

**PROCEEDINGS OF
THE 2014 INTERNATIONAL CONFERENCE ON
WIRELESS NETWORKS**

**ICWNN
2014**

Editors

**Hamid R. Arabnia
Leonidas Deligiannidis, George Jandieri
Ashu M. G. Solo
Fernando G. Tinetti**



WORLDCOMP'14

July 21-24, 2014

Las Vegas Nevada, USA

www.world-academy-of-science.org

©CSREA Press

This volume contains papers presented at The 2014 International Conference on Wireless Networks (ICWN'14). Their inclusion in this publication does not necessarily constitute endorsements by editors or by the publisher.

Copyright and Reprint Permission

Copying without a fee is permitted provided that the copies are not made or distributed for direct commercial advantage, and credit to source is given. Abstracting is permitted with credit to the source. Please contact the publisher for other copying, reprint, or republication permission.

Copyright © 2014 CSREA Press
ISBN: 1-60132-278-X
Printed in the United States of America

CSREA Press
U. S. A.

Foreword

It gives us great pleasure to introduce this collection of papers to be presented at the 2014 International Conference on Wireless Networks (ICWN'14), July 21-24, 2014, at Monte Carlo Resort, Las Vegas, USA.

An important mission of the World Congress in Computer Science, Computer Engineering, and Applied Computing (a federated congress to which this conference is affiliated with) includes *"Providing a unique platform for a diverse community of constituents composed of scholars, researchers, developers, educators, and practitioners. The Congress makes concerted effort to reach out to participants affiliated with diverse entities (such as: universities, institutions, corporations, government agencies, and research centers/labs) from all over the world. The congress also attempts to connect participants from institutions that have **teaching** as their main mission with those who are affiliated with institutions that have **research** as their main mission. The congress uses a quota system to achieve its institution and geography diversity objectives."* By any definition of diversity, this congress is among the most diverse scientific meeting in USA. We are proud to report that this federated congress has authors and participants from 78 different nations representing variety of personal and scientific experiences that arise from differences in culture and values. As can be seen (see below), the program committee of this conference as well as the program committee of all other tracks of the federated congress are as diverse as its authors and participants.

The program committee would like to thank all those who submitted papers for consideration. About 70% of the submissions were from outside the United States. Each submitted paper was peer-reviewed by two experts in the field for originality, significance, clarity, impact, and soundness. In cases of contradictory recommendations, a member of the conference program committee was charged to make the final decision; often, this involved seeking help from additional referees. In addition, papers whose authors included a member of the conference program committee were evaluated using the double-blinded review process. One exception to the above evaluation process was for papers that were submitted directly to chairs/organizers of pre-approved sessions/workshops; in these cases, the chairs/organizers were responsible for the evaluation of such submissions. The overall paper acceptance rate for regular papers was 27; 17% of the remaining papers were accepted as poster papers (at the time of this writing, we had not yet received the acceptance rate for a few individual tracks.)

We are very grateful to the many colleagues who offered their services in organizing the conference. In particular, we would like to thank the members of the Program Committee of ICWN'14, members of the congress Steering Committee, and members of the committees of federated congress tracks that have topics within the scope of ICWN. Many individuals listed below, will be requested after the conference to provide their expertise and services for selecting papers for publication (extended versions) in journal special issues as well as for publication in a set of research books (to be prepared for publishers including: Springer, Elsevier, BMC, and others).

- *Prof. Ali Abedi; Department of Electrical and Computer Engineering and Cooperating Associate Professor of CIS; Director, Center for Undergraduate Research (CUGR); Director, Wireless Sensor Networks (WiSe-Net) Lab; The University of Maine, Orono, Maine, USA; Senior Member, IEEE; Associate Editor: IEEE/KICS Journal of Communications and Networks and IET Wireless Sensors Systems; Vice President of Technology and Board Member, Beyran Corp, Maryland, USA; Co-Founder and CTO, Navindor Company, Maryland, USA*
- *Prof. Afrand Agah; Assistant Chair & Graduate Coordinator, Department of Computer Science, West Chester University of Pennsylvania, West Chester, Pennsylvania, USA*
- *Dr. Selim Aissi (Congress Steering Committee); Vice President, Global Information Security, Visa Inc., USA (formerly: Chief Strategist - Security, Intel Corporation, USA)*
- *Dr. Eng. Hamid Ali Abed Al-Asadi; Head of Computer Science Department, Faculty of Education for Pure Science, Basra University, Basra, Iraq*
- *Prof. Rafeeq AbdulRahman Al-Hashemi; Dean of Information Technology, Al-Hussein Bin Talal University, Jordan*
- *Prof. Nizar Al-Holou (Congress Steering Committee); Professor and Chair, Electrical and Computer Engineering Department; Vice Chair, IEEE/SEM-Computer Chapter; University of Detroit Mercy, Detroit, Michigan, USA*

- Prof. Hamid R. Arabnia (Congress Steering Committee); Professor of Computer Science; The University of Georgia, Graduate Studies Research Center, Athens, Georgia, USA; Editor-in-Chief, *Journal of Supercomputing* (Springer); Editor-in-Chief, *Emerging Trends in CS and Applied Computing* (Elsevier); Editor-in-Chief, *Transactions of Computational Science & Computational Intelligence* (Springer); Elected Fellow, Int'l Soc. of Intelligent Biological Medicine (ISIBM); USA
- Prof. Ezendu Ariwa; Faculty of Computer Science and Technology, University of Bedfordshire, UK; Chair, IEEE Consumer Electronics & Broadcast Technology Chapter, UKRI; Chair, IEEE Technology Management Council Chapter, UKRI, UK
- Prof. P. Balasubramanian; Alliance University, Bangalore, India
- Prof. Michael Panayiotis Bekakos (Congress Steering Committee); Professor of Computer Systems; Director, Laboratory of Digital Systems, Department of Electrical and Computer Engineering, Democritus University of Thrace, Greece; Head, Parallel Algorithms and architectures Research Group (PAaRG); Editor-in-Chief, *The Journal of Neural, Parallel & Scientific Computations*, USA
- Dr. Sidahmed Benabderrahmane; INRIA (French National Computer Science Institute), France
- Prof. Juan-Vicente Capella-Hernandez; Executive and Quality Manager, Wireless Sensor Networks Valencia, Inc.; Member, Editorial Board: IEEE RITA Journal; *International Journal On Advances in Networks and Services*; *International Journal of Computer Science & Information Technology Applications*; Universitat Politècnica de Valencia, Valencia, Spain
- Prof. Juan Jose Martinez Castillo; Director of The Acantelys Research Group and Coordinator of the Computer Engineering Department, Universidad Gran Mariscal de Ayacucho, Venezuela
- Dr. Daniel Bo-Wei Chen; Department of Electrical Engineering, Princeton University, New Jersey, USA
- Prof. Kevin Daimi (Congress Steering Committee); Director, Computer Science and Software Engineering Programs, Department of Mathematics, Computer Science and Software Engineering, University of Detroit Mercy, Detroit, Michigan, USA
- Prof. Leonidas Deligiannidis (Session Chair & Co-Editor, ICWN); Professor, Computer Science, Wentworth Institute of Technology, Massachusetts, USA
- Somdip Dey; School of Computer Science, The University of Manchester, Manchester, UK
- Dr. Lamia Atma Djoudi; Synchrone Technologies, France
- Prof. Mary Mehrnoosh Eshaghian-Wilner (Congress Steering Committee); Professor of Engineering Practice, University of Southern California, California, USA; Adjunct Professor, Electrical Engineering, University of California Los Angeles, Los Angeles (UCLA), California, USA
- Prof. Oleg Finko; Krasnodar Higher Military Command Engineering School Rocket Forces, Russia; Institute of Information Technology and security, Kuban State Technological University, Russia
- Prof. Mohammad Shahadat Hossain; Department of Computer Science and Engineering, University of Chittagong, Chittagong, Bangladesh; Visiting Professor, Trisakti University, Indonesia; Visiting Academic Staff, The University of Manchester, UK
- Dr. Guofeng Hou; Bell Laboratories and Microsoft Corporation, USA
- Prof. George Jandieri (Congress Steering Committee & Vice Chair of CSC); Georgian Technical University, Tbilisi, Georgia; Chief Scientist, The Institute of Cybernetics, Georgian Academy of Science, Georgia; Editorial Board Member: *International Journal of Microwaves and Optical Technology*, *The Open Atmospheric Science Journal*, *American Journal of Remote Sensing*
- Prof. Young-Sik Jeong (Congress Steering Committee); Department of Multimedia Engineering, Dongguk University, Seoul, South Korea; Editor-in-Chief, *Journal of Information Processing Systems (JIPS)*
- Dr. Christos Kartsaklis (PDPTA); Oak Ridge National Laboratory, Oak Ridge, Tennessee, USA
- Prof. Byung-Gyu Kim (Congress Steering Committee); Multimedia Processing Communications Lab.(MPCL), Department of Computer Science and Engineering, College of Engineering, SunMoon University, South Korea
- Prof. Dattatraya V. Kodavade (Congress Steering Committee); Head of Computer Science and Engineering, D.K.T.E Society's Textile & Engineering Institute, Ichalkaranji, Maharashtra State, India
- Gurudatt Anil Kulkarni; I/C Head of Department and Lecturer, Electronics & Telecommunication Department, Marathwada Mitra Mandal's Polytechnic, Pune, India
- Dr. Vijay H. Mankar; I-C Head, Department of Electronics & Telecommunication, Government Polytechnic Nagpur, India; Fellow, The Institution of Engineers, India
- Prof. George Markowsky (Congress Steering Committee); Professor and Associate Director, School of Computing and Information Science; Chair International Advisory Board of IEEE IDAACS; Director 2013 Northeast Collegiate Cyber Defense Competition; Chair Bangor Foreign Policy Forum; President Phi Beta Kappa Delta Chapter of Maine; Cooperating Prof. Mathematics & Statistics Department UMaine; Cooperating Prof. School of Policy & Int'l Affairs UMaine; University of Maine, Orono, Maine, USA
- Dr. Andrew Marsh (Congress Steering Committee); CEO, HoIP Telecom Ltd (Healthcare over Internet Protocol), UK; Secretary General of World Academy of BioMedical Sciences and Technologies (WABT) a UNESCO NGO, The United Nations

- *Dr. Kamal Mehta; Department of Computer Engineering, Institute of Technology, Nirma University, Ahmedabad, India; Vice Editor-in-Chief, International Journal of Innovative Science & Modern Engineering*
- *Prof. Robert Morelos-Zaragoza; Electrical Engineering Department, San Jose State University, San Jose, California, USA; Senior Member, IEEE; Author of book "The Art of Error Correcting Coding" (2nd edition, John Wiley and Sons), USA*
- *Prof. G. N. Pandey (Congress Steering Committee); Vice-Chancellor, Arunachal University of Studies, Arunachal Pradesh, India; Adjunct Professor, Indian Institute of Information Technology, Allahabad, India*
- *Prof. James J. (Jong Hyuk) Park (Congress Steering Committee); Department of Computer Science and Engineering (DCSE), SeoulTech, Korea; President, FTRA, Editor-in-Chief, HCIS Springer, JoC, IJITCC; Head of DCSE, SeoulTech, Korea*
- *Prof. R. Ponalagusamy (PDPTA); Department of Mathematics, National Institute of Technology, Tiruchirappalli, India; Editor-in-Chief, International Journal of Mathematics and Engineering with Computers*
- *Dr. Xinyu Que (PDPTA); IBM T. J. Watson Research Center, Yorktown Heights, New York, USA*
- *Dr. Atta ur Rehman; Department of Information System, University of Malaya, Kuala Lumpur, Malaysia*
- *Dr. Kandarpa Kumar Sarma; Associate Professor, Head of Department ic, Department of Electronics and Communication Technology, Gauhati University, Assam, India; Senior Member, IEEE; Fellow, IETE*
- *Ashu M. G. Solo (Congress Steering Committee & Publicity Chair); Fellow of British Computer Society, Principal/R&D Engineer, Maverick Technologies America Inc.*
- *Prof. Fernando G. Tinetti (Congress Steering Committee); School of Computer Science, Universidad Nacional de La Plata, La Plata, Argentina; Co-editor, Journal of Computer Science and Technology (JCS&T)*
- *Prof. Patrick S. P. Wang (Congress Steering Committee); Fellow: IAPR, ISIBM, WASE; Professor of Computer and Information Science, Northeastern University, Boston, Massachusetts, USA and Zijiang Visiting Chair, ECNU, Shanghai, NTUST, Taipei; iCORE Visiting Professor, University of Calgary, Canada; Otto-von-Guericke Distinguished Guest Professor, University Magdeburg, Germany*
- *Prof. Shih-Jeng Wang (Congress Steering Committee); Department of Information Management, Central Police University, Taiwan; Program Chair, Security & Forensics, Taiwan; R.O.C.; Director, Information Crypto and Construction Lab (ICCL) & ICCL-FROG*
- *Dr. Wei Wei; School of Computer Science and Engineering, Xi'an University of Technology, Xi'an, P. R. China; Member of China Computer Federation (CCF), P. R. China*
- *Prof. Mary Q. Yang (Congress Steering Committee and Vice Chair of ABDA and BIOCAMP); Director, Mid-South Bioinformatics Center and Joint Bioinformatics Ph.D. Program, Medical Sciences and George W. Donaghey College of Engineering and Information Technology, University of Arkansas, USA*

We would like to extend our appreciation to the members of the program committees of individual sessions, tracks, and workshops; their names do not appear in this document; they are listed on the web sites of individual tracks.

As Sponsors-at-large, partners, and/or organizers each of the followings (separated by semicolons) provided help for at least one track of the World Congress: Computer Science Research, Education, and Applications Press (CSREA); Taylor & Francis, UK (<http://www.taylorandfrancis.com/>); US Chapter of World Academy of Science (<http://www.world-academy-of-science.org/>); American Council on Science & Education & Federated Research Council (<http://www.americancse.org/>); HoIP, Health Without Boundaries, Healthcare over Internet Protocol, UK (<http://www.hoip.eu>); HoIP Telecom, UK (<http://www.hoip-telecom.co.uk>); and WABT, Human Health Medicine, UNESCO NGOs, Paris, France (<http://www.thewabt.com/>). In addition, a number of university faculty members and their staff (names appear on the cover of the set of proceedings), several publishers of computer science and computer engineering books and journals, chapters and/or task forces of computer science associations/organizations from 5 countries, and developers of high-performance machines and systems provided significant help in organizing the conference as well as providing some resources. We are grateful to them all.

We express our gratitude to keynote, invited, and individual conference/tracks and tutorial speakers - the list of speakers appears on the conference web site. We would also like to thank the followings: UCMSS (Universal Conference Management Systems & Support, California, USA) for managing all aspects of the conference; Dr. Tim Field of APC for managing the printing of the proceedings; and the staff of Monte Carlo Resort (Convention department) in Las Vegas for the professional service they provided. Last but not least, we would like to thank the Co-Editors and Associate Co-Editors of ICWN'14: Prof. Hamid R.

Arabnia, Prof. Leonidas Deligiannidis, Prof. George Jandieri, Ashu M. G. Solo, and Prof. Fernando G. Tinetti.

We present the proceedings of ICWN' 14.

Steering Committee, 2014

<http://www.world-academy-of-science.org/>

Contents

SESSION: SENSOR NETWORKS AND APPLICATIONS + RELATED ISSUES

| | |
|---|-----------|
| Performance Analysis of IEEE 802.15.4 For Intra-Vehicle Wireless Networks | 3 |
| <i>Utayba Mohammad</i> | |
| Time Synchronization Protocol Using Lighting Control for Wireless Sensor Network | 10 |
| <i>Shoichi Nagamitsu, Hiroto Aida, Ryoga Okunishi, Yo Motoya, Mitsunori Miki</i> | |
| Lifetime Extension Algorithms for the Connected Sensor Cover | 17 |
| <i>Daisuke Matsumoto, Akihiro Fujiwara</i> | |
| Performance of Hierarchical Polling-based MAC scheme for Wireless Body Sensor Network | 23 |
| <i>Shusaburo Motoyama</i> | |
| A Software Update Method using Clustering WSNs | 29 |
| <i>Hyeyeong Jeong, Byoungchul Ahn</i> | |
| Packet Loss Resilience Lighting Control for Wireless Sensor Networks | 35 |
| <i>Yushi Uchimura, Hiroto Aida, Ryoga Okunishi, Yo Motoya, Mitsunori Miki</i> | |
| A Network Structure for Medical Assistance in Rural and Urban Areas Using IoT Technology | 42 |
| <i>Edivaldo Serafim, Shusaburo Motoyama</i> | |
| Detecting Boundary Nodes in WSN | 47 |
| <i>Nihel Senouci, Moustafa Kouider El Ouahed, Hafid Haffaf</i> | |
| An Energy based Routing Algorithm Using the Center of Local Clustering in Wireless Sensor Networks | 53 |
| <i>Chung Sie Rhee, Ming He Jin</i> | |

SESSION: WIRELESS NETWORKS AND SECURITY ISSUES + IOT

| | |
|--|-----------|
| Hierarchical-Based Measurement of Situation Awareness in the Internet of Things | 61 |
| <i>Audrey Gendreau, Rita Barrios</i> | |
| Investigating Performance of Extended Epidemic Routing Protocol of DTN under Routing Attack | 69 |
| <i>Harminder Singh Bindra, A L Sangal</i> | |
| TinyWatermark: A Code Obfuscation-based Software Watermarking Framework for Wireless Sensor Networks | 75 |
| <i>Emanuele Nunes de Lima Figueiredo Jorge, Luci Pirmez, Rafael de Oliveira Costa, Igor Leao dos Santos, Claudio Miceli de Farias, Davidson Rodrigo Boccardo, Luiz Fernando Rust da Costa Carmo, Lucila Maria de Souza Bento</i> | |

Source-Location Privacy Protection in Wireless Sensor Networks using AZR Routing 82
Zhiwen Zeng, Meiling Zeng, Hui Liu

Applying TCP Profiling to Detect Wireless Rogue Access Point 88
James Yu

One-time Pad Cipher Based on Out-Key Distribution 95
Shengyuan WU

SESSION: MOBILE COMPUTING AND APPLICATIONS

Traffic: A Fully Integrated Accident Management System in Vehicular Networks Through Smartphones 103
Sevgi Kaya, Burcu Gulfem Ozergin, Halid Ozsoy, Taskin Kocak, Cagri Gungor

Self-Handover Optimization in NEMO Networks for LTE-Advanced Congestion Control Purposes 108
Houda Mzoughi, Faouzi Zarai, Lotfi Kamoun

Application of Autonomous Mobile Agents to Provide Security in Wireless Networks 114
Marcel O Odhiambo, Aderemi Lawal

Fixed Cluster Head Based Routing for Heterogeneous Mobile Wireless Sensor Network 119
Jaideep Lakhota, Rajeev Kumar

SESSION: WIRELESS NETWORK APPLICATIONS, AD-HOC NETWORKS, VANET, NOVEL ALGORITHMS, PROTOCOLS AND RELATED TECHNOLOGIES

Joint of Feedback and Feedforward Controller on Application to Wireless Tele-Control System Considering Uncertainty 125
Faramarz Alsharif, Shiro Tamaki, Katsumi Yamashita, Tustomu Nagado, Mohammad Reza Alsharif, Heung Gyoon Ryu

Performance Analysis of Broadcasting Real-Time Data Placement over Wireless Multi-Channels 132
Ding-Jung Chiang, Ching-Sheng Wang, Chien-Liang Chen, Wen-Jay Lo

A Transmission Parameter Optimization Method for GA-based Cognitive Engines 139
Keunhong Chae, Huaping Liu, Seokho Yoon

| | |
|---|------------|
| Ultra High Video Data Compression for Android Devices Using OpenCV and other Open-Source Tools | 144 |
| <i>Ronald Yu, Tong Lai Yu</i> | |
| Self-aligning Wireless Communication for First Responder Organizations in Interoperable Emergency Scenarios | 151 |
| <i>Peter Dorfinger, Georg Panholzer, Ferdinand Von Tullenburg, Massimo Cristaldi, Giovanni Tusa, Franz Bohm</i> | |
| UWB Antenna Equalization of Pulse Modulation for IEEE 802.15.4a UWB PHY | 158 |
| <i>Loay Khalaf</i> | |
| Wireless-Aware Congestion Control for Transmission over Heterogeneous Networks | 162 |
| <i>Jyun-Siou Fan, Sheng-Shuen Wang, Hsu-Feng Hsiao</i> | |
| Performance Improvement in Subcarrier QAM Free Space Optical Links in the Presence of Atmospheric Turbulence and Pointing Error with Spatial Diversity and Beam Optimization | 169 |
| <i>Devi Chadha, Bhaskar Chakravarty</i> | |
| An Implementation of the TDMA Baseband Modem for Voice Relay | 174 |
| <i>Yeonbo Kim, Byoungchul Ahn, Yong-Wook Bae</i> | |
| Region Authority (RA) Collaborated Certificate Organization and Management in VANET | 179 |
| <i>Shahnawaj Khan, Naveen Chauhan</i> | |
| Performance Evaluation of 6LoWPAN Based Networks for Ubiquitous Health Monitoring System | 184 |
| <i>Waiser Mehmood, Ammad Hassan, Rohan Tabish, Farid Touati, Adel Ben Mnaouer, Brahim Gaabab</i> | |
| An Approach for Analysis the Impact of LTE-based Femtocell Networks - Case Study Based on Discrete Simulation | 189 |
| <i>Ketyllen Silva, Carlos Silva, Andre Donza, Carlos Frances, Nandamudi Vijaykumar</i> | |
| A Simulation Study of Effect of MPLS on Latency over a Wide Area Network (WAN) | 196 |
| <i>Adeyinka Ajao Adewale, Samuel Ndueso John, Charles Ndujiuba</i> | |
| A Heuristic Algorithm for Longest Simple Cycle Problem | 202 |
| <i>Parveen Kumar, Nitin Gupta</i> | |
| SESSION: WIRELESS NETWORKS AND ENERGY EFFICIENCY ISSUES | |
| A New Power Saving Routing Algorithm for Delay Tolerant Networks | 211 |
| <i>Azadeh Omidvar, Karim Mohammadi</i> | |

Energy-efficient Heuristics for Multi Hop Routing in People-centric Environments 216
Antonio Oliveira-Jr, Rosario Ribeiro, Tercio Filho, Dalton Matsuo, Marcos Batista, Claudio Souza, Jose-Ricardo Ribeiro

QoS-Based Power-Efficient Resource Management for LTE-A Networks with Relay Nodes 221
Kai-Ten Feng, Tzu-Hao Su, Tain-Sao Chang

SESSION: POSTER PAPERS

A New Routing Protocol for Improving Path Stability in Mobile Ad-hoc Networks 229
Hyung-Jik Kim, Hae-Il Choi, Sunwoong Choi

Developing Mobile Raspberry Pi Base Station Cloud for Wireless Sensor Networks 231
Andrew Wilson, Hwajung Lee

SESSION: LATE BREAKING PAPERS AND POSITION PAPERS: WIRELESS NETWORKS AND RELATED ISSUES

Simulation of Reactive Routing Protocols in Wireless Mesh Networks: a Systematic Literature Review 235
Stella Jacyszyn Bachega, Dalton Matsuo Tavares

Intelligent and Secure Routing in Heterogeneous Wireless Networks 241
Suman Sangwan, Parvinder Singh, R.B. Patel

A Practical Evaluation of Smartphone Application on Mesh Networks 247
Dalton Tavares, Anelisa Silva, Stella Bachega, Rafael Aroca, Jo Ueyama, Glauco Caurin, Antonio Oliveira Jr

Access Point Reconfiguration Using OpenWrt 254
Dalton Tavares, Maicon Lima, Rafael Aroca, Glauco Caurin, Antonio Oliveira Jr, Tercio Santos Filho, Stella Bachega, Marcos Batista, Sergio Silva

A Review of Handover Schemes in Overlaid Macro-femto Cellular Networks 261
Suman Deswal, Anita Singhrova

Performance Evaluation of NeBuST-wide Burst Sensor Data Transmission Protocol 266
Hiroaki Higaki

New Mobile Digital Signature Solution Based on MicroSD 272
Khaled Moawad, Mostafa Abdel-Aazim, Bahaa Hassan