

EDUCATION, TRAINING AND CERTIFICATION: DISSEMINATING COMSOC'S TECHNOLOGICAL ASSETS

Advancement of communications engineering and related arts and sciences is a most important component of the IEEE Communications Society's (ComSoc) activities. Besides fostering the advancement of communications sciences and technologies, stimulating subsequent development and deployment is equally important. Education (including training and certification) may be considered the "third arm," following Publications and Conferences, for achieving these goals.

In the "Golden Triangle" vision set at the beginning of 2010, the vertices point to three fundamental directions for the innovation and growth of ComSoc: globalization, young leaders, and industry. From education's viewpoint, we may interpret globalization as meaning not only incorporating global culture and values in ComSoc, but also disseminating ComSoc's technical knowledge base globally. Likewise, industry means building relationships with industry by creating multidisciplinary links between ComSoc and industry by disseminating ComSoc's technical programs and services oriented to industry.

In the succeeding "Growth Engine" vision, which was intended to guide ComSoc's growth in the rapidly changing environment of communications convergence, education and content were identified as one of the three major growth items. Though ComSoc's activities in Education have not been as prominent as Publications and Conferences in the past, we are now ready for comprehensive efforts to fully unfold educational activities in combination with training and certification programs, by taking advantage of the mature enabling technologies for globally-networked education, training, and certification services.

As addressed in an earlier President's Page, communications plays a pivotal role in a broad spectrum of human life: it enables people to reach other people and independent information sources without the limits of time or distance; inspires people in oppressed countries to acquire freedom; helps people in underdeveloped countries to climb the ladder of economic and social development; and ultimately inspires creative minds to envisage new ways of contributing to humanity. In support of such high-profile roles, ComSoc has already facilitated the advancement of communications engineering and technology, and we are now focusing on dissemination through technical education, training, and certification programs.

I share this month's President's Page with Stefano Bregni,



BYEONG GI LEE



STEFANO BREGNI



CELIA DESMOND



JOHN PAPE

ComSoc's Director-Education, Celia Desmond, Chair of Ad hoc Communications Certification Committee, and John Pape, Staff Director-Marketing and Creative Services.

Stefano Bregni is an associate professor of telecommunications networks at Politecnico di Milano. He is a Member at Large on the Board of Governors and Director of Education of ComSoc. Since 2004, he has been serving as a ComSoc Distinguished Lecturer, giving 10 tours and visiting 14 different countries. He serves as Technical Program Vice-Chair of GLOBECOM 2012. He also served

as Symposia Chair of GLOBECOM 2009 and Symposium Chair in eight other ICC and GLOBECOM conferences. He is the Editor of ComSoc's *Global Communications Newsletter* and author of the book *Synchronization of Digital Telecommunications Networks* (J. Wiley & Sons).

Celia Desmond is the President of World Class – Telecommunications, providing

training in telecommunications management. She is a long-time contributor and leader of the IEEE and ComSoc: She served as President of the IEEE Canada in 2000-1, President of ComSoc in 2002-3, Vice President of Technical Activities of the IEEE in 2006, and Director and Secretary of the IEEE in 2007. In particular, she has been the principal contributor in developing and operating ComSoc's Wireless Communications and Engineering Technology (WCET) program since 2007. In 2010 and 2011 she managed the migration of a Canadian bank network to MPLS. Prior to IEEE and ComSoc services, she worked at Bell Canada, where she held several managerial positions, including provision of strategic direction to corporate planners. Now she teaches courses on project management at the University of Toronto, World Class Productivity, Stevens Institute of Technology, and the University of Denver, and also manages a program for entrepreneurs at the Ontario Society of Professional Engineers. Celia is the author of *Project Management for Telecommunications Managers* (Springer) and *Project Management for Telecommunications Projects* (Wiley).

John Pape, the Director of Marketing and Creative Services, has been with ComSoc since 1997. His responsibilities include planning and implementing ComSoc's marketing activities for membership, publications, continuing education, and conferences. During his tenure, he successfully managed the

migration of products from print to electronic media, and the evolution of marketing tactics from direct mail and manual processing to complicated e-mail campaigns and social media outreach. Recently, he has led ComSoc's efforts to develop and offer a digital option for *IEEE Communications Magazine*, and for creating and offering ComSoc's virtual training course on wireless communications engineering. From 1989 to 1997 he managed the Publications Marketing Department of the American Society of Civil Engineers. He held the title of Director in 1997. He has managed marketing activities for more than 30 years with international publishers including S. Karger Publishers, Methuen, and Springer-Verlag.

EDUCATIONAL PROGRAMS

ComSoc offers a rich portfolio of educational programs. Significant progress has been made for enriching the portfolio in recent years, compared to early times when one or two days of tutorials were offered to on-site conference attendees or just a few on-line tutorials.

Recently, new initiatives flourished and enhanced the scope of our educational programs, including on-line Tutorials Now™, webcasts of conference events, and ComSoc Webinars. In addition, we offer other free education services to ComSoc members and young people, as well as new ways of e-teaching.

TUTORIALS NOW™

The Tutorials Now™ on-line program (<http://www.comsoc.org/tutorialsnow>), which was launched about seven years ago, may be the best known educational program of ComSoc today. It presents a collection of engaging tutorials given at recent major ComSoc conferences and appropriately repackaged and recorded off-line by the lecturer. The portfolio of tutorials covers the hottest topics in all areas of communications, from classic subjects to state-of-the-art and emerging technologies.

More than 100 tutorials are currently listed. With a duration from two to five hours, they feature charts with voice-over comments by the lecturer. All lecturers are well recognized international experts. The tutorials are available for purchase to everyone, at a special price for ComSoc members. Companies sponsor and offer free titles on-line for a three-month period. Sponsored titles are very successful and attract several thousand subscribers.

In order to enrich the portfolio of Tutorials Now™ titles and keep it up to date, after each major ComSoc conference the lecturers of most successful tutorials are offered the opportunity to prepare and record at home a polished version of their lessons for inclusion in Tutorials Now™. We have also conducted trials to record live tutorials at some of our major conferences (e.g., IEEE GLOBECOM).

CONFERENCE WEBCASTS

The Conference Webcast idea was started two years ago as a result of the global economic recession to provide colleagues who could not travel with an opportunity to still be a part of the conference. Webcasts were tried first at IEEE GLOBECOM 2009 in Hawaii. We are only webcasting conference content not appearing in IEEE Xplore, for example, keynote sessions, business forums, panels, and some tutorials. In addition to providing the live webcasts, we are also recording them for later viewing (<http://www.comsoc.org/webcasts>).

WEBINARS AND FREE EDUCATIONAL SERVICES

IEEE ComSoc Webinars are free (with corporate sponsors), on-line, multimedia panel sessions open to all members.

They feature an audio+slide show downstream and a text channel upstream (for questions and answers). They focus on technologies, products, and services of interest to ComSoc members. Typically, webinars last up to two hours and may cover three or four presentations, with a moderator introducing speakers and facilitating questions and answers. The moderator, usually a senior ComSoc volunteer, is appointed for each webinar and, with other event organizers, defines sponsors, topics, potential speakers, and logistics details of the live event. Viewers and panelists can participate from the convenience of their desks, without the burden of traditional conference expense or travel.

Distinguished Lecturers On-line is a membership development program, stemming from the well-known Distinguished Lecturer Program (managed by the Director of Membership Program Development). Selected lectures made by ComSoc Distinguished Lecturers are offered free to everyone on the ComSoc web site, as a service to the community and as a sample program to non-members.

FREE EDUCATIONAL EVENTS FOR YOUNG PEOPLE

Currently, M. Devetsikiotis and F. Granelli on ComSoc's Education Board are developing an initiative aimed at high-school students, to increase their awareness of the importance of communications and of the ComSoc community. This was first done through the outreach events organized in Cape Town, South Africa, in conjunction with ICC 2010. Three days of outreach events were organized at the University of Cape Town and in local high-schools, talking about the latest advances in telecommunications and promoting communications as a service for society. These events took advantage of the ComSoc's Distinguished Speakers Program (DSP) and of the fact that several ComSoc Distinguished Lecturers and other experts were attending ICC 2010 in Cape Town. We plan to further develop different types of educational events for young people.

NEW WAYS FOR E-TEACHING

G. Giannattasio, M. Devetsikiotis, and F. Granelli on the Education Board are testing web tools for new ways to offer on-line education. The emphasis is on facilitating disseminating knowledge to Student Chapters and disadvantaged areas around the globe.

Webinar platforms that do not require users to download or install local applications are of great interest for this. In the first trials, Virtual Distinguished Lecturer Tours and On-line Tutorials oriented to IEEE Region 9 were successfully organized in 2010. New trials are being planning.

PROFESSIONAL TRAINING

In 2010 ComSoc began developing independent courses for the practicing communications professional. The first course, Virtual Intensive Course on Wireless Communications Engineering (VIC-WCE), was derived from the subject matter covered by the IEEE Wireless Communication Engineering Technologies (IEEE WCET®) certification program. The intent was to offer the practitioner with several years of experience the opportunity to expand his or her familiarity with areas of wireless engineering that have changed recently or are not part of the individual's current tasks or responsibilities. The Wireless Communications Engineering course was the first start of our professional training program, which will be expanded to cover a diverse set of subjects in the future. Anyone working in the field, in need of quality practice-oriented information, or considering career enhancement or change, will find ComSoc professional training a great benefit.

VIC-WCE Schedule for 2011

2011	Course	Notes
20 July	Wireless Communications Engineering: Current Practice	One day virtual
3 Aug	LTE for the Wireless Engineering Practitioner: Fundamentals & Applications	One day virtual
22-26 Aug	Virtual Intensive Course on Wireless Communications Engineering	Five day virtual
6-8 Sep	Wireless Communications Engineering; Tokyo	Three day in-person
10-14 Oct	Virtual Intensive Course on Wireless Communications Engineering	Five day virtual
25 Oct	The Future of Wireless: Nanotechnology and Practical Wireless Communications; 4GWorld, Chicago	One day in-person
21 Oct	Professional Wireless Communications Engineering; IEEE Metro Area Workshop, Austin	One day in-person
17 Nov	LTE for the Wireless Engineering Practitioner: Fundamentals & Applications	One day virtual
4 Nov	Professional Wireless Communications Engineering; IEEE Metro Area Workshop, Huntsville	One day in-person

VIRTUAL AND IN-PERSON INSTRUCTION

Some ComSoc courses are in-person and some are virtual, offered via the Internet in a webinar style format. Instructors call in from their office and provide live lectures to an audience that could be on multiple continents. The most popular course has been the five-day VIC-WCE. Each day there are two hours of instruction in the morning and two hours in the afternoon. Short quizzes (three to five multiple choice questions) complement the subject matter. Students ask questions via their Internet connection and answers are provided after breaks or the next day. For those who cannot attend the live virtual session, a recorded stream is made available the next day. Each student receives a copy of the *Wireless Engineering Body of Knowledge* (WEBOK) book and a print handout version of the 400+ slides. At the end of the course students can complete the application for CEUs. Of course, students receive a certificate of course completion.

The subject matter is rigorous, covering fundamental knowledge (basics): RF Engineering, Propagation and Antennas; Wireless Access Technologies; Network & Service Architecture; Network Management and Security; Facilities Infrastructure; and Agreements, Standards, Policies and Regulations.

CONTINUING EDUCATION FOR WORKING PROFESSIONALS

Students from such companies and organizations as US Cellular, Belize Telemedia, and Becker Wholesale Mine Supply have populated classes. Students from 24 countries have taken ComSoc training courses. The results of surveys indicate a high degree of satisfaction, and comments have been positive. Here is one of many: "I am enjoying the events so far; I must say that it does cover a lot of the wireless technologies. Very educational."

In the second half of 2011, eight courses are planned, including a course on LTE and an in-person three-day course in Japan

through the Mobile Computing Promotion Consortium (MCPC). By the end of 2011, it is estimated that almost 400 students will have participated in a ComSoc continuing education course.

New courses and new instructors are planned for the future, including one-day courses on an Introduction to Wireless Communications and Broadband Access Standards. Every month there will be ComSoc training available, including bi-monthly offerings of the five-day VIC-WCE. If all plans come to fruition, ComSoc will hold more than 20 courses and serve 900 students in 2012.

The ComSoc continuing education offerings have proven to be popular with working communications professionals, especially those in industry, government and consulting. It is advisable to register early for courses. In most cases we limit the number of available seats, and several courses have been sold out. Discounts are available for ComSoc members and for groups making multiple-seat purchases. Our web location (see: Training under Careers) at www.comsoc.org provides a full catalog of upcoming courses. Those interested can also keep up on Facebook and through our bi-monthly newsletter, *IEEE Wireless Communications Professional*.

WCET CERTIFICATION PROGRAM

Aside from educational programs, ComSoc offers a certification program in Wireless Communication Engineering Technologies (WCET®).

The IEEE WCET examination was originally developed by ComSoc to provide professionals with a vendor-neutral method for demonstrating their practical skills in the wireless field as well as to offer employers a quantifiable way for selecting qualified individuals for wireless engineering positions and projects worldwide.

CERTIFICATION VS. CERTIFICATE

This program features an examination, with some associated materials that can assist applicants to prepare. It is not a certificate program, but a certification program. The difference is that a certificate program is an education program that may or may not include an examination, at the conclusion of which the attendees are provided with certificates from the sponsoring organization attesting to their participation in the learning program. A certification program, on the other hand, requires successful completion of an examination, which may or may not have associated learning materials. The certification is earned only when the attendee passes a rigorous exam.

For ComSoc, the WCET program includes the exam, which was developed following the highest professional standards for such examination preparation, along with a practice exam, the WEBOK and some training materials which are mentioned within this column. ComSoc's professional training course, VIC-WCE, is a typical example of them, which can provide a training opportunity for WCET applicants to get better prepared.

REASONS FOR WCET CERTIFICATION

The IEEE WCET® program was introduced by ComSoc in March 2008 to address the worldwide wireless industry's growing need for professionals with real-world problem-solving skills. The certification provides practicing wireless communications professionals with an internationally accepted creden-



Certificate awarded to those who successfully complete the WCET certification program.

tial attesting to their expertise. The benefits to both wireless professionals and employers also include:

- Certifying the practitioner's knowledge of key wireless applications, technologies, and standards.
- Helping individuals working in other engineering areas switch to the wireless field as new, exciting, and higher paying opportunities arise.
- Screening job applicants on the basis of demonstrated ability, while assessing employees for increased responsibilities and promotions.
- Reducing the costs, time, and resources associated with the development and implementation of employer in-house wireless training programs.

It is recommended that candidates for the IEEE Wireless Communications Professional® (WCP) credential have a bachelor's or comparable degree from an accredited institution and at least three years of professional wireless engineering experience. To earn the IEEE WCP® designation, they must pass the program's detailed comprehensive examination. The exam is administered on computers at worldwide locations. It is composed of 150 multiple choice questions, and the applicant can take up to four hours to complete the exam.

INFORMATION SOURCES

Please visit www.ieee-wcet.org to learn more about WCET certification. From the website you can also subscribe to the bi-monthly *IEEE Wireless Communications Professional* electronic newsletter. Free PDF and print copies of the *Candidate's Handbook*, which contains everything you need to know about the WCET program and exam, can also be requested at www.ieee-wcet.org. Please e-mail your questions to Rolf Frantz, WCET Industry Relations, at cert@comsoc.org.

LOOKING TO THE FUTURE

Although the education and training programs currently offered by ComSoc are quite successful and developing fast, ComSoc will continue working toward exploiting the full potential of these programs. Looking to the future, further work is needed to extend these programs in response to the fast progression of communications convergence and covering content going beyond the current focus on "wireless" (e.g.,

optical, wireless-wireline convergence, e-Health). In addition, the time is now ripe to make a further leap and open new directions for delivery of education content to a much wider audience, including increased use of social media for greater user interaction.

ON-LINE DELIVERY IN THE CONVERGED ERA

Today we are experiencing the convergence of communications to network architectures based largely on IP packet technology. This convergence of telephone, computer, and broadcasting communications has established a firm platform based on IP, on which information providers collaborate and compete with communication service providers. Our environment changed a lot in recent years: major players introduced new distributed applications and operating systems, innovating business models, while users are moving from "plain" cellular phones to smart hand-held devices, which can access application stores. Today, average users spend more time on content browsing than on phone calls.

In ComSoc, we recognize the need to convert existing products and services and make them accessible over smart devices, to extend the reach and the base of potential subscribers. In envisaging new education services, we cannot leave out of our consideration the perspective of "smart device" users.

The success of our *Tutorials Now™* titles and of the recent VIC-WCE training virtual courses is solid. Nevertheless, the full potential that education content has for ComSoc is much wider. It can be exploited by developing new education programs, designed to be accessible on-line everywhere, easily, and in particular on mobile smart devices. This may bring tremendous opportunities of ComSoc's growth in the future.

NEW EDUCATION PRODUCTS AIMED AT INDUSTRY

Statistics reveal that ComSoc has shifted rather far from industry over the past 10 years. This is evidenced by membership distribution, conferences, and publications content, and several other products, services, and programs. While industry still accounts for more than half of ComSoc's membership, contrary to the past, many (though not all) of the Society's conferences get lower industrial attendance. We need to exercise a special effort to recover the active participation of industry and to expand ComSoc's coverage to duly reflect communications convergence. Education should constitute an important part of this effort.

To this purpose, new examples of education programs may include digests of evolving communications technology, especially aimed at small-size enterprises, short courses focused on career development and management, and some broad-scoped courses (dealing with converged communications) that effectively combine conventional communications with networking, broadcasting, computing, OS platforms, and applications/content/services.

In addition, we notice a strong need for extending the reachability of ComSoc's educational programs in order to widen the pool of potential customers in industry. For example, we should develop appropriate means to accommodate those employees who are not able to leave their office for courses of one or more days. This forces us to improve our on-line delivery strategies of educational programs significantly and urgently.

Furthermore, we note that good educational programs are not necessarily based on the traditional lecture model. For example, on-line delivery of panels or live discussions is very well appreciated in industry, as it helps viewers to quickly catch the essential information.