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WORKSHOP REPORT

## Fourth IEEE International Workshop on Cloud Computing Systems, Networks, and Applications (CCSNA), San Diego, CA, USA

By Tolga Soyata, Al-Sakib Khan Pathan, Weiwei Fang, and Ranga Rao Venkatesha Prasad, Workshop Publicity Co-Chairs

The 2015 IEEE Global Communications Conference (GLOBECOM) was held in San Diego, CA, USA December 6–10. Themed “Connecting All through Communications,” this flagship conference of the IEEE Communications Society brought together researchers from all over the world to discuss the latest advances in communications technology. The technical program consisted of 12 symposia, 22 workshops, 17 tutorials, as well as industry and business panels.

The Fourth IEEE International Workshop on Cloud Computing Systems, Networks, and Applications (CCSNA) was one of three full-day workshops held in conjunction with GLOBECOM 2015. The first CCSNA workshop was held at GLOBECOM 2013 to address the demand for cloud computing topics. The one-day workshop received 46 high quality submissions, and was well attended. We were proud to have Dr. Mladen Vouk (North Carolina State University, USA), Dr. Rod Smith (IBM, USA), and Dr. Masum Hasan (Cisco Systems, USA) as our distinguished keynote speakers. Continuing on the success of our first CCSNA, we organized the second IEEE International Workshop on CCSNA at GLOBECOM 2014, receiving 67 high quality papers and accepting 26. During the event, Mac Devine (Vice President of SDN Cloud Services and CTO, IBM Cloud Services Division) gave a keynote speech on “The Perfect Storm Intensifies—The Convergence of BigData, Cloud and the Internet of Things is Now at Full Strength.” Prof. Kishor S. Trivedi (Duke University) gave a keynote speech on “Capacity Planning for Infrastructure-as-a-Service Cloud.” We continued to organize the third IEEE International Workshop on CCSNA at IEEE ICC 2015. The demand for the event at ICC 2015 on Cloud Computing remained strong, as we had received 69 submissions and accepted 25 papers. We had two keynote speeches given by Prof. Jean Bacon (University of Cambridge) on “Information Flow Control for Cloud and Internet of Things,” and Dr. Wesley Armour (University of Oxford) on “Addressing the Big Data Challenge Posed by the World’s Largest Telescope.”

Cloud computing, as well as cloud-inspired business models, enable on-demand access to a shared pool of resources, namely computing, storage, networks, services, and applications. With the advent of cloud-based systems, cloud operators have been aiming at reliable, secured, privacy-preserving, and cost-efficient cloud design and management. As the cloud infrastructure aims at offering various IT resources as services, requirements of cloud applications vary based on the resources that are requested as services. Thus, the resources may refer to heavy computation resources, massive storage resources, high-capacity network resources, and so on. The heterogeneity of cloud applications leads to the challenge



CCSNA 2015 Workshop keynote speech by Dr. Ammar Rayes.



CCSNA 2015 Workshop audience.

of holistic design of a robust cloud system that can oversee and handle the diverse needs of numerous types of applications. On the other hand, these challenges enforce cooperation of various players in the cloud system, each of which focuses on a different segment such as network, computing, applications, and systems.

The International Workshop on Cloud Computing Systems, Networks, and Applications (CCSNA-2015) aims at the crossroads between scientists, researchers, practitioners, and students from diverse domains in cloud computing research. The workshop aims at attracting contributions of system and network design that can support existing and future applications and services.

CCSNA 2015 was a joint effort by leading experts in the field of cloud computing from all over the world. Both Yaser Jararweh from Jordan University of Science and Technology and Burak Kantarci from Clarkson University served as the general chairs. The technical program committee was chaired by Houbing Song from West Virginia University, who is the director of the Security and Optimization for Networked Globe Laboratory (SONGLab, www.SONGLab.us), Fen Hou from the University of Macau, Kuan Ching-Li from Providence University, and Zuqing Zhu from the University of Science and Technology of China.

Following are the organizers of CCSNA 2015.

**General Chairs:** Yaser Jararweh, Jordan University of Science and Technology, Jordan; Burak Kantarci, Clarkson University, USA.

**Technical Program Chairs:** Houbing Song, West Virginia University, USA; Fen Hou, University of Macau, China; Kuan Ching-Li, Providence University, Taiwan; Zuqing Zhu, University of Science and Technology of China, China.

*(Continued on Newsletter page 4)*

## COMM2016: The 11th Romanian International Conference on Communications

By Victor Croitoru, Ioan Nicolaescu, and Nicolae Oaca, Romania

The 11th IEEE International Conference on Communications (<http://www.comms.ro>), organized by the Romanian Military Technical Academy, through the Department of Communications and Military Electronic Systems, and the Politehnica University of Bucharest, under the aegis of IEEE Romanian Section and Romanian Academy of Technical Sciences, was held on 9–10 June 2016, at the attractive National Military Palace, in the heart of Bucharest, the capital of Romania.

The history of the Romanian International Conference on Communications goes back to 1996, when the Military Technical Academy (MTA) and Politehnica University of Bucharest decided to create a forum to share knowledge and exchange information in the field of communication systems. The Military Technical Academy provides education in the field of communication systems for the Romanian Ministry of Defense and for other structures within the national security and defense system. As a result, the main topics of research are oriented toward command, control, communications, computers, intelligence, surveillance, and recognition systems.

Researchers and experts from industry, research institutes, and universities from 14 countries around the world submitted 127 papers for presentation at COMM2016. Submitted papers were reviewed by 87 scientists from universities, institutes, and ICT companies all over the world, with 106 papers, or 83%, recommended for presentation within the technical program.

At the opening ceremony the participants were welcomed by Prof. Ioan Nicolaescu, Vice-Rector for Educations, MTA; Prof. Victor Croitoru, Politehnica University of Bucharest; Iulian Constantin Vizitiu, Rector of the MTA; Prof. Corneliu Burileanu, Vice-Rector, Politehnica University of Bucharest; Marius Catalin Marinescu, President of ANCOM; Mircea Eremia, President of the IEEE Romania Section; and Sorin Vasilca, Technical Deputy Director of Special Telecommunications Service.

COMM 2016 featured the following invited speakers: Prof. Piet van Genderen from Delft University of Technology, the Netherlands; Prof. Adrian Popescu from Blekinge Institute of Technology, Sweden; Prof. Matthias Uwe Pätzold from the University of Agder, Norway; and Prof. Paul Cotae from the University of the District of Columbia, USA.

Communications 2016 was organized into a plenary session, 15 regular parallel sessions, four special sessions, and one workshop. The workshop on the electromagnetic compatibility was organized by ANCOM, the Romanian National Authority for Management and Regulation in Communications, as an opportunity to present the Electromagnetic Compatibility Laboratory in Prejmer, Brasov, equipped at the highest standards with the latest generation of equipment. This provided a new opportunity to ANCOM President Catalin Marinescu to reiterate the objective that the ANCOM team should be involved in research in the field of electromagnetic compatibility, as well as an occasion to present the first two research papers jointly conducted by researchers from the Technical University of Cluj and ANCOM within the laboratory in Prejmer.

One popular session was “Antennas and Propagation,” in which six papers in the field of dielectric resonator antennas, pattern optimization with the help of genetic algorithms, adaptive beamforming, and metamaterials were presented by Ph.D. students and professors. The session on “Computational Intelligence” included six papers authored by researchers from India, Italy, Romania, and Switzerland. The covered topics included theoretical aspects, such as the stability of limit cycles in recurrent neural networks, issues in symbolic model checking, and local receptive field feature extractors. Applications ranged from prediction in the pre-paid mobile telecommunication industry to pattern recogni-



A traditional group photo on the stairs of the National Military Palace.



The National Military Palace by night.

tion in space imagery, to handwriting recognition, etc. The mix of papers at least partly addressing fundamentals and of studies dealing with applications was key to the success of the session, with all papers eliciting more questions and discussion than the chairs were able to allow. This may indicate to the organizers of the next edition of the conference that they should organize a multi-session track devoted to “Computational Intelligence.”

The session on “Vehicular Technology Systems” included four papers dealing with malfunction detection using spectral analysis for automotive braking systems; control technologies of choice for future vehicular networks; intra-car communications and diagnosis solutions; and safety critical applications for vehicular networks. They mostly included preliminary results of research carried out by Ph.D. students, revealing critical aspects of autonomous driving and envisioning solutions for them.

In the “Communication Security” session, the following topics were addressed by presenters from public institutions, research institutes, and universities: searching for encrypted data in cyber physical systems focusing on secure and efficient communication systems; a new framework for enhanced measurable cyber security in computer networks; design and validation in distributed intrusion detection and prevention systems; security issues in most popular content management systems, and determination of cyber threats and vulnerabilities of critical infrastructure. The topics were well addressed and were enthusiastically received by a large audience.

The session on “Network Operations and Management” included four papers dedicated to hot topics in different areas: OpenFlow, OTT video streaming, energy consumption in mobile networks, and distributed analysis of monitored data. The mix of papers indicates the diversity of the research problems existing today, and the high quality of the papers shows the strong research existing in Romania.

Prof. Adrian Popescu from Blekinge Institute of Technology, Sweden, presented the results obtained in the Celtic-Plus research project CONVINCe, which is focused on reducing the power con-

*(Continued on Newsletter page 4)*

## Enterprise Cybersecurity Track at CommunicAsia 2016

By Ewell Tan and Leo Hwa Chiang, Singapore

As Asia's largest integrated information and communications technology (ICT) event, the CommunicAsia 2016 Summit was held concurrently with EnterpriseIT 2016 and BroadcastAsia 2016, at the Marina Bay Sands Convention Centre in Singapore, from 31 May to 3 June 2016. This event attracted more than 30,500 international attendees throughout the four day event, and gathered about 1,100 exhibitors from 49 countries and regions, highlighting innovations critical for digital transformation in the region. Delegates gained insights from more than 170 companies through leaders at the CommunicAsia 2016 Summit.

The Director of IEEE Asia Business Development, Leo Hwa Chi-



Lim Soon Chia, the Director of Technology Division from Cybersecurity Agency Singapore, gave a welcome address to the participants at Enterprise Cybersecurity track at CommunicAsia 2016.



(From left): Ewell Tan, Leo Hwa Chiang, Prof. Andrew Woodward, Chirag Gohel, Nurhazman Abdul Aziz.

ang, together with the Director of IEEE Division III, Celia Desmond, and the Executive Director of the IEEE Communications Society, Susan Brooks, initiated an agreement between the Singapore Exhibition Services Pte. Ltd. and the IEEE Communications Society to jointly organize a one day track on Enterprise Cybersecurity at CommunicAsia 2016 on 2 June 2016. This one day track featured 11 distinguished speakers from industry and cybersecurity agencies.

As the Co-Chair of this conference, Lim Soon Chia, Director of the Technology Division at Cybersecurity Agency Singapore, gave a welcome address to the audience. After his opening speech, Prof. Yuval Elovici, Research Director of iTrust from Singapore University of Technology and Design, gave a talk about "Tackling Insider Threat"; Ko Sasaki, General Manager from LAC (a member of the Japan Network Security Association) gave a presentation on "Advanced Persistent Threats," followed by Eric Lam, Director of the Asia Enterprise Cybersecurity Group at Microsoft, who gave a presentation on "Enhancing Security and Privacy While Managing IoT Data Generation in Enterprises."

*(Continued on Newsletter page 4)*

## 20th Optical Network Design and Modeling Conference (ONDM 2016)

By Maria Victoria Bueno-Delgado, ONDM 2016 Financial Chair, and Pablo Pavon-Mariño, ONDM 2016 General Chair, Universidad Politécnica de Cartagena, Spain

The Optical Network Design and Modelling (ONDM) international conference is a respected forum that brings together researchers, engineers, and practitioners in the design and modeling of optical networks. The ONDM congress covers cutting-edge research in established areas such as optical networking, optical systems, as well as emerging topics such as novel Internet architectures, new optical network architectures for the cloud/data center, wireless optical networks, photonic integrated networks, and SDN-NFV developments in optical networks.

ONDM was founded in 1997 in Vienna, Austria. The following annual editions were held in different cities around the world, expanding the topics at the same pace as the research in optical networks advanced. The number of editions of this international conference is a sign of its quality and appreciation among the scientific community.

The 20th edition of the ONDM conference, technically sponsored by the IEEE Communications Society, was held 9–12 May 2016 at the School of Telecommunications Engineering (ETSIT), Universidad Politécnica de Cartagena (UPCT), in Cartagena, Spain. The local organization was run by Engineering Group Telecommunications Network (GIRTEL, <http://girtel.upct.es>) of the UPCT.

During the four days of the conference, the attendees participated in various scientific activities such as the work presentation sessions,



Leonid Kazovsky from Stanford University, keynote speaker at ONDM 2016.

the workshop "Big Data for Networking: Opportunities, Challenges and Requirements," as well as the workshop "Elastic Networks Design and Optimization," which included several interesting tutorials. Following the conference tradition, ONDM 2016 was a single-track event, and their 39 presentations were arranged in 11 sessions.

Similar to their last editions, ONDM 2016 gathered participants from more than 25 countries, from all continents, with more representation from Europe, Asia, and North America. The internationality of the conference is made evident also by the plurinational representation in its Technical Committee, and the presence of its members in other prestigious international forums.

Papers presented in the conference were subject to a rigorous selection process of peer review, carried out primarily by members of the conference Technical Program Committee, with an

*(Continued on Newsletter page 4)*

## ONDM2016/Continued from page 3

acceptance rate below 50%. Authors of papers accepted for the conference were invited to submit an extended version of their paper to a Special Issue dedicated to ONDM 2016 in the prestigious *IEEE/OSA Journal of Optical Communications and Networking*. The editors of this special issue are Massimo Tornatore (Politecnico di Milano, Italy), Nina Skorin-Kapov (University Centre of Defence, Spanish Air Force Academy, Spain), and Pablo Pavón Mariño (Universidad Politécnica de Cartagena, Spain).

The conference included four extraordinary keynote talks at the start of each of the four days, given by Juan Pedro Fernández Palacios (Telefonica), Josue Kuri (Facebook), Leonid Kazovsky (Stanford University), and Jane M. Simmons (Monarch Network Architects). The keynotes covered exciting new trends in optical networking, such as the expected evolution of the metro, the planning of the networks interconnecting large datacenters, or the use of novel quasi-passive optical devices for creating rearrangeable topologies in access networks.

As conference organizers, we were happy to receive very positive feedback from the attendees, who highlight the high reputation of the conference, the friendly atmosphere, single track that encourages scientific interactions among attendees and presenters, and the high quality of the works. These are the distinctive features of ONDM, which will surely be continued and expanded in the next edition, ONDM 2017 in Budapest (Hungary).

## COMM2016/Continued from page 2

sumption in video distribution networks, under the requirement of provision of expected end-user quality of experience. This is a three year project, with participation by industrial and academic partners in four European countries participate.

In his invited paper "Multiple Time Series Fisher Periodicity Test for the Detection of the Distributed New Shrew Attacks," Dr. Paul Cotae, a professor at the University of the District of Columbia, focused on the detection of low rate denial of service attacks. The obtained results reveal that these attacks can be effectively identified by using a Fisher g-statistic test for one dominant periodicity, as in the case of Shrew attacks.

The fruitful collaboration with the universities from Bucharest, Timisoara, Cluj, and Iasi has contributed to the quality of the Program significantly. The conference participants had an opportunity to visit Mogosoia and Snagov, highly appreciated tourist resorts close to Bucharest.

## COMMUNICASIA 2016/Continued from page 3

After a networking lunch, Prof. Yu Chien Siang, Chief Innovation Officer from Certis Cisco, presented his talk on "Innovating and Securing New Systems, All Done in One Breath"; Mark Ames, Associate Director of KPMG Management Consulting, shared with us "How Do You Manage the Risk of Bring Your Own Device (BYOD)?"; Frank IP, Vice President of Marketing and Business Development from Huawei, discussed the topic "Defence in Depth," and David Williamson, CEO of EfficientIP, presented his technical topic on "Next Generation Security for Telcos and ISPs."

After the distinguished speakers had given their presentations, the attendees sat in on roundtable discussions that were moderated by Frank IP, Mark Ames, David Williamson, Ko Sasaki, Colin Cooper, Director of Strategic Development at Viasat; and Amirudin Bin Abdul Wahab, CEO of Cybersecurity Malaysia. The topics of the roundtable discussion include "Countering the Threats to Cyber and Cyber Physical Assets Arising out of Higher Connectivity"; "Cyber Security Education Awareness and Training"; "Achieving a Secure Enterprise Architecture—Challenges and Practical Solutions"; "Using Coordinated Security Intelligence and Analytical Tools in Detecting and Mitigating Advanced Persistent Threats (APT)," and "Challenges for Regulators in National Cybersecurity." After a fruitful discussion, Co-Chair, Prof. Andrew Woodward, Dean of the School of Science at Edith Cowan University, gave a closing remark. There was a lucky draw at the end of the Enterprise Cybersecurity track.

There were about 101 delegates at the Enterprise Cybersecurity track, and it was one of the most popular and well attended Enterprise IT tracks at CommunicAsia 2016. We greatly appreciate all the distinguished speakers who were willing to share their expertise and knowledge at this event.

In addition, the IEEE Asia-Pacific office colleagues, Ewell Tan, Nurhazman Abdul Aziz, Chirag Gohel, Keng Lam Kuan, together with six student volunteers from Singapore University of Technology & Design (SUTD) and Singapore Nanyang Technological University (NTU), helped man the IEEE booth at CommunicAsia 2016, to promote membership in IEEE and the IEEE Communications Society, and also to increase public visibility. There were approximately 80 visitors at our booth through the four day event. We had a very successful event, and we look forward to organizing similar events in the future.

## CCSNA/Continued from page 1

**Steering Committee:** Chuan Heng Foh, University of Surrey, UK; Jinsong Wu, Universidad de Chile, Chile; Periklis Chatzimisios, Alexander TEI of Thessaloniki, Greece; Yaser Jararweh (Jordan University of Science and Technology, Jordan; Andy Rindos, IBM Research, USA; Mladen Vouk, North Carolina State University, USA.

CCSNA 2015 received 63 papers and accepted 26, an acceptance rate of 41 percent. Papers were submitted from 26 different countries and regions spanning North America, Europe, the Middle East, Africa, Asia/Pacific, and Latin America. These papers covered the following topics:

- Cloud computing systems and networking: principles, designs, analyses, and performance.
- Big data, data centers, and cloud managements.
- Cloud services, applications, security, and interdisciplinary topics.

CCSNA 2015 also featured two keynote speeches by Dr. Ilkay Altintas, who is the Chief Data Science Officer at the San Diego Supercomputer Center (SDSC), UC San Diego, where she is also the Founder and Director for the Workflows for Data Science Center of Excellence; and Dr. Ammar Rayes, who is a Distinguished Engineer at Cisco Services Technology Group focusing on smart services, IoT, analytics, and network management. Their speeches were entitled "The Role of Cloud Computing and Workflows in a Data-Driven World" and "Securing IoT Networks," respectively.

The 5th CCSNA workshop will be held in Washington D.C. in conjunction with IEEE GLOBECOM 2016 ([http://www.ieee-ccsna.org/ccsna\\_gc16/](http://www.ieee-ccsna.org/ccsna_gc16/)).



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