

# **WTS 2024**

## **Wireless Telecommunications Symposium 2024**

### **Global Wireless Communications: Theory and Practice**

**April 9-12, 2024**



**Oakland/San Francisco, California, USA**

## **WELCOME TO WTS 2024**

Welcome to the twenty-third annual Wireless Telecommunications Symposium, WTS 2024, “Global Wireless Communications: Theory and Practice.” We hope that WTS 2024 will be a stimulating and rewarding experience for you. During the next three days of invited speakers’ presentations, accepted paper sessions, panel discussions and tutorials, WTS 2024 will explore a wide range of multidisciplinary wireless communications, mobile computing, and related topics in depth.

The WTS 2024 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 2024, 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 2024 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 2024, 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, and Cal Poly Pomona’s Computer Information Systems, Electrical & Computer Engineering.

Finally, special thanks go to the members of the WTS Committee who spent many hours over the past couple of months organizing WTS 2024.

On behalf of the WTS Committee -- Welcome to WTS 2024!

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

**WTS 2024 Program April 9-12, 2024  
(as of March 13, 2024)**

**Tuesday, April 9**

6:00  
pm –  
9:00  
pm

WTS Organizers' Pre-Conference Dinner & Meeting

**Wednesday, April 10**

8:00  
am –  
9:00  
am

Registration

9:15  
am –  
9:30  
am

Welcoming Remarks

9:30  
am –  
10:15  
am

"Delivering Ubiquitous Connectivity"  
**Dr. William Webb**  
Chief Technology Officer, Access Partnership

10:15  
am –  
10:30  
am

Break

10:30  
am –  
11:15  
am

"AI in Radio Access Network: Industry Positioning and Research  
Initiatives"  
**Dr. Habib Riazi**  
Spectrum, Technology, and Wireless Management Consultant

11:15  
am –  
12:00  
pm

"5G security Operational Challenges"  
**Dr. Francois Cosquer**  
CTO Security, Cloud and Network Services  
Nokia Business Group

12:00  
pm –  
1:15  
pm

Lunch

	Poster Paper Session
1:15 pm – 1:45 pm	1570971108 Respiratory Anomaly Detection using Reflected Infrared Light-wave Signals <b>Md Zobaer Islam</b> (University of North Carolina, Chapel Hill, USA) Brenden Martin, Carly Gotcher, Tyler Martinez and John O'Hara (Oklahoma State University, USA); Sabit Ekin (Texas A&M University, USA)
1:45 pm – 2:15 pm	1570983723 <i>Starlink and Cellular Connectivity under Mobility: Drive Testing Across the Arctic Circle</i> <b>Claes Beckman</b> (KTH Royal Institute of Technology, Sweden); Johan Garcia (Karlstad University, Sweden); Herman Mikkelsen and Patrik Persson (Icomera AB, Sweden) IEEE Xplore
2:15 pm – 3:00 pm	"Telecom Regulatory Update 2024" <b>Andrew D. Lipman</b> Partner, Morgan Lewis
	Doctoral Student Session
3:00 pm – 3:30 pm	1570983159 <i>Autoencoder-Based Domain Learning for Semantic Communication with Conceptual Spaces</i> <b>Dylan T Wheeler</b> and Bala Natarajan (Kansas State University, USA)
3:30 pm – 4:00 pm	Break
4:00 pm – 9:00 pm	Coach Tour/Welcoming Dinner & WTS Committee Recognition Ceremony at McCormick & Kuleto's, Ghirardelli Square, San Francisco
<b>Thursday, April 11</b>	
9:30 am – 10:15 am	<i>"From FiveG to FutureG: A Bird's Eye View"</i> <b>Dr. Venkatesh Ramaswamy</b> Chief Technologist for NextG, MITRE Labs
10:15 am – 10:30	Break

am	
10:30 am – 11:15 am	<p>“Emerging security challenges in mobile health”  <b>Dr. Upkar Varshney</b> (Georgia State Univ.)</p>
11:15 am – 12:00 pm	<p>“Leadership in a Technology Driven World”  <b>Terry D. Kramer</b>  Faculty Director of the UCLA Anderson’s Easton Technology Management Center  Adjunct Professor at UCLA’s Anderson School of Management  Former Executive at Vodafone Group</p>
12:00 pm - 1:15 pm	Lunch
1:15 pm - 1:30 pm	<p>“Small-Cell &amp; Femto-Cell Wireless Rf/Antenna Architecture &amp; Challenges”  <b>Balamurugan Shanmugam</b>  Senior Hardware Design Engineer, Google Llc  Pixel Wireless Hardware Team (Mountain View)</p>
1:30 pm – 3:00 pm	<p>Selected Topics in Wireless Communications and Security  Moderator: <b>Dr. Qing-An Zeng</b> (No. Carolina A&amp;T State Univ.)</p> <p>“Advanced IoT Connectivity Technologies”  <b>Dr. Qing-An Zeng</b> (No. Carolina A&amp;T State Univ.)</p> <p>“Reconfigurable Intelligent Surfaces (RIS) in 6G Wireless Communications”  <b>Dr. Thomas Ketseoglou</b> (Cal Poly Pomona)</p> <p>“Replay attacks using SDRs”  <b>Dr. Tamer Omar</b> (Cal Poly Pomona)</p> <p>“Fault-Tolerances in Sorting Networks”  <b>Dr. Salam Salloum</b> (Cal Poly Pomona)</p> <p>“Securing Mobile Communications: Challenges and Solutions”  <b>Dr. Ehsan Sheybani</b> (USF)</p>
3:00 pm – 3:30	<p><i>Empowering Practitioners: Developing a Cybersecurity Curriculum to Address Security Vulnerabilities in Unmanned Aerial Vehicles (UAVs) and Similar Wireless Internet of Things (IoT) Devices</i></p>

pm	<b>Jennifer Breese, Maryam Roshanaei, Brian Gardner, Jainil Kakka, Dusan Ramljak, Michael Bartolacci</b> (all Penn State University)
3:30 pm – 4:00 pm	Break
4:00 pm – 9:00 pm	Coach Tour/Offsite Dinner at Scoma’s Restaurant, Fisherman’s Wharf, San Francisco
<b>Friday, April 12</b>	
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 – 3:20 pm	Break
3:20 pm – 6:00 pm	Paper Presentation Session (IV)
	WTS Organizers’ Post-Conference Dinner

## WTS 2024 Paper Presentation Program (as of March 13, 2024)

### Wednesday, April 10

1:15  
pm –  
1:45  
pm

Poster Paper: “Respiratory Anomaly Detection using Reflected Infrared Light-wave Signals”  
**Md Zobaer Islam**, Brenden Martin, Carly Gotcher, Tyler Martinez and John O’Hara (Oklahoma State University, USA); Sabit Ekin (Texas A&M University, USA)

3:00  
pm –  
3:30  
pm

Doctoral Session: *1570983159 Autoencoder-Based Domain Learning for Semantic Communication with Conceptual Spaces*  
Dylan T Wheeler and Bala Natarajan (Kansas State University, USA)

### Thursday, April 11

3:00  
pm –  
3:30  
pm

Invited: *Empowering Practitioners: Developing a Cybersecurity Curriculum to Address Security Vulnerabilities in Unmanned Aerial Vehicles (UAVs) and Similar Wireless Internet of Things (IoT) Devices*  
Jennifer Breese, Maryam Roshanaei, Brian Gardner, Jainil Kakka, Dusan Ramljak, Michael Bartolacci (all Penn State University)

### Friday, April 12

8:00  
am –  
10:00

Paper Presentation Session I  
1570978641 *Dynamic Adjustment of Control Message Delay in Reactive Ad Hoc Routing Protocol*  
Haoran Miao, Beomkyu Suh and Ki-Il Kim (Chungnam National

am	<p>University, Korea (South) IEEE Xplore</p> <p>1570977062 <i>Research on Key Technology of ISAC in Low-Altitude Network</i> Yiming Yu, Songtao Gao, Yangyang Cao and Ritao Cheng (China Mobile Group Design Institute Co., Ltd, China) IJMNDI</p> <p>1570988801 <i>Enhancements for 5G NR PRACH Reception: An AI/ML Approach</i> Rohit Singh (Indian Institute of Technology, Madras, India); Anil Kumar Yerrapragada, Jeeva Keshav S and Radha Krishna Ganti (Indian Institute of Technology Madras, India) IEEE Xplore</p> <p>1570983589 <i>Leveraging Deep Unsupervised Learning for Joint Passive Beamforming and Power Control of RIS-Aided D2D Networks with Energy Constrained Nodes</i> Ayush Madhan-Sohini (IIIT Delhi, India); Omer Waqar (University of the Fraser Valley, Canada) IEEE Xplore</p> <p>1570980683 <i>User Association for 5G Networks</i> Zohar Naor (University of Haifa, Israel) IEEE Xplore</p>
10:00 am – 10:20 am	<b>Break</b>
10:20 am – 11:40 am	<p>Paper Presentation Session II</p> <p>1570975750 <i>Interference in Wireless Networks - A Power Allocation Approach</i> Tzalik Maimon (Ceragon Networks, Israel) IJMNDI</p> <p>1570966723 <i>Multi-criteria Knowledge-based decision-making functionality for swarm of drones</i> Elena Politi (Harokopio University, Greece); Dimitris Georgiadis (Harokopio University of Athens, Greece); George Dimitrakopoulos (Harokopion University of Athens, Greece) IEEE Xplore</p>



1570985574 *6G-based Intelligent, Context-Aware, and Trustworthy User-Centric Healthcare Applications*

Albena Mihovska (Research, Development & Innovation Consortium (RDIC)); Vladimir K. Poulkov (Technical University of Sofia, Bulgaria)  
IEEE Xplore

1570980368 *Feasibility exploration for an robust and reliable wireless connection for AI-generative-designed, additively manufactured articulated robotic arms*

Thomas M. Wendt (University of Applied Sciences Offenburg & Work-Life Robotics Institute, Germany); Thomas Weeber (BESTec-etp Freiburg GmbH, Germany)  
IJMNDI

11:40  
am –  
1:00  
pm

**Lunch**  
**Best Paper Awards Ceremony**

Paper Presentation Session III

1570983850 *TLS implementation for Trusted Bluetooth Devices*  
Aissaoui-Mehrez Hassane (Mines-Telecom Institute - Telecom-Paris - Institut Polytechnique de Paris, France & Laboratoire Traitement Et Communication de l'Information Paris Saclay (LTCl), France)  
IJMNDI

1570978941 *Iterative wireless node localization based on Bluetooth and visible light for smart lighting systems*  
Marilia Barandas (Fraunhofer Portugal AICOS, Portugal); Ricardo Santos (Associação Fraunhofer Portugal Research & FCT NOVA, Portugal); Jorge Filipe and Carlos Silva (Tridonic Portugal, Portugal)  
IEEE Xplore

1:00  
pm –  
3:00  
pm

1570983393 *A Machine Learning Driven Methodology for Alarm Prediction Towards Self-Healing in Wireless Networks*  
Luís Miguel Mata (Instituto Superior Técnico & Instituto Superior de Engenharia de Lisboa, Portugal); Marco Sousa (Celfinet and Instituto Superior de Engenharia de Lisboa (ISEL), Portugal); Pedro Vieira (Instituto de Telecomunicações / ISEL, Portugal); Maria Paula Queluz (Instituto Superior Técnico, Portugal); António J. Rodrigues (IT / Instituto Superior Técnico, Portugal)  
IEEE Xplore

1570983699 *An Approach for Localizing User Terminals in 6G Mobile Networks*  
Caleb Ludinga Lodi (Laval University, Canada); Ronald Beaubrun (Université Laval, Canada)  
IEEE Xplore

1570979478 *An Ensemble Approach for Fake Base Station Detection in 5G Networks using Temporal Graph Analysis and Anomaly Detection*  
Sheng Sun, Morris Repeta, Ibrahim AbuAlhaol, Gwenaél Poitau and Ali Esswie (Dell Technologies, Canada)  
IEEE Xplore

3:00  
pm –  
3:20  
pm

**Break**

3:20  
pm –

Paper Presentation Session IV

5:20 pm 1570989889 *Deep Learning-based Channel Estimation for Massive MIMO-OTFS Communication Systems*  
Mostafa Payami and Steven D Blostein (Queen's University, Canada)  
IEEE Xplore

1570984883 *SDR Based Replay Attack for Drone Intervention*  
Tamer Omar (California State Polytechnic University - Pomona, USA);  
Tyson Duran (Cal Poly Pomona, USA); Motassem Al-Tarazi (University  
of Nebraska-Lincoln, USA); Thomas Ketseoglou (California State  
Polytechnic University, Pomona, USA)  
IEEE Xplore

6:00 pm - WTS Organizers' Post-Conference Dinner

## Speaker Biographies

**Dr. François Cosquer** is CTO Security, Cloud and Network Services, for Nokia Business Group. He has also served as Head of Solutions Security for the Alcatel-Lucent Corporate Solutions organization and as CTO Security and Technology Strategist for the Alcatel-Lucent Enterprise Business Group. Over the past 20 years, he has held senior positions with research institutions, equipment vendors and telecommunications operators. He draws on extensive experience in security architecture, networking, operating systems, middleware, and multimedia applications. He has been speaker, panelist, and chair at key industry events and conferences. François graduated in Electronics and Computing and holds an MSc in Computer Science and a Ph.D. in Computer Engineering. He currently serves as Adjunct Professor at the Faculty of Engineering and Computer Science, University of Concordia, Montreal.

**Terry D. Kramer** has a 35-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 2015-2023, 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, 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.

**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.

He was won many awards and in 2017 was named to *The Legal 500* Hall of Fame.

Andy is admitted to practice in the District of Columbia.

**Dr. Venkatesh Ramaswamy** is Chief Technologist for NextG at MITRE Labs in Bedford, Massachusetts, where he currently leads technical innovation and R&D activities in 5G/6G technologies. He has more than 22 years of experience in the telecommunications industry and has held technical leadership positions at top technology companies, startups, and research labs. Currently he serves as one of the active industry members of the ATIS/Next G Alliance Research Council ([Next G Alliance Research Council – Next G Alliance](#)), working on the development of a comprehensive North American 6G strategy. He is also an industry researcher at the NSF Edge AI Institute ([Organization and Key Personnel | NSF AI Institute for Future Edge Networks and Distributed Intelligence \(osu.edu\)](#)), where he explores synergies between networking and AI. He has published more than 50 peer-reviewed publications and holds numerous patents, served as a Technical Program Committee (TPC) member for various conferences, and participated in several technical panels. He received his PhD in Electrical Engineering in 2007.

**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 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 Mountbatten Medal for technology entrepreneurship. William has a first class honours degree in electronics, a PhD and an MBA.

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Upkar Varshney, Georgia State University  
William Webb, Weightless SIG  
Stephen Weinstein, Columbia University  
Roger Whitaker, University of Cardiff  
Qing-An Zeng, North Carolina A&T State University

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Dr. Qing-An Zeng, North Carolina A&T State University

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