THE FIRST IEEE COMMUNICATIONS SOCIETY SUMMER SCHOOL TRENTO, ITALY, JULY 6-9, 2015

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The city of Trento, the educational, scientific, financial and political centre of Northern Italy, served as the ideal launching point for the first IEEE Communications Society (ComSoc) Summer School. With a population of more than 100,000 residing in this noted university city, Trento is recognized throughout the country for its high quality of life, prosperous business opportunities, advanced research centers and renowned international cultural institutions. It also boasts a rich heritage of cultural and social lifestyles; enriched international conferences, meetings and exhibitions; traditional costume festivals and market fares; historical events; and global festivals highlighted with theatre, music and dance.

Participants of ComSoc's first Summer School program.

Held July 6-9, the first IEEE ComSoc Summer School provided participants with top-level lectures on hot topics in communications as well as a myriad of networking opportunities. Targeting IEEE ComSoc PhD student members, the event was originally conceived by IEEE ComSoc President Prof. Sergio Benedetto as well as Prof. Khaled Letaief, Vice-President of Technical Activities; Prof. Stefano Bregni, Vice-President of Member Relations; and Prof. Michele Zorzi, Director of Education.

"I'm very happy and honored that Trento was chosen for the first edition of this event," says Prof. Fabrizio Granelli, the venue's local organizer. "We did our best to select the most promising students and then provide them with an exciting and unprecedented program in addition to the world communications authorities as speakers. We were deeply impressed by the positive and constructive attitude of the participants, who were all well prepared and interactive."

Selected from more than 100 applicants during the Spring of 2015, the Summer School hosted 43 participants from worldwide locations at the University of Trento, one of the youngest Italian universities (funded in the 1960s) and in conjunction with the Dept. of Information Engineering and Computer Science, the 2nd highest ranked ICT department in Italy.

On July 6, the conference opened with the introductions of the Rector of the University of Trento, Prof. Paolo Collini; Head of the Dept. of Information Engineering and Computer Science (host and co-founder of the initiative), Prof. Gian Pietro Picco; the ComSoc VP Member Relations, Prof. Stefano Bregni; and the Head of the ComSoc Education Board Training Working Group, Prof. Fabrizio Granelli.

Afterwards, the event's program began with an interactive lecture on "Collaborative Near-Capacity Wireless System Design" by Prof. Lajos Hanzo, University of Southampton, UK. Aimed at future wireless communication systems, this talk first discussed the limitations of MIMOs relying on co-located array-elements and then showed how single-antenna-aided cooperative mobiles can circumvent these limitations through the formation of MIMOs with distributed elements - a concept also referred to as Virtual Antenna Arrays (VAA). The corresponding amplify-forward and decode-forward protocols as well as their hybrids were studied in relation to channel coding, which has to be specifically designed for the VAAs in order to prevent avalanche-like error-propagation. Hence, sophisticated three-stage-concatenated iterative channel coding schemes were identified, arguing that in the absence of accurate channel information at the relays the best way forward might be to use multiple-symbol differential detection. Indeed, it is rather unrealistic to expect that an altruistically relaying handset would also accurately estimate the source-relay channel for the sake of high-integrity coherent detection. EXIT-chart-aided designs were then introduced for creating near-capacity solutions in addition to a range of future research directions and open problems.

On July 7, Prof. Giuseppe Bianchi from the University of Rome – Tor Vergata, Italy delivered a talk entitled "From Dumb to Smarter Switches in Software Defined Networks: Towards a Stateful Data Plane." The seminar was motivated by a crucial shortcoming in today's Software Defined network architectures, namely the need to mandate the execution of all control tasks to a remote controller, and the relevant emerging concerns in terms of latency and signaling overhead. After a brief overview of Software Defined Networking principles as well as a review of Openflow, the talk focused on recent approaches (recent OpenFlow extensions, Reconfigurable Match Tables, Protocol Oblivious Forwarding, etc) devised to improve data plane programmability on the fast path, i.e. directly inside the switches themselves. In addition, it introduced OpenState, a very recent proposal devised to permit platform-agnostic programmability of stateful tasks (formally described in terms of abstract state machines such as Mealy Machines). It also focused on architecture and implementation issues (including backward compatibility with OpenFlow commodity Hardware), as well as application examples (forwarding consistency, MAC learning, reverse path forwarding, fault recovery, etc).

On Tuesday afternoon, the participants had the chance to present their ongoing and future plans during a 2-hours poster session. The session was open to all students of the local doctoral school as well as to the professors and researchers of the ICT department.

The following day, Prof. Andrea Goldsmith from Stanford

University, USA, presented a four-hour lecture on "The Next Wave in Wireless Communications." It started by discussing the fundamentals of wireless communications, i.e. channel models and impairments, capacity adaptive techniques, diversity, MIMO, OFDM, Spread Spectrum techniques and proceeded with an extensive discussion on multiuser systems, a survey of current cellular systems and a review of future expectations.

The speech then focused on ad hoc wireless networks, which are expected to gain additional relevance in scenarios of device-to-device communications and Internet of Things. However, the discussion underlined the need for a more flexible and efficient access technology for the scarce communication resources, paving the way for secondary user access in the framework of cognitive radio networks.

Finally, Prof. Goldsmith introduced the issues related to object connectivity (sensors, battery-limited devices) to the Internet, opening a discussion on green wireless networks and the ways to save or harvest power for communications. The session ended with additional hot topic examples and transversal areas of application of the communications theory (e.g. neural science).

On the last day, Prof. Nelson L.S. da Fonseca of the State University of Campinas, SP, Brazil, presented a seminar on "Networking for Big Data," which included a discussion on its ecosystem, perspective in Society and Science and processing capabilities. Prof. Fonseca then spoke about network virtualization as a fundamental pillar to networking support for the Big Data area as well as research opportunities not only on networking for Big Data but also on Big Data for networking. Also provided were lab exercises for students to practice on their way back home.

During the course of the four-day event, the IEEE ComSoc Summer School included specific sessions enabling participants to understand the actual problems and technology in the field of communications. To this aim, practical sessions were held on Tuesday and Wednesday and included visits to the datacenter of the University of Trento and to the local network provider, Trentino Network and its Network Operation Center.

"It was a challenging and exciting event. We are very proud of the outcome, and hope it will become an integral component of the yearly events organized by the IEEE ComSoc for its members," concludes Prof. Granelli.

For additional information on IEEE ComSoc Summer School, please visit http://www.comsoc.org/summer-school.

CALL FOR PAPERS
IEEE COMMUNICATIONS MAGAZINE
SEMANTICS FOR ANYTHING AS A SERVICE

BACKGROUND

Services (including anything as a service) are the buzz in the industry. Networks are morphing to utilize new technologies like network functions virtualization and software-defined networking that are changing the way services are ordered, configured, and monitored. To support the evolving infrastructure, new network and service management platforms need to support standard mechanisms for communication within and across administrative domains. In order to support on-demand, dynamic configuration and monitoring, both common application programming interfaces (APIs) and a common language that has agreed semantics are required. Standards bodies are using information and data modeling to describe the abstract representations and detailed structured data needed by the orchestrators and controllers in the ecosystem.

This Feature Topic addresses industries' standards usage and advancements in the area of information and data modeling that support the semantics needed for end-to-end service management. Comparing and contrasting the top-down vs. bottom-up approaches to API development is also invited. Solicited topics include (but are not limited to):

- Information modeling
- Data modeling
- Transforming information models to data models
- Service development life cycle aspects
- End-to-end service management frameworks
- Model-driven development
- Modeling tools
- Landscape of YANG models
- Survey of modeling work from industry groups
- Advances needed in network management protocols
- Interaction of open source and traditional industry fora and standards development organizations

SUBMISSIONS

Articles should be tutorial in nature and written in a style comprehensible to readers outside the specialty of the article. Authors must follow *IEEE Communications Magazine*'s guidelines for preparation of the manuscript. Complete guidelines for prospective authors can be found at http://www.comsoc.org/commag/paper-submission-guidelines. It is very important to note that *IEEE Communications Magazine* strongly limits mathematical content, and the number of figures and tables. Paper length should not exceed 4500 words. All articles to be considered for publication must be submitted through the IEEE Manuscript Central site (http://mc.manuscriptcentral.com/commag-ieee) by the deadline. Submit articles to the "March 2016/Semantics for Anything as a Service" category.

SCHEDULE FOR SUBMISSIONS

- Manuscript Submission Due: September 15, 2015
- Decision Notification: November 15, 2015
- Final Manuscript Due: January 1, 2016
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