr. Mounir Hahad, Head of Juniper Threat Labs, Juniper Networks

Description

The confluence of the increasing economic costs of cyber-attacks and the emergence of new technologies such as 5G and distributed/networked platforms, including Internet of Things (IoT) and cloud computing, has led to new research problems in network security. Similarly, with increased incidences of man-made and natural disasters there is an urgent need for novel algorithms, models, analysis, architectures, and systems that are both resilient and secure. Advances in AI and machine learning have also provided new insights and possible solutions to the grand research challenges in network resilience and security. The workshop provides an interdisciplinary platform to bring together researchers from engineering, science, mathematical/statistical and other disciplines to present cutting edge research and help formulate future research agenda in these domains.

Workshop Chairs

Dr. Abdelfattah Amamra, Cal Poly Pomona

Dr. John Korah, Cal Poly Pomona
Dr. Salam Salloum, Cal Poly Pomona

WTS 2022 Tutorial

WTS 2022 Tutorial - “The need for DevSecOps in a 5G network”

Presenter: Paul Farag, Principal Cybersecurity Architect - Focus on telecom technologies, T-Mobile

Abstract

The adoption of 5G networks promises to increase speeds and reduce latency. The promise of reduced latency will be done by bringing the compute closer to the end device. As the complexity of these networks grow there will also be increased demand for computing resources. Service providers need a way to grow their compute requirements in a manner that ensures resilience, confidentiality, and availability. Automation is key to being successful in this area and DevSecOps is a means of managing the automation.

Outline:

- Why is 5G different from previous wireless cores
 - 1G to 3G
 - 4G enhancements
 - 5G architecture
- Edge compute and its role within 5G
- 5G and how latency is reduced
 - Edge compute
 - Support
 - Use cases
 - Internal compute scaling needs
 - Compute evolution in the data centers
 - History of virtualization
 - Containers
 - Orchestration
 - Infrastructure as code

- DevOps
 - Pipeline
 - Public Private Cloud
- Supporting solutions within this environment
 - Vendor support
 - In house applications
- Building a DevSecOps Pipeline - People, Process, and technology
 - What is a pipeline
 - Processes
 - Technically
 - Image repository
 - VCS
 - Orchestration
 - Secrets management
 - Vulnerability management
 - People
- Update your security strategy

Speaker's Biography

Paul Farag, Principal Cybersecurity Architect focusing on telecom technologies at T-Mobile USA, is a technical leader with over 25 years industry experience and 20 plus years with mobile data experience spanning from 1G to 5G and Beyond. He has been in roles from operations, network engineering, network architecture. Now he focuses on cybersecurity of 5G networks and the related services on the network. He first received his B.S in 1995 majoring in computer information systems and telecommunications.

Paul received his MBA in 2004, and his M.S. in Cyber Security Management in 2020. In addition, Paul also is certified as a CISSP, CDPSE, and has an ITIL certification as well. Most recently Paul has been focusing on Security of devops in a 5G environment, Security of IoT, and contributions to roaming security within industry groups.

WTS 2022 Paper Presentation Program

Wednesday, April 6

Doctoral Students' Session

2:00
pm –
2:45
pm
PT

Xplore 1570793732 *A Framework for Information Freshness Analysis in UAV-based Sensing and Communications*
Ananya Hazarika and Mehdi Rahmati (Cleveland State University, USA)

Xplore 1570791004 *Coexistence Scenarios in 5G: Outdoor-Outdoor and Outdoor-Indoor Networks*
Siminfar Samakoush Galougah (University of Maryland, USA); Luca Rose (Nokia Bell Labs, France); Philippe Sehier (Nokia, France)

Thursday, April 7

Poster Paper Session

4:45
pm –
5:15
pm
PT

Universal Feature Vectors For Discrimination Of Modern Modulated Waveforms

Sylwester Sobolewski (USAF AFMC AFLCMC / WNYEDA, USA); William L Adams, Jr. (United States Air Force, USA); Ravi Sankar (University of South Florida, USA)

Performance Measurement of a Long-Range (LoRa) Network using the ns-3 Simulator

Amritpal Kaur and Jeff Kilby (Auckland University of Technology, New Zealand)

Friday, April 8

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| <p>7:00 am – 9:00 am PT</p> | <p>Paper Presentation Session I</p> <p>Xplore 1570791926 <i>FEAR: Federated Cyber-Attack Reaction in Distributed Software-Defined Networks with Deep Q-Network</i> Trung V. Phan (Technische Universität Chemnitz, Germany); Tri Gia Nguyen (FPT University, Vietnam)</p> <p>Xplore 1570787574 <i>Physical Layer Security Analysis Over Composite Generalized Gamma-Lognormal Fading Channels</i> Youssef Eldokmak, Mahmoud H. Ismail and Mohamed S. Hassan (American University of Sharjah, United Arab Emirates); Aiman Erbad (Hamad Bin Khalifa University, Qatar)</p> <p>Xplore 1570789046 <i>RLENS: RL-based Energy-Efficient Network Selection Framework for IoMT</i> Amr Abo-eleneen (Qatar University, Qatar); Alaa Awad Abdellatif (Politecnico di Torino, Italy); Amr Mohamed (Qatar University, Qatar)</p> <p>Xplore 1570790888 <i>Lead-Acid Battery Lifetime Estimation using Limited Labeled Data for Cellular Base Stations</i> Halil Ertan (Innova Bilişim Çözümleri, Turkey); Amir Yavariabdi (Karatay University, Turkey); Selver Küçükbay (Innova Bilişim Çözümleri A.Ş., Turkey); Ali Emre Tiryaki (Türk Telekom Research Center, Turkey); Ersin Aksoy (Innova Bilişim Çözümleri A.Ş., Turkey); İren Özalp (Türk Telekom Research Center, Turkey)</p> <p>IJITN 1570784248 <i>Minimally Equicorrelated MIMO Modeling for NLOS MM Wave Performance Improvement</i> Sabyasachi Bhattacharyya (Indian Institute of Information Technology Guwahati, India); G Aruna (IIIT Guwahati, India)</p> <p>IJITN 1570782207 <i>Can digitization of professional mobile services advance gender equality</i> Yann Kowalczuk (Czech Technical University in Prague, Czech Republic); Jan Holub (Czech Technical University in Prague & Faculty of Electrical Engineering, Czech Republic)</p> |
| <p>9:00 am – 9:20 am PT</p> | <p style="text-align: center;">Break</p> |
| <p>9:20 am – 11:00 am</p> | <p>Paper Presentation Session II</p> <p>Xplore 1570790650 <i>SCCORe: Smart Continuity of Care for Opioid Recovery</i></p> |

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| PT | <p>Upkar Varshney (Georgia State University, USA); Anu G Bourgeois (GSU, USA); Neetu Singh (University of Illinois Springfield, USA); Shanta R Dube (Wingate University, USA)</p> <p>IJITN 1570787563 <i>Mobile Digital Contact Tracing for COVID-19: A Review of Some Successes and Failures Beyond the U.S. and Their Data Privacy Implications</i> Joanne C. Peca (Information Networking Institute, Carnegie Mellon University, Pittsburgh, U.S.); Galen Grimes (Penn State Greater Allegheny, Pennsylvania State University, McKeesport, U.S.); Mahdi Nasereddin (Penn State Berks College, Pennsylvania State University, Reading, U.S.); Edward J. Glantz (College of IST, Pennsylvania State University, University Park, U.S.)</p> <p>IJITN 1570794350 <i>Social Network Anomaly Detection for Optimized Decision Development</i> Harshit Srivastava (USF, USA); Ehsan Sheybani and Ravi Sankar (University of South Florida, USA)</p> <p>IJITN 1570790776 <i>A Method Using GIS to Generate Rendezvous Areas for Mobile Sinks in WSNs</i> Adrien Chardon Fabian and Min Kyung An (Sam Houston State University, USA)</p> |
| 11:00 am – 12:10 pm PT | <p>Lunch Best Paper Awards Ceremony</p> |
| 12:10 pm – 2:10 pm PT | <p>Paper Presentation Session III</p> <p>Xplore 1570792805 <i>BER Performance of 4x1 Space-Time Parallel Block Coded Two-Path OFDM Systems</i> Hen-Geul Yeh (California State University Long Beach, USA); Jun Zhou (California State University, Long Beach, USA)</p> <p>IJITN 1570792529 <i>Frequency Domain Transformations and Convolutional Neural Networks to Predict Unlabeled Shark Behavior with GPS Data</i> Daniel Farthing (California State University, Long Beach, USA); Hen-Geul Yeh (California State University Long Beach, USA)</p> <p>IJITN 1570794021 <i>Tutorial for Space-Time ICI Parallel Cancellation Technique for OFDM Systems</i> Hen-Geul Yeh (California State University Long Beach, USA)</p> |

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| | <p>IJITN 1570787038 <i>Autonomous Flight of High-Endurance UAVs to Monitor Powerlines</i> Derek Mata, Raffael Pillai, Ryan Sandoval, Shadman Ahmed, Do Gyu Lee, Martin O'Connell and Joshua Kidwell (California State Polytechnic University, Pomona, USA); Steven Dobbs and Zhen Yu (California State Polytechnic University at Pomona, USA)</p> <p>IJITN 1570789813 <i>Performance Evaluation of Machine-Learning Models for Self-Healing in 5G Networks</i> Tamer Omar (California State Polytechnic University - Pomona, USA); Abdelfattah Amamra (California State Polytechnic University, USA); Thomas Ketseoglou (California State Polytechnic University, Pomona, USA); Cristian Daniel Mejia (California State Polytechnic University, Pomona & College of Engineering, USA); Cesar Soto (Cal Poly Pomona, USA); Quinlan E Stankus and Grant D Zelinka (California State Polytechnic University, Pomona, USA)</p> <p>IJITN 1570790579 <i>Autonomous Rover for Groundwork Lawn Mow</i> Tamer Omar (California State Polytechnic University - Pomona, USA); Alex X Pazmino (USA) Van T Chau (California State Polytechnic University, Pomona, USA); Marco A Gallardo (1725 Pecos River, USA); Daniel R Lopez (University of Engineering, USA)</p> |
| 2:10 pm – 2:30 pm PT | Break |
| 2:30 pm – 6:00 pm PT | <p>Paper Presentation Session IV</p> <p>Xplore 1570784332 <i>Simplified Path Split Strategy for SCL Decoding Algorithm with Lower Latency</i> Yiling Peng (Xiamen University, China); Huihui Wu (McGill University, Canada); Pingping Chen (Fuzhou University, China); Lin Wang (Xiamen University, China)</p> <p>Xplore 1570786750 <i>An Enhanced Interleaved Chirp Spreading LoRa Modulation Scheme for High Data Transmission</i> Yu Shi, Weikai Xu and Lin Wang (Xiamen University, China)</p> <p>Xplore 1570787273 <i>Joint Time and Power Control of Energy Harvesting CRN Based on PPO</i> Kun Du (CQUPT, China); Xie Xian-Zhong and Zhaoyuan Shi (Chongqing University of Posts and Telecommunications, China); Min Li (Chongqing University of Posts & Telecommunications, China)</p> <p>Xplore 1570790378 <i>Low-Complexity Distributed Precoding in User-Centric Cell-Free mmWave MIMO Systems</i> Yingrong Zhong, Yashuai</p> |

Cao and Tiejun Lv (Beijing University of Posts and Telecommunications, China)

Xplore 1570790809 *Trajectory Optimization in UAV-aided Mobile Edge Computing Systems With Reinforcement Learning*

Kexin Sheng (Nanjing University of Science and Technology); Huaju Song (Nanjing Xiaozhuang University, China); Yuwen Qian (Nanjing University of Science and Technology, China)

Xplore 1570791177 *Energy-efficient multi-connectivity enabled user association and downlink power allocation in mmWave networks*

AiLing Chen (WenZhou University, China); Shengchang Li and Zhenzhou Tang (Wenzhou University, China); Kezhong Jin (Wenzhou University, China & Chonnam National University, Korea (South))

Xplore 1570787972 *Regression-based K nearest neighbour for resource allocation in network slicing*

Dandan Yan (Macao Polytechnic University, China); Xu Yang and Laurie Cuthbert (Macao Polytechnic Institute, Macao)

IJITN 1570790180 *Detection and Analysis Ads through the Mini-Programs*

Linjie Liu and Biao Liu (Beijing Electronic Science and Technology Institute, China); Jianyi Zhang (Beijing Electronic Science and Technology Institute & University of Louisiana at Lafayette, USA); Leixin Yang and Zhiqiang Wang (Beijing Electronic Science and Technology Institute, China)

IJITN 1570787722 *Integration of Agricultural Wireless Sensor Networks to Web-of-Things through an Edge-computing-enriched WSNs/WoT Gateway*

Chenrui Yu, Liang Gong, Rui Fang, Yixiang Huang, Wei Wu and Chengliang Liu (Shanghai Jiao Tong University, China)

IJITN 1570790781 *Increased Throughput on LTE-Wifi using Balia Multipath-TCP on Software Defined Wireless Network*

Teknologi Informasi (Telkom University & Information Technology Bachelor Program, Indonesia)

Speaker Biographies

Terry D. Kramer has a 30-year career in telecommunications. For 18 of the 30 years, Terry worked for Vodafone Group Plc/AirTouch Communications in a variety of roles domestically and internationally including Group Strategy and Business Improvement Officer and Regional President, Vodafone Americas which included oversight of Vodafone's 45% interest in Verizon Wireless and Vodafone's venture capital activities. Terry also sat on the Executive Committee of Vodafone Group Plc and on the Board of Verizon Wireless.

In June 2012, Terry received an appointment by President Obama to serve as Ambassador, Head of U.S. Delegation for the World Conference on International Telecommunications. This 100 person delegation comprised of members of U.S. Government, industry and civil society, formulated and communicated the U.S. policy regarding the criticality of a free and open internet, the criticality of inclusive, multi stakeholder governance, the need to proactively address cybersecurity threats and the need for liberalized, open markets which encourage accelerated broadband access globally.

Terry is currently the Faculty Director of the UCLA Anderson's Easton Technology Management Center, which is responsible for preparing the next generation of leaders for a world driven by technology, based innovation. He is also a full time Adjunct Professor at UCLA's Anderson School of Management teaching three courses—a foundational technology management course covering the impact of disruptive innovation on products, services, markets and competition, another course on technology and society addressing the changing nature of leadership addressing the benefits technology can offer juxtaposed against a growing techlash and a third course—a global immersion program covering the transformational impact of technology on the greater China region. From 2011-13, he was an Entrepreneur in Residence at the Harvard Business School. In each year from 2017-2021, he was awarded UCLA Anderson Teacher of The Year by the Fully Employed Executive MBA's and in 2019 additionally received the Citibank Teaching Award.

Terry sits on the Advisory Boards of RapidSOS and Jarbly U, is the Board Chair of the Harvard Business School California Research Center and is a member on the UCLA Economics Department Board of Visitors. He is also the former Board Chair of Skylo Technologies.

Terry holds a Bachelors degree in Economics from UCLA and MBA from Harvard University and resides in the San Francisco Bay Area.

Anne Y. Lee is a Bell Labs Fellow currently working as a CTO Partner in the Technology Leadership Office on Technology Strategy and Architecture supporting the CSTO and CEO by analyzing the evolution of key technologies (e.g. artificial intelligence) and the overall network architecture to identify new directions for the industry and the impact and requirements on the company's portfolio. Prior to this, Anne was the CTO of IMS Innovations. In this role, she initiated and drove next generation IP communications solutions such as WebRTC as well as worked on creating the vision and initiating the work for future IP communications. She has also previously worked in both the Wireless CTO and Wireline CTO organizations. Anne has over 30 years of experience at Nokia (AT&T, Lucent Technologies, Alcatel-Lucent, and Nokia).

She is the original IMS technical team leader for Lucent Technologies working closely with the standards team from the beginning – circa 1999 – to pioneer the multi-access, globally interoperable IP communications system being deployed worldwide today. 2019 was the 20th anniversary of IMS and today there are roughly four billion devices deployed utilizing VoLTE, VoWiFi, fixed voip, and RCS services. Adoption of IMS continues around the globe into 5G and beyond.

Anne is a technologist at heart and an electrical engineer and computer scientist by training. She became a Bell Labs Fellow in 2005.

Anne's blog posts:

- <https://www.bell-labs.com/institute/blog/putting-ai-historical-perspective/>
- <https://www.nokia.com/about-us/careers/life-at-nokia/employee-blogs/2020-ada-lovelace-honoree-anne-lee-pioneering-software-engineer-in-telecommunications-technology/>
- <https://www.bell-labs.com/institute/blog/today-we-celebrate-invaluable-contributions-women-technologists-nokia-bell-labs/>

Andrew D. Lipman is a partner at Morgan Lewis and the leader of the firm's Telecommunications, Media and Technology Practice. He practices in most aspects of communications law and related fields, including regulatory, transactional, litigation, legislative, and land use. Andy's clients in the private and public sectors include those in the areas of local, long distance, and international telephone common carriage; Internet services and technologies; conventional and emerging wireless services; satellite services; broadcasting; competitive video services;

telecommunications equipment manufacturing; and other high-technology applications. Additionally, he manages privatizations of telecommunications carriers in Europe, Asia, and Latin America.

To open the US local telephone market to competition, Andy has been involved in most new legal and regulatory policies at the Federal Communications Commission, at state public service commissions, in Congress, and before courts. He helped shape crucial provisions of the Telecommunications Act of 1996 and used similar approaches to promote the opening of foreign markets. He also obtained one of the first competitive local service and interconnection agreements in continental Europe and the first competitive fiber network application in Japan. Andy's practice includes strategic analysis of companies' telecom user agreements, renegotiating existing agreements, and negotiating new, more favorable telecom user agreements.

For nearly a decade, Andy served as senior vice president, legal and regulatory affairs, for MFS Communications, the nation's largest competitive local services provider. One of the founders of MFS, Andy helped guide the company from startup to its eventual sale for \$14.4 billion to WorldCom.

Frequently writing and speaking on telecommunications, Andy's work encompasses more than 170 articles and five books, including two Dow Jones books on telecommunications. He occasionally appears on National Public Radio, C-SPAN, Bloomberg News Network, and ABC News, and he served on the editorial advisory boards of Phillips Publishing Company, Internet Law and Regulation, Telecommunications Alert, Telecommunications Reports, Telecommunications Regulatory Monitor, and The Satellite Compendium.

Andy served as general counsel to the International Teleconferencing Association and as legislative/regulatory counsel to the International Satellite Users Association. He sits on the board of directors of five public companies trading on the NYSE, NASDAQ, and Toronto Stock Exchange. Additionally, he co-founded the Association of Local Telecommunication Services (ALTS)—the national trade association for competitive telecommunications carriers—and served as its first chairman.

Prior to joining Morgan Lewis, Andy was a partner in the corporate practice of another international law firm, where he was also a member of the executive board and leader of the telecommunications, media and technology practice. Before entering private practice, he participated in the

legal honors program at the US Department of Transportation and served in the Office of the Secretary of Transportation. He also served as an extern law clerk to Judge Raymond Sullivan of the California Supreme Court.

Andy was awarded a Bachelor of Arts, Summa Cum Laude from the University of Rochester in 1974 and Juris Doctor for Stanford Law School in 1977.

In 2017 he was named to The Legal 500 Hall of Fame and in 2018 its Leading Lawyer Media, technology and telecoms: Telecoms and broadcast: transactional.

Andy is admitted to practice in the District of Columbia.

Chris Pearson is the President of 5G Americas. In his executive role, he is responsible for the overall planning of the organization and providing management for the integration of strategy and operations in the areas of technology, marketing, public relations and regulatory affairs. As President of 5G Americas (formerly called 4G Americas), Mr. Pearson represents the organization's Market Representation interests within the 3rd Generation Partnership Program (3GPP) organization. Mr. Pearson led the organization from its inception in 2001 as the 3GPP family of technologies market share grew from 10 percent in 2001 to more than 90 percent in North, Central and South America. Mr. Pearson came to the organization from the Universal Wireless Communications Consortium (UWCC) where he served as Executive Vice President in charge of the strategic executive management of the global TDMA wireless technology consortium. Prior to joining the UWCC, Mr. Pearson held several senior technical and marketing positions at AT&T Wireless and GTE. With more than 28 years of experience in the telecommunications industry, Mr. Pearson is a recognized spokesperson in mobile wireless and 5G technology trends and has spoken at technology conferences throughout the world including CES, Mobile World Congress, CTIA, LTE World, 5G World North America, and 5G Forum USA. Mr. Pearson earned a Master of Business Administration degree from The Albers School of Business and Economics at Seattle University and a Bachelor of Arts degree with emphasis in Marketing and Finance from the University of Washington.

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.

William Webb is one of the world's leading wireless communications experts. William is CEO at Webb Search, an independent consultancy. 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 Mountbatten Medal for technology entrepreneurship. William has a first class honours degree in electronics, a PhD and an MBA.

Co-Sponsors

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Department
College of Science: Computer Science Department



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IEEE Foothill
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