

# **2017 Advances in Wireless and Optical Communications (RTUWO 2017)**

**Riga, Latvia  
2-3 November 2017**



**IEEE Catalog Number: CFP17AWZ-POD  
ISBN: 978-1-5386-0586-8**

**Copyright © 2017 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:	CFP17AWZ-POD
ISBN (Print-On-Demand):	978-1-5386-0586-8
ISBN (Online):	978-1-5386-0585-1

**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

# Advances in Wireless and Optical Communications

## RTUWO'17

### Table of contents

<b>Chairs Welcome Message</b> .....	<b>vi</b>
<b>Steering Committee</b> .....	<b>vii</b>
<b>Technical Programme Committee (TPC)</b> .....	<b>viii</b>
<b>Technical Sponsors, Patrons, Promoters and Supporters</b> .....	<b>xi</b>
<b>Keynote Speakers</b> .....	

---

#### Session A1 : Optical fibers and photonics

Evaluation of Polynomial Matrix SVD-based Broadband MIMO Equalization in an Optical Multi-Mode Testbed. ....	1
<i>A.Sandmann, A.Ahrens, S.Lochmann</i>	
Optical Wireless Monolithically Integrated Receiver with Large-Area APD and DC Current Rejection .....	12
<i>D.Milovančev, T.Jukić, B.Steindl, H.Zimmermann</i>	
Frequency Independent Nano-antennas for Optical and Infrared Energy Harvesting .....	17
<i>G.Gagnani, S.Bergamaschi</i>	
Gain Clamped L-Band EDFA Based on a Lasing Structure Using FBG .....	24
<i>F.Durak, A.Altuncu</i>	
The Optical Disdrometer .....	28
<i>L.Quyen, N.Thang, N.Vu, N.Truyen, V.Malyugin, D.Kiesewetter</i>	
Nonlinear MIMO Impulse Responses Determination Using Pseudo Random Sequences, and Nonlinear Compensation .....	32
<i>J.Van Kerrebrouck, H.Li, J.Verbist, G.Torfs, J.Bauwelinck, P.Demeester</i>	

#### Session B1 : Wireless PHY techniques

An Image Transmission Technique Adaptive to Underwater Time-Dispersive Fading Channels with Progressive Zero Padding OFDM ...	N/A
<i>H.Esmail, D.Jiang</i>	
Multi-Hop Space Shift Keying with Path Selection .....	40
<i>F.Yarkin, İ.Altunbaş, E.Basar</i>	
Performance Analysis of Source Transmit Antenna Selection in Space Shift Keying with Cooperative Amplify-and-Forward Relaying ...	45
<i>F.Yarkin, İ.Altunbaş, E.Basar</i>	
Error Rates Analysis of MIMO Space-Time Block Codes in Generalized Shadowed Fading Channels .....	N/A
<i>E.Salahat, N.Ali, A.Hakam</i>	
Detection Capabilities of a Shifted Constellation-based Method Against Pilot Contamination Attacks .....	56
<i>D.Mihaylova, Z.Valkova-Jarvis, G.Iliev</i>	
The Impact of Waveform on the Efficiency of RF to DC Conversion Using Prefabricated Energy Harvesting Device .....	61
<i>A.Litvinenko, A.Aboltins, S.Tjukovs, D.Pikulins</i>	

#### Session 04 : Invited talk

Digital Nonlinearity Compensation in High-Capacity Optical Fibre Communication Systems: Performance and Optimisation .....	67
<i>T.Xu, N.Shevchenko, B.Karanov, G.Liga, D.Lavery, R.Killey, P.Bayvel</i>	

**Session A2 : Optical networking**

Impact of Physical and Geometrical Parameters on Visible Light Communication Links . . . . .	73
<i>A.Behlouli, P.Combeau, S.Sahuguede, A.Julien-Vergonjanne, C.Le Bas, L.Aveneau</i>	
Evaluation and Research of FBG Optical Temperature Sensors Network . . . . .	79
<i>U.Senkans, S.Spolitis, V.Bobrovs</i>	
Real-time All-Digital Radio-over-Fiber LTE Transmission . . . . .	83
<i>J.Van Kerrebrouck, L.Breyne, H.Li, J.Bauwelinck, G.Torfs, P.Demeester, T.Bohn</i>	
Evaluation of Lifetime of the Fiber Optic Infrastructure Based on Chromatic Dispersion and Polarization Mode Dispersion Measurements . . . . .	87
<i>A.Ciekurs, R.Neitals, J.Porins</i>	
Successive Interference Cancellation in Spatially Multiplexed Fiber-optic Transmission . . . . .	91
<i>A.Sandmann, A.Ahrens, S.Lochmann</i>	

**Session B2 : Wireless networking**

BER Analysis of Dual-Hop Relaying System with Energy Harvesting in Nakagami-m Fading Channel . . . . .	96
<i>M.Babaei, U.Aygöli</i>	
Two-Way Decode and Forward Relaying for OFDMA Mobile Systems . . . . .	102
<i>N.Farouk, W.Alexan, A.El-Mahdy</i>	
Average Fade Duration of SIR Based Hybrid SC Diversity System in Mobile Wireless Networks in Composite Fading Channel in the Presence of CCI . . . . .	N/A
<i>C.Stefanovic</i>	

**Session A3 : Channel coding**

Usage of Divergence Within Concatenated Multithreshold Decoding Convolutional Codes . . . . .	112
<i>V.Zolotarev, G.Ovechkin, P.Ovechkin, E.Egamberdiyev</i>	
IR-HARQ Scheme for Multiband WLAN System . . . . .	117
<i>M.Yofune</i>	
Selecting Algorithm for Codegram Detection . . . . .	122
<i>A.Borozdin, N.Forova, S.Sizov</i>	
Comparative Study of Channel Coding Techniques for MIMO-CEM System with IF Sampled 1-Bit ADC . . . . .	126
<i>A.Amrallah, H.S. Hussein, E.Mohamed, W.Alexan</i>	

**Session B3 : Wireless MIMO**

Outage Performance of Two Way Full-Duplex Relaying with Antenna Selection . . . . .	132
<i>E.Fidan, O.Kucur</i>	
Outage Performance of NOMA with TAS/MRC in Dual Hop AF Relaying Networks . . . . .	137
<i>M.Aldababsa, O.Kucur</i>	
A Closed Form Analytic Expression for Massive MIMO finite-SNR Diversity Gain in Case of Correlated Rayleigh Channels . . . . .	142
<i>A.Gvozdev, T.Artemova</i>	
Performance of Zero-Forcing Receive Beamforming with Signal Space Diversity over Rayleigh Fading Channels . . . . .	147
<i>S.Ozyurt, O.Kucur</i>	

**Session A4 : Signal processing**

Method for Transmission of Wide Bandwidth Signals Based on Event Timing and Deliberate Randomization of Signal Sampling . . . . .	152
<i>I.Bilinskis, E.Boole, A.Skageris</i>	
Design of FBMC Waveform by Exploiting a NPR Prototype Filter . . . . .	156
<i>J.Wen, H.Jingyu, F.Li, D.Wang, J.Li</i>	
Low Complexity DSP Block Design Methodology for Road Speed Monitoring . . . . .	162
<i>M.Terauds, K.Zueters</i>	

The Practical Approach to Elimination of Affected Channels in a Direct Conversion Receiver .....	167
<i>A.Borozdin</i>	
Uplink Power Control for Ultra-Dense C-RAN with Non-Orthogonal Multiple Access .....	170
<i>R.Rai</i>	
Speech Enhancement Using A Critical Point Based Wiener Filter .....	175
<i>M.Lu, X.Zhou, N.Jaber, K.Hua, M.Ali</i>	
<b>Session B4 : Routing, network and traffic management</b>	
Vehicular Multitier Gateway Selection Algorithm for Heterogeneous VANET Architectures.....	180
<i>S.Ansari, T.Boutaleb, S.Sinanovic, C.Gamio, I.Krikidis</i>	
Flexible Resource Allocation for Device-to-Device Communication in FDD System for Ultra-Reliable and Low Latency Communications .....	186
<i>B.Singh, Z.Li, M.Uusitalo</i>	
Multipath Routing and Brokering in Inter-Domain or Inter-AS with SDN: A Model.....	192
<i>J.Abe, H.Mantar</i>	
Novel Throughput Quantile Averaging Methods for the Proportional Fair Algorithm in Indoor Mobile Networks.....	198
<i>Z.Valkova-Jarvis, V.Stoykov</i>	
Integrated Wireless Network Performance Estimation for Moving Vehicles .....	203
<i>A.Ancans, N.Bogdanovs, E.Petersons, A.Ipatovs</i>	
An AKARI-based Secure Communication Scheme for EPC Tags .....	208
<i>K.Baghery, B.Abdolmaleki</i>	
<b>Session A5 : Sensor networks and positioning</b>	
Requirements Analysis to Operation Parameters of Local Ship Positioning System at Sea Wave Presence .....	214
<i>I.Shirokov, I.Ablyakimov, A.Azarov, N.Wilson</i>	
Improving Data Aggregation Dependability and Security in Wireless Sensor Networks .....	N/A
<i>Z.Aliouat, M.Aliouat</i>	
A Waste City Management System for Smart Cities Applications .....	225
<i>D.Vu, G.Kaddoum</i>	
Dynamic Frequency-Sharing with Licensed-Assisted Access for 5G Communication Systems.....	230
<i>T.Yoshioka, H.Matsuno, N.Suzuki, K.Sugiyama</i>	
Smart Vehicle Security Systems Using Internet of Things (IoT).....	N/A
<i>V.Govindraj, M.Sathiyarayanan, B.Abubakar</i>	
An Efficient Coverage in Wireless Sensor Networks Using Fuzzy Logic-Based Control for the Mobile Node Movement.....	239
<i>O.Banimelhem, M.Naserllah, A.Abu-Hantash</i>	
<b>Session B5 : Cognitive radio and D2D</b>	
Fixed and Adaptive Relaying Power Schemes for Underlay Cognitive Radio Networks .....	245
<i>W.Alexan, S.Imam, A.El-Mahdy</i>	
Reliable V2X Communications for Safety-critical Intelligent Transport Systems .....	251
<i>I.Kabashkin</i>	
Interference Management for D2D Communications Underlay Macro-Small Cell Networks with Imperfect Channel Estimation.....	256
<i>E.Maher, A.El-Mahdy</i>	
Leakage Rate Based Hybrid Untrustworthy Relay Selection for A Dual-Hop Half/Full-Duplex Bi-directional Wireless Relaying Networks .....	262
<i>V.Ozduran</i>	
Smart Antennas for Multi-path Routing in Ad-hoc Wireless Networks .....	268
<i>L.Cikovskis, I.Slaidins</i>	
5G Radio Resource Management Approach for Internet of Things Communications .....	N/A
<i>A.Saddoud, W.Doghri, E.Charfi, L.Fourati</i>	

---

<b>Author index .....</b>	<b>276</b>
---------------------------	------------