MARCH 2009

GOLDRush

The quarterly newsletter of IEEE GOLD for young professionals

IEEE Celebrating 125 Years of Engineering the Future

GOLD Graduates Of the Last Decade

IN THIS ISSUE

GOLD news	4
GOLDRush invited articles	9
Peer-reviewed contributions	10
Republished articles	14
Notices	18
GOLD Committee 2009	21

HIGHLIGHTS

GOLD involvement at the 2009 IEEE-USA Annual Meeting	6
GOLD Member Profile: Helene Fung	8
IEEE GOLD Humanitarian Efforts	9
The Real Robot Revolution	12
Engineers Without Borders Awarded Funds for Return to Peru	17

MESSAGE FROM ADRIAN PAIS

2009 MGA GOLD Committee Chair

Dear IEEE GOLD members,

I hope that the New Year has brought you much success and joy, despite the ongoing economic crisis in the world. It is a privilege and honour to be your new GOLD Chair for 2009. My committee and I will work hard towards the Member and Geographic Activities (MGA) Board's goal that each and every young technical professional finds a home within the IEEE.

This year, we have new GOLD Coordinators in Region 3 (Wah Myint), Region 4 (Aisha Yousuf), Region 7 (Dan Coode) and Region 8 (Joao Figueiras). The new GOLDRush Editor-in-Chief is George Gordon (from New Zealand) and the new coordinator for the GOLD Webinar series is Megha Joshi (from India). I extend a warm welcome to them and to all new GOLD volunteers throughout the world, and look forward to working with you all.

I would like to thank the Past GOLD Chair, Soon Wan, for his tireless efforts for GOLD over the past two years. Under his leadership and the hard work of many volunteers, some of the major achievements have included the first ever global GOLD Summit held in conjunction with Sections Congress 2008 in Quebec City and the expansion of GOLD's initiatives in Societies.

As GOLD Committee Chair, it is my hope and dream that my committee can meet

the needs of each and every young technical professional who has the privilege of being a part of the IEEE. In its transformation process, the MGA Board (to which the GOLD Committee belongs) is strongly encouraging *member engagement*. A core belief held by many within the IEEE is that humanity and technology play a huge role in solving many of the world's most pressing challenges in areas such as communications, transport, water supply and electricity. *Member engagement* seeks to encourage, empower, mobilize, and inspire its members to be active towards such causes through their commitment and participation in the organisation. This is a *mutually beneficial* relationship - the member not only benefits

from being a part of the IEEE community, but the IEEE community benefits from the member's unique contributions and experiences. As a result, humanity benefits from the IEEE.

In view of *member engagement*, and upon wide discussion and consultation, I put forward the following six values to my committee and GOLD members throughout the world:

- **Focus on the member** – our volunteers will do everything possible to ensure that the needs of young technical professionals are being met.
- **Servant leadership** – we work from our hearts to serve each others' needs, knowing that we create an environment of trust and responsibility when we are willing to 'give' rather than expecting to 'receive'.
- **Seek to understand so as to be understood** – we are a huge global organisation with members from a wide variety of backgrounds and cultures. We can only solve some of the pressing challenges if we first seek to understand those challenges.
- **Quality, not quantity** – there will be a strong focus on the *quality* of events and opportunities that we create for members, rather than the *quantity*.
- **Cooperation** – we seek to cooperate with other entities in the IEEE (and beyond) for the benefit of our members.
- **Celebrating youth** – we work together, achieve great things, and as a result have a lot of fun and celebrate life itself.

"A core belief held by many within the IEEE is that humanity and technology play a huge role in solving many of the world's most pressing challenges"

The key initiatives that the GOLD committee will work on this year are intended to impact *you, the member,* by creating an improved member experience in the *long-term*. Some of these initiatives include:

- developing a 3-to-5 year strategic plan,
- expansion of highly successful initiatives such as the GOLD webinar series,
- creating GOLD programmes that interlock with existing student activities to enable a more logical transition for students into GOLD,
- developing a process for identifying and nurturing young volunteer leaders, and
- developing manuals to support our volunteers at every level.

There is much work to be done, and we have a huge mountain to climb! We welcome you to join us on this journey – if you are interested in being more involved in GOLD by contributing to some of the above initiatives then please e-mail me directly at a.pais@ieee.org.

Last but not least, I wish all our Affinity Group leaders and members throughout the world a very successful year ahead. Without you, GOLD would not be in existence and I am very grateful for your contributions to the IEEE.

Best wishes,
Adrian Pais
2009 MGA GOLD Committee Chair

MESSAGE FROM THE EDITOR

George Gordon, IEEE GOLDRush Editor

Greetings GOLDRush readers! It is my great honour to be taking on the role of GOLDRush editor-in-chief for 2009. Before I reveal what's in store for GOLDRush 2009, a little about myself. I am based in Auckland, New Zealand where I am currently working as a software engineer at a small company. I hold a Bachelor's Degree in Electrical and Electronics Engineering from the University of Auckland and will be commencing my Ph.D. in optical communications in the UK later this year.

I must acknowledge the outstanding work of the previous GOLDRush editor, Adrian Pais, who really instigated the metamorphosis of GOLDRush into the high quality professional publication it is today. For his work he has been awarded an MGA GOLD achievement award in 2008 - an honour of which no candidate was more deserving.

These are big shoes to fill, but this year I aim to continue the phenomenal growth and success of GOLDRush seen in 2007 and 2008. As a publication for young technology

professionals, GOLDRush must be as dynamic as its tech-savvy audience and keep pace with the modern world. You will notice our sleek new look for 2009, designed by Victoria Bayly, and if you are an avid Twitterer you may already be following our tweets at twitter.com/IEEEGOLDRush. For those of you less familiar with Twitter, it is a new microblogging service burgeoning in popularity. I strongly encourage you to visit our Twitter page - it is not necessary to sign up to view our updates. You can even subscribe to our RSS feed on Twitter to have brief summaries of GOLDRush articles delivered directly to you.

We would also like to increase your involvement in GOLDRush because as our loyal readers, this is your newsletter. In the June edition we will be starting a reader's forum open to submissions from everyone. The basic idea is that you, as readers, can submit your comments and opinions on this edition's articles for inclusion in the next edition. Authors will be able to respond to these submissions to clarify any issues. More general comments and opinions are also welcome. A profile of a GOLD member will also be included in each edition to provide insight into the careers of other young professionals around the globe.

It is my vision that GOLDRush will become a leading publication for young technology professionals. It will be platform for young professionals to communicate with one another, learn new skills and make the world a better place through activities such as humanitarian initiatives.

"Distance is no longer a barrier to success and young professionals from around the globe can work together online to achieve amazing feats"

There are a number of other new features in the works for later this year, to be finalised at a later date. For the moment, however, we are planning a special IEEE 125th anniversary edition, to be released in June and I strongly encourage you to prepare a submission for this, or submit any creative ideas you may have that would complement this theme.

New Zealand, where I am based, was once described as "the last bus stop on the planet" as it is a very geographically remote country. However, owing to the marvels of modern technology these geographical barriers have been vanquished and I am now able to work with a team of wonderful editorial assistants from around the globe to create this publication. I must thank Agusti Solanas from Spain, Lori Hogan from Canada, Claudio Camasca and Alex Wong from New Zealand, Aisha Yousuf and Kristi Hummel from the USA, Lisa Lazareck from the UK and Timothy Wong from Australia - without their help GOLDRush would not be possible. As you can see, distance is no longer a barrier to success and young professionals from around the globe can work together online to achieve amazing feats. Online collaboration across borders will help develop new technologies, help humanitarian projects to flourish and may ultimately play a key part in fostering global peace through cross-cultural understanding.

I hope you enjoy this edition of GOLDRush - certainly a healthy dose of GOLD. Please feel free to email me with any comments at g.s.gordon@ieee.org and I look forward to reading your submissions to the reader's forum.

READER'S FORUM

Coming June 2009

Starting from the June 2009 edition of GOLDRush, we are inviting opinions and questions on any of our articles to be published in our new Reader's Forum section. This gives you, as our readers, the chance to ask questions directly to the authors of articles or express your opinions and views on items appearing in GOLDRush. Submissions must be strictly **no more than 200 words** and may be edited if necessary. Submissions should be sent to GOLDRush@ieee.org **no later than 5 May 2009.**

This is an excellent chance for you to interact with GOLDRush and we look forward to hearing your thoughts on this edition.

Make your voice heard by writing to the GOLDRush Reader's Forum!

Copyright Microsoft

GOLD NEWS
From around the world

Introducing Yasuharu Ohgoe and GOLD Japan

By Yasuharu Ohgoe
(MGA GOLD Rep. 2009)

My name is Yasuharu Ohgoe, but my friends call me Yasu. In 2008 I established the Tokyo GOLD Affinity Group, the first GOLD affinity group in Japan. I am currently just starting the first GOLD activities in Tokyo and other Japanese sections. I hope that in the future, GOLD affinity groups will be established in every section in Japan.

I was born in Shizuoka, Japan and I now live in Tokyo. I have been married to my wife for 8 years and have two lovely daughters. My hobbies are playing the piano, watching baseball games and Formula One racing. I received B. Eng., M. Eng., and D. Eng. degrees from Tokyo Denki University, Saitama, in 2000, 2002, and 2005 respectively. Since graduating I have been working as a research associate at Tokyo Denki University. I am involved with several research projects in material sciences. My professional interests include plasma processing technology and development of carbon thin films.

The Asia-Pacific region (R10), my hometown area, consists of about 50 countries and sustains more than 60% of the world's population. R10 contains a lot of diversity in the nationalities and the cultures of each country. This diversity is exactly the energy that drives the Asia Pacific region. I feel our region is one of the most energetic regions in the world. Though customs and languages may differ in each country or region, it is personality that defines culture. In art and literature, the merit of a work is determined by the author's personality. The same is true of science and technology. These, too, are dependent on the personality of the engineer, just like art and literature. Therefore, a national character appears in every science and technology innovation.

In order to live together in peace, we must develop mutual understanding between different nationalities and cultures. Additionally, we must mutually develop our personalities. I believe that the activities of IEEE GOLD are able to cultivate individual personalities through developing members' technical careers and soft-skills, and by fostering networking and mentoring. IEEE GOLD activities provide invaluable experiences that contribute to the promotion and the development of a mutual understanding for the world.

Inauguration of the 7th Egyptian Engineering Day. From left: H.E. Minister of Higher Education, H.E. Minister of International Cooperation, H.E. Minister of State for Administrative Development and EED Honorary Chairman

The 7th Egyptian Engineering Day – EED'08

By Shaimaa Yehia
(Secretary IEEE Egypt GOLD)

Abbreviations usually hold much more than expected, and this certainly holds true for the three-letter acronym EED, short for Egyptian Engineering Day. EED, now in its seventh year, is an event organized by the IEEE Egypt GOLD that transcends the boundaries of a mere acronym.

If you have never been to EED, then to give you a basic idea: it is an event where recent engineering and computer science graduates exhibit their graduation projects, from adjoining booths, to industry invitees over three consecutive days. For recently graduated engineers, the timing of the event, usually the last week of July or first week of August each year, is suitably chosen to introduce them to the market and industry.

Besides offering a perfect chance for hiring, EED also provides an opportunity for incubating low-cost R&D ideas based on the exhibited projects. This allows industry to obtain the latest solutions to fulfill market needs, delivered purely by young Egyptian hands and minds. In parallel with the exhibition, the EED hosts a valuable agenda of open sessions and workshops. Some of these aim to update visitors on the latest cutting-edge technologies from a range of engineering disciplines, while others are dedicated to soft-skills.

Under the slogan *"Choices…Unlimited"*, EED'08 assisted recent graduates to explore the entire market spectrum and match their talents to the available market opportunities. EED'08 was also an excellent starting point for innovative business ventures and relationships as it sought to encourage entrepreneu-

rial spirit amongst engineers. This was achieved through the cooperation of different parties and delegates from a range of backgrounds including IEEE, industry, universities, commercial ventures, government, NGOs, recruiters and the media. EED'08 was inaugurated by three Egyptian ministers: H.E. Minister of State for Administrative Development, H.E. Minister of Higher Education and H.E. Minister of International Cooperation. EED'08 has now become one of the major professional national days in Egypt. More about EED history can be found on our website: http://www.ieeegoldegypt.org.

This year, EED'08 hosted three concurrent events:

- Made In Egypt (MIE) competition finals - After three rounds, graduation projects were judged against technical and business criteria. Winning MIE projects were those that demonstrated a fruitful cooperation between bright undergraduates and experienced industry mentors to produce mature prototypes that tackle real needs in the Egyptian industry or to introduce new products into the Egyptian market. MIE is now one of the main IEEE Egypt GOLD activities.
- Future City competition - On their way to finals, preparatory school students exhibited their creative ideas of how they see their city in the future from an engineering perspective. Future City forms part of the IEEE Egypt GOLD goal to develop an engineering mindset in younger generations.
- Launching Ceremony of the IEEE Women In Engineering Affinity Group in Egypt, whose mission is to inspire, engage, encourage, and empower women engineers with the local Egyptian community.

Preliminary on-event-statistics at EED'08 illustrated the following facts: 200 participating engineering and computer science graduation projects, 103 job offers, 19 sales of graduation projects, 24 to-be-funded graduation projects, 10 to-be-incubated graduation projects, 100 volunteers and over 4200 visitors. EED'08 was sponsored by key local and multinational industrial entities. Mark your calendar now for EED'09 from 1st-3rd of August 2009!

Change in EMBS GOLD coordinator position

By Matthias Reumann (EMBS GOLD Coordinator)

Lisa Lazareck has handed over the position of GOLD representative to the IEEE Engineering in Medicine and Biology Society (EMBS) to me, Matthias Reumann, as of January 1st 2009. While Lisa will be taking up new challenges as chair of the Students Activities Committee, I will try to follow in her footsteps and continue her successful work as EMBS GOLD coordinator. I am very excited to join the GOLD team and look forward to contributing and promoting GOLD benefits to the community in EMBS. A highlight of GOLD within EMBS this year will be the GOLD networking reception at the EMBC 2009 annual conference in Minneapolis, USA, to which I would once again very much like to invite you all.

To give you an idea about who I am, allow me to briefly introduce myself. I was born in Frankfurt/Main, Germany in 1978 and started my studies in Electronics at the University of Southampton, UK. My course was an integrated European course in Electronics which led me to the Universität Karlsruhe (TH), Germany, in my fourth year and the ESIEE (École Supérieure d'Ingénieurs en Électronique et Électrotechnique) in Paris, France, in my fifth year. As my undergraduate degree I received a Masters of Engineering in Electronics with the Tripartite Diploma in 2003. During my studies in Karlsruhe I became fascinated by medical

Matthias Reumann, the new EMBS GOLD coordinator

imaging and image processing. I decided to apply for a Ph.D. position at the Institute of Biomedical Engineering at the Universität Karlsruhe (TH). My Ph.D. supervisor, Olaf Dössel, suggested that I should look into clinical applications of cardiac models, which I ultimately did. I managed to complete and defend my Ph.D. thesis in February 2007. Having a desire to go into industry but not give up research, I received an offer for a post-doctoral position in the Functional Genomics and Systems Biology Group of the Computational Biology Center at the IBM T. J. Watson Research Center in Yorktown Heights, USA. I joined IBM Research in June 2007 where I still work today. My primary research interests remain clinical applications of cardiac models to improve diagnosis and therapy planning. The complexity of cardiac models requires large computer resources for a detailed multi-physical, multi-scale heart modelling. At the IBM T. J. Watson Research Center I am working on high performance computers to enable fast cardiac simulations.

While I am just starting, I am very much looking forward to the challenges ahead and hope you will embrace the opportunities GOLD and EMBS offer. Please feel free to contact me any time (mreumann@ieee.org) if you have questions concerning GOLD within the EMBS, if you have ideas and suggestions of what you would like GOLD to do for you or if you would like to get involved as a volunteer.

GOLD involvement at the 2009 IEEE-USA Annual Meeting

By Aisha Yousuf
(Region 4 GOLD Coordinator)

The 2009 IEEE-USA Annual Meeting was held February 26 – March 1, 2009 in Salt Lake City, UT. The theme for the meeting was "Engineering the Alternative Energy Debate," where volunteers and members discussed important economic, social, and political issues relating to alternative energy. The meeting also provided general volunteer training, and discussions and workshops on developing leadership skills and career development. In addition, IEEE-USA hosted an awards banquet to recognize some of its outstanding volunteers and engineers.

The IEEE-USA Annual Meeting also emphasized the importance of GOLD as an IEEE entity by having GOLD poster sessions for the first time. Normally poster sessions are planned to emphasize PACE activities, but this time it featured both PACE and GOLD posters. The six regions in IEEE-USA were requested to bring a GOLD poster to the meeting for display during the poster session. In addition, each region was also allocated 15 minutes to make a presentation about GOLD activities in that region. The regions were asked to highlight the successful GOLD activities and how they were organized so the other regions may learn from these successes. At the end of meeting a best poster award was presented for the best poster out of all the PACE and GOLD posters. The best poster award this year was presented to the Region 2 GOLD coordinator Rachel Andre Krepps for her GOLD poster.

IEEE-USA also provided $5,000 to each region to send GOLD delegates to the annual meeting. Regions were encouraged to select GOLD delegates that were new volunteers in IEEE so they could develop their leadership and networking skills and learn more about volunteering in IEEE, specifically in GOLD. IEEE-USA also made a great effort to get the GOLD delegates involved by giving them an opportunity to get involved as annual meeting volunteers. This way the delegates learned more about IEEE-USA and IEEE in general. The regions were also asked to encourage their sections to send additional GOLD delegates to the annual meeting. The annual meeting planning committee also had GOLD members so GOLD was well represented at the meeting. I would especially like to recognize the efforts of Vishnu Pandey for all his hard work in coordinating GOLD involvement at the IEEE-USA Annual Meeting.

Some GOLDies showing their IEEE spirit by making an IEEE sign in front of the science and technology statue at the Utah Capitol building. Pictured left to right: Kheng Swee Goh, Aisha Yousuf, Amy Qiao, and Scott Tamashiro

GOLDies at the IEEE-USA Annual Meeting

Overall, the event was a fun learning experience. It highlighted all the important issues surrounding engineers in the US, such as alternative energy, career development, and lifelong employability. It also helped form stronger connections between the regions and local GOLD affinity groups in US regions were able to learn from each other. Hopefully the IEEE-USA Annual Meeting will make a positive contribution to successful GOLD activities this year.

Taking IEEE Hong Kong volunteering to a new level

By Henry Cheng
(Hong Kong Section GOLD Affinity Group)

Over the past few months, the IEEE Hong Kong (HK) GOLD has maintained its momentum by organizing and participating in various activities, including technical, networking, and community service events. For example, we held a Christmas Party with several local engineering institutions and the Woman Teachers Association, which was a successful and fun event. Additionally, GOLD members helped deliver meals to elderly people in need throughout the holidays and festivals. Our members responded very well to this type of community outreach event.

In fact, a major community service event for HK GOLD over the last year extended beyond our community and across our borders. On 12 May 2008, there was a severe earthquake in Sichuan Province, China. In response to this tragic event, a group of young engineers in Hong Kong, determined to help, formed the 512 Young Engineers Alliance to consolidate the rebuilding efforts of various engineering disciplines. IEEE HK GOLD was fully supportive of this initiative and contributed by helping to rebuild schools in Sichuan.

The key commitment of the 512 Young Engineers Alliance was to reconstruct Yuanjia Primary School which was seriously damaged in the earthquake. With the professional knowledge of our young engineers, delegates of the Alliance engaged in the planning, design and construction stages of the school rebuilding project. They also leveraged modern design elements in the project, such as quake-resistant measures used in Hong Kong.

To meet the financial commitment of the project, the Alliance launched a fund-raising program called "One Square Meter Per Person", which is a series of on-going fund-raising events. The first fund-raising event was held on a tram, a long-established form of transportation in Hong Kong. By decorating a tram with posters showing the reconstruction of the Yuanjia School, the public could access information of the work's progress and make donations while riding the tram.

Delegation to Sichuan in July 2008, two months after the earthquake. The mountain in the background was believed to be the centre of the massive earthquake.

The second event was held at the Star Ferry Pier at Tsim Sha Tsui. Star Ferry Pier is an historical icon of Hong Kong and also a famous local scenic spot. By running a fund-raising booth there over many weekends, we have been very successful in bringing our message to the public, including tourists, and receiving their kind donations.

"The key commitment of the 512 Young Engineers Alliance was to reconstruct Yuanjia Primary School which was seriously damaged in the earthquake."

As we begin our activities for 2009, we would like to send our best wishes to the Sichuan Province. We hope that IEEE volunteering will be strengthened and promoted to a new level thanks to the efforts of our young volunteers.

Comments on GOLD news? Write to our Reader's Forum at GOLDRush@ieee.org

Call for articles and ideas for GOLDRush IEEE 125th Anniversary edition

This year the June edition of IEEE GOLDRush will be a special themed edition commemorating the 125th anniversary of IEEE. To celebrate, IEEE GOLDRush invites you to submit articles related to this very special occasion. You are encouraged to be creative and we also welcome suggestions for special features. The article topic(s) shall be of interest to young professionals and article(s) must be **strictly no more** than 700 words. Articles should be sent to the IEEE GOLDRush editor, George Gordon, at GOLDRush@ieee.org **on or before 5 May, 2009**. Please feel free to include captioned photos or pictures with your submission. All articles and photo(s) will be peer reviewed and edited if necessary.

IEEE
Celebrating 125 Years
of Engineering the Future

MEMBER PROFILE

Every issue, we will profile a GOLD member in the workforce. This issue's profile looks at:

Helene Fung

IEEE Member, Perth, Australia

Career description:
I am a business analyst at HWE Mining, which is a wholly-owned subsidiary in the Leighton Group. My role involves analysing data and being a bit of an internal management consultant to help the company improve how we operate and strategically plan for future growth. There is a bit of a niche market for those who understand how the business world works as well as how to work with technical people.

Personal interests:
I have been a volunteer on community radio in my native Cantonese (a dialect of Chinese) on Saturday mornings since 1994. I've also been learning Salsa and ballroom dancing for just over 2 years.

IEEE involvements:
I am currently the Region 10 GOLD Coordinator, a member of the Region 10 Humanitarian Technology Challenge Committee, Region 10 Student Activities Committee and the Western Australia section GOLD committee.

How has IEEE shaped your career?:
I started getting involved in IEEE and the second last year of university, starting a student branch; and got more involved at high levels from then on. Discovered in the process that while the technical stuff was intellectually challenging to learn about, running a committee was equally challenging but a lot more fun! So I'd credit my IEEE involvement as a key factor influencing my decision to go into management consulting after graduation. IEEE also gave me exposure to experience and a chance to learn from successful leaders that few in early stages of their career would be privy to.

Words of advice for young professionals:
A university lecturer once said "a degree only qualifies you to be an educated idiot". After I entered the workforce I discovered how true it was. You can't possibly know everything, and knowing what you don't know should be part of a lifelong self-improvement process. So if you don't know or are not sure about something, do some research on your own or ask someone - better still find yourself a mentor!

INVITED ARTICLES

IEEE GOLD Humanitarian Efforts

By Darrel Chong (Project Director IEEE GOLD Humanitarian Fellowship)

In the last year, much has been written about humanitarian efforts. I am very pleased that IEEE GOLD has implemented the plans put forth in 2008.

Firstly, we piloted a successful IEEE Humanitarian Workshop in October 2008 in Boston. About 115 students and young professionals attended the workshop. Speakers from the UN Foundation, MIT Public Service Center, EWB-USA, Linknet Zambia, and IEEE graced the workshop and shared with attendees their perspectives on how engineers can better affect the community. Such a coming together of young minds from various universities and industries is rare. We were encouraged by the feedback and intend to expand the same workshop to the rest of the IEEE regions. We hope to see similar interest and impact in other places as well.

Subsequently, we started work to develop processes for the IEEE GOLD Humanitarian Fellowship and put out a call for proposal submission. The IEEE Foundation has granted us US$30,000 to kick-start this program. In January 2009, 10 projects and individuals were selected as recipients for the fellowship grant. The intent of the fellowship is to enable IEEE to partner with and empower young leaders who are delivering significant value to the community through humanitarian projects. We hope that by doing so, young people can implement their ideas and expand their initiatives in the future. We believe that by sponsoring these projects, we are able to touch lives in different parts of the world through various technological methods, covering a wide range of needs (healthcare, energy, food, water, communication, education). The project that scored the highest (*8.47* out of 10) in our review process was that of Mr. Ashifi Gogo, a graduate student at Dartmouth College. His project seeks to develop a mobile technology for drugs authentication in Africa, where 80% of drugs are counterfeit. The technology will provide a reliable means for people to authenticate drugs purchased from retail stores using their mobile phones. The fellowship grant of $3,000 will be used to initiate a second technology trial in Ghana before a larger scale implementation.

Copyright Microsoft

The newly formed IEEE GOLD Humanitarian Fellowship has given out US$30,000 in grants to humanitarian technology projects

I was very excited when I was reading through all the proposals that came in last December. In my opinion, the fellowship program provides an excellent avenue for IEEE to invest in good ideas and people with a passion for a better world. The return on investment is enhanced standard of living, new relationships, and new understanding between the developing and developed communities.

"The return on investment is enhanced standard of living, new relationships, and new understanding between the developing and developed communities."

In the meanwhile, the IEEE GOLD Humanitarian Fellowship program is still in its infancy. There are plans in the pipeline to expand this program. Finally, thank you all – Soon Wan, Robert Vice, Uri Moszkowicz, Karel Matthee, Adrian Pais, and Barry Shoop – for volunteering and working joyfully and relentlessly behind the scenes. Your efforts have borne much fruit!

One particular project, run at Boston University, is featured on page 17. For the full list of grants, see page 19.

Comments on this article? Write to our Reader's Forum at GOLDRush@ieee.org

PEER-REVIEWED CONTRIBUTIONS

Taking the Well-beaten Path in Alien Shoes

By Adam J. Hill (IEEE Graduate Student Member)

In the rapidly expanding world of technology, engineering can refer to an extremely wide range of subjects. Consequently, young engineers seem to be focusing on very specific fields more than ever. This is by no means a bad thing. With the never ending expansion of knowledge, it is nearly impossible to become an expert in every aspect of engineering, but very possible to master a specific area.

Sometimes diving deep into a specific field will ultimately lead to research in very different disciplines. This has been my experience working in audio engineering. At the very root of audio engineering is electrical engineering. This includes audio recording, storage, transmission, signal processing and source reproduction. Electrical engineering, though, is only the tip of the iceberg.

Take a minute to think about the challenges faced by audio engineers. It is reasonably safe to say that there has never been an audio related product that has been loved by all. The human ear's physical structure is as unique as a fingerprint. No two sets of ears are the same. Therefore, no two people will hear something in exactly the same way. Add anatomy of the human hearing mechanism into the mix, and we have two fields necessary to explore.

Next, consider the final destination for received audio signals; the most unique part of any person: the brain. The brain can play many different, and sometimes unfortunate, roles in the perception of sound. One important perceptual role the brain plays is an unconscious one. We filter as much irrelevant data out of the received audio signal as possible to get the clearest representation of what we are hearing. This includes dealing with significant frequency and temporal masking effects occurring at the basilar membrane in the inner ear. It may also include filtering out unwanted environmental noise (to a point) for better intelligibility.

Another role that is rarely addressed in audio engineering (or possibly just ignored), is the effect our experiences/expectations play into sound perception. Imagine going to a friend's house to hear his new home stereo system. Your friend paid top dollar for this system with all the bells and whistles. Having heard a few systems in your day, you immediately cringe when he fires it up. In his mind, though, it is the best thing since sliced bread. It must be; just look at that price tag!

The interesting point here is that your friend perceives this system to sound great. This does not mean that he has a bad ear; just that he has an altered perception of this specific system influenced by his expectations. No matter how "perfect" a system may be there is no telling what tricks our brains may play on us! Now on top of electrical engineering and anatomy, we must consider psychology and psychoacoustics.

There is no reason to stop there. Imagine a home speaker system which included robotics and internal navigation. All you would have to do is take it out of the box and switch it on. The system would automatically position and calibrate itself to give optimum performance. How could the system take psychological aspects of perception into account you might ask? How about a little artificial intelligence?

This outside the box thinking is what excites me in my work. These extreme ideas may not be possible quite yet, but thoughts like these can lead to more realistic original ideas in your field. It is certainly possible to make accomplishments by sticking strictly to your chosen field of expertise, but I believe it is far more rewarding to also reach out to other disciplines for additional ideas and inspiration.

Adam Hill is currently working on a Ph.D. at the University of Essex under the supervision of Professor Malcolm Hawksford. His research focuses on the optimization of low-frequency reproduction in small rooms by means of active networked subwoofer arrays. He holds a B.S. in Electrical Engineering from Miami University and an M.Sc. with Distinction in Acoustics and Music Technology from the University of Edinburgh.

For the audio world, the band The Black Keys may have put it best in the intro to their song, "The Breaks":

> *Lean forward slightly. Look straight at the speaker and listen with a sparkle in your eye; as though you may be thinking, "Gee, this is the most wonderful thing I've ever heard in all my life!"*

Comments on this article? Write to our Reader's Forum at GOLDRush@ieee.org

Professional Development for New Engineers

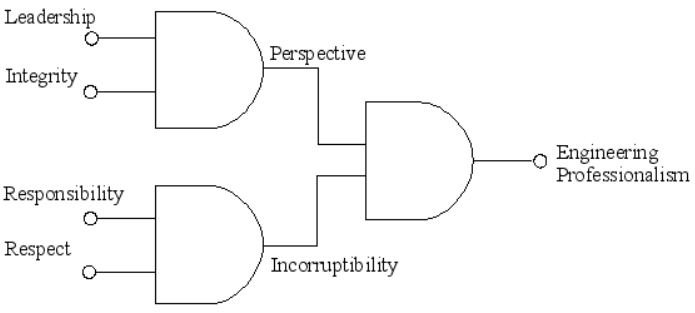
By Robbie Gosine
(IEEE Member)

If you are just starting out in engineering, you may be confused if someone tells you to exhibit leadership. You may not have any subordinates and as such you may ask yourself whom exactly am I leading? Well, leadership does not always mean that you are in charge, but it can imply that you take charge or take initiative. You will always have some projects that will require novel thinking, or more work than usual. It is in such a situation that you become a leader and assume the responsibility. Responsibility for a project is not easy, even the smallest project requires planning. However, by assuming responsibility, you become engaged and you are able to guide the direction and development of the project. This type of self-development provides the skills you need to take on progressively more responsibility and it shows your manager the type of employee you are.

Parallel to leadership, is integrity. In a nutshell it is a measure of your moral character. As an engineer, you will face ethical, moral and character issues that will require you to ponder your decisions considering not only the immediate results but the long term ramifications as well. From the product you create, to the reports you type and even the way you deal with your co-workers, these all define you. Doing the right thing is not always easy; however as an engineer it is paramount. Remember, we are professionals and like doctors, lawyers and architects we are held to a societal standard and a professional standard, which we must endeavor to maintain. If you lose grasp of your integrity, then you lose grasp of the profession.

Responsibility can be considered an integral part of leadership, while at the same time responsibility can be considered akin to integrity. In taking responsibility for your actions and your work, you have accepted the inherent accountability that comes with it. At the end of the day, when you put your name on the work you have done, you more or less put your stamp of approval that this work is done to the best of your ability and to your high standards. If you decide to forget your responsibilities, you begin to lose that tangible part that connects us to society; as engineers, we have a duty to our society. If we decide to shirk our responsibility then what do we have?

Respect is a very fundamental idea and it begins with you. Respecting yourself and your talents is the keystone of learning to respect others. As a professional you realize that those you interact with are deserving of respect as well. Whether you are interacting with a customer or someone within your company, endeavor to show them the proper respect. Avoid taking advantage of someone, disrespecting them or in some way belittling them; this is not the way a professional acts and is not acceptable for an engineer. Mutual respect tends to help a team work that much better because it encourages novel thinking and acceptance through the feeling of equality. It also encourages camaraderie which solidifies the team's presence as a productive group. In a sense, respect is the kernel of a professional and the means by which you will develop your career.



Graphic illustrating the logic sequence of leadership, integrity, respect and responsibility.

ENS Robbie Gosine is an Engineering Duty Officer in the US Navy and an equipment engineer at Consolidated Edison of New York with several years experience in the power industry. He studied electrical and bio engineering (BSEE, MSEE, MsBioE) and is currently pursuing his Ph.D. in Biomedical Engineering.

As you progress through your engineering career, perhaps you may decide to stay within the pure engineering disciplines or you may opt for a pathway into management. Regardless of the path you take in your career, be mindful of your overall goal. Remember that the objective should never cause you to lose sight of your responsibilities as an engineer and what you stand for - your integrity should never be questionable. Begin to develop the kernel of leadership, show initiative and show your superiors that you are an engineer that is capable of analyzing a problem, developing a solution and following through to completion. In the end, it comes down to the fundamentals of Leadership, Integrity, Responsibility, and Respect. These four key components are from my perspective, not only the keys to developing as a professional, but also the keys to being a valuable member of our society.

Comments on this article? Write to our Reader's Forum at GOLDRush@ieee.org

The Real Robot Revolution

By Michael Milford
(IEEE Member)

The Terminator pauses, its red glowing eyes scanning the environment. Flashes of laser fire flash past in the background, as Hunter Killer robots fly overhead. Suddenly, the cyborg catches sight of movement and its red pupils shrink to a small pinpoint. It raises its plasma rifle and starts to walk mechanically, with single minded purpose; destroy all that is human!

This scenario is the one that much of society is familiar with; the post-apocalyptic, dystopian future ruled by machines. Successful movies such as the Terminator franchise and Matrix trilogy have planted firmly in our minds the idea of machines and artificial intelligence (AI) 'out of control' and becoming overlords of humanity. While this may be a possibility in the long term, in the short to medium term (read the next twenty or thirty years) there are more plausible scenarios in which robotic and automation technology will start to 'take over' humanity, so to speak.

Back in the real world, robotics has been an integral part of many industries for several decades, such as car manufacturing. However, these robots have generally been expensive, highly specialized pieces of equipment, with which the vast majority of the population has had no direct contact. More recently, a new wave of robotics has started to enter the domestic home – domestic service robots. The best example is surely the range of vacuum cleaner robots now available in normal retail stores, with names such as *Roomba*. The growth in this area has been nothing short of phenomenal; from 54,000 domestic service robots at the end of 2002 to 3,400,000 units at the end of 2007, according to the "World Robotics 2008" survey by the United Nations Economic Commission for Europe.

"The growth in this area has been nothing short of phenomenal; from 54,000 domestic service robots at the end of 2002 to 3,400,000 units at the end of 2007"

"There are millions of blue collar jobs that can and will be at least partially performed by robots in the next few decades, without requiring the creation of true AI."

The *real* robot revolution started when the population first gained access to cheap, mass produced domestic service robots that actually save some customers time (depending on having a robot-friendly house) and hence positively impact their quality of life. While many vacuum robots were purchased for their 'robot appeal', for the first time in history some members of the general public were buying a robot because it would make their life just that little bit easier. It is also important to note that the vast majority of these existing floor cleaning robots are relatively 'dumb' machines, operating without knowledge of where they are in absolute space, and far inferior in capability to the state of the art research robots. Yet they are able to replicate, albeit inefficiently, some aspects of a very common task carried out in millions of homes.

While society should still retain an appreciation of the more extreme sci-fi scenarios, it is the creeping entry of 'mundane' robotics into the home and workplace that should be given the most attention. 'Low level' robotics and automation is already very much present in our everyday lives, from automatic checkouts, computer phone line operators, and car washes. While there is still much research progress to be made, there are millions of blue collar jobs that can and will be at least partially performed by robots in the next few decades, without requiring the creation of true AI. Instead, the improvements will come from incremental advances in mechanical, control, sensor and AI research. Robots will start to be involved in roles such as stacking shelves, simple cooking tasks, and more advanced cleaning tasks.

Robots are becoming an increasingly widespread presence in our everyday home and work lives. Just because they are not particularly bright or scary does not mean we should not be prepared.

Michael Milford has a BE in Mechanical and Space Engineering (2002) and a Ph.D. in Electrical Engineering (2006) from the University of Queensland. He is a Research Fellow at the Queensland Brain Institute at the University of Queensland working in biologically inspired robot mapping and navigation

Comments on this article? Write to our Reader's Forum at GOLDRush@ieee.org

Requirements Definition: Art and Science

By Marcos M. Sastre-Córdova (IEEE Graduate Student Member)

Great! You nailed the interview and landed that dream engineering job. You are confident about your technical and engineering skills and are eager to apply them all to your first assignment. Then reality kicks in. You have to deal with company standards, processes, procedures, schedules, plans, quality assurance, your boss (who by the way might not clearly communicate what he/she wants but expects you to deliver regardless), and engineering requirements. Sooner or later you will have to deal with the tedious and often underrated task of defining requirements of a system, which are meant to translate customer needs into an engineering solution to satisfy them. Good requirement writing practices are essential for the development of complex systems. Unfortunately, this is not every engineer's cup of tea.

Managers and engineering leads, in my experience, have the bad habit of assigning the requirements definition tasks to inexperienced folks right out of school. The fact that you are an engineer or analyst skilled in grammar and composition may not properly qualify you to write good requirements. Be that as it may, there are a few things you can do to at least ensure a minimum level of quality is achieved in the specification of them. INCOSE, the International Council of Systems Engineering, provides a number of guidelines that I consider being the ABCs of good requirement writing. My favorite ones are: 1. Necessary, 2. Achievable, 3. Unambiguous, and 4. Verifiable.

Yes, it has to be necessary; not nice to have. This requires frequent and in depth discussion with your customer (who represents the end user of the system) in negotiating what is essential to meet the need and what is not. "Nice to haves" add unnecessary costs and scope to the system and may get in the way of implementing functionality that is really needed. Putting it as Steve Covey would say "things that matter the most should never be at the mercy of what matters least", and engineering is no exception.

Ignorance can be deadly, and unachievable requirements arise from it. Fortunately, as technical people, we have a good sense of what can and cannot be done with current technology. This does not mean, however, we are immune to over specifying a system with goals that cannot be met. The "ilities" (i.e., maintainability, reliability, availability, etc.) are a common area for these type of offenses. I mean, it is nice to specify that your system will have a reliability of 99.9%, but if it is a prototype or developmental hardware it might be an issue to achieve.

> ***"The interpretation of a requirement has to be the same for any reader. An ambiguous requirement is an accident waiting to happen."***

These checks are based on "science" but this next one takes some artistic ability as well. Unlike poetry, the interpretation of a requirement has to be the same for any reader. An ambiguous requirement is an accident waiting to happen. The way to go around this is with effective peer reviews. This gives the opportunity to other members of your team to read what you wrote. Pay attention to their discussions and ensure that they understand the intent of the requirement as you specified it. Listen, listen, listen. Arrogance does not help…at least not for this one!

Finally, it is time to sell off your system and to do so ALL requirements must be verified. Some will be done by testing, some by demonstration; some might require extensive analysis or lengthy inspections. But at the end, all requirements must be verifiable. That is, each requirement should have enough information in it so that a person with no particular knowledge of the implementation or design of the system can verify the requirement was satisfied. A successful verification event goes a long way. Customer delight is of the essence in this step, and this is the time to blow him/her away.

Engineering process ensures a common level of quality and compliance for everything that we do. Requirement development is key to the process and essential to produce high quality systems time after time. Remember the ABCs and never underestimate the importance of the art and science of writing good requirements.

Marcos M. Sastre-Córdova is a Senior Systems Engineer at Raytheon Company in Portsmouth, RI, where he has worked since graduation for the last 9 years. He holds degrees in physics and physical oceanography from the University of Puerto Rico Mayagüez and an MBA from the University of Rhode Island. He is currently a doctoral candidate at the University of Massachusetts Dartmouth.

Comments on this article? Write to our Reader's Forum at GOLDRush@ieee.org

ARTICLES FROM IEEE *THE INSTITUTE*

How IEEE Can Help the Engineers in Nigeria

Republished with permission from *The Institute*, Feb. 2009

By Prince Ikenna Ibe

Nigeria is a country blessed with many resources. We have oil and gas and mineral resources including talc, iron ore, bitumen, and coal. And, of course, we have our citizens, more than 146 million of them. The 48-year-old nation has developed a diverse economy with strong involvement in agriculture, banking, commerce, mining, oil and gas, solid minerals, and tourism. And with more than 53 universities and other post-secondary learning institutions and thousands of primary and secondary schools, Nigeria's educational sector is no doubt one of Africa's largest.

It would be expected that Nigeria, the most populous country in Africa, would have by now produced a crop of engineers who can compete head-to-head with their counterparts in other countries. But that has not happened. We do have great scientists and leading world technologists, like Philip Emeagwali, the math whiz who came up with the formula for allowing a large number of computers to communicate simultaneously, and Anthony Okon Nyong, a corecipient of the 2007 Nobel Peace Prize. But they are not products of Nigeria's educational system, which is large but has many problems. University curricula cover outdated technologies and are taught by inexperienced lecturers who are more concerned with making ends meet than with conducting research that could improve the nation's technological development and enhance their institution's academic standards. The odds are definitely not in favor of Nigeria producing proficient engineers in the 21st century in reasonable numbers.

ENTER IEEE Is there a role for the IEEE Nigeria Section to play in developing the country's technical capabilities? Let me share a story I heard a long time ago. A man was walking in the woods when a ripe mango fell and hit his head. If this man was a good Nigerian, he'd bless God for giving him bit of food, wipe the mango clean, and bite off a big chunk. However, according to the story, the man picked up the mango and wondered what caused it to fall to the ground instead of flying up or remaining on the stem. Then he thought: There must be a force that pulled it down to the ground. This is how the theory of gravity was developed!

What we should take away from this story is that Nigerian engineers, even with the limitations imposed by the current educational system, can still make a difference in the 21st century. People with limited knowledge but good perceptions have developed several technologies. Helping to develop African engineers in the 21st century is a task that the IEEE Nigeria Section in particular—and IEEE as a whole—must take on.

During an IEEE GOLD (Graduates of the Last Decade) webinar, "The 21st-Century Engineer," given in June by GOLD member Adrian Pais, a research scientist with LinkNet Zambia, I asked this question: "What can IEEE do to create a balance and improve the quality of engineers in Africa? There seems to be a big difference between engineers from most African nations and their counterparts in the Western world—which can be largely attributed to poor education and communications infrastructure." Pais answered that

Prince Ikenna Ibe is the IEEE Nigeria Gold Chair. He is the principal consultant of Prince Ibe Ventures, a network solutions company.

IEEE has huge resources waiting to be tapped and that the IEEE Nigeria Section should apply those resources to improve Nigeria's educational system. We discussed financial resources. And he suggested that we seek ideas from world-renowned professionals, capitalizing on lessons learned in improving education around the world. He pointed to projects he has carried out in Zambia, including designing a master's degree engineering curriculum for the University of Zambia.

I acted on Pais's suggestion during a recent trip to Philadelphia and Tulsa, Okla. I met with top IEEE senior members and Fellows, who agreed to deliver lectures and seminars to Nigeria via video conferencing. One of them was 1999 IEEE President Kenneth Laker of the University of Pennsylvania.

ETHICS Nigerian engineers can make a huge difference in the area of ethics, which is one of six key values Pais covered in his lecture. There is a striking lack of ethics in Nigerian business circles. The ethical decay is eating away at the fabric of society.

It is not uncommon for projects to be poorly executed even when vast amounts of money are spent. Unfortunately, engineers are often involved in conspiracies—which goes against the tenets of their profession.

According to an article on the Nigeria-Direct Web site, corruption, with its bribery, graft, fraud, and nepotism, has been one of Nigeria's major challenges during its existence. Deep-seated corruption is the primary reason behind the country's difficulties in developing. The article points out that Transparency International, an independent organization that monitors corruption globally, ranks Nigeria among the five most corrupt nations in the world, "an inglorious record that has stunted growth in all areas of endeavor in the country."

I believe the Nigerian 21st-century engineer who behaves ethically can create a massive turnaround in the nation's economic development. The IEEE Nigeria Section must do all it can to create a spirit of honesty and excellence among its members. They, in turn, can influence other engineers—which ultimately would lead to ethical behavior. The results could be mind-boggling. Contracts would be executed to specifications, better roads would be built and maintained, and the unethical culture would be no more. So many other positive outcomes would likely follow that Nigeria could finally be able to develop properly.

Learning the Ins and Outs of Humanitarian Projects

Republished with permission from *The Institute*, Jan. 2009

By Ivan Berger

To foster technological innovation and excellence for the benefit of humanity" is IEEE's core purpose. Look around, and you can see results in improved living standards, better medical devices, and more efficient practices that make technology more affordable. Not every advance comes from IEEE members, but with more than 375 000 members in 160 countries, much of it does.

But how can your skills benefit people in areas where technology is sparse and where the need is not for high technology but for basic needs like water, power, and communication? And do you have what it takes to apply your expertise in places where the language, climate, and culture are completely unfamiliar?

Last October, 115 IEEE members and others voluntarily gave up a Saturday to look into questions like these and learn how to apply their technical and other skills to humanitarian causes. The venue was the first IEEE Humanitarian Workshop, organized by the IEEE Graduates of the Last Decade group (GOLD) in cooperation with Engineers Without Borders–USA, a nonprofit humanitarian organization that partners with developing communities. The IEEE Foundation and the IEEE Boston Section sponsored the event. The day was given over to talks on the nuts and bolts of volunteering for humanitarian projects, brainstorming sessions on solving real-world problems faced in the field, and networking.

"GOLD sponsored this event to inform the younger members of humanitarian opportunities and inspire them to contribute to humanity and society, which many of them have a compelling desire to do," says Robert Vice, chair of the Boston GOLD chapter.

The most challenging—and popular—talk was "Have You Got What It Takes in Rural Africa?" given by Gertjan van Stam, CEO of Linknet Zambia, a cooperative that builds communications links in rural Zambia. Van Stam is also vice chair of IEEE's Zambia Section. He told the audience to "throw away preconceived ideas about the people of the areas you're going to. They're smart." He added, "You might think that the people in rural areas don't know what they're doing, but they know very well, because they are surviving." Van Stam noted that unlike many people in Western nations, Zambians rank character higher than credentials, responsibilities higher than rights, and the community higher than the individual. "It's a relational culture," he said.

If you want to help, van Stam said, "You have to invest in a relationship. A lot of good people come in and fail miserably because they do not take the time for that. It's the local person who has to start something; if we start it, it's going to fail.

"And you have to commit," van Stam continued. "I see people coming in just for a year or two, and that's fine, but a season is the time between a dream and a reality. To achieve that dream, it could take a year, or it could take a lifetime. I've been there for six years."

Colleen O'Holleran, from EWB, also stressed commitment. "Are you going in for two weeks, to do something really great and then leave? Or are you going to partner with communities so you can put something in place that remains?" she asked. "It's important to those volunteering to make sure that what you're doing is truly sustainable"

The Real-World Project session, led by EWB's Andrew Waddoups, was a brainstorming exercise to design and construct a solar-powered water system in the Ecuadorian Amazon. The exercise covered understanding what tasks need to be done and what resources are available, then designing, funding, and implementing it all—except, perhaps, for funding—in collaboration with the community involved.

More than 92 percent of the 43 participants surveyed said the workshop motivated them to get involved in humanitarian projects, and more than 80 percent said the workshop helped them understand how to apply their engineering skills.

"One of the challenges facing IEEE is the recruitment and retention of younger members," Vice says. More than a third of those attending were not IEEE members, of whom half felt the workshop increased their desire to join and 25 percent thought it might.

Participants were also offered the chance to apply for one of 10 fellowships of US$ 3000 to fund their involvement in humanitarian projects. For more on the humanitarian workshop, visit http://www.ewh.ieee.org/reg/1/gold/humanitarian-workshop/

Making It as a Consultant

Republished with permission from *The Institute*, Feb. 2009

By John R. Platt

With the world economy in shaky shape, many IEEE members are looking at consulting to supplement their incomes, or worse, to replace income from lost jobs. But how do you become a consultant?

"All you need do is declare yourself one, because anyone can be a consultant," says James Chan, president of Asia Marketing and Management in Philadelphia and author of *Spare Room Tycoon: Succeeding Independently, the 70 Lessons of Sane Self-Employment* (Nicholas Brealey, 2000). Chan, who recently celebrated his 25th year as a consultant, was the featured speaker at the December meeting of the Philadelphia and the New Jersey Coast sections' IEEE Consultants Network. He provided a number of tips on what it takes to make a living as a consultant.

"It takes courage and fortitude to be a consultant," says Chan, who says he hears a lot of fear in the questions he's asked at his talks. There are three groups in his audience, he says: people afraid of losing their jobs, those who have already lost them, and a smaller group of people who are already working as consultants but want to boost their income. Says Chan, "I tell them all: Don't be afraid."

Most people, according to Chan, have trouble selling themselves or selling the qualities that make them valuable as consultants. Keep in mind that potential clients don't just want engineering acumen, he says: "They want your viewpoint, your way of solving problems, your opinions, and your personality." He recommends that you look at the services you can provide as your brand and have confidence in your own brand.

TOUGH SELLS The hardest part is finding paying clients, Chan says. Those starting out should write letters and mail them to potential clients. Tell them what you do and how good you are at it. Send out as many letters as you can and evaluate the responses. And keep at it. Continue to fine-tune your message based on the responses you get.

"Once you have a client, other people will find you more credible, because then you'll have a track record," Chan says.

WHAT ABOUT FEES? The question Chan fields most frequently is how much to charge. There are three points to consider when setting your price, he says. "First, there are market prices for the type of work you do. Second, your price depends on how much the market will bear. And third, you need to charge enough to live on.

"And keep in mind that there are only 2000 hours in a year," Chan continues, pointing out that most consultants are lucky to bill one-third of those hours. "Therefore, if you charge US $100 per hour, your annual consulting income will be $66 700." He points out that if you charge $150 per hour, your annual income would be a tad over $100 000.

Don't be shy or timid about stating your fee, he says. "When people pay for your work, they pay attention."

MARKET YOURSELF Find ways to promote yourself, Chan says. Set up a Web site for you and your company. Use technical terms on it that will help potential customers find you when they conduct a search. Meanwhile, attend conferences and other networking events in your field to expand your contacts and increase your visibility.

Despite the global downturn, the need for high-tech consultants is "tremendous," asserts Chan. "The more specialized you are, the easier it is to find the right clients."

Chan has put 10 chapters of his book, *Spare Room Tycoon*, online for free.

IEEE Resources for Consultants Whether you're already a full-time consultant or just starting out, IEEE offers several services of value.

The IEEE Consultants' Network is an alliance of local networking groups in Canada, India, Mexico, Pakistan, and the United States. The groups offer the opportunity for local consultants to meet and learn from each other while promoting their availability to local businesses. There's no charge to belong.

Local IEEE consultants' networks are overseen by the Alliance of IEEE Consultant Networks. "We help establish the local groups and tie them together," says IEEE Senior Member Bob Gauger, who consults in the reliability, availability, and maintainability field. "IEEE strongly supports them."

To find a local group in your area or for information on starting your own local network, visit IEEE-USA Local Consulting Network.

Gauger also conducts surveys for IEEE-USA's *Profiles of IEEE Consultants*. This annually updated e-book helps you find what other consultants in your field are charging and how your skills compare with those of other consultants, based on such information as education, experience, median earnings, and hourly fees.

"It provides a very good picture of the consulting business," Gauger says. "It identifies where consultants are located and how they find their clients, which can help fellow consultants get started and know what their competition is like."

IEEE members can buy the latest edition, the *2007 Profiles of IEEE Consultants*, published in 2008, for US $9.95. Gauger is currently conducting research for the 2008 e-book, which will be available by midyear.

Another service to check out is the IEEE-USA Consultants Database, a searchable database for companies looking for consultants and consultants looking for projects. More than 20 000 IEEE members are registered in the database, which more than 30 000 companies searched last year, Gauger says.

"I find this to be a very good resource," Gauger says. "It has brought me a number of contracts."

Members pay a $79 annual fee to be part of the database and submit their profiles, which can then be searched by clients looking for consultants. For more information, visit IEEE-USA Local Consulting Network.

ARTICLE FROM BOSTON UNIVERSITY

Engineers Without Borders Awarded Funds for Return to Peru

Republished with permission from *Boston University College of Engineering*, Feb. 2009

By Kate Fink

The students of Boston University's Engineers Without Borders (BU-EWB) chapter have won two grants that will help them complete their first project: installing a water filter in an isolated Peruvian village.

The awards from the IEEE and the national EWB organization total $6,800 in new funding for the BU-EWB chapter. The two grants provide a helpful boost to the students' funds for buying project materials and paying for travel expenses to Peru.

"It's a really nice addition to their fundraising efforts," said BU-EWB faculty advisor Mechanical Engineering Assistant Professor Catherine Klapperich.

These grants bring the BU-EWB chapter's savings to approximately $10,000, nearing the $15,000 the group will need for materials and travel costs. They are planning one or two visits by a small contingent of EWB members in late May or early June to install the water filter and train residents of Chirimoto, Peru on its care.

Severe floods devastated the small town of Chirimoto -- in remote, northern Peru -- about 30 years ago, and the town has yet to fully recover. In January 2008, five members of BU-EWB visited Chirimoto to assess the town's needs. They interviewed residents, held town meetings, analyzed water samples from the creeks providing the town's water, and assessed sunlight intensity to consider a solar power project.

After assessing the data and interview responses, the group decided that installing a sand water filter at one of the creeks would provide the greatest immediate benefit for the most townspeople.

BU-EWB Vice President Jeremy Schein (ENG'10), on behalf of the group, applied for and won the 2008 IEEE GOLD Humanitarian Fellowship for $2,800.

Darrel Chong, project director of the IEEE GOLD Humanitarian Fellowships, said that based on project reviewers' comments, the BU group was selected because "the project has extremely high impact on the community, water is an important sustainable resource for any community, and the project had a good track record which gave us confidence in the team executing the project."

The national Engineers Without Borders organization awarded the BU-EWB chapter a Goldman Fund grant of $4,000. The grant is part of the EWB-USA Richard and Rhoda Goldman Fund that will support 34 EWB groups this year, with an emphasis toward water projects in Latin America.

"Projects were chosen based on a number of criteria, including project sustainability, host community involvement, and partnerships with other organizations," said Zoe Kircos, EWB-USA grant coordinator.

"The main focus now is prototyping the sand water filter – building a proof-of-concept prototype, a cross section of the filter," said BU-EWB President Paolo Belfiore (ENG'09), of the group's goals during the spring semester before returning to Chirimoto. "It's a simple type of filter that requires some periodic cleaning, but no high-tech maintenance. This is not a temporary remedy, though, so an important part of the project will be setting up a board of townspeople to be in charge of the filter."

The group plans to continue their relationship with Chirimoto for years to come and has future projects in mind to address other needs identified during their first visit. Additional aid to Chirimoto may include installation of solar panels to power the community center and a medical center, a coffee toaster that would increase the selling price of coffee beans harvested by townspeople, and the addition of stove hoods in home kitchens to decrease smoke inhalation.

For more information on the Boston University Engineers Without Borders chapter and their work in Chirimoto, visit the group's website at http://people.bu.edu/ewbexec/

Mariano Hernandez Escalante, Paolo Belfiore (ENG'09), Malco Perez Rodriguez, Emily Johnson (SPH'08), Chris Spring (ENG'08) and Elder Perez Rodriguez stand in the center of Chirimoto during the BU-Engineers Without Borders assessment visit in January 2008.

NOTICES

Call for proposals: Real-World Engineering Projects

Real-World Engineering Projects: Curricula Development for First-Year Undergraduate Students in Electrical Engineering, Computer Engineering, Computer Science, Electrical Engineering Technology and new for 2009 Biomedical Engineering

Discovery-Based Projects in IEEE Fields of Interest

In its third successful year, the IEEE continues its program to develop curricula in IEEE fields of interest for use with first-year students studying electrical engineering, computer engineering, computer science and electrical engineering technology. **New for 2009, IEEE has added biomedical engineering to the program.** The program continues to seek high quality, hands-on, team-based projects that focus on real-world problems whose solutions benefit society. The projects are expected to make the related IEEE fields of interest more relevant to first-year students, and to illustrate how the work of engineers and computer scientists directly impacts society. The ideal projects will allow students to discover the importance of a contemporary problem, and excite their interest in creative solutions. It will demonstrate how and why technical methods work, rather than simply providing a recipe for a solution. It will allow the students to discover underlying complex engineering and science principles, and provide motivation for further study and engagement.

Completed projects will be disseminated by IEEE for use by faculty in the development of first-year courses. Projects should be stand-alone modules requiring a combined 10 to 30 hours of lecture and laboratory instruction, and should be easily replicated at institutions worldwide with reasonable cost and effort. Authors of completed projects will receive an honorarium from IEEE. Submissions are open to **all faculty members** who teach Electrical Engineering, Computer Engineering, Computer Science, Biomedical Engineering and/or Electrical Engineering Technology at a university that grants degrees in EE, CE, CS, BE and/or EET programs. Initial abstracts are due by **March 31, 2009**. Complete details regarding the call for proposals are available at: http://www.realworldengineering.org or contact us at realworldengineering@ieee.org

Call for 2009 IEEE Educational Activities Board (EAB) award nominations

The IEEE Educational Activities Board (EAB) is once again seeking nominations to recognize and honor individuals, companies and IEEE Society/Council for their contributions to engineering and technical education. The deadline for the 2009 nominations is 30 April 2009.

There are eight (8) awards open for nominations.

They are:

- **IEEE EAB Meritorious Achievement Award in Accreditation Activities** – for efforts that foster the maintenance and improvement of education through the accreditation process.
- **IEEE EAB Meritorious Achievement Award in Continuing Education** – for contributions to the design, delivery, and support of continuing education courses and programs in the IEEE fields of interest.
- **IEEE EAB Meritorious Achievement Award in Informal Education** – for IEEE members who volunteer their time in public educational settings such as museums, parks, zoos, and aquariums and serve as librarians, docents, tour guides, curators, board members or technical advisors. This award recognizes their impact on teachers, students and the public.
- **IEEE EAB Major Educational Innovation Award** – for outstanding educational innovations that have had a major impact and have been emulated by others.
- **IEEE EAB Pre-University Educator Award** – for current pre-university classroom teachers who have inspired an appreciation of mathematics, science, and technology, and the engineering process. Pre-university teachers who have encouraged students to pursue technical careers are also recognized through this award.
- **IEEE EAB Meritorious Service Citation** – for IEEE volunteers who are past members of EAB or current or past members of EAB Committees (other than currently serving on ARC) for outstanding and sustained service to the aims and objectives of the Educational Activities Board.
- **IEEE EAB Employer Professional Development Award** – for organizations employing IEEE members and their contributions to their employees' continuing education and professional development.

- **Society/Council Professional Development Award—**for IEEE Societies or Councils for major contributions to the professional development of its members through the outstanding products, services and support in the areas of lifelong learning, continuing education and professional development.

For complete award descriptions, honorarium details, access to nomination packets and to read about the 2008 EAB Award Recipients, visit us on-line at http://www.ieee.org/eab-awards

Questions? Please send an email to eab-awards@ieee.org.

Worldwide contest challenges participants to "Save the Earth"

The IEEE Committee on Earth Observation (ICEO) is launching "SaveEarthGame," two international computer game design contests — with a top prize of $20,000 USD — that challenge participants to demonstrate how real-world events affect the Earth and impact people. A panel of specialists will award prizes for the two different contests.

The first contest beginning Feb. 9, 2009, is open to all age groups, and is for the development of a game concept. It does not require any computer programming skills, just imagination and ingenuity. Contestants will create a computer game concept using Earth Observations to contend with a myriad of environmental issues that impact Earth: disasters, health, energy, climate, water, weather, ecosystems, agriculture and biodiversity. Entries should be submitted by April 10, 2009. The winners will receive a Computer Game Development Workshop Class and cash prizes ranging from $100 to $1000.

The second contest, which kicks off May 1, 2009, is to design a playable, prototype computer game and requires game development skills. Contest participants are encouraged to use earth observation data as a means to forecast and respond to environmental challenges. Contestants will be able to communicate globally with IEEE engineers, GEO teams and scientists as mentors and as an additional resource in game development. Proposals must be submitted by June 30, 2009. At that time, judges will identify finalists who will have until August 2010 to create and submit functional, playable games. The winner receives a $20,000 (US) prize plus an expense-paid trip to the Group on Earth Observations (GEO) Summit.

Contest updates will be provided on the contest's official Web site, www.SaveEarthGame.org.

"We created these contests to stimulate minds around the world into coming up with unique ideas or concepts for understanding and dealing with vital issues facing our planet and challenge the ingenuity of young people. It's a unique way to apply gaming technology for humanitarian and educational efforts."
— Scott Tamashiro, IEEE Senior Member

The game competition is sponsored by the following international organizations:

- The IEEE Committee on Earth Observation
- IEEE Computer Society
- DigiPen Institute of Technology
- 1st Playable Productions
- GEO, Group on Earth Observation
- IGDA, International Game Developers Association
- GLOBE, Global Learning and Observations to Benefit the Environment.

For more information contact:

- Tobi Saulnier, IGDA info@SaveEarthGame.org
- Raymond Yan, DigiPen 425-895-4419 info@SaveEarthGame.org

IEEE GOLD Humanitarian Fellowship grants

IEEE GOLD Humanitarian Fellowship Grants were awarded to the following projects:

Healthcare Initiatives

Project 1: "To develop a mobile technology for drugs authentication" (Ghana)
Proposal Leader: Ashifi Gogo (Postgrad, Dartmouth College)
www.mpedigree.org

Project 2: "To develop a remote medical diagnostics platform for health workers" (Philippines)
Proposal Leader: Crystal Mao (Undergrad, MIT)
www.mocamobile.org

Project 3: "To design a visit scheduling technology for health workers" (Tanzania)
Proposal Leader: Emma Brunskill (Postgrad, MIT)

Project 4: "To develop social-emotional technologies for Autism Spectrum Disorders" (Bangladesh)
Proposal Leader: Ehsan Hoque (Postgrad, MIT)

Education Initiatives

Project 5: "To build a library to further education opportunities" (Ghana)
Proposal Leader: Mohit Agrawal (Undergrad, Princeton University)
www.princeton.edu/~ewb/

Energy Initiatives

Project 6: "To acquire knowledge on energy application and to develop a water pumping system" (Honduras)
Proposal Leader: Ethan Larochelle (Undergrad, Northeastern University)
www.ewb.neu.edu

Subsistence Initiatives
Project 7: "To develop a sand filter to provide clean water" (Peru)
Proposal Leader: Jeremy Schein (Undergrad, Boston University)
http://people.bu.edu/ewbexec/

Project 8: "To invest in equipments and techniques to sustain food supply" (Myanmar)
Proposal Leader: Wah Wah Myint Garis (VP, Bank of America)

Project 9*: "To design and implement MFPs (multifunction platforms & water system) to improve agriculture production" (Uganda)
Partner organization: EWB Columbia Student Chapter
Selected applicant: Stephanie Quinn

ICT Initiatives
Project 10*: "To develop communication network in rural Africa" (Zambia)
Partner organization: Linknet Zambia
Selected applicant: John Henson (Postgrad, Boston University)

** Applicants without projects but were willing to participate in humanitarian projects were screened and selected for the two projects.*

IEEE GOLD sponsored webinars for 2009

Helping engineers get through the business landscape, work together in creating new products and contribute in a business or commercial role is what this series of three webinars is offering. Each session will be scheduled for one hour and is offered at no charge. The next session is outlined below:

Seminar 3: Saturday, 4 April 2009 at 8:00am Eastern

Topic: "Career change: how engineers can contribute in a business/commercial role for a technology company". Session will explore how people with engineering experience who also develop business skills can play key roles in technology companies where a combination of technical and commercial skills can be very effective.

Biography: Arun Gopalakrishnan has worked for the DuPont Company as a Market Manager in Wilmington, Delaware since July 2006. Arun's first role at DuPont was providing marketing consulting to startup businesses within the company. He moved to his current role in DuPont's Performance Elastomers division in August 2007, where he sets the global strategy and drives revenue growth in the Energy, Oil & Gas business segment. Arun's areas of specialty include innovation processes, business development, and pricing and profitability management.

Send any questions to gold@ieee.org. For more information on each webinar topic, dates and details, visit http://www.ieee.org/web/membership/gold/events/ArunGsessions09.html

IEEE Launches Interactive Web Site to Highlight Members' Humanitarian Projects

IEEE has announced the new Humanitarian Technology Network (HTN) - a platform that enables IEEE members to connect and collaborate with others doing similar humanitarian work, while gaining visibility and recognition for their efforts. In addition to sharing details of their project(s), IEEE members may also post their needs for advice, funding or assistance from others. The ability to post articles in the HTN is one of the benefits of IEEE membership. Anyone can browse or view the HTN content, including humanitarians, Non-Governmental Organizations (NGOs), and others who may wish to partner with or fund member humanitarian efforts.

The HTN is built on the same technology as the IEEE Global History Network launched in 2008. The platform accommodates multi-media descriptions - including text, photographs, diagrams, audio, video, as well as PowerPoint slide presentations.

The network is now open for IEEE member contributions. Visit www.ieeehtn.org to make your humanitarian contributions more visible.

Got any GOLD related notices? Submit them to GOLDRush@ieee.org by 10 May 2009 for inclusion in the June edition

GOLD COMMITTEE 2009

Chair
Adrian Pais

Past Chair
Soon Wan

TAB Representatives to GOLD
Xavier Perez Costa
Mark Haselkorn
Ravi Todi

MGA Representatives to GOLD
Sandra (Candy) Robinson
William (Bill) Serre
Yasuharu Ohgoe

Regional Coordinators
Region 1
Uri Moszkowicz
Region 2
Rachel Andre
Region 3
Wah Wah Myint
Region 4
Aisha Yousuf
Region 5
Jeffry Handal
Region 6
TBD
Region 7
Dan Coode
Region 8
João Figueiras
Region 9
Gaspar Añó
Region 10
Helene Fung

GOLD Representatives on IEEE Societies
Society Overseer
Aju Thomas Abraham
Aerospace & Electronic System
Mike Roberts
Antennas & Propagation
Ryan S. Adams
Circuits & Systems
Sunil Pai, Delia Rodriguez de Llera, Martin Di Federico, Pui-In (Elvis) Mak
Communications Society
Angela Yingjun Zhang, Ricardo Veiga (past)
Computational Intelligence Society
Justin Zhan
Computer Society
Carlos Rueda-Artunduaga
Consumer Electronics Society
Teodor Buburuzan
Council on Electronic Design Automation
David Atienza
Education Society
Aju Thomas
Electron Devices Society
Ravi Todi
Engineering Management Society
Marisa Bazanez-Borgert
Engineering in Medicine & Biology Society
Matthias Reumann, Lisa Lazareck (past)
Geoscience & Remote Sensing Society
Shannon Brown
Laser & Electro-Optics Society
Lianshan Yan
Magnetics Society
John Nibarger
Microwave Theory and Techniques Society
Sergio Palma Pacheco, Jenshen Lin

GOLD Representatives on IEEE Societies (continued)
Power Engineering Society
Glen Tang
Robotics Society
Agostino Desantis
Society on Social Implications of Technology
Emily Anesta
Systems, Man and Cybernetics Society
Ferit Sahin and Wing Ng
Technology Management Council
Marisa Bazanez-Borgert
Vehicular Technology Society
William Sommerville

GOLD Representatives on other IEEE Entitites
IEEE-USA
Ravi Todi
Publications Services & Products Board
Adrian Pais
Standards Association
TBD
Student Activities
Balvinder Blah

IEEE GOLDRush Volunteers
Editor
George Gordon
Editorial Assistants
Claudio Camasca
Lori Hogan
Kristi Hummel
Lisa Lazareck
Agusti Solanas
Timothy Wong
Aisha Yousuf
New layout designer
Victoria Bayly
Graphic Designer
Alex Wong