IEEE Global Humanitarian Technology Conference (GHTC) 2014
October 10 - 13, 2014
San Jose, California, USA

Technology for the Benefit of Humanity

Organized and Sponsored by IEEE Region 6, Santa Clara Valley Section, and Seattle Section

Conference Program

IEEE Catalog Number: CFP14GHT
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GHTC Live Event Blogs
http://ieeeghtc.wordpress.com

GHTC Facebook
https://www.facebook.com/ieeeghtc

GHTC Twitter
https://twitter.com/ieeeghtc

GHTC LinkedIn
Welcome Message from Conference Chair and Vice Chair

Catherine Blackadar Nelson  
GHTC 2014 Conference Chair  
catherine.nelson@ieee.org

It is my pleasure to welcome you to the 4th annual IEEE Global Humanitarian Technology Conference 2014. This year we are located in the heart of Silicon Valley, a hub of visionaries, leading-edge researchers, and world-class technology entrepreneurs. We have 3 exciting days filled with technical papers, demonstrations, workshops, posters, awards and a student contest. We have an excellent speaker line up with people from across the globe representing academia, NGO’s, government and corporate sectors. With this program we continue to foster a comprehensive, collaborative environment, where the best and the brightest can work together to support innovative humanitarian solutions. This year along with our superb technical track, we have added a few new tracks. One is the invited speaker track that will feature experts in GHTC’s 5 key areas. These practitioners come to share their functional solutions, field experience and lessons learned. The other is a skills track focusing on helping your humanitarian venture succeed by teaching courses in business acumen, grant writing and presentation skills. We are also honored to have the Palo Alto Mobile Emergency Operations Center here to demonstrate the latest advances mobile communications. We hope you enjoy the conference and take this opportunity to meet colleagues, make new friends, and enhance your professional growth as we work together to change the world.

Sincerely,
Catherine Blackadar Nelson  
GHTC 2014 Conference Chair

Joe Decuir  
GHTC 2014 Conference Vice Chair  
jdecuir@ieee.org

Welcome to GHTC 2014. Please use this opportunity to share your successes with technology for humanitarian use, learn from your colleagues, and continue to support humanitarian work and GHTC going forward.

We hope this conference will encourage you to continue implementing humanitarian technologies, and inspire you to invent new ideas. We are looking forward to seeing new papers and presentations from you at next year’s GHTC, planned for October 2015 in Seattle.

Sincerely,
Joe Decuir  
GHTC 2014 Conference Vice Chair
On behalf of the Steering Committee, we welcome you to the IEEE Global Humanitarian Technology Conference 2014. We are excited about this year’s conference, and believe it will meet IEEE’s core purpose to foster technological innovation and excellence for the benefit of humanity. This 4th annual conference continues to focus on applying technology to solve the world’s most pressing humanitarian and development challenges. It has become the IEEE and IEEE Region 6 flagship annual conference designed to gather scientists, engineers, technology professionals, academics, foundations, government and non-government organizations, and individuals engaged in humanitarian work to discuss and develop solutions for present and future humanitarian needs.

This year’s conference is packed with three days of oral presentation sessions organized into five technical tracks, plus posters, plenary keynotes, panel sessions, workshops, contests, and an awards ceremony. There should be something for everyone in attendance. We have plenary keynote speakers from industry, academia, non-profit organizations, government agencies, Foundations and NGO’s.

The Technical and Speaker Program Committees have worked hard to develop a truly international program featuring keynote speakers, panelists, papers and posters from across the spectrum of humanitarian engineering and technology.

This year, GHTC features 127 technical papers, 28 “lightning” talks and 14 poster presentations, in five parallel tracks: Energy, Health, Disaster Connectivity & Communications, Humanitarian Challenges & Opportunities, and Water & Agriculture. Other sessions include a student paper contest, workshops and demonstrations.

Additionally, an international set of humanitarian technology practitioners with real stories and experience will be joining the conference as featured speakers in keynote, plenary, and other program sessions.

Please use this opportunity to enhance your personal and professional growth, network with friends and colleagues, and meet new ones. Enjoy the conference!

program.ghtc@ieee.org
GHTC 2014 Sponsors and Organizing Committee

Organized and Co-Sponsored by

IEEE Region 6
http://sites.ieee.org/r6

IEEE Santa Clara Valley Section
http://www.ieee.org/scv

IEEE Seattle Section
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Catherine B. Nelson, Intel Corporation

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Nathan Johnson, Arizona State University
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Technical Track Co-Chairs
Energy Track:
Daniel Soto, Sonoma State University
Soon Wan, Vicor Corporation

Health Track:
Michael Weber, onVector Technology
Nick Massetti, Nick Massetti Consulting

Disaster, Connectivity and Communication Track:
Catherine B. Nelson, Intel Corporation
Joe Decuir, CSR, IEEE Seattle

Humanitarian Challenges and Opportunities Track:
Lew Terman, IBM
Jery Althaf, theamazingfactory.com

Water and Agriculture Track:
Alan Mickelson, University of Colorado

Finance
Chair/Treasurer: Edward Aoki, IEEE SCV
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Chair: Thomas Coughlin, Coughlin Associates
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GHTC 2014 Advisory Committee

2014 GHTC Page 6
GHTC 2014 Proud Patrons

PLATINUM

IEEE Humanitarian Ad Hoc Committee

www.ieee.org/about/corporate/ad_hoc/humanitarianadhoc.html

National Aeronautics and Space Administration
For supporting participant travel and development of proceedings for GHTC 2014

NASA Applied Sciences Program
http://appliedsciences.nasa.gov

For Earth Science Data Access
http://earthdata.nasa.gov
PROUD PATRONS

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Beginner Patrons

Adriano Galati, Amos Veremachi, Ray Larsen, Ram Sivaraman
Azmat, Scott Tamashiro, Supersoon :), Ramesh Nair, Nahum Nir
This conference is made possible by the following participation ….
GHTC 2014 Badges
Badges must be worn at all times and are necessary for entrance into all IEEE GHTC sessions.

Registration Hours (At 1st Floor Lobby)
The registration will take place at the hotel 1st floor lobby. The conference information desk is adjacent to the registration area. All attendees and accompanying guests must register and receive a conference badge in order to participate in conference activities.

Registration and Information Desk Hours
Friday, 10 October: 1:30pm – 7:30pm
Saturday, 11 October: 7:00am – 6:00pm
Sunday, 12 October: 7:00am – 6:00pm
Monday, 13 October: 7:00am – 1:30pm

Exhibition Hours (At Mezzanine Level)
Saturday, 11 October: 10:00am – 6:30pm
Sunday, 12 October: 10:00am – 6:30pm
Monday, 13 October: 10:00am – 4:00pm

Welcome Reception (Friday, 10 October, 6:00pm At California Ballroom)
All conference registrants are cordially invited to the Welcome Reception (included with the conference registration fee). Don’t miss the opportunity to network.

Dinner Tickets
Dinners are included with the conference registration. Extra tickets for the Dinner Reception and the Awards Dinner can be purchased for $80.00 at the reception desk.

Language
All Conference Sessions and Publication will be in English.

GHTC Steering Committee Debrief Meeting
At Monterey Room, 5:30pm – 6:00pm
October 10, 2014 (Friday)
Program Summary

8:00am – 5:00pm
IEEE PES CSI (Community Solutions Initiative) Workshop
San Jose Ballroom

1:30pm – 7:30pm
GHTC Registration
1st Floor Lobby

6:00pm – 7:30pm
Welcome Reception
California Ballroom

7:30pm – 9:30pm
IEEE Young Professionals Session
California Ballroom

Anh Bui, Benetech
"Empowering Good People to Do Good: Unlocking Tech-For-Good Innovation"
It is our sincere pleasure to invite you to a special CSI workshop that has two main purposes: (1) To bring together CSI collaboration members to discuss recent sustainable initiative progress, and (2) to discuss the paths forward to expand operations globally as a new Signature Program of the IEEE Foundation. Signature status brings direct Foundation development staff and management support to secure a growing seed funding budget to launch up to ten new partnership startups per year.

The CSI strategy is not only to seed new initiatives with equipment and training donations, but to plant the sustainable business and operations model originally developed in partnership with Sirona in Haiti which achieved the original pilot demonstration of a sustainable business model in 2011-2012. Subsequently the model was refined to include Standard Operating Procedures in 2013-14 for easy dissemination globally. Expanding to scale is the final goal which involves both a highly efficient affordable service and the ability of the startup to attract capital to grow from ten systems to 2,000 systems, each serving 8-homes and ~ 500 people for 1 million people in total by 2020.

Reliable community owned electricity is a first step toward the developmental empowerment of whole communities from within. To be lastingly significant, many more steps are urgently needed, beginning with broad community-based education. The CSI Education vision is called “Learning beyond the Lightbulb.” It envisions cooperating with partners in both Community Based Online Courses but also in community development beyond the Lightbulb such as clean water, sanitation, rural healthcare, local governance and commerce. Broad education, including but not only technical, is key to the long-term success of all sustainable development.

**Workshop Structure:**
Introductory presentations will encourage interactive sharing of perspectives and questions from participants. Some of the strategy themes being considered are as follows:

1. What new initiatives have been made since the initial pilot programs established in Haiti in 2011-12?
2. What are the *Learning Beyond the Light Bulb* community based education program’s major goals and pilot plans?
3. How well are the system products working and what are current improvement goals?
4. How standardized are the product and the business models and are local variants desirable or not?
5. What evidence do we have for business sustainability and impact in different regions?
6. How are present partnerships structured and what are partnership requirements going forward?
7. What are the immediate expansion plans for 2014-15?
8. What progress has the Signature Program made and what results are expected in 2014-15?

Note that participants are welcome to suggest topics not covered above. Discussion Leaders will be drawn from active IEEE CSI Practitioners, Partners and IEEE Humanitarian Program Leadership. A detailed program will be posted in advance.

With best regards,
Ray Larsen & Robin Podmore, CSI Co-Chairs
Empowering Good People to Do Good: Unlocking Tech-For-Good Innovation
Anh Bui, Director, Product Strategy for Global Literacy, Benetech

Standard for-profit approaches do not typically address the needs of disadvantaged populations because they don’t represent a big enough market—or because the risk profile makes them an unattractive investment based on the expected returns. Consequently, the benefits of technology only reach the richest 1% or 5% of the globe’s population. So how do we harness the power of technology for positive social impact? Join Anh Bui, Director of Product Strategy at Benetech, a nonprofit technology company that develops software applications to address pressing social needs. Anh will discuss how Benetech uses technology to ignite communities and advance innovative solutions, serving some of the world’s most vulnerable populations. Additionally, learn about Benetech's deep commitment to social impact and how it leverages talent from the nonprofit, corporate, and open source technology sectors.

Anh Bui is Director of Product Strategy at Benetech, where she leads the development and implementation of overall product strategy in Benetech's Global Literacy Program. Anh heads the product management team behind Bookshare, the world's largest online accessible library, as well as a broad portfolio of services and tools dedicated to improving access to books, educational materials, and other digital information to people with disabilities, such as visual impairment or learning disabilities. As head of the DIAGRAM Center—a research and development center focused on accessible digital images—she has helped forge the world's foremost community of experts in the space, as well as establish a critical resource for technologists, publishers, educators, and end-users alike. Before joining Benetech in 2012, Anh served as the Associate Director of Product Management at HighWire Press, a division of the Stanford University Libraries that provides technology for publishers of leading peer-reviewed journals and other scholarly content. She holds a PhD from U.C. Berkeley, where she also led the development of the first digital scholarly editions of Mark Twain's writings, and was deeply involved in digital library initiatives and the emerging technologies of digital humanities.
October 11, 2014 (Saturday)  
Program Summary

7:00am
Registration (1st Floor Lobby)  
Breakfast (Mezzanine Level)

8:00am – 10:00am
Opening Plenary (California Ballroom)

• Catherine Nelson, Conference Chair
• Roberto de Marca, IEEE President & CEO
• Khanjan Mehta, Humanitarian Engineering Penn State,
  "From Humanitarian Engagement to Sustainable Impact"
• Anil Gupta, Indian Institute of Management and Honey Bee Network
  "Empathetic innovations for closing the social technological gap"

10:30am – 6:30pm
IEEE SIGHT (Special Interest Group in Humanitarian Technology) Meeting (MONTEREY ROOM)
- SIGHT Member Only

10:30am – 12:30pm
• Student Paper Contest (SAN JOSE BALLROOM)
• Energy Track – Technical Paper Session A1 (SALON K)
• Health Track – Technical Paper Session A2 (SALON M)
• Disaster, Connectivity & Communication Track – Technical Paper Session A3 (SALON A)
• Humanitarian Challenges and Opportunities – Technical Paper Session A4 (SALON B)
• Water and Agriculture – Technical Paper Session A5 (SALON L)

12:30pm – 1:30pm
Lunch and Exhibits (Mezzanine Level)

1:30pm – 3:30pm
• Poster Setup and Presentation (SALON C)
• Energy Track – Technical Paper Session B1 (SALON K)
• Health Track – Technical Paper Session B2 (SALON M)
• Disaster, Connectivity & Communication Track – Technical Paper Session B3 (SALON A)
• Humanitarian Challenges and Opportunities Track – Technical Paper Session B4 (SALON B)
• Water and Agriculture – Technical Paper Session B5 (SALON L)
4:00pm – 6:00pm
(Special Sessions – Demonstrations, Presentations, Panels)

- Fostering Social Ventures Workshop: Fund Raising, Business & Presentation Skills (SAN JOSE BALLROOM)
- NASA Solutions using Satellites to Improve Environmental Management: Navigating Earth Science/Earth Observation Data and Information Resources (SALON K)
- Autonomous Modular Multi-rotor Aerial Vehicle as First Responder (SALON K)
- Frontiers of Humanitarian Engineering: Learning from Social Justice, Feminism, and Failure (SALON M)
- WLAN Communication Prototype as a Contingency network for Natural Disasters (SALON A)
- Communicating in Disasters: A Ten-Year Experience with Interactive Demo by HumaniNet (SALON A)
- IEEE EPICS (Engineering Projects In Community Service) Workshop (SALON B)
- X-Track Session (SALON L)
  - 4:00- 4:30 Representation Technologies, Tapan Parikh (School of Information at the University of California, Berkeley)
  - 4:30 – 5:00 Inculcating Mass Awareness on Environmental Issues, Ravindra Joshi (Tata Power Delhi Distribution Limited)
  - 5:00 – 5:30 Role of Rural Microgrids in Alleviating Energy Poverty, Vineeth Vijayaraghavan (Solarillion Foundation)
  - 5:30 – 6:00 Emergent Response: How humanitarian organizations and grassroots networks can collaborate on disasters response and recovery work, Devin Balkind (Sarapis)

6:30pm – 9:30pm
Dinner Reception
(California Ballroom)

- Donna Baranski-Walker, Rebuilding Alliance and Maha Elgenaidi, Islamic Networks Group
  "A Human Response to Human Suffering: Technology, Gaza, and Perception"

- Bradley Younggren, Mobisante
  "Ultrasound Everywhere"

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IBM and IEEE The Smarter Planet Challenge
www.ieee.org/go/smarter_planet_challenge
October 11, 2014 (Saturday)
Opening Plenary
8:00am – 10:0am  California Ballroom

• Welcoming Remarks – Catherine Nelson, Conference Chair

Catherine Blackadar Nelson has a B.A. in computer science specializing in security, Internet technologies, and communications. She has over 20 years experience in emergency response and has participated in many responses including Hurricane Katrina, the Haitian earthquake, and the Japan 2011 earthquake/tsunami. She is a regular speaker at security and humanitarian conferences and an advisor to multiple organizations, including the UN, USAID and FEMA providing guidance in disaster and remote communications.

For the past 8 years she was instrumental in building the Cisco Tactical Operations Disaster Response team, which specializes in providing disaster and mobile communications in austere environments. She provided engineering expertise, logistical support, responder training, and was the primary developer of incident tracking and disaster management tools.

Current she is a Senior Security Researcher at Intel. She has a patent pending for Security Risk Modeling, is a private pilot and HAM radio operator. She is a member of the NetHope Women’s TechConnect Mentor program and working to help develop the Rapid Technology Assessment Team Initiative launched out of the US Naval Post Graduate School, which provides communications assessments in disasters to the humanitarian community.

• Opening Remarks – Roberto de Marca, 2014 IEEE President & CEO

J. Roberto de Marca was a Fulbright Scholar at the University of Southern California, where he earned a Ph.D. in Electrical Engineering. He has been in the faculty of the Catholic University, Rio de Janeiro (PUC/Rio), since 1978 where he has held several leadership and administrative positions including Associate Academic Vice President for Sponsored Research. Twice on leave, Dr. de Marca served as Scientific Consultant with AT&T Bell Laboratories, Murray Hill. He has been a Visiting Professor at the Politecnico di Torino and more recently he was a Visiting Professor at the Hong Kong University of Science & Technology and a Guest Scientist at the NEC Europe Research Labs, Heidelberg, Germany.

He was founding President of the Brazilian Telecommunications Society and in 1990, Prof. de Marca was appointed Scientific Director of the Brazilian National Research Council (CNPq) where he approved the initial funding of the national research network that opened the way for the widespread use of Internet in Brazil. He was a delegate to several ITU-R TG8/1 meetings, also chair of a working group on QoS, where the wireless 3G technology specifications were developed. From 2009 to 2011 he was a member of FINEP’s (the largest Brazilian R&D& Innovation funding agency) Presidential Advisory Board.

He is an IEEE Fellow and a full member of both the Brazilian Academy of Sciences and Brazilian National Academy of Engineering. Dr. de Marca was the 2000-2001 President of the IEEE Communications Society. In 2008 he held the office of IEEE Vice President of Technical Activities.
• **Plenary**

**From Humanitarian Engagement to Sustainable Impact**
Khanjan Mehta, Founding Director of the (HESE) Humanitarian Engineering and Social Entrepreneurship Program, Assistant Professor of Engineering Design, Penn State University

This talk will discuss four priorities to advance from engagement to impact:
1. Primacy of Economic Sustainability
   Business models first, Specific price targets, Design products to designing ensembles
2. Need for Practical Partnerships
   Across disciplines, External to the university (with non-profits interested in spinning off independent ventures), Private sector partnerships
3. Need for Evidence-based approaches
   Focused Applied Research, Implementation science, Finding new ways to nurture this art and communicate this science
4. Changing the Conversation
   Defining Career Pathways and elevating development as a full-time profession / pursuit, Broader Engagement / Big Design Questions / Frame Changers

Khanjan Mehta is the Founding Director of the Humanitarian Engineering and Social Entrepreneurship (HESE) Program and Assistant Professor of Engineering Design at Penn State. Mehta has led technology-based social ventures in Kenya, Tanzania, India, Sierra Leone, Mozambique and other countries. These ventures range from telemedicine systems and ruggedized biomedical devices to low-cost greenhouses, solar food dryers, and cell phone-based social networking systems. Mehta has co-authored over 70 journal articles and refereed conference proceedings under the HESE umbrella. Mehta serves as an Associate Editor for the IEEE Technology and Society Magazine and Contributing Editor for the Engineering 4 Change portal. He is the creator of a daily cartoon series, Frame Changers, that captures learning moments in the broad areas of HESE and Sustainable Development. The HESE program was the recipient of the 2013 W.K. Kellogg Foundation Engagement Award from APLU, 2011 Outstanding Specialty Entrepreneurship Program Award from USASBE and was named by Popular Mechanics as one of thirty “Awesome College Labs” across America.

• **Keynote**

**Empathetic innovations for closing the social technological gap**
Anil Gupta, Indian Institute of Management and Honey Bee Network

Empathetic innovations for closing the social technological gap: Honey Bee Network Model – Inclusion of bypassed spaces, sectors, skills and social segments in developmental agenda has rightly engaged the attention of world technology leaders. But this inclusion in the true sense may not happen unless we begin to learn from grassroots innovators and communities and blend formal and informal S & T systems. This has been the mission pursued by The Honey Bee Network, a social movement for the last twenty five years. The heuristics of sustainable frugal innovation will not emerge from a *jugaad* (makeshift) mentality. These will require an empathetic understanding of affordability, accessibility, availability, rejuvenability, durability and *circularity* of products and services. Designing new solutions by building upon artifactual, metaphorical, heuristic and gestalt aspects of innovation will fertilize our imagination, enrich scientific inquiry and result in reciprocal, responsive, and responsible relationship with knowledge rich- economically poor, creative communities. I will include reference to innovations by children, tech youth, common people and other individuals in creating a truly national and international inclusive innovation eco-systems. I will also argue how professional societies like IEEE strengthen the linkage between formal and informal science and technology system to humanize the technological development processes.

Anil Kumar Gupta is Professor, Indian Institute of Management, Vastrapur, Ahmedabad; Coordinator, SRISTI (Society for Research and Initiatives for Sustainable Technologies and Institutions); Founder, Honey Bee Network and Executive Vice Chair, National Innovation Foundation. His Research and Action Interests include: expanding global, national and local space for grassroots inventors and innovators to ensure recognition, respect and reward for them; blending excellence in formal and informal science; linking innovations, investments
and enterprise; creating Knowledge Network at different levels for augmenting grassroots green innovations and technological innovations by youth to build a global value chain to get the creativity its due; support to Honey Bee Network including about 185,000 ideas, innovations and examples (not all unique) of traditional knowledge from various parts of the country (nifindia.org) and rest of the world on farm and non-farm sustainable technologies, and 200,000 projects of engineering and related disciplines through www.techpedia.in of sristi.org

Anil is a Member, National Innovation Council, chaired by Adviser to Prime Minister; Fellow, National Academy of Agricultural Sciences and Fellow, The World Academy of Art and Science, California 2001. He has a Ph.D. in Management, M.Sc. in Genetics, and B.Sc. Agriculture. Anil has been walking (around 6000 kms across India) for a week or more every summer, and winter for last 17 years as a part of Shodhyatra (journey on foot) to celebrate creativity at grassroots, to learn from grassroots teachers and share creativity of communities encountered so far.

October 11, 2014 (Saturday)
Student Paper Contests
10:30am – 12:30pm   SALON C

Session Chair: Ramesh Nair
Contest Judges: Thomas Coughlin, Adil Usman

<table>
<thead>
<tr>
<th>Time</th>
<th>ID</th>
<th>Student Paper Title</th>
<th>Contestants</th>
</tr>
</thead>
<tbody>
<tr>
<td>10:30am</td>
<td>Paper #1</td>
<td>Command Based Intensity Controller for Surgical Lights</td>
<td>Keerthi Subu (Sahrudaya College, Kerala, India)</td>
</tr>
<tr>
<td>10:50am</td>
<td>Paper #2</td>
<td>Everybody Poops: Preliminary Design of Novel Sit Squat Toilet</td>
<td>Rebecca Byler (Georgia Institute of Technology)</td>
</tr>
<tr>
<td>11:10am</td>
<td>Paper #3</td>
<td>Exo Supportive Device For Individuals With Restricted Mobility</td>
<td>Dmitry Klisch (Algonquin College of Arts and Science, Canada)</td>
</tr>
<tr>
<td>11:30am</td>
<td>Paper #4</td>
<td>Promoting Education: A Framework for Monitoring E-Learning Impact</td>
<td>Raymond Harry (TUM, Germany)</td>
</tr>
<tr>
<td>11:50am</td>
<td>Paper #5</td>
<td>Postpartum Hemorrhage Treatment Using MNPs</td>
<td>Aswin Raghav, Dheepashri, Divyalakshmi (SSN College of Engineering, India)</td>
</tr>
<tr>
<td>Time</td>
<td>Paper ID</td>
<td>Paper Title</td>
<td>Author Names</td>
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<tr>
<td>10:30am</td>
<td>40</td>
<td>Design of a 1 kVA PV System for Electrical Laboratory in Faculty of Engineering, University of Uyo, Nigeria</td>
<td>Ye-Obong Udoakah* (University of Uyo)</td>
</tr>
<tr>
<td>10:50am</td>
<td>106</td>
<td>Solar Photovoltaic versus Micro-Hydroelectricity: A Framework for Assessing the Sustainability of Community-run Rural Electrification Projects</td>
<td>Mahmoud Kabalan* (Villanova University); Benaiah Anabaraonye (Imperial College London)</td>
</tr>
<tr>
<td>11:10am</td>
<td>162</td>
<td>Off-Grid, Low-Cost, Electrical Sun-Car System for Developing Countries</td>
<td>Otward Mueller*, Eduard Mueller (MTECH Laboratories, LLC)</td>
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<tr>
<td>11:30am</td>
<td>251</td>
<td>Scalable DC Micro Grids Provide Cost Effective Electricity in Regions without Electric Infrastructure</td>
<td>Mark Dudzinski* (Light the World, Inc.); Frank Sharp, Dennis Symanski (EPRI – Electric Power Research Institute)</td>
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<tr>
<td>11:50am</td>
<td>42</td>
<td>An Assessment of the Potential Impacts of Knowledge-based Data-driven Decision Support in Social Welfare</td>
<td>Ricardo Anderson*, Stascia Gordon, Gunjan Mansingh (University of the West Indies)</td>
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<tr>
<td>12:10pm</td>
<td>360</td>
<td>South Sudan Rural Electrification Project: The Hybrid Mini-grid &amp; PBK Project</td>
<td>Mou Riiny* (Village Help for South Sudan)</td>
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<tr>
<td>Time</td>
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<tr>
<td>10:30am</td>
<td>23</td>
<td>A Text Mining Approach to Automated Healthcare for the Masses</td>
<td>Vishnu Pendyala*, Yi Fang, JoAnne Holliday (Santa Clara University); Ali Zalzala, Community Tracks (USA and Institute of Management Technology, UAE)</td>
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<tr>
<td>10:50am</td>
<td>64</td>
<td>Efficacy of Knowledge Transfer and Exchange Between CHWs and Community Members in Low Resource Settings</td>
<td>Grace Warkulwiz*, Laurel Paul, Khanjan Mehta Penn State University</td>
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<tr>
<td>11:10am</td>
<td>80</td>
<td>A Scalable mHealth System for Noncommunicable Disease Management</td>
<td>Gari Clifford*, Carlos Arteta, Tingtin Zhu, Marco Pimentel, Mauro Santos, Joao Domingos, Ali Maraci, Joachim Behar, Julien Oster (University of Oxford)</td>
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<td>11:30am</td>
<td>141</td>
<td>Making Data Collection in Low-resource Contexts Intuitive, Fun, and Interactive</td>
<td>Greg Wenner, Martin Marino, Eric Obeysekare*, Khanjan Mehta (Penn State University)</td>
</tr>
<tr>
<td>11:50am</td>
<td>346</td>
<td>Telemedicine Report</td>
<td>Sangeeta Pardeshi* (Macquarie University)</td>
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<tr>
<td>12:10pm</td>
<td>354</td>
<td>Tele-Consulting Through Rural Health Centres for Tribal Community – A Case Study from Wayanad</td>
<td>Roshan Issac (College of Engineering, K ballooppara); Sreevas Sahasranamam* (IIM Kozhikode)</td>
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**October 11, 2014 (Saturday)**  
**Technical Paper Session A3:**  
**Disaster, Connectivity, and Communication Track**  
**10:30am – 12:30pm   SALON A**

Session Chair: Joe Decuir

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<th>Paper ID</th>
<th>Paper Title</th>
<th>Author Names</th>
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<tr>
<td>10:30am</td>
<td>34</td>
<td>A Distributed Floor Control Protocol for next generation PMR based on Hybrid LTE and Satellite Networks</td>
<td>Joan Ventura Jaume*, Laurent Girardeau (Airbus Defense and Space); Laurent Franck (Telecom Bretagne – Institut Mines Telecom)</td>
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<tr>
<td>10:50am</td>
<td>104</td>
<td>Succinct Data: Extreme Compression for ODK Forms – Making Digital Field Assessment Practical During Disasters by Minimizing Data Transmission Size and Costs</td>
<td>Paul Gardner-Stephen*, Andrew Bettison, Romana Challans, Jeremy Lakeman (Flinders University); Ewan Caldicott, Matthew Lloyd (New Zealand Red Cross); Dione Gardner-Stephen (Serval Project Inc.)</td>
</tr>
<tr>
<td>11:10am</td>
<td>121</td>
<td>Field technical surveys: An essential tool for improving critical infrastructure and lifeline systems resiliency to disasters</td>
<td>Alexis Kwasinski* (University of Texas at Austin)</td>
</tr>
<tr>
<td>11:30am</td>
<td>123</td>
<td>Building Coordination Capacity: Post-Disaster Organizational Twitter Networks</td>
<td>Aaron Opdyke*, Amy Javernick-Will (University of Colorado Boulder)</td>
</tr>
<tr>
<td>11:50am</td>
<td>216</td>
<td>Disaster Mitigation By Crowdsourcing Hazard Documentation</td>
<td>Yulong Yang*, Michael Sherman, Janne Lindqvist (Rutgers University)</td>
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<tr>
<td>12:10pm</td>
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**October 11, 2014 (Saturday)**

**Technical Paper Session A4: Humanitarian Challenges and Opportunities Track**

10:30am – 12:30pm   SALON B

Session Chair: Michael Wilson

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<tr>
<th>Time</th>
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<tr>
<td>10:30am</td>
<td>14</td>
<td>Remote Labs in Developing Countries: An Experience in Brazilian Public Education</td>
<td>José Pedro Simão*, UFSC; João Paulo Lima, Universidade Federal de Santa Catarina; Willian Rochadel, Universidade Federal de Santa Catarina; Juarez da Silva, UFSC</td>
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<tr>
<td>10:50am</td>
<td>73</td>
<td>Living Laboratory: Role and applicability in Science Education</td>
<td>Puspalata Pattojoshi* (C V Raman College of Engineering)</td>
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<tr>
<td>11:10am</td>
<td>190</td>
<td>Education for One Earth – Leveraging the power of ICT</td>
<td>Pramod Sharma (Centre for Environment Education Ahmadabad); Sanjeev Prashar* (IIM Raipur)</td>
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<tr>
<td>11:30am</td>
<td>315</td>
<td>Learning Beyond-the-Light-Bulb among Least Developed Countries based on a Sustainable PV Solar Utility Model</td>
<td>Raymond Larsen* (SLAC National Accelerator Lab); Robin Podmore (Incsys); Michelle Lacourciere (Sirona Haiti); Patrick Lee (Engincom); Ron Moulton (Village Help South Sudan); Seth Myers (Community Solutions Initiative); Martin Niboh, Michael Wilson (Torchbearer); Patrick Ryan (IEEE); Derek Welbourn (Inhaus Surfaces); Daniel Wessner (Regis University)</td>
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<tr>
<td>11:50am</td>
<td>269</td>
<td>Improving the Science Education Through New Perspectives</td>
<td>André Kakiuthi, Fernando Pimental, Thiago Moraes (UNESP-Guaratinguetá); Rafael Matsuyama (University of Sao Paulo)</td>
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<tr>
<td>12:10pm</td>
<td>234</td>
<td>Local Content Development Framework and Methodology for Knowledge and Skill Development: IEEE Madras Section SIGHT Case Study</td>
<td>Mukundhan Srinivasan* (IISc Bangalore); Anand Balu, Arun Noel Victor, Antony Venus A.J, Kartik Kulkarni, Madhuri K, SP Sree Rakshaa (IEEE Madras Section SIGHT); Vineeth Vijayaraghavan (Solarillion Foundation)</td>
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<tr>
<td>10:30am</td>
<td>39</td>
<td>Energy from Anaerobic Digesters for Water Management: Case Study of Pakistan</td>
<td>Tariq Mahmood Khalil*, Quanbao Zhao (Washington State University); Leena Maqsood (Michigan State University)</td>
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<tr>
<td>10:50am</td>
<td>60</td>
<td>Community Development through a Sustainable Micro Business Selling Clean Water</td>
<td>Yung Wong* (Embry-Riddle Aeronautical University); Shavin Pinto, Yan Tang, Marc Compere (Embry-Riddle Aeronautical University)</td>
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<td>11:10am</td>
<td>102</td>
<td>Malting Technology in the Development of Safe and Sustainable Complementary Composite Food from Cereals and Legumes</td>
<td>Idongesit Ana*, Hannah .I.J. Udota, Ye-Obong Udoakah (University of Uyo)</td>
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<td>11:30am</td>
<td>154</td>
<td>An Interactive Nutritional Guide to Develop Low-cost Healthy Meals While Sustaining Indigenous Foods</td>
<td>Krista Liguori*, Abdalla Nassar, Khanjan Mehta (Penn State University)</td>
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<tr>
<td>11:50am</td>
<td>157</td>
<td>Real-Time Communication based on IEEE 802.11b/g for Automation of Agricultural Vehicles</td>
<td>Julius Schöning (University of Osnabrück); Christian Rusch (CLAAS Selbstfahrende Erntemaschinen GmbH); Christian Schindelhauer (Albert-Ludwigs-Universitat Freiburg)</td>
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<td>12:10pm</td>
<td>165</td>
<td>A Wireless Sensor Network Platform Optimized for Assisted Sustainable Agriculture</td>
<td>Abel Rodriguez de la Concepcion, Riccardo Stefanelli, Daniele Trinchero* (Politecnico di Torino)</td>
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<td>45</td>
<td>CrisisTracker: Connecting First Responders to Twitter Analysis</td>
<td>Fred Morstatter*, Shamanth Kumar, David Kahn, Joshua Stiefer, Justin Sampson, Terrance Williams, Wesley Bowman, Daniel Howe, Mark Karlsrud, Grant Marshall, Huan Liu (Arizona State University)</td>
<td>Disaster, Connectivity &amp; Communication</td>
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<td>107</td>
<td>PLC Load Controller for Micro-hydroelectric Systems in Rural Settings</td>
<td>Mahmoud Kabalan* (Villanova University); Diane Tamir; Pritpa Singh</td>
<td>Energy</td>
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<td>139</td>
<td>Smarden: A Smart Gardening Approach to Conserve Resources</td>
<td>Scott Parmley, Jason Kelly, Farid Farahmand* (Sonoma State University)</td>
<td>Disaster, Connectivity &amp; Communication</td>
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<td>176</td>
<td>Recycling of Etchants Used in Printed Circuit Board Manufacturing</td>
<td>Ronny Lanes Silveira* (PUC – Minas); Thelma Virginia Rodrigues (PUC-Minas); Tiago Dias (PUC-MG)</td>
<td>Water and Agriculture</td>
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<tr>
<td>185</td>
<td>Asset Maintenance/Replacement based on Criticality Analyses and Energy</td>
<td>Tayseer Almasaleha* (ADDC); Majid Alkathairi; Surendra Chhajta</td>
<td>Energy</td>
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<tr>
<td>237</td>
<td>A Development of a PV-Powered Aquaponics System</td>
<td>Gunnar Shaffer; Francisco Quintanar; Christopher Soenksen; Cindy Achieng; David Ready (Hidden Creek Development Center); Tim Gilmour, Junseok Song* (John Brown University)</td>
<td>Water and Agriculture</td>
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<tr>
<td>245</td>
<td>Transformative Reductions in Operational Energy Consumption (TROPEC)</td>
<td>LaTonya Jordan*, Oak Ridge National Laboratory; Terry Sharp, ORNL</td>
<td>Energy</td>
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<tr>
<td>257</td>
<td>Knowledge Based Platform to Manage Home Care and Advanced Mutual Communications (NeuroCare Portal)</td>
<td>Sara Nasiri*, Madjid Fathi (Institute of KBS &amp; KM); Susanne Dienst; Mareike Dornhöfer</td>
<td>Health</td>
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<tr>
<td>258</td>
<td>Empowering the Visually Disadvantaged with Modern Technology</td>
<td>Kalyan Rapolu*, Shyam Banala, Shravan Banala, JayaSumana Gone, Rohit Nanngari, Archana Bindu, Swathi Mudumbai (VT Seva)</td>
<td>Humanitarian Challenges and Opportunities</td>
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<tr>
<td>304</td>
<td>GIS for Squatter Upgrading Projects: How It Improves Informal Settlements in Lusaka Province, Zambia</td>
<td>Kana Kudo* (UCLA)</td>
<td>Humanitarian Challenges and Opportunities</td>
</tr>
<tr>
<td>372</td>
<td>e-NABLE: Collaborative Innovation Of, By, and For the Global Village</td>
<td>Adam Arabian* (Seattle Pacific University); Jon Schull (Rochester Institute of Technology); Andreas Bastian; Frankie flood; Ivan Owen; Jorge Zuniga</td>
<td>Health</td>
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<td>1:30pm</td>
<td>9</td>
<td>Survey of Energy Use and Costs in Rural Kenya for Community Microgrid Business Model Development</td>
<td>Henry Louie*, Steve Szablya, McLean Sloughter (Seattle University); Vincent Van Acker (Alstom Grid); Ayesha Pirbhai (The Boeing Company)</td>
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<tr>
<td>1:50pm</td>
<td>62</td>
<td>The DC House Project: An Alternate Solution for Rural Electrification</td>
<td>Taufik Taufik* (Cal Poly State University)</td>
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<tr>
<td>2:10pm</td>
<td>66</td>
<td>Rechargeable Lithium Ion Battery Units as Supplemental Energy in Haiti</td>
<td>Courtney Foss, Jared Leventhal*, Alan Mickelson (University of Colorado at Boulder)</td>
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<tr>
<td>2:30pm</td>
<td>75</td>
<td>Consumer investment in watt-scale products</td>
<td>Daniel Soto* (Sonoma State University)</td>
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<td>2:50pm</td>
<td>214</td>
<td>Modular converter system for low-cost off-grid energy storage using second life Li-ion batteries</td>
<td>Christoph Birkl*, Damien Frost, Adrien Bizeray, Robert Richardson, David Howey (University of Oxford)</td>
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<td>3:10pm</td>
<td>365</td>
<td>Battery Storage: Comparing Shared to Individually Owned Storage Given Rural Demand Profiles of a Cluster of Customers</td>
<td>Mitchell Lee, Gordon Shaw, Vijay Modi* (Columbia University)</td>
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**October 11, 2014 (Saturday)**

**Technical Paper Session B2: Health Track**

1:30pm – 3:30pm   SALON M

Session Chair: Nick Massetti

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<tr>
<td>1:30pm</td>
<td>43</td>
<td>Harnessing Local Technology: Manufacturing Small Scale Mixers for Fortification of Edible Oils and Wheat Flour in Northern Ethiopia</td>
<td>Jennifer Head* (Institute of International Edu); Besufekad Getachew, Mitiku Gabrehiwot (Mekelle University)</td>
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<tr>
<td>1:50pm</td>
<td>54</td>
<td>Supporting Immunization Programs with Improved Vaccine Cold Chain Information Systems</td>
<td>Richard Anderson*, Trevor Perrier, Fahad Pervaiz (University of Washington); Sophie Newland (PATH); Bharath Kumar (HISP India); Ranjit Dhiman (UNICEF); Sisouveth Norasingh (Lao EPI)</td>
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<tr>
<td>2:10pm</td>
<td>59</td>
<td>The IncuLight: Solar-Powered Infant Incubator</td>
<td>Virginia Hall, Eric Geise, Nasser Kashou* (Wright State University)</td>
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<tr>
<td>2:30pm</td>
<td>140</td>
<td>Process Modeling and Evaluation of a Pilot Healthcare Technology Solution in Slum Communities</td>
<td>Ali Zalzala*, Sudipto Banerjee, Laura Zalzala (Institute of Management Technology, UAE)</td>
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<tr>
<td>2:50pm</td>
<td>200</td>
<td>Practical Challenges for Large Scale Deployment of mHealth Solution: Insights from a Field Trial</td>
<td>Senthil Kumar Kumaresan*, Nataraj Kuntagod, Sanjoy Paul, Sreenivasan Ganti (Accenture);</td>
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<tr>
<td>3:10pm</td>
<td>279</td>
<td>Get a Grip! Handgrip Strength as a Health Screening Tool</td>
<td>Molly Eckman*, Christopher Gigliotti, Staci Sutermaster, Khanjan Mehta (Penn State University);</td>
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### Technical Paper Session B3: Disaster, Connectivity, and Communication Track

**1:30pm – 3:30pm**  
**SALON A**

**Session Chair:** Catherine Nelson

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<tr>
<td>1:30pm</td>
<td>103</td>
<td>Low-Cost, Open-Source, Collapsible, Air-Transportable, Field-Manufacturable Telecommunications Tower</td>
<td>Gregory Stevens, David Ilba, Stuart Wildy, Paul Gardner-Stephen* (Flinders University); Matthew Lloyd (New Zealand Red Cross)</td>
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<tr>
<td>1:50pm</td>
<td>164</td>
<td>Enabling ICT Development with Low Cost High Capacity Wireless Networks in Remote and Underdeveloped Locations. An application to Public Finance Management in Comoros Islands</td>
<td>Abel Rodriguez de la Concepcion, Daniele Trinchero*, Riccardo Stefanelli (Politecnico di Torino); Mazen Hasna, Mohamed Abdel Elsayed (Qatar University); Karim Attoumani (ABGE); Naceur Mechmoum (Qatar Ministry of Foreign Affairs)</td>
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<tr>
<td>2:30pm</td>
<td>201</td>
<td>UAVs for Humanitarian Missions: Autonomy and Security</td>
<td>Tullio Tanzi*, Ludovic Aprvill (Telecom-ParisTech); Jean-Luc Dugelay, Yves Roudier (EURECOM)</td>
</tr>
<tr>
<td>2:50pm</td>
<td>207</td>
<td>Flooding through the lens of mobile phone activity</td>
<td>David Pastor-Escuredo*, Alfredo Morales-Guzman, Yolanda Torres Fernandez (Universidad Politécnica de Madrid); Jean-Martin Bauer, Amit Wadhwa (World Food Programme); Carlos Castro-Correa (Coordinación de Estrategia Digital Nacional), Presidencia de la Repúb de México; Liudmyla Romanoff, Jong Gun Lee, Alex Rutherford, Miguel Lungo-Oroz (United Nations Global Pulse); Vanessa Fírias-Martínez (University of Maryland); Nuria Oliver (Telefónica Research); Enrique Fírias-Martínez (Telefónica I+D)</td>
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<td>3:10pm</td>
<td>366</td>
<td>Data-driven Local Planning at National Scale: How data collected on mobile phones enable a Conditional Grants Scheme in Nigeria</td>
<td>Brett Gleitsmann, Prabhas Pokharel, Salah Chafik, Candice Heberer, Chris Tan, Myf Ma, Zaiming Yao, Vijay Modi* (Columbia University)</td>
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## October 11, 2014 (Saturday)
### Technical Paper Session B4: 
#### Humanitarian Challenges and Opportunities Track  
1:30pm – 3:30pm   SALON B

Session Chair: Lewis Terman

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<tr>
<td>1:30pm</td>
<td>112</td>
<td>Using Tablets and Satellite-based Internet to Deliver Numeracy Education to Marginalized Children in a Developing Country</td>
<td>Imran Zualkernan* (American University of Sharjah); Shirin Lutfeali (Save The Children); Asad Karim(Teletaleem)</td>
</tr>
<tr>
<td>1:50pm</td>
<td>167</td>
<td>ICT Based Solutions for Education in Rural India – A Case Study</td>
<td>Jineet Doshi* (DA-IICT)</td>
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<td>2:10pm</td>
<td>175</td>
<td>Changing a Life with Technology from a Classroom</td>
<td>Enrique Aguayo-Lara*, Livier Hernández-Hirales (Tecnológico de Monterrey)</td>
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<td>2:30pm</td>
<td>181</td>
<td>Humanitarian Projects Platform (HPP)</td>
<td>Vinicius Carraschi* (Univ Estadual Paulista – Bauru); Rafael Matsuyama (Plano B Systems); Marlon Carvalho (Univ Estadual Paulista – Bauru)</td>
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<tr>
<td>2:50pm</td>
<td>235</td>
<td>Real-World proficiency augmentation among learners through merger of Project Based Learning (PBL) and Student Social Responsibility (SSR)</td>
<td>Mukundhan Srinivasan* (IIsc Bangalore); Anand Balu, Arun Noel Victor, Antony Venus A.J (IEEE Madras Section SIGHT); Vineeth Vijayaraghavan (Solarillion Foundation); Kartik Kulkarni, Madhuri K, SP Sree Rakshaa (IEEE Madras Section SIGHT);</td>
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<td>3:10pm</td>
<td>337</td>
<td>A Successful Entrepreneurship Formula for Solving Computer Illiteracy</td>
<td>Manuel Silvestre*, Miguel Angel Rubio de Diego (TEDECO); Susana Muñoz Hernandez (DLSI (UPM))</td>
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<td>Time</td>
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<tr>
<td>1:30pm</td>
<td>48</td>
<td>Towards Providing Smarter Agriculture for Corn Farmers in Isabela</td>
<td>Rhia Trogo* (Delfin Jay Sabido IX, IBM Philippines); Edgardo Tongson (WWF Philippines); Orlando Balderama (Isabela State University)</td>
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<tr>
<td>1:50pm</td>
<td>180</td>
<td>Quantifying Water Savings with Greenhouse Farming</td>
<td>Kelsey Czyzyk*, Shayne Bement, William Dawson, Khanjan Mehta (Penn State University)</td>
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<td>2:10pm</td>
<td>194</td>
<td>Design of Arecanut Segregation and Cutting Prototype</td>
<td>Akash Hulkod*, Dr. K.V. Mahendra Prashanth (SJB Institute Of Technology)</td>
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<td>2:30pm</td>
<td>212</td>
<td>Identifying Technical and Economic Improvements to the MoneyMaker Hip Pump</td>
<td>Christopher McComb*, Pablo Santaeufemia, Kenji Shimada (Carnegie Mellon University); Nathan Johnson (Arizona State University)</td>
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<td>through Multi-Objective Optimization</td>
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<td>2:50pm</td>
<td>205</td>
<td>Smart Irrigation Using Low-Cost Moisture Sensors and XBee-based Communication</td>
<td>Akash Kumar, Khurram Kamal, Mohommad Omer Arshad (National University of Sciences and Technology Islamabad); Tanabaalan Vadamala (Universiti Teknologi Malaysia); Senthan Mathavan (Nottingham Trent University)</td>
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October 11, 2014 (Saturday)
Fostering Social Ventures Workshop: Fund Raising, Business and Presentation Skills
4:00pm – 6:00pm   SAN JOSE BALLROOM

• **Speaker #1:**
  **Successful Presentations for a Global Audience**
  Catherine B. Nelson, Disaster Communications Engineer/Humanitarian Technologist, Senior Security Researcher, Intel Corporation

  **Abstract:** In today's world half the battle is getting your message across. However this is easier said than done. When dealing with cross-cultural and multilingual audiences, how do you ensure they understand what you are saying, can follow your slideshow and do not fall asleep. Also as technical people, we need to be able to get our ideas across to non-technical people, especially since they are often the ones who hold the purse strings or can help promote your ideas. This session will focus on how to build a good slide presentation, what works and what does not. We will discuss how to handle a mixed audience of both technical and non-technical people. Lastly we will discuss how to speak to a global audience and how keep the audience’s attention.

  Catherine Blackadar Nelson has a B.A. in computer science specializing in security, Internet technologies, and communications. She has over 20 years’ experience in emergency response and has participated in many responses including Hurricane Katrina, the Haitian earthquake, and the Japan 2011 earthquake/tsunami. She is a regular speaker at security and humanitarian conferences and an advisor to multiple organizations, including the UN, USAID and FEMA providing guidance in disaster and remote communications.

  For the past 8 years she was instrumental in building the Cisco Tactical Operations Disaster Response team, which specializes in providing disaster and mobile communications in austere environments. She provided engineering expertise, logistical support, responder training, and was the primary developer of incident tracking and disaster management tools.

  Current she is a Sr. Security Researcher at Intel. She has a patent pending for Security Risk Modeling, is a private pilot and HAM radio operator. She is a member of the NetHope Women’s TechConnect Mentor program and working to help develop the Rapid Technology Assessment Team Initiative launched out of the US Naval Post Graduate School, which provides communications assessments in disasters to the humanitarian community.

• **Speaker #2:**
  **Business Skills for Startups to Change the World**
  Azmat Malik, President, Acuventures

  **Abstract:** In this session we will cover the why’s and how’s of social ventures from the perspective of founder with little business training or experience. We will discuss a broad range of topics related to the formation, planning, funding, marketing, and operations, etc. of any business, with particular reference to social ventures.

  Azmat Malik was a senior executive in marketing and operations at major US, European, and Asian companies in the semiconductor industry. He provides strategy, marketing and operations consulting to early and mid-stage companies in cleantech, electronics, and medical devices, and social enterprises. He has advised...
emerging companies in setting go-to-market strategy, and prepared founders for seed, angel, and growth funding. His focus is in Power Electronics, Cleantech, Medical Devices, Sensors and MEMS. He was Associate Professor at the Lahore University of Management Sciences, teaching MBA courses in marketing. He is active in the angel investor community, focused on energy efficiency, smart grid, electronics thermal management, and medical diagnostics. He is President of the Engineering Alumni Society of the University of California, Berkeley. Mr. Malik was active in the Cleantech Open Accelerator, and has mentored startups that have become commercially successful. He has MSEE and MBA from the University of California, Berkeley.

• **Speaker #3:**
  **Finding the Funding: Leveraging internal and external resources to fund your program or meeting**
  Jennifer Fortier Stewart, MBA, Senior Manager, Government Grants, IEEE Corporate Activities

**Abstract:** With so many excellent programs and meetings competing for limited resources, how do you find the funding you need to make the most of your great ideas? This session will give you an overview of funding programs within IEEE and provide a road map for seeking external funding from private foundations/trusts and government agencies in U.S. and Europe. Learn

  • how to become an authorized IEEE Principal Investigator,
  • how to submit applications to private foundations and government agencies,
  • how to manage federal funds post-award, and
  • where to go for the help you need.

Well executed applications result in funded grants. Working with IEEE’s Government Grants staff, the 2014 GHTC conference organizers were able to secure $38,000 from federal agencies. Learn how you can do the same.

**Jennifer Fortier Stewart**, Senior Manager, Government Grants, currently oversees the business administration activities of each of the IEEE’s federal grants and cooperative agreements, including grants from NASA, NSF, and the U.S. State Department, among others. She is charged with leading IEEE’s efforts to raise funding from government sources in the United States and abroad, in support of IEEE’s programs and initiatives. Ms. Stewart has over thirteen years of experience in the field of federal grants, contracts and cooperative agreements. She began her career overseeing Economic Development Administration (EDA) grants to small and minority-owned businesses in Philadelphia, PA. Since that time, she has served as a professional grant writer and grant manager to a number of non-profits in the Philadelphia and Washington, D.C. areas. Most recently, Jennifer served as the Grants Administration Director for the international Association of Fire Fighters (IAFF), where she oversaw more than $20 million in direct grants, contracts and cooperative agreements focused on subject areas critical to fire fighters and the communities they serve. She also assisted cities throughout the United States in securing over $200 million in federal funds in support of local fire and emergency response services. Jennifer is part of the Corporate Development team under IEEE Corporate Activities, and she works closely with the accounting staff, each of IEEE’s operating units, the Office of the Comptroller and IEEE member groups, to ensure that the IEEE meets all of its grant deliverables, fulfills its federal reporting requirements, and adheres to federal guidelines and regulations pertaining to federal grant administration. Ms. Stewart has a Bachelor of Arts in International Area Studies from Drexel University and a Masters of Business Administration from the University of Maryland.
Session C1-1 (4:00pm to 5:30pm) #319

NASA Solutions using Satellites to Improve Environmental Management: Navigating Earth Science/Earth Observation Data and Information Resources

Sarah Hemmings*, NASA; Nancy Searby, NASA; Christine Lee; David Toll, NASA; Ana Prados

The Capacity Building Program within the NASA Applied Sciences Program (Earth Science Division), focuses on building skills and capabilities to apply Earth science and Earth Observations towards societal benefit across the nine thematic areas supported by the intergovernmental Group on Earth Observations (GEO): agriculture, biodiversity, climate, disasters, ecosystems, energy, health, water, and weather. This presentation will demonstrate various Earth science and Earth Observation tools, resources, training materials, portals, and data/information products that can be used for environmental monitoring and in some cases, decision-making, in developing country contexts. The goal of the demonstration is to empower and assist the IEEE-GHTC community in navigating the wealth of Earth science information services that are freely and publicly available from NASA and its partners. The presentation will also provide an overview of opportunities to learn more about Earth Observations and how people can use these valuable Earth science assets in environmental monitoring and decision-making.

Session C1-2 (5:30pm to 6:00pm) #284

Autonomous Modular Multi-rotor Aerial Vehicle as First Responder

NiMA Asghari*, IKW, University of Osnabrück; Amin Abouee, Technical University of Munich; Seyed Jalal alddin Khademi Kolahbakhsh, TU Darmstadt

Only in the past few years over 500 people have gone overboard from seaworthy vessels. Often these vessels are far from shore. An unmanned aerial vehicle as marine first responder can act in a timely manner to help rescue individuals in danger of drowning. The vehicle can provide an eye in the sky to help in the search and rescue of the individual overboard. The robot through the use of computer vision, can pinpoint and track overboard individuals in the water. In our current prototype, we are using off the shelf parts to build a modular waterproof buoyant frame for the multi-rotor. The battery endurance is maximized by using high-torque low-rpm brushless DC motors. A dock mounted charging station using tethers is currently under development for real world testing. Note: we’d like to hold a workshop/seminar session to demo our prototype and get feedback from the audience for further developments.
Session C2-1 (4:00pm to 6:00pm) #203

Frontiers of Humanitarian Engineering: Learning from Social Justice, Feminism, and Failure

Brent Jesiek*, Andrea Mazzurco, Julia Thompson, Purdue University; Jane Lehr, Cal Poly – San Luis Obispo; Juan Lucena, Colorado School of Mines

Engineering holds considerable promise to address global humanitarian challenges. Yet paradoxically, many cutting-edge development projects and initiatives fall far short of their potential, all too often leaving behind disappointed stakeholders and new social and/or environmental problems. This interactive workshop poses thought-provoking questions such as: Among many possible factors, to what extent do sociocultural considerations make or break humanitarian engineering projects? What counts as socially and ethically responsible humanitarian engineering practice, and what training is necessary to enable it? The facilitators will offer concepts, frameworks, and examples drawn from and organized around three overlapping, complimentary themes: social justice, feminism, and failure. Through interactive case studies and lessons culled from both the literature and panelists’ experiences, attendees will be invited to explore opportunities for intensified dialogue, collaboration, and mutual learning amongst humanitarian technical professionals, humanists, social scientists, community members/organizers, and other relevant stakeholders. The facilitators will share evidence from their own efforts to study challenges and opportunities that surface when engineers are challenged to rethink how they define and solve problems when working with developing communities. While this workshop most closely aligns with the Humanitarian Challenges and Opportunities track, it will highlight insights and lessons that cut across the five tracks.
WLAN Communication Prototype as a Contingency network for Natural Disasters

Andres Astudillo, IEEE

The communication systems are highly affected in case of some specific problems such as natural disasters like a tornado, an earthquake or electricity shortage. In those cases, communication buildings are suffering as they are moving or shaken, leaving the network services and power systems useless. Finally, people who are in those affected areas are trying to reestablish a communication but all at the same time with often the consequence of an overload in the network system. In the case of an earthquake disaster for example, where buildings are collapsing or moving and people are trapped inside, it is hard for them to release the rubbles. It is then necessary to develop different communications ways in order to allow the affected people to share valuable information such as their health state, geoposition, temperature, humidity and even the carbon dioxide levels, among others environmental variables. All of this is aiming to improve and save the time used for the rescuer trying to save them, as time is perhaps the most critical variable in natural disasters. Due to the quick advance of science and technology, smartphones and smart terminals have seen their prices reduced considerably, making them affordable for everyone. This is also another reason why it is now possible to develop a portable, self-sustain energy system and a low budget prototype allowing the communication between terminals. It will be used in emergency cases, creating a community network for help and rescue.

Communicating in Disasters: A Ten-Year Experience with Interactive Demo by HumaniNet

Gregg Swanson, HumaniNet

One of the most critical elements in disaster response is reliable communications. In sudden-onset emergencies, especially major natural disasters, infrastructure is usually damaged, causing severe degradation or elimination of cell phone and landline communications. In these situations, both in the U.S. and in global emergencies, the fastest and most reliable solution for relief teams and responders is mobile satellite communications. This includes satellite phones and lightweight terminals that provide voice, text messaging, email, full Internet. Executive Director Gregg Swanson will present case studies from actual disasters and discuss best practices from the field. Attendees may participate in an interactive demo of these capabilities, using three types of satellite devices. Communications planning for emergencies is essential, but often overlooked. The case studies will address the primary failures and shortcomings in different scenarios and will suggest some easy steps to evaluate team requirements. The session will also address experiences in conflict regions where personnel security and team effectiveness depend upon dependable satellite communications. Since 2002, HumaniNet has assisted relief teams, responders, and government agencies in numerous emergencies, including the 2004 South Asia tsunami, the Haiti earthquake, Hurricane Katrina and the 2011 Japan earthquake and tsunami.
IEEE EPICS (Engineering Projects In Community Service)

Nicholas J. Kirsch, Department of Electrical and Computer Engineering and the Director of University of New Hampshire Wireless Laboratory

The workshop will include an overview of IEEE’s implementation of the Engineering Projects In Community Service (EPICS) in IEEE Program. The EPICS in IEEE program fosters partnerships between university students to work with non-profit organizations to deliver technical solutions to local communities. The overview will include examples of successful partnerships from around the globe. Following the overview, attendees will participate in an interactive session focused on developing a proposal/petition for funding, followed by a presentation on next steps.

Nicholas J. Kirsch (S’00-M’09) obtained his B.S. degree in Electrical Engineering from the University of Wisconsin - Madison in May 2003. Nicholas received an M.S. degree in Electrical Engineering and Telecommunications in June 2006 and a Ph. D. in Electrical Engineering in June 2009 from Drexel University in Philadelphia, Pennsylvania. In 2001 and 2002, Nicholas worked for W.L. Gore & Associates and in graduate school, he worked in the Drexel Wireless Systems Laboratory and the Applied Communication and Information Networking group in Camden, NJ. Beginning in 2009, he joined the faculty at the University of New Hampshire in Durham, NH. He is currently as Assistant Professor in the Department of Electrical and Computer Engineering and the Director of UNH Wireless Laboratory. Kirsch’s work has been funded by the National Science Foundation, IEEE, and private industry. His current research interests are Multiple-input multiple-output (MIMO) communications systems, cognitive and software defined radios, spectrum sensing and sensor networks, and transparent antennas.

In 2013, Kirsch successfully started an Engineering Projects in Community Service (EPICS) in IEEE project in collaboration with St. Thomas Aquinas High School in Dover, NH and The Nature Conservancy of New Hampshire. He is now serving on the EPICS in IEEE committee.
Representation Technologies

Information technologies are essential tools for the representation and communication of human knowledge. However, many groups are still inadequately represented on the Internet. My research group developed Avaaj Otalo, a phone-based voice message board allowing small farmers in rural India to ask, answer and browse agricultural questions and answers. Avaaj Otalo has been deployed for over four years, and receives hundreds of calls every week. I report on recent results from this deployment, including evidence of impact on farmer decision-making, reducing the use of less effective and potentially harmful pesticides, through a randomized controlled trial (RCT). While Avaaj Otalo illustrates the importance of designing appropriate user interfaces for representing knowledge from underrepresented groups, knowledge must still be translated to structured, quantitative forms for aggregation and policy decision-making. Local Ground is a data collection, mapping and information visualization tool that help youth develop data skills by making connections between different representations of empirical phenomena. Students begin by collecting open-ended qualitative data, in the form of free-hand drawings, pictures and audio interviews. Based on these observations, students can design of structured data collection instruments for more systematic inquiry and analysis. These various forms of data are combined into narratives that can articulate youth perspectives to a variety of stakeholders. Local Ground has been used to involve youth the planning of a public park, ground-truth civic data about food access, and document air quality issues across the BART transportation system. Within these projects, I explore several themes in my work, including the design of more accessible interaction techniques allowing new populations to author content, the importance of bottom-up data for planning and valuating development projects, and how we can employ participatory computing technologies to improve learning and human agency.

Tapan Parikh is an Assistant Professor at the School of Information at the University of California, Berkeley. Tapan’s research interests include human-computer interaction (HCI), mobile computing, paper and voice UIs and information technologies for education, governance and international development. Tapan and his students have started several technology companies serving community-based organizations (CBOs), non-governmental organizations (NGOs), governments and non-profits. He holds a Sc.B. degree in Molecular Modeling with Honors from Brown University, and M.S. and Ph.D. degrees in Computer Science from the University of Washington, where his dissertation won the William Chan Memorial award. Tapan has also received the NSF CAREER award, a Sloan Fellowship, was named TR35 Humanitarian of the Year, and has won several best paper awards for his group’s work.

Inculcating Mass Awareness on Environmental Issues

Sustainable development is not possible without sustainable energy. Nearly one person in five on the planet still lacks access to electricity. Twice that number, almost three billion people rely on wood, coal, charcoal or animal waste for cooking and heating. This is a major barrier to eradicating poverty and building shared prosperity. 1400 million across the world have no access to electricity. 300 million in India still live in dark. Electrical energy to bottom of pyramid segment of society is the need of hour. Solar is green form of energy and do not need long gestation period power generation plants needing land acquisition, fuel linkages, transmission lines to feed power etc. Thus it is the fastest way to light about 75 million homes in India and 350 million homes across the world that does not have any access to electricity. The children of these deprived homes can then study and move towards belonging to mainstream society.

The Environment Events make all including deprived section of society aware of solar lamps, appliances also. A case study of few solar lamps installed in my guidance and control in a slum tells a good creative story. How children are studying, housewife is cooking in solar lamplight; women have safety even when there is no power.
One of the best parts was participation of children in drawing environment theme paintings in these events and debating on environment.

Solar energy is a means of fastest way to reach the max dark homes is an idea whose time has come. Working in partnership, governments, parliamentarians, private sector companies, industries, and civil society can make diverse contributions inspired by a unity of purpose. Together, we can power a sustainable future free of poverty. Huge task, but we all have to work towards that. We also use Smart phone technology to spread fast best practices in this area. Awareness spreading for fastest results coupled with call to global contributors to come forward to participate in this journey to light 75 million homes in India and 350 million homes across the world.

Ravindra Joshi has implemented large Automated Utility Projects and now is Head of Special Consumer Group in Tata Power Delhi Distribution Limited, responsible for distribution of power, reliability, billing and collection of 0.2 million Slum Consumers covering a population of 1 million and 510 square km area. We have to innovate ways to uplift their status in society and bring them in mainstream. As Chair, IEEE Delhi Section HTC partnering with UN organized several environment awareness, innovative idea generation, street play events with young and enthusiastic volunteers, in normal residential colonies, Malls and slums. The events covered about 0.2 million over last decade, including in slums. Being widely travelled across the world and having worked in Europe, SE Asia adds global perspective of human issues taken up in these drives.

Joshi has Electrical Engineering degree from IIT, MBA from Lancaster University, UK. He is Joint Secretary, Chair-Human Technology Challenge Standing Committee of IEEE Delhi Section. He has 30 years of experience in corporate world in India, SE Asia and Europe. He is Auditor Tata Business Excellence Model, a quality initiative of Tata group and assessor for Tata Council for Community Initiative. Has been invited to National Innovation Forum at President of India Office. Regularly partnering with UN, has organized several environment awareness events, including for slum children.

X-Track Session C5-3  (5:00pm to 5:30pm)

Role of Rural Microgrids in Alleviating Energy Poverty
Energy poverty has been a critical challenge in India since independence and various approaches have been adopted in addressing the same. The challenge is still large and the social and cultural context is evolving. The population without access to energy is still large and close to 400 million people in India alone, according to some estimates.

The earliest solutions involved providing portable solar lighting. While this was widely accepted and solved an important challenge albeit in a limited way, some of the original beneficiaries and communities are now looking for solutions that address energy needs and where lighting alone does not suffice as being adequate. With the progress of rapid electrification of villages, the expectation of a “grid type” energy solution has also become the norm in among the target population.

In these circumstances, with the rapidly declining costs of solar and the adaptation of technology, rural microgrids presents a unique opportunity similar to what mobile telecom offered a decade ago. The talk will go into the details of this in the Indian context and outline the developments, opportunities and challenges from various stakeholder perspectives.

Vineeth Vijayaraghavan is the Director (Research and Outreach) at Solarillion Foundation, a non-profit research and outreach foundation working on research, outreach and implementation of sustainable energy and engineering solutions for emerging markets.

A thought leader in the space in India, he has been speaking and moderating industry and stakeholder panel discussions on subjects ranging from renewable energy financing, projects and its viability in the Indian context and often assisting stake holders with critical inputs in shaping policies relating to renewable energy, specifically solar, wind and bio energy in India. He is also actively involved in sustainable initiatives, energy security and next generation energy efficiency and management solutions including smart grid, rural micro grid and distributed generation solutions.
He was nominated from India for the BRIC Clean Energy and Exchange program, a Department of State Exchange Program, where he travelled to the US in 2011 and had numerous meetings with stakeholders in the US including senators, policymakers, congressmen and other officials, in October 2011.

Vineeth holds a Master of Science degree in Electrical Engineering from The Ohio State University, Columbus, Ohio and a bachelor's degree in Engineering in Electronics and Communications from the University of Madras. Vineeth Vijayaraghavan is the Director (Research and Outreach) at Solarillion Foundation, a non-profit research and outreach foundation working on research, outreach and implementation of sustainable energy and engineering solutions for emerging markets.

X-Track Session C5-4 (5:30pm to 6:00pm)

**Emergent Response: How humanitarian organizations and grassroots networks can collaborate on disasters response and recovery work**

Social networking, collaborative productivity software and free/libre/open-source (FLO) tools and techniques are empowering everyday people to organize their own large scale disaster response efforts. Occupy Sandy in New York City constituted one such effort; growing to tens of thousands of volunteers in a matter of weeks, it was the largest volunteer-led disaster relief effort in recent US history.

This talk will describe Occupy Sandy’s organizational structure and activities, examine why Occupy Sandy and relief institutions found it difficult to collaborate, explain how NYC:Prepared’s FLO tools enable collaboration between relief institutions and citizen-led response efforts, and propose a few simple steps humanitarian agencies can take to leverage emerging grassroots networks to improve the effectiveness of their relief work.

Devin Balkind works at the intersection of the nonprofit sector, the free/libre/open-source (FLO) movement, and community organizing to help each benefit from the best practices of the others.

Through Sarapis, the nonprofit organization where he serves as Executive Director, Devin applies FLO methodologies to civic challenges by developing and deploying software tools and operational techniques for a wide range of groups, including software communities, human service providers and, most recently, disaster relief coalitions.
Plenary #1:
A Human Response to Human Suffering: Technology, Gaza, and Perception
Donna Baranski-Walker, Founder & Executive Director of Rebuilding Alliance
Maha Elgenaidi, Executive Director, Islamic Networks Group

With over 110,000 Palestinians made homeless, Americans are responding thoughtfully to overwhelming scenes of man-made disaster. This session will explore the multifaceted ways in which social media have emerged as a leading player in building humanitarian support for embattled communities in Israel/Palestine, and how social media offers enhanced perceptions of the shared, very human reality both of American Muslims and of the communities of the Middle East judged by U.S. attitudes and policies.

**Donna Baranski-Walker** is the Founder & Executive Director of Rebuilding Alliance, a U.S. nonprofit organization dedicated to rebuilding war-torn communities and making them safe. Donna holds a B.S. in EE from the Massachusetts Institute of Technology, and an M.S. in Ag. Eng. from the University of Hawaii. In 2003, she helped a Muslim Palestinian village build their kindergarten, then design, finance, and build affordable homes, a model for the neighborhood-centered design needed now in Gaza. On the 30th anniversary of the founding of the Polish Solidarity movement, Donna was awarded the Medal of Gratitude at the Gdansk Shipyard in Poland before 27,000 people for her organizing in Chicago when she was 24 years old. Donna’s work in the Middle East began in 1990 when her New York Times op-ed, “Small Lights in the Darkness,” was translated into Arabic and presented to the Iraqi Women’s Federation a week before the First Gulf War began.

**Maha Elgenaidi** is the Executive Director of Islamic Networks Group (ING), a non-profit organization with affiliates around the country that counter prejudice and discrimination against American Muslims by teaching about their traditions and contributions in the context of America’s history and cultural diversity, while building relations between American Muslims and other groups. She is the author of training handbooks on outreach for American Muslims as well as training seminars for public institutions on developing cultural competency with the American Muslim community. A senior fellow of the American Leadership Forum and recently named by the San Jose Business Journal as one of Silicon Valley’s Women of Influence, Maha has been recognized with numerous civil rights awards, including the “Civil Rights Leadership Award” from the California Association of Human Relations Organizations and the “Citizen of the Year” award from the Santa Clara County Board of Supervisors. She holds a master’s degree in Religious Studies from Stanford University and received her bachelor’s degree in Political Science and Economics from the American University in Cairo.
Plenary #2: Ultrasound Everywhere  
Bradley Younggren, Chief Medical Officer, Mobisante

Smartphones have taken on an unexpected role in healthcare by serving as medical devices for both consumers and health care providers. By leveraging the computing power in smartphones, companies are able to provide cheaper, more scalable options for the consumer. Moreover, cellular is one of the few technologies broadly available and adopted in developing nations. This talk will describe our quest to make cheap point-of-care ultrasound devices based on smartphone technology accessible around the world. Case studies from developed and developing nations will be presented. We will also discuss how these experiences apply to medical devices in the global space at large.

Dr. Bradley Younggren is the Chief Medical Officer of Mobisante, Inc., a company involved in delivering point of care ultrasound through both smartphones and tablets. He is also an active mentor for Highway1, a hardware incubator based in San Francisco, CA and has spoken on medical devices at numerous conferences such as Google I/O in 2014. He is also the Director of Emergency Ultrasound at Evergreen Hospital Medical Center in Kirkland, Washington and the Medical Director of Emergency Preparedness and the Associate Trauma Medical Director. Before coming to Evergreen, Dr. Younggren spent 11 years at Madigan Army Medical Center where he helped pioneer point-of-care ultrasound for the Army in both the Emergency Department as well as in the pre-hospital and combat environments. Dr. Younggren is an assistant clinical professor of Medicine at the University of Washington as well as Adjunct Professor in Emergency Medicine, Baylor School of Medicine. He is also a Faculty of Conflict and Catastrophe Medicine, The Worshipful Society of the Apothecaries of London. Dr. Younggren served a tour of duty in Iraq where he earned a Bronze Star for his performance with the 2-14 Cavalry Squadron (Stryker).
October 12, 2014 (Sunday)
Program Summary

7:00am
Registration (1st Floor Lobby)
Breakfast (Mezzanine Level)

8:00am – 10:00am
Sunday Plenary (California Ballroom)

• Luke Filose, Intel Corporate Social Responsibility
  "Humanitarian Inc.? Exploring the Corporate Role in International Development Projects"
• Camille Crittenden, CITRIS UC Berkeley
  "IT Innovations for Human Rights, Civic Engagement and Humanitarian Development"

10:30am – 12:30pm
• IEEE SIGHT (Special Interest Group in Humanitarian Technology) Workshop (Monterey)
• Energy Track – Technical Paper Session D1 (SALON K)
• Health Track – Technical Paper Session D2 (SALON M)
• Disaster, Connectivity & Communication Track – Technical Paper Session D3 (SALON A)
• Humanitarian Challenges and Opportunities – Technical Paper Session D4 (SALON B)
• Water and Agriculture – Technical Paper Session D5 (SALON L)

12:30pm – 1:30pm
Lunch and Exhibits (Mezzanine Level)

1:30pm – 6:30pm
Mobile Emergency Operations Center Demonstration (Outside)

1:30pm – 3:30pm
• Energy Track – Technical Paper Session E1 (SALON K)
• Health Track – Technical Paper Session E2 (SALON M)
• Health Track – Technical Paper Session E3 (SALON A)
• Humanitarian Challenges and Opportunities – Technical Paper Session E4 (SALON B)
• Humanitarian Challenges and Opportunities – Technical Paper Session E5 (SALON L)
4:00pm – 6:00pm
(Special Sessions – Demonstrations, Presentations, Panels)

• Panel(4:00–6:00pm) - Human Trafficking: Research Perspectives on Challenges and Opportunities for Innovation (SALON K)

• Panel Session (4:00–5:00pm) - Using Technology to Bring Biomedical Innovations to Emerging Markets (SALON M)

• Presentation (5:00–5:30pm) - Human-centric Health: Empowering People with 24/7 Personalized Monitoring (SALON M)

• Demonstration (4:00–5:00pm) - Changing How Technology & Information Is Used During Humanitarian Challenges (SALON A)

• Demonstration (5:00–6:00pm) - Mobile Training Toolkit (MTT): A Comprehensive and Sustainable Capacity Building Approach for Solar PV Energy Technologies (SALON A)

• Demonstration (4:00–5:30pm) - New Zealand Red Cross “Succinct Data” Communication System (SALON B)

• Presentation (5:30–6:00pm) - Collaborate.org – A Worldwide Collaboration and Geospatial Infrastructure (SALON B)

• X-Track (SALON L)
  ➢ 4:00–4:30pm - Humanitarian Robotics and Automation Technology Challenges, Raj Madhavan (IEEE Robotics & Automation Society – Special Interest Group on Humanitarian Technology)
  ➢ 4:30–6:00pm - Micro-grid: Examples and Discussion, Nathan Johnson (Polytechnic School, Arizona State University)

6:30pm – 9:30pm
Social Event and Award Ceremony
(California Ballroom)

• Region 6 Awards, GHTC Student Papers Awards, Global Humanitarian Engineering Awards

• Laura Stachel and Brent Moellenberg, We Care Solar, "Bringing the First 100 Watts to Last Mile Health Centers"

• Iana Aranda, ASME, Engineering for Change, EWB-USA NY, "Trends in Engineering for Global Development"

Can You Change the World?
Show us how and you could win US$10,000

IEEE Presidents’ Change the World Competition
www.ieeechangetheworld.org
Plenary:
**Humanitarian Inc.? Exploring the Corporate Role in International Development Projects**


How and why does a multinational corporation engage with NGOs on a grassroots level to deploy technology in the developing world? What are the opportunities from a product development, employee engagement, community impact and strategic partnership perspective? What are the pitfalls and risks? This session will share lessons learned from Intel's experiences working with partners to deploy technology in some of the most challenging environments on earth. We will explore the application of technology to improve education, health, and agricultural productivity, and the importance of human capital, open communication and shared expectations.

*Luke Filose* works in Intel’s Corporate Responsibility Office where he manages the Intel Education Service Corps. IESC is an employee engagement program that provides technical assistance to NGOs and governments deploying Intel solutions in developing countries. Luke has extensive sales and marketing experience in emerging markets in the technology and renewable energy sectors and has also managed NGO projects on the ground in Africa. Luke was a Peace Corps volunteer in Mauritania where he focused on microfinance and business education. He has a BA and MBA from UC Berkeley with an emphasis on social entrepreneurship and corporate social responsibility.

Keynote:
**IT Innovations for Human Rights, Civic Engagement and Humanitarian Development**

*Camille Crittenden*, Deputy Director, CITRIS (Center for Information Technology Research in the Interest of Society)

Innovations in online and mobile tools have sparked new means of public engagement, promoted government transparency and accountability, and strengthened democratic practices around the world. This presentation will examine the implications for democracy, human rights, and humanitarian missions stemming from new technology. It will consider the intended and unintended effects on elected officials and policymakers, international donors and public agencies, and the constituencies they serve. Case studies will include open data projects, crisis mapping initiatives, and new platforms for engaging voters and beneficiaries of humanitarian interventions. We will also discuss issues of the “digital divide,” consider which voices may be omitted from online representations, and explore ways to overcome these barriers to participation.

*Camille Crittenden* serves as Deputy Director of CITRIS (Center for Information Technology Research in the Interest of Society), Director of the Data and Democracy Initiative, and Executive Director of the Social Apps Lab. Prior to coming to CITRIS in 2012, she was Executive Director of the Human Rights Center at Berkeley Law, where she helped to develop its program in human rights, technology, and new media. She has written and spoken widely on these topics, as well as technology applications for civic engagement, government transparency and accountability, and the digital divide. She held previous positions as Assistant Dean for Development with International and Area Studies at UC Berkeley and in development and public relations at University of California Press and San Francisco Opera. She earned an MA and Ph.D. from Duke University.
IEEE SIGHT Workshop on Creating Local Impact

This workshop aims to discuss ideas on how engineers can engage themselves and their local peers in helping the community using technology. SIGHT is a global community of locally-focused engineers who inspire, enable, and connect with their peers and partners to solve local problems by deploying, developing, demonstrating, educating or advocating engineering and technology based solutions. 50+ SIGHTs in 18 countries are working on activities and projects in the fields of education, communication, energy, health and assistive technology. We will discuss the work and vision of some these groups and brainstorm on the challenges and opportunities we have in collaborating with communities.

Section Chair: Nirupama (Niru) Prakash Kumar
Facilitators: Kartik Kulkarni, Chair, IEEE SIGHT Steering Committee
            Alfredo Herrera, Chair, IEEE SIGHT Engagement Subcommittee
            Anand B, Chair, Madras SIGHT, India
            Holly S Brown, SIGHT Program Manager, IEEE

Niru is heavily involved with IEEE and is currently an Ambassador for IEEE’s Community Solutions Initiative (CSI), a signature program of the IEEE Foundation. She is helping CSI with strategies for women entrepreneurship based rural electrification projects in India. She also serves on the IEEE SIGHT Steering Committee. In the past she has served on IEEE’s Humanitarian Ad Hoc Committee whose primary responsibility is to set direction and policies for IEEE member engagement in Humanitarian activities. She has also served as IEEE’s Region 6 (Western US, Alaska and Hawaii) Women in Engineering coordinator helping set up various women in engineering groups for the benefit of IEEE women engineers and also for helping in K12 outreach efforts for engineering.

Kartik works for Oracle Corporation's Data and In-memory Technology Group in Redwood City, USA. In 2009, Kartik led his team winning IEEE Presidents’ Change the World Competition for the project – Electronic Aids for physically and mentally challenged children. Kartik believes that IEEE can be a strong global taskforce of volunteers committed to championing technology solutions for development and solving community problems. This taskforce if oriented and channeled could produce local community leaders in important efforts such as activism, awareness, advocacy, and deployment of technology based solutions.

Alfredo Herrera is an electrical engineer with over 16 years of experience in digital design and verification (ASIC/FPGA), radio system performance verification, technical project management and manufacturing test engineering. He is a senior radio performance verification engineer at Ericsson, and he is experienced in measurement and automation of multi-standard software defined cellular radios. Alfredo is currently finalizing a Master degree in Systems Science and his thesis is on Open Source Hardware for human development at the University of Ottawa.

Anand B is an Entrepreneur and is the Co-founder & Director of Trentz Interactive Services Private Limited. Prior to this, he was working as Projects Analysis & Management Lead for Innovation eXperience. He is an Electrical & Electronics Engineer by education, who is primarily interested in social innovation models and technologies that can enable equitable socio-economic developments. Anand has organized and volunteered for about 125+ events with IEEE and received 15+ recognitions and various prestigious awards for his outstanding leadership & services to IEEE. He has also received other awards like IEEE Region 10 Humanitarian Technology Activities Project Award & IEEE Region 10 Student Paper Award.

Holly Schneider Brown is Program Manager, Corporate Activities at IEEE, where she supports the Humanitarian Ad Hoc Committee (HAHC), including the Special Interest Groups on Humanitarian Technology (SIGHT) Steering Committee. She is the program manager of the Engineering for Change (E4C) Webinar Series and serves on the advisory committee for the Global Humanitarian Technology Conference (GHTC) 2013. Holly holds a BA from Vassar College, Poughkeepsie, NY and an MA from the Freie Universität Berlin, Germany. With over 10 years of professional experience in program and project management, Holly is the IEEE staff lead in developing and executing the SIGHT program.
<table>
<thead>
<tr>
<th>Time</th>
<th>Paper ID</th>
<th>Paper Title</th>
<th>Author Names</th>
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</thead>
<tbody>
<tr>
<td>10:30am</td>
<td>7</td>
<td>LED street lighting as a strategy for climate change mitigation at local government level</td>
<td>Roberto Barraza*, Gilberto Velazquez-Angulo, Jaime Romero-González, Edith Flores Tavizón (UACJ); José Huertas-Cardozo (ITESM Campus Toluca)</td>
</tr>
<tr>
<td>11:10am</td>
<td>195</td>
<td>Design of an Effective and Economical Bus Commune System</td>
<td>Chandan M*, Dr. K.V. Mahendra Prashanth, Goutham S P (SJB Institute Of Technology)</td>
</tr>
<tr>
<td>11:30am</td>
<td>226</td>
<td>Investigating the Influence of Length and Cross Sectional area on Stratification of a Rock bed Heat Storage</td>
<td>Amos Veremachi*, B.C.Cuamba (Eduardo Mondlane University); Ole J.Nydal, J.Lovseth (NTNU); Azhar Zia (Uppsala University)</td>
</tr>
<tr>
<td>11:50am</td>
<td>252</td>
<td>3D Thermal Model of Power Electronic Conversion Systems for Wind Energy Applications</td>
<td>Canras Batunlu (Manchester Metropolitan University)</td>
</tr>
<tr>
<td>12:10pm</td>
<td>173</td>
<td>Economically Designed Solar Car for Developing Countries (Pakistan)</td>
<td>Muhammad Farooq* (BTU Cottbus, Germany); Adil Salman (Dublin Institute of Technology, Ireland); Sohaib Ahmad Siddiqui (BTU Cottbus, Germany); Muhammad Ibrahim Khalil (UET Lahore, Pakistan); Wasim Mukhtar (The University of Bradford, UK)</td>
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<td>Time</td>
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<tr>
<td>10:30am</td>
<td>144</td>
<td>Exo-supportive Device for Individuals with Restricted Mobility</td>
<td>Dmitry Klishch*, Sean Horn and Bruno Rocha (Algonquin College)</td>
</tr>
<tr>
<td>10:50am</td>
<td>147</td>
<td>LIFESUIT Exoskeleton Gives the Gift of Walking so They Shall Walk</td>
<td>Monty Reed (They Shall Walk .org)</td>
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<tr>
<td>11:10am</td>
<td>158</td>
<td>Multidisciplinary Design of Suitable Assistive Technologies for Motor Disabilities in Colombia</td>
<td>Ricardo Chavarriaga*, Maria Norah Hurtado, Marcela Bolaños, Jose Angel Loaiza Quintero, Juan Manuel Mayor Torres, Manuel Vicente Valencia Diaz, Jaime Aguilar-Zambrano, (EPFL)</td>
</tr>
<tr>
<td>11:30am</td>
<td>172</td>
<td>Seating Fabrication System for Clinical Rehabilitation Settings in Low Income Countries: The Experience of Mexico and Colombia</td>
<td>Jorge Letechipia*, Abel Arredondo, Luis Hernandez (CITeR, Universidad Iberoamericana); Aldo Alessi (Instituto Nacional de Rehabilitacion); Andres Torres, Robinson Torres, Yeison Montagut (CITeR Escuela de Ingenieria de Antioquia)</td>
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<tr>
<td>11:50am</td>
<td>197</td>
<td>BCI and Motion Capture Technologies for Rehabilitation based on Videogames</td>
<td>John Muñoz*, Julian Villada (HCI Group, Colombia); Ricardo Chavarriaga (EPFL)</td>
</tr>
<tr>
<td>12:10pm</td>
<td>222</td>
<td>Technologies for Rehabilitation: Problems and Opportunities in the Physiotherapy Clinic at PUC Minas – Brazil</td>
<td>Angélica Rodrigues de Araújo*, Márcia Drumond das Chagas e Vallone, Thelma Virginia Rodrigues, Carlos Augusto Paiva da Silva Martins, Plínio Soares Paolinelli Maciel, Isabella Cristina Dante Perdigão, Sarah Gladys Fernandes Amaral (PUC Minas – Brazil)</td>
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</tbody>
</table>
## Technical Paper Session D3: Disaster, Connectivity, and Communication Track
10:30am – 12:30pm   SALON A

Session Chair: Joe Decuir

<table>
<thead>
<tr>
<th>Time</th>
<th>Paper ID</th>
<th>Paper Title</th>
<th>Author Names</th>
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<tbody>
<tr>
<td>10:30am</td>
<td>20</td>
<td>Civil Information Integration and Interoperability</td>
<td>Gerard Christman* (Femme Comp Inc.); Brian D. Fila (MPMS-Oahu, LLC)</td>
</tr>
<tr>
<td>10:50am</td>
<td>150</td>
<td>Probabilistic Density Based Adaptive Clustering Scheme to Improve Network Survivability in WSN</td>
<td>Jitender Grover*, Reena Rain (MMU, Sadopur)</td>
</tr>
<tr>
<td>11:10am</td>
<td>209</td>
<td>Towards Semi-Automated Satellite Mapping for Humanitarian Situational Awareness</td>
<td>Stefan Voigt*, Elisabeth Schoepfer (German Aerospace Center); Christoffel Fourie, Alexander Mager (DLR)</td>
</tr>
<tr>
<td>11:30am</td>
<td>170</td>
<td>MicroFilters: Harnessing Twitter for Disaster Management</td>
<td>Andrew Ilyas* (Waterloo Collegiate Institute)</td>
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</table>

11:50am

12:10pm
## Technical Paper Session D4:
**Humanitarian Challenges and Opportunities Track**

10:30am – 12:30pm   SALON B

**Session Chair: Amy Wood**

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<tr>
<th>Time</th>
<th>Paper ID</th>
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<tbody>
<tr>
<td>10:30am</td>
<td>15</td>
<td>Technological Uncertainty: Exploring factors in Indian Start-Ups</td>
<td>Susmita Ghosh*, Bhaskar Bhowmick (IIT Kharagpur)</td>
</tr>
<tr>
<td>10:50am</td>
<td>135</td>
<td>Crowdfunding as a Catapult for Innovation in the Middle East: Obstacles and Possibilities</td>
<td>Rafat Abushaban</td>
</tr>
<tr>
<td>11:10am</td>
<td>225</td>
<td>Bottom-up Integration of Data-aware Communities – Some Initial Work in Kapgari village Community</td>
<td>Ranjan Sen*, Bulbul Sen (Kapgari Inc)</td>
</tr>
<tr>
<td>11:30am</td>
<td>244</td>
<td>Application and Modification of Design for Manufacture and Assembly Principles for the Developing World</td>
<td>Amy Wood*, Charles Wood, Christopher Mattson (Brigham Young University)</td>
</tr>
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11:50am

12:10pm
### Technical Paper Session D5:
**Water and Agriculture Track**

**10:30am – 12:30pm**  
**SALON L**

**Session Chair:** Ed Perkins

<table>
<thead>
<tr>
<th>Time</th>
<th>Paper ID</th>
<th>Paper Title</th>
<th>Author Names</th>
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<tbody>
<tr>
<td>10:30am</td>
<td>227</td>
<td>Remote Delay Tolerant Water Quality Monitoring</td>
<td>Christie Ritter*, Mallory Cottingham, Alan Mickelson, Jared Leventhal (University of Colorado at Boulder)</td>
</tr>
<tr>
<td>10:50am</td>
<td>255</td>
<td>Helios: A Solar Sterilization and Distillation Unit for Water for Resource-Poor Settings</td>
<td>Yatindra Patel* (Carnegie Mellon University); Christine Sidoti; Jinie Haytko; Gryphon Drake; Anshul Dhankher; Gihoon Song</td>
</tr>
<tr>
<td>11:10am</td>
<td>305</td>
<td>Implementation of Electrochemical Sensors in Arsenic-contaminated Areas of West Bengal in India toward Rapid and Point-of-Use Detection of Arsenic in Drinking Water</td>
<td>Unyoung Kim*, Jessica VanderGiessen (Santa Clara University); Xavier Savarimuthu (Xavier College)</td>
</tr>
<tr>
<td>11:30am</td>
<td>52</td>
<td>Sanitation Revolution: Combining User-Centric Approach with Novel Sit-Squat and Filtration Technologies</td>
<td>Rebecca Byler*, Jasmine Burton, Erin Cobb, Brandie Banner (Georgia Institute of Technology)</td>
</tr>
</tbody>
</table>

11:50am

12:10pm
State of the Art Mobile Communications: Mobile Emergency Operations Center (MEOC):
Kenneth Dueker, Director of Emergency Services, Office of Emergency Services, City of Palo Alto

This bus-sized mobile command vehicle is capable of serving as a back-up EOC, an Incident Command Post (ICP), and a back-up Public Safety Answering Point (PSAP) 911 Center.

The MEOC features a full interoperability system (Sytech RIOS), capable of transmitting or patching on a wide spectrum of frequencies from HF through microwave. In addition, the MEOC has a satellite dish for voice and data. The MEOC also includes a Barrett HF NVIS radio system, capable of communicating with the National Guard, the military, State OES, and other entities.

The MEOC is used about every other week, on average, and is often deployed to:

• Stanford Football Games: Such mass gatherings are not only identified as a high-risk target by the U.S. Department of Homeland Security, but have always been a priority for PAPD and the Stanford University Department of Public Safety (DPS). The MEOC serves as a communications and command post for PAPD, PAFD, and Stanford DPS staff.

• Calls for Service: In cases ranging from major criminal incidents (such as homicides), mutual aid requests, SWAT or other extended operations, the MEOC has been deployed.

• VIP & Presidential Visits: When the President visits Palo Alto/Stanford, the MEOC serves as the locus of our command and the Secret Service liaisons. Other VIPs, such as foreign dignitaries, may also be supported by MEOC deployment.

Kenneth Dueker, J.D., is the Director of Emergency Services for the City of Palo Alto and has held that position since 2011. Dueker joined the Palo Alto Police Department in the 1990s as a Reserve Officer and, later, worked full-time. He served in the Field Services Division (Patrol) as well as the Investigative Services Division (Detectives) in general law enforcement as well as special projects, later, reporting directly to the City Manager and to the Chief.

Dueker previously was a corporate emergency planner for the Atlantic Richfield Company (ARCO) where he developed life safety and disaster recovery contingency plans for the protection of company personnel and facilities. These plans and programs were tested and validated during the Northridge Earthquake of 1994.

Dueker is also the founder of PowerFlare Corporation, a maker of environmentally friendly, rugged LED lighting and signal products for public safety and rescue.

Dueker completed graduate school at Harvard University where he earned a doctorate in law (J.D.) from Harvard Law School. He holds an undergraduate degree, cum laude, from Pomona College (Claremont Colleges). He is also a member of Phi Beta Kappa.
### October 12, 2014 (Sunday)
**Technical Paper Session E1: Energy Track**
1:30pm – 3:30pm  SALON K

Session Chair: Daniel Soto

<table>
<thead>
<tr>
<th>Time</th>
<th>Paper ID</th>
<th>Paper Title</th>
<th>Author Names</th>
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<tbody>
<tr>
<td>1:30pm</td>
<td>136</td>
<td>Economic Viability of Biogas Plant Fuelled by Rubber Latex Water</td>
<td>Powlu Shibu*, Edwin Austine (IEEE)</td>
</tr>
<tr>
<td>1:50pm</td>
<td>223</td>
<td>Community Capacity Building: Collaborative Micro-Hydropower Design in Cameroon</td>
<td>Anne Dare, Tiago Forin, Klein Ileleji, Brent Jesiek*, John Lumkes, Patrick Pawletko (Purdue University)</td>
</tr>
<tr>
<td>2:10pm</td>
<td>243</td>
<td>Humanitarian Technology Research Group: Developments at the University of Adelaide</td>
<td>Cristian Birzer*, Paul Medwell, Peter Kalt (The University of Adelaide)</td>
</tr>
<tr>
<td>2:30pm</td>
<td>264</td>
<td>Potentials of Biogas Production and GHG Mitigation in Guatemalan Dairy Farms</td>
<td>Nicole Miranda*, Malcolm McCulloch (University of Oxford); Andrés Chicol</td>
</tr>
<tr>
<td>2:50pm</td>
<td>298</td>
<td>An Experiential and Global Competition Approach for Sustainable Energy Conception, and Development of Skills of Future 21st Century Engineers: The Experience of Shell Eco-Marathon</td>
<td>Mahmoud Abdulwahed (Qatar University)</td>
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<td>3:10pm</td>
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</table>
## Technical Paper Session E2: Health Track

1:30pm – 3:30pm  
SALON M

### Session Chair: Nick Massetti

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<tr>
<td>1:30pm</td>
<td>110</td>
<td>MyVox – Device for the Communication Between People: Blind, Deaf, Deaf-blind and Unimpaired</td>
<td>Fernando Ramirez-Garibay*, Joel Huegel (Tecnológico de Monterrey, Guadalajara Campus); Alejandro Federico Eufracio Aguilera; Cesar Millan Olivarria</td>
</tr>
<tr>
<td>1:50pm</td>
<td>115</td>
<td>Four Tasks of a Robot-assisted Autism Spectrum Disorder Diagnostic Protocol: First Clinical Tests</td>
<td>Damjan Miklic, Frano Petric*, Zdenko Kovacic, Anja Babic, Kruno Hrvatinic, Maja Cepanec, Sanja Simlesa, Jasmina Stosic (University of Zagreb); Luka Malovan (FER, University of Zagreb)</td>
</tr>
<tr>
<td>2:10pm</td>
<td>217</td>
<td>HearThat? – An App for Diagnosing Hearing Loss</td>
<td>Silvia Figueira*, Kevin Nguyen, Shweta Panditrao (Santa Clara University)</td>
</tr>
<tr>
<td>2:30pm</td>
<td>242</td>
<td>Novel Smartphone Attachment for Ophthalmic and Otoscopic Exams</td>
<td>Amanda Fujiki, Kirsten Johnson, Quinn Tate* (University of Utah); Matthew Wells</td>
</tr>
<tr>
<td>2:50pm</td>
<td>302</td>
<td>A Sensor Based Virtual Piano Biofeedback System for Stroke Rehabilitation</td>
<td>Jiang Lu, Ting Zhang*, Fei Hu, Mengcheng Guo, Lv Wu (University of Alabama)</td>
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<td>Time</td>
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<tr>
<td>1:30pm</td>
<td>161</td>
<td>KOM (Keep Out Mosquitoes) Project: Anthropo-philic Terraforming and Manipulation of Landscapes for Mosquito Vector Control in Malaria Disease Management and Eradication</td>
<td>John-Thones Amenyo*, Sangeeta Jadoonanan, Salim Gnabode, Tahseen Tabassum, Aerren Kublal (York College, CUNY)</td>
</tr>
<tr>
<td>1:50pm</td>
<td>290</td>
<td>Development of a Mobile-Based Hand Vein Biometrics for Global Health Patient Identification</td>
<td>Richard Fletcher*, Rujia Zha, Varsha Raghavan (MIT); Miriam Havercamp, Patricia Hibberd (MassGeneral Hospital for Children)</td>
</tr>
<tr>
<td>2:10pm</td>
<td>218</td>
<td>Applications of Wood’s Lamp Technology to Detect Skin Infections in Resource-Constrained Settings</td>
<td>Holly Cardillo, Jennifer Kohler*, Ellie Kriner, Khanjan Mehta (Penn State University)</td>
</tr>
<tr>
<td>2:30pm</td>
<td>356</td>
<td>Incorporating User Needs into Product Development for Improved Infection Detection for Malaria Elimination Programs</td>
<td>Paul LaBarre*, Kelly Ebels, Chris Crudder, Christine Clerk, Sarah McGray, Kendall Magnuson, Kathy Tietje (PATH)</td>
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<tr>
<td>2:50pm</td>
<td>358</td>
<td>Diagnostics to Support Malaria Elimination: Choosing an Appropriate Biomarker to Target the Subclinical Plasmodium Falciparum Transmission Reservoir</td>
<td>Paul LaBarre*, Kenneth Hawkins, Robert Burton (PATH)</td>
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<td>3:10pm</td>
<td>265</td>
<td>Limitations of Hemozoin as a Diagnostic Biomarker for Malaria</td>
<td>Matthew Horning*, Charles Delahunt, Benjamin Wilson, Michael Hegg, Maurizio Vecchione, (Intellectual Ventures Laboratory); Joshua Proctor (Institute for Disease Modeling)</td>
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<tr>
<td>1:30pm</td>
<td>70</td>
<td>Next Generation Data Classification and Linkage: Role of Probabilistic Models and Artificial Intelligence</td>
<td>Gayan Hettiarachchi*, Azusa Ebisuya (Osaka University); Dhammika Hettiarachchi (The University of Tokyo); Nadeeka Hettiarachchi (National Institute of Genetics)</td>
</tr>
<tr>
<td>1:50pm</td>
<td>124</td>
<td>Hack for the Homeless: A Humanitarian Technology Hackathon</td>
<td>Natalie Linnell*, Silvia Figueira, Vincente Ciancio, Lauren Falzarano, Neil Chintala (Santa Clara University)</td>
</tr>
<tr>
<td>2:10pm</td>
<td>331</td>
<td>OpenPLC – An Open Source Alternative to Automation</td>
<td>Thiago Alves*, Thelma Virginia Rodrigues (Pontifical Catholic University Minas Gerais); Mario Buratto (PUC/MG)</td>
</tr>
<tr>
<td>2:30pm</td>
<td>166</td>
<td>MedizDroids Project: Ultra-Low Cost, Low-Altitude, Affordable and Sustainable UAV Multicopter Drones For Mosquito Vector Control in Malaria Disease Management</td>
<td>John-Thones Amenyo*, Olajide Oladipo, Daniel Phelps, Folly Sewovoe-Ekuoe, Sangeeta Jadoonanan, Sandeep Jadoonanan, Tahseen Tabassum, Salim Gnabode, Tanging Sherpa, Michael Falzone, Abrar Hossain, Aerren Kubal (York College, CUNY)</td>
</tr>
<tr>
<td>2:50pm</td>
<td>303</td>
<td>Affordable Altered Perspectives: Making Augmented and Virtual Reality Technology Accessible</td>
<td>Ahmed Amer*, Phillip Peralez (Santa Clara University)</td>
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October 12, 2014 (Sunday)
Technical Paper Session E5:
Humanitarian Challenges and Opportunities Track
1:30pm – 3:30pm   SALON L

Session Chair: Rob Melich

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<tr>
<td>1:30pm</td>
<td>261</td>
<td>Youth StreetConnect – Helping Homeless Young Women</td>
<td>Silvia Figueira*, Kelsey Dedoshka, Katie Le, Kaitlin Kirasich (Santa Clara University); Deb Levine (YTH)</td>
</tr>
<tr>
<td>1:50pm</td>
<td>169</td>
<td>Designing and Developing Sustainable Housing for Refugee and Disaster Communities</td>
<td>Rob Melich* (Agile 3D Technology LLC); Stuart Ohlson (Humanitarian House LLC)</td>
</tr>
<tr>
<td>2:10pm</td>
<td>55</td>
<td>Project Jagriti: Crowdsourced Child Abuse Reporting</td>
<td>Dhruv Chand*, Sreecharan Sankaranarayanan, Chandramouli Sharma (NITK Surathkal)</td>
</tr>
<tr>
<td>2:30pm</td>
<td>241</td>
<td>Developing a Low Cost Educational Device for the Learning Disabled: Outcomes and Learnings</td>
<td>Niranjan Uma Shankar (IEEE)</td>
</tr>
<tr>
<td>2:50pm</td>
<td>224</td>
<td>Low-Cost Intelligent Gesture Recognition Engine for Audio-Vocally Impaired Individuals</td>
<td>Rishikath Chandrashekaran* (Sri Venkateswara College of Engineering); Harini Sekar, Gautham Rajagopal (Easwari College of Engineering); Rajesh Ramesh, Vineeth Vijayaraghavan (Solarillion Foundation)</td>
</tr>
<tr>
<td>3:10pm</td>
<td>263</td>
<td>CharityNet – Online Crowd-Charity System Driven by Social Psychology and Performed through Social Dissemination of Charity</td>
<td>Sinisa Rudan* (Electrotechnical Fac, Belgrade); Sasha Rudan (Oslo University); Bojana Radovanovic (University of Cambridge)</td>
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</table>
October 12, 2014 (Sunday)
Special Session F1: Panel Session
4:00pm – 5:30pm   SALON K

Session F1-1 (4:00pm to 6:00pm) #293

Human Trafficking: Research Perspectives on Challenges and Opportunities for Innovation

Nicole Bryan (Montclair State University); Rane Johnson (Microsoft Research); Sasha Poucki (Montclair State University); Sue McIntyre; Mary Leary (Catholic University of America)

Microsoft Research and Microsoft Digital Crimes Unit have partnered in spearheading research on the relationship between technology and human trafficking. The results reveal unexpected findings that highlight a more complex and nuanced ecosystem than originally hypothesized. The messiness of the relationship between technology and trafficking provides reason for caution and underscores the need for a holistic approach to viable, ethical and sustainable technological solutions.

As more technologists want to get involved in this field, we want to share learning on best practices and engage in open dialogue on how to create a viable way forward for technological innovation in this space. The panel seeks to share examples of well-intentioned efforts that may cause more harm than good and spark new conversation around responsible technological innovation. Our aim is to stimulate dialogue around how to ask the right questions to understand the areas in which technological disruptions can better enable or facilitate the decrease in human trafficking while ensuring those who are vulnerable or at risk for victimization are not harmed in the process. We invite participants to join us in an interactive discussion on how to work across sectors to make a difference and learn from other global humanitarian efforts.

This session will share insights and findings from academic researchers and practitioners engaged in research on the role of technology in human trafficking. The session is explicitly interdisciplinary and interactive; it seeks to engage the audience in active problem solving around challenges and opportunities for creating responsible intervention to combat human trafficking through technological innovation. The panelists will discuss research conducted in collaboration with experts in computer science, business, ethics, law, social psychology and human rights. It is designed to spark a new conversation, stimulate audience interaction and share lessons learned.

The panel chair is Rane Johnson-Stempson, Principal Research Director of Microsoft Research Outreach. The panelists include Nicole Bryan, Director of CSR in the School of Business at Montclair State University, Mary Leary, Director of the Experiential Curriculum and Associate Professor of Law at the Catholic University of America and Sasha Poucki, Research Fellow in Management at Montclair State University. The panelists will discuss findings from research funded by Microsoft Research and the Microsoft Digital Crimes Unit.

Rane Johnson-Stempson
Nicole Bryan
Mary Leary
Sasha Poucki
October 12, 2014 (Sunday)
Special Session F2:  Panel Session
4:00pm – 6:00pm   SALON M

Session F2-1 (4:00pm to 5:00pm) #296

Using Technology to Bring Biomedical Innovations to Emerging Markets
Moderator: Jitendra Mudhol, Founder, CollaMeta

Panelists:
Terry Mandel, Founder and CEO, BioMedLink
Dan Desmond, Consultant, The SIMI Group
Kevin Montgomery, Senior Researcher, Center for Innovation in Global Health, Stanford University School of Medicine

Emerging markets and Bottom of Pyramid (BoP) sectors involve tremendous challenges and opportunities to Biomedical innovators. WHO reports that in sub-Saharan Africa, up to 70% of medical equipment stands idle due to lack of power, water, supplies, training and tech-support. A UN report estimates that by 2025, people 60 and older will represent more than 15% of the total population, using disproportionate amount of health resources. The big challenges include regulation, distribution, access and affordability. The opportunity here is to disrupt a $90 Billion market that has 3 Billion customers. The discussion will focus on the role Technology can play to address some of these challenges.

Terry Mandel, CEO of BioMedLink, combines a passion for global health with long, broad experience as a communications strategist, organizational designer, and leadership mentor. She advises diverse clients committed to improving access to biomedical innovation effective in the developing world through supply chain/emerging market business development, strategic product, program, communications design, and collaboration that strengthens innovation. Past clients include Aravind Eye Care System, WE CARE Solar, and organizations bringing translational research and clinical work force development to low-resource settings.

Host of BioMedLink Talks: Innovation, Collaboration & Transformation in Global Health, a podcast series to launch in early 2014, featuring interviews with thought leaders on the forefront of change, Terry was a regional judge for the 2014 Hult Prize, and has been a mentor for the Global Social Venture Competition since 2010. Terry has lectured at Stanford University Graduate School of Business, College of the Arts Design Strategy MBA Program, and John F. Kennedy University School of Management, among others, and been published in The New Paradigm in Business, Executive Excellence, Business Ethics, and San Francisco Business Times. Her pioneering work around marketing with integrity led to an appearance on ABC News Nightline with Ted Koppel.

Dr. Kevin Montgomery is a Senior Researcher at the Center for Innovation in Global Health at Stanford University, and previously the Technical Director of the National Biocomputation Center, where his team developed technologies in computation, visualization, and simulation in medicine and surgery. Research projects include computer-based surgical planning, intraoperative assistance systems, surgical simulators, anatomical atlases, and wireless telemedicine/telemetry. He regularly serves as an advisor for DoD, NIH, NSF, and other agencies, as well as advises and consults with several small, high-tech companies in the Silicon Valley. He earned his PhD in Computer Engineering from the University of California.
Dan Desmond is the Founder and President of The SIMI Group, a leading innovator in healthcare, public health and community health solutions. Long a champion of interoperable standards in healthcare and other domains, he has spearheaded government and nongovernmental transformative change through the application of technology in a meaningful manner. His forte is bringing together government, nongovernment and private sector leaders and stakeholders to achieve a unified vision to develop and implement sustainable solutions to common problems. Since 2010, the Health Resilience Exchange online service has demonstrated the power of public-private collaborations. He is currently a co-Director of the Beacon Educational, Analytical and Coordination Hub (BEACH) initiative to empower decision makers with actionable information in austere and emergency environments.

Jitendra Mudhol, an IEEE Senior Member, is an engineer and an entrepreneur. He is the Founder of CollaMeta, which builds sensors-based Internet-of-Things solutions for monitoring and control in enterprises, in the developed and emerging markets. CollaMeta uses Machine Learning algorithms as part of its architecture. Jitendra is a volunteer at the Global Social Benefit Incubator at the Santa Clara University that has incubated over 200 social enterprises over 10 years. Passionate about innovation, Jitendra is trained and certified to teach the famed “Creativity in Business” course that was taught in the Graduate School of Business at Stanford University. He has an MBA from the Santa Clara University.

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Session F3-1 (4:00pm to 5:00pm) #253

Changing How Technology & Information Is Used During Humanitarian Challenges
Mark Parker (Smart Selling International)

During times of humanitarian challenges or natural disasters information is often slow, inflexible, out of date, or difficult to understand. Yet information can reassure, calm, and empower a community. The concept that I have created will improve how information is generated, gathered and used and hence improve rescue and relief outcomes. By combining social collaboration with augmented reality in a mobile app, we will improve how relief resources are deployed and ensure people can help themselves and those around them. Consider this scenario: Joe has survived a major storm and needs to get to a relief center. He has a vehicle and some supplies; he enters this detail into the app, which nominates a safe route based on real-time data that is being supplied by an aide agency (or Government response agency). The AR feature in the app alerts Joe that another local – Ann has medical expertise but low mobility; the app arranges a meet point with Joe. Both get to safety and the agency logs both movements and Ann’s expertise availability. The app will optimize how local resources are used, and provide new, rich, real-time insights for aide agencies. Importantly, human behavior is now a shared data source that will improve macro and micro-level decision-making, information flow and response outcomes. Whilst the app is still a concept it is unique and also scalable for a number of reasons. 1. It is a combination of both existing technologies and emerging technologies that will improve existing practices. 2. The concept will create new ways to manage resources, particularly micro-resources. 3. Scalability risk decreases as adoption and use increases. Finally, the solution will be built under an open-source framework. This creates opportunities for wide collaboration.

Session F3-2 (5:00pm to 6:00pm) #374

Mobile Training Toolkit (MTT): A Comprehensive and Sustainable Capacity Building Approach for Solar PV Energy Technologies
Bülent Bicer (Arizona State University)

Within the last 20 years, many capacity building initiatives in the developing world on renewable energy technologies have proved to be less effective and practically unsustainable due to the lack of (1) practical and hands-on training materials, complementing theoretical classroom training; (2) integration into the existing educational framework; and (3) training infrastructure for renewable energy within this educational framework. For the past few years, Arizona State University (ASU) has been implementing a highly successful and innovative Vocational Training and Education on Clean Energy (VOCTEC) program in many developing regions in the world. To meet these objectives in a sustainable manner, ASU has developed a complete, portable “out-of-the-box” training center on solar PV technologies (aka Mobile Training Toolkit – MTT) to enable those institutions and their instructors to train technicians and students on the fundamentals, installation, operations and maintenance of solar PV energy systems both, on-campus or on remote communities in a practical and comprehensive way. Nearly 50 MTT units have been produced and integrated into the training infrastructure of educational institutions in the Asia, Africa and the Pacific.
Session F4-1 (4:00pm to 5:30pm) #17

New Zealand Red Cross “Succinct Data” Communication System
Matthew Lloyd (New Zealand Red Cross)

In the past New Zealand Red Cross has had a successful project donating “disaster proof” Iridium satellite phones to Pacific Island Red Cross Societies. Operationally they were a great success but the running costs were a burden. Consequently NZRC has designed a communication system, now at the initial field testing stage, based upon Android smart phones, that can communicate independent of cellular infrastructure, using Wi Fi mesh (Project Serval) and satellite text (Iridium SBD, DeLorme’s InReach device). The result is a tough, inexpensive, very portable, and path diverse system that can collect, collate, analyse and display disaster assessment data very shortly after collection. As well as managing and tracking personnel in the field. NZRC would like to make a presentation followed by a hands on demonstration.

Session F4-1 (5:30pm to 6:00pm) #254

Collaborate.org – A Worldwide Collaboration and Geospatial Infrastructure
Kevin Montgomery (Collaborate.org)

As we look to the future, humankind faces challenges that are increasing, while our resources are ever dwindling. To survive and thrive we need to work together- no one individual or organization, agency or even government can address these global challenges all by themselves. To face these issues, we need to access and integrate many types of multimodal data from many sources, to collaborate with others both inside and outside our own organizations irrespective of geographic location, to develop a shared understanding, better decision-making, and coordinate action.

Collaborate.org is an open global online community of people, working together and sharing resources, expertise and enthusiasm, empowered with advanced collaboration and visualization tools, and all the world’s geospatial data at your fingertips- including real-time sensor data, GIS and database information, news/RSS and social media, and satellite and aerial imagery. It currently hosts over 2.2M layers (over 5PB of data) in a worldwide cloud computing infrastructure, with the easy ability for users to upload and share their own data with those they wish- everything people need to work together in one place to empower them to do Great Things.
X-Track Session F5-1 (4:00pm to 4:30pm)

Humanitarian Robotics and Automation Technology Challenges
Raj Madhavan, IEEE Robotics & Automation Society – Special Interest Group on Humanitarian Technology (RAS–SIGHT)

Robotics and Automation Technologies hold immense promise in transforming people’s lives across various communities around the globe. The IEEE Robotics & Automation Society – Special Interest Group on Humanitarian Technology (RAS–SIGHT) is inviting the academic and non-academic community to participate in Humanitarian Robotics and Automation Technology Challenges (HRATC) with the intended goal of developing robotic systems that are based on applied systems’ methodologies and are cost effective, reliable and efficient. HRATCs provide unprecedented opportunities for robotics and automation researchers and practitioners around the world to collaborate using their skills and education to benefit humanity. The problems (challenges) are framed with the environmental, cultural, structural, political, socio-economic and resource constraints so that solutions can be developed, deployed, and sustained.

As an example of this initiative, I will discuss a recently held landmine clearance challenge (first in the HRATC series) that I co-organized with the intent of producing an open source solution for the age old problem of detecting and classifying unexploded ordnance buried in minefields. According to the UN Mine Action Service, landmines kill 15,000-20,000 people every year (mostly children) and maim countless more across 78 countries. Demining efforts cost US$300-1000 per mine, and, for every 5000 mines cleared, one person is killed and two are injured. Thus, clearing post-combat regions of landmines has proven to be a difficult, risky, dangerous, and expensive task with enormous social implications for civilians. I will also share some of my preliminary thoughts and efforts on disaster relief, environmental surveillance, and monitoring using Unmanned Aerial Vehicles (UAVs) popularly referred to as drones.

Raj Madhavan is with the Institute for Systems Research, and a member of the Maryland Robotics Center at the University of Maryland, College Park. Currently he is on leave working on applying robotics and automation technologies for the benefit of humanity in a variety of domains. His work focuses on the applied use of robotics and automation technologies for the benefit of under-served and under-developed communities by working closely with them to sustain developed solutions. This is made possible by bringing together researchers, practitioners from industry, academia, government, and various entities such as the IEEE Robotics Automation Society’s Special Interest Group on Humanitarian Technology (RAS-SIGHT), NGOs, NPOs and other organizations across the globe. He has held appointments with the National Institute of Standards and Technology (March 2002-June 2013) and the Oak Ridge National Laboratory (March 2001-January 2010). He received his Ph.D. in Field Robotics from the University of Sydney, and an ME (Research) in Systems Engineering from the Australian National University. Dr. Madhavan has been serving as the Vice President of the Industrial Activities Board (2013-2016), Chair of the Standing Committee for Standards Activities (2011-2016), and since Sept. 2012 as the Chair of the Special Interest Group on Humanitarian Technology (SIGHT), all within the IEEE Robotics and Automation Society.

For more details, see [http://www.isr.umd.edu/faculty/madhavan](http://www.isr.umd.edu/faculty/madhavan).

He can be contacted via email at rajmadhavan.tech4humanity@gmail.com.
Microgrid Examples and Discussion
Moderator: Nathan Johnson, Polytechnic School, Arizona State University

Microgrids are becoming an increasingly common means for providing electricity to villages, peri-urban areas, hospitals, businesses and industrial parks. Early applications of microgrids provided power to off-grid villages away from a centralized electric grid, with more recent applications in sections of a centralized grid that experience poor power quality or outages. Much of this growth has been driven by declining costs of renewables and storage, increasing costs of grid electricity and fossil fuel, and new power electronics and controls technologies. Please join us in a town hall discussion of recent advancements and examples of microgrids.

October 12, 2014 (Sunday)
Social Event and Awards Ceremony
6:30pm – 9:30pm   California Ballroom

Region 6 Individual Awards

Catherine Blackadar Nelson
For outstanding service to the members of Region 6 through tireless work and leadership of the continued growth of the Global Humanitarian Technology Conference.

Russell Kinner
For outstanding performance to the members of Region 6 serving as a key resource to many Sections in the Region, providing financial and NetSuite guidance to emerging leaders and supporting the development of Region 6 strategies.

Edward Perkins
For outstanding performance for the members of Region 6 through your leadership and organizational skills in the planning and execution of numerous Region 6 events including the Global Humanitarian Technology Conference and SusTech.
Region 6 Director Corporate Awards

Large Company of the Year
Innovative Contributions to Advancing Technology
The company has redefined innovation through designing and building some of the world’s most advanced memory and semiconductor technologies.

Micron Technology is being recognized for product innovations that impact the value and performance of products in which they are used.

Small Company of the Year
Innovative Contributions to Advancing Technology
The company creates smart, thoughtfully designed products that connect people to the vast world of entertainment.

VIZIO is being recognized for the design and development of high quality, consumer friendly entertainment systems including intuitive Smart TV products.

Large Company of the Year
Innovative Contributions to Humanitarian Technology
The company researches and develops new technologies by partnering and creating a collaborative environment between industry and academia.

Samsung is being recognized for the support of community events, creating an environment of service and the development of applicable medical technology that improves the lives of people around the world.

Small Company of the Year
Innovative Contributions to Humanitarian Technology
The company develops and uses technology to create positive social change.

Benetech is being recognized for the continued commitment to community improvement through literacy, environmental and human rights initiatives.

Outstanding Large Company of the Year
Contributions to Engineering and Engineering Professionalism
The company is a technology and innovation leader specializing in defense, security and civil markets throughout the world. Raytheon provides state-of-the-art electronics, mission systems integration and other capabilities in the areas of sensing; effects; and command, control, communications and intelligence systems; as well as a broad range of mission support services.

Raytheon and Raytheon Space and Airborne Systems is being recognized for supporting the engineering profession by actively promoting employee involvement in engineering societies and STEM outreach initiatives.
Outstanding Small Company of the Year
Contributions to Engineering and Engineering Professionalism
The company is a financial services, merchant services aggregator and mobile payments company.
It markets several software and hardware products and services.

Square, Inc. is being recognized for actively engaging technical staff, providing needed resources and serving as an excellent example of corporate social responsibility in the support of essential STEM initiatives.

Education and Public Outreach Organization
Contributions to Engineering Education and Engineering Professionalism
The company continues to play a pivotal role in delivering and managing an investment strategy in purpose-driven innovation, research and education to spur greater businesses opportunities, further investments and new technology sector growth.

Science Foundation Arizona (SFAz) is being recognized for continued efforts and leadership in STEM education initiatives and building a strong collaborative network of community and technical organizations to improve public understanding of the importance of engineering education.
The Global Humanitarian Engineering Awards have been developed to recognize the contribution that both organizations and individuals make to improve the lives of those less fortunate in the world. In 2013 the inaugural award winners, Dr. Ashifi Gogo and iDE Product Development showcased the exceptional thinking that is taking place to improve the standard of living in poverty stricken parts of the world.

The GHEA have made a statement to the field of humanitarian engineering through honoring innovation and change that can make a difference. The 2013 Humanitarian Engineer of the Year accolade received by Dr. Ashifi Gogo for his Sproxil Mobile Produce Authentication system has seen the product used over 5 million times in the developing regions of Africa and Asia.

**Humanitarian Engineer of the Year**
Honor and reward the extraordinary achievements of a single engineer, who has had marked positive effects on the quality of life of marginalized communities. The ultimate aim is to draw attention to successful undertakings that may serve as models for other in the field of humanitarian engineering. The prize will recognize effectiveness as well as vision. There will be one finalist from each global region. Note that there is no requirement for a formal qualification in engineering to win the award.

**Humanitarian Engineering Project of the Year**
Honor and reward the extraordinary achievements of a project or program that has had marked positive effects on the quality of life of marginalized communities. The prize will recognize effectiveness as well as vision. There will be one finalist from each global region.
We Care Solar: Bringing the First 100 Watts to Last Mile Health Centers

Laura Stachel, We Care Solar and UC Berkeley (Blum Center for Developing Economies)
Brent Moellenberg, We Care Solar

Laura Stachel was studying obstetric care in an urban state hospital and surrounding clinics in Nigeria, she found a surprising result. Lack of reliable electricity was a major factor for maternal and infant mortality, even in grid-connected buildings. Women with pregnancy complications were unable to obtain life-saving care, for lack of light and electricity-dependent equipment, despite the availability of trained medical personnel.

Partnering with her husband, Hal Aronson, and engineer Brent Moellenberg, they developed a technology – the Solar Suitcase – and an organization – We Care Solar – to address the problem. Starting with pilot programs in Nigeria, Haiti, and Liberia, We Care Solar began installing Solar Suitcases in last mile health centers. Over the last four years, the organization has had a global reach, deploying hundreds of Solar Suitcases to rural clinics and hospitals in Africa and Asia. We Care Solar conducts training workshops to build local capacity in Solar Suitcase installations, usage and maintenance.

In this talk, Dr. Stachel and Mr. Moellenberg discuss the initial design criteria for the early Solar Suitcases, the iterative nature of designing technology for last mile health centers, and the challenges and delights of bringing this technology to scale.

Dr. Laura Stachel is the co-founder and Executive Director of We Care Solar, an award-winning non-profit that designs and delivers solar-powered solutions to health centers to improve maternal and newborn health outcomes. Her husband, Dr. Hal Aronson, designed the first “Solar Suitcase” for Nigerian health care in 2009. Dr. Stachel is an obstetrician-gynecologist with fourteen years of clinical experience. She received her MD from University of California, San Francisco, and MPH from UC Berkeley. She is a Staff Specialist at the Blum Center for Developing Economies at UC Berkeley.

Dr. Stachel was the Principle Investigator of a MacArthur Foundation funded study on Solar Suitcases in northern Nigeria and Uganda. Laura co-chairs the United Nations Foundation Practitioners’ Working Group on Energy and Health, and is a strong advocate for using renewable energy to enhance rural health care. Laura has received numerous honors, and was a 2013 CNN Top Ten Hero for her work with We Care Solar.

Brent Moellenberg is a Mechanical Engineer originally from Colorado, now living and working in San Francisco. He has been traveling to work with PV power systems in developing countries since 2005, and has designed and installed off-grid systems in some of the most remote areas throughout Africa and Haiti. In 2010, he joined We Care Solar as Lead Engineer helping to design and implement the Solar Suitcase, a self-contained off-grid solar power and lighting solution currently used in nearly 800 medical clinics in over 20 countries.
Trends in Engineering for Global Development
Iana Aranda, Senior Program Manager, Engineering for Global Development Sector, ASME

This talk will be focus on products targeting those living in poverty, hurdles to implementation of fit-for-service products, the role of standards and present a new mechanism for product design and development.

Iana Aranda is a Senior Program Manager of the Engineering for Global Development sector at ASME, a not-for-profit professional organization that enables collaboration, knowledge sharing and skill development across all engineering disciplines, while promoting the vital role of the engineer in society. Her primary focus at ASME is on the design, development and implementation of a portfolio of programs in emerging markets, social innovation and sustainable design. Iana also serves as the Senior Programs Architect for Engineering for Change, LLC (E4C) – a global alliance of 15 organizations and 21,000+ individuals dedicated to promoting sustainable and accessible technology-based solutions for underserved communities. In this role, she has guided the development of E4C’s digital platform, content strategy, and partnerships with technical societies, NGOs and other organizations involved in developing and deploying essential technologies.

In addition to her role at ASME, Iana has served as the President of the Engineers Without Borders (EWB-USA) New York Professional Chapter for over 4 years where she administered projects in Kenya, Cambodia, Peru, El Salvador and Uganda and managed strategic development, partnerships, volunteer leadership, operations and new project design. Iana has over 10 years of experience in academic, research and nonprofit sectors focusing on the intersection of engineering design, business development and social responsibility. Her unique professional background has established her as a knowledge broker and global connector with networks extending across science, technology, education, and global development sectors. Iana is an active agent for social change, with a proven record of creative problem solving and bridging diverse communities.

www.engineeringforchange.org
October 13, 2014 (Monday)
Program Summary

7:00am
Registration (1st Floor Lobby)
Breakfast (Mezzanine Level)

8:00am – 9:00am
Monday Plenary (California Ballroom)

Allyson Cote, Maternova
"The Lifecycle of Innovations and Technologies for Empowering Women & Girls Worldwide"

9:00am – 10:00am
Invited Speakers for Each Track

- Energy Track – 9:00 - Ray Larsen (CSI), 9:30 - Bulent Bicer (ASU) (SALON K)
- Health Track – 9:00 - Muhammed Zaman (BU), 9:30 - Mario Aleman (SIGHT Nicaragua) (SALON M)
- Disaster, Connectivity & Communication Track – 9:00 - Eric Rasmussen (HIS), 9:30 - Laura Jacob (Palantir) (SALON A)
- Humanitarian Challenges and Opportunities – 9:00 - Lisha Sterling (GWB), 9:30 - John Crowley (HHI) (SALON B)
- Water and Agriculture – 9:00 - Scott Bornheimer (Becton-Dickinson), 9:30 - John Coonrod (The Hunger Project) (SALON L)

10:30am – 12:30pm

- Panel Session: Humanitarian Technology Innovation @ Silicon Valley, and the arise of Social Enterprise (San Jose Ballroom)
- Energy Track – Technical Paper Session G1 (SALON K)
- Health Track – Technical Paper Session G2 (SALON M)
- Humanitarian Challenges and Opportunities – Technical Paper Session G4 (SALON B)
- X-Track Session G5: (SALON L) Human-centric Health: Empowering People with 24/7 Personalized Monitoring, Yasunori Kimura (CEO, Fujitsu Laboratories of America)

12:30pm – 1:30pm
Lunch and Exhibits (Mezzanine Level)
1:30pm – 3:30pm

Lightning Talks

- Energy Track Session H1 (SALON K)
- Health Track Session H2 (SALON M)
- Disaster, Connectivity, and Communication Session H3 (SALON A)
- Humanitarian Challenges and Opportunities Session H4 (SALON B)
- Water and Agriculture Session H5 (SALON L)

4:00pm – 5:30pm

Closing Plenary

- John McKnight, Salvation Army
  "From Crab Pots to Micro Chips: How Technology Has Been Applied To Humanitarian and Disaster Relief through the Last Century"

- Steve Hipskind, NASA
  "How the View from Space Improves Life on Earth"

October 13, 2014 (Monday)

Monday Plenary
8:00am – 9:00am  California Ballroom

Keynote:
The Lifecycle of Innovations and Technologies for Empowering Women & Girls Worldwide

Allyson Cote, Co-founders of Maternova, Inc.

The Lifecycle of Innovations and Technologies for Empowering Women & Girls Worldwide

The number of girls and women living in poverty around the world is growing disproportionately in relation to men. The fundamental lack of basic health care, education, and personal safety is trapping girls in poverty. In many countries, giving birth, is the single most dangerous thing a woman can do. Over 2.3 million women and newborns will not survive the experience of birth this year. Their lives are cut needlessly short. Though the day of birth is the day of gravest danger, the solutions start in childhood and even before that… In utero! There are a growing number of revolutionary entrepreneurs and innovators developing sustainable solutions for improving the outcomes and quality of life for women and girls. Maternova is pleased to share our insight into how the commercialization and deployment of exciting disruptive technologies and novel innovations are reducing preventable mortality. Simple innovations touching every stage of girls’ development are needed to improve both personal and community benefits over a lifetime.

Allyson E. Cote is Maternova’s Co-Founder and Vice President. A serial entrepreneur, Allyson has cofounded two successful startup companies, Shape Up, Inc a global wellness platform and SaaS revolutionizing social networking as part of health, along with Alessandra Gold, Inc. a cutting edge global apparel and footwear ecommerce retailer with offices in three countries. She attended the University of Massachusetts graduating with a degree in Sociology. Currently she is working towards an MBA in Advocacy and Policy. With Maternova, Inc and Maternova Research, Allyson focuses on proprietary product development and marketing.
The Humanitarian Technology Sustainability Challenge
(9:00-9:30am)
Ray Larsen
Co-Chair of the IEEE Community Solutions Initiative (CSI), SLAC National Accelerator Laboratory, Stanford University

In 2008, in collaboration with IEEE, UN and Vodafone Foundations, IEEE launched a 3-year pilot program called the Humanitarian Technology Challenge. The program succeeded in creating technology solutions for interconnectivity, medical records and reliable electricity; but sustainability as a market-based business model without constant infusion of charitable or grants funding remains the greatest challenge. The reliable electricity solution developed on the IEEE Community Solutions Initiative SunBlazer 1.5kW charging station now has sufficient field experience to demonstrate sustainable potential, but the real challenge is for each new seeded company must secure venture or loan capital for rapid growth to have the desired high impact on reducing global energy poverty. Meanwhile, continuing IEEE pro-bono professional assistance and up-front donated funding are needed to seed such initiatives, and very tight management and maintenance control is necessary for profitability on the thin income stream of kerosene and candles equivalent. Today a plethora of market based products are becoming available while new technologies continue to expand the range of viable options, which in application are heavily dependent on population density of energy-poor communities. Kerosene and candles replacement is only a beginning to generating the energy growth necessary for broad economic impact. This has also led to realization that achieving community prosperity depends on much more than the availability of modest amounts of electricity, but also on clean water, sanitation, communication, health care and, underpinning all long-term community self-sustainability, community based education[i]. All of these involve growing energy needs and potential sustainable business opportunities, which require future IEEE collaboration with a range of partners. In all cases, business models must demonstrate sustainability to attract the growth funding needed to have impact on the UN Millennium Development Goals to eliminate the worst of world poverty among 1.4 billion people by 2030. This talk will address these issues and the response of IEEE Community Solutions Initiative, now becoming an IEEE Foundation Signature Project.


Ray Larsen is an IEEE NPSS Life Fellow, PES Member and Co-Chair of the IEEE Community Solutions Initiative (CSI) non-profit under sponsorship of the Power and energy and Nuclear and Plasma Sciences Societies. He is a former head of the Electronics Department and currently Special Projects Manager of the Instrumentation and Controls Division at the SLAC National Accelerator Laboratory, Stanford University, and a Past President of NPSS. He founded the IEEE Humanitarian Technology Challenge Community Solutions Working Group which in 2010 became CSI. He led the design and project team for the CSI SunBlazer project in Haiti which obtained IEEE funding to build a total of 15 charging stations which its business partner Sirona Haiti successfully deployed in 15 communities between June 2011 and August 2012. Ray secured the outstanding pro bono help of commercial partners Nextek and Russell Engineering which were critical along with the remarkable field development of Sirona Haiti. At the same time three new Africa partners were secured and continue to develop community electricity in Cameroon, Nigeria and South Sudan. In
addition to seeding ten new startups per year with IEEE Foundation funding, the global vision has been expanded to include Community Based Online Curriculum (CBOC) courses with partners Regis University and Posner Center for International Development as a pillar of sustainable development moving forward.

Ray holds degrees in Electrical Engineering from University of British Columbia (BASc-EE, MASc-EE with thesis) and Stanford University (Degree of Engineer-EE with thesis). He is co-holder of two patents in high speed analog sampling and digitizing chip technology and former President and CEO of a Silicon Valley startup to incorporate the technology into a commercial product line in partnership with a major instrument company investor.

**VOCTEC: A sustainable capacity building initiative for renewable energy technologies (9:30-10:00am)**

Bulent Bicer  
Project Manager, Arizona State University

Within the last 20 years, many capacity building initiatives in the developing world on renewable energy technologies have proved to be less effective and practically unsustainable due to the lack of (1) practical and hands-on training materials, complementing theoretical classroom training; (2) integration into the existing educational framework; and (3) training infrastructure for renewable energy within this educational framework. For the past few years, Arizona State University (ASU) has been implementing a highly successful and innovative Vocational Training and Education on Clean Energy (VOCTEC) program in many developing regions in the world. So far, this innovative approach has yielded in more than 50 certified educators and more than 300 trained male and female solar PV professionals and technicians in Africa, the Pacific and the Caribbean. This session will provide an overview of the program scope, objectives and approach as well as results and impact in communities worldwide year-to-date.

**Bülent Bicer** is a Project Manager at Arizona State University’s Ira A. Fulton Schools of Engineering on the Polytechnic campus. In this position, he designs and implements many of ASU’s international technical training programs and professional development projects in renewable energy and entrepreneurship. Examples include a multi-year Vocational Training and Education on Clean Energy program in the Pacific, Kenya and India, a renewable energy and entrepreneurship program in the Caribbean, Solar Certification for West-Africa and Renewable Energy Entrepreneurship training in the Pacific Islands. He is the co-founder of ASU’s ATIC center which is dedicated for the product/prototyping needs of small businesses and is the co-inventor of ASU’s Mobile Training Toolkit, a portable “out-of-the-box” training center for solar PV technologies and systems for vocational and technical educational institutions. Mr. Bicer is also affiliated with ASU’s Photovoltaic Reliability Laboratory, where he executes solar PV related research projects.

Prior to joining ASU, he was an entrepreneur and held various international sales, marketing and leadership positions in the private sector in Europe and the U.S at global telecommunications and IT companies. Mr. Bicer holds a B.Sc. in Electrical Engineering and a M.Sc. in Industrial Engineering from the Munich University of Applied Sciences. He is a certified Project Management Professional (PMP) and a certified Six Sigma Green Belt.
Saving Lives by Improving Global Medicine Quality: Microfluidics meets Quality Control (9:00-9:30am)

Muhammad Zaman
Howard Hughes Medical Institute Professor of Biomedical Engineering and International Health at Boston University

The World Health Organization estimates that about 10-30% of pharmaceuticals in the world are either substandard or counterfeit. Poor quality medicines indicate a compromised health system that adversely affects health outcomes. It has a major impact on morbidity, mortality and public and individual finances. Additionally, it is also a key contributor to the development and proliferation of drug resistant strains of infections, including TB, malaria and other infections that affect us all, in the developed and the developing world. The human cost is well above the $75 billion annual estimated cost to pharmaceutical industry.

The current and available technologies for screening poor quality drugs can be broadly divided into two categories: high cost, quantitative technologies and lower cost and qualitative technologies. The high-end methods, (e.g. HPLC) can give a precise measurement of active pharmaceutical ingredients (API) concentration, but require trained personnel, advanced lab set up and are not suitable for field testing in resource limited settings. The cost is often prohibitive and leads to no testing whatsoever, leading to further problems. The current alternative is a low cost method, recommended by the WHO, known as the MiniLab. This technology is inexpensive but provides only qualitative results and can not provide any dissolution testing.

In order to address these challenges, we have developed and successfully tested a novel technology, Pharmachck that uses a microfluidic chip based technology, novel molecular probes and an on-chip mixing system to quantify the concentration, dissolution, quality and activity of drugs, all within the same experiment. This technology substantially reduces the cost of testing and has been successfully tested both in the lab and in resource limited settings.

Some of the advantages of the technology include: 1) Improved accuracy, portability and reliability compared with field standard (e.g. Minilab), 2) Ability to carry out dissolution testing 3) Performance as a point-of-care technology in remote settings 4) An inexpensive, disposable and portable microfluidics platform 5) A customizable, modular platform to perform analyses in small spaces.

The focus of this talk will be the global challenge associated with poor quality drugs, the current solutions and their limitations and our solution that is now being scaled in multiple countries and is being considered by public and private sector stake holders at all points in the vulnerable supply chain for life saving drugs.

Muhammad H. Zaman is Howard Hughes Medical Institute Professor of Biomedical Engineering and International Health at Boston University. He is also the Associate Chair of the Department of Undergraduate Affairs and Associate Director of the Kilachand Honors College. Prof. Zaman’s current research is focused on developing robust technologies for the developing world and on capacity building and education in these countries. Technologies developed by Prof. Zaman are in various stages of implementation in multiple countries. Prof. Zaman’s technology, Pharmachck, that is able to rapidly and quantitatively detect substandard and counterfeit medicines, was named one of the ten “world changing idea” by Scientific American in 2013 and was awarded the Saving Lives at Birth Transition to Scale ($2 million) grant in 2014.
Prof. Zaman is actively involved in bringing quality engineering education in the developing countries. He is currently involved in setting up the first biomedical engineering departments at African Universities in Kenya, Zambia, Malawi, Uganda and Ethiopia. He is on the board of Consortium of Universities for Global Health (elected 2014).

He has won numerous awards for his research, teaching and outreach activities from prestigious national and international organizations. His current research is supported by NIH, NSF, USAID, Saving Lives at Birth Consortium, and other private foundations. He is a regular contributor on issues of innovation and global health for the Project Syndicate, Huffington Post and writes a weekly column on innovation and health for a leading Pakistan daily, Express Tribune (owned by the NY Times).

Prototyping Appropriate Medical Technologies for Quality Community Health Services
(9:30-10:00am)

Mario Aleman
SIGHT Nicaragua, Universidad Nacional de Ingenieria

Rural clinics serve over 3 billion people worldwide, and over half of these clinics lack electricity, and appropriate medical technologies. As a result, one often observes elevated post-surgical infection rates in such condition-poor regions. Due to the lack of a local maintenance infrastructure, donation of first-world solutions often end up contributing only to a graveyard of irreparable machines.

In Nicaragua, a developing country located in Central America, there is abundant solar radiation in most rural areas which represent opportunities to mainstream the advancement of medical technology. To address this multi-faceted problem, the Solarclave project harnesses the power of the sun to fuel steam sterilization in an autoclave that is locally manufactured using pre-existing local supply chains and expertise. The Solarclave project aims not only to provide rural clinics with a sustainable and socially integrable device, but also creates better economic opportunities. Furthermore, a prototyping laboratory is being developed with help of IEEE SIGHT Nicaragua, students and professors from Universidad Nacional de Ingenieria UNI and other international universities to provide renewable energy applications and medical technology to fabricate innovative, cost effective and robust devices. Among other solutions being developed for community clinics are: solar-powered weather stations, medical incubators, foot-pump nebulizers, solar-powered cooler for vaccination storage, and other 3D printed DIY (Do-it-yourself applications) applications operated by micro-controllers.

Upon successfully piloting our projects with various clinics, institutions and organizations in Nicaragua, we will look to adapting our devices, capabilities and infrastructure to provide higher quality of rural health service in other communities and developing countries.

Mario Aleman is a Senior Member of IEEE (The Institute of Electrical and Electronics Engineers) from Nicaragua. He received the B.S degree from Universidad Nacional de Ingenieria in Nicaragua and his M.S. degree from Berlin Technical University in Germany both in Electronic Engineering. He has research experience in Photovoltaic technology and renewable energy as a visiting research scholar at Massachusetts Institute of Technology, Arizona State University, and Cornell University. Mario serves as IEEE Nicaragua Section Chair and founder of the Maker Space initiative. Recipient of several young social entrepreneur awards after founding Bright New Ideas in 2006, a non for profit organization dedicated to the design and distribution of solar lanterns in more than 150 underserved communities in Nicaragua. As SIGHT (Special Interest Group for Humanitarian Technology) founder, Mario leads the implementation of community-based projects in technology in communities working closely with academic institutions, both locally and globally. Mario is a VOLT (Volunteer Leadership Training Program) graduate from 2013 with experience developing strategies and generating project ideas to be locally implemented in his section. Mario also serves as a Young Professional YP Chair for CAPANA (Central America and Panama) council in Region 9 and volunteer member for YP leadership and training. He is recipient of Hall of Fame Award for outstanding young professionals groups and also recipient of the IEEE Theodore W. Hissey award, as an outstanding volunteer for the development of young professionals and student activities in Region 9.
System Design in Disaster Response: Providing Clean Water and Restarting
(9:00-9:30am)

Eric Rasmussen
CEO, Infinitum Humanitarian Systems and Core Faculty in Exponential Medicine and Global Grand Challenges, Singularity University

Climate change, environmental degradation, and population vulnerability are all causing a gradual but perceptible increase in the frequency and severity of natural disasters. The communities most at risk in such disasters are those least able to protect themselves from the disruption of critical physical and economic systems. Response teams, acting with the support of national and international agencies, can provide a bridge from the immediate aftermath of an event into a recovery toward normal, but those disaster response teams do not usually remain long enough to see critical systems restored, nor is it their task.

However, some teams are designing a functional deployment extension from response through recovery to reconstruction, focusing on new designs for water and communications that begin in the immediate response phase. One effort is for the urgent, and then ongoing, delivery of purified drinking water at the neighborhood level – 500 to 1000 people at a time. The other is a dedicated technical assessment of communications infrastructure damage to accelerate the rate of recovery and improve resilience during rebuilding. During this presentation we’ll review the historical need for water, power, and comms in developing-world disasters, and explain our recent deployment findings from Supertyphoon Haiyan. We’ll then describe the two practical initiatives under development in water and communications to accelerate response effectiveness, establish long-term improvements in public health, and generate local income in a disaster zone. Please note that there are a number of problems we’ve not yet solved, and we welcome collaboration partners.

Dr. Eric Rasmussen is a medical doctor and the CEO for Infinitum Humanitarian Systems (IHS), a private sector social business built on a profit-for-purpose model. By training he is an internal medicine physician with both undergraduate and medical degrees from Stanford University and a Masters degree in disaster medicine from the UN World Health Organization’s affiliate CEMEC (Centre Europeen pour la Medecin des Catastrophes) in Italy. He was elected a Fellow of the American College of Physicians in 1997.

Rasmussen is a Research Professor in Environmental Security and Global Medicine at San Diego State University and an instructor in disaster medicine at both the International Disaster Academy in Bonn, Germany (BBK, or Bundesamt für Bevölkerungsschutz und Katastrophenhilfe) and the Institute for Disaster Preparedness in Beijing, China.

He is a member of the core faculty at Singularity University within the NASA Ames Research Center, teaching in both the Exponential Medicine and Global Grand Challenges tracks. He also serves as Permanent Advisor to the UN Secretary-General’s High Level Expert Panel on Water Disasters, and is a member of the US National Academy of Science’s Committee on Grand Challenges in Global Development.
Rasmussen served as a physician in the US Navy for 25 years aboard nuclear submarines, amphibious ships and aircraft carriers. He was Fleet Surgeon for the US Navy’s Third Fleet and chairman of an academic department of medicine in Seattle. Among his wartime deployments are Bosnia (x3), Afghanistan (x2), and Iraq for ten months. His disaster deployments include Supertyphoon Haiyan in the Philippines, Haiti’s earthquake, Banda Aceh for the tsunami, and New Orleans after Hurricane Katrina.

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**Grameen + Palantir = Data Driven Agriculture**  
*(9:30-10:00am)*

Laura Jacob  
President, IEEE SSIT

Over the past 18 months, Palantir Technologies has aided the Grameen Foundation in using technology to improve quality of life in the developing world. Focused on the most rural parts of these underdeveloped countries, Palantir is using big data analytics to uncover key insights that can help Grameen in improving lives in those communities. Together, the two hope to “bring technology the last mile.”

Laura Jacob is President of IEEE’s Society on the Social Implications of Technology, and serves on IEEE’s Humanitarian Committee. She is a Software Engineer for Palantir Technologies in Palo Alto, California. She holds a Bachelor’s Degree in Computer Science from Pace University.

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**I Change the World. I am an Engineer.**

- I think small.  
  “It took me years to understand the basic principles of technology and how they can be used to improve our lives.” —Sara, software engineer

- I work in medical robotics.  
  “I love working with cutting-edge technology and developing new ways to use it to improve people’s lives.” —Emily, medical roboticist

- I love people and technology.  
  “I work with people and technology every day. I love being able to see the impact of my work.” —Tara, tech manager

- I was inspired by my father.  
  “My father was a computer engineer. He always encouraged me to pursue my passions.” —Alex, software developer

- I create ocean power.  
  “I love creating sustainable energy solutions. It’s important to me to make a difference.” —Sarah, renewable energy engineer

- I am practical and logical.  
  “I enjoy solving complex problems and finding creative solutions.” —J ohn, systems architect

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**IEEE Women In Engineering**

Read more about women in engineering at  
[www.ieee.org/women](http://www.ieee.org/women)

IEEE 2014 GHTC Page 75
October 13, 2014 (Monday)
Invited Speaker:
Humanitarian Challenges and Opportunities
9:00am – 10:00am   SALON B

Session Chair: Joe Decuir

Beyond the Hackathon: accelerating open source projects toward sustainability
(9:00-9:30am)

Lisha Sterling
Executive Director, Geeks Without Bounds

Geeks Without Bounds (GWOB) supports open source humanitarian projects through a combination of hackathons and an accelerator program that takes promising projects through six months of mentorship towards long term sustainability. In this talk, we’ll look at a cross section of the hardware and software projects that GWOB supports both in the accelerator and on an ad hoc basis, sharing some of the lessons that we’ve learned along the way. We’ll look at how projects grow through a series of hackathons and what happens in between the code sprints. We’ll also discuss how you or your project team can get involved so that we can improve humanitarian digital response together.

Lisha Sterling is the executive director at Geeks Without Bounds, an accelerator that supports open source humanitarian projects through hackathons and mentorship. She is listed in the P2P Foundation’s list of 100 Women Co-Creating The Peer To Peer Society. She has been a software developer for over 20 years. She brings that experience together with her formal education in Latin American Studies and early work experience in international aid and refugee support to help engineers and those who work in crisis response build common languages for working on a wide range of challenges.

Making Crisis Legible: Opening Data across the Disaster Cycle
(9:30-10:00am)

John Crowley
Harvard Humanitarian Initiative

Coordinated action requires both shared information and a mechanism to exchange it. The new Humanitarian Exchange Language and efforts around open data at The World Bank, UN Office for the Coordination of Humanitarian Affairs, World Food Programme, and other major players are changing the structure of information flows before, during, and after crisis. But no one is putting all the LEGOS together yet, and coordinated action is still faltering. This talk will examine the current major open data projects for crisis, survey the major challenges around the technologies and policies, and explore what would an integrated humanitarian data system might look like.

John Crowley mobilizes technologists, humanitarians, and policy makers to build multi-institutional solutions to big problems in crisis response. He is a consultant to the Global Facility for Disaster Reduction and Recovery at The World Bank Group, an adviser to the Humanitarian Data Exchange at UN Office for the Coordination of Humanitarian Affairs, and a researcher at the Harvard Humanitarian Initiative. John holds an MPA from Harvard’s Kennedy School of Government’s, where he was the Robert C. Seamans, Jr. Fellow in Science, Technology, and Public Policy. He also holds an MA in History of Ideas and an MusB in Cello Performance and Music History & Literature from Boston University. He tweets at @jcrowley.
October 13, 2014 (Monday)
Invited Speaker:
Water and Agriculture
9:00am – 10:00am   SALON L

Session Chair: Ed Perkins

**Point of Care CD4 Testing for HIV/AIDS Patient Management: the BD FACSPresto™**

(9:00-9:30am)

Scott J. Bornheimer
Staff Scientist, R&D, BD Biosciences

The BD FACSPresto™ Near-Patient CD4 Counter* measures absolute CD4+ cell counts, %CD4, and total hemoglobin (Hb) from a single drop of fingerstick or venipuncture blood for staging and monitoring HIV/AIDS patients. This system requires minimal training to operate and can process 10 tests per hour. Features include a user-friendly touchscreen, unitized dry reagent cartridge, onboard reagent and instrument QC, and automated data analysis. This talk will discuss the technology and performance of the BD FACSPresto system in testing HIV/AIDS patient samples.

*Product under development, not available for sale or use

Dr. Scott Bornheimer received a Ph.D. in Chemistry and Biochemistry from the University of California, San Diego focused on investigating heterotrimeric G-protein signaling through mathematical modeling, fluorescent biosensors, and live cell imaging. Since that time he has led a group in point of care diagnostics at BD Biosciences in development of the BD FACSPresto.

**Smart Villages: Resilience, Gender and Decentralization**

(9:30-10:00am)

John Coonrod
Executive Vice President, The Hunger Project

The majority of the world’s poor are women food farmers, and the constraints to their ability to lift themselves out of poverty are enormous and complex, and are compounded by the challenges of climate change. This talk will explore holistic strategies based on a systems approach to empowering women to overcome these challenges in Asia, Africa and Latin America, and will discuss the degree to which lessons learned from these strategies can be adapted to country-wide programs to achieve the forthcoming UN Post-2015 Sustainable Development Goals (SDGs).

**John Coonrod** is the Executive Vice President of The Hunger Project and is a former research physicist. Over the past 30 years, Dr. Coonrod has helped develop bottom-up, holistic poverty-reduction strategies in more than a dozen countries across Africa, South Asia and Latin America. He is an expert in gender and local democracy, and is the primary author of the UN-sponsored annual State of Participatory Democracy Report. He has been interviewed on BBC, CNN and NBC television and has lectured at the United Nations, Columbia University, Massachusetts Institute of Technology (MIT), New York University (NYU), Princeton University and the United States Air Force Academy.
October 13, 2014 (Monday)
Panel Session: Humanitarian Technology Innovation @ Silicon Valley, and the arise of Social Enterprise
10:30am – 12:30pm   San Jose Ballroom

Humanitarian Technology Innovation @ Silicon Valley, and the arise of Social Enterprise
– Co-organized by IEEE Santa Clara Valley Section - Consumer Electronics Society

Moderator: Professor Radha Basu, Director, Frugal Innovation Lab, Santa Clara University

The panel discussion will introduce some of the humanitarian technology innovations that are being developed at the Silicon Valley in Northern California, the birthplace of numerous high tech companies. This would provide an opportunity for various institutes and organizations to share knowledge and experience based on the humanitarian technology projects that they have developed, and to exchange ideas and visions on the future directions of the technology development.

Some of the questions to be addressed by the panel include:
1) What are the most urgent and critical humanitarian problems to be solved?
2) Can the state-of-the-art product and technology be extended and applied to humanitarian applications?
3) What are the key technologies for humanitarian applications that have been validated which are yet to be productized?
4) What could be the process of product realization and commercialization of new technology that can be applied to humanitarian applications?
5) What would be the essential factors for the projects or products to be scalable and sustainable?
6) What could be the biggest roadblocks to the successful realization and deployment of humanitarian technologies?
7) Could social enterprises solve humanitarian problems?

Panelist:
1. Erica Weirich, MA, MD, Founder & Director, Global Health Research Foundation

2. Orin Laney, PE, CEO, Atwood Research
   “Where are the philosophers? Where are the systems engineers?”
   This year’s Global Humanitarian Technology Conference, as in past years, features information on projects scattered across the technology spectrum. Glaring in omission is discussion of how these pieces fit together, or should fit together, trends and the meaning behind them, and consideration of the proper staging sequences for inserting technology into the lives of those who need it. As we look at major humanitarian crises currently in the news, we read of wars and refugees, droughts and economic stress, and the ravages of the Ebola virus, currently on track for deaths in the hundreds of thousands. What priorities do these crises suggest? What is the proper division between small scale efforts and large ones, and between those that most naturally are those of the public or private sectors? We need the larger conversations that provide the “view from 10,000 meters”.

3. My T. Le, MEng, PhD
   • Founding Director, Stanford Gap for Good
   • Lecturer, Electrical Engineering Department, Stanford University
   • Board of Director, Global Health Research Foundation

4. Silvia Figueria, PhD, Associate Professor, Computer Engineering, Santa Clara University
Radha Ramaswami Basu has over 35 years of experience in technology management. She is widely recognized as a leading woman entrepreneur in hi-tech companies and as a pioneer in the Indian software business. Radha spent twenty years at Hewlett Packard in engineering and general management. In 1985 she founded the company’s operations in India and set up the first software center of any multinational in Bangalore. She then became General Manager of Hewlett Packard Electronic Business Software Division, which she grew to a $1.2 billion global business.

Radha held the position of Chairman & CEO at Support.com from July 1999 to May 2006. She led the company through initial and secondary public offerings in 2000 and 2003, and built it into a worldwide market leader in support automation software.

In 2006, Radha and her husband Dipak created the Anudip Foundation, a social enterprise in India with the mission of generating livelihood opportunities for marginalized people through market aligned skills training in information technology and micro entrepreneurship. Anudip has impacted more than 22,000 rural women and youth to obtain livelihoods in the new economy. In 2011, Radha founded and is CEO of iMerit Inc., a technology services company www.iMerit.net that has pioneered the ‘smartsourcing model’ with Anudip trained graduates working on web enabled IT services for global customers.

Radha is currently serving as Director, Frugal Innovation Lab at Santa Clara University and sits on the boards of NetHope, Santa Clara University CSTS and Jhumki Basu Foundation. Radha has won numerous awards including Excelsior Leadership, Top25 Women of the Web, CEO of the Year 2000, Leader of the Millennium, and has been profiled in the Wall Street Journal, Business Week, Upside Magazine and Economic Times. She has featured as a guest speaker at Oxford University, Wharton, MIT Sloan, Stanford Business School, Santa Clara University, and the Forbes Executive Summit.

Dr. Erica Weirich will discuss the Global Health Research Foundation (http://www.ghrf.org), which combines health development and respect for culture with Silicon Valley technology and resources. GHRF deploys information technology tools for rapid outcomes access and data utilization, to support sustainable health development in medically underserved areas. GHRF solutions have improved efforts to identify outbreaks, and treat and control disease. Using medical and technology assessments, and tools and business strategies for rapid cycle testing, GHRF is working to ensure that functioning solutions are made sustainable, scalable and transferable. Dr. Weirich is the founder and director of Global Health Research Foundation, a practicing physician in Los Altos, and Adjunct Professor of Medicine at Stanford University School of Medicine.

Orin E. Laney is the CEO of Atwood Research, a consultancy specializing in electronic development and regulatory compliance. He is a senior IEEE member, holds MBA and MSEE degrees, and is a registered Professional Engineer in the state of California. As an author and public speaker he has visited many college campuses on behalf of the IEEE to lecture on professional and career matters. Originally a native of the Washington, D.C. area, Mr. Laney now makes his living in Silicon Valley.
My Le received her BS in Electrical Engineering from UC Davis in 1983. Le proceeded to obtain MS and PhD degrees in Electrical Engineering from UC Berkeley. Her thesis was in the area of integrated circuit design and computer architecture and she is first author on several publications. Le later joined a start-up company, Granite Systems, and continued to work there after the company was acquired by Cisco Systems. Dr. Le's research and industry efforts have been at the cutting edge of Internet technology and have resulted in major advances and revenue. At Cisco, Le gained very extensive design/development experience in networking components and experience with both start-up environment and large company politics. Le is currently a Lecturer of EE at Stanford and has taught several courses in the EE department. She is also the founding director of the Stanford Gap For Good Program.

Silvia Figueira is an Associate Professor of Computer Engineering at Santa Clara University. She received her Ph.D. degree in Computer Science from the University of California, San Diego. Her research is in the area of performance evaluation and prediction, recently with a focus on energy efficiency. She is a member of the SCU Frugal Innovation Lab, in which she leads the Mobile Lab and advises students working on mobile applications for underserved communities and emerging markets.
### October 13, 2014 (Monday)
**Technical Paper Session G1: Energy Track**
10:30am – 12:30pm   SALON K

Session Chair: Soon Wan

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<tr>
<th>Time</th>
<th>Paper ID</th>
<th>Paper Title</th>
<th>Author Names</th>
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<tbody>
<tr>
<td>10:30am</td>
<td>26</td>
<td>Impact of Co-Firing a Traditional Peruvian Biomass Cookstove with Biogas on Emissions and Combustion Efficiency</td>
<td>Manil Poudyal; Alexander Cranney, Matthew Jones*, Randy Lewis (Brigham Young University)</td>
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<tr>
<td>10:50am</td>
<td>27</td>
<td>Utilization of Infrared Photography to Assess Heat Losses in a Peruvian Cookstove</td>
<td>Cameron Quist, Randy Lewis*, Matthew Jones (Brigham Young University)</td>
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<tr>
<td>11:10am</td>
<td>47</td>
<td>A Global Review of End User Needs: Establishing the Need for Adaptable Cookstoves</td>
<td>Kendall Thacker*, McCall Barger, Christopher Mattson (Brigham Young University)</td>
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<tr>
<td>11:30am</td>
<td>118</td>
<td>Domestic Biogas Digesters in Developing Countries: Performance and selection of appropriate design for mass dissemination</td>
<td>Jerome Mungwe*, Emanuela Colombo (Politecnico di Milano)</td>
</tr>
<tr>
<td>11:50am</td>
<td>238</td>
<td>Energy Storage integrated Solar Stove: A case of solar Injera baking in Ethiopia</td>
<td>Asafaw Tesfay*, Ole Nydal (NTNU); Mulu Kahsay (EiT-M)</td>
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<td>12:10pm</td>
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<tr>
<td>10:30am</td>
<td>145</td>
<td>Healthcare Geopolitics in Urban Slums: an Empirical Study</td>
<td>Laura Zalzala*, Ali Zalzala (CommunityTracks, USA and Institute of Management Technology, UAE); V S Parasaran; Sanjeev Prashar (IIM Raipur)</td>
</tr>
<tr>
<td>10:50am</td>
<td>178</td>
<td>Analysis of Informational and Technological Requirements for the Respiratory Therapy Workshops in Peru</td>
<td>Mila Kwiatkowska*, Les Matthews (TRU)</td>
</tr>
<tr>
<td>11:10am</td>
<td>188</td>
<td>Effective Utilization of Low Cost Incineration and Its By-Products in India</td>
<td>Shyam Swaroop Nigam* (Tata Elxsi); ADIL USMAN (Reva institute of technology)</td>
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<tr>
<td>11:30am</td>
<td>208</td>
<td>Designing Sustainable Revenue Models for CHW-Centric Entrepreneurial Ventures</td>
<td>Jonathan Callan*, Phillip Sundin, Stephen Suffian, Khanjan Mehta (Pennsylvania State University)</td>
</tr>
<tr>
<td>11:50am</td>
<td>306</td>
<td>Measuring Activities and Counting Steps with the SmartSocks – An Unobtrusive and Accurate Method</td>
<td>Ting Zhang, Jiang Lu*, Fei Hu, Ke Bao, Yeqing Wu (University of Alabama)</td>
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Safety and Security for Healthcare Workers in West Africa

As of 05 October the Ebola crisis has infected more than 8,000 people and killed more than 4,000 in Liberia, Guinea, and Sierra Leone. The medical support staff in those countries have also suffered enormous losses, with more than 700 healthcare workers infected and more than 300 dead of the disease. The White House and USAID have scheduled an all-day meeting and second-day workshop on 10-11 October on the topic "How can we improve the safety and security of healthcare workers in the Ebola Crisis".

IEEE GHTC speaker Dr. Eric Rasmussen was selected by the White House for that set of Friday and Saturday meetings, and will be flying directly from DC to this GHTC meeting the day after, bringing an understanding of Ebola crisis needs and opportunities into this Monday workshop. Dr. Rasmussen will establish a brief foundation and context, then describe the specific problems under evaluation, discuss briefly some of the options suggested in DC, and then start a deeper conversation around what else might be done, and why, and how. Please join us.

Dr. Eric Rasmussen is a medical doctor and the CEO for Infinitum Humanitarian Systems (IHS), a private sector social business built on a profit-for-purpose model. By training he is an internal medicine physician with both undergraduate and medical degrees from Stanford University and a Masters degree in disaster medicine from the UN World Health Organization’s affiliate CEMEC (Centre European pour la Medecin des Catastrophes) in Italy. He was elected a Fellow of the American College of Physicians in 1997.

Rasmussen is a Research Professor in Environmental Security and Global Medicine at San Diego State University and an instructor in disaster medicine at both the International Disaster Academy in Bonn, Germany (BBK, or Bundesamt für Bevölkerungsschutz ind Katastrophenhilfe) and the Institute for Disaster Preparedness in Beijing, China.

He is a member of the core faculty at Singularity University within the NASA Ames Research Center, teaching in both the Exponential Medicine and Global Grand Challenges tracks. He also serves as Permanent Advisor to the UN Secretary-General’s High Level Expert Panel on Water Disasters, and is a member of the US National Academy of Science’s Committee on Grand Challenges in Global Development.
### Technical Paper Session G4:
#### Humanitarian Challenges and Opportunities Track

10:30am – 12:30pm   SALON B

Session Chair: Nathan Johnson

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<tr>
<td>10:30am</td>
<td>187</td>
<td>Mobile-Enabled Delay Tolerant Networking in Rural Developing Regions</td>
<td>Adriano Galati*, Theodoros Burchas, Sandra Siby, Seth Frey, Maria Olivares, Stefan Mangold (Disney Research Zurich)</td>
</tr>
<tr>
<td>10:50am</td>
<td>347</td>
<td>Breaking Into Social Nervous System – Architecture for Reality Mining</td>
<td>Deepak Vashisth, Himanshu Sharma (MD University Rhotak)</td>
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<td>11:10am</td>
<td>361</td>
<td>Project Stay Alert!</td>
<td>Nayan Jeevagan, Pallavi Santosh, Rishabh Berlia, Shubham Kandoi (R.V. College of Engineering)</td>
</tr>
<tr>
<td>11:30am</td>
<td>362</td>
<td>RFID Based Vehicle Identification During Collisions</td>
<td>Nayan Jeevagan, Pallavi Santosh, Rishabh Berlia, Shubham Kandoi (R.V. College of Engineering)</td>
</tr>
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11:50am

12:10pm
Human-centric Health: Empowering People with 24/7 Personalized Monitoring
Yasunori Kimura*, Ajay Chander, Surya Josyula (Fujitsu Laboratories of America)

In this talk, Yasunori Kimura, president of Fujitsu Laboratories of America, will present an overview of Fujitsu Laboratories’ Human-centric approach to using information and communications systems to create an intelligent society. The talk will focus on Fujitsu Lab’s research in building an anytime, anywhere ubiquitous health sensing platform. The platform can aggregate and synchronize multiple continuous, high data rate sensor streams and perform insightful calculations on those multiple streams in real-time. The result is a system that allows a person to better understand their physiological wellbeing at the present and better safeguard their own future health. The talk will describe this system’s evolution from a netbook based platform to a piece of purpose built hardware all the way through embedment in a Fujitsu smartphone or other mobile device. Various real-world use cases and trials will also be discussed. Additionally, the talk will cover a few other aspects of the Human-centric Intelligent Society (HCIS) such as the smart cane and body-area networks (BANs).

Mr. Kimura joined Fujitsu Limited in 1981. Throughout his career, he has been engaged primarily in computer system design and development. Some of the projects he contributed to include: the development of a compiler for parallel inference machines used on the Japanese fifth generation computer system, energy efficient server systems, and supercomputers. He spent a summer at Stanford University as a visiting scholar in 1995, and served as a visiting professor at the University of Tokyo for four years from 2002.

Mr. Kimura transferred to Fujitsu Laboratories of America in November, 2009, and in 2011, was appointed as president & CEO. Mr. Kimura’s personal interests include reading and walking, and wine tasting is his new hobby since he came to California
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<tr>
<td>1:30pm</td>
<td>10</td>
<td>Harnessing Electricity on the Zambezi River</td>
<td>Steve Szablya (Seattle University)</td>
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<tr>
<td>1:50pm</td>
<td>109</td>
<td>The Centrality of Electricity for Internet Uptake in Low-income Countries</td>
<td>Laura Hosman* (Cal Poly); Laura Armey (Naval Postgraduate School)</td>
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<tr>
<td>2:10pm</td>
<td>116</td>
<td>Engineering Students Solving Global Humanitarian Technological Needs: Seeking Client</td>
<td>Anneliese Watt*, Ashley Bernal, Scott Kirkpatrick (Rose-Hulman Institute of Technology)</td>
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<tr>
<td>2:30pm</td>
<td>268</td>
<td>Power Generating Wind Turbine</td>
<td>Andrew Stephens*, WIDE; Steven Jensen, Noah Prince, Oscar Bi</td>
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<td>338</td>
<td>Opportunity for New technologies relevant to response/recovery – Transformative Reductions in Operational Energy Consumption (TROPEC)</td>
<td>LaTonya Jordan (Oak Ridge National Laboratory)</td>
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<td>3:10pm</td>
<td>76</td>
<td>Ideal Energy Project Implementation Model for Off-Grid Regions</td>
<td>Ifeanyi Orajak*, Chuka Eze (GVE Projects Ltd)</td>
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October 13, 2014 (Monday)  
Lightning Talk Session H2: Health Track  
1:30pm – 3:30pm  SALON M

Session Chair: Sylvia Figueira

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<td>Charles Onu (Fisher Foundation)</td>
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<td>Smartphone-Based Imaging Devices for Nano-Object and Small Molecule Detection in Resource-Limited Settings</td>
<td>Qingshan Wei*, Aydogan Ozcan (University of California)</td>
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<td>Advancing Electricity-Free Molecular Diagnostics at the Point-of-Care: Optimizing the NINA platform for a Malaria LAMP Assay</td>
<td>Paul LaBarre*, Robert Burton, Jered Singleton, Dylan Guelig, Kenneth Hawkins, Onyinye Edeh, Bernhard Weig (PATH); Josh Buser (University of Washington Department of Bioengineering)</td>
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<td>Use of Mobile Phone, Tablets and EMR in Global Health</td>
<td>Bobby Jefferson (Futures Group)</td>
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<td>Hacking the How (So Your What ≠ So What!): Matching Biomedical Innovation with Developing World Markets</td>
<td>Terry Mandel (BioMedLink)</td>
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<td>Scaling a Tele-Health Project in Nicaragua</td>
<td>Pritpa Singh (Villanova University)</td>
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<td>Build Back Better – Reconstruction of Balakot Town After 2005 Earthquake</td>
<td>Muhammad Abrar* (ERRA Pakistan)</td>
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<td>After Typhoon Haiyan: Using TV White Spaces to Provide Emergency ICT Services</td>
<td>Harley Sitner*, Paul Garnet (Microsoft)</td>
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<td>Hyper Local Digital Manufacturing in the Immediacy of Need</td>
<td>Ashley Dotz* (3DPforHealth); Eric James, Andrew Lamb, Nick Haan (Field Ready)</td>
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<td>Global Earthquake Forecasting System</td>
<td>Friedemann Freund (SETI Institute/NASA); Patrick Hogan (NASA); Kevin Montgomery* (Collaborate.org)</td>
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<td>Poverty of Relationship Can Also Be Overcome With Technology: The Sharing Economy</td>
<td>Darin Petersen, Valerie Anderson, Brett Anderson (Common Change); Lee Voth-Gaeddert, Daniel Oerther* (Missouri S&amp;T)</td>
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<td>Big Data Analysis of Trends in Phone Calls Record to Improve the Phone Communications</td>
<td>Carlos Badenes Olmedo* (DIA (UPM)); Susana Muñoz Hernandez (DLSI (UPM))</td>
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October 13, 2014 (Monday)
Lightning Talk Session H4:
Humanitarian Challenges and Opportunities Track
1:30pm – 3:30pm  SALON B

Session Chair: Beryl Bellman

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<td>Beryl Bellman* (Cal State LA); Shekar Viswanathan (National University)</td>
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<td>Public Participation in Power Generation – An Assessment Through SPV in India</td>
<td>Abrar Ahmad*, Anwar Siddiqui (Jamia Millia Islamia)</td>
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<td>Machine Learning in the Service of Social Entrepreneurs</td>
<td>Jitendra Mudhol* (CollaMeta)</td>
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<td>Array Antenna Technology for Hard of Hearing and Humanity</td>
<td>James Johnson* (Vortis Technology Inc.)</td>
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<td>The Top Hardware Challenges of ICT in the Developing World</td>
<td>Laura Hosman* (Cal Poly); Bruce Baikie (Inveneo)</td>
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### October 13, 2014 (Monday)
**Lightning Talk Session H5:**
**Water and Agriculture Track**
1:30pm – 3:30pm   SALON L

Session Chair: Alan Mickelson

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<td>Matthew Lloyd* (New Zealand Red Cross); Colin Pawson (Enertec Marine)</td>
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<td>A Solar-Pumped Domestic Water Supply for the Mountains of Rural Haiti</td>
<td>Eric Sabelman*, Trudy Reagan, Rose Ashford, Elisee Abraham, Randy Mont-Reynaud (IPCF-Helping Hillside Haiti)</td>
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<td>91</td>
<td>Multi-Stage Organic Water Filter System</td>
<td>Eobin George* Gaurav Tiwari (MIST)</td>
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<td>3:10pm</td>
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</table>
October 13, 2014 (Monday)
Closing Plenary
4:00pm – 5:30pm   California Ballroom

Plenary #1:
From Crab Pots to Micro Chips: How Technology Has Been Applied To Humanitarian and Disaster Relief through the Last Century
John A. McKnight, Director, Emergency and Disaster Services, The Salvation Army San Francisco Metro and Golden State Division

In my presentation, I will leverage from history and personal experiences in Humanitarian and Disaster Response to show how technologies, from the simple to the complex, have aided people in recovering their lives.

John McKnight is the Director of Emergency and Disaster Services for The Salvation Army in San Francisco and the Golden State Division, an area that encompasses a third of California. He has over 25 years of combined experience in Emergency and Disaster Preparedness, Industrial Safety, and Business Resiliency planning. A Navy Veteran, he spent 10 years managing pharmaceutical manufacturing facilities before transitioning into the non-profit sector. As a former Board member of the American Red Cross in Marin County and a shelter manager, he helped plan for county and bay area wide responses by the Red Cross in the event of major disasters. He served as shelter manager during both the Loma Prieta earthquake and the Oakland hills fire. His unique combination of military, industrial, and community emergency preparedness backgrounds comes out in his lively presentations to educate and assist communities in their disaster preparedness planning.

Plenary #2:
How the View from Space Improves Life on Earth
Steve Hipskind, Chief, Earth Science Division, NASA Ames Research Center

NASA has been observing the Earth from space for over 40 years. It embarked on a very ambitious program of “Earth System Science” utilizing our unique perspective from space in the 1990’s with a program called the Earth Observing System or EOS. Many space faring nations have entered the Earth observation fray, indeed much of the focus of other space programs is on Earth observation. More recently there has been tremendous commercial interest in space-based Earth observation, especially here in Silicon Valley, with companies like Planet Labs and Skybox Imaging, the latter having just been purchased by our search friends to the north.

There is now an incredible wealth of observations of the Earth. The challenge is that turning these observations into actionable information is not trivial. NASA leads the world in making its Earth observation data publically available. Google Earth has completely changed the way people access and use geospatial data. I will talk about these and other efforts at NASA Ames to make important information about the Earth more readily accessible to a much broader community of users.

Steve Hipskind is the Chief of the Earth Science Division at NASA Ames Research Center. The division is primarily a research group working on global to local problems in Earth system science using NASA’s unique perspective from space. The Division focuses on atmospheric and ecosystem science and technology development. It is comprised of over 100 scientists, engineers and technical support personnel using observations from space and specialized aircraft. The division has a heritage of scientific discovery and application of NASA science and technology for societal
benefit. Recent studies have focused on pollution transport into and out of North America, tropical cloud systems and climate impact on the water cycle as well as coastal ocean processes, including coral reefs and algal blooms. The division has led the nation in the use of Unmanned Aerial Systems (UAS) for Earth observations. It has a major collaborative effort with the NASA Advanced Supercomputing Division at Ames developing the NASA Earth Exchange (NEX), a unique, leading edge system to provide better access to NASA’s Earth observations, models and analytical tools.

Mr. Hipskind began his career at the National Center for Atmospheric Research and then at Oregon State University before coming to NASA Ames. He has conducted research in stratosphere-troposphere exchange and led the early development of the Ames’ Earth Science Project Office into the premier NASA group for managing national and international airborne field campaigns. His field work has taken him from Punta Arenas, Chile on the Straits of Magellan to Kiruna, Sweden above the Arctic circle, and many latitudes and longitudes in between.
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IEEE Graduate Student Member

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Community Solutions Initiative (CSI) is a not-for-profit member group of IEEE (Institute of Electrical & Electronics Engineers) - the largest technical professional association in the world - committed to open-source design and delivery of energy solutions to the world's poorest and most energy-deprived populations.

**Our Mission** - To use renewable energy and technology to improve lives of people in remote communities in a sustainable way.

**Our Vision** - To enable non-government organization (NGO) partners to provide access to basic electrical services for 50 million people within 10 years.

**Our Members are Volunteers** - We are dedicated professionals who sense a unique opportunity in history to help eradicate global poverty. We all work pro-bono...educators, doctors, entrepreneurs, business leaders, CEOs, members of boards and heads of NGOs interested in assisting developing countries.

A technical team is developing advanced plug-and-play features for the main modular building block. Others are working on advanced solar energy, wind generation, hydro and other low-cost off-grid power applications. Each of these devices offers an energy solution that could work in rural areas depending on the size of need.

Other members are developing social enterprises and self-sustaining business models in concert with NGOs and providers. CSI is bringing together a coalition of thousands of like-minded citizens who are helping small business entrepreneurs in energy-deprived populations grow.

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Plenary: Salons D-G, J, H (California Ballroom)
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