WTS 2019

Wireless Telecommunications Symposium 2019

Global Wireless Communications: Now and in the Future

April 9 - 12, 2019

California State Polytechnic University, Pomona

Watson Hotel
New York City, NY, USA

WELCOME TO WTS 2019

Welcome to the eighteenth annual Wireless Telecommunications Symposium, WTS 2019, "Global Wireless Communications: Now and in the Future." We hope that it will be a stimulating and rewarding experience for you. During the next four days of invited speakers' presentations, accepted paper sessions, workshops, tutorials and a panel discussion, WTS 2019 will explore a wide range of multidisciplinary wireless communications, mobile computing, and emerging media topics in depth.

The WTS 2019 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 2019, the many reviewers who reviewed them, and the co-chairs, mini-symposium 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 2019 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 2019, 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 the program.

Finally, special thanks go to many organizations that 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 and Electrical & Computer Engineering Departments.

On behalf of the WTS 2019 Committee -- Welcome to WTS 2019!

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

WTS 2019 Program April 9-12, 2019
Watson Hotel
New York City, NY, USA

Tuesday, April 9	
	Interdisciplinary Workshops: Topics in Wireless Communications I "Cybersecurity, Privacy, and Intelligence (CSPI 2019)" Organizers: **Dr. Ehsan Sheybani** & **Dr. Giti Javidi** University of South Florida
10:00 am – 12:00 pm	Tutorial: "Big Data and Cybersecurity Analytics" **Dr. Lila Rajabion** University of South Florida
12:00 pm – 2:00 pm	Lunch (on own)
2:00 pm – 3:00 pm	Paper Presentations
3:00 pm – 3:15 pm	Break
	Interdisciplinary Workshops: Topics in Wireless Communications II "Young Research and Entrepreneurship: Challenges and Innovations" Organizer: **Dr. Theofilos Chrysikos** University of Patras
3:15 pm – 5:00 pm	Tutorial
5:00 pm – 5:45 pm	Paper Presentations

6:00 pm – 9:00 pm	WTS Organizers' Meeting
Wednesday, April 10	
8:00 am - 9:00 am	Registration
9:00 am – 9:15 am	Welcoming Remarks
9:15 am – 10:00 am	"Digital Transformation" **Dr. Drew Hwang** Chair & Professor, CIS Department Cal Poly Pomona
10:00 am – 10:30 am	Break
10:30 am – 11:15 am	**Dr. Qing-An Zeng** Interim Chair & Associate Professor, Computer Systems Technology Department North Carolina A&T State University
11:15 am – 12:00 pm	"Eyes on 2020 - Observations on competitive advantage for CSP's" **Dr. Rob van den Dam** Global Telecommunications Industry Leader, Institute for Business Value IBM
12:00 pm – 2:00 pm	Lunch Guest Speaker: **Prof.dr Milica Pejanović-Djurišić** United Nations Ambassador/Permanent Representative from Montenegro

2:00 pm – 2:45 pm	**Joe Weinman** Author, Keynote Speaker, and Digital Strategist
2:45 pm – 3:15 pm	Break
3:15 pm – 4:45 pm	Panel Discussion: "5G Security: New Architecture, New Services, New Challenges" Organizer and Panel Moderator: **Dr. François Cosquer** CTO Security Nokia Software Panelists Include: **Dr. Ed Amoroso**, CEO , TAG Cyber (former AT&T CSO) **Antony Martin**, Infrastructure Security Expert, Orange **Thomas Reddington**, Industry Professor of Computer Science, NYU **Ron Winward**, Security Evangelist, Radware
4:45 pm – 5:30 pm	Doctoral Students' Session "Performance Analysis for Virtual-Cell Based CoMP 5G Networks Using Deep Recurrent Neural Nets" Mohamed Elkourdi, Asim Mazin and Richard D. Gitlin (University of South Florida, USA)
5:30 pm – 9:00 pm	Welcoming Reception & Dinner WTS Organizer Recognition Ceremony Guest Speaker: **Dr. Henning Schulzrinne** Julian Clarence Levi Professor of Computer Science at Columbia University Former Chief Technology Officer at the US Federal Communications Commission (FCC) Co-Author of the Internet Protocols RTP, SIP, and RTSP
Thursday, April 11	
9:00 am – 10:00 am	"Industry Expectations for Information Systems Professionals" & "Global Vulnerabilities of Cyber Attacks on Financial Securities Exchanges" **Dr. Carlos Navarrete** &

	Dr. Greg Carlton Professors, CIS Department Cal Poly Pomona
10:00 am – 10:30 am	Break
10:30 am – 11:15 am	**Dr. Martin Kohn** Independent Consultant and Strategist – Health Data Analytics, Health Policy and Healthcare Management
11:15 am – 12:00 pm	Interdisciplinary Workshops: Topics in Wireless Communications III "Fake News, Real Implications: Responsibilities and Consequences in the Political, Financial and Social Process" **Dr. Vassiliki Cossiavelou** Youth & Media Lab, Aegean University
12:00 pm - 2:00 pm	Lunch Guest Speaker: "Cyber and Information Security in the Big Apple: Preparing Students and Working Professionals for Securing the Wireless World and Beyond" **Dr. Katia Passerini** Dean, College of Professional Studies Professor, Division of Computer Science, Mathematics and Science St. John's University
2:00 pm – 2:45 pm	"How America Is Using Electronic Media" **Dr. William F. Baker** Educator, Author, and Former Broadcast Television Executive Director, Bernard L. Schwartz Center for Media, Education, and Public Policy Fordham University
2:45 pm – 3:15 pm	Break
3:15 pm – 4:00	"5G and Next-generation Automation" **Dr. Marcos Tavares** Researcher

pm	Nokia Bell Labs
4:00 pm – 4:45 pm	Poster Paper Session
	Dinner and Coach Tour
4:45 pm - 5:30 pm	Guest Speaker: **Dr. Jon Peha** Professor, Dept. of Engineering and Public Policy and the Dept. of Electrical and Computer Engineering Carnegie Mellon University Former Chief Technologist of the U.S. Federal Communications Commission
5:30 pm – 9:30 pm	Dinner and Tour
Friday, April 12	
8:10 am – 10:10 am	Paper Presentation Session (I)
10:10 am – 10:20 am	Break
10:20 am – 12:00 noon	Paper Presentation Session (II)
12:00 noon – 1:10 pm	Lunch Best Paper Awards Ceremony
1:10 pm – 3:10	Paper Presentation Session (III)

pm	
3:10 pm – 3:30 pm	Break
3:30 pm – 5:30 pm	Paper Presentation Session (IV)

Panel Discussions, Workshops & Tutorials

WTS 2019 Interdisciplinary Workshops: Topics In Wireless Communications

Wireless communications is a very broad field encompassing many subject areas and disciplines. An interdisciplinary viewpoint, emphasizing the field's technological, management, policy, security, and application foundations, is necessary when examining it. To demonstrate the breadth of wireless communications and its interdisciplinary nature, the WTS 2019 Interdisciplinary Workshops: Topics in Wireless Communications will bring together a group of researchers with diverse backgrounds in three separate focus area workshops. A brief description of each workshop follows:

(1) **Young Research and Entrepreneurship: Challenges and Innovations**
Organizer: Dr. Theofilos Chrysikos, University of Patras

In a constantly shifting global environment, the next generation of academia and industry will seek to set targets and goals for the development and implementation of new ideas to solve modern-day problems. This workshop brings

together young researchers and entrepreneurs from academia, private initiative and industry to share experiences, innovations and advances in their work, as well as to share (and learn from) their hardships, challenges and roadblocks. Topic areas of interest include, but are not limited to, the following:

- Case studies, test-beds and simulations
- Start-ups, research hubs and innovation prototypes
- Smart world: from smart home to smart city
- Green solutions and applications
- Smart/M-Health and Biosensors/Biomedical devices
- 5G/Backhaul modeling and standardization
- Security, privacy, authentication
- Cloud computing/Big data
- Machine learning
- Virtual Reality/Augmented reality products

(2) **Cybersecurity, Privacy, and Intelligence (CSPI 2019)**
Organizers**:** Dr. Ehsan Sheybani & Dr. Giti Javidi, University of South Florida

Increasingly, sophisticated techniques from artificial intelligence and machine learning are being applied to challenges in security and privacy fields. However, experts from these areas do not have a high-visibility medium at premier machine learning and artificial intelligence conferences, where they can meet and exchange ideas so that strong collaborations can emerge, and cross-fertilization of these areas can occur. Moreover, current courses and curricula in security do not sufficiently emphasize background in these areas and students in security are not emerging with deep knowledge of these topics. This workshop addresses the research and development efforts in which analytical techniques from machine learning and artificial intelligence are applied to solve security challenges.

Topic areas of interest include, but are not limited to, the following:

- Artificial intelligence techniques for security
- Machine learning for security
- Applications of AI to security
- Inference Control
- Privacy-preserving data mining
- Security of machine learning
- Security of data mining
- Case studies
- Educational topics and courses

(3) **Fake News, Real Implications: Responsibilities and Consequences in the Political, Financial and Social Process**
Organizers: Dr. Vassiliki Cossiavelou, Aegean University, Youth & Media Lab
Dr. Athina Karatzogianni, University of Leicester

The Fake News workshop helps the participant become more knowledgeable in identifying and fighting fake news and follow international developments towards this target. It considers information disorders and their implications with respect to the political process, such as Brexit and Trump's election, and everyday social life. It also considers the main actions taken by international institutions towards the protection of citizens from cyber-propaganda.

Topic areas of interest include, but are not limited to, the following:

- Political campaigning and fighting fake news
- Assessing the impact of social media in public opinion
- Big Data and tackling cyber-propaganda
- Real-time social media mining
- Fact-checking organizations and fake news

- Fake news and trust in mainstream media
- Production and dissemination of fake news for medical issues
- Fake news and the business/corporate sector
- Fake news as a business
- Disinformation and virality in advertisement
- Shifting epistemologies of news in a digital age
- Future of journalism in times of post-truth and fake news
- Bots and non-human actors' detection in content generation
- Biases employed by algorithms to decide which subjects are newsworthy
- Fake news in social media 'echo chambers'
- Trolling, online aggression and gender
- Measurement systems and social 'attention metrics'
- Taxonomies and definitions of the different kinds of fake news
- User experience and branding in fake news era
- User profiling and fake news
- Semiotics of fake news and virality
- Natural language processing for fake news
- Privacy and security in news recommender systems
- Threats to individual privacy and public law solutions

WTS 2019 Panel Discussion

5G Security: New Architecture, New Services, New Challenges
Panel Organizer and Moderator: Dr. Francois Cosquer, CTO Security, Nokia Software

Panelists Include:
Dr. Ed Amoroso, CEO , TAG Cyber (former AT&T CSO)
Antony Martin, Infrastructure Security Expert, Orange

Thomas Reddington, Industry Professor of Computer Science, NYU
Ron Winward, Security Evangelist, Radware

Abstract
With initial trials and roll outs in progress, 5G experimentations and standards are going hand in hand at high speed trying to deliver on high expectations from end-users. Beyond high bandwidth, low latency and reduced power consumption at the radio level, 5G is actually a drastic change in the industry in terms of architecture and services. The introduction of new technologies brings automation and orchestration to a different level compared to existing cellular infrastructures. The rise of IoT devices connectivity requirements adds an additional scale factor. This is no surprise that 5G security has become a key area of interest as it combines a long list of topics: From NFV security with all its technical flavors such as virtualization, cloud, VM, container, services, to SDN security with its promise of flexibility and service chaining, combined with new delivery models such as Continuous Integration and Continuous Delivery. This panel will begin by discussing top security challenges, requirements and associated best practices - as well as identifying their potential dependencies and interactions from an end to end perspective. The panel will then discuss potential use cases of incidents including scenarios where frequent changes in these high dynamic and distributed systems could lead to security incidents. Finally, possible directions for addressing those challenges and increase the overall security posture are identified.

Tuesday, April 9 Watson Hotel	
	Interdisciplinary Workshops: Topics in Wireless Communications I: Cybersecurity, Privacy, and Intelligence (CSPI 2019)
2:00 pm - 3:00 pm	*Machine Learning-based Primary User Emulation Attack Detection In Cognitive Radio Networks using Pattern Described Link-Signature (PDLS)* Abdulsahib Albehadili and Atif Ali (University of Toledo, USA); Farha Jahan (The University of Toledo, USA); Ahmad Y Javaid and Jared Oluoch (University of Toledo, USA); Vijay Devabhaktuni (The University of Toledo, USA) *Design and Development of a Modular K12 Cybersecurity Curriculum* Ehsan Sheybani (University of South Florida, USA); Giti Javidi (University of South Florida Sarasota-Manatee, USA); Zacharias Pieri (USFSM, USA) *Enhancing Cybersecurity Workforce Human Factors in VUCA Environment* Ehsan Sheybani (University of South Florida, USA); Giti Javidi (University of South Florida Sarasota-Manatee, USA); Mitch Javidi (National Command and Staff College, USA)
	Interdisciplinary Workshops: Topics in Wireless Communications II: Young Research and Entrepreneurship: Challenges and Innovations
5:00 pm – 5:45 pm	*Design analysis of a proposed pancreas-implantable antenna and WBAN channel characterization for the MICS and ISM bands* Konstantina Zarafeta, Theofilos Chrysikos and Stavros Koulouridis (University of Patras, Greece); Stavros Kotsopoulos (Wireless Telecommunications Laboratory, Greece) *A New Proposed Fuzzy Medical Care System For Remote Health Monitoring Using Wearable Antennas* Dimitrios Tyrovolas and Theofilos Chrysikos (University of Patras, Greece); Stavros Kotsopoulos (Wireless Telecommunications Laboratory, Greece)

Wednesday, April 10 Watson Hotel	
4:45pm – 5:30pm	Doctoral Students' Session *Performance Analysis for Virtual-Cell Based CoMP 5G Networks Using Deep Recurrent Neural Nets* Mohamed Elkourdi, Asim Mazin and Richard D. Gitlin (University of South Florida, USA)

Thursday, April 11 Watson Hotel	
4:00pm – 4:45pm	Poster Paper Session *Flow-based Transmission Scheduling Assuming WLAN for Industrial Automatio* Yoshihisa Kondo (ATR Adaptive Communications Research Lab., Japan); Tatsuya Yoshioka (Advanced Telecommunications Research Institute International, Japan); Akio Hasegawa (ATR Adaptive Communications Research Lab., Japan) *An IOT based low cost environment monitoring system using single board sensor integration and ThingSpeak server for developing countries* M Samiul Ehsan, Shukla Biswas, Anika Nawar, Rumali Siddiqua and Belal Bhuian (BRAC University, Bangladesh)

Friday, April 12 Watson Hotel	
8:10 am – 10:10 am	I-A Internet of Things, WSN & Smart Devices I IEEE Xplore Papers *Uncovering the True Potentials of the Internet of Things* Abdulrahman Yarali (MSU, USA); Manu Srinath (Murray State University, USA) *Localization of Passive UHF RFID Tags Based on a Frequency-Stepped Continuous-Wave Approach* Martin Scherhäufl (Linz Center of Mechatronics GmbH, Austria); Markus Pichler-Scheder (LCM, Austria); Andreas Stelzer (Johannes Kepler University Linz, Austria) *RFID Implementation in Supply Chain Management Using P2P Network Overlay* Pouyan Ahmadi, Khondkar Islam and Pooja Podduturi (George Mason University, USA); Trevor Maco (Virginia Tech, USA) *Design and Evaluation of a Novel MAC Protocol for Multi-Implantable UHF-RFID Transmitters for Brain-Computer Interface Applications* Albena Mihovska (Aarhus University, Denmark); Harshini Harikrishnan (SDSU, USA); Aarjish Sarkar (Mt. Carmel High School, USA); Christopher Paolini (San Diego State University, USA) *Emerging Technology Trends in Vehicle-to-Everything Connectivity* Neelu Sinha (Fairleigh Dickinson University, USA) *An Experimental Study on Energy Consumption of Wireless Multipath TCP Connections* Atef Abdrabou, Monika Prakash, Ahmed AlShehi, Sirag-Eldin Ahmed and Mohamed Darwish (UAE University, United Arab Emirates)

8:10 am – 10:10 am	I-B Physical and MAC Layers I IEEE Xplore Papers *Alternating Renewal Theory Based MAC-Layer Sensing Period Optimization in CRNs with Hybrid OFF/ON Channel State Length Distributions* Zhiwei Mao (Fairleigh Dickinson University, USA); Xianmin Wang (Cypress Seminconductor Corp., Hazlet, New Jersey) *Energy-efficient Techniques for Combating the Influence of Reactive Jamming Using Non-Orthogonal Multiple Access and Distributed Antenna Systems* Joumana Farah and Jacques Akiki (Lebanese University, Faculty of Engineering, Lebanon); Eric Pierre Simon (University of Lille, France) *Self-Synchronizing Time-Division Multiple-Access Network Protocol* Andres Monterrosas (Johns Hopkins University Applied Physics Laboratory, USA); William Kight (JHU/APL, USA); Emre Gunduzhan (Johns Hopkins University Applied Physics Laboratory, USA); David Coleman (JHU/APL, USA) *Blind Parameters Estimation for Universal Filtered Multicarrier: a Cyclostationarity Approach* Kawtar Zerhouni (University of Cadi Ayyad, Information Technology and Modeling Laboratory, Morocco & IFSTTAR, LEOST, France); Fouzia Boukour Elbahhar (IFSTTAR, France); Raja Elassali (Cadi Ayyad University, Information Technology and Modeling Laboratory, Morocco); Khalid Elbaamrani (University Of Cadi Ayyad, Morocco) *Capacity and Energy-Efficiency of Delayed Access Scheme for Small Cell Networks* Haluk Celebi (Columbia University, USA); Ismail Güvenç (North Carolina State University, USA); Henning Schulzrinne (Columbia University, USA) *Device-to-Device Communications in Millimeter Wave Band: Impact of Beam Alignment Error* Niloofar Bahadori and Nima Namvar (North Carolina A&T State University, USA); Brian T Kelley (University of Texas at San Antonio, USA); Abdollah Homaifar (North Carolina A&T State University, USA)
10:10 am – 10:20 am	**Break**
10:20 am – 12:00 pm	II-A Internet of Things, WSN & Smart Devices II IJITN & Other Papers *Kinetic Threats and IoT Cybersecurity Issues Facing the Interconnected Society and its Digital Resilience* J Shim (Georgia State University, USA) *Monitoring Coverage Holes with Mobile Nodes in Wireless Sensor Networks* Arunita Jaekel and Dhruvi Patel (University of Windsor, Canada) *A Multi-Layered Reliability Approach in Vehicular Ad-Hoc Networks*

	Hasita Kaja (University of Missouri, Kansas City, USA); Cory Beard (University of Missouri-Kansas City, USA) *Reliability-Secrecy Tradeoff for Implantable Medical Devices* Alaa Awad Abdellatif, Lutfi Samara and Amr Mohamed (Qatar University, Qatar); Mohsen Guizani (University of Idaho, USA); Abdulla K Al-Ali and Aiman Erbad (Qatar University, Qatar) *Lower-limb Rehabilitation at Home: A Survey on Exercise Assessment and Initial Study on Exercise State Identification Toward Biofeedback* Seanglidet Yean, Bu Sung Lee and Chai Kiat Yeo (Nanyang Technological University, Singapore)
10:20 am – 12:00 pm	II-B Network Layer & NGNs I IEEE Xplore Papers *Towards Tactile Wireless Multi-Hop Networks The Tactile Coordination Function as EDCA Supplement* Frank Engelhardt, Chenke Rong and Mesut Günes (Otto von Guericke University Magdeburg, Germany) *A Machine Learning Assisted Method of Coverage and Capacity Optimization (CCO) in 4G LTE Self Organizing Networks (SON)* Zhenyi Lin (Verzion Wireless, USA); Ye Ouyang (Verizon Wireless, USA); Le Su and Wenyuan Lu (Verzion Wireless, USA); Zhongyuan Li (Verizon Wireless, USA) *P2P: From Packets to People, Leverage Wireless Artifical Intelligence for Bridging Network Performance Healthiness to Quality of Experience (QoE) in 4G Networks* Ye Ouyang (Verizon Wireless, USA); Le Su, Wenyuan Lu and Zhenyi Lin (Verzion Wireless, USA); Maulik Shah (Verizon, USA); Zhongyuan Li (Verizon Wireless, USA) *A Network Selection Algorithm for supporting Drone Services in 5G Network Architectures* Emmanouil Skondras (UNIPI, Greece); Eirini Zoumi (University of Piraeus, Greece); Angelos Michalas (Technological Education Institute of Western Macedonia, Greece); Dimitrios D. Vergados (University of Piraeus, Greece) *A Distributed Mitigation Strategy Against DoS Attacks in Edge Computing* Giuseppe Potrino, Floriano De Rango and Peppino Fazio (University of Calabria, Italy)
10:20 am – 12:00 pm	II-C Modeling, Simulations, and Analytics I IEEE Xplore Papers *QoE-driven Anomaly Detection in Self-Organizing Mobile Networks using Machine Learning* Chetana V Murudkar and Richard D. Gitlin (University of South Florida, USA) *Performance of Optically-Preamplified, Direct-Detection, M -ary PPM for Inter-Satellite Links*

	Sanaa Hamid Mohamed (University of Leeds, United Kingdom (Great Britain)); Aly Elrefaie (W&Wsens Devices, USA); Mohamed Hassan and Taha Landolsi (American University of Sharjah, United Arab Emirates) *A Probabilistic Closed-form Expression for the Amount of Data Secondary Users Can Transmit in Cognitive Radio Networks* Maram Helmy, Yousuf Aborahama, Mohamed Hassan and Mahmoud H. Ismail (American University of Sharjah, United Arab Emirates) *Clustering Algorithms and Validation Indices for mmWave Radio Multipath Propagation* Bogdan Antonescu, Miead Tehrani Moayyed and Stefano Basagni (Northeastern University, USA) *Digital Recording System Identification Based on Blind Deconvolution* Michel Kulhandjian (University of Ottawa & Carleton University, Canada); Hovannes K. Kulhandjian (California State University, Fresno, USA); Claude D'Amours (University of Ottawa, Canada); Dimitris A. Pados (Florida Atlantic University, USA)
12:00 pm – 1:10 pm	**Lunch** **Best Paper Awards Ceremony**
1:10 pm – 3:10 pm	III-A Internet of Things, WSN & Smart Devices III IJITN & Other Papers *A Novel Congestion Avoidance Algorithm for Autonomous Vehicles Assessed by Queue Modeling* Khashayar Kotobi (The University of Tennessee at Chattanooga, USA); Mina Sartipi (University of TN at Chattanooga, USA) *Low-Cost RFID Authentication Protocol Based on Elliptic Curve Algorithm* Rania Baashirah, Abdelshakour A. Abuzneid, Salah Addine Mellouki, Zeba Siraj and Cheng Zhan (University of Bridgeport, USA) *A Study of Various Network Security Challenges in the Internet of Things (IoT* Abdulrahman Yarali (MSU, USA); Manu Srinath (Murray state University, USA); Randall Joyce (Murray State University, USA) *Connecting Internet-of-Things (IoT) Devices to Cellular Networks* Zohar Naor (University of Haifa, Israel) *Incoming Traffic Characterization of WiFi-based Internet of Things Gateways* Maitha Al Darei, Atef Abdrabou and Monika Prakash (UAE University, United Arab Emirates) *Exploring Non-idealities in Real Device Implementations of Bluetooth Mesh* Paul Gavrikov (University of Applied Sciences Offenburg, Germany); Matthias Lai (NewTec GmbH; University of Applied Sciences Offenburg, Germany); Thomas M. Wendt (University of Applied Sciences Offenburg, Germany)

1:10 pm – 3:10 pm	III-B Physical and MAC Layers II IJITN & Other Papers *Adaptive Complex Filtering for Narrowband Jamming Mitigation in Resource-Constrained Wireless Network* Georgi Iliev (Technical University of Sofia, Bulgaria); Albena Mihovska (Aarhus University, Denmark); Dimitriya Mihaylova and Zlatka Valkova-Jarvis (Technical University of Sofia, Bulgaria) *Performance of Uplink Non-Orthogonal Multiple Access (NOMA) in the Presence of Channel Estimation Errors* Faeik Al Rabee and Richard D. Gitlin (University of South Florida, USA) *Second-Order Statistics of MRC Reception with a Transparent Amplify-and-Forward Relay* Jia-Chin Lin (National Central University, Taiwan) *Optimum Receiver Based on Principal Component Analysis for Spatially Correlated Nakagami-m Fading Channels* Jia-Chin Lin (National Central University, Taiwan) *A Trust Framework for Centralized TDMA Scheduling Mechanism in Vehicular Ad hoc Networks* Mohamed Hadded (VEDECOM, France); Toumi Khalifa (IRT SYSTEMX, France); Anis Laouiti (TELECOM SudParis, France); Paul Muhlethaler (INRIA, France)
1:10 pm – 3:10 pm	III-C Cybersecurity, Privacy, Assurance & Business Policy IJITN & Other Papers *Real Options Analysis of Next-Generation Frequency Spectrum License* Donghyun An and Deok-joo Lee (Seoul National University, Korea); Taegu Kim (Hanbat National University, Korea); Jonghoon Park (Kyung Hee University, Korea) *The Convergence of Blockchain, Internet of Things (IoT) and Building Information Modeling (BIM): The Case of the Smart Museum* Konstantina Siountri (University of Piraeus, Greece); Emmanouil Skondras (UNIPI, Greece); Theodoros Mavroeidakos and Dimitrios D. Vergados (University of Piraeus, Greece) *IACAP: Internet-exposed Assets Cybersecurity Analysis Platform* Yan Sun (Queen Mary University of London, United Kingdom (Great Britain)); Mingsheng Yin (Queen Mary University of London, USA); Saioa Arrizabalaga and Santiago Figueroa (Ceit & Universidad de Navarra, Tecnun, Spain); Javier Añorga (Ceit-IK4 Universidad de Navarra, Tecnun, Spain) *Business Models Evolution in the Wireless Industry: A Case Study of Xiaomi in China* Min Zhang and Katia Passerini (St. John's University, USA); Michael Bartolacci (Penn State University - Berks, USA) *Performance and Security Analysis of Hash Functions*

	Sultan Almuhammadi and Omar Bawazeer (King Fahd University of Petroleum & Minerals, Saudi Arabia) *New NLFSR Functions of Degree 3 with Optimal Periods* Ibraheem Al-Hejri (King Fahd University of Petroleum and Minerals, Saudi Arabia); Sultan Almuhammadi (King Fahd University of Petroleum & Minerals, Saudi Arabia)
3:10 pm – 3:30 pm	**Break**
3:30 pm – 5:30 pm	IV-A Network Layer & NGNs II IJITN & Other Papers *Performance Evaluation of MANET Algorithms in an Emergency Response Environment* Pouyan Ahmadi and Khondkar Islam (George Mason University, USA); Trevor Maco (Virginia Tech, USA); Subhankar Ghosh (George Mason University, USA) *A Review of Low Altitude Platform (LAP) Wireless Network Deployment for Emergency Communications Practitioners* Michael Bartolacci (Penn State University - Berks, USA); Larry LeBlanc (Vanderbilt University, USA); Thomas Grossman (University of San Francisco, USA) *Analysis of MAC Protocol for D2D in 5G Networks* Abdullilah Alotaibi and Salman A AlQahtani (King Saud University, Saudi Arabia) *AirSense: An Air Contaminant Detection System* Rania Baashirah, Neha Pasnoori, Xinai Cao, Seowon Jung and Abdelshakour A. Abuzneid (University of Bridgeport, USA) *FANET for Precision Agriculture Domains: Recruiting Strategy based on ACO* Floriano De Rango, Mauro Tropea, Giuseppe Potrino and Amilcare Santamaria (University of Calabria, Italy) *An Intelligent Management Functionality for Improving the Interaction with Autonomous Vehicles* Ilias Panagiotopoulos (Harokopio University of Athens, Greece); George Dimitrakopoulos (Harokopion University of Athens, Greece)
3:30 pm – 5:30 pm	IV-B Modeling, Simulations, and Analytics II IJITN & Other Papers *Real-Time Indoor Geolocation Tracking for Assisted Healthcare Facilities* Albena Mihovska (Aarhus University, Denmark); Christopher Paolini, Mahasweta Sarkar and Kinjal Gala (San Diego State University, USA); Paul Bryden (University of Strathclyde, United Kingdom (Great Britain)); Matthew Wang

(UCLA, USA)

Conceptual Modeling of an IP Phone Communication System: A Case Study
Sabah S. Al-Fedaghi and Ghadeer Aldamkhi (Kuwait University, Kuwait)
RF-Based Machine Learning Solution for Indoor Person Detection
Pedro de Santana (Samsung SIDIA, Brazil); Vicente A. de Sousa Jr. (Federal University of Rio Grande do Norte & Group for Researching and Fast Prototyping Solutions for Communication (GPPCOM), Brazil); Thiago Scher (Samsung SIDIA, Brazil); Alvaro Augusto M. de Medeiros (Federal University of Juiz de Fora, Brazil); Juliano Bazzo (Samsung SIDIA, Brazil)

On the Enabling of Efficient Coexistence of LTE with WiFi: A Machine Learning-Based Approach
Mohamed Hassan, Mahmoud H. Ismail and Mohamed El-Tarhuni (American University of Sharjah, United Arab Emirates)

GPS Location Spoofing using Software Defined Radio
Chai Kiat Yeo (Nanyang Technological University, Singapore)

The key Impacts of Softwarization in the modern era of 5G and the Internet of Things
Opeoluwa T Eluwole (BDO LLP, United Kingdom (Great Britain)); Mike Ojo (University of Pisa, Italy)

Speaker Biographies

Dr. William F. Baker directs the Bernard L. Schwartz Center for Media, Public Policy, and Education at Fordham University, where he is also the Claudio Aquaviva Chair and journalist in residence. Prior to joining Fordham, he served as the CEO of the Educational Broadcasting Corporation for 20 years. He is president emeritus of WNET-Thirteen, New York's public television station.

He has been called an icon of public television for producing some of the industry's most respected and popular programs, including Bill Moyers Journal, Nature, Cyberchase, and Great Performances. Among numerous honors, he has won seven Emmys and two Columbia Dupont Journalism awards and was named to the National Academy of Television Arts & Sciences Management Hall of Fame and the Broadcasting and Cable Hall of Fame.

In 2008, he was appointed as a senior research fellow at the Hauser Center for Nonprofit Organizations at Harvard University.

Baker holds a BA, MA, and PhD from Case Western Reserve University and seven honorary doctorates from universities in America and Europe, including Fordham. He teaches the only business class at Juilliard. His interests include astronomy, horology, and polar science. He is believed to be the eighth person in history to have stood on both the North and South poles.

Dr. Theofilos Chrysikos was born in Patras, Greece in 1982. He received his Engineering Diploma from the Department of Electrical and Computer Engineering of the University of Patras in 2005 and his PhD in 2012 on Wireless Channel Characterization with emphasis on channel measurements and modeling on path loss, large- scale (shadowing) and small-scale fading, physical-layer security and RF safety, under the supervision of Professor Stavros Kotsopoulos.
Dr. Chrysikos is a Senior Research Associate at the Wireless Telecommunications Laboratory of the Department of Electrical and Computer Engineering (University of Patras, Greece) with over 45 publications and 220 (third-party) citations. His topics of interest include 5G channel modeling, mobile cellular networks, small cells/backhaul design and evaluation, antennas and propagation, microwave/RF/EMC measurements and characterization, satellite networks and telemetry systems, IoT and Smart home/cities, Body Area Networks and Smart/Mobile Health, biomedical/biomechanical interdisciplinary research, information- theoretic physical layer security, ad-hoc and sensor networks, vehicular communications, Public Safety/PPDR services and digital cultural platforms and solutions.
Dr Chrysikos is also an Assistant Professor (non-tenured) at the TEI of Central Greece, a selected instructor at the Post-graduate program of the Physics Department (University of Patras, “Digital communications” course) and has an ample teaching experience in various academic institutions in Greece (University of Patras, University of Athens, TEI of Western Greece, TEI of Peloponnese). Dr. Chrysikos is a stand-in Lecturer in various Schools of the Hellenic Army (2014-2018). Dr. Chrysikos has a decade-long teaching experience in the public higher education technical sector.
Past research experience includes the SALUS FP7, PEACE FP7, MIMOSA-Thales and QAPLAT (Greece-Czech Republic Interstate Program) projects. Dr. Chrysikos is currently involved in the Marie Curie Sonnet Project (2017-2019) and is a co-founder and active participant of the Wheamo and Moment start-ups. In 2016, Dr. Chrysikos was the 1st winner of the Falling Walls Greek Lab and a contestant at the international lab finals in Berlin.

Dr. Chrysikos has participated in over 60 TPCs and has chaired three sessions in acclaimed conferences. He is a member of the Technical Chamber of Greece and a member of its Standing Committee of New Technologies (Western Greece Chapter, 2014-2019).

Dr. François Cosquer is CTO Security for Nokia Software 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.

Dr. Vassiliki Cossiavelou, Ph.D., is currently Scientific Policy Officer in the European Commission while she is also Senior Communication Adviser at State and Associate Researcher of Youth and Media Lab in the Department of Cultural Technology and Communication of the University of the Aegean, Greece. Dr. Cossiavelou's research agenda has been extensive, ranging from EU policies on media communication, to media gatekeeping, sports broadcasting, mega-events communication, social media strategies, branding. Her current research interests include EU and USA regulations on media, social media strategies, privacy and security issues, business models in social and traditional media industries, big data, media archives. Dr. Cossiavelou's papers have appeared in proceedings of int'l conferences such as IEEE, ACM, INFORMS, WTS, WSKS, ICTSMA, among others. Her research papers appear in Journals such as the IJMNT and IJITN. She is a member of several EU and UN communication initiatives as well as International media and telecommunications professionals' associations. Her journal papers have external references in multidisciplinary journals such as Journal of Broadcasting & Electronic Media, International Journal of Sport Communication, among others and in grey bibliography of Purdue University, National University of Athens, University of Macedonia, etc. She has been regularly invited in European and American universities as lecturer and keynote speaker in media and telecommunications conferences. Outside academia, she has been assigned to two diplomatic posts as Communication Officer in Greek Embassy of Greece in China and

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Dr. Martin Kohn (MD, MS, FACEP, FACPE) is a consultant working in health data analytics, health policy and healthcare management. He is an experienced physician, clinical informaticist, and health policy analyst. He was most recently Chief Medical Scientist at Sentrian, which creates predictive analytic systems integrating home monitoring with longitudinal health data for patients with complex chronic diseases. Sentrian identifies patients who are likely to need hospitalization days before they become seriously ill to provide time to intervene and avoid hospitalization. Previously, he was the Chief Medical Scientist for Care Delivery Systems in IBM Research developing analytic tools for healthcare, including the use of the Watson supercomputer.
Dr. Kohn is a board-certified emergency physician with over 30 years of practice and management experience. He received bachelor and master of science degrees in electrical engineering from MIT, the MD from Harvard Medical School and a master's degree in health management and policy from NYU. He did additional graduate study in bio-medical engineering at Stanford. He has been a healthcare executive, educator and congressional health policy advisor. Dr. Kohn is board certified in Clinical Informatics, a certified physician executive and has published on clinical, technical, management and policy subjects. He speaks frequently on the role of "Big Data" and artificial intelligence in clinical decision support and the transformation of healthcare. His broad background and publications in engineering, data science, clinical medicine, management and health policy allow him to work closely with all players in the joint effort of technology in healthcare.

Katia Passerini, Ph.D. is Dean of the College of Professional Studies at St. John's University, where she also holds a Professor appointment in the Division of Computer Science, Mathematics and Science. Dr. Passerini was the Hurlburt Chair and Professor of Management Information Systems, Martin Tuchman School of Management (2003-2016), New Jersey Institute of Technology (NJIT). She held a joint appointment in the Information Systems (IS) Department in the College of Computing Sciences. She served as Dean for the Albert Dorman Honors College (2013-16).

Her research interests are focused on understanding macro-economic

drivers of knowledge management, studying wireless broadband applications and industry trends; and, computer-supported learning and education. She has published extensively in refereed journals and proceedings (Communications of the ACM, IEEE IT Professional, Communications of AIS, Electronic Commerce Review, Journal of Knowledge Management, Computers & Education, Journal of Educational Hypermedia and Multimedia, IEEE Internet Computing, Organization Management Journal, International Journal of Management Education) and professional journals (Project Management Network, Cutter IT Journal, Cutter Benchmark Review), particularly in the area of computer-mediated learning, IT productivity, and knowledge management. She was nominated five times for best paper awards at regional and national conferences, and won once. She serves on editorial boards of various IS journals and acted as program and track chair in selected IS conferences.

Katia's professional background includes multi-industry projects at Booz Allen Hamilton (now part of PriceWaterhouseCoopers) and the World Bank where she focused on information technology projects in Europe, North America and the South Pacific. Katia is a certified project management professional (PMP®) and worked on various projects in the automotive and telecommunications industries and higher education. Some of her projects included business process management, balanced scorecard definition; business needs analyses and gaps assessment, benchmarking, evaluation of IT investments feasibility and outcomes.

Dr. Passerini holds degrees in political science (LUISS University, Italy), economics (University of Rome II- Tor Vergata, Italy), MBA and PhD degrees from The George Washington University, and a Certificate in Business Project Management from New York University. She was a Fulbright Student and Administrator Scholar, an Italian National Research Council Fellow (CNR) and received several funded scholarships awards.

Jon Peha is a Professor at Carnegie Mellon University with experience in industry, government, and academia. In government, he served at the Federal Communications Commission as Chief Technologist, in the White House as Assistant Director of the Office of Science & Technology Policy, in the House Energy & Commerce Committee where he was responsible for telecom and e-commerce, and at USAID where he helped launch and led a US Government interagency program to assist developing countries with information infrastructure. In industry, he has been Chief Technical Officer for three high-tech companies, and a member of technical staff at SRI International, AT&T Bell Labs, and Microsoft. At Carnegie Mellon, he is a Full Professor in the Dept. of Engineering & Public Policy and the

Dept. of Electrical & Computer Engineering, and former Associate Director of the university's Center for Wireless & Broadband Networking. His research spans technical and policy issues of information and communications technology, including spectrum, broadband Internet, wireless networks, communications for emergency responders and disaster resilience, universal service, privacy and cybersecurity, secure Internet payment systems, online dissemination of copyrighted material, vehicular networks and intelligent transportation systems, smart cities. Dr. Peha holds a PhD in electrical engineering from Stanford, and a BS from Brown. He is an IEEE Fellow and an AAAS Fellow, and was selected by AAAS as one of 40 "Featured AAAS Science and Technology Policy Fellows" of the last 40 years ("40@40"). He is member of the National Academy of Science's Disaster Resilience Roundtable, and the U.S. State Department's Advisory Committee on International Communications and Information Policy. Dr. Peha has received the FCC's "Excellence in Engineering Award," the IEEE Communications Society TCCN Publication Award for career contributions, and the Brown Engineering Medal.

Prof.dr Milica Pejanović-Djurišić is currently 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 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 Montenegriin 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

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Dr. Rajabion received her Doctoral degree in Management of Information Technology from Lawrence Technological University. She also holds an MS in Computer Information systems from University of Detroit Mercy and two undergraduate degrees in Computer Science and Psychology from University of Windsor, Canada.

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

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

He is editor of the "Computer Communications Journal", the "ACM

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

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

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

Marcos Tavares is a researcher with Nokia Bell Labs, NJ, USA, where he conducts fundamental and applied research in the field of wireless communications related to the creation, theoretical performance evaluation, simulation and implementation of novel techniques to enhance spectral efficiency, improve user experience and/or support new applications. More recently, Mr. Tavares is focusing on the evolution of 5G and the development of wireless technologies that will compose the connectivity fabric enabling the next industrial revolution. Mr. Tavares received the Electrical Engineering degree with the highest honors from the Federal University of Pernambuco, Brazil, the M.Sc. degree from the Universitat Karlsruhe (TH), Germany, and the Dr.-Ing. degree from the

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Dr. Rob van den Dam is the Global Telecommunications Industry Leader at the IBM Institute for Business Value. He is responsible for developing and deploying strategic thought leadership in telecommunications and as such contributor to IBM's global telecom strategy. In this role he develops future agendas, industry outlooks and business value realization studies. He has 20 years' experience in the telecom industry and has worked in a range of advisory and implementation roles for major telecommunications, media and government organizations.

Prior to joining IBM he worked for Data Sciences where he was Senior Principal and one of the founders of Data Sciences' telecommunications practice. He started his career 30 years ago at the National Aerospace Industry where he worked in both national and international projects. Rob graduated at the Delft University in Aerospace Engineering (with honours), where he received a PhD.

Recent work includes future scenario planning, big data, Cloud, social business, and Internet of Things. Rob periodically presents or participates in panel sessions at major industry conferences, such as World Future Trends Summit, ITU World, GSMA Mobile Asia Conference, Total Telecom World, World Telecom Council, CommunicAsia, Broadband World Forum, and Asian Carriers' Conference. He has published multiple articles in, amongst others, Total Telecom Magazine, Telecom Asia magazine, European Communications, Mobile Europe, Annual Review of Communications and Journal of Telecommunications Management.

Joe Weinman is a frequent global keynoter and the author of Cloudonomics: The Business Value of Cloud Computing (Wiley, 2012), Digital Disciplines: Attaining Market Leadership via the Cloud, Big Data, Social, Mobile, and the Internet of Things (Wiley CIO, 2015), and co-editor of a forthcoming text on fog computing and fog economics (Wiley, 2019). He was the Cloud Economics editor of IEEE Cloud Computing magazine from 2014 to 2018. He has held a variety of executive leadership positions at AT&T, HP, and Telx and currently serves on the advisory boards of several technology companies. Weinman has a BS in computer science from Cornell University, an MS in computer science from the University of Wisconsin-Madison and has completed executive education at the International Institute for Management Development in Lausanne. Weinman has been awarded 24 patents in a wide variety of fields,

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Dr. Qing-An Zeng is Interim Chair and Associate Professor of Computer Systems Technology, and Director of the Wireless and Mobile Networking Laboratory at North Carolina A&T State University. He received his MS and PhD degrees both in electrical engineering from Shizuoka University. He has over 30 years of networking research experience in both the industry and academy. He was a representative of NEC in Japan and worked as a member of 3GPP Layer 2 Task Working Group and Layer 3 Task Working Group until 3GPP Release 99 issued. He currently holds several patents in the handoff scheme and security algorithm of wireless and mobile systems. He has published more than 140 publications including books, book chapters, journal articles, and conference proceedings papers. He is the co-author of a book entitled "Introduction to Wireless and Mobile Systems, 4th edition" published by Cengage Learning in 2014. He is a senior member of IEEE.

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