

The quarterly newsletter of IEEE GOLD  
for young professionals



# GOLD *Rush*

September-  
December 2012



## Featured in this issue

**Harnessing Light Revisited**

**Volunteer Professional Communities:  
A Case for the Power of the Few**

**A Need for Power & Energy Engineers,  
Today and Tomorrow**

**The Engineer's Role in Medical Imaging  
and Research: a Real Need**



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### GOLDRush Timeline

*February 8:* March submission deadline

*March 29:* March edition released

*April 19:* June submission deadline

*June 28:* June edition released

Front cover photo:

IEEE volunteers celebrate after the successful August 2012 TISP workshop in Hyderabad, India

## From the Editor

Stuart Bottom

Greetings, and welcome to another edition of GOLDRush! After a few production hiccups, I'm pleased to bring you this special double issue in celebration of the new year.

I'm very pleased with the accomplishments of our team over the past year; we've come a long way and I ask that you join me in thanking each of them for their contributions. We continue to drive GOLDRush towards an ever higher standard of quality, and this issue showcases that more than ever. Each article and item offers something special.

As I reflect on this past year, I'd like to thank Eva Lang, 2012 GOLD Committee Chair, for her hard work and dedication to an extremely challenging job. It has been an honor to work with her, and I look forward to seeing what the future has in store for her. I am also pleased to welcome Timothy Wong, my friend, colleague, and mentor, as the incoming 2013 GOLD Committee Chair. Indeed, we have another exciting year ahead.

As you look forward to 2013 and beyond, stay focused on your goals and be sure to give something back too. As engineers, we are especially tasked with making the world a better place!

Please do not hesitate to contact me with questions or comments on [LinkedIn](#), [Twitter](#), or via [email](#). With your help, we can keep GOLDRush great! ■

Stuart Bottom  
2012-2013 Editor-in-Chief



Above: IEEE Iraq Section GOLD members and friends celebrate IEEE Day at the historic castle in Kirkuk, Iraq

# Readers' Forum

Your questions and opinions

If you would like to share your thoughts in GOLDRush, send them to [goldrush@ieee.org](mailto:goldrush@ieee.org)!

## Harnessing Light Revisited

Matt D. Weed  
IEEE Graduate Student member

On August 13th, the U.S. National Academy of Sciences released a report emphasizing the status of optics and photonics (O&P) in the national, and global, economy. The report addresses technological developments that have taken place in recent years, economic opportunities that exist, and recommendations for achieving U.S. leadership in the industrially ubiquitous field of O&P. While the report targets the U.S. potential, the findings can be applied globally. In fact, the committee's previous report from 1998<sup>1</sup> on the same topic spurred unification of more than 1,700 firms across Europe.<sup>2</sup> It is hoped that accelerating progress in O&P, as outlined in the report, will inspire a concerted effort by the community to capitalize on the opportunities available around the world.

The report outlines eight major technological areas worthy of priority as the U.S. emphasizes an advanced technology economy.

- Communications, Information Processing, and Data Storage
- Defense and National Security
- Energy
- Health and Medicine
- Advanced Manufacturing
- Advanced Photonic Measurement and Applications
- Strategic Materials for Optics
- Display

Interwoven in these technical areas, five grand challenges emerge that frame the strategic vision of the committee. Including the seamless integration of electronic-photonic platforms, oil-solar grid cost-parity, and short wavelength sources for fabrication are lofty but valuable goals. Meeting these challenges will position the U.S. as a leader in the

business of data centers, advanced manufacturing and lithography, and situational awareness. These all are all trillion dollar industries that are either centrally dependent or



Author and colleagues attending Congressional Visit Day.

strongly enabled by advancements in O&P.

From a less technical point of view, the committee also outlines how progressive workforce development in high-tech fields is crucial. In the U.S., employment is the hot topic of the upcoming election season and staring in the face of historically high unemployment rates are growing industries that are struggling to find qualified candidates. The simple fact is that education has not kept up with technological advance and a new generation of skilled laborers must be trained and adapt to modern employment needs.

One of the most striking findings from the report is that in the world of U.S. R&D, private investment has outpaced Federal investment since about 1980. Additionally, small and medium sized businesses are starting to dominate the bulk of this high-tech

development work. Therefore, the committee recommends encouraging private gap-funding opportunities to propel advanced technologies out of the laboratory by making economic indicators more readily available for the industries of O&P.

Finally, considering all their findings, the committee makes the recommendation for the creation of a National Photonics Initiative. While there is no proposed form for this program, such a federal crosscutting initiative would primarily work to compile data on the industry, empower the investment landscape and educate the workforce.

Regardless of your national allegiances, the recommendations in this report are telling of the world we are all working hard to enable as the young professionals of IEEE. It is already a world of interdisciplinary research, with optics a major part of this cross-industry achievement. This report is a call to action, and motivation to pursue big ideas. We should join the discussion and communicate with those who hold the purse strings about how necessary and lucrative investments in emerging technologies are. IEEE advertises itself as "the world's largest professional association for the advancement of technology" and as the up and coming generation, we will soon inherit control over a high-tech world; why not start that transition now? ■

*Matt D. Weed is a PhD Student at CREOL, the College of Optics & Photonics at the University of Central Florida.*

<sup>1</sup> [http://www.nap.edu/catalog.php?record\\_id=5954](http://www.nap.edu/catalog.php?record_id=5954)

<sup>2</sup> <http://www.photonics21.org/aboutPhotonics.php>

# IEEE GOLD Community News

From around the world

## IEEE GOLD Germany Visits Akamai

Friederike Wendler

During this year's trip of the Munich IEEE Student Branch to Switzerland, IEEE GOLD Germany and IEEE Gold Switzerland arranged a visit to the European headquarter of Akamai Technologies in Zurich. After visiting CERN in Genève, the group used the ride back home for a stop in Zurich. Thanks to the initiative of the section GOLD Coordinators Andreas Neumeier (Germany) and Mihail Prundaru (Switzerland), the group enjoyed an interesting afternoon in the offices of Akamai.

During the visit, Dr. Duke Hong and Mr. Neumeier gave a comprehensive overview of the challenges of internet content delivery and the way the Akamai platform works. Akamai uses this platform to optimize routes and replicate data dynamically to deliver content and applications more quickly, reliably and securely. The group heard about well-known companies all over the world that trust Akamai's service to stream live videos or deliver other time-critical Internet-based services to their end users. Thanks to everyone involved at Akamai for the invitation and for making the visit happen! ■

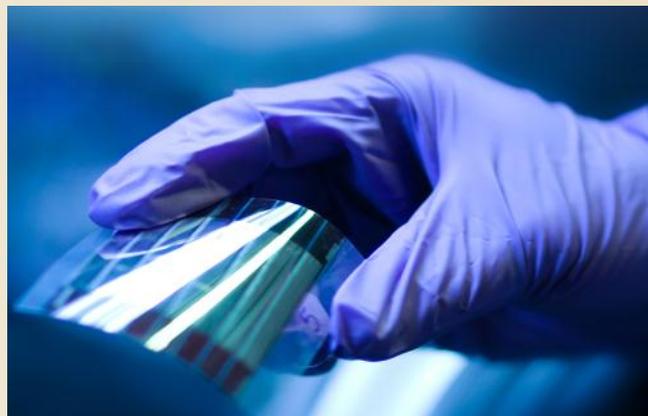


Trip participants learn about Akamai's global content platform.

## Flexible solar cells straight from Finland

Rafal Sliz, IEEE GOLD Finland

At the end of May, IEEE GOLD Finland organized a Summer School on Flexible Solar Cells. This particular topic was carefully chosen given increasing industry-wide interest in cheap and renewable energy production. This event was held in Oulu, the city of Nokia's mobile origins. In order to ensure high quality lectures, the organizers invited high-profile speakers from as far away as Germany, Belgium, and the United Kingdom. Attendees were mostly graduate students from Finland and Region 8. Nevertheless, some undergraduate students and industry representatives were present. Very intensive lectures started with an introduction to the physics of solar cells, presented by Uli Wuerfel from Fraunhofer Institut für Solare En-



A flexible solar cell — the future of energy harvesting.



Group picture of the summer school participants.

ergie Systeme in Germany. After this, Tom Aernouts and Eszter Voroshazi from IMEC in Belgium gave a lecture on organic solar cells and their reliability. Finally, Arman Ahnood and Yuji Suzuki from the London Centre for Nanotechnology in the UK explained thin-film silicon solar cells and the implementation of micro- and nano-structures in solar cells. The event gathered students and professionals from the printed electronics field who share a common vision and dream: that solar energy harvesting does not need to be "rigid" and could be cheaply implemented everywhere. ■

# IEEE GOLD Community News

From around the world

## Egyptian Engineering Day 2012

Submitted by Hossam Ali, Vice Chairman of Egyptian Engineering Day

Egyptian Engineering Day (EED) is the annual event brought to the Egyptian engineering community by IEEE GOLD Egypt to fill the gap between graduates of the Engineering schools and the market's needs.

"Egypt ... On the Runway" was the slogan for this year's Egyptian Engineering Day. This slogan was selected to perfectly reflect the current situation of Egypt and the turning point that Egyptians are living in, motivating young engineers in the vital role they need to play during this critical time.

With the blessing of Egyptian Prime Minister Dr. Hesham Kandil and in the presence of respected Egyptian industry leaders, EED was held in the CICC on the 2nd and 3rd of September. The first day began with Eng. Amgad Ibrahim (chairman of EED 2012) giving the opening speech and introducing Dr. Ahmed Darwish (Chairman of the IEEE Egypt Section) who shared a welcoming speech with the crowd. Then Eng. Hani Mahmoud, Egypt's Minister of Communication and delegate of the prime minister, shared a thoughtful speech about the event and the future of Engineering in Egypt. He expressed his pride in the event and in the efforts exerted by the volunteers, and noted that Egypt's future is in good hands as long as it has fruitful youth like those present at EED.



From left to right: Dr. Hany Mahmoud, Minister of Communications and Information Technology; Dr. Essam Sharaf, former Prime Minister; and Eng. Amgad Ibrahim, EED'12 Chairman during a visit to the projects exhibition

The opening ceremony was honored by the presence of Dr. Essam Sharaf (former Prime Minister of Egypt), Dr. Ibrahim Ghoniem (Egypt's Minister of Education), Dr. Nadia Zokhary (Egypt's Minister of Scientific Research), and other representatives from government entities. Also present among the attendees were the IEEE Egypt Section board members, several CEOs from market-leading companies, and Dr. Ali El Mousa (IEEE Region 8 Vice President for Membership and representative of the Region 8 committee). Their presence elevated the prestige of EED to another level and proved that the industry-university partnership that IEEE GOLD Egypt is trying to build and maintain is heading in the right direction.



Opening session of EED 2012

The program of EED this year can be described as an enriched program with over 30 speakers sharing their thoughts and ideas. Twelve of these were international speakers, and three were CEOs. Different speaker tracks were offered, running parallel to each other. The Technical Track covered aspects of leading-edge technology and was presented by well-known speakers. The Entrepreneurship Track showcased real-life Egyptian entrepreneurs who shared their success stories with young engineers. Finally, the Soft Skills Track was presented by well-known trainers of engineers.

A quick tour of the EED gallery this year offered an impression of the vast improvement that EED has brought to academic life. Around 9000 visitors enjoyed more than 250 projects presenting their hard work over the last year. These projects represented over 32 Universities from all over Egypt. Finally, around 1200 young engineers presented their work and competed to be one of the EED competition winners.

The EED has become an attraction for engineers in other Middle Eastern countries as well. This year saw representatives contributing 9 projects from Tunisia, Palestine, Jordan, Lebanon, and Libya.

*(Continued on page 6)*



Distinguished guests deliver EED'12 competition prizes

# IEEE GOLD Community News

From around the world

## Egyptian Engineering Day 2012

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Architectural Engineering and Petroleum Engineering are the newest additions to the EED gallery, which stresses that EED is not organized solely for electrical and electronics engineers. IEEE GOLD Egypt intends EED to be an annual nexus for all Egyptian engineers.

The Made In Egypt Competition finals took place at EED and were a success for the 7th year in a row. Thirty teams reached the finals out of more than 300; the winners were announced during the EED closing ceremony.

The top ten teams from the Future City Competition were also present, to deliver their message "Today a student ... tomorrow an engineer ... the future is ours!"

At the end of closing ceremony our hardworking volunteers celebrated their achievements; the event was organized by 250 volunteers from IEEE GOLD Egypt and IEEE student branches. ■



EED2012 volunteers celebrate after the closing ceremony.

For more information, visit the EED website <http://www.eed.eg> and <http://www.ieeegoldegypt.org>.

## 'PhD Guide' Seminar with MIT Solutions

Samarth Deo, IEEE KTH Royal Institute of Technology Student Branch Chairman

The IEEE Student Branch at KTH (<http://www.ieee-kth.org>) is a small part of the IEEE which serves the students at KTH Royal Institute of Technology, Stockholm, Sweden. It aims to involve students in both professional and social activities to make studying more insightful and more enjoyable. Our events are open to all students, IEEE members and non-members.

Recently, this student branch organized a four-hour long seminar in collaboration with MIT Solutions (<http://www.mitsolutions.se>) on 4th May 2012 at the KTH Kista Campus in Stockholm. The theme of this event was to guide recent graduates and soon-to-be graduates on the prospect of beginning studies for a PhD. Even though the



target audience was from Iran, we had good participation from other students as well. The event was also webcasted.

Speakers at this event were Professor Jens Zander, Professor Gerald Maguire, Professor Henry Radamsson, Dr. Farzad Kamrani, and Liang Rong (researcher @ ICT-KTH and Vice-Chair of the IEEE KTH-Kista Student Branch). The PhD student panel was composed of Amir Hossein Payberah, Abbas Eslami Kiasari, and Nima Dokoo-haki. In attendance were 73 persons with another 95 joining via webcast. ■

# IEEE GOLD Community News

From around the world

## Region 8 Student Branch Congress in Madrid

Rafal Sliz, IEEE GOLD Finland

This year, at the end of July, Madrid was a proud host of the Region 8 Student Branch Congress. The local organizing committee, together with SAC and GOLD committees, prepared a great program where attendees learned much and acquired new technical and soft skills. The Congress was divided into several tracks: Student, GOLD, Professional Activities, and plenary sessions; so every attendee was able to find something interesting.

It was four very intense and demanding days of learning and networking with other students. Several social events served perfectly as platforms to exchange views and ideas between attendees. During the GOLD track, all



GOLD Chairs enjoying the GOLD Track

young professionals had a chance to learn the tools and mechanisms of maintaining a healthy organization as IEEE strives to be. A meeting with Region 8 Operating Committee was met with much excitement—here, GOLD participants spoke with the Region 8 governing body in an informal and friendly atmosphere.

The congress would not be the same without the amazing food served by our Spanish friends. To summarise, this was a well-organized event where students and GOLD had a chance to improve their skills, socialize with each other, and learn how to make the IEEE a better organization. Overall, a job well done! ■



A snapshot from the social evening



Group photo of participants *almost* making the Spanish flag

# IEEE GOLD Community News

From around the world

## A Personal Account of the Region 8 SBC in Madrid

Caroline Chan, IEEE EMC Society GOLD Representative

In July 2012, I had a close encounter with other Student Branch Representatives and GOLD affinity representatives at the Region 8 Student Branch Congress.

It was an awesome experience to spend five days in Madrid surrounded with brilliant, friendly people full of energy who are volunteers in IEEE. What do I, coming as a Representative of GOLD EMC, living in Region 6 (Western USA), have in common with them? What could we possibly share and benefit from each other? The answer is simply friendship. With friendship, we can expand our knowledge, broaden our cultural horizon through networking with people all over the world and finally combine our effort to improve our field for the benefit of humanity.

This congress started with an ice breaker where we partnered with one individual and learned a bit about him/herself and introduced that person to the rest of the group. Ah, the game of remembering everyone's name in a short time span. You could imagine how well I did... but no worries, SBC/GOLD Congress gave us many opportunities to know each other and immerse ourselves in Spain's culture.

In Spain, it is common to have lunch at 2pm and dinner at 9pm, which seems to be rather late in many other countries. However, this was not an issue since we were too excited by the prospect of making new friends each night, first at the Welcome Reception, then at the gala the night after, at the multicultural event on the third night and finally, a typical paella outdoor cookout on the last night. During the day, we went through the opening act, Q/A to the R8 Opcom, technical and professional activities, and a visit to the San Lorenzo de El Escorial monastery outside of Madrid.

Our last day was rather emotional. In a short five days, I and the other IEEE SBC/GOLD representatives, many

who traveled very far from home outside of R8, were able to make lasting connections and meaningful relationships. We made a pact to meet again in the future. Meanwhile, we pledge to be an example to our generation and strive to fill in the shoes of our current leaders to the best of our abilities and learn from the lessons shown to us now and in the future.

What have I learned? With enthusiasm, we could transfer this energy to our peers and encourage them not to give up their dreams, keep up their technical skills in their respective technical societies, bravely try out different career paths, learn on how to organize an event in a short amount of time and how to be conscious of and use body language efficiently. Moreover, this event provided me the understanding on how IEEE is perceived and how other entities are helping out the engineers in Region 8. We want to ensure we provide the right support and needs to our members. With these new skills, I am ready for new challenges and to better serve to the community.

R8 IEEE SBC/GOLD Madrid team really created a magical event, giving us such great opportunity to know more about ourselves, and for giving us tools to succeed and facilitating the environment in which to make important and long-lasting connections with our peers. ■

*Caroline Chan is the GOLD representative for the IEEE EMC Society. She can be reached at [goldemc@gmail.com](mailto:goldemc@gmail.com)*



## GOLD EMC at the 2012 International EMC Symposium

Caroline Chan, IEEE EMC Society GOLD Representative

GOLD EMC made a presence at the 2012 International EMC Symposium at Pittsburgh, Pennsylvania. We had Dr. Jun Fan and Lee Hill as honorary keynote speakers for the Special GOLD EMC session and over sixteen GOLD EMC and Eligible came to join for a fun social bowling night. ■

*For more information on EMC GOLD, visit*

*<http://www.facebook.com/ieeegoldemc> or*

*<http://www.ewh.ieee.org/soc/emcs>*



# IEEE GOLD Community News

From around the world

## IEEE RDP Pakistan: Developing Technical Solutions to Real World Problems

Muhammad Saqib Jamil, Graduate Member  
Wajeeh Muhammad Raja, Graduate Student Member  
Farrukh Jamal, Student Member



The concept of research has evolved ever since the beginning of mankind. People from all races strive to find the purpose of their existence and that led them to discover the idea of research as a vital part of the process of understanding any subject. Over the course of time, many organizations were established and IEEE is one of the foremost organizations that seeks to serve humanity by advancing technology. IEEE GOLD and student members from Pakistan are working hard in a spirit of spreading the positive aspects of technology; in this spirit, they have launched the IEEE Research Development Program Pakistan (IEEE RDPP).

What is IEEE RDP Pakistan, and what activities are being planned from this platform? IEEE Research Development Program Pakistan (IEEE RDPP) is an initiative of IEEE GOLD and Student Members from Pakistan to promote the concept and idea of research work at the undergraduate level. This project is also being supported by Microsoft and Google in Pakistan. The basic aim and purpose of IEEE RDPP is to facilitate and help willing students at the undergraduate level with their research work and provide them with everything they might need: from material assistance and experts' advice to funding for their papers and getting them published in international journals. We also seek to provide students with technical knowledge in the form of workshops, seminars, and national conferences, thereby giving them an opportunities to be recognized by intellectuals through scholarships, awards and certificates.

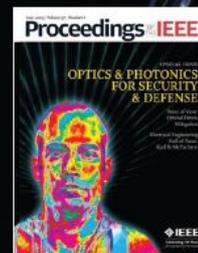
In Pakistan, at present, retention of IEEE members is decreasing day by day and this is a problem for students in many other countries as well. Volunteers and student members have questions about their memberships and the services offered to them in return. These questions, when not answered completely, compel a member to discontinue his/her membership, hence contributing in lower membership retention. The scope and goal of RDP is not confined to promoting the trend of research but also to look after and provide solutions to the issues and insecurities of members. For the purpose, the executive committee of IEEE RDP Pakistan has decided to introduce several awards of international worth to encourage hard-working and dedicated volunteers. The motivation for this step is the fact that very few awards are offered by the sections each year and these awards are normally taken by branch executives even if there are more active and hardworking student members in their branch. IEEE RDP Pakistan has already discussed this plan with the representatives from other countries as we plan to expand this initiative to other countries and advocate for the establishment of RDP's in all the active sections worldwide. A few countries which have shown a positive and prompt response to this call

include India, Sri Lanka, Bangladesh, Indonesia, Greece, Jamaica, and Ukraine. We at IEEE RDP Pakistan look forward to these collaborations!

The official launch of IEEE RDP Pakistan is planned at the Pakistan Student Congress 2012, and the first series of awards will be distributed at the closing ceremony. ■

For more information on the IEEE Research and Development Program in Pakistan or to get in touch with the executives of the program, please visit the official Facebook page at: <https://www.facebook.com/ieeerdpp>

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## Hyderabad Teacher In Service Program with Kendriya Vidyalaya Sangathan

Prashant Venkatasubban, Hyderabad Section GOLD AG Vice-Chair

After successful workshops in two different locations, Mylavaram and Warangal, the TISP Andhra Pradesh team derived lessons from these workshops and developed the tier system to enable better outreach of the initiative into schools to directly impact students.

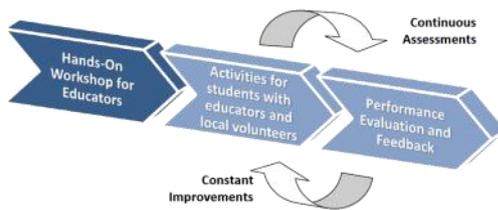


Diagram explaining the tier system devised by TISP Andhra Pradesh

The first tier is designed to introduce the initiative to the educators and volunteers, which also consists of 2-4 hands-on sessions. This tier is critical and provides an opportunity to understand the school's existing curriculum and develop a path for the initiative. The lesson plans and timelines are charted out in this tier.

The second tier takes the initiative to school students and is organized by a teacher, supported by volunteers who participated in the first tier. This tier is used to test the lesson plans and timelines in action.

The third tier consists of receiving feedback from the educators and evaluating students' performance, which is then used to improve activities. This tier is essential to enhance the lesson plans and create new ones, if needed.



With an enthusiastic child invitee and her windmill model

To demonstrate the tier system in action, the TISP Andhra Pradesh team (part of TISP India) organized a Tier 1 workshop. This workshop was presented in collaboration with the "Most Trusted Education Brand<sup>1</sup>" in India, Kendriya Vidyalaya Sangathan, on 11th August 2012 at Kendriya Vidyalaya, AFS Begumpet. Thirty educators representing

13 different Kendriya Vidyalaya schools across Andhra Pradesh participated.

Mr. Saleem, Deputy Commissioner of the Kendriya Vidyalaya Regional Office Hyderabad was invited as the chief guest; in his address to the audience he encouraged participants to continue their efforts to support the initiative and scale it into more schools. He also mentioned that Kendriya Vidyalaya Sangathan has been working along similar lines for the past few years, citing the organization's previous initiatives. He stressed the importance of improving the educational system and noted the value of practical and inquiry-based learning. Finally, he expressed his confidence in the collaboration of Kendriya Vidyalaya Sangathan and the TISP initiative.

After this, Mr. Atul Negi, Chairman of the IEEE Hyderabad section, shared his experiences with the audience. Citing Mr. Saleem's thoughts, he also expressed support for the concept of practical learning. He also mentioned the need to strengthen the collaboration between schools and the TISP initiative.

This was followed a presentation by Mr. Prasanna Venkatesan, the Chair of TISP India. who detailed IEEE's role in the initiative. He explained the motto of TISP India and shared his experiences building models during his education. He concluded with the statement "The teacher is the second parent, and words by a teacher have more effect on students."



Educators building a model of the windmill

Following this, Tania Thanda, TISP AP Champion, introduced the hands-on sessions and briefed the participants on the lesson plans, "Working with Wind" and "Electric Messages." Lesson materials were distributed, and the session continued with aplomb as the educators enthusiastically performed the experiments.

As the workshop drew to a close, the volunteers of TISP Andhra Pradesh had a face-to-face discussion with the

*(Continued on page 11)*

# IEEE GOLD Community News

From around the world

## Hyderabad Teacher In Service Program

*Continued from Page 10*

educators to familiarize them with the support that would be provided. This also enabled the volunteers to understand the curriculum of the school to choose the lesson plans most relevant to their syllabus. The workshop garnered positive feedback from the participants, with a 90% acceptance rate and 60% of the educators requesting to continue on to the second tier.

The TISP Andhra Pradesh team has already charted out a roadmap to take the initiative to Tier 2 by connecting the curriculum of each school with the appropriate lesson plans.

The TISP team in Andhra Pradesh believes it is essential to work closely with educational institutions like Kendriya Vidyalaya Sangathan to scale up this initiative and motivate students to be innovators. The team's goal is to impact 1600 students from the 13 participating schools by the end of this year and to continuously improve the methodologies implemented in the initiative. ■

<sup>1</sup>The Economic Times, "Brand Equity," September 2011



TISP officers interacting with the educators

## IEEE GOLD Graduate Internship Program in Lahore, Pakistan

Muhammad Maroof Raza, IEEE GOLD Lahore Chair

Muhammad Saqib Jamil, IEEE GOLD Lahore Secretary

True humanity demands that one work for the good of others for at least a small part of his or her life. A principal aim of IEEE as an organization is to serve humanity by providing better opportunities to people and helping them with their educational and professional careers. IEEE members all around the world work towards and volunteer for this noble aim in various capacities. Much work is being done in Pakistan to promote IEEE at the national and international levels and to bridge the gap between the educational and professional careers of students. IEEE GOLD Internship Program (IEEE GIP) is also a part of this initiative.

This program is specially designed for the students and graduate members of IEEE within the IEEE Lahore Section. The motivation behind this program is to help graduates and graduating students start their professional careers by linking them with industry. A common problem in countries like Pakistan is that many students find it difficult to get a job early in their professional careers due to lack of any strong references, even if they are competent and deserving. To address this problem, the IEEE GIP program keeps students informed of the latest job opportunities and helps deserving students get referenced and recruited.

A series of career guidance sessions, professional networking seminars, and various workshops have been planned by the IEEE GIP executive body.

A few of the most recent opportunities offered to participants in GIP were internships in the following organizations:

- Huawei Transmission Department
- Wateen
- Sofizar
- Sublime Wireless
- ZTE/ESPAK BSS
- Systems Pvt. Ltd., Lahore, Pakistan
- Mobilink GSM, Pakistan
- Pakistan Telecommunication Company Limited

The active representatives of IEEE GIP are working hard to foster better coordination between companies and academic institutions. There are plans to expand the program to other IEEE sections of Pakistan as well, in order to help student members countrywide. Finally, IEEE GOLD Lahore Affinity Group executives have agreed to create specific internship opportunities for graduate students every summer. ■

*To learn about the latest activities of the IEEE GIP, please visit their official Facebook Group at:*

<https://www.facebook.com/groups/ieee.gold.Lhr.GIP/>

## Teacher In Service Program Week by GOLD in Kerala, India

Ranjit R. Nair, Kerala GOLD Chair

Education is the essence for molding a society of duty-bound, righteous citizens. To promote awareness of technical education and to build a generation of quality engineers, Kerala GOLD has embarked on a journey to train high school science teachers in engineering concepts in a week-long series of Teacher In Service Programs (TISP Week 2012). This was the largest TISP series in India, covering the whole of Kerala state and training high school science teachers at eight locations in a span of six days from 23rd to 28th July 2012. This series was organized by IEEE Kerala GOLD in collaboration with IEEE EAB, IEEE Region 10 Educational Activities, and the Department of Education of the Government of Kerala.

The event became a reality as a result of careful planning and sheer volunteerism by the GOLD members along with student and senior IEEE members of the Section. It sought to train 160 teachers from 80 schools, and over the long term it is meant to be a yearlong initiative involving follow-up workshops at schools, ultimately impacting around ten thousand high school students across Kerala. The training series began with a grand function at Trivandrum on 23rd July in the gracious presence of Section Executives, including Dr. Rob Reilly, President of IEEE Education Society, who inaugurated the event. Each individual training event had two hands-on sessions where teachers and IEEE student volunteers designed and built the specified working model. Working models were windmills, Morse code, rubber band racers, catapult, and series / parallel circuit.

A core committee was formed to plan and execute this challenging event. This team travelled to all the training venues continuously throughout the six days. A schedule was carefully planned with two TISP Champions at each location, supported by two other members of the Core Committee. During each workshop, participants were divided into teams of two teachers and two volunteers, working together for the full day. This helped foster deeper networking and encourage the bonding between teachers, GOLD members, and student volunteers needed for the follow up sessions.

The responses received from delegates at all the venues were generally excellent, with participants expressing excitement and their thrills at seeing their innovative engineering designs working in front of them. This helped boost the morale of the

teachers. A brainstorming session was also included at the end of the day, in which each team formed a plan to be executed in their schools within the next six months, including the dates of follow-up workshops to be coordinated and carried out by the volunteer team at each local station. Feedback was collected from teachers, and we fondly remember these words of a senior science teacher: "This was an eye opener for all of us. You have shown us how to impart practical knowledge and concepts into the minds of youngsters. We assure you that the upcoming senior students will be fully made aware of engineering education and its types." This marathon training workshop series came to a befitting end on 28th July 2012 at NIT Calicut, showing a record participation of 172 teachers from 104 schools. Explaining the success, our GOLD Advisor said "The excitement of teachers when their models started working had the potential to be contagious and every one of them wanted IEEE volunteers to interact with school science clubs more often, showing the immense potential for TISP."

The lesson we learned and the message we wish to convey to our GOLD colleagues is "Creating awareness of the potential of the engineering profession and nurturing the creative minds of school children are the need of the hour, and TISP is a wonderful initiative that supports this goal by placing engineering projects in the hands of the would-be engineers of tomorrow. What makes it special is that when youngsters take the baton and lead the marathon, the finish line is just a stone's throw away. So let's all come together and try to sharpen engineering talent within the school walls to make a better world tomorrow." ■



TISP Week Day One delegates with Dr Rob Reilly

# IEEE GOLD Community News

From around the world

## Celebrating IEEE Day 2012 in Kirkuk's Historic Castle

Eng. Saad Jasim Mohammad, Iraq Section GOLD Chair

IEEE GOLD members and Dr. Eng. Sattar Al Maliky (IEEE Iraq Section Chairman) celebrated IEEE Day 2012 at the historic castle in Kirkuk, Iraq. The theme for this year of "Engineering the Future and Beyond" was emblazoned on t-shirts worn by members for the occasion. We even invited some children to join us for the celebration.

We took advantage of the opportunity to discuss our plans for future activities with Dr. Eng. Sattar Al Maliky. We plan to hold new workshops, lectures, and social activities to help all who are interested in science develop better communication skills. For example, we plan to address the skill of preparing quality lectures.

During the event, we walked through Kirkuk Castle and enjoyed it immensely. It is a special place which caused us to reflect on the historical achievements of our ancestors. ■



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# IEEE GOLD Community News

From around the world

## IEEE Day 2012 Twitter Contest: #IEEEDayKerala

Vijay S Paul, Kerala GOLD Electronic Communications Coordinator

In February 2012, IEEE Kerala GOLD decided it was high time to explore using social media to reach out to its targeted audience with the message of its activities and news. Our team decided to focus on Facebook as the main platform since most of the target audience was already present there. For this, we established an official Facebook page at <https://www.facebook.com/keralagold>. Additionally, we launched an official Twitter account: @IEEEKeralaGOLD.

Both channels were updated with regular news about the happenings in IEEE Kerala Section and the activities of GOLD. Along with that, we shared important news and articles useful to the community. The Facebook page generated good audience engagement and became home to some quality content.

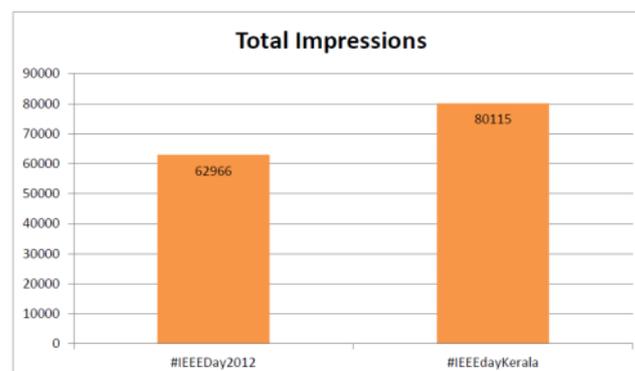
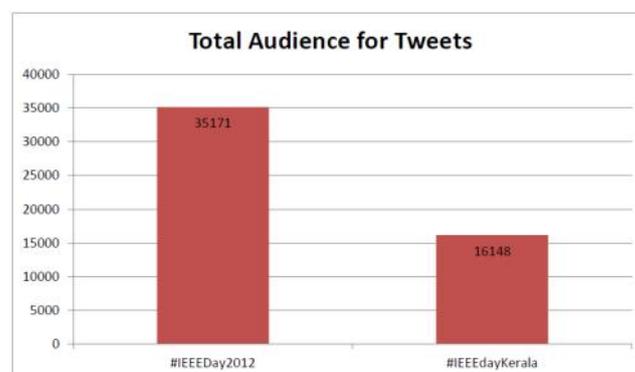
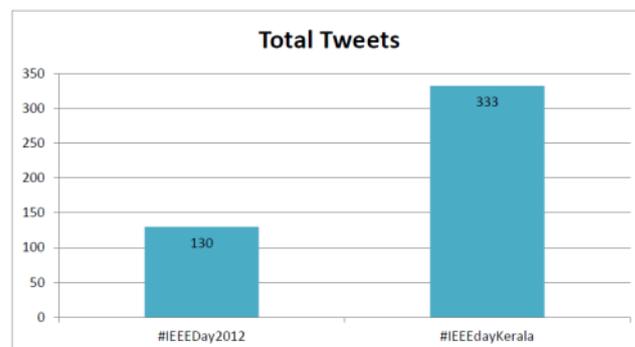
Since it was evident that our Facebook presence was on track to maintain its good engagement rate, it was time to shift our focus to Twitter. Since our targeted audience in the region of Kerala was not quite Twitter-savvy, a real motivation existed to introduce them to Twitter and establish our Twitter account as part of our social media presence. This prompted the idea to hold an online Twitter contest as part of IEEE Day 2012. We decided to go ahead with the event in spite of our uncertainty about the level of contest participation we would see. The end result surprised us all.

The guidelines of the contest were declared in advance to be as follows:

1. The contest would be open to GOLD and Student members of the IEEE Kerala Section.
2. The contest would be held from 0000Hrs – 2359Hrs IST October 2, 2012.
3. Questions would be about IEEE and its history. There would be 20 questions in all, spread throughout the day.
4. Questions would be first tweeted from IEEE Kerala GOLD's official Twitter account and then posted on its Facebook Page. Answers would be accepted only via tweets, in the format @IEEEKeralaGOLD <answer> #IEEEDayKerala
5. IEEE Kerala Section GOLD Execom members would not be eligible to participate in the contest.
6. Winners would be decided based on the maximum number of first answers tweeted in the correct format.

The contest began at the exact time mentioned in the above guidelines. All questions were answered correctly. The amazing thing to note is that the first correct answer to all questions, except one, was received within 5 minutes of posting the question.

To demonstrate the reach and penetration of this contest, here we present a comparative analysis of the performance of #IEEEDayKerala and #IEEEDay2012, the official worldwide hashtag for IEEE Day. All data was taken from HashTagTracking.com at 0044Hrs October 3, 2012.



As this data reflects, the reach of our Twitter campaign was excellent—particularly when one considers the small size of our Twitter audience and the fact that our contest was restricted to members of the Kerala Section. We can speculate that when compared with #IEEEDay2012, one reason that #IEEEDayKerala was so successful may be that the former was a generalized, unstructured topic while the latter was a targeted campaign which generated tweets according to a planned structure.

We consider this contest to be a successful demonstration of the power of structured interactions on social media and ultimately, a proof of the true power of teamwork. Congratulations to all involved. ■

# IEEE GOLD Community News

From around the world

## 2<sup>nd</sup> IEEE Greece GOLD A.G. Summer School, Greece

Dr. Nicolas Sklavos, IEEE Greece GOLD Affinity Group Council Chair

The IEEE Greece Gold Affinity Group, the Department of Informatics & MM – Technological Educational Institution of Patras Greece, and the Department of Telecommunication Systems & Networks – Technological Educational Institution of Messolongi Greece organized the 2nd IEEE Greece GOLD Affinity Group ATHENA Summer School 2011. This event covered the thematic area of “Wireless Technologies & Applications” and was held from July 3-8, 2011 in the beautiful city of Pyrgos, Greece. Technical support and sponsorships were provided by Pyrgos Municipality, IEEE Greece GOLD Affinity Group, Cosmote S.A., and Teledrom.

The IEEE Greece GOLD A.G. Summer School ATHENA plays a leading role in connecting universities and industry partners within Greece. The main focus of ATHENA was the training of students (under-graduate, post-graduate, Masters & PhD Thesis students) as well as engineers (scientists, engineers and professionals which mainly work in the areas of mobile and wireless networks) in technical details of existing (GSM, GPRS, WCDMA) and new emerging technologies and applications like LTE and security. In this way students and professionals had an advantage in boosting their future vocational skills and private sector companies would have a good scientific staff well-prepared in the latest technology.

Teaching lectures were organized into a general courses section (which includes the theoretical parts of GSM, GPRS, WCDMA/UMTS and LTE) and specialized courses fo-

cused on applications in the area of mobile telephony (including advanced topics such as Networks Design, Applications of All Manners, Network Security, and Energy). The ATHENA Summer School also included invited talks from distinguished scientists of the IEEE community, industry, and academic sectors.

For more details, please visit the 2nd IEEE Greece GOLD A.G. Summer School website:

<http://www.athenasch.knossosnet.gr>. ■



Professor Nicolas Sklavos (General Chair of ATHENA) opening the Summer School



Professor Socrates Kaplanis, President of TEI of Patras, during his talk

## Volunteer Professional Communities: A Case for the Power of the Few

M. Amin Rahimian, Graduate Student Member and Co-Chair, CSS Chapter of IEEE Montreal Section

“Never doubt that a small group of thoughtful committed citizens can change the world; indeed, it is the only thing that ever has.” I have been inspired by my experiences with “volunteer professional communities” and I have come to believe that a community of committed individuals with common interests and shared professional capabilities can indeed achieve much and contribute to the well-being of the greater human society.

Wikipedians were amongst the first major volunteer communities, with which my involvement required a certain degree of professionalism. I had been intrigued by the idea of sharing human knowledge and making it available to all, and by being an editor on Wikipedia, I was hoping to play a role in helping it realize its worthy goal. The number of people who take the time to actually write and edit Wikipedia articles may be much smaller than those who read and use the articles, but a few committed Wikipedians have been enough to realize a highly reliable source for web-based learning. Most of the editing and collaboration on Wikipedia is channeled through on-line wiki-based facilities operated by the Wikimedia Foundation,<sup>1</sup> and various rules and hierarchies have evolved through time to protect the encyclopedia’s articles against low quality edits.

While Wikipedia offers truth through numbers,<sup>2</sup> the free and open source model of software development provides functionality and versatility through the collaboration of volunteer programmers who share the common interest of enhancing software’s performance. The Linux operating system is one of the most prominent examples of free and open source software (FOSS) collaboration and typically all its underlying source code can be used, freely modified, and redistributed. Having thus passed through a more or less evolutionary process of development, Linux has emerged as a mature and reliable operating system that in many respects resembles the human social structure upon which it evolves.

As a third example, amateur radio operators (sometimes referred to as “Hams”) band together in clubs and other user groups to share their expertise in using the frequency spectrum open to them. Various on-the-air events are organised each year to help amateur radio operators hone their skills and put them into practice. In one such event, over 35,000 amateurs from ARRL,<sup>3</sup> RAC,<sup>4</sup> and other countries within IARU<sup>5</sup> – Region 2 (Americas) compete with each other in the fourth full weekend in June of each year in what is known as ARRL Field Day.<sup>6</sup> Amateur radio operators are usually among the first groups of people to deploy crucial communications infrastructure in case of an emergency where normal telephone and wireless services are disrupted. In this way, they play an important role in the early coordination of help and relief activities.<sup>7</sup>



2012 Field Day in Pine Beach Park – Dorval, QC, Canada

The aforementioned models of cooperation, contribution and sharing amongst interested professionals can be replicated wherever there is a potential and/or need for collaborative development. The GNU General Public Licence for FOSS<sup>8</sup> and licensed amateur radio operators are practical examples of how strong and highly influential volunteer professional communities can prosper and coexist with established commercial and business structures. Wikipedia, on the other hand, is a perfect example of a regulated social structure whose temporal evolution, as regulated by specific rules and hierarchical supervisory controls, has led to an awe-inspiring accumulation of sparse and diverse individual contributions.

In short, the localized and cooperative frameworks of volunteer professional communities provides interested individuals with the opportunity to obtain the required expertise for participating in a domino effect where much is achieved through the collaboration of a few. ■

<sup>1</sup> Wikimedia Foundation: <http://wikimediafoundation.org/wiki/Home>

<sup>2</sup> Truth in Numbers? Everything, According to Wikipedia: [http://en.wikipedia.org/wiki/Truth\\_in\\_Numbers](http://en.wikipedia.org/wiki/Truth_in_Numbers)

<sup>3</sup> ARRL (American Radio Relay League): <http://www.arrl.org/home>

<sup>4</sup> RAC (Radio Amateurs of Canada): <http://www.rac.ca/en/>

<sup>5</sup> IARU (International Amateur Radio Union): <http://www.iaru.org/index.html>

<sup>6</sup> ARRL Field Day: <http://www.arrl.org/field-day>

<sup>7</sup> Ham radio operators to the rescue after Katrina: <http://www.msnbc.msn.com/id/9228945>

<sup>8</sup> GNU General Public Licence: <http://www.gnu.org/copyleft/gpl.html>

## A Need for Power & Energy Engineers, Today and Tomorrow

Reza Arghandeh, PhD candidate at Virginia Tech University

Sabrina Provencher, PhD candidate at Virginia Tech University

The United States is approaching a technological crisis. In the next 10 years, over half of its energy industry workers will be retiring [1]. A shortage of highly skilled workers currently exists, while the demand for them looks to only increase to meet future needs. The pipeline of workers to fill such fields as power systems engineering and other occupations in the energy sector are not expected to offset the number of workers due to retire, nor meet future growth projections in these fields [1]. The Power and Energy Engineering Workforce Collaborative (PWC) estimates that undergraduate and graduate engineering graduation rates must double for the next five to eight years to meet projected workforce demands [2]. For utility companies today, difficulties due to the economic downturn have resulted in the canceling of new projects, a slowdown in the hiring of new employees, and offers of early retirement to experienced employees. Predictions are that after an economic recovery, the resultant shortage of qualified experts in the power and energy field will pose a tremendous challenge to the security and reliability of our nation's power systems.

It is evident that the US must attract more students in the Science, Technology, Engineering, and Mathematics fields, whether economically feasible at this time, or not. To expand the number of graduates in these fields, it will become increasingly important to draw in students from underrepresented demographic groups and to create opportunities in these fields for all American students. One means devised to spurn wide student interest in engineering was the creation of grand challenges. In 2008, the National Academy of Engineering (NAE) identified engineering opportunities that will impact the world's next few generations, known as the "Grand Challenges of Engineering" [3]. These 14 grand challenges identify engineering, research, and innovation as the means for addressing some of most world's most pressing problems of today and the future.

Today's world conditions have shifted the vision of energy consumers and suppliers towards more power system infrastructural investments, technological innovations, and renewable energy resource applications. Due to the importance of energy issues well into the future, three of the 14 Grand Challenges as outlined by the NAE focus specifically on power and energy. These grand challenges are: 1) restoring and improving urban infrastructure, 2) making solar energy affordable, and 3) providing energy from fusion [3]. Because the students of today will be the next generation of energy users, effective energy education programs can help students choose energy sources and behaviors that will benefit everyone to ensure a sustainable energy future.

Evidence since the launch of the 14 Grand Challenges campaign has shown it be a great success [4]. When

framed in a way that invites them to change the world, students view science and engineering as interesting, exciting, and relevant. The reality is that many of the engineering and technological challenges of today require not only engineering, but also an understanding of the social sciences, business, and even the humanities [4]. For example, energy design projects in addition to engineering and science often require power engineers to take into account cultural norms, distribution logistics, and existing infrastructures. The interdisciplinary nature of design when presented in developmentally appropriate ways has the ability to motivate students who did not understand how their skill sets might contribute to engineering solutions to energy problems, and engages them in real world problem solving. Design tasks, viewed as problems common across humanity and as "real," motivate students to revisit and refine their knowledge base. High-interest energy design problems additionally have the potential to present students with a creative outlet, as well as a means for them to develop some of the very same heuristics expert engineers use. In schools across America today, the United States is doing what other countries, like the United Kingdom, have been doing nationally since the 1990's: exposing learners to energy-related engineering and other design tasks well in advance of college. (Continued on page 18)

*Reza Arghandeh (S'09 - IEEE) is a Ph.D. candidate in the Department of Electrical and Computer Engineering at Virginia Tech University. He is member of DEW software developing team for power systems planning and operation. He received his B.S. degree in Electrical Engineering from K.N.T University of Technology, Tehran, Iran in 2005 and M.S. in Energy Systems Engineering from University of Manchester, Manchester, UK in 2008. His research interests are renewable energy resources, energy storage systems, demand response, distributed generation, and smart grid optimization and control.*

*Sabrina Provencher is a PhD candidate in the Integrative STEM Education program at Virginia Tech University. She was a Council on Technology and Engineering Teacher Educators (CTETE) 21st Century Leadership Academy Fellow, and recipient of the 2012 Outstanding Student Award of the International Technology and Engineering Educators Association (ITEEA). She has worked for Engineering is Elementary® (EiE), a project of the National Center of Technological Literacy at the Museum of Science- Boston, and as an assessment item writer for the high school level curriculum of Engineering by Design® (EbD), the only standards-based national curriculum for technological literacy for all of grades K-12 in the US. In the summer of 2012, she trained and led the very first assessment writing team for EbD TEEMS®, the elementary level curriculum of EbD® due for release in Fall 2012.*

# IEEE GOLD Peer Reviewed Articles

## A Need for Power & Energy Engineers

Continued from Page 17

By promoting an image of the engineer as someone who can make a difference in the world and by developing young students' interest in energy issues, campaigns such as the "Grand Challenges of Engineering" advance the goal of creating the skilled power and energy engineers needed to construct our nation's future energy systems. Further progress is still necessary if the US is to create the number of innovative, well-trained power engineers needed to build our nation's future energy systems. Undoubtedly, widespread exposure to energy engineering issues is important. However, future efforts should also focus on 1) continued improvements in the quality of K-12 and post-secondary engineering coursework, 2) increased research support to build and enhance energy and power engineering programs at universities, and 3) the creation of mentoring programs that encourage senior power engineers, students, and new engineers to develop and refine their expertise collaboratively, and function as communities of learners. ■

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## The Engineer's Role in Medical Imaging and Research: a Real Need

Dr. Angel Alberich-Bayarri PhD, Quantification Unit, Quiron Hospital Group, Valencia, Spain

Among the multiple careers of engineers, an uncommon one is to become part of a hospital staff. Today, medicine is reaching such levels of hi-tech equipment that there is a paradigm change in the traditional clinical workflows.

For years, the incorporation of technological equipment in hospitals implied a direct relationship between the clinicians and these systems, with the corresponding support of the manufacturer. However, this relationship did not significantly alter the doctor's assessment of patients, because technology was quite 'transparent'. Clinicians, in their daily work were mainly devoted to applying diagnostic tests to study the patient's disease and complement the clinical data, evaluate the results and formulate an appropriate therapeutic path. Nowadays, given the complexity and variety of technological processes that underlie modern medicine, the clinician enters a new paradigm of work based on multidisciplinary teams.

An area where this change is currently taking place is in Medical Imaging. This discipline has had a very significant technological growth in recent decades. In this scenario, where initially interacted the medical imaging specialists with technology and radiological images, has now changed. With the advent of digital radiography, the gradual emergence of new generations of CT, MRI equipment and also hybrid systems (i.e. PET-CT), among others, radiologists found the need to add an important workload mainly based in technology training, added to the traditional dedicated work of image interpretation and elaboration of the radiology report. These needs have focused primarily on understanding the working mechanisms of acquisition techniques and the interpretation of the resulting images, which have

increased in complexity. Techniques such as MRI can provide images of the same anatomical region with different contrasts, related to different situations or biological processes, being analyzed for the same anatomic cut.

This gap that currently exists between the specialist's daily work, the control of the image acquisition technology and interpretation of the information contained in these images, which is frequently multiparametric, has eased the progressive integration of biomedical engineers in the radiological scenario.

The engineer fits perfectly in a clinical setting where doctors live together with a high burden of clinical work and up-to-date technology equipment. Among other tasks, the biomedical engineer must be the person controlling the physical principles underlying medical technology and be responsible of assuring that the different acquisition modalities provide the best images to facilitate the radiological interpretation. It is also the ideal mediator between the manufacturer of the equipment and the hospital. The biomedical engineer should be able thus to facilitate technological understanding between the equipment and the clinician.

But not only the work of biomedical engineer must be limited to focus on controlling the acquisition, but also has in front of him a wide range of development fields which can bring significant added value to the work environment and the study patients' diseases. This ways of development for the biomedical engineer mostly correspond to the field of medical images post-processing. The digital medical imaging equipment has made it easier today to generate a large amount of data with high spatial, temporal and contrast

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# IEEE GOLD Peer Reviewed Articles

## The Engineer's Role in Medical Imaging and Research

Continued from Page 18

resolutions. This information can be used to implement new computational image processing techniques to try to extract other information not visually observable in the images. Sometimes the human eye of the radiologist can not accurately objectify a particular disease process in the patient. However, simulation and modeling techniques can be applied to medical images with aim of extracting quantitative indicators of a particular biological process, also known as Imaging Biomarkers. An example of bone-structure analysis

from MRI images for the diagnosis of Osteoporosis can be appreciated in figure 1.

Imaging Biomarkers can be expressed in many different ways, from simple averages in a given region, parametric maps showing the regional distribution of a given indicator, and even multivariate images for a more direct assessment of the relevant clinical questions.

Young engineers must therefore view this field as a new opportunity for professional development. What better to apply our well known engineering techniques to the study of the most perfect existing machine: the human body?

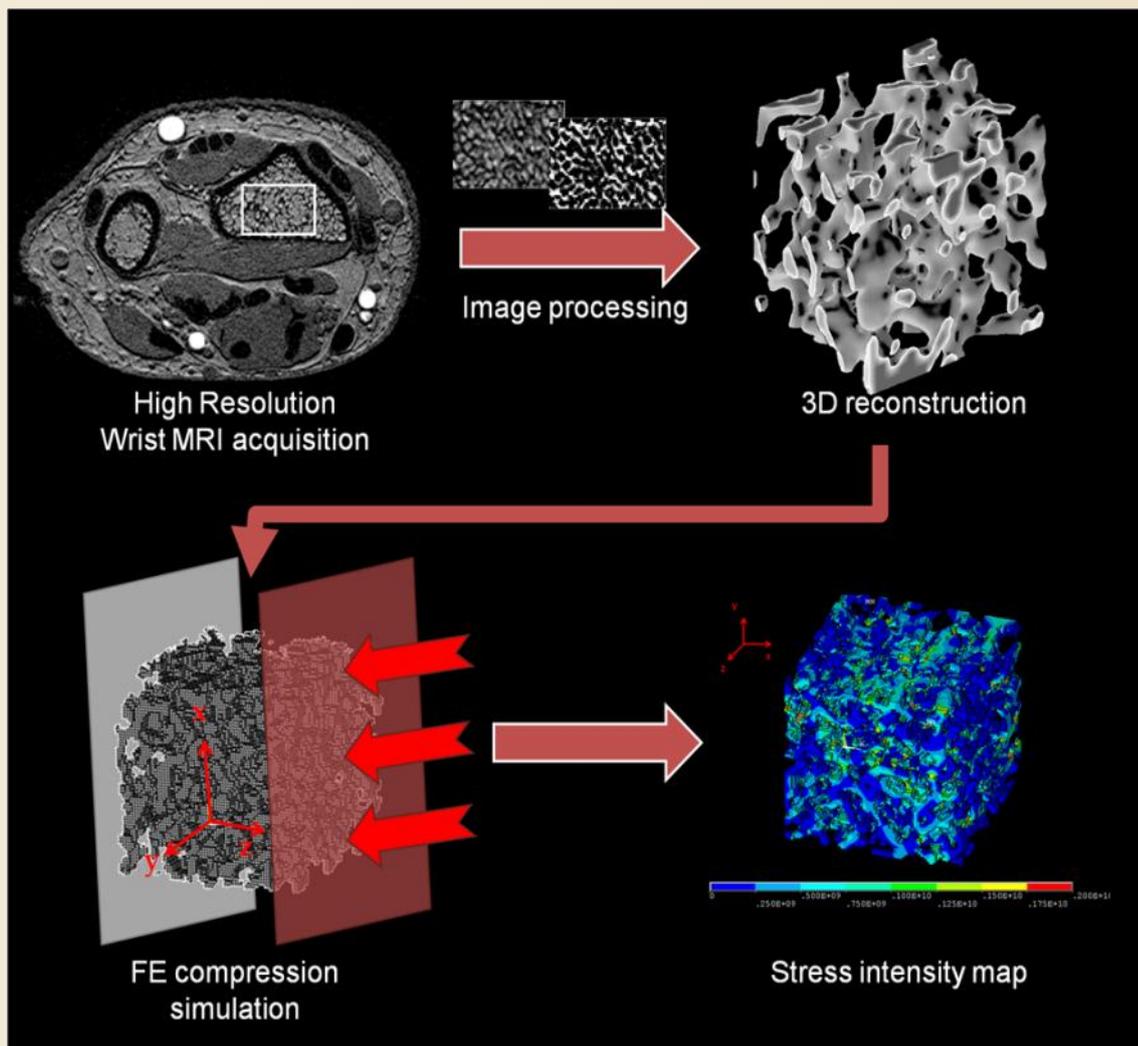


Figure 1. Bioengineering workflow for the analysis of the cancellous bone of a wrist in a patient with osteoporosis.

## IEEE GOLDRush Call for Articles: March 2013 Edition

IEEE GOLDRush invites you to submit an article for publication in the March 2013 edition. The article topic(s) shall be of interest to young professionals, the primary readers of the publication. Articles must be strictly no more than 700 words and should be sent to the IEEE GOLDRush editor at [GOLDRush@ieee.org](mailto:GOLDRush@ieee.org) on or before 1 February 2013. 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. Full submission guidelines must be adhered to and can be found at <http://www.ieee.org/web/membership/gold/newsletter/goldrushPolicy.htm> ■

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