GLOBAL Communications NEWSLETTER

September 2014

Sister and Related Societies – Reaching Out to ComSoc's Global Community

Interview with Curtis Siller, Director of Sister and Related Societies

By Stefano Bregni, Vice-President for Member Relations, and Curtis Siller, Director of Sister and Related Societies

Stefano Bregni

Curtis Siller

This is the first of a series of eight short articles that will be published monthly in the *Global Communications Newsletter* beginning with this issue, covering all areas of IEEE ComSoc Member Relations. In this series of articles I will introduce the seven Member Relations Directors (Sister and Related Societies; Membership Programs Development; AP, NA, LA, EAME Regions; Marketing, and Industry Relations) and the Chair of the Women in Communications Engineering (WICE) Standing Committee. They will present their sector activities and plans.

In this issue we begin with Curtis Siller, Director of Sister and Related Societies.

Previously, Curtis had been on the IEEE Communications Society Board of Governors continuously for 16 years, as President (2004-2005), three terms as a Director and twice as a Vice-President. He was an IEEE Division Director. He was also Editor-in-Chief of the *IEEE Communications Magazine* in 1993-1995. Curtis is an IEEE Life Fellow. He worked for more than 30 years at Bell Labs (where he was named a Bell Labs Fellow), then later in various other high-tech and consulting companies.

It is my pleasure to interview Curtis and offer him this opportunity to outline his current activities and plans for ComSoc Sister and Related Societies.

Bregni: *Curtis, let us begin by explaining what are the Sister and Related Societies of ComSoc.*

Siller: The IEEE Communications Society has a long tradition of global outreach. Dating back nearly 20 years, ComSoc instituted a novel program, entering into relationships with Sister and Related Societies. Briefly, Sister Societies are those that have a charter that overlaps ComSoc's technical scope, though they are typically national professional societies. On the other hand, Related Societies are those whose focus complements but does not overlap ComSoc's technical orientation.

Bregni: *Therefore, Sister and Related Societies are important elements in the strategy of ComSoc toward globalization.*

Seller: Absolutely. Both are important ingredients in ComSoc's international initiative. Allow me a moment to share a few benchmarks. As a robust Society, ComSoc is IEEE's second largest, with a membership that is over 50,000 and continues to experience steady membership growth. Notably, 2004 was a very significant year. It was then that our Society transitioned to more international members than those in the United States. Today 38.9% of our membership is in the USA, and 61.1% international, with especially significant growth in Asia and the Southeast Asian rim. By way of contrast, IEEE, our parent organization, attained a majority of international membership in late 2011/early 2012, nearly eight years later.

Bregni: *OK, but to how many Sister Societies worldwide is ComSoc linked?*

Siller: Please review the full list of Sister and Related Societies at www.comsoc.org/about/sistersocieties. You'll find that ComSoc has reached out to over 30 Sister Societies worldwide and a variety of Related Societies. Each of those many Societies adds to our global community! In early 1995, a half dozen societies entered into these agreements. Since then, the number has grown five times, as noted above.

Bregni: *Then how does ComSoc reach out to Sister and Related Societies? Are our relationships regulated in some way? And what kinds of activities are mainly addressed by cooperation?*

Siller: There are at least two essential elements that bond us to these societies: conferences and publications. We'll share more about that in a moment. The formal bases for these relationships are two Memoranda of Understanding (MOUs). Generally, these span two to four years, with the ComSoc President and a corresponding Sister or Related Society president as signatories. Essential ingredients include: submission of papers to ComSoc conferences, journals, transactions, and magazines; discounted participation at our conferences; discounted subscription to ComSoc publications; affiliate membership in ComSoc; streamlined technical co-sponsorship of conferences; participation in ComSoc technical committees; and advertising promotions.

Bregni: *Would you tell us something more also about Related Societies?*

Siller: In addition to these Sister Society agreements, ComSoc enjoys Related Society agreements. These include, of course, many operational units within IEEE itself, such as the Signal Processing, Computer, Circuits and Systems, and Power and Energy Societies. Among those outside of the IEEE, let me note the East-West Institute, a "think tank" in New York City, dedicated to facilitating world harmony, and the Pacific Telecommunications Council.

Bregni: *In conclusion, would you share with us some of your plans for your next year as Director of Sister and Related Societies?*

Siller: The opportunities are immeasurable and could well

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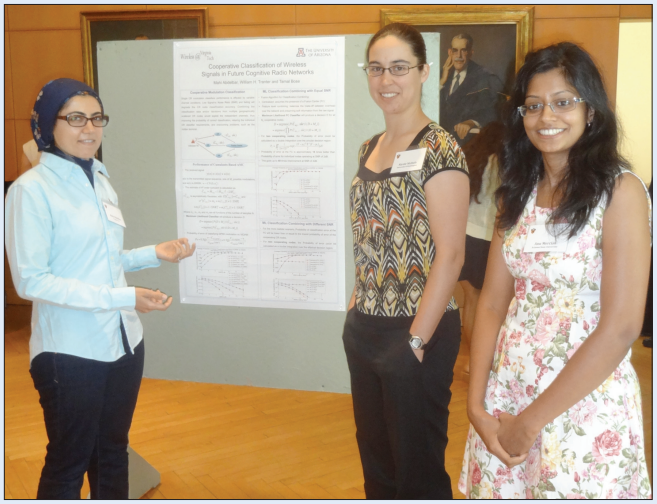
Second IEEE ComSoc Women's Workshop on Communications and Signal Processing: Already a Tradition

By Octavia A. Dobre, Chair of the WICE Committee, Memorial University, Canada, and Shalinee Kishoree, Past-Chair of the WICE Committee, Lehigh University, USA

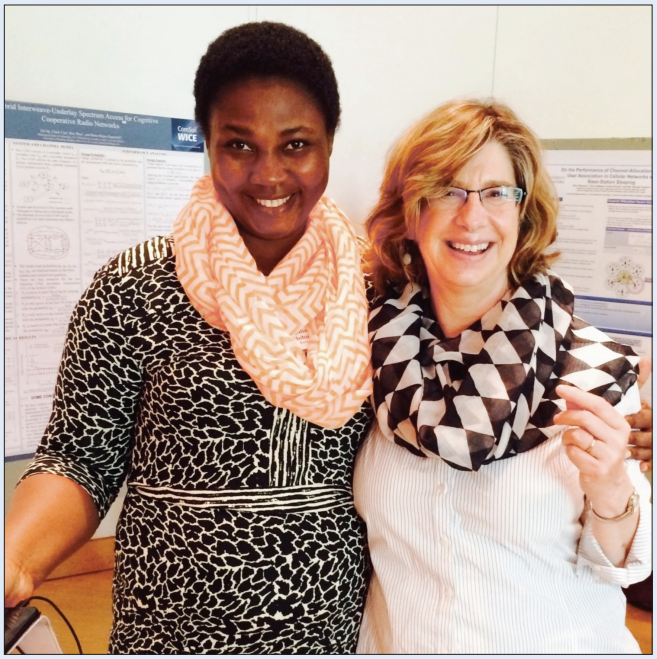
Foreword by Stefano Bregni, IEEE ComSoc Vice-President for Member Relations

The authors of this article, Octavia Dobre and Shalinee Kishoree, are the Chair and Past-Chair, respectively, of the IEEE ComSoc Standing Committee on Women in Communications Engineering (WICE).

The mission of the WICE Committee is to promote the visibility and roles of women communications engineers and to provide a venue for their professional growth. Octavia and her Committee are working on a number of new initiatives coherent with such goals. Updates and information are posted regularly on the WICE web site, hosted on comsoc.org.



Mahi Abdelbar (Virginia Tech) explains her research to Nicole Nichols (U. of Washington) (center) and Anu Merican (Arizona State).



O. J. Femi-Jemilohun (U. of Essex) (left) and Sarah K. Wilson (Santa Clara U.) after meaningful technical discussions.

As VP for Member Relations, I attach utmost importance to improving the visibility and the representation of women engineers in our sectors of professional activity and in ComSoc, in particular by guaranteeing equal opportunity regardless of gender and by providing support for specific needs. Indeed, this is one of the five strategic directions I set in Member Relations at the beginning of my term: globalization, industry, academia, students, and women (a.k.a. the Golden Pentagon, presented in the President's Page of the April 2014 issue of the IEEE Communications Magazine).

With its second edition taking place this July at the School of Engineering and Applied Science at Princeton University, the IEEE ComSoc Women's Workshop on Communications and Signal Processing has already become a tradition. This event provides a unique venue for junior and senior women researchers to interact regarding recent developments in their fields, and facilitates both formal and informal mentoring and networking between the attendees. Senior women present technical talks, while poster sessions are organized for junior women. A warm and fruitful environment is created, where ideas originate and develop and mentoring occurs organically.

This year cutting edge results were presented from the areas of wireless communications, information theory, video compression, data storage, applications of signal processing to marine life, astronomy, visible light communications, and several others. In addition to the technical sessions, social components were included in the agenda, such as discussions focusing on the role of women in STEM and IEEE ComSoc, panel discussions driven by junior attendees to address their questions regarding career development in both industry and academia, but also mentoring the senior attendees who were looking for guidance in shaping the next phase of their career, e.g. advice on promotion to full professor, balancing service and work, and serving in major administrative positions. Furthermore, a presentation was given to both junior and senior participants on how the assembled researchers could employ social media tools to become leaders and influencers in the broader communities.

In total, the workshop was attended by 19 junior and 14 senior participants and two ComSoc staff, from the USA,

Technical discussions (left to right): Ilknur Aydin (Farmingdale State), Shalinee Kishore (Lehigh U.), and Nasim Arianpoo (UBC).

WOMEN'S WORKSHOP/*Continued from page 2*

Canada, Turkey, UK, UAE, and Sweden. The junior attendees consisted of 13 graduate students, four postdocs, and two pre-tenure Assistant Professors. A travel grant was awarded to each junior attendee. Of the 14 senior attendees, 10 came from academia and four from industry, namely Anna Scaglione (UC-Davis), Antonia Tulino (Bell Labs), Brenda Connor (Ericsson), Daniela Tuninetti (U. of Illinois-Chicago), Elena Neira (Verizon Wireless), Emina Soljanin (Bell Labs), Eve Riskin (U. of Washington), Maite Brandt-Pearce (U. of Virginia), Octavia Dobre (Memorial U.), Pamela Cosman (UCSD), Sarah Kate Wilson (Santa Clara U.), Sirin Tekinay (Kadir Has U.), Shalinee Kishore (Lehigh U.), and Tara Javidi (UCSD).

At this edition of the workshop, the IEEE ComSoc Women in Communications Engineering (WICE) Best Poster Presentation Award was presented. Among many worthy candidates, the selected poster was "Digital Signal Processing for Event Horizon Telescope," presented by Laura Vettatschitsch (Harvard U.). Laura shared with us her thoughts about the workshop: "The intimate size of the event allowed for deeper discussion and collaboration across topics related to my research. I had the chance to discuss applications of new signal processing algorithms I had not initially thought of in the fields of compressed sensing and predictive filtering. The senior women giving so freely of their time allowed for genuine technical mentorship to take place. Perhaps it was the welcoming culture demonstrated by the senior women and freedom from intimidation, as questions and discussions that preceded the technical talks were given more time, and turned out to be more lively and engaging than other conferences. Women that do not usually get a chance to ask questions and speak up at conferences executed on many opportunities to do so in the last few days. Over the past few days, junior researchers who happened to be female got to speak, ask questions, and communicate their exciting technical work to leaders in the field, and we all became vocal, confident, and engaged leaders. If practice makes perfect, then this workshop gave women a unique chance to practice leadership in ways not often afforded attendees of technical conferences."

The experiences that junior attendees had at the event were also shared through feedback forms:

"A great opportunity to meet with other juniors and professors, who are inspiring examples of ways of being women in engineering."

"Excellent all around. Powerful messages, good technical program. Thank you for providing this wonderful venue."

"Networking with other junior and senior women was fun, inspiring, and beneficial."

This fantastic event would not have been possible without the effort and generous support from various people and organizations. We would like to thank our financial sponsors, Princeton's School of Engineering and Applied Science, IEEE ComSoc, the Centre for Discrete Mathematics and Theoretical Computer Science (DIMACS), the Centre for Science and Information (CSoI), and the IEEE Information Theory and Signal Processing Societies.

In particular we would like to thank Prof. Vincent Poor (Princeton U.) for hosting the event, Prof. Sergio Benedetto (IEEE ComSoc President) and Prof. Stefano Bregni (IEEE ComSoc Vice-President for Member Relations) for their support of WICE activities, Elena Neira (IEEE ComSoc Director of Online Content), as well as Ting Qian, Carol Cronin, Carole Swaim, Maxim Loskutnikov, and Bruce Worthman from IEEE ComSoc, for their invaluable support.

We also thank the organizing committee for their precious contribution, namely: Shalinee Kishore (Lehigh U.), Sarah Kate Wilson (Santa Clara U.), Octavia Dobre (Memorial U.), Urbashi Mitra (USC), Arsenia Chorti (U. of Essex), Laura Toni (EPFL), Zahra Ahmadian (U. of B.C.), Kelly Androniccos (Purdue U.), and Leslie Rusch (Laval U.).

The success of the first two editions of the workshop have paved the road for successful future editions, and we are looking forward for another great experience at the 2016 IEEE ComSoc Women's Workshop on Communications and Signal Processing!

Elena Neira (Verizon Wireless) and Octavia A. Dobre (Memorial U.) discussing about social media tools and promotion of WICE activities.

Relaxing, informal, and warm atmosphere at dinner time, after a group hike.

Group photo from the IEEE ComSoc Second Workshop on Communications and Signal Processing.

Highlights from TiECon 2014 (Santa Clara, CA, USA): The Internet of Things Track

By Alan J Weissberger, NA Correspondent/IEEE GCN and ComSoc Community Content Manager, USA

TiECon Internet of Things1 Track Overview:

The major IoT[1] trends and the disruptive opportunities they may create were comprehensively covered during the no-nonsense, commercial free, IoT technical sessions on May 16, 2014. IoT has tremendous potential for use in various communications technologies, both wireless and wireline.

IoT will be a huge total market, but it is not monolithic. Each vertical industry will have its own opportunities and challenges. Lack of industry standards, security (business), and privacy (consumer), are the biggest obstacles for IoT to overcome and be successful. These issues must be resolved for IoT to reach its promise and potential.

The areas that will be most impacted by IoT include: start-up innovation, consumer value and enjoyment, societal benefit, entrepreneurial companies, established device and network vendors, and network/cloud service providers.

Note 1.: Cisco and Qualcomm refer to IoT as the Internet of Everything or IoE.

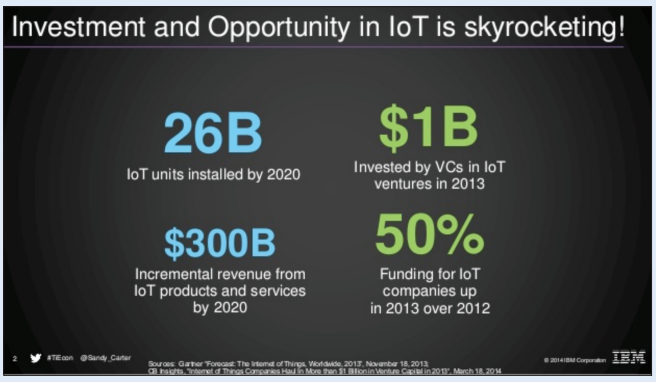
More information on the TiECON 2014 IoT track is at: http://tiecon.org/internet-of-things

Highlights of Industrial IoT Infrastructure Session

Important points made by panelists: Carl Stjernfeldt, Shell Technology Ventures; Joseph J. Salvo, Complex Systems Engineering Laboratory at GE Global Research; and Nate D'Anna, Cisco Systems:

- Shell is using the IoT in oil drilling operations where "last mile" connectivity in the ocean is quite challenging — nine thousand feet under the surface of the ocean. Shell collects a tremendous amount of data in the field, but uses "intelligent pushback" to get large amounts of that data processed and analyzed, with the results conveyed to a decision maker in the field (presumably, a human operator).
- GE is building out an "Industrial Internet," which is a virtual network overlay on a physical network. GE sees a strong trend of "data commoditization and lower level knowledge." Today everyone has access to lots of data and information. Future market and technical differentiation will be centered around decision making, learning which data to forget/discard and which data to retain/remember.
- A consortium of companies (AT&T, Cisco, GE, IBM, and Intel) was launched in late March 2014 to foster interoperability in the Industrial Internet. Goals are to identify requirements for open interoperability standards and define common architectures to connect smart devices, machines, people, processes, and data.
- Cisco has a $100M venture fund to invest in the IoE and move it forward. Cisco sees a huge industrial customer demand for collecting large amounts of data. They believe decision making is needed at the network edge, to only send relevant data to the cloud for processing. "Make decisions locally, by smart devices at the edge of the network," said Cisco's Nate D'Anna.
- There is a huge need to get real-time data from a variety of complex industrial sub-systems (e.g. a jet engine) via satellite, microwave, fiber optic long haul, or short range WiFi/Zigbee wireless networks.
- Each layer of the protocol stack will need flexibility to accomodate measuring, monitoring, analytics, automated decision making in the field, and other tasks. The trade-off between bandwidth vs. reliability is very important for the Industrial Internet and ruggedized IoT applications.
- Managing the onslaught of incoming real-time data (monitoring status, alarms, and measurements) will be critical in the industrial world. Smarter and faster edge devices that monitor complex real-time systems and make decisions about which data to retain and which to push back (to the cloud/data center) for number crunching.
- Standards help market adoption as they facilitate interoperability, mass production, and lower costs. However, there are a plethora of wireless and wire-line connectivity standards that might have to be supported for different IoT market segments. This may create a "matrix of pain," said one panelist.
- It could be that IP (Network Layer protocol) will be the lowest common denominator that all Internet connected "things" support. Speaking for GE, Salvo said: "The Industrial Internet wants interoperability (over vendor specific solutions), like USB I/O devices that auto-configure and work." Joe suggested that the (Industrial Internet) market will determine the best standards.
- Security is certainly a critical issue. It must take into account the hardware, software, network, and devices/components, as well as the human factor, according to Salvo. It must recognize the context of what's happening in the industrial systems being monitored and controlled. No security standards, methods, or procedures were identified during this session.
- GE believes the context of data is becoming more important than the data itself. There is a need for data storage centers to only retain relevant data from connected devices, with most of it discarded at the network edge. This seems identical to Cisco's view expressed above. Mr. Salvo sees a hyper-connected world with a changing role for computation and big data. Analyzing vast amounts of data, and predicting and changing system performance are the key attributes of this new computational model. "We are at an inflection point. The next wave of productivity will connect brilliant machines and people," he said.

Note: Surprisingly, there was no discussion of the need for a robust network (for the Industrial Internet/IoT) with lightening speed fault isolation and failure recovery. Something that the public Internet doesn't provide.



Overview of the market opportunity for IoT provided by Sandy Carter of IBM.

Highlights of Qualcomm Keynote: Proximity's Role in the Internet of Everything (IoE)

Cloud-based services have already evolved to support the Internet of Everything (IoE). But the majority of IoT communications may not be roundtrip to a server in the Cloud? This talk by Rob Chandhok of Qualcomm addressed the "Internet of Things near or close to me." Here are Rob's key messages:

- Today IoE is cloud-based and fragmented, with different

TiECon 2014/*Continued from page 4*

cloud systems for each type of appliance, e.g. speakers, TV, refrigerators, washing machines, etc. This author believes this has to change if IoE is to realize its potential and be a huge market (or industry of vertical markets).

•A successful IoT architecture will be more complex than client/server computing. A heterogeneous IoE will bring many challenges, including: discovery, identity, adaptation, manage, interoperate, exchange information and services, security, and privacy. Let's take identity as an example. It includes such capabilities as determing which servers are nearby, and which interfaces and APIs are available for the devices along with other attributes. Security involves eliminating attacks and thwarting bad actors from the public Internet.

•IoE "near me" is a dynamic subset of the IoE that involves proximity. Toward that end, an open source software platform called AllJoyn was created to provide a meaningful interaction between smart things via a common language. AllJoyn was initially developed by Qualcomm Innovation Center, Inc., and is now a collaborative open source project of the AllSeen Alliance. It gives manufacturers and developers the tools they need to invent new ways for smart things to work together.

•AllJoyn was said to facilitate and/or provide an open connectivity framework over both wireless and wire-line networks; interoperability between connected devices/things; core services as basic building blocks; and an ecosystem that addresses many vertical industry use cases.

Highlights of IBM Keynote: What Really Matters for IoT

Sandy Carter's presentation take-aways: Investment and opportunities in the IoT are expanding rapidly, and this will continue for many years. It is forecast that by 2020 $300B in incremental revenue will derive from IoT products and services (the source of that forecast was not identified).

Three items are needed for the above IoT forecast to be realized, according to Ms. Carter:

•Focus on domain knowledge expertise, value drivers, and design (focus on outcome, not the devices(s)).

•Integrated solution that includes data analytics and cognitive computing along with monitoring sensors.

•Ecosystem that includes many different types of vendors, service providers, software suppliers, and system integrators.

Again, the IoT opportunity exists by vertical industry segment, rather than a single monolithic market. The top ranked IoT industry verticals (in order of revenue opportunities) are: auto, healthcare, industrial, retail, asset management, utilities/energy, home monitoring, and control/building automation.

IoT integrated solution opportunities identified were:[2] data collection at $87B; analystics at $237B; cognitive computing at $370B.

Note 2: Source: Harbor Research report dated April 7, 2014. No timeframes given for the above forecasts. However, data analytics, optimized for each customer, was said to be a $180B opportunity in 2016.

SDN Control of the IoT:

One critical issue that was very briefly addressed at TiECon was how to control the huge number of devices/sensors that make up the IoT? During a "lightening round" of presentations by start-ups, a company named K2 Inc. (http://k2-inc.com/) suggested using SDN for that purpose. Among other attributes, SDN was said to facilitate faster roll out of services that can be easily updated based on the changing requirements of IoT. SDN control of IoT governs how much data can be sent based on Configurable Policies. Finally, SDN was said to permit agile and flexible multiple protocol implementations without carrying out expensive and cumbersome hardware upgrades. While all the SDN attention had been on data centers and (to a lesser extent) campus networks and WANs, we think the IoT could offer much promise and potential.

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INTERVIEW WITH SILLER/*Continued from page 1*

take more than a year; these are evolving relationships and the possibilities are almost limitless. Naturally, MOUs that are expiring need to be renewed, and additional societies — not yet among the existing 30 mentioned above — need to be identified. Additionally, elements will be added to these agreements to make them more meaningful to the Sister and Related Societies, and for ComSoc. Further, in the past I think there has been little direct, personal contact between ComSoc members and individuals in our reciprocal organizations. One way to enhance these contacts is to offer social events at ComSoc's most notable international conference and meeting venues, so we can greet each other on a personal level and discuss ideas that would bond us more fully. ComSoc celebrates all of these relationships. They are essential to our presence in the world community. Please contact me if you know of other societies that might invite our engagement.