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CHAPTER REPORT

## International Seminar at the El Salvador ComSoc Chapter on Current Trends in Mobile Communications

By Carlos Eugenio Martínez-Cruz, El Salvador Chapter Chair

In July 2015, the IEEE El Salvador ComSoc chapter hosted an international seminar. The focus was on current trends in mobile communications. The seminar, which lasted eight hours, was given by Dr. Ing. Francisco J. Escribano from Universidad Alcalá de Henares, Madrid, Spain. Dr. Escribano is an active member in IEEE Spain and has also been a member of the IEEE Spanish national board since 2016.

Thirty nine professionals attended the call. There were representatives from many different places from the telecommunication sector. Forty percent were from the industry, forty percent were from the public sector, and twenty percent were from universities. Very few events in the daily life of this tiny nation attract so many and such a diversity of telecommunication professionals.

The seminar was divided into four parts. The first part introduced enabling technologies needed for present and future mobile generations. Concepts like spread spectrum modulation, adaptive techniques, OFDM, MIMO, spectrum management, millimeter wave propagation, and networking improvements were introduced. The second part presented the concept of standards and their role in industry. An overview was made over past cellular network standards, from the almost forgotten 1G to the newest ideas behind 5G. In part three, current cellular network deployments were analyzed. In this part, as an example, the lecturer used the evolution of Spanish mobile networks to illustrate key spectrum management decisions. In Europe, the transition from analog to digital television technology released a significant amount of high quality radio spectrum. Future mobile network deployments and, in general, the wireless communications industry, are going to benefit from it. Part four was dedicated to business: new business models are emerging and need to be taken into consideration.



Dr. Francisco J. Escribano (left) received a diploma of recognition.



Lecture of Francisco J. Escribano in El Salvador.



Telecommunication professionals who attended the seminar.

Participants' opinions were very positive. At the same time, the event was enriched through different comments made during the seminar. Such comments represented industry, government, and university perspectives.

In coming years, Salvadoran society will face many different challenges. In 2016, following a supreme court decision, the government has to redefine the mechanism through which spectrum is allocated. At the same time, a Terrestrial Digital Television Standard has to be chosen. In 2017, most spectrum licenses have to be renewed. Incumbent cellular phone companies need to know if new rules are going to be introduced. All these issues make IEEE ComSoc activities of paramount importance.

Through the years, the El Salvador and Guatemala ComSoc chapters have developed a very close collaborative relationship. A week later, the same seminar was given in Guatemala City, where the Universidad Galileo hosted the event. Professionals from industry and professors from Galileo University attended the meeting.

Finally there was also spare time to visit a volcanic lake called Ilopango. The lake is known for being a possible source for the extreme weather events of AD 536 which triggered a catastrophic global climate change event. American paleo-ecologist Dr. Robert Dull, senior research fellow at the Environmental Science Institute at the University of Texas in Austin, said that the Ilopango volcano was the cause of the AD 536 climate cooling that lasted for at least two years, globally.

## netBaltic: Enabling Non-Satellite Wireless Communications over the Baltic Sea

By Michal Hoeft, Krzysztof Gierlowski, Krzysztof Nowicki, Jacek Rak, and Jozef Wozniak, Poland

Researchers from the Department of Computer Communications lead by Prof. Jozef Wozniak from Gdansk University of Technology, Poland, in cooperation with several Polish industrial partners including the National Institute of Telecommunications, the Institute of Oceanology of the Polish Academy of Sciences, and companies (DGT-LAB and NavSim), are currently working on deployment of the wireless communications infrastructure over the Baltic Sea without satellite communications. This pioneering architecture is planned to be the major outcome of the netBaltic project realized in the years 2015-2018 and co-funded by the Polish National Centre for Research and Development.

The main aim of the netBaltic project is to develop and deploy a broadband wireless communication system providing connectivity in a heterogeneous wireless mesh network environment able to meet the requirements of e-navigation services. In particular, the lack of reliable high-throughput communications is currently the major barrier in e-navigation implementations. Existing HF and VHF technologies, although offering long link ranges, are unreliable and their bandwidth is limited, while satellite communications is often too expensive, especially for smaller vessels.

This problem was recognized first in the TRITON project implementing homogeneous WiMAX mesh networking solutions with modified mechanisms of MAC layer and dedicated beamforming antennas. In netBaltic, the main focus is in turn on higher network layers and building the architecture to integrate different wireless technologies. The objective is to design and deploy three different groups of mechanisms related to particular communication areas. The first one (area A) includes mobility management of moving vessels providing uninterrupted communications across different wireless technologies. The second one (area B) refers to a self-



Michal Lewczuk presenting netBaltic initial solutions.



netBaltic members participating in the project meeting (left to right): Krzysztof Nowicki, Jozef Wozniak, Teresa Pluta, Lukasz Wiszniewski, Tomasz Gierszewski, Krzysztof Gierlowski, Michal Hoeft, and Wojciech Guminski.

organizing heterogeneous mesh network expanding hop-by-hop connectivity between ships and onshore infrastructure elements. Organization of such a mesh network will employ information from real-time measurements as well as existing and commonly utilized systems supporting maritime navigation (like AIS). The last one (area C) is dedicated to nodes located far away from other

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## IEEE Spanish Signal Processing and Communications Joint Chapter's Activities in 2015

By Víctor P. Gil Jiménez, Chair of the IEEE Signal Processing and Communications Joint Chapter, Spain

Our Chapter had a fantastic year in 2015. We experienced significant growth with many activities, including the coordination of the Distinguished Lecturer Tour by Prof. Hamid Jafarkhani across five countries. This tour started in Italy, where he attended the Annual Meeting of GTTI (National Telecommunications and Information Theory Group), then moved to France, and later to Spain, where he gave three talks at the University Carlos III de Madrid (UC3M), Polytechnic University in Madrid (UPM), and the University



Prof. Hamid Jafarkhani during his presentation at UC3M.



Prof. Ying-Dar Lin answering questions.

ty of Malaga (UMA), with the topic "Distributed Space time Coding and Cooperative Communications for Next Generation Wireless Broadband Systems." Then he travelled to Portugal, and finally to Switzerland. This talk was a very interesting introduction to the history of space time coding, followed by a discussion of what we can expect from it in the near future of broadband communications.

In addition, the chapter organized several other Distinguished Lectures, including the one by Prof. Hamid Krim at the University of Alcalá (UA) and Polytechnic of Valencia (UPC), with the topics "Sparsity, Convexity, Nullity and all that..." and "Sensor and Social Networks: A Case for Topological Data Analysis." There was also a lecture by Prof. Jianwei Huang at the CTTC speaking about "Mobile Data Offloading." Prof. Ying-Dar Lin gave several talks at Polytechnic University of Catalonia (UPC), the University of Zaragoza (UZA), and the University Carlos III de Madrid (UC3M) on the topics "Software Defined Networking: Why, Where, When, and How," "Research

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## IEEE ComSoc Distinguished Lecturer Tours: Why, How, and Tips from a Distinguished Lecturer

By Ying-Dar Lin, IEEE Fellow, IEEE ComSoc Distinguished Lecturer, National Chiao Tung University, Taiwan

### WHY DLT

The rationale behind the IEEE Distinguished Lecturer Tour (DLT) program is to lower the barrier of international academic exchange, with IEEE covering international air tickets and the hosts covering local accommodation. This greatly reduces the expenditures required by local hosts, which is critical for hosts in developing countries or those who are unwilling to go through budget logistics. Providing hotel accommodation and lunch/dinner is much simpler than paying for long-distance air tickets. The increased exchange would facilitate spreading research trends and fostering research collaboration.

My own motivation to serve as a distinguished lecturer ranges from sheer academic recognition, feedback to my research results, potential collaboration, to mixing in sightseeing fun. I would judge a talk as a failure if no questions were asked. The more questions I received, the more rewarding a DLT was because often these questions prompted me to reflect again on my research problem and solution. Although not every DLT would introduce you to new collaborators, a perfect match would come up from time to time. Spending one full day with your host provides an opportunity to find common interests, if not immediately then maybe in the future. I must say that DLTs boosted my international contacts, and allowed me to visit tourist destinations that most conferences would not take me to.

### HOW TO DLT

To be a ComSoc distinguished lecturer, apply by September 30 each year, with the completed form and a four-minute video to prove that you can present fluently and vividly. After being selected, you either organize or are organized with a DLT, file a

Destination	When	Initiator	Venues	Topics
Australia – Sydney – Melbourne	June 2014	Deakin	Univ. of Sydney Deakin Univ. Swinburne Univ. of Tech.	– SDN
Indonesia – Bandung – Bali	Nov. 2014	Bandung	Institute of Tech Bandung ICTSI'14 in Bali	– SDN – Research roadmap driven by NBL
USA – Monterey – San Jose – Oklahoma City – Austin	Dec. 2014	Myself	Naval Postgraduate School San Jose State Univ. Univ. of Oklahoma AT&T Labs IBM Research ComSoc Austin Chapter	– Traffic forensics – SDN
Europe – London – Barcelona – Zaragoza – Madrid – Louvain	June 2015	Myself	Univ. of Surrey Univ. of Politechnic Catalunya Univ. of Zaragoza Univ. of Carlos III Madrid Univ. of Catholic Louvain	– SDN – Traffic forensics – Research roadmap by NBL – Int'l. academic services
New Zealand – Christchurch – Wellington – Auckland	Aug. 2015	NZ	Univ. of Canterbury Victoria Univ. of Wellington Auckland Univ. of Tech.	– SDN – Research roadmap driven by NBL
Latin America – Santiago – Buenos Aires – Montevideo	Sept. 2015	LA	Univ. of Diego Portales Univ. of Buenos Aires Univ. of Montevideo	– SDN

Table 1. Summary of my six DLTs.



Classic auditorium at the University of Buenos Aires.



At AT&T Labs (left to right): Ying-Dar Lin, Robert Dailey, Chris Chase, Fawzi Behmann.

DLT application with ComSoc, conduct the DLT, and then file for reimbursement on-line at the ComSoc website with receipts and a DLT report. All DLT reports are posted at <http://www.comsoc.org/about/memberprograms/distinguished-lecturers>, which can be googled easily with "ComSoc DLT."

There were six DLTs in my first term of two years, as summarized in the accompanying table. Unlike most other distinguished lecturers who wait for invitations indefinitely, I also reached out to researchers I know personally to arrange DLTs. I ended up having two DLTs initiated by myself and four others invited by someone I knew or did not know. In the DLTs to New Zealand and Latin America I didn't know any inviting hosts or chapter chairs, while the DLTs to Australia and Indonesia were invited by someone I knew. The DLTs to the U.S. and Europe were organized by myself, where I knew some hosts but not all. The Austin chapter chair, who I did not know but is now my friend, was approached by me and they organized three talks to AT&T Labs, IBM Research, and the Austin Chapter, with all attendees from industry. I got to know two dozen people through these DLTs, with some of them added to my Facebook.

Though ComSoc policy recommends two DLTs per year for a Distinguished Lecturer and expects three lectures in three venues in each DLT, this is just a general guideline. I added an extra DLT to Indonesia, with only two talks, in the first year without sponsorship from ComSoc because the host covered the cost of the entire trip. In the second year, after I committed to the DLTs to Europe and Latin America, the New Zealand chapter chair approached me. We asked ComSoc whether the third DLT could be sponsored, and got was approved. I attempted to pack as many talks as I could into a DLT and piggyback it onto a conference trip to save time and money. In extreme cases, I packed five and six talks into the DLTs to the U.S. and Europe, and piggybacked them onto Globecom and ICC, respectively. Some hosts also tried to piggyback a talk onto an event. The DLT in Indonesia turned out to be two keynote speeches in a conference. As a one-day workshop, the hosts in Louvain and Auckland invited local net-

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## DLT TIPS/Continued from page 3

work researchers and packed eight to 10 small talks after my keynote. Beyond DLTs, I was also invited to give lectures elsewhere, with keynotes in Japan and Bangladesh.

The number of attendees and the number of questions are two metrics that one would state in a DLT report. In my talks, it ranges from 20 to 150 attendees (with an average of 30) and three to 15 questions (with an average of six). The extremes happened in Buenos Aires, with an artistic auditorium seating 150, and AT&T Labs in Austin, where my host asked me about 15 questions directly related to his traffic forensics work. He concluded that this was the most interesting talk he had recently and should have called back his colleagues on vacation. I know that AT&T Labs would be an excellent place to spend my sabbatical.

### USEFUL TIPS

Here I summarize my lessons for potential distinguished lecturers.

1. Don't simply wait for invitations. Reach out someone you know or chapter chairs to organize your DLTs.
2. Make your topics appealing and current. Put topics, your bio, and past reports on the ComSoc web page. Some chapter chairs do look at them to invite lecturers.
3. Don't talk on one single piece of research. Give a roadmap with a series of works. Encapsulate your roadmap with a tutorial first. The entire audience will not fall in your area.
4. Care more about the number of questions being asked than the number of attendees. Write them down in your report and treasure them as feedback to your research.
5. Pack more lectures into a DLT and piggyback onto a conference trip whenever possible.
6. Call for collaboration in your talk to identify potential partners, but don't expect a match after each talk. Perfect matches come naturally.
7. Follow up with those who discussed with you more and maybe add them to your Facebook.
8. Allocate at least two nights, preferably three nights, to a city to give yourself one full day to explore a new city.

Ying-Dar Lin is a Distinguished Professor of Computer Science at National Chiao Tung University (NCTU) in Taiwan. He received his Ph.D. in Computer Science from UCLA in 1993. He served as a visiting scholar at Cisco Systems in San Jose during 2007–2008. Since 2002, he has been the founder and director of Network Benchmarking Lab (NBL), which reviews network products with real traffic. NBL recently became an approved test lab of the Open Networking Foundation (ONF). He

also cofounded L7 Networks Inc. in 2002, which was later acquired by D-Link Corp. His research interests include quality of services, network security, deep packet inspection, wireless communications, and recently software defined networking. His work on "multi-hop cellular" was the first along this line, and has been cited over 700 times and standardized into IEEE 802.11s, IEEE 802.15.5, WiMAX IEEE 802.16j, and 3GPP LTE-Advanced. He is an IEEE Fellow (class of 2013), an IEEE Distinguished Lecturer (2014-2017), and a Research Associate of ONF. He is serving or has served on the editorial boards of many journals, guest edited several special issues, and co-chaired symposia at IEEE Globecom'13 and IEEE ICC'15. He published a textbook, *Computer Networks: An Open Source Approach*, with Ren-Hung Hwang and Fred Baker (McGraw-Hill, 2011).

## NETBALTIC/Continued from page 2

vessels, and as a result, are only occasionally able to establish connections (and thus necessary to be provided with dedicated delay-tolerant communication solutions).

Networking solutions and communication systems being developed in netBaltic aim to address data transmission needs of multiple maritime activities. The most important use of the system is directly related to maritime safety and efficiency by providing the communications platform for e-navigation services, as defined by the International Maritime Organization. The concept of e-navigation includes, for example, integration of a multitude of navigational systems and aids that currently have to be separately monitored by a bridge crew, as well as making increased use of inter-ship data exchange for purposes of safety and efficiency of maritime travel.

Interest in system capabilities has also been expressed by various research and governmental organizations, planning to employ its data acquisition capabilities (both online and delay tolerant) for purposes of research and environmental monitoring, particularly in areas of limited maritime traffic and consequently lacking the alternate communication infrastructure.

Finally, the system aims to provide broadband Internet connectivity in locations of high concentration of participating vessels (covering a wide range of vessel types, from one-man boats to ocean tankers), to be used for access to various applications and services available in modern internetworking, starting with e-mail and web-browsing and ending with direct multimedia streaming.

With the core elements of the netBaltic system scheduled to be developed in 2018, it seems that many e-navigation initiatives that are currently being developed will be provided with this robust communication platform.

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Roadmap Driven by Network Benchmarking Lab (NBL): Deep Packet Inspection, Traffic Forensics, WLAN/4G/5G, Embedded Benchmarking, Software Defined Networking, and Beyond," and "Traffic Forensics: Capture, Replay, Classification, Detection, and Analysis," during which he shared his experiences during the past 15 years in the field. Finally, in September Prof. John Thompson gave a DL at the University Carlos III (UC3M) and the University of Malaga (UMA) on the topic "The Advantage of Communications Enabling the Smart Grid," being at the same time at IEEE EUROCON held by the University of Salamanca (USAL).

As it can be seen, the activities have been spread around the country in order to reach as many IEEE members as possible. Several of these activities attracted great interest by IEEE members, and the discussions after them valuable for the attendees. Indeed, the Chapter was awarded by the IEEE Spanish Section as the Best Chapter in 2015.

All past activities, including some streaming, and the new activities can be found at our new webpage: <http://spcom.ieeespain.org>, which is also the best way to contact the chapter board and other IEEE members. We encourage you to share your ideas with us. If they are interesting and possible, we will do our best to make them a reality.

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