

# **2018 IEEE Middle East and North Africa Communications Conference (MENACOMM 2018)**

**Jounieh, Lebanon  
18-20 April 2018**



**IEEE Catalog Number: CFP18N76-POD  
ISBN: 978-1-5386-1255-2**

**Copyright © 2018 by the Institute of Electrical and Electronics Engineers, Inc.  
All Rights Reserved**

*Copyright and Reprint Permissions:* Abstracting is permitted with credit to the source. Libraries are permitted to photocopy beyond the limit of U.S. copyright law for private use of patrons those articles in this volume that carry a code at the bottom of the first page, provided the per-copy fee indicated in the code is paid through Copyright Clearance Center, 222 Rosewood Drive, Danvers, MA 01923.

For other copying, reprint or republication permission, write to IEEE Copyrights Manager, IEEE Service Center, 445 Hoes Lane, Piscataway, NJ 08854. All rights reserved.

***\*\*\* This is a print representation of what appears in the IEEE Digital Library. Some format issues inherent in the e-media version may also appear in this print version.***

IEEE Catalog Number:	CFP18N76-POD
ISBN (Print-On-Demand):	978-1-5386-1255-2
ISBN (Online):	978-1-5386-1254-5

**Additional Copies of This Publication Are Available From:**

Curran Associates, Inc  
57 Morehouse Lane  
Red Hook, NY 12571 USA  
Phone: (845) 758-0400  
Fax: (845) 758-2633  
E-mail: [curran@proceedings.com](mailto:curran@proceedings.com)  
Web: [www.proceedings.com](http://www.proceedings.com)

CURRAN ASSOCIATES INC.  
**proceedings**  
.com

# 2018 IEEE Middle East and North Africa Communications Conference (MENACOMM)

## Security and Privacy

<i>On the Collision Property of Chaotic Iterations Based Post-Treatments over Cryptographic Pseudorandom Number Generator</i>	
Luigi Marangio (Université de Bourgogne Franche-Comté & Femto-ST Institute, France), Christophe Guyeux (University of Franche-Comté, France), Jacques Bahi (University of Franche-Comté, France) .....	1
<i>On Blockchain Security and Relevant Attacks</i>	
Joanna Moubarak (USJ, Lebanon), Eric Filiol (ESIEA, France), Maroun Chamoun (Université Saint Joseph, Lebanon) .....	7
<i>A Secure Client-Side Framework for Protecting the Privacy of Health Data Stored on the Cloud</i>	
Ali Sakr (Arab Open University & IIET NGO, Lebanon), Elias Yaacoub (Self Employed, Lebanon), Hassan Noura (American University of Beirut, Electrical and Computer Engineering, Lebanon), Mohammed Al-Husseini (Beirut Research and Innovation Center, Lebanon), Khalid Abualsaud (Qatar University, Qatar), Tamer Khattab (Qatar University, Qatar), Mohsen Guizani (University of Idaho & University of Idaho, USA) .....	13
<i>S-DES: An Efficient &amp; Secure DES Variant</i>	
Mohamad Noura (University Bourgogne Franche-Comté, France), Hassan Noura (American University of Beirut, Electrical and Computer Engineering, Lebanon), Ali Chehab (American University of Beirut, Lebanon), Mohammad Mansour (American University of Beirut, Lebanon, USA), Raphaël Couturier (University Bourgogne Franche-Comté, France) .....	19
<i>Novel Order preserving encryption Scheme for Wireless Sensor Networks</i>	
Elie Khoury (Antonine University, Lebanon), Maguy Medlej (Universite Antonine, France & Lebanese University, Lebanon), Chady Abou Jaoude (Antonine University & TICKET Lab, Lebanon), Christophe Guyeux (University of Franche-Comté, France) .....	25

## Hardware and Systems

<i>Channel Hardware simulator Design and Implementation for MIMO Time-Varying 802.15.7 VLC indoor signals</i>	
Bachir Habib (USEK, Lebanon), Hanna Farhat (Lebanese University & University Institute of Technology, Lebanon) .....	31
<i>Dielectric Spectroscopy for Planar Materials Using Guided and Unguided Electromagnetic Waves</i>	
Hassan Shwaykani (American University of Beirut, Lebanon), Ali El-Hajj (American University of Beirut, Lebanon), Joseph Costantine (American University of Beirut, Lebanon), Fatima AlZahraa Asadallah (American University of Beirut, Lebanon), Mohammed Al-Husseini (Beirut Research and Innovation Center, Lebanon) .....	36
<i>Comparison of UHF RFID Loop Matching Antennas Based on Various Substrate-Metal Material Combinations</i>	
Nadeen R Rishani (Universite Paris-Est Marne-la-Vallee, United Arab Emirates), Fatima Zohra Gourari (Université de Tlemcen, Algeria), Julien Dubouil (Université Paris-Est, France), Laheurte Jean Marc (ESYCOM, France), Raed Shubair (Massachusetts Institute of Technology (MIT), USA), Sara Abou Chakra (Lebanese University & UIT, Lebanon) .....	41

<i>FSO Cooperative All-Active and Selective Relaying Schemes with Backup RF Antennas</i> Mustapha Hamad (Lebanese American University, Lebanon), Chadi Abou-Rjeily (Lebanese American University (LAU), Lebanon) .....	46
---	----

## IoT, Cloud Computing & Smart Cities

<i>Home Energy Management System Considering Modular and Deferrable Electric Loads Under Time-Variable Pricing Scheme</i> Sawsan Al Zahr (Telecom ParisTech, France) .....	52
<i>Information Technology Infrastructure for Data Streams Native Filtering</i> Rayane El Sibai (Université Pierre et Marie Curie, France), Jacques Bou Abdo (Notre Dame University, Lebanon), Jacques Demerjian (Lebanese University - UL & Faculty of Sciences II, Lebanon), Yousra Chabchoub (Institut Supérieur d'Electronique de Paris, France), Raja Chiky (Institut Supérieur d'Electronique de Paris, France), Kablan Barbar (Lebanese University, Lebanon) .....	58
<i>MAC layer-based evaluation of IoT technologies: LoRa, Sigfox and NB-IoT</i> Hussein Mroue (University of Nantes, France), Abbass Nasser (AUCE, Lebanon), Sofiane Hamrioui (University of Nantes, France), Benoit Parrein (University of Nantes, France), Eduardo Motta Cruz (Université de Nantes IETR, France), Gilles Rouyer (SPIE City Networks, France) .....	64
<i>Innovative Mobile Cloud Strategy that Supports Responsive Mobile Web Apps in Education iConnect via the Cloud</i> Ferial Malaeb-Khaddage (University of Balamand, Lebanon), Henry Larkin (Deakin University, Australia) .....	69
<i>Safe Driving: A Mobile Application for Detecting Traffic Accidents</i> Samah Jamal (Arab Open University, Lebanon), Houssam Zeid (Arab Open University, Lebanon), Mohammad Malli (Arab Open University, Lebanon), Elias Yaacoub (Self Employed, Lebanon) .....	75

## Positioning and Signaling

<i>Robust Radio Resource Allocation for Heterogeneous Traffic in PD-NOMA-Based HCNs</i> Ali Mokdad (Tarbiat Modares University, Iran), Mohammad Moltafet (TMU, Iran), Paeiz Azmi (Tarbiat Modares University, Iran), Nader Mokari (Tarbiat Modares University, Iran) .....	81
<i>Optimization of Indoor Radio Coverage</i> Younni Ziade (Beirut Arab University, Lebanon) .....	87
<i>Study the Estimated Distance Error in Indoor Localization using UHF-RFID</i> Elias Hatem (Lebanese University, Lebanon & ESIGETEL, France), Sara Abou Chakra (Lebanese University & UIT, Lebanon), Bachar A. ElHassan (Lebanese University, Faculty of Engineering, Branch1 & order of Engineers and Architects - Tripoli, Lebanon), Elizabeth Colin (ESIGETEL, France), Jean-Marc Laheurte (Université de Paris Est Marne La Vallée (UPEMLV), France), Catherine Marechal (Efrei PARIS, France) .....	93

<i>Direction of Arrival Estimation for LTE-Advanced and 5G in the Uplink</i> Mohammad Haroun (Lebanese University, Lebanon), Marta Cabedo-Fabrés (Universidad Politécnica de Valencia, Spain), Hussam Ayad (Lebanese University, Lebanon), Jalal Jomaah (Lebanese University, Lebanon), Miguel Ferrando-Bataller (Universitat Politècnica de València, Spain) .....	98
--	----

## Wireless Sensor Networks

<i>Wireless Multimedia Sensor Network deployment for disparity map calculation</i> Anthony Tannoury (Antonine University, Lebanon), Rony Darazi (Antonine University, Lebanon), Abdallah Makhoul (University of Franche-Comté & FEMTO-ST, France), Christophe Guyeux (University of Franche-Comté, France) .....	104
<i>A New Autonomous Data Transmission Reduction Method For Wireless Sensors Networks</i> Gaby Bou Tayeh (Université of Bourgogne Franche Comté, France), Abdallah Makhoul (University of Franche-Comté & FEMTO-ST, France), Jacques Demerjian (Lebanese University - UL & Faculty of Sciences II, Lebanon), David Laiymani (LIFC, France) .....	110
<i>Distributed Data Aggregation based Modified K-means Technique for Energy Conservation in Periodic Wireless Sensor Networks</i> Ali Kadhum Idrees (University of Babylon, Iraq), Wathiq Laftah Al-Yaseen (Kerbala Technical Institute, Al-Furat-Al-Awsat Technical University, Iraq), Mohamad Abou Taam (AUCE, Lebanon), Oussama Zahwe (AUCE, Lebanon) .....	116
<i>Combining Compression and Clustering Techniques to Handle Big Data Collected in Sensor Networks</i> Hassan Harb (American University of Culture and Education, Lebanon), Chady Abou Jaoude (Antonine University & TICKET Lab, Lebanon) .....	122
<i>On the Performance of Resource-aware Compression Techniques for Vital Signs Data in Wireless Body Sensor Networks</i> Joseph Azar (Université de Franche-Comté - UFC, France), Abdallah Makhoul (University of Franche-Comté & FEMTO-ST, France), Rony Darazi (Antonine University, Lebanon), Jacques Demerjian (Lebanese University - UL & Faculty of Sciences II, Lebanon), Raphaël Couturier (University Bourgogne Franche-Comté, France) .....	128

## Performance Analysis and Coding

<i>Decentralized Joint Cache-Channel Coding over Erasure Broadcast Channels</i> Sarah Kamel (Telecom ParisTech, France), Mireille Sarkiss (CEA LIST, France), Michele A Wigger (Telecom ParisTech, France) .....	134
<i>Performance Analysis of Fisher-Snedecor F Composite Fading Channels</i> Taimour Aldalgamouni (Higher Colleges of Technology, United Arab Emirates), Mehmet Ilter (Aalto University, Finland), Osamah S. Badarneh (University of Tabuk, Saudi Arabia), Halim Yanikomeroglu (Carleton University, Canada) .....	140

<i>Performance Assessment of Linear Precoding for Multi-User Massive MIMO Systems on a Realistic 5G mmWave Channel</i>	
Mariam ElHassan (Lebanese University, Lebanon), Ammar El Falou (Lebanese University, Lebanon), Charlotte Langlais (IMT Atlantique Bretagne Pays de la Loire & Lab-STICC, France) .....	145
<i>Hybrid Precoding Design with AoD Estimation for Millimeter Wave MIMO Systems</i>	
Isa Altoobaji (University of Bahrain, Bahrain), Mohab A. Mangoud (University of Bahrain, Bahrain) .....	150
<i>The Outage Probability of Mobile Wireless networks over <math>\eta</math>-<math>\mu</math> Fading Channel</i>	
Ashraf Al-Rimawi (Birzeit University, Palestine), Jamal Siam (Birzeit University, Palestine), Ali Abdo (Birzeit University, Palestine) .....	154

## Big Data & Data Mining

<i>An Improved Non-Personalized Combined-Heuristic Strategy for Collaborative Filtering Recommender Systems</i>	
Georges Chaaya (CNAM, France), Elisabeth Metais (CNAM, France), Jacques Bou Abdo (Notre Dame University, Lebanon), Raja Chiky (Institut Supérieur d'Electronique de Paris, France), Jacques Demerjian (Lebanese University - UL & Faculty of Sciences II, Lebanon), Kablan Barbar (Lebanese University, Lebanon) .....	159
<i>Similarity Measures for Collaborative Filtering Recommender System</i>	
Lamis Al Hassanieh (Notre Dame University, Lebanon), Chady Abou Jaoude (Antonine University & TICKET Lab, Lebanon), Jacques Bou Abdo (Notre Dame University, Lebanon), Jacques Demerjian (Lebanese University - UL & Faculty of Sciences II, Lebanon) .....	165
<i>Combining Web Data Extraction and Data Mining Techniques to Discover Knowledge</i>	
Nathalie Bouldoukian (Holy Spirit University of Kaslik (USEK) & N/A, Lebanon) .....	170
<i>Geopolitical interactions from reduced Google matrix analysis of Wikipedia</i>	
Samer El Zant (University of Toulouse & IRIT, France), Katia Jaffrès-Runser (University of Toulouse, France), Dima Shepelyansky (Université Paul Sabatier, France) .....	176
<i>Feature Selection Approach based on Hypothesis-Margin and Pairwise Constraints</i>	
Samah Hijazi (Lebanese University & ULCO, France), Mariam Kalakech (Lebanese University-Faculty of Business Administration, Lebanon), Denis Hamad (Universite du Littoral Cote d'Opale-Laboratoire LISIC, France), Ali Kalakech (Lebanese University-Faculty of Business Administration, Lebanon) .....	182
<i>Survey: When semantics meet Crowdsourcing to enhance Big Data Variety</i>	
Houssein Dhayne (Saint-Jospeh University, Lebanon), Rima Kilany (Saint-Jospeh University, France), Maria Sokhn (HES-SO Valais Wallis, Switzerland) .....	188

## QoS & Fault Analysis

<i>TOBTD: Throughput Debugging in Total-Order Broadcast Systems</i>	
Mohamad-Jaafar Nehme (Université de Grenoble Alpes, France, France), Abbass Zein Eddine (Université du Havre, France, Lebanon) .....	194

<i>Fault Tree Analysis for the Intelligent Vehicular Networks</i>	
Abdallah Dabboussi (UTBM, Université Bourgogne Franche-Comté, France), Raed Kouta (UTBM, France), Bachar A. ElHassan (Lebanese University, Faculty of Engineering, Branch1 & order of Engineers and Architects - Tripoli, Lebanon), Lina Nachabe (American University of Culture and Education, Lebanon), Jaafar Gaber (UTBM, France), Maxime Wack (University of Technology of Belfort-Montbéliard (UTBM), France) .....	200
<i>Streaming and Playback of 16K 360° Videos on the Web</i>	
Louay Bassbouss (Fraunhofer FOKUS, Germany), Stefan Pham (Fraunhofer FOKUS, Germany), Stephan Steglich (Fraunhofer FOKUS, Germany) .....	206
<i>A performance evaluation of data streams sampling algorithms over a sliding window</i>	
Rayane El Sibai (Université Pierre et Marie Curie, France), Yousra Chabchoub (Institut Supérieur d'Electronique de Paris, France), Jacques Demerjian (Lebanese University - UL & Faculty of Sciences II, Lebanon), Raja Chiky (Institut Supérieur d'Electronique de Paris, France), Kablan Barbar (Lebanese University, Lebanon) .....	211
<i>Security and QoS Guarantee-based Resource Allocation within Cloud Computing Environment</i>	
Mohamad Hamze (University of Burgundy, France), Hassan Harb (American University of Culture and Education, Lebanon), Oussama Zahwe (AUCE, Lebanon), Mohamad Abou Taam (AUCE, Lebanon) .....	217

## 5G & Software Defined Network

<i>Software-defined Networking-based Resource Management in 5G HetNet</i>	
Rami Khoder (UL & Versailles, Lebanon), Rola Naja (Lebanese University, Prism Lab-Versailles, Lebanon) .....	223
<i>SDN-Based Vertical Handover Decision Scheme for 5G Networks</i>	
Jacky Rizkallah, JGR (Univerite Saint Joseph, Lebanon), Nadine Akkari Adra (King Abdulaziz University, Saudi Arabia) .....	229
<i>NFV/SDN-based vEPC Solution in Hybrid Clouds</i>	
Hassan Hawilo (UWO, Canada), Lingxia Liao (Electrical and Computer Engineering, University of British Columbia, Canada), Abdallah Shami (University of Western Ontario, Canada), Victor C.M. Leung (University of British Columbia, Canada) .....	235
<i>Optimization of the Implementation of Network Slicing in 5G RAN</i>	
Nazih Salhab (University Paris-Est, Marne la Vallée, France, France), Salah El Falou (Lebanese University, Lebanon), Salah Eddine Elayoubi (CentraleSupélec, France), Rana Rahim-Amoud (Lebanese University, Lebanon), Rami Langar (University Paris Est Marne-la-Vallée, France) .....	241

## MAC and Cross-Layer Design

<i>Enabling and deploying long-range IoT image sensors with LoRa technology</i>	
CongDuc Pham (University of Pau, France) .....	247

<i>Cross Entropy Algorithm for Improved Soft Fusion-based Cooperative Spectrum Sensing in Cognitive Radio Networks</i>	
Ayman A. El-Saleh (A'Sharqiyah University (ASU), Oman), Mahmoud A. M. Albreem (A'Sharqiyah University (ASU), Oman), Tauseef R. Ahad (Multimedia University, Malaysia), Waziha Raquib (Multimedia University, Malaysia)	253
<i>ComLoB: Link quality and queuing delay based Composite routing protocol for traffic Load Balancing in WSNs</i>	
Hamadoun Tall (LIMOS-CNRS, France), Gerard Chalhoub (Clermont University, France), Michel J. Misson (Clermont Université / LIMOS CNRS, France)	258

## **BSN & E-Health**

<i>Collaborative Body Sensor Networks: Taxonomy and Open Challenges</i>	
Nadine Bou Dargham (Notre-Dame University, Lebanon), Jacques Bou Abdo (Notre Dame University, Lebanon), Jacques Demerjian (Lebanese University - UL & Faculty of Sciences II, Lebanon), Christophe Guyeux (University of Franche-Comté, France), Abdallah Makhoul (University of Franche-Comté & FEMTO-ST, France)	264
<i>General Semantic System for Monitoring &amp; Assisting Diabetes patient "MySmart Diabetes OntoREFerence" Ontology</i>	
Lina Nachabe (AUCE, Lebanon & Universite Telecom Sud Paris -Evry, France), Marc C. Girod-Genet (INT - GET, France), Bachar A. ElHassan (Lebanese University, Faculty of Engineering, Branch1 & order of Engineers and Architects - Tripoli, Lebanon), Dima Al Mouhammad (Mrs., Lebanon)	270
<i>Efficient Cluster-Based Routing Algorithm for Body Sensor Networks</i>	
Nadine Bou Dargham (Notre-Dame University, Lebanon), Jacques Bou Abdo (Notre Dame University, Lebanon), Jacques Demerjian (Lebanese University - UL & Faculty of Sciences II, Lebanon), Christophe Guyeux (University of Franche-Comté, France), Talar Atechian (Antonine University, Lebanon)	276
<i>Intelligent Eye: A Mobile Application for Assisting Blind People</i>	
Milios Awad (Arab Open University, Lebanon), Jad El Haddad (Arab Open University, Lebanon), Edgar Khneisser (Arab Open University, Lebanon), Tarek Mahmoud (Touch Mobile Operator, Lebanon), Elias Yaacoub (Self Employed, Lebanon), Mohammad Malli (Arab Open University, Lebanon)	282
<i>Smart-Phone based System to Monitor Walking Activity: mHealth Solution</i>	
Rami Yared (Bishop's University, Canada), Chady Abou Jaoude (Antonine University & TICKET Lab, Lebanon), Jacques Demerjian (Lebanese University - UL & Faculty of Sciences II, Lebanon)	288