



The 19th International Conference on Wireless and Mobile  
Computing, Networking and Communications.

21-23 June 2023, Montreal, Canada.

# Conference Program

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## WiMob 2023

Montréal, Québec, Canada



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MONTRÉAL**  
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D'INGÉNIERIE



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## Welcome

It is our great pleasure to welcome you to the 19th IEEE International Conference on Wireless and Mobile Computing, Networking and Communications (WiMob'2023) in Montreal, Canada. Since the first edition of WiMob in 2005, the IEEE International Conference on Wireless and Mobile Computing, Networking and Communications has been the key forum for the exchange of knowledge and experience among researchers, developers and practitioners of wireless and mobile technology. For eighteen years, the International IEEE WiMob conference has provided unique opportunities for researchers and developers to interact, share new results, show live demonstrations, and discuss emerging directions in Wireless Communications, Mobile Networking and Ubiquitous Computing. Putting together WiMob 2023 has been a team effort. First of all, we would like to thank the authors of all submitted papers. Furthermore, we would like to express our gratitude to the program committee and to all external reviewers, who worked very hard on reviewing papers and providing suggestions for their improvements.

The technical program of the main conference consists of 35 full-papers constituting 38% of acceptance ratio and 5 short papers. Moreover, we are proud and thankful of having 3 renowned keynote speakers at the 2023 edition of WiMob: - Professor Octavia A. Dobre, Memorial University, Canada, - Dr. Wen Tong, CTO, Wireless Network, Huawei Technologies Co., Ltd. and - Professor Ekram Hossain, University of Manitoba, Canada.

We would also like to thank the organizers of all workshops organized jointly with WiMob 2023:

- 11th international workshop on e-Health Pervasive Wireless Applications and Services (eHPWAS'23): Tayeb Lemlouma (IRISA Lab and Rennes 1 University, France) leading the workshop with Sébastien Laborie (Université de Pau et des Pays de l'Adour, France), Abderrezak Rachedi (University Paris-Est Marne-la-Vallée, France) and Yevgeniya Kovalchuk (Birmingham City University, United Kingdom).
- 2nd International Workshop on Vehicular Networks for Risk Reduction and Safety Related systems (VN4RRSR'23) (10th cycle of the WiMob Workshop formerly known as "Emergency Networks for Public Protection and Disaster Relief"): Maurizio Casoni (University of Modena and Reggio Emilia, Italy) leading the workshop.
- 16th International Workshop on Selected Topics in Wireless and Mobile computing (STWiMob 2023): Anna Maria Vegni (Roma Tre University, Italy) and Abderrahim Benslimane (University of Avignon, France).

We owe much gratitude to our General chair Honggang Wang (University of Massachusetts Dartmouth, USA) for his support.



We would like to thank strongly our Executive chair Anna Maria Vegni (Roma Tre University, Italy) for handling several general tasks allowing smooth running of the Conference globally. Many thanks to Antoine Gallais (INSA Hauts-de- France CNRS, France), Mauro Conti (University of Padua, Italy), Wessam Ajib (University of Quebec at Montreal, Canada) and Himal A. Suraweera (University of Peradeniya, Sri Lanka) for handling the Technical Program activities; their contributions were very valuable.

Many thanks to all TPC co-chairs without forgetting our Short Papers, Demos and Posters Symposium co-chairs, Valeria Loscri (INRIA, France) and Marica Amadeo (University Mediterranea of Reggio Calabria, Italy).

Also, we would like to thank as well as our Executive co- and Ranwa Al Mallah (Royal Military College, Canada).

Without the help of the publicity co-chairs WiMob would not have had such a success; so, many thanks to Leo Mendiboure (University Eiffel, France), Huong Nguyen Minh (University of Science and Technology of Hanoi, Vietnam), Michele Girolami (ISTI, CNR, Italy), Sahil Garg (ETS, University of Quebec, Canada) and Jiadai Wang (Northwestern Polytechnical University, China).

Also, we would like to thank Marco Di Renzo (University Paris-Saclay, CentraleSupélec, France) and Martine Bellaïche (Polytechnique Montreal, Canada) for handling aspects of the workshops start-up. We present a great thanks to Alejandro Quintero (Polytechnique Montreal, Canada) Vietnam) as a publication chair.

Strong thanks to our local organization chair Franjeh El Khoury (Polytechnique Montreal, Canada) for her strong local support from the first day to the last and also for her outstanding work on posting information related to WiMob 2023 on the web site.

Finally, we would like to thank our technical sponsors IEEE and IEEE Communications Society for endorsing the conference.

We hope that you will find this program interesting and thought-provoking and that it will provide you with a valuable opportunity to share ideas with other researchers and practitioners from institutions around the world.

**Aderrahim Benslimane**  
*WiMob 2023 Steering  
 Committee Chair  
 University of Avignon, France*



**Samuel Pierre**  
*General Chair  
 Polytechnique Montreal, Canada*



**Anna Maria Vegni**  
*Executive Chair  
 Roma Tre University, Italy*





# Program Overview

Wednesday, June 21, 2023	
Room M-2201	Room M-2203
8:30 - 13:00 Registration	
9:30 - 11:10 <b>ST1</b>	9:30 - 11:10 <b>HP1</b>
11:10 - 11:30 Coffee Break	
11:30 - 12:30 Keynote Speaker 1: (Room M-1120)	
12:45 - 14:00 Lunch	
14:00 - 15:40 <b>ST2</b>	14:00 - 15:40 <b>HP2</b>
15:40 - 16:00 Coffee Break	
16:00 - 17:40 <b>ST3</b>	16:00 - 17:40 <b>HP3</b>
19:30 Welcome Cocktail	



Thursday, June 22, 2023	
Room M-2201	Room M-2203
8:30 - 13:00 Registration	
9:30 - 11:10 <b>W1</b>	9:30 - 11:10 <b>W2</b>
11:10 - 11:30 Coffee Break	
11:30 - 11:45 Opening Ceremony (Room M-1120)	
11:45 - 12:45 Keynote Speaker 2: (Room M-1120)	
12:45 - 14:00 Lunch	
14:00 15:40 <b>W3</b>	14:00 15:40 <b>W4</b>
15:40 16:00 Coffee Break	
16:00 17:40 <b>ST4</b>	16:00 17:40 <b>ST5</b>
20:00 Conference Banquet	



Friday, June 23, 2023	
Room M-2201	Room M-2203
8:30 - 13:00 Registration	
9:30 - 11:10 <b>W5</b>	9:30 - 11:10 <b>W6</b>
11:10 - 11:30 Coffee Break	
11:30 - 12:30 <b>Keynote Speaker 3: (Room M-1120)</b>	
12:45 - 14:00 Lunch	
14:00 - 15:40 <b>W7</b>	14:00 - 15:40 <b>VN</b>
15:40 - 16:00 Coffee Break	
16:00 - 17:40 <b>SP</b>	



**Legend:**

Workshops		
VN: VN4RRSR	HP (eHPWAS): HP1, HP2, HP3	ST (STWiMob): ST1, ST2, ST3, ST4, ST5
Main Conference		
W1 ... W7: sessions of the main conference WiMob 2023		
SP: WiMob 2023 Short Papers, Posters and Demos		
Rooms for sessions		
Room M-2201	Room M-2203	
General Session Keynote Talks		
Room M-1120		



## Wednesday, June 21, 2023

**09:30 – 11:10**

**Room: M-2203**

### **eHPWAS SESSION 1: Healthcare Data Management and Security**

Chairs: Guann-Pyng Li (University of California, Irvine, USA), Tayeb Lemlouma (IRISA Lab and Rennes 1 University, France)

- **eHPWAS SESSION 1.1 UbiSecE: UbiLab's Secure Cloud Environment for Public Health Research in Microsoft Azure**

Pedro Augusto Da Silva E Souza Miranda, Jasleen Kaur and Plinio P Morita (University of Waterloo, Canada)

- **eHPWAS SESSION 1.2 Clinically Prioritized Data Visualization in Remote Patient Monitoring**

Teena Arora (Federation University, Australia); Venki Balasubramanian, Andrew Stranieri and Arun Neupane (Federation University Australia, Australia)

- **eHPWAS SESSION 1.3 Food Nutrient Extraction Based on Image Recognition and Entity Extraction**

Hanzhong Gao and Yanjun Liu (The George Washington University, USA); Jianwei Gao (Shandong Academy of Agricultural Sciences, China); Jingjuan Li (Institute of Vegetables, China)

- **eHPWAS SESSION 1.4 Design & Development of Misinformation Analysis System for Govt Prevention of Public Health Crises**

Irfhana Zakir Hussain (University of Waterloo, Canada & SRM Institute of Science and Technology, India); Jasleen Kaur, Matheus Lotto, Zahid Ahmad Butt and Plinio P Morita (University of Waterloo, Canada)

- **eHPWAS SESSION 1.5 Actigraphy-Based Algorithm for Spinal Range of Motion Assessment for Axial Spondyloarthritis Patient**

Sydney Peters (AbbVie, USA); Tiancheng He (AbbVie, USA); Yunzhao Xing (Statistical Innovation - Global Therapeutics - AbbVie, USA); Rameez Chatni (Informational Research - AbbVie, USA); In-Ho Song (Immunology Clinical Development - AbbVie, USA); Michelle Crouthamel (Digital Science - Global Therapeutics - AbbVie, USA); Nancy Curran (Clinical Pharmacology - Global Therapeutics - AbbVie, USA); Dan Webster (Digital Science- Global Therapeutics AbbVie, USA); Matthew D. Czech (Digital Science - Global Therapeutics - AbbVie, USA); Jie Shen (AbbVie, USA)

**Room: M-2201**

### **ST1: Wireless networks 1**

Chair: Abderrahim Benslimane (University of Avignon & LIA/CERI, France)

- **Chained estimation for data reduction-driven routing in wireless sensor networks**

Brandon Foubert (Laboratoire Informatique de Grenoble & Drakkar, France); Christian Salim (Junia, Computer Science and Mathematics, France); Nathalie Mitton (Inria Lille - Nord Europe, France)

- **A Review of AI-based MANET Routing Protocols**

Fatemeh Safari, Izabela Savic and Daniel Gillis (University of Guelph, Canada); Jason Ernst (University of Guelph & Left of the Dot Media Inc, Canada); Herb Kunze (University of Guelph Guelph, Canada)

- **A novel FRTS/FCTS-based MAC Protocol for In-band Full-duplex Wireless Ad-hoc Networks**

Md. Abubakar Siddik, Tawsif Shahriar and SM Zuhair Zawhar Zaki (Bangladesh University of Engineering and Technology, Bangladesh); Ashikur Rahman (University of Alberta, Canada); Monirul Haque Imon (Bangladesh University of Engineering and Technology, Bangladesh); Raqeeb Rab (Ahsanullah University of Science and Technology, Bangladesh); Abderrahmane Leshob (University of Quebec at Montreal, Canada)

- **Reinforcement Learning-Based Routing For Deadline-Driven Wireless Communication**

Kiril Danilchenko (Ben Gurion University of the Negev, Israel); Gil Kedar (Ceracon, Israel); Michael Segal (Ben-Gurion University of the Negev, Israel)

- **Robotaxis as Computing Clusters: A Stochastic Modeling Approach**

Chinh Tran and Mustafa Mehmet-Ali (Concordia University, Canada)



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**11:00 – 12:30**

**Room:** M-1120

**Keynote1: Full Duplex Communications for the Next Generation Wireless Networks**

Octavia A. Dobre, Memorial University, Canada

Chair: Samuel Pierre (Polytechnique Montreal, Canada)

**Abstract**

With work on the 3GPP Release 18 ongoing, 5G-Advanced is on its way. An unprecedented proliferation of new Internet-of-everything services is continuing, such as extended reality, aerial vehicles, automation of industry, and connected autonomous systems, leading to the digital transformation of the society. In the last few years, the research community has started to look toward the next generation (6G) of wireless networks, which aims to bring us closer to the fully connected, intelligent digital world of the future. This talk will briefly discuss the vision for 6G wireless networks, and then focus on the full duplex technology which theoretically doubles the sum rate and enables reduced latency. In particular, different machine learning-based methods will be presented to tackle the critical self-interference problem in full duplex transceivers. The talk will conclude with directions for future investigation in the next generation wireless networks.

**Biography**

Octavia A. Dobre is a Professor at Memorial University, Canada. Her research interests include technologies for B5G wireless, as well as optical and underwater communications. Dr. Dobre is the Director of Journals of the IEEE Communications Society, and served as the inaugural Editor-in-Chief (EiC) of the IEEE Open Journal of Communications Society and the EiC of the IEEE Communications Letters. She was the General Chair, Tutorial Co-Chair, and Technical Co-Chair at various conferences. Dr. Dobre was a Royal Society Scholar and a Fulbright Scholar. She is an elected member of the European Academy of Sciences and Arts, a Fellow of the Engineering Institute of Canada, a Fellow of the Canadian Academy of Engineering, and a Fellow of the IEEE.



**14:00 – 15:40**

**Room: M-2203**

**HP2: eHPWAS SESSION 2: Artificial Intelligence in Healthcare**

Chairs: Saadi Boudjit (University Sorbonne Paris Nord, France), Tayeb Lemlouma (IRISA Lab and Rennes 1 University, France)

• **eHPWAS SESSION 2.1 Support Vector Machine for minute Colorimetric Classification of Viral RNA**

Carolina del Real Mata (McGill University, Canada); Olivia Jeanne (McGill University, Canada); Tamer AbdElFatah, Mahsa Jalali, Haleema Khan and Sara Mahshid (McGill University, Canada)

• **eHPWAS SESSION 2.2 Accuracy and precision of smartwatch for patient monitoring in Out-of-Hospital environment**

Kaio Bin (Hospital Das Clínicas Da Faculdade de Medicina Da Universidade de São Paulo & Instituto de Medicina Física e Reabilitação, Brazil); Lucas Ramos De Pretto and Fábio Beltrame Sanchez (Hospital Das Clínicas Da Faculdade de Medicina Da Universidade de São Paulo, Brazil); Linamara Battistella (University of Sao Paulo, Brazil)

• **eHPWAS SESSION 2.3 Plug-and-play Text-based Emotion Recognition for Chatbots as Virtual Companions for Older People**

Guang Lu, Lukas Große Westermann and Patric Eberle (Lucerne University of Applied Sciences and Arts, Switzerland)

**Room: M-2201**

**ST2: Internet of Things**

Chair: Brandon Foubert (Laboratoire Informatique de Grenoble & Drakkar, France)

• **SoD-MQTT: A SDN-Based Real-Time Distributed MQTT Broker**

Tidiane Sylla (Université Gustave Eiffel, France & Université Des Sciences, Des Techniques Et Des Technologies de Bamako, Mali); Radheshyam Singh (Technical University of Denmark, Ørstedes Plads, Kgs. Lyngby Denmark, Denmark); Leo Mendiboure (Université Gustave Eiffel, France); Michael S. Berger (Technical University of Denmark, Denmark); Marion Berbineau (COSYS, Université Gustave Eiffel, IFSTTAR, Univ Lille & Railenium, France); Lars Dittmann (Technical University of Denmark, Denmark)

• **A Computation Offloading Framework for Android Devices in a Mobile Cloud**

Vlad-Florin Ilie, Mihail-Andrei Bănică, Radu-Ioan Ciobanu and Ciprian Dobre (University Politehnica of Bucharest, Romania)

• **Energy-Efficient Scheduling and Resource Allocation for Power-limited Cognitive IoT Devices**

Kang Wang (Sun Yat-Sen University & School of Electronics and Information Technology, China); Peiran Wu and Minghua Xia (Sun Yat-sen University, China)

• **Area Under Time Series Transformation for Home Appliance Classification**

Leo Ogrizek (Jožef Stefan Institute, Slovenia); Blaz Bertalanic (Jozef Stefan Institute, Slovenia); Mihael Mohorcic (Jozef Stefan Institute & Jozef Stefan International Postgraduate School, Slovenia); Carolina Fortuna (Jozef Stefan Institute, Slovenia)

• **ZBDS2023: A multi location Zigbee dataset to build innovative IoT Intrusion Detection Systems**

Olivier Lourme (University of Lille & CNRS, France); Gilles Grimaud (Université de Lille, France); Michael Hauspie (University of Lille, France)



**16:00 – 17:40**

**Room: M-2203**

**HP3: eHPWAS SESSION 3: IoT and Wearable Devices in Healthcare**

Chair: Tayeb Lemlouma (IRISA Lab and Rennes 1 University, France)

• **eHPWAS SESSION 3.1 A Wearable Auricular Laser Acupuncture Device with IoT Sensors for Personalized Wellness Enhancement**

Wenrui Lin and Guann-Pyng Li (University of California, Irvine, USA)

• **eHPWAS SESSION 3.2 End-to-End 5G Priority Scheduling Strategy for a WBAN Health Monitoring System**

Saadi Boudjit (University Sorbonne Paris Nord, France); Marwen Abdennebi (L2TI Laboratory, University of Paris Nord, France); Audace Manirabona (University of Burundi, France & University of Paris 13, Burundi); Nawel Zangar (ESIEE PARIS, France)

• **eHPWAS SESSION 3.3 Predictive Treatment of Third Molars Using Machine Learning and Panoramic Radiographs**

Héctor Aravena and Miguel Arredondo (Universidad Andres Bello, Chile); Carlos Fuentes (Universidad Andres Bello, France); Carla Taramasco (Universidad Andres Bello, Chile); Diego Alcocer (Hospital Provincia Cordillera, Chile); Gustavo Gatica (Universidad Andres Bello & Santiago de Chile, Chile)

• **eHPWAS SESSION 3.4 Smartphone Camera as a Diagnostic tool for Detection of Pulse Rate and Blood Oxygen Concentration**

Anastasis C Polycarpou, Panayiotis Antoniou and Marios Nestoros (University of Nicosia, Cyprus)

**Room: M-2201**

**ST3: Deep learning**

Chair: Claude Fachkha (University of Dubai, United Arab Emirates)

• **Deep learning assisted quality ranking for list decoding of videos subject to transmission errors**

Alexis Guichemerre and Stéphane Coulombe (École de Technologie Supérieure, Canada); Anthony Trioux (Xidian University, China); Francois-Xavier Coudoux (Université Polytechnique Hauts-De-France, France); Patrick Corlay (University of Valenciennes, France)

• **Learning to Detect Wireless Spectrum Occupancy Using Clustering Approaches**

Gregor Cerar and Blaz Bertalanic (Jozef Stefan Institute, Slovenia); Mihael Mohorcic (Jozef Stefan Institute & Jozef Stefan International Postgraduate School, Slovenia); Carolina Fortuna (Jozef Stefan Institute, Slovenia)

• **Optimized Resource and Deep Learning Model Allocation in O-RAN Architecture**

Ahmed Makhoul (Qatar University, Qatar); Alaa Awad Abdellatif (Politecnico di Torino, Italy); Ahmed Badawy and Amr Mohamed (Qatar University, Qatar)

• **Evaluating Machine Learning Techniques for Predicting Link Instability in Wireless Networks to Support Live Video Streaming**

Sharon Choy and Bernard Wong (University of Waterloo, Canada)

• **Optimal D2D Learning-Based Neighbor Selection in mmWave Networks using Gittins Indices**

Vamshi Vijay Krishna Jeripotula, Mahendran Veeramani and Venkataramana Badarla (Indian Institute of Technology Tirupati, India)



# Thursday, June 22, 2023

**09:30 – 11:10**

**Room:** M-2201

**W1: Wireless Communications**

Chair: Ashraf A Tahat (Princess Sumaya University for Technology, Jordan)

• ***A Novel Single Grant-Based Uplink Scheme for High Throughput and Reliable Low Latency Communication***

Snigdhaswin Kar, Prabodh K Mishra and Kuang-Ching Wang (Clemson University, USA)

• ***Analysing and Learning Low-Latency Network Coding Schemes***

Vincent Latzko (TU Dresden, Germany); Christian Leonard Vielhaus (Technische Universität Dresden, Germany); Mahshid Mehrabi (Technical University of Dresden, Germany); Frank H.P. Fitzek (Technische Universität Dresden & ComNets - Communication Networks Group, Germany)

• ***Soft-Output PAC Decoder for Uplink Sparse Code Multiple Access System***

Tatiana Rykova (Fraunhofer HHI, Germany); Barış Göktepe (Fraunhofer Heinrich Hertz Institute, Germany); Thomas Schierl and Cornelius Hellge (Fraunhofer HHI, Germany)

• ***Interest-based Routing in Opportunistic Networks: Evaluating IRP against SCORP***

Daniela Córdova-Pintado (Escuela Politécnica Nacional & Universidad Autónoma de Barcelona, Spain); Adrián Sánchez-Carmona and Ramon Martí (Universitat Autònoma de Barcelona, Spain)

• ***Design of Multilevel Coding for Clipped and Filtered OFDM With Clipping Noise Cancellation***

Daichi Muramatsu and Hideki Ochiai (Yokohama National University, Japan)

**Room:** M-2203

**W2: IoT networks**

Chair: Franjeh El Khoury (Polytechnique Montreal, Canada)

• ***Latency and Power Consumption in 2.4 GHz IoT Wireless Mesh Nodes: An Experimental Evaluation of Bluetooth Mesh and Wirepas Mesh***

Silvano Cortesi, Michele Magno and Christian Vogt (ETH Zurich, Switzerland); Elio Reinschmidt (ETH Zürich, Switzerland)

• ***Helium-based IoT Devices: Threat Analysis and Internet-scale Exploitations***

Veronica Rammouz, Joseph Khoury and Đorđe Klisura (The University of Texas at San Antonio, USA); Morteza Safaei Pour and Mostafa Safaei Pour (San Diego State University, USA); Claude Fachkha (University of Dubai, United Arab Emirates); Elias Bou-Harb (The Cyber Center For Security and Analytics, University of Texas at San Antonio, USA)

• ***Physical-layer Authentication with Watermarked Preamble for Internet of Things***

Yuqi Leng and Ruiqi Zhang (Sun Yat-Sen University, China); Wenkun Wen (Guangzhou Techphant Co. Ltd, China); Peiran Wu and Minghua Xia (Sun Yat-sen University, China)

• ***Lightweight synchronization to NB-IoT enabled LEO Satellites through Doppler prediction***

Zheng Zhou and Nicola Accettura (LAAS-CNRS, France); Raoul Prévost (TeSA Lab, France); Pascal Berthou (CNRS/LAAS - Université de Toulouse, France)

• ***Entropy and Divergence-based DDoS Attack Detection System in IoT Networks***

Makhduma Farukali Saiyed (University of Regina, Canada); Irfan S. Al-Anbagi (Faculty of Engineering and Applied Science, University of Regina, Canada)



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**11:30 - 11:45**

**Room:** M-1120

**Chair:** Abderrahim Benslimane (University of Avignon & LIA/CERI, France)

**Opening Ceremony**

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**11:45 - 12:45**

**Room:** M-1120

**Chair:** Abderrahim Benslimane (University of Avignon & LIA/CERI, France)

**Keynote2: 6G Wireless Distributed Networks Computing Architecture for ChatGPT Services**

Wen Tong, CTO, Wireless Network, Huawei Technologies Co., Ltd.

**Abstract**

The emerging wireless networks architecture for 6G will encompass the novel data plane and computing plane design, to address the "data-driven" service and applications in 2030-2050 time-frame. Moreover, the AI or even the AGI will become the dominant service and applications, therefore, it is imperative that the mobility connectivity will be optimized to deliver AI service in the people-to-people, machine-to-machine communications scenarios. A new Distributed Wireless Networks Computing Architecture is proposed to meet the challenges for the post Moore's law computing and post Shannon communications, this will consider of the exa-FLOPS computing at data-center and peta-FLOPS at mobile devices. ChatGPT like service will be excellent example for the 6G mobile service for the mass consumer market and the emerging consumer robot markets.

**Biography**

Dr. Wen Tong is the CTO, Huawei Wireless and a Huawei Fellow. He is the head of Huawei wireless research, and the Huawei 5G chief scientist and led Huawei's 10-year-long 5G wireless technologies research and development. Dr. Tong is the industry recognized leader in invention of advanced wireless technologies, Dr. Tong was elected as a Huawei Fellow and an IEEE Fellow. He was the recipient of IEEE Communications Society Industry Innovation Award in 2014, and IEEE Communications Society Distinguished Industry Leader Award for "pioneering technical contributions and leadership in the mobile communications industry and innovation in 5G mobile communications technology" in 2018. He is also the recipient of R.A. Fessenden Medal. For the past three decades, he had pioneered fundamental technologies from 1G to 6G wireless. Prior to joining Huawei in 2009, Dr. Tong was the Nortel Fellow and head of the Network Technology Labs at Nortel. He joined the Wireless Technology Labs at Bell Northern Research in 1995 in Canada. Dr. Tong is a Fellow of Canadian Academy of Engineering, and he serves as Board of Director of Wi-Fi Alliance.



**14:00 – 15:40**

**Room: M-2201**

**W3: Wireless networks**

Chair: Alejandro Quintero (Polytechnique Montreal, Canada)

• ***A Soft Voting Classification Model for Network Traffic Prediction in VANET/V2X***

Parvin Ahmadi Doval Amiri (Mobile Computing and Networking Research Laboratory (LARIM) & Ecole Polytechnique de Montreal, Canada); Samuel Pierre (Mobile Computing and Networking Research Laboratory (LARIM), Ecole Polytechnique de Montreal, Canada)

• ***Wi-Fi Multi-Path Parameter Estimation for Sub-7 GHz Sensing: A Comparative Study***

Francesca Meneghello (University of Padova, Italy); Alejandro Blanco (The University of Edinburgh, Spain); Antonio Cusano (University of Padova, Italy); Joerg Widmer (IMDEA Networks Institute, Spain); Michele Rossi (University of Padova, Italy)

• ***A Versatile Machine Learning-Based Vehicle-to-Vehicle Connectivity Model***

Ashraf A Tahat (Princess Sumaya University for Technology, Jordan); Talal Edwan (The University of Jordan, Jordan); Motaz-Bellah Dababseh, Mohammed Nidal, Mohammed Rumman and Alaa Arabiat (Princess Sumaya University for Technology, Jordan)

• ***Whose Data are Reliable: Sensor Declared Data Reliability***

Sakib Shahriar Shafin, Gour Chandra Karmakar, Iven Mareels and Venki Balasubramanian (Federation University Australia, Australia); Ramachandra Rao Kolluri (IBM Australia Pty Ltd, Australia)

• ***Enhancing Video Streaming Quality of Service with Software-Defined Networking and Network Slicing: A Scalable AV1 Approach***

Sina Keshvadi (Thompson Rivers University, Canada); Yogesh Sharma (University of Regina, Canada)

**Room: M-2203**

**W4: UAV networks**

Chair: Donald R Reising (University of Tennessee at Chattanooga, USA)

• ***Multi-Agent Q-Learning for Drone Base Stations***

Salim Janji and Adrian Kliks (Poznan University of Technology, Poland)

• ***Density-Aware Reinforcement Learning to Optimise Energy Efficiency in UAV-Assisted Networks***

Babatunji Omoniwa (Trinity College Dublin, Ireland); Boris Galkin (Tyndall National Institute, Ireland); Ivana Dusparic (Trinity College Dublin, Ireland)

• ***Energy-Efficient Task Offloading and Trajectory Design for UAV-based MEC Systems***

Mohamed El-Emary (École de Technologie Supérieure, Canada); Ali Nawaz Ranjha (École de Technologie Supérieure ÉTS, Canada); Diala Naboulsi (École de Technologie Supérieure, Canada); Razvan Stanica (INSA Lyon, France)

• ***Quality of Service Evaluation and Forecast for EV Charging Based on Real-World Data***

Ribal Atallah (Hydro Quebec Research Institute, Canada); Nassr Al-Dahabreh, Mohammad Ali Sayed, Khaled Saredidine and Mohamed Elhattab (Concordia University, Canada); Maurice J. Khabbaz (American University of Beirut, Lebanon & Concordia University, Canada); Chadi Assi (Concordia University, Canada)

• ***Sec-PUF: Securing UAV Swarms Communication with Lightweight Physical Unclonable Functions***

Wassila Lalouani (Towson University, USA)



**16:00 – 17:40**

**Room: M-2201**

**ST4: Security and Privacy**

Chair: Elias Bou-Harb (The Cyber Center For Security and Analytics, University of Texas at San Antonio, USA)

• ***Privacy vs Utility analysis when applying Differential Privacy on Machine Learning Classifiers***

Mathuranthagaa Selvarathnam (CITY, University of London, Sri Lanka); Roshan G. Ragel (University of Peradeniya, Sri Lanka & University of New South Wales, Australia); Reyes Aldasoro Carlos Constantino (CITY University of London, United Kingdom (Great Britain)); Muttukrishnan Rajarajan (City University London, United Kingdom (Great Britain))

• ***Multivariate Polynomial Public Key Digital Signature Algorithm: Semi-covariance Analysis and Performance Test over 5G Networks***

Atinderpal Singh Lakhan and Mohammed Abuibaid (Carleton University, Canada); Zhehan Wang (Liverpool, United Kingdom (Great Britain)); Jun Steed Huang (Carleton University & University of Ottawa, Canada); Mostafa Taha (Carleton University, Canada)

• ***Practical Trustworthiness Model for DNN in Dedicated 6G Application***

Anouar Nechi and Ahmed Mahmoudi (University of Lübeck, Germany); Christoph Herold (Technische Universität Braunschweig, Germany); Daniel Widmer (Universität zu Lübeck, Germany); Thomas Kuerner (Braunschweig Technical University, Germany); Mladen Berekovic (Uni Luebeck, Germany); Saleh Mulhem (Luebeck University, Germany)

• ***Security Implications of a Satellite Communication Device on Wireless Networks Using Pentesting***

Jordan Gurren (JT Global, United Kingdom (Great Britain)); Avanthika V Harish, Kimberly Tam and Kevin D Jones (University of Plymouth, United Kingdom (Great Britain))

**Room: M-2203**

**ST5: Wireless networks 2**

Chair: Moises Nunez (Universidad de Ingenieria y Tecnologia - UTEC, Peru)

• ***Lightweight Group Pre-Handover Authentication Scheme for Aviation 5G Air-To-Ground Networks***

Gege Tian, Tao Shang, Qianyun Zhang, Kaiquan Cai and Liang Zhao (Beihang University, China)

• ***Improving the performance of OLSRouting using PHY-IP information for realistic V2V/MANETs***

Yann Maret (Edge Hill University, United Kingdom (Great Britain) & University of Applied Sciences of Western Switzerland, Fribourg, Switzerland); Mohsin Raza (Edgehill University, United Kingdom (Great Britain)); Franck Legendre (Armasuisse, Switzerland); Nik Bessis (Edge Hill University, United Kingdom (Great Britain)); Jean-Frederic Wagen (University of Applied Sciences of Western Switzerland, Fribourg, Switzerland)

• ***dRG-MEC: Decentralized Reinforced Green Offloading for MEC-enabled Cloud Network***

Asad Aftab (Technische Universität Wien, Austria); Semeen Rehman (TU Wien, Austria)

• ***Outage Performance of IRS-Assisted Underwater Optical Wireless Communication Systems over Combined Channel Model***

Lam Vu, Trung-Anh Do and Nguyen Van Thang (Posts and Telecommunications Institute of Technology, Vietnam); Tien-Sy Dang (Academy of Military Science and Technology, Vietnam); Ngoc Dang (Posts and Telecommunications Institute of Technology, Vietnam)



## Friday, June 23, 2023

**09:30 – 11:10**

**Room:** M-2201

### **W5: Deep Learning**

Chair: Mihael Mohorcic (Jozef Stefan Institute & Jozef Stefan International Postgraduate School, Slovenia)

- **Deep Learning Assisted Channel Estimation for Cell-Free Distributed MIMO Networks**

Zoheb Hassan and Jeffrey Reed (Virginia Tech, USA); Imtiaz Ahmed (Howard University, USA); Kamrul Hasan (Tennessee State University, USA); Ahmed Rubaai (Howard University, USA); Cong Pu (Oklahoma State University, USA)

- **A Low Complexity Approximation of Gradient Descent for Learning over Single and Multi-Agent Systems**

Mohammad Nassralla (American University of Beirut, Lebanon); Naeem Akl (Qualcomm, USA); Amr Mohamed (Qatar University, Qatar); Zaher Dawy (American University of Beirut, Lebanon)

- **Performance of IEEE802.11bd for Legacy and NGV Devices with Channel Bonding and No Fallback**

Farzaneh Abdolahi (Toronto Metropolitan University, Canada); Jelena Mišić (Ryerson University, Canada); Vojislav B. Mišić (Toronto Metropolitan University, Canada)

- **5G Mobile Network Signal Strength Interpolation Using Machine Learning GAN Algorithm**

Manar Zaboub and Marius Corici (Fraunhofer FOKUS, Germany); Thomas Magedanz (Fraunhofer Institute FOKUS / TU Berlin, Germany)

- **Communication-Efficient  $\Delta$ -Stepping for Distributed Computing Systems**

Haomeng Zhang and Junfei Xie (San Diego State University, USA); Xinyu Zhang (University of California San Diego, USA)

**Room:** M-2203

### **W6: IoT applications**

Chair: Chunchao Lane (Marywood University, USA)

- **Everyone can slice LoRaWAN**

Thibaut Bellanger (INSA Lyon, France); Alexandre Guitton (Université Clermont Auvergne, France); Razvan Stanica (INSA Lyon, France); Fabrice Valois (Univ Lyon, INSA Lyon, Inria, CITI, France)

- **IP/MPLS and MPLS/TP Teleprotection Latencies over High Voltage Power Lines**

Kinan Ghanem (Strathclyde University, United Kingdom (Great Britain) & PNDC, United Kingdom (Great Britain)); Stephen O Ugwuanyi and James Irvine (University of Strathclyde, United Kingdom (Great Britain))

- **Sensor-based Wastewater Monitoring Framework to Detect COVID-19**

Lutful Karim (Seneca College of Applied Arts and Technology, Canada); Md. Nour Hossain (Indiana University Kokomo, USA); Nargis Khan (Seneca College of Applied Arts and Technology, Canada); Mohammad Shorfuzzaman (Taif University, Canada); Jalal N Almhana (Universite de Moncton, Canada); Nidal Nasser (Alfaisal University, Saudi Arabia)

- **Evaluating Energy Consumption and Maximum Communication Distance for SX1280 LoRa Transceiver at 2.4 GHz towards Adaptive Networks**

Alonso Llap (Universidad de Ingeniería y Tecnología - UTEC, Peru); Moises Nunez (Universidad de Ingeniería y Tecnología - UTEC, Peru)

- **Fine Time Measurement based Time Synchronization for Multi-AP Wireless Industrial Environments**

Sugandh Huthanahally Mohan (FORTISS GmbH, Germany); Rute C. Sofia (Fortiss, Germany & ISTAR, ISCTE-IUL, Portugal)



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**11:30 – 12:30**

**Room:** M-1120

**Chair:** Abderrahim Benslimane (University of Avignon & LIA/CERI, France)

**Keynote3: Reconfigurable Intelligent Metasurfaces for Smart Radio Communications in 6G**

Ekram Hossain, Ph.D., P.Eng., FIEEE, FCAE, FEIC, University of Manitoba, Canada

**Abstract**

Reconfigurable Intelligent metaSurfaces (RISs) are generally planar surfaces consisting of unit-cells that can be tuned dynamically to alter the amplitude, polarization, and/or phase of the incident electromagnetic signals, thereby collaboratively reconfiguring the signal propagation to achieve various desired functions such as three-dimensional (3D) passive beamforming, spatial interference nulling and/or cancellation. RISs can serve as low-cost network nodes to achieve network densification without using expensive base stations or access points. They are envisioned to be one of the key technologies in order to boost coverage, capacity, energy efficiency, reliability, and security of 6G wireless communications. In this talk, starting from the fundamental background and classification of a variety of RISs, their operating principles and applications, design and resource allocation solutions for RIS-enhanced wireless networks will be presented. These solutions borrow a variety of concepts and tools from signal processing for wireless communications, stochastic geometry, optimization, and deep learning. Open research challenges and research directions pertaining to design and deployment of RIS and their integration with other key 6G technologies (e.g. for mmWave and THz communications) will be also discussed.

**Biography**

Ekram Hossain (IEEE Fellow) (<http://home.cc.umanitoba.ca/~hossaina>) is a Professor and the Associate Head of Graduate Studies in the Department of Electrical and Computer Engineering at University of Manitoba, Winnipeg, Canada. He is a Member (Class of 2016) of the College of the Royal Society of Canada, and also a Fellow of the Canadian Academy of Engineering and a Fellow of the Engineering Institute of Canada. He received his Ph.D. in Electrical Engineering from University of Victoria, Canada, in 2001. Dr. Hossain's current research interests include design, analysis, and optimization of Beyond 5G/6G networks, applied machine learning, game theory, and network economics. He was elevated to an IEEE Fellow "for contributions to spectrum management and resource allocation in cognitive and cellular radio networks". He was listed as a Clarivate Analytics Highly Cited Researcher in Computer Science in 2017, 2018, 2019, 2020, 2021, and 2022. Dr. Hossain has won several research awards including the "2017 IEEE Communications Society (ComSoc) Best Survey Paper Award", the 2011 IEEE Communications Society Fred Ellersick Prize Paper Award, and the University of Manitoba Merit Award in 2010, 2013, 2014, and 2015 (for Research and Scholarly Activities). He received the 2017 IEEE ComSoc TCGCC (Technical Committee on Green Communications & Computing) Distinguished Technical Achievement Recognition Award "for outstanding technical leadership and achievement in green wireless communications and networking". Currently, he is a Member of the Next G Alliance Research Council (<https://www.nextgalliance.org/research-council/>) working on developing a comprehensive North American 6G Research strategy. Also, he serves as an Editor of the IEEE Transactions on Mobile Computing and the Director of Online Content (2022-2023) for the IEEE ComSoc. Previously, he served as the Editor-in-Chief of the IEEE Press (2018-2021), the IEEE Communications Surveys and Tutorials (2012-2016), and the Director of Magazines for the IEEE ComSoc (2020-2021). Dr. Hossain was an elected Member of the Board of Governors of the IEEE ComSoc for the term 2018-2020. He is a registered Professional Engineer in the province of Manitoba, Canada.



**14:00 – 15:40**

**Room: M-2203**

**VN: VN4RRSR: Vehicular Networks for Risk Reduction and Safety-Related Systems**

Chair: Martin Klapez (University of Modena and Reggio Emilia, Italy)

• ***Platoon-Local Dynamic Map: Micro cloud support for platooning cooperative perception***

Carlos M Risma Carletti (Politecnico di Torino & Eurecom, Italy); Claudio E. Casetti (Politecnico di Torino, Italy); Jérôme Härri (EURECOM, France); Fulvio Rizzo (Politecnico di Torino, Italy)

• ***Analyzing Inter-Vehicle Collision Predictions during Emergency Braking with Automated Vehicles***

Joseba Gorospe (Mondragon Unibertsitatea, Spain); Shahriar Hasan and Mir Riyanul Islam (Mälardalen University, Sweden); Arrate Alonso (Mondragon Unibertsitatea, Spain); Svetlana Girs (Mälardalen University, Sweden); Elisabeth Uhlemann (Mälardalen University, Sweden)

• ***Comparing different GPS solutions for the Cooperative Awareness Messages Distribution***

Carlo Augusto Grazia, Martin Klapez and Maurizio Casoni (University of Modena and Reggio Emilia, Italy)

• ***Semantically Optimized End-to-End Learning for Positional Telemetry in Vehicular Scenarios***

Neelabhro Roy, Seyed Samie Mostafavi and James Gross (KTH Royal Institute of Technology, Sweden)

• ***Bringing Connected Vehicle Communications (V2X) to Shared Spectrum***

Jon M. Peha (Carnegie Mellon University & White House Office of Science & Technology Policy, USA)

**Room: M-2201**

**W7: Security and privacy**

Chair: Martin Husák (Masaryk University, Czech Republic)

• ***RF Fingerprint-based Identity Verification in the Presence of an SEI Mimicking***

Donald R Reising, Joshua Tyler, Mohamed K Fadul and Matthew Hilling (University of Tennessee at Chattanooga, USA); Thomas Loveless (University of Tennessee, Chattanooga, USA)

• ***Keep your Enemies closer: On the minimal Distance of Adversaries when using Channel-based Key Extraction in SISO 6G Systems***

Felix Klement (University of Passau, Germany); Shoya Takebuchi (Ministry of Internal Affairs and Communications, Japan); Tolga Arul and Stefan Katzenbeisser (University of Passau, Germany)

• ***Analyzing the Feasibility of Privacy-Respecting Automated Tracking of Devices Fleeing a Burglary***

Ben Swierzy, Markus Krämer, Daniel Vogel and Daniel Meyer (University of Bonn, Germany); Michael Meier (Uni Bonn, Germany)

• ***Sabotage-proof Messenger Discovery for Protesters based on Brownian motion and Erasure Coding***

Chunchao Lane (Marywood University, USA); Wen Cheng (Southern Arkansas University, USA); Todd Dotter and Zachary Parkhurst (Marywood University, USA)

• ***Residual Service Time Optimization for legacy Wireless-TSN end nodes***

Pablo Avila-Campos (Ghent University - Imec, Belgium); Jetmir Haxhibeqiri (IDLab, Ghent University - imec, Belgium); Merkebu Girmay (Ghent University - Imec, Belgium); Ingrid Moerman and Jeroen Hoebeke (Ghent University - imec, Belgium)



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**16:00 – 17:40**

**Room:** M-2201

**SP: WiMob-SPPDT'2023 - WiMob 2023 Short Papers, Posters and Demos**

**Chair:** Saadi Boudjit (University Sorbonne Paris Nord, France)

• ***Low Complexity HARQ Algorithm for a Polar Code Decoder***

Janak Sodha (University of the West Indies, Barbados)

• ***Distributed Cryptography for Lightweight Encryption in Decentralized CP-ABE***

Mohammed B. M. Kamel (Furtwangen University, Germany & Eotvos Lorand University, Hungary); Janneke Van Oosterhout (University of Twente, The Netherlands); Peter Ligeti (Eotvos Lorand University, Hungary); Christoph Reich (HS Furtwangen, Germany)

• ***Recommending Similar Devices in Close Proximity for Network Security Management***

Vladimír Bouček and Martin Husák (Masaryk University, Czech Republic)

• ***Reduced Complexity Group-based Precoding for Downlink Cell-free Massive MIMO***

Mariam Mussbah, Stefan Schwarz and Markus Rupp (TU Wien, Austria)

• ***Exploring the Potential of Residual Networks for Efficient Sub-Nyquist Spectrum Sensing***

Hem Regmi and Sanjib Sur (University of South Carolina, USA)



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