

# IEEE GOLDRush September 2008

The quarterly newsletter of IEEE GOLD for young professionals.



## Message from 2008 MGA GOLD Committee Chair, Soon Wan

Dear GOLD members,

Every three years, Section leaders from around the world gather at the IEEE Sections Congress. IEEE Member and Geographic Activities Board (MGA) sponsors the congress, with days of working sessions and networking. At the congress, the attendees will learn how to utilize the available resources in IEEE to maximize their volunteering efforts, and to perform more effectively as volunteer leaders.

Realizing the great opportunity to meet the grassroots leadership, the MGA GOLD (Graduates of the Last Decade) Committee organized the first-ever worldwide GOLD Summit at this year's Sections Congress in Quebec City, Canada. GOLD volunteers from all the ten Regions were invited to participate. One of the goals of this year's GOLD Summit is to celebrate GOLD achievements worldwide. In addition, we want to develop our future GOLD leaders to excel in their Region's activities, and to leverage them from the

networking and leadership training at the Sections Congress. We also hope that having GOLD members at the Sections Congress will increase their motivation and dedication, thus becoming more engaged young volunteers for IEEE.

The IEEE GOLD program was launched institute wide at the Sections Congress in 1996. Since then, the program has provided significant benefits to many GOLD members including leadership development, young career mentoring, and professional networking. GOLD members are IEEE Full Members or GSMS (Graduate Student Members) who have graduated with their first professional degree in the past ten years. The main objective of GOLD is to facilitate the transition from Student to higher grade members. In addition, GOLD strives to enhance the membership retention rate of recent graduates and their participation in the IEEE. GOLD's vision is to increase the value and worth of IEEE services and programs to young professionals and recent graduates. And, their mission is to develop programs and foster relationships to provide tangible value to members, promote the GOLD program to stu-

dents, and to recruit, develop and nurture volunteers.

The number of GOLD Affinity Groups in IEEE around the world continues to grow. Currently, we have 137 active GOLD affinity groups servicing about 29,000 GOLD and 27,500 GSM members worldwide. 9 groups were formed this year, and several more groups are in the process of being formed.

Since the last Sections Congress in 2005, the number of Regional GOLD activities was significantly increased, and the scale was larger than before. In 2006, many Regions inaugurated their first Regional GOLD Congress. Early this year, Region 10 had their second GOLD/Student Congress in Chennai, India, and for the first time, Region 10 WIE (Women in Engineering) co-hosted the congress. In April, Region 1 Student Activities Committee, GOLD and WIE also co-sponsored their second annual GOLD/Student/WIE conference in Teaneck, New Jersey US. In August, Region 8 once again organized their second Student Branch and GOLD Congress (SBC 2008) in London, United Kingdom. Region 9 will also have their second GOLD/Student congress in Octo-

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	Number of GOLD AG	Active Members		
		As 08/11/2008		
		GOLD	GSM	Student
<b>Region 1</b>	15	2,365	1,520	1,692
<b>Region 2</b>	6	2,367	1,422	1,616
<b>Region 3</b>	6	2,563	1,795	2,385
<b>Region 4</b>	14	2,226	1,364	1,693
<b>Region 5</b>	12	2,577	1,298	1,738
<b>Region 6</b>	10	4,271	2,355	2,663
<b>Region 7</b>	15	2,195	1,573	1,332
<b>Region 8</b>	22	5,195	8,107	9,119
<b>Region 9</b>	17	1,228	1,140	5,986
<b>Region 10</b>	20	3,984	6,885	18,605
<b>Total</b>	137	<b>28,971</b>	<b>27,459</b>	<b>46,829</b>

ber in Bogotá, Colombia. All these conferences are geared towards meeting the educational, professional development, career advancement and networking needs of engineering students and recent graduates.

Society GOLD Activities have also increased significantly since 2006. More societies are creating specific benefits for their society GOLD members. Just to list a few, IEEE EDS (Electron Devices Society) has established the EDS Early Career Award to recognize EDS GOLD members making contributions in fields of interest to the EDS. IEEE RS (Reliability Society) supports GOLD through university scholarships, best student paper awards, and society student outreach university seminars. Reliability Society also created "Engineer of the Year" to award a young engineer (GOLD) who has made a significant contribution in Reliability Engineering. IEEE CASS (Circuits and Systems Society) offers a Pre-Doctoral Fellowship available to a GOLD member studying in a PhD program related to the interest of SSCS. SSCS also awards Out-

standing Paper Awards to GOLD members who have written outstanding research work in ISCAS or Transactions journal papers.

Last year, IEEE TMC (Technology Management Council) and IEEE ComSoc (Communication Society) piloted GOLD tracks at IEMC'07 and GLOBECOM'07 respectively. We envisioned that these tracks would focus on technical and career-related issues, thereby providing

an opportunity for GOLD members from around the world to interact with their peers, publicize their on-going thesis research, and learn about technical problems from other members. ComSoc has made the GOLD Conference an annual event at this and next year's GLOBECOM conferences.

IEEE EMBS (Engineering in Medicine and Biology Society) hosted the 3rd annual EMBS-GOLD Networking Reception at the flagship EMBS Conference in Vancouver, Canada in August 2008. The purpose of the joint EMBS-GOLD Reception was to establish, in an informal networking environment, what exactly these transitioning members need, want and must-have from the EMB Society. Last year, IEEE MTT-S (Microwave Theory and Techniques Society) GOLD sponsored a panel session on "Career Development: Giving your career a Never-Ending Boost", and a

GOLD Reception at the IMS'07 (International Microwave Symposium) in Hawaii. This year, IEEE SMCS (Systems, Main and Cybernetics Society) formed a GOLD Committee, and planned their first GOLD Reception at SMCS Annual Meeting in October in Singapore.

In the next three years, we will work hard to provide more training and resources for our GOLD volunteers, and encourage GOLD Activities in all Sections and Societies around the world. Please support GOLD, and be proud of being part of the growing community. Watch as GOLD continues to grow!

Best regards,  
Soon Wan  
2008 MGA GOLD Committee Chair



Region 1 GOLD Congress

## GOLDRush Invited Articles

### Top 10 Things New Professors Need to Hear

By Robert W. Heath Jr.

Recently I had the privilege to address a group of new Professors at UT Austin and deliver my list of the top 10 things that new professors need to hear. Six years earlier I had received the same orientation. I attended similar seminars and listened to the advice of recently tenured faculty and seasoned Assistant Professors on the tenure process. Looking back, I now realize that few of the suggestions influenced me in my own tenure process.

This article is intended to give my personal view on how to create a foundation for tenure success. I hope that I provide some insight for those of you currently involved in tenure track positions or contemplating academic careers. If you are unaware of what Assistant Professors actually do, I hope it gives some appreciation that teaching at a University means a lot more than just teaching.

#### 1. Tenure is a dash for the cash.

The amount of research dollars acquired and spent is very important to the university. Not only does it play a role in many university rankings, but it also provides funding for basic infrastructure through grant overhead. Consequently, I suggest writing as many good proposals as possible. Try

different avenues for funding like NSF, government, industry, internal funding opportunities, and foundations. Essentially I recommend pursuing any relevant funding opportunity. While possibly controversial (I find most faculty either strongly for or strongly against), I recommend requesting your graduate students' help with proposals. Graduate students will do the majority of the work if the proposal is funded. Why not have them help fund their own education? It provides valuable experience for students, which most of us didn't receive, and can be helpful especially when writing tricky sections like the literature review.

#### 2. Write many papers.

Publications and students are the main outputs of research. Of course quality measured in terms of impact (or citations) is extremely important. It is hard to write an exceptional, well cited paper at your academic job in the few years before tenure. Consequently, I suggest erring on the side of writing more papers with very good quality instead of taking big risks and writing only a select few papers. Graduate students learn by writing papers, so let them learn. You might be surprised how good the results can be.

#### 3. Spend time recruiting graduate students.

Graduate students are the main vehicles for conducting research. As a faculty member, it is surprising how little time is actually available to conduct research, given the time required for raising money, teaching, and service. Good graduate students have a positive return on the amount of time spent to train and supervise them. Recruiting promising students is one of the most important objectives as a faculty member. Answer all emails you receive from potential students. Encourage students who look exceptional. Don't be afraid to discourage students with little chance of admission; it is in their best interest as well. Look for promising students in the classroom.

#### 4. Create a good working relationship with your students.

It is often an awkward transition from graduate student to Assistant Professor. This can be magnified when advising students who may be older and have more real world work experience. It helps a great deal to build a more formal working relationship. Don't be afraid to set deadlines and milestones for each student. Explain your expectations upfront and what the student



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needs to do to achieve them. Don't be afraid to part ways with low performing students who have been given proper notice of low performance. Provide prompt feedback to your graduate students on their research. Give them feedback on paper drafts as quickly as possible (this also contributes to point 2). Perform fun activities with your students (social events, happy hour, etc) to keep morale high.

#### 5. Reduce time spent on teaching preparation.

Now don't

freak out here; I'm not suggesting do a poor job at teaching. Among many activities, lecture preparation has a way of absorbing all amount of time available no matter if it is a few hours or a few days. Unfortunately, this leaves less time available for other important activities like raising money, generating research, supervising students, and service. Get creative about minimizing class preparation time. Use old lecture notes as a starting point, especially if you took a good class on the subject. After class, get copies of student notes to help you prepare for future lectures. The lecture notes give you access to covered material as well as in-class created material like examples. If you have a TA for your class, have them type notes or create PowerPoint slides if you don't already have notes in a digital format. Be creative about having students do the work. In-class group projects (students break up into teams and make a presentation) and other projects are a great alternative to lecturing and a great way to reduce lecture preparation.

**6. Create an online resume and archive everything you do when you do it.** As an academic, your CV (curriculum vitae) is expected to document every facet of your academic life. Once you create a draft for your online CV, add details when events occur. This in-

cludes being a reviewer for a conference or journal, becoming a technical program committee member, organizing a session at a conference, chairing a session at a conference, giving a presentation, submitting papers, revising papers, and serving on student committees. This information will be required for annual reports and will also fit in your tenure package.

**7. Remember your teaching portfolio.** An important part of the tenure package is the teaching portfolio, which consists of all course-related material including notes, handouts, and assignments. Be aware that many schools require several examples of student work for all assignments. Be sure to make copies and mark the students name off (to protect privacy) or better yet create digital copies. You should have poor, average, and exceptional examples for every course that you teach. While it seems obvious, remember where it is filed. I had the unpleasant experience of locating material for two courses (sending emails to former students begging for copies of material). When I cleaned out my office to upgrade my furniture, they were neatly placed in an unused cabinet.

**8. Make the most of every travel opportunity.** Academics have a lot of travel opportunities. Given the time and fi-

nancial cost of travel, make the most of every visit. When traveling to a given destination, feel free to invite yourself to visit local universities, companies, or funding agencies. This is a great way to perform face-to-face networking. At other universities you can get insight into cutting edge research activities. Visiting companies will provide guidance on what kinds of practical research problems are hot and will give you a potential technical contact for funding, while visiting a potential program manager at a funding agency will provide some insight into the proposal process. Note that universities and companies will invite you for a talk if given notice that you will be "in town." This is important because having invited talks on your CV is important for your tenure application. Finally, don't forget to have some fun while traveling: eat at good restaurants; go scuba diving (get certified early); or ski the slopes.

**9. Understand what the department expects for tenure in terms of research, teaching, and service.** This is obvious but the variance in the answers you receive can be frightening. Great resources are recently tenured faculty, who can often provide an honest answer about what is really important. This will certainly vary by university, college, and department so get specific recom-

mendations if possible. Talk to senior faculty to get a behind-the-scenes perspective. It is especially valuable if you can find faculty who are on the college or university level committees and who can give guidance on what is viewed as important from the next administrative level. For example, the department may value teaching but the dean may prioritize research dollars

**10. Maximize productivity in whatever way you can.** At this point you probably realize there is a lot to do and little time to do it! As a graduate student, you generally have only a few tasks and lots of freedom on when and how to complete those tasks. As a faculty member you will need to get creative about maximizing your productivity. Most importantly, find a solution that works. Are you productive late at night? If so then stay up late and come in late. Office too distracting? Go to a coffee shop for a few moments of serenity. For a long term solution, set up a home office. Get disconnected for a while. Don't answer the phone, turn off the email, and concentrate on the task at hand. Think about having a closed-door policy.



## Technology Consulting – Reality, Challenges, Opportunities

By Sundar Iyer

Consulting is a much used, much misunderstood, and occasionally maligned profession. My experience over the last decade, working in a multinational telecom system vendor, an IT system integrator and a media-comms provider has led me to believe a consultant is a versatile generalist, or '10m deep and 100m wide.'

I am required, often at short notice, to build up sufficient knowledge and credibility with multiple stakeholders. Naturally, one never starts with all the answers, and so teamwork, informational interviewing, plus industry journal literature reviews, and analyst reports are essential. Once I formulate a viewpoint, I must (diplomatically) articulate the fact-based, value-driven perspective to impel a course of action. These

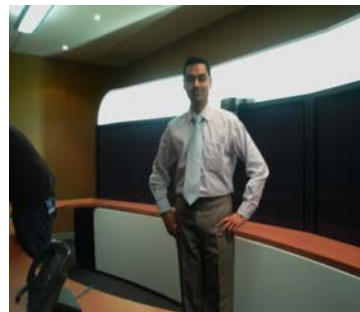
desired actions involve aspects of technology planning, selection, design, build, test, deployment, maintenance and evolution of complex systems, e.g. network planning systems or service delivery platforms.

This technological aspect, while important, is but a single factor in a complex multi-factorial web. There are always multiple stakeholders, the very human issues behind organizational inertia to change, the necessity of alignment with the firm's strategy, commercial viability, legal, regulatory and ethical issues. Given this diversity of considerations required, the MBA is, with good reason, an apt qualification to encourage such holism. For example, when launching a network-wide reporting platform, we need to simultaneously fulfill regulatory reporting requirements, ensure the privacy of individual subscribers, while giving

information meaningful enough to make informed marketing and system dimensioning decisions.

Almost all technology consulting work involves influencing investment decisions and/or changing systems, processes, functions, and attitudes – far and away, the most challenging aspect. It calls for the persuasive skills of an advocate, the nous of a financial accountant, the logic of a detective to uncover latent needs and pains, and of course, technical skill - an ideal nexus for today's professional engineer.

If you are comfortable with creating structure out of uncertainty, get a buzz out of continuously learning, and are a people-person, then you will find this field very rewarding. There are plenty of opportunities for leadership, for it is ultimately, a wealth creator and a driver of economies.



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## GOLD News

### Cedar Rapids Section GOLD Affinity Group Spotlights 4 Events

By Shana Fliginger  
(Cedar Rapids Section GOLD Affinity Group)

Cedar Rapids Section GOLD Affinity Group kicked off the year with a Family Film Night at Red Cedar Lodge nestled in the Squaw Creek Nature Preserve between Marion and Cedar Rapids, IA. Spearheaded by Section Advisor and former Chair Gary Bishop, this event, which combines the fun of going to the movies with a cozy rustic

setting and an opportunity for outdoor activities, has almost become a tradition. On September 11, 2008, Co-chairs Steve Collins and Shana Fliginger teamed up with Premier Advisors for "Investing for Engineers" dinner presentation. This venue was tailored to both ends of the membership spectrum with the first portion covering how to invest as an engineer / engineering student starting out, while the second portion focused on members who are near retirement age. A Q&A session concluded

the presentation. During September and October, Steve and Shana are coordinating with Student Branches at the University of Northern Iowa in Cedar Falls and the University of Iowa in Iowa City to hold two Meet-N-Greet activities to garner interest in IEEE. Steve and Shana have also begun working with a local realtor to conduct a workshop for first-time home buyers which is tentatively slated for early spring or late fall.

### What's been happening in Region 10 besides the Olympics...

By Helene Fung  
(IEEE Region 10 GOLD Coordinator)

In the spirit of the 29<sup>th</sup> Olympiad, here's a snapshot commentary of how I think we're going in the top four on my list of priorities for GOLD in Region 10:

#### 1. Facilitate experience and expertise sharing – GOLD medal performance (yes, pun intended!)

In January, R10 successfully held a joint Student/GOLD/WIE Congress in Chennai, India where delegates from all three demographics within IEEE's Region 10 membership base had a chance to network and learn from each other's experience.

We have also successfully lobbied for R10 to financially support 5 GOLD delegates to participate in the GOLD Summit and Sections Congress to be held in Quebec, Canada in September. An additional 3 section-funded delegates will also be joining us in Quebec.

So sacrificing my beauty sleep to lobby a few more section chairs at a breakfast meeting held just before the main R10 meeting is finally paying off!

#### 2. Establish a R10 GOLD Working Group and improve coordination through clustering of GOLD groups – just off the starting block

We have identified two suitable volunteers, who have experience in forming peer to peer support networks between student branches, to act as facilitator to champion this project. We have reviewed background information about the demographic trends and level of activities held by different GOLD groups to inform the brainstorming for the optimal way to cluster the R10 GOLD groups, and we're about to start soliciting for further input from the GOLD groups on the suggested approach.

#### 3. Native language information cam-

**paign aimed to bridge language barrier and information gap to facilitate formation of new GOLD – should be safe for a silver medal performance, but going for gold**

I have identified a common trait in many R10 countries where IEEE already has significant presence among the more mature members yet there aren't any active local GOLD groups - English is a second language locally. My interaction with some section chairs at the R10 meeting confirmed that there is an information gap possibly due to the language barrier. I therefore recruited GOLD volunteers to help produce an information flyer about GOLD and how to start a new GOLD group, which has been translated into Chinese and Japanese as a pilot project. We're aiming to launch hard copies of the native language flyers at Sections Congress to relevant section chairs.

My predecessor, Dr Yasuharu Ohgoe, has also begun to discuss the

possibility of starting a new GOLD group with the Tokyo section committee, which looks promising.

#### **4. Develop and recommend young volunteers who will become good candidates for other higher level IEEE opportunities – should be worth at least a bronze medal, but still hopeful for silver and gold in the longer term**

I am always on the look out for promising talents through my interaction with GOLD volunteers, and have personally taken on a mentor role to help develop a few of them. A list of “good young

people” has also been forwarded to Ted Hissey and Darryl Chong for consideration by IEEE Nominations & Appointments Committee and the GOLD Talent Search Program.

I have also just accepted an invitation to join a new adhoc Board level committee for Volunteer Leadership Development. The committee aims to help IEEE better manage its most important resource – its volunteers, in a more systematic manner. Hopefully we can find ways to better equip our volunteers with skills they need, and to bridge the disconnect between roles to

be filled on IEEE’s various committees and boards and the enthusiastic volunteers who do want to get more involved but don’t know how or what opportunities are out there.

#### **One world one dream, forever friends**

As cliché as it may sound, I think the common thread between our first ever GOLD Summit and the Olympics is to foster friendships beyond geographical boundaries, so we’re all really looking forward to it!

## Siberian Conference on Control and Communications

**By Oleg Stukach  
(GOLD Chair, Russia Siberia Section)**

The seventh SIBCON, a major conference of the Tomsk Joint Chapter, was held in Tomsk. This event was organised by Siberia Section, co-sponsored by ED-S, MTT-S, and ComSoc, and sponsored by the Russian Foundation for Basic Researches.

Topics included Simulation and Modeling in Control and Information Processing; the Basic Problems of Communication and Control Theory; Digital Video and Image Processing. There was also a special session on Materials for electron Devices and X-Ray Detectors. The program consisted of the paper presentations, discus-

sions, and the social program included a street-seeing tour, banquet and bowling.

We cordially invite all interested experts to participate in the next SIBCON 2009. Your cooperation and support in the Scientific Program Committee would be highly appreciated. Please find further information on the Web: <http://www.comsoc.org/tomsk>.

## Membership Booth Featured at ICMLC 2008

**By Wing Ng (GOLD Representative — Asia Pacific) and Patrick Chan (Student Activities Chair)**

At the 2008 International Conference on Machine Learning and Cybernetics (ICMLC), Kunming, China, the Student Activities Committee and the Graduates of the Last Decade (G.O.L.D.) Committee joined together to host the SMC Society Membership Booth and conduct a membership drive for new members. The SMC Membership Booth was visited by hundreds of international conference delegates from China, Taiwan, and other countries including the U.S., Canada, and Poland.

The GOLD representative, Wing Ng and Student Activities Chair, Patrick Chan developed the booth which included photos of Society officers and a description of membership categories and benefits. During the conference program, they presented to conference attendees an introduction to IEEE, the SMC Society, and described membership benefits of technical Information, networking opportunities, and career development tools. Because of the high level of interest from delegates who visited the booth, it is expected to result in increased membership of the SMC Society, particularly from Region 10. For further information about membership benefits



*Wing Ng and Patrick Chan at the SMC Membership Booth*

please contact Wing Ng at [wingng@ieee.org](mailto:wingng@ieee.org).

## Peer-reviewed Contributions

# From Digital to Paper? How Canada's Proposed Bill C-61 Will Affect Literature Review

By Thorarin Bjarnason  
(IEEE Graduate Student Member)

We live in a digital age; storing data is what computers are designed to do. Canada's proposed Bill C-61 (copyright bill) will force scientists to abandon their computer-friendly pdf journal archives in favour of paper copies. With powerful computers at our fingertips, we will instead be thumbing through filing cabinets.

I am a thesis-writing PhD Candidate who previously completed a thesis-based MASc. When I first started performing research, pdfs of journal articles were rare and many articles had to be photocopied from the library. Presently, the majority of journals release pdf versions of their articles, and some, like Physical Review and Nature, have digitized their archives back to their first volumes. What used to take hours in the library – to look up the articles, find the book-bound versions in the journal archives, and photocopy – now takes a matter of minutes using PubMed or Web of Knowledge and a University Li-

brary proxy. Present copyright laws in Canada permit these innovative steps to simplify literature review for academic and industrial research.

Like any experienced researcher, I have my own system for archiving digital versions of journal articles. I have my own naming convention (Year-Journal-Number-Pages-Authors) and use my operating system's search function to find desired items. Furthermore, portable storage consists of cheap, massive hard-drives in small form factors. Such devices allow me to easily transport my journal archive to conferences and meetings, where I often connect my drive to someone's laptop in order to retrieve literature for discussion. I consider myself to be a typical academic and my colleagues use similar methods for pdf article archives.

Contemporary literature review has reached a state of euphoria. What used to take hours in a library can now be performed from your desk or even your living room, at your convenience, even when a thought strikes you. Having experienced the transition from paper library databases to digital

online databases, I am fully conscious of the benefits gained from the digital transition.

Canada's proposed Bill C-61 destroys the euphoria of contemporary research. Section 30.2(5.01) states that a digital copy acquired through a library can only be printed once, and that the digital copy cannot be used for more than 5 business days after the original download. Researchers must print the pdfs out on paper, only once, and then delete the digital versions.

Bill C-61 does not acknowledge that paper copies of literature review are becoming passé. For comparison, 100 digital articles require roughly 60Mb of hard-drive space while the paper versions will fill a filing cabinet drawer. Consequently, digital journal archives can be carried on a device smaller than your thumb, while the paper archives are simply too large to carry conveniently. Paper can easily be misplaced and is susceptible to damage from water, fire, and general wear-and-tear; arguably digital versions suffer the same problems. However, writing automated scripts to backup digital copies to off-site servers is trivial, while paper cop-

ies essentially stay in a filing cabinet and backing them up off-site is cumbersome and extremely time consuming. Many scientists are no longer archiving paper versions of journal articles.

In the digital age this proposed copyright bill forces us to revert to paper with its clause preventing persistent digital copies. The euphoria of digital literature review is being threatened: a thesis isn't built in 5 days.

*Acknowledgement: Thank you Corree Laule, PhD, for your helpful suggestions.*



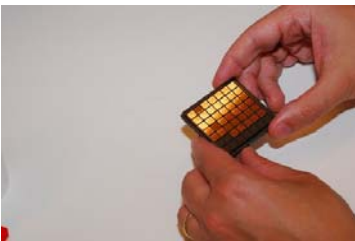
*Thorarin Bjarnason is a farmer and PhD candidate in Electrical Engineering with the University of Calgary, Alberta, Canada and [ImagingInformatics.ca](http://ImagingInformatics.ca). His research focuses on image processing of magnetic resonance images of white matter.*



## Surfing the Millimeter-Waves

By Byron Wicks  
(IEEE Student Member)

Today, wireless technologies have a dramatic impact on our lives. We live in an increasingly connected world. Access to voice and data communications is almost ubiquitous with our computers, phones, and cameras connected via WiFi, Bluetooth and cellular networks. Primarily the electronics for these devices are implemented on silicon. Silicon, and the CMOS process in particular, is the standard and most inexpensive technology for building the circuits used in consumer electronic devices. As



*A photograph of the world's first transceiver integrated on a single chip that operates at 60-GHz on the CMOS process. It allows wireless transfer of audio and video data at up to 5 gigabits per second, ten times the current maximum wireless transfer rate, at low cost.*

silicon technology scales smaller in size and the transistors increase in speed, in accordance with Moore's Law, it is only a matter of

time before silicon will be a viable alternative at millimeter-wavelengths; the portion of the spectrum ranging from 30 to 300 GHz. The implementation of millimeter-wave wireless devices in silicon has the potential to enable new classes of highly integrated, low cost, power efficient, high-speed applications and allows for integration of very small high gain arrays. This article highlights two promising potential applications of millimeter-wave frequencies; high-speed wireless communication and vehicular safety.

Currently our existing wireless technologies are too slow to deal with bandwidth intensive multimedia applications. The millimeter-wave spectrum has a large unlicensed region around the 60-GHz channel with reduced interference ideally suited for high data rate communications, which the IEEE has convened a task group to investigate. Devices implemented in this region promise to allow electronic devices to connect seamlessly and power efficiently at high data rates without any interaction. Your personal computer, high definition televisions, digital video recorders, digital cameras, and portable music and video players, will be able to communicate your videos, favourite TV shows, latest movies, and the footy wirelessly within seconds with no need to exchange wires, or purchase

switches. A typical scenario for this technology is an individual who visits a kiosk in a shopping centre and buys a movie and downloads it wirelessly to a portable multimedia device. On returning home the portable multimedia device would seamlessly connect to a high definition television, and a surround sound system, and turn them on automatically and play the rented movie. There would be no wires, no switches or complex operating procedures required in order to be able to connect all of these devices.

Currently automobile accidents are a leading cause of fatalities and injuries. Automotive radar technologies are able to help avoid collisions by detecting objects near the car, assisting with braking, blind spot warning with lane departures, and enhancing the driver's vision when driving in inclement weather and low visibility conditions. Sensors are able to provide parking assistance, and pre-imminent side collision detection. A minority of these systems is employed on current vehicles and only equipped on luxury automobiles due to prohibitively high cost. In order for these systems to be universally deployed across the entire price range of automobiles a low cost solution is urgently required. Silicon technology and the millimeter-wave frequencies prom-



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ises to facilitate the realization of this visions.

Implementing wireless technologies at millimeter-waves frequencies has the promise to provide low cost, power efficient, high data-rate wireless communication. This article has introduced two such applications of numerous that will utilise the millimeter-wave spectrum.

## Professional Volunteerism

By Yau Hee Kho  
(IEEE Member)

Mention the word volunteer and chances are we would immediately think of volunteer aid workers. Little do we realize that the scope of volunteerism stretches beyond just offering humanitarian services; in one way or another I believe as members of a global professional engineering organization that is the IEEE, we would have done volunteer services without even noticing them. Think about this: are you an active committee member? Have you ever helped in recruiting new members, or organizing an event for members, or giving a presentation, all for the benefits of the Institute and its members without getting paid? If yes, you would have volunteered professionally.

Professional volunteerism could be thought of as contributing in a professional capacity without actively seeking rewards of any kinds, be it monetary or materialistic. Volunteerism is important for any member-based institution that is “of the members, by the members and for the members”. The IEEE is no exception. You may think that staff members are the ones who provide the services and events that the Institute offers. This is only partially correct since staff help in maintaining the day-to-day

running of the Institute, but the core of what the Institute stands for depends on the members. A thorough study of the IEEE webpages will reveal that the foundation of the Institute is firmly laid on its memberships. Hence active voluntary contributions from members are of paramount importance.

At this point you may wonder “But what’s in it for me to volunteer?” Well, I can easily quote you a few of the usual selling pitches used in the recruitment of new committee members, such as “It looks good on your CV!”, “It impresses your potential employers!” etc. This is true. But from personal experience, there is a lot more than just filling up empty pages in your CV in order to impress people.

The positions of office-holders within a committee usually mimic that of a company in the real world. There is the Chairman/President which can be likened as the CEO who oversees the whole company. Then there is the Honorary Secretary who can be likened as the chief marketing/communication officer. And not forgetting the Treasurer as the chief financial officer. These titles may not match exactly but the functions are similar.

For students and young engineers, getting involved in committees therefore offers unique and valuable opportunities to get training and exposure in leadership

positions. The experience and skill gained in these positions is transferable and can usually be put into good use in your career to get a head start against your peers. What’s more, the opportunities are not limited at the local level only. Depending on your experience and motivation, you can get involved at the national and international (i.e. global) level. In fact, you can aspire to achieve as well and as high as in your actual career. This experience cannot be obtained from textbooks and cannot be bought with money – it is simply priceless!

Once a President of a Student Chapter told me when I was still an undergrad student that as a President he was able to run the Chapter as if he was running a small business enterprise. He got to learn and be able to lead the Chapter, chair meetings, practicing his enterprising wits in recruiting members when faced with a rival institution, rubbed shoulders with many important people etc. The idea of ‘running a small business enterprise’ really fascinated me at the time and that was how I got to become an active volunteer.

A good starting point to kick start your parallel career as a professional volunteer would be to speak to your local committee members. They will be able to assist you. Alternatively the IEEE volunteer webpage ([http://](http://www.ieee.org/web/volunteers/home/index.html)



*Yau Hee Kho gained his B.Eng (first class honours) degree in 1997 and PhD degree in 2008 from the University of Canterbury, New Zealand. From 1998 to 2002, he worked as an RF engineer in Singapore, and he is now a researcher in wireless digital communications. He is currently a member of Council and Technical & Professional Services Board of the IET, UK.*

[www.ieee.org/web/volunteers/home/index.html](http://www.ieee.org/web/volunteers/home/index.html)) provides many useful resources. Remember, you gain more by giving more. So be a volunteer today!

## Should I Work at a Startup or Large Corporation?

By Oren Feinstein  
(IEEE Member)

Many students and young professionals ask themselves this very question when they are ready to apply for a job. Sure, there are more options but I will focus on these two extremes, giving a perspective from my experiences. My goal is not to convince you that one is better than the other, but rather to give you my insights, which should help you make your own decision as to which employer is the right fit for you.

### Structure

Startups typically have one vertical structure in place, for instance, a founder managing an engineer and two interns, or three founders managing one software team, which can have a few managers and ten software engineers. Whether it is expressly written or not, there is typically one chain of command in a startup.

In large corporations, there can be many vertical and horizontal structures in place. For example, a large company can have three products that are developed by three separate vertically-structured teams. The horizontal structure in the previous example is that from the company's perspective, the heads of each product team are at the same level in the

company's overall chain of command.

### Responsibility

In a startup with only four people, every member of the team is extremely important to keep the business afloat. Each team member must develop many skills and address needs as soon as possible. One flaw or weak link can jeopardize the existence of the business.

Large corporations must hire very specialized individuals to fill a specific role. Large corporations try to find the best candidates, who show strong leadership and initiative. Every team member is accountable for his/her actions. As the individual's career advances, responsibility grows.

### Training

Since funding is an enormous factor in the quality of training, expect that training at startups is up to you. Training at startups usually consists of books and on-the-job internal training. If you speak up and show that you want to learn, people are usually receptive to help you.

On the other hand, large corporations plan a budget for training annually and understand that highly-trained individuals have broad, positive business impacts. Training at large corporations is structured and geared to advance individuals in their careers and

bring immediate positive results back to the work environment. Training consists of books, on-the-job training, external classes, sending individuals to obtain advanced degrees, online learning modules, etc. Knowledge is power, and talking to many differently specialized individuals helps you improve yourself and your skill set.

### Benefits

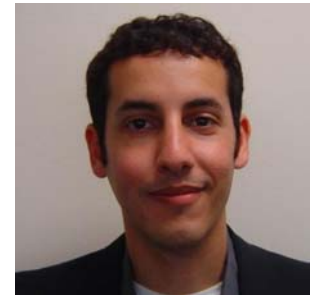
At startups, your benefits are mainly compensation and stock options - not bad if you were one of the first employees at Microsoft or Google. Depending on the startup, you may get medical and dental benefits as well.

At large corporations, your benefits are compensation, 401K, pension plans, stock purchasing plans, affordable medical and dental insurance for you and your family, paid vacation and holidays, vacation resources, financial planning assistance, etc.

### Perks

At startups, your perks can be free lunch with the founder every day, free dinner and drinks for late work nights, free tickets to arts, entertainment, or sporting events, as well as many more novel tokens of appreciation.

Large corporations have international recognition and exposure. You have the opportunity to work in different locations nationwide or



*Oren Feinstein is a Software Engineer at Schlumberger in Houston, TX, United States. He received his Bachelor of Science in Electrical Engineering from the University of Texas at Austin and Master of Science in Electrical Engineering from Stanford University.*

even worldwide depending on business need and your career goals. More perks are discounted tickets to arts, entertainment, or sporting events, discounts at local stores, restaurants, and exercise facilities, table tennis and billiards table at work, cafeterias, massage, pilates, and yoga classes, as well as much more.

In the end, there is no right or wrong answer as to what company size is the best employer. It is all a matter of fit for you. Examine the way that you like to work and your values, and find a company that allows you to pursue your career goals.

## Building Better Engineers: Extending and Consolidating the Gains

**By Ifeyinwa E. Chika**  
(IEEE Graduate Student Member)

It is generally acknowledged that there are problems with our engineering graduates. Many factors contribute, chief among them being the way universities teach engineering. There is a gap between engineering as it is taught and as it is done. Change is definitely needed. There is need for an educational framework that builds experiences that would draw from real world activities and breathe life into the idealized models of the classroom. Slowly but steadily the change has begun and is already accomplished and deep rooted in many universities. Many more universities and engineering educators are yet to come into the knowledge or implications of this gainful change.

The aim of engineering faculties is to “Build Better Engineers” by facilitating students’ maturation into skilled real-world problem solvers able to make reasoned decisions in challenging situations. This real-world problem solving requires such skills as technical competence, team work, lifelong

learning, and evaluation of alternatives and social/environmental impact of choices. The pressure of rising population and societal dynamics necessitates that engineers will be called upon to design and implement sustainable systems and technologies with multidisciplinary implications<sup>1</sup>. The traditional lecture-based educational paradigm encourages memorization with emphasis on content delivery which encourages instructors to maintain a profile of all-knowing authorities, while the learner remains “unknown”, thereby creating a professional deficiency. It is this professional deficiency the new, tuition-free Franklin W. Olin College of Engineering in Massachusetts wants to address based on a new educational paradigm<sup>2</sup>.

System dynamics have propelled a shift in paradigm to student-centred learning, an educational framework for learning enhancement, promoting experiential learning and cognitive growth, fostering critical and sustainable thinking needed to make sound engineering decisions. The paradigm seeks to improve the quality of learning through a redefinition of the learning environment, the roles of the instructor, the roles of the learner and the relationship among them<sup>1</sup>. It emphasises participatory learning and advocates for reduction in lecture hours and increase in problem/real world-based learning activities with the teacher as a mentor and facilitator. Engineering faculties are embracing this educational paradigm.

*Ifeyinwa E. Chika is a PhD student in the Electronic and Computer Engineering Department of the University of Portsmouth, UK. The research programme is funded by the Schlumberger Foundation under its Faculty For The Future scholarship programme aimed at encouraging women in science and technology in their pursuit of academic excellence. She is also a tenured academic staff member of the Electrical and Electronic Engineering Department, Federal University of Technology, Owerri, Nigeria.*



However, there are two different worlds of engineering faculties: the developed and the in-transition. The fundamental problem of those in the countries in transition is the lack of adequate laboratory resources. Laboratory

activities are one of the most important components of engineering education. It may not be possible to “build better engineers” without meaningful laboratory resources. There are situations where effective engineering laboratory education cannot be provided because of funding and: laboratory equipment has deteriorated, maintenance is lacking, and replacement is impossible; laboratory equipment is costly and difficult to purchase; there are large classes and one laboratory stand. The challenge is the need for alternative means of providing genuine laboratory experiences in such situations if the gains of the paradigm change are to be extended and consolidated. The virtual laboratory is seen as a feasible complement, or possible

<sup>1</sup>D. Huntzinger, et al, “Enabling Sustainable Thinking in Undergraduate Engineering Education”, *Int. Journal of Engineering Education*, **23**(2), 2007, pp 218-230.

<sup>2</sup>J. Schwartz, “Building Better Engineer”, *Int’l Herald Tribune*, September 29, 2007, <http://www.ihf.com/articles/2007/09/28/news/wbolin.php>, accessed 11/08/2007.

<sup>3</sup>M. E. Auer, “Virtual Lab versus Remote Lab”, [http://www.online-lab.net/rel/documents/auer\\_icde.pdf](http://www.online-lab.net/rel/documents/auer_icde.pdf) (published 2000), accessed 10/01/2008

<sup>4</sup>I. Chika, D. Azzi, J. Stocker, and B. Haynes, “Genuine lab experiences for students in resource constrained environments: The RealLab with Integrated Intelligent Assessment”, *Int’l Journal of Online Engineering*, **4**(3), August 2008.



alternative, to the real laboratory. In this context, we take virtual laboratory to be software versions of the real laboratory where each experimental setup is implemented in software such that a personal computer can take the place of an

entire laboratory workbench<sup>3</sup>. Research efforts geared towards such virtual laboratories have been reported<sup>4</sup>. The challenge is not over, as there are many engineering disciplines.

Also, to further extend and

consolidate the gains of the paradigm change in engineering education, the change, its implications and requirements need to be often highlighted to enable educators gain useful insights, with the aim to motivate and stimulate them to

improve the quality of engineering education. The hope is to elicit some level of response towards more effective engineering curriculum and instructional strategies.

## Congratulations! You have landed the job. First day of work, now what do you do?

By Rahat Mujib  
(IEEE Member)

**D**o not act confused! That is the last thing you want to do on your first day at a new job. Yet, I can honestly say, this is one thing I have felt quite often on my first day or for a few early jittery weeks, at least early in my career. The feeling can be summarized as “where is the list of tasks that I am suppose to be good at, for which I was hired?” Over time what I have learned is that there no such list of tasks. In fact, if you are lucky enough to land a job in a well-organized company, no one will ever tell you what to do.

Once you have landed the job, consider yourself good enough to be there. You should never wonder if the company have made the right decision in hiring you. Hiring someone to fill a permanent position almost never happens from a snap decision. It is not one thing you said or did during the inter-

view. In a large enough organization, more than one person is involved in deciding if you are good enough, and they take their time and discuss bits and pieces of your actions from the interview as much as they can. So, rest assured you are not “lucky” to be there, you are good enough.

Now, if you think like that, you will not get or act confused. You would definitely want to get your hands dirty and want to do the things that you found on the job descriptions. Eventually you will discover things that you should get involved with. These (if you are lucky) will not necessarily be communicated to you directly; however you will find them as tasks pending, or being discussed among your colleagues or with your boss. Eventually, after a week or two of warming up in the company, your boss, for example may tell one of your colleagues “maybe we should get X to look into that one” (X being you). Your boss did not mean that you may consider

looking into that task at your option. He really meant for you to take the lead and actively work on that task. At this point you should not hesitate to nod your approval of the task assigned to you and you should get started on it from that moment.

So, what should you be doing, in the period between your start date and the day you start working on a particular deadline-oriented task? You observe and you absorb! That’s right! You look around to see faces; try to get familiar with a few faces you see walking by or hanging around your desk. You may not know their name but overtime when you do, this practice will help you to put names to the faces more easily. You should also listen carefully. Often things are said on the other desk that affects you in some ways. This is especially important in your early days, when you are trying your best to get on and be on the good side of your colleagues. You can learn a lot about the setup, which includes

the systems or other colleagues you may be working with. The things you learn simply by observing and absorbing in this early period will help you get comfortable in the company quicker than you expect.

One last thing I mention may come as a surprise to you. You may find that the pending tasks you are discovering were not on the job description or even discussed in your interview. You may be correct in thinking so. However, what you do with this realization will pave the path forward. For example, if you were hired as a computer programmer, should testing someone else’s code be part of your task-list? Eventually it may not be, but if that’s what needs to be done, someone needs to do it. If you are not doing anything else, you should jump on it. You do not become a tester by doing so; you become a master.

## Notices

### IEEE-USA offers valuable references and resources

**By Sharon C. Richardson**  
(IEEE-USA Communications Assistant)

Need to know the ins and outs of consulting? Searching for information on electric energy reliability? Want tips on writing a resume? Or would you like to know how to communicate with members of Congress? Check out IEEE-USA's e-books [[www.ieeeusa/communications/ebooks](http://www.ieeeusa/communications/ebooks)] for a diversified array of valuable references and resources on these topics and more, offered to members for free, or at a low, discounted member price.

IEEE-USA launched its e-book publishing program in 2005 to provide useful and educational information on topics of interest to IEEE's U.S. members. The e-book format provides a medium for delivering a wealth of information in one concentrated resource, in an

easily downloadable PDF format, and at an affordable price. IEEE-USA offers IEEE members quality original and compilation e-books at great prices that assist them in career guidance and development, and help educate and inform them on tech policy topics of interest to engineers.

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### Your Career and Networking with IEEE Electron Devices Society AdCom Members

**By Ravi Todi**

Come join us on Sunday evening, 14 December 2008, from 5 -7 p.m. at the Hilton San Francisco Hotel for an EDS sponsored, career development strategy session, especially designed for graduate students and young professionals, who are Graduates of the Last Decade (GOLD) members. The session includes a seminar on career development strategies in today's globally competitive world and a panel discussion focusing on career options and career path selection with expert panelists from academia, research, design, development and manufacturing and will be followed by a golden opportunity for you to meet with EDS Officers and Administrative Committee (AdCom) members at a special networking session. Establishing a network with successful EDS AdCom members and enjoying some of the other key EDS benefits (e.g., online access to ED Letters and Transactions and the IEDM proceedings) are some of the primary reasons for joining EDS. This event will be held in conjunction with EDS' flagship conference, the

IEEE International Electron Devices Meeting (IEDM), held December 15-17. For information visit the web-site at <http://www.his.com/~iedm/>.

Mary Ann Bopp, Manager for Career Development at IBM, will present a seminar entitled Career Development: Imagine the Possibilities. She will talk about how to approach career development, whether you are tenured in your profession and want to continue to grow in your field of expertise, or you want to change your career path but don't know how to start, or you're fresh out of college and are just beginning your career journey. The discussion will include how to use mentoring as a means to developing your career, no matter whether you work in a small company or large corporation. Leveraging many relationships throughout your career is instrumental in helping you progress along a career path; develop new expertise and skills -- or just using a network to "socialize" within the company.

For additional details on this EDS sponsored GOLD event, please contact EDS GOLD representative, Dr. Ravi Todi at [rtodi@ieee.org](mailto:rtodi@ieee.org).

### Looking for a student loan? SimpleTuition can help

SimpleTuition is a search engine resource for finding private student loans and graduate student loans. One does need a US social security number or a co-signer who has one to apply. Many education lenders are listed, and the search allows you to see the payment

streams at various interest rates and loan amounts, then click directly to the loan application of your choice. Also, once you register at this site, it sends helpful email updates with tips about finding funding. Visit <http://www.simpleruption.com/ieee/home> for more information.

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# IEEE

## Humanitarian Workshop '08



Many of us are fortunate to live in a relatively secure environment where we can pursue education and dreams. Far away from most of us - in Africa, or even close to home like New Orleans in the United States or Sichuan in China, where

catastrophes strike recently, there are tremendous needs for humanitarian aids. Engineers can play an active role in bringing hope, relieving pain, restoring livelihood, and accelerating economic progress in these areas through appropriate use of technology.

IEEE aims to develop a platform to create awareness among the younger engineers and students on how we can use our engineering knowledge and skills to bless the communities. Therefore, IEEE partners with a number of organizations, such as Engineers Without Borders - USA and United Nations Foundation to put together a 1-day workshop. At the end of the workshop, attendees will be more informed on how humanitarian organizations use technologies to positively impact the world we live in. Eventually, we hope attendees will obtain a more holistic understanding of how they can play a part in humanitarian efforts, and even be inspired to do so at the end of the workshop.



Technology for Humanity



***"Understanding humanitarian works through the lens of engineering"***



**18th Oct '08  
9am-5pm (Sat)  
Boston, USA**

**Boston University  
College of Arts & Sciences (CAS)  
725 Commonwealth Ave  
Boston MA**

**Main Sponsor:**





## ***Tentative program***

### Keynote speeches:

- ✍ Humanitarian projects and technology
- ✍ How organizations stay involved in humanitarian outreaches?
- ✍ Research and field projects: case examples

### Hands-on session:

- ✍ Solving problems faced in the field

### Booth Visits:

- ✍ Connect with humanitarian organizations and project leaders

Lunch and refreshment will be provided



## ***Organizers***

✍ Institute of Electrical Electronics Engineers Inc. (IEEE) is a non-profit organization established to foster technological innovation and excellence for the benefit of humanity. Today, IEEE has more than 375,000 members worldwide, sponsors more than 850 conferences annually, and has nearly 1,300 standards under development. IEEE GOLD (Graduates Of the Last Decade), the young professional entity of IEEE, collaborates with Region 1 (Northeastern USA) and Boston Section to host this workshop. [www.ieee.org](http://www.ieee.org), [www.ieee.org/gold](http://www.ieee.org/gold)

✍ Engineers Without Borders - USA (EWB-USA) is a non-profit humanitarian organization established to partner with developing communities worldwide in order to improve their quality of life. The partnerships involve the implementation of sustainable engineering projects, while involving and training internationally responsible engineers and engineering students. [www.ewb-usa.org](http://www.ewb-usa.org)



## ***Main Speakers:***

- ✍ Mr. Mitul Shah, Senior Director of UN Foundation
- ✍ Ms. Collen O'Holleran, Mr. Seth Kassels, and Ms. Rosemary Powers, Senior Managers of EWB-USA

## ***IEEE GOLD Humanitarian Fellowship***

Sponsorship is available for attendees who desire to participate in humanitarian projects. Interested attendees may compete for the IEEE GOLD Humanitarian Fellowship. 10 fellowships (each worth up to US\$3,000) will be awarded to applicants who fulfill the selection criteria. The details of the criteria will be provided at a later date. For more information, please contact Darrel Chong at [dchong@ieee.org](mailto:dchong@ieee.org).

Humanitarian projects corresponding to each of the 10 fellowships will also be made known to attendees prior to the workshop. Recipients of the fellowship will take part in the humanitarian project that they have chosen at the time of application. At the end of the projects, recipients will share with IEEE the learning and experiences gained from being involved in grass root humanitarian work.



"Do not withhold good from those who deserve it, when it is within your power to act."



## ***Hands-on Session - Prizes for innovative solution***

Problem solving is a norm for EWB-USA's field project teams. More often than not, the best solutions are not only effective, but also simple to implement and easy to learn. To allow the attendees to have a feel of solving some field-related issues, EWB-USA will be designing a mock session based on completed projects. The workshop will get attendees to brainstorm and propose solutions to challenges that are faced by EWB-USA. Teams that come up with the most innovation solutions, win prizes.



## ***Registration***

- ✍ Free for IEEE or EWB-USA members
- ✍ \$15 for non-members (\$10 for registration before September 21)
- ✍ Anyone who registers before Sept 21 will be eligible to win one of ten mysterious gifts.
- ✍ Registration closes on October 11

For registration, please go to [www.ewh.ieee.org/reg/1/gold](http://www.ewh.ieee.org/reg/1/gold)

**Contact**  
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## Call for Participation

## IEEE GOLD Session at GLOBECOM 2008

The Hilton New Orleans Riverside, New Orleans, Louisiana, USA  
3 December, 2008

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### *The Road to The Future*

Find yourself in a perplexing situation in your early career? Feel strong need for direction and guidance to facilitate decision? Come join us in the IEEE Graduates of the Last Decade (GOLD) Panel in GLOBECOM 2008 at New Orleans!

Founded in 1996, GOLD aims to help young professionals make a smooth transition from being a student to entering the professional world. **The GOLD Panel Session** at IEEE GLOBECOM 2008 will bring together world-renowned scholars, researchers, practitioners, and business leaders from academia, industry, and government to discuss issues of interest to both students and young professionals who are in their early stages of career planning. Each panelist will give a short presentation, and a Question & Answer section will follow. Come along to share your ideas. You will enjoy it!

For details, please visit <http://www.ieee-globecom.org/gold.html>

### Panelist:



Prof. Vincent Chan  
Massachusetts Institute of  
Technology



Prof. Andrea Goldsmith  
Stanford University



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