IEEE-GHTC 2019

9th IEEE Global Humanitarian Technology Conference

October 17-20, 2019

Seattle, Washington, USA

UN SDGs

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Contents

Welcome from the Chair

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Céad Míle Fáilte romhaibh go léir to the 9th annual IEEE Global Humanitarian Technology Conference hosted by IEEE Region 6, Seattle Section and IEEE Society on Social Implications of Technology, Technical Co-Sponsored by IEEE-USA, IEEE Consumer Electronics Society, IEEE Engineering Medicine and Biology Society, IEEE Microwave Theory and Techniques Society, IEEE Power and Energy Society and IEEE Smart Village, with Global Good and IEEE Humanitarian Activities Committee as Patrons.

IEEE GHTC brings together stakeholders from around the world sharing a common interest in addressing societal challenges at home and abroad. Supporting achievement of the UN Sustainable Development Goals (SDGs), GHTC provides a platform for researchers, technologists, engineers, policy makers and practitioners to share knowledge and experiences, build capacity and facilitate relationship building.

This year's program features plenary panels focused on "Disaster Recovery, Disadvantaged Communities and Displaced People" and "Health-Related Issues in Resource Constrained Environments". This is complemented by parallel tracks showcasing activities in Energy, Health, Agriculture, Connectivity, Education, Disaster Mitigation, Water and Sustainable Development.

We have extended the duration of the Plenary Panels, not just to allow more time for discussion but also for delegates to share personal experiences and insight. We are building on the participatory workshop sessions introduced last year through the introduction of a number of Unconference Sessions in the program, allowing delegates to influence topics and issues to be discussed, and share expertise.

Lunches and social events will provide opportunities for delegates and presenters to cluster at specific tables dedicated to discussion and knowledge sharing in specific thematic areas. Please take advantage of these opportunities – all of us have knowledge and experiences to share as well as lessons to learn.

Keynote speakers this year include Neil Sahota, Chief Innovation Officer, University of California (Emerging Technologies Research & Policy Institute), Irvine; Tom Coughlin, IEEE-USA President; and Tess Russo, Portfolio Lead and Research Scientist at Global Good.

On Thursday, there are several special events open to all conference delegates:

- Half-day Workshops (IoT and AI architecture for humanitarian services, Applied Machine Learning for Social Good and Fundamentals of Off-Grid Electrical Systems)
- Student Poster Competition
- Young Professionals Reception

On behalf of the Conference Committee I would like to thank everyone who has contributed to this year's conference – in particular the experts who volunteered their time to provide constructive, actionable feedback to improve the quality and impact of papers in the conference proceedings. Please take the opportunity during and after the conference to share your ideas of how we should continue to innovate as we start preparing for the 10th anniversary of GHTC in 2020.

Prof. Paul M Cunningham
Chair, IEEE GHTC 2019
Dublin, Ireland

Welcome from the Program Chairs

The Program Committee welcomes you to the 9th IEEE Global Humanitarian Technology Conference. We are excited about this year's conference and believe it will help advance technology for the betterment of society.

In the last 8 years, GHTC has established itself as the main conference on humanitarian technology in the US. People from all over the world have gathered every year to learn, present, and discuss new ways to use or develop technology to help impoverished populations. The Program Committee has worked hard this year to maintain the tradition. We have developed an international program with keynote speakers, panels, paper presentations, and workshops from across the spectrum of humanitarian engineering and technology.

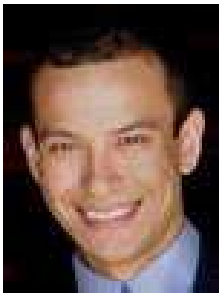
We have accepted over 140 papers covering several of the United Nations' Sustainable Development Goals. We will have parallel sessions in Health, Energy, Education, Agriculture, Connectivity, Water, Disaster Mitigation, and Sustainable Development.

We will have two plenary panels, one on "Disaster Recovery, Disadvantaged Communities and Displaced People" on Friday morning, and one on "Health-Related Issues in Resource Constrained Environments" on Saturday morning. In addition, we will three keynote speakers:

- Neil Sahota, Chief Innovation Officer, University of California, Emerging Technologies Research & Policy Institute
- Thomas Coughlin FIEEE, President of IEEE-USA and President, Coughlin Associates
- Tess Russo, Portfolio Lead and Research Scientist at Global Good

There will be plenty of opportunities for networking during the breaks, lunches, and receptions. Please use these opportunities to enhance your personal and professional growth, network, and learn about new projects. We hope you enjoy the conference!

Silvia Figueira, PhD
Program Chair



Henry Louie, PhD
Technical Program Chair

Silver Patrons

Millions of people suffer and die each year in poor countries from causes that humanity has the scientific and technical ability to solve. Funded by Bill Gates and focused on a shared vision with Nathan Myhrvold, Global Good invents technology to solve some of humanity's most daunting problems. We do this by collaborating with leading humanitarian organizations, forward-looking governments, research institutions, and corporate and private sector partners that bring our inventions to market.

See www.intellectualventures.com/globalgood

The IEEE Humanitarian Activities Committee (HAC) supports strengthening the capacity and impact of IEEE volunteers, staff and OUs involved in sustainable development and humanitarian technology-related activities around the world. IEEE HAC facilitates necessary education and training, builds strategic partnerships, provides funding for projects and events and supports IEEE SIGHT (Special Interest Group on Humanitarian Technology) activities.

IEEE Seattle Section

Welcome Reception Patron

IEEE Young Professionals is the group of IEEE members and volunteers who have graduated from their first professional degree within the past 15 years. It is an international community, whose members are interested in elevating their professional image, expanding their global network, connecting with peers locally and giving back to their community.
See https://yp.ieee.org/

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IEEE Smart Village (ISV) supports the world's energy-impoverished communities by providing a comprehensive solution combining renewable energy, community-based education, and entrepreneurial opportunities. ISV provides seed-funding to carefully selected community entrepreneurs based upon a credible business plan that will impact significant number of people with electricity, education and small enterprise development.

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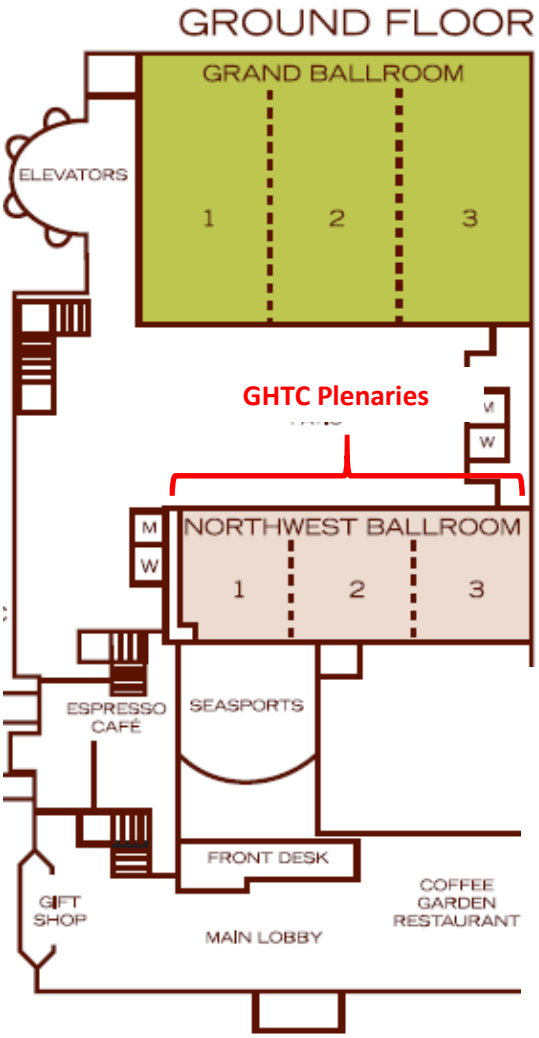
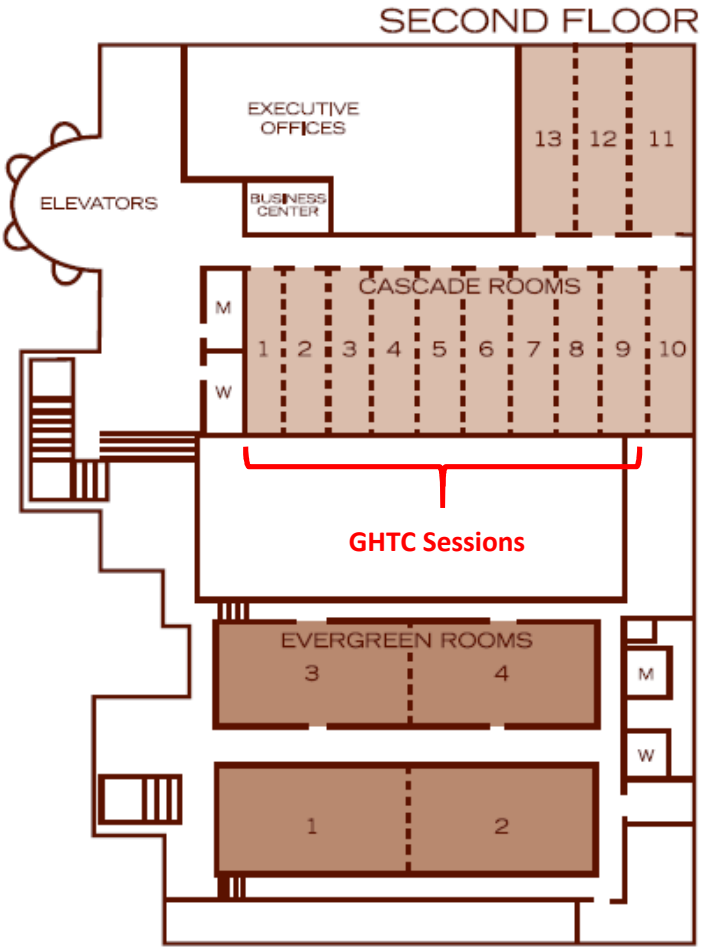


DoubleTree by Hilton Seattle Airport



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See website/proceedings for more details

Call for Papers

IEEE GHTC 2019

IEEE Global Humanitarian Technology Conference
DoubleTree by Hilton Seattle Airport | October 17–20, 2019
www.ieeeghtc.org

The 9th IEEE Global Humanitarian Technology Conference (IEEE GHTC 2019) is an international flagship conference sharing practical technology enabled solutions addressing the needs of underserved populations and resource constrained environments around the world and the United Nations Sustainable Development Goals (UNSDG).

Stakeholders from the public, private, education and research, societal, funding and donor sectors are invited to submit proposed papers (or presentations) sharing Sustainable Development and Humanitarian Technology related insights, experiences, good practices and lessons learnt from a research, policy, practitioner and/or community perspective. To this end, GHTC welcomes paper and presentation submissions in the Sustainable Development and Humanitarian/Appropriate/Assistive Technology spaces. Submissions by practitioners (governmental, for-profit and non-profit), academics, private sector actors and policy makers describing intervention design and implementation, field experiences and best practices, case studies, project monitoring and evaluation results, and original research are of particular interest.

Focus areas for IEEE GHTC 2019 include (but are not limited to):

- Agriculture & Food Security (SDG2)
- Good Health and Well Being (SDG3)
- Quality Education (SDG4)
- Clean Water & Sanitation (SDG6)
- Affordable & Clean Energy (SDG7)
- Disaster Mitigation, Preparedness, Response & Recovery
- Communication/Connectivity in Support of Development

As well as describing technological aspects, submissions are encouraged to consider socio-cultural, socio-economic, environmental and policy perspectives, and how sustainable development best practices such as community engagement, capacity building, local ownership, co-design and Collaborative Open Innovation, Social Return on Investment (SROI), Theory of Change planning, and PESTLE analysis are applied.

Three types of submissions are possible for presentation at GHTC: **Full Papers** are appropriate for mature work or completed projects and *should not exceed eight pages*; **Short Papers** are appropriate for early stage projects or authors wishing to share a snapshot of results-in-progress, experiences and perspectives, and *should be three to four pages in length including a short reference section*. **Oral-Only (Poster) Presentations** are appropriate for work-in-progress, projects in the pre-implementation stage as well as an option for practitioners, policy makers or community representatives who do not want to write a paper. Oral-Only submissions should be described in *one or two pages*. Short Papers and Oral-Only Presentations will be accepted for presentation either during a paper session or poster session at the discretion of the Program Committee.

Complementing the 2019 IEEE GHTC Conference Proceedings, accepted papers presented during the conference will also be submitted for publication in the IEEE *Xplore*® Digital Library.

Conference Schedule

	Thursday 17 October 2019				
13:00-17:00	**Cascade 1&2**	**Cascade 3&4**	**Cascade 5&6**		
	Workshop: IoT and AI architecture for humanitarian services	Tutorial: Applied Machine Learning for Social Good	Workshop: Fundamentals of Off-Grid Electrical Systems		
17:00-19:00	***Student Poster Competition (NW Ballroom)***				
19:00-21:00	***YP Welcome Reception (cash bar) and Poster Awards (NW Ballroom)*** ***Tickets required: Registration and payment as part of online registration***				

	Friday 18 October 2019				
08:00 - 10:00	***Welcome Address and Opening Plenary*** ***Panel on Disaster Recovery, Disadvantaged Communities and Displaced People***				
10:00 - 10:30	***Networking Coffee Break***				
	Cascade 1&2	**Cascade 3&4**	**Cascade 5&6**	**Cascade 9**	**Cascade 7&8**
10:30 - 12:00	Energy 1: Mini-Grids	Health 1: Assistive Solutions	Agriculture 1: Smart Farming	Connectivity 1	Contributing to IEEE Sustainable Development Activities Around the World (Participatory Workshop)
12:00 - 14:00	***Lunch & Keynote***				
14:00 - 15:30	Energy 2: Small-Scale Solar	Health 2: Supporting Vaccination and Immunisation	Agriculture 2: Soil & Land Management	Connectivity 2	Education 1: Supporting Training and Innovation
15:30 - 16:00	***Networking Coffee Break***				
16:00 - 18:00	Energy 3: Energy for Irrigation & Productive Uses	Health 3: Global Health	Agriculture 3: Leveraging Sensors and Smart Technology	Connectivity 3	Education 2: Addressing Challenges
1800 - 1900	**Networking Opportunities (Cash Bar)**				

Conference Schedule

	Saturday 19 October 2019				
08:00 - 10:00	***Plenary*** ***Panel on Health-Related Issues in Resource Constrained Environments***				
10:00 - 10:30	***Networking Coffee Break***				
	Cascade 1&2	**Cascade 3&4**	**Cascade 5&6**	**Cascade 9**	**Cascade 7&8**
10:30 - 12:00	Energy 4: Innovations	Health 4: Diagnosis	Agriculture 4: Applications & Case Studies	Sustainable Development - Applications	Water 1: Supporting Sanitation
12:00 - 14:00	***Lunch & Keynote***				
14:00 - 15:30	Energy 5: Supporting Adoption	Health 5: Diagnosis & Screening	Disaster Mitigation 1: Leveraging appropriate technologies	Sustainable Development - Case Studies 1	Water 2: Effective Water Reuse
15:30 - 16:00	***Networking Coffee Break***				
16:00 - 18:00	Energy 6: Field Experiences	Health 6: Supporting Diagnosis & Treatment	Disaster Mitigation 2: Leveraging Information Systems	Sustainable Development - Case Studies 2	Water 3: Supporting Access to Water
1800 - 1900	**Networking Opportunities (Cash Bar)**				
19:00 - 20:30	**Networking Dinner (Subsidised by GHTC 2019)** **Tickets required: Registration and payment required as part of online registration**				
	Sunday 20 October 2019				
	Cascade 1&2	**Cascade 3&4**	**Cascade 5&6**	**Cascade 9**	**Cascade 7&8**
08:30 - 10:00	Smart Village I	Health 7: Supporting Mobility	Disaster Mitigation 3: Supporting Rapid Response	UnConference Session	
10:00 - 10:30	***Networking Coffee Break***				
10:30 - 12:00	Smart Village II	Health 8	Disaster Mitigation 4: Supporting Disaster Recovery	UnConference Session	
End of Conference					

IoT and AI Architecture for Humanitarian Services Workshop

Date: October 17, 1-5 pm

Abstract

In this 4-hour workshop we discuss potentials of Internet-of-Things (IoT) technologies in addressing humanitarian challenges in developing countries. We explore many examples of IoT applications and possible artificial intelligence use-cases, and benefits such as improving agricultural production by alerting farmers about weather patterns, healthcare by remotely conducting remote diagnosis of diseases.

In the second part, we describe the main IoT building blocks: (1) sensor types and them interfaces, including UART, SPI and I2C; (2) common microcontroller (3) connectivity requirements and wireless technologies such as ZigBee, Wi-Fi, LoRa, Bluetooth Wireless 4 .0 LE, RFID, and NFC in terms of range, bandwidth, and battery life; (4) cloud computing and storage platforms such as AWS, IBM Blue mix, Microsoft Azure, GE Predix, etc. We also elaborate on power harvesting methods and the importance of power management for IoT-based networks and ways to optimize node life-time.

The workshop also covers the fundamentals of AI, algorithm flow diagram and how to create AI software on MCU (device) as well utilize the cloud components.

We conclude the workshop with live demonstration of several IoT-based systems each having different design criteria and power constraints. The audience can interact with the systems and explore their capabilities and limitations.

A few AI demonstration shall be presented on IoT evaluation kit designed using open source hardware and IoT cloud stacks.

Learning Objectives

The primary motivations of the tutorial are as follows:

i) Learn the concept and architecture of IoT and AI work flow.
ii) IoT and AI related protocols.
iii) Wireless technologies used in IoT enabled systems and how AI are the part of IoT systems.
iv) Explanation on IoT domain related to Hardware, Sensors and connectivity protocols.
v) Walking through various connectivity methodologies.
vi) Importance of various IoTcloud platforms and AI implementations.
vii) Creating social awareness with demonstrating various real-time applications

Detailed Description

The tutorial is designed to introduce low cost, reliable and real-time solutions for IoT enabled monitoring and control systems, such as Remote Water Testing, or air quality monitoring systems (as shown below). In today's world cloud enabled systems are considered as smart systems due to their capability of sensing, data processing, decision making and communicating with the cloud. The participants will learn how sensors are connected to the hardware platform and how the hardware

platform fetches data from sensors and pass it to cloud using various connection methodologies. The tutorials also provide the fundamentals of AI and how to implement AI algorithm on open source hardware and software.

Also, the tutorial will introduce various sensors used in monitoring systems, IoT hardware platforms, networking topologies, protocols (CoAP, 6LoWPAN, REST, MQTT, HTTP etc.) and cloud platforms.

Participants will go through few case studies, schematics, design methodologies and infrastructure details. Participants will be proposed to design and execute a real-time parameter Monitoring project based on the learned concepts and principles and expected to complete the project within additional off-time tutorials days.

Audience

Students at all levels (B.Tech. /M.Sc./M.Tech./Ph.D.) or Faculty from reputed academic institutions and technical institutions.

Instructors

Shivakumar Mathapathi is Adjunct Lecturer at Santa Clara University and Adjunct professor at Sonoma State University. He has over 25 years of experience in product development, design and faculty. Mathapathi is a seasoned technologist, entrepreneur, instructor and practitioner on the Internet of Things (IoT) with extensive experience as lead faculty, lab-practice and mentorship in executing smart city, smart agriculture, assisted living and other IoT related projects. He has designed study programs and academic syllabus for The IoT course, a master's curriculum (4 units) taught at Santa Clara University and California Polytechnic State University. He led capstone design project at Cal Poly (part of California Stata University) to design and develop IoT cloud platform needed for smart city.

Mr. Mathapathi has contributed to build the ecosystem and establish innovation pathways for the OpenIoT project, a blueprint and awarded Open Source project in the Internet of Things for smart Cities sponsored by the European commission. He is focused on academic research and Innovation and he is involved in architecture design and development of smart city projects such as smart trash monitoring, Flood monitoring and smart trail traffic monitoring –designed for the City of San Luis Obispo. California.

Mr. Mathapathi is also a team lead for Global City team Challenge (GCTC) project hosted by the National Institute of Standards and technology (NIST) under the Department of Commerce, USA. GCTC team comprises of Sonoma State University, Santa Clara University, City of San Leandro, City of Galway (Ireland) and City of Rohnert Park, CA.

Mr. Mathapathi has designed IoT development kit (patent file pending). The Kit enables design proof of concept (PoC) for IoT application. The kit consists of various sensors viz Temperature, Humidity, Air quality (CO2), Light, pressure and Gas sensors connected to AWS (Amazon) IoT cloud platform.

Farid Farahmand received his PhD in 2005 and is currently the Chair of the Engineering Science Department (Electrical Engineering) at Sonoma State University in California, U.S.A. He is also the director of Advanced Internet Technology in the Interests of Society Laboratory. Prior to his academic position at Sonoma State, Dr. Farahmand worked as the research scientist at Alcatel-Lucent Corporate Research and was involved in development of terabit optical routers. Farid has received multiple Fulbright Fellowships, and he has been a Fulbright Scholar since 2014. Dr. Farahmand holds multiple international patents, numerous reference conference articles and journal publications, and several book chapters, on the subjects of wireless communications, Internet-of-Things, optical networking, green networking, and delay tolerant networks. He has also authored many educational papers focusing on eLearning and Active Learning in classrooms. Farid is actively involved in many conferences and serves as the reviewer and coeditor to a number of technical conferences and journals. He is a member of IEEE, ASEE, and Engineers Without Borders-USA.

Tutorial: Applied Machine Learning for Social Good

Date: Thursday, October 17, 1-5 pm

Abstract:

This tutorial focuses on teaching the process of applying machine learning in practical applications around societal challenges. We focus on the several societal challenges described by the United Nations Global Goals, and help define a systematic approach of thinking and building solutions that can take advantage of the data based learning abilities of machine learning and apply those to different challenges. Using the UN Global Goals, we start by focusing on established targets that are known to be important for society, and then we help build methods using machine learning, followed by methods to deploy such solutions for practical use.

Objective:

This tutorial will focus on topics around using machine learning methods for social good. This includes knowledge of some basics in machine learning, and focusing on how to identify societal challenges, define problems, find solutions using machine learning and methods to deploy those solutions in the real world.

Content:

The tutorial will base itself on the course at University of California, Santa Cruz on Applied ML for Social Good (https://sites.google.com/ucsc.edu/cmps290t-spring-2019/). This would include case studies, coding samples, and a full run through building an ML based solution for one of the target problems under the United Nations Global Goals.

Approach:

First we will introduce the framework of Identification, Definition, Solution and Deployment. Then we will discuss the identification using UN Global Goals. This will then be used in definition using targets from Global Goals. Then we will teach a Machine Learning pipeline (Gather data, Extract features, Develop model, Train and optimize, Evaluate). This pipeline will then be used on a specific problem and dataset. The deployment will be taught using a client-server model. The tutorial will end with additional resources to learn more on the topic.

The tutorial will be in the form of an interactive project based class. This will include some basics of machine learning (ML) using python, a detailed framework for building ML solutions for applications in social good. The sequence of topics is as follows:

1. We first introduce the idea of building machine learning assisted solutions that can help tackle some of the societal challenges.
2. We then describe a process which follows Identification, Definition, Solution and Deployment.

3. Identification refers to the process of analyzing different social challenges, and then identifying specific problems. For instance, we can refer to the targets associated with the United Nations Global Goals.
4. Definition is the next step where given a problem space, we want to define it as a set of tasks which can use machine learning in different areas. While identification is to find a real world problem, definition is used to split it down into reasonably achievable tasks.
5. Solution, the next step refers to building the ML based solution which follows its own pipeline and process.
6. The role of definition is to turn the societal challenge into a machine learning problem on which a solution can be built.
7. The final phase of deployment is the point where an ML based solution is reconnected with the societal challenge. This means that while the ML method may provide a numerical or a certain kind of result, it must be delivered to the end users in a consumable way.
8. In deployment, we discuss methods using web, mobile and embedded technologies.
9. Deployment can also refer to social or political methods using which an ML solution can be finally delivered to the beneficiaries.
10. In solution, we define the concepts of gathering data, extracting features, building a learning model, training and optimization, followed by evaluation of the model before deployment, as described in Figure 1.

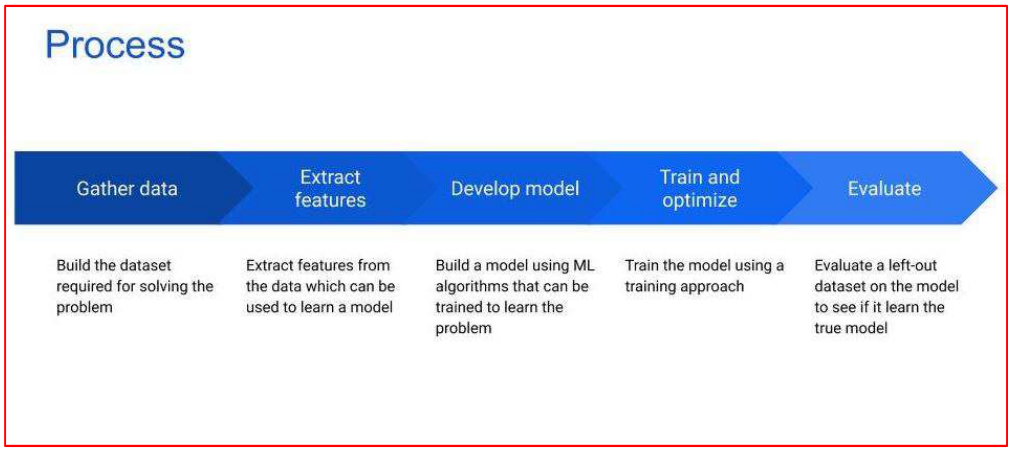

Figure 1 – Machine learning process for building a solution.

The tutorial will run this process while helping build a full solution using Python and Tensorflow Starter code base will be provided and explained, and then more stages will be built over the process of learning. We will start by summarizing some case studies which will help build an intuition for the space. The tutorial will also include discussions where participants will work on forming a solution process for certain UN global goals targets.

In addition to the global goals, we also refer to the AI use cases in social good domain presented in [3]

Expectations

At the end of the tutorial, we expect that the participants will develop a systematic flow of thinking about solutions using machine learning for tackling societal challenges. We also think that this tutorial will help build a framework which can be used to build different solutions. With the help of discussions in the tutorial, we expect to build a strong community in this domain, which focuses on deployable solutions for real societal challenges, and help achieve some progress on the United Nations Global Goals.

Instructor:

Rakshit Agrawal (University of California, Santa Cruz, USA)

REFERENCES

[1] R. Agrawal, “Applied machine learning for social good.” [Online]. Available: https://sites.google.com/ucsc.edu/cmps290t-spring-2019/

[2] U. Nations, “The global goals for sustainable development.” [Online]. Available: https://www.globalgoals.org/

[3] M. Chui, M. Harrysson, J. Manyika, R. Roberts, R. Chung, P. Nel, and A. van Heteren, “Applying artificial intelligence for social good.” [Online]. Available: https://www.mckinsey.com/featured-insights

Fundamentals of Off-Grid Electrical Systems Workshop

Date: Thursday, October 17, 1-5 pm

Abstract:

This half-day tutorial covers the contextual, technical, and practical implementation aspects of off-grid electrical systems in developing countries. These off-grid systems include mini-grids, micro-grids, energy kiosks, solar home systems and solar lanterns. System architectures and components, including small-scale solar, wind, hydro, biomass and conventional generation sets, batteries and converters are covered. The mini/micro-grid design process is discussed. Pre-implementation best practices, including site assessment and considerations for business model development are discussed. The instructor draws upon his firsthand experience and contemporary research to provide attendees with the foundational knowledge needed to implement or study off-grid systems. The tutorial is based on the book "*Off-Grid Electrical Systems in Developing Countries*".

Instructor:

Henry Louie, PhD Associate Professor, Fr. Wood Research Chair, SEATTLE UNIVERSITY

Dr. Henry Louie received his B.S.E.E. degree from Kettering University in 2002, his M.S. degree from the University of Illinois at Urbana-Champaign in 2004 and his PhD in Electrical Engineering from the University of Washington in 2008. He is a Professor in the Department of Electrical and Computer Engineering at Seattle University. In 2015 Dr. Louie was Fulbright Scholar to Copperbelt University in Kitwe, Zambia. He is the President and Co-founder of KiloWatts for Humanity, a non-profit organization providing off-grid electricity access and business opportunities in sub-Saharan Africa. Dr. Louie is an Associate Editor *for Energy for Sustainable Development* and is a founding member of the IEEE PES Working Group on Sustainable Energy Systems for Developing Communities. Dr. Louie is recognized as an IEEE Distinguished Lecturer for his expertise on energy poverty. He is a Senior Member of the IEEE and was a registered professional engineer in Zambia. He previously served as Vice President of Membership & Image of the IEEE Power & Energy Society.

Student Poster Competition

Thursday, October 17 17:00 - 19:00

Room: NW Ballroom

Chair: Mostafa Mortezaie (DeVry University, USA)

Participants

Poster Title	Author(s)	School
A Wind Farm made of Kites	Daniel Bower, Logan DuBois, Dane Erosa, Amy Johnson	Washington State University - Everett
Automated Malaria Classification System	Wanzin Yazar (UCB), Austin Tsang (SFSU)	UCBerkely, San Francisco State U
Reusable, real-time Aptamer-based Biosensor Using Covalent Functionalizing Transition Metal Dichalcogenides	Yue Ling	Simon Fraser University
EcoFresh	Arslan Azeem and Leejoo Hwang	University of Regina and Simon Fraser University
Electrodepositing Switchable Photovoltaic Window Electron and Hole Transport Layers	Rachel Tham[1]; Kevin Prince, [2,4]; Anica Neumann [2,4], Caleb Boyd [3,4], Lance Wheeler [4]	1. University of Illinois at Urbana-Champaign, Champaign, IL 2. Colorado School of Mines, Golden, CO 3. Stanford University, Palo Alto, CA 4. National Renewable Energy Laboratory, Golden, CO
HiveSpy	Sami Lama, Liying Liang, Yuya Yabe, Peter Fergusen	Santa Clara University
Hydration Automation	Peter Ferguson, Zach Cameron, Nicholas Kniveton, Will Tuttle	Santa Clara University
Innovation Tower	Vaibhav Sharma	Yale University.
MAF UPS remote monitoring system	Benjamin Vincent, Timothy Gage, Seth Truitt	California Baptist University
Phoenix Zoo - Elephant Engagement	Taylor Benning	Arizona State University
Solar Energy Tracking System	David Palmer, Janio Moreno	DeVry University - Long Beach
The Journey of Engineering Service-Learning: Preparing an Engineering Student with 21st century Skills	Mak Min Yi	The Hong Kong Polytechnic University

Young Professionals & Welcome Reception and Poster Awards

7:00-9:00 PM, Thursday, October 17

Room: Northwest Ballroom

TICKETS REQUIRED

Agenda:

Cash bar & Taco Station

GHTC Student Poster Competition Awards

Speaker: Carrie Smith, Physio-Control

Speaker Biography:

Carrie Ann Smith is an Electrical Design Engineer at Physio-Control (now part of Stryker). She works to enhance state-of-the-art medical technology. She completed her undergraduate degree in Electrical and Computer Engineering with a minor in computer science (Magna Cum Laude) from Seattle University, where she served as the chair for Tau Beta Pi the engineering honor society, president and charter member of IEEE HKN honor society, and chair of IEEE.

She served as an Electrical/Computer Engineering advisor for a University of Washington mechanical engineering senior design team to help develop a novel insulin-delivery pump for patients with low acuity, while in her senior year. She has volunteered with KiloWatts for Humanity to help fight energy poverty in rural villages for two years.

Recently she traveled to the Chalokwa and Munyama villages in Zambia, Africa to implement an updated data acquisition system she helped build over the previous year, which provides remote access and monitoring of the power system. She has participated in key research at the University of Arizona centered around autonomous ground vehicles and cognitive radio, where she investigated the implications of millimeter wave high-frequencies particular to automotive radar.

She is currently volunteering on the committee of IEEE YP, pursuing a Master of Science in Computer Science at Seattle University, and finishing her Master of Science in Electrical Engineering at the University of Washington.

LinkedIn: https://www.linkedin.com/in/carrie-ann-smith-95240899/

AI is the Disruptor: How to Wield the Tool Building the 21st Century

Neil Sahota, University of California (Irvine)

Abstract:

With the advent of artificial intelligence (AI) solutions (e.g. IBM Watson, DeepMind AlphaGo), organizations are the precipice of a major change. Much like the iPhone (released just 10 years ago), we are at a pivotal time where AI will be incorporated into so many aspects of our professional and personal lives. Organizations that have suffered through pain points they could not resolve or opportunities they could not achieve may now have a solution through cognitive computing. To bring the next generation of products and solutions to the forefront, organizations will need fresh ideas and new techniques and practices to best leverage AI capabilities. In turn, this means developing people who understand cognitive computing and how to use it for future product development. This presentation will illustrate the path ahead of you and how to begin your journey with AI.

Neil Sahota (萨冠军) is an IBM Master Inventor, United Nations (UN) Artificial Intelligence (AI) subject matter expert, Faculty at UC Irvine, and author of **Own the A.I. Revolution**. With 20+ years of business experience, he works with organizations to create next generation products/solutions powered by emerging technology. His work experience spans multiple industries including legal services, healthcare, life sciences, retail, travel and transportation, energy and utilities, automotive, telecommunications, media/communication, and government. Moreover, Neil is one of the few people selected for IBM's Corporate Service Corps leadership program that pairs leaders with NGOs to perform community-driven economic development projects. For his assignment, Neil lived and worked in Ningbo, China where he partnered with Chinese corporate CEOs to create a leadership development program.

In addition, Neil partners with entrepreneurs to define their products, establish their target markets, and structure their companies. He is a member of several investor groups like the Tech Coast Angels and assists startups with investor funding. Neil also serves as a judge in various startup competitions and mentor in several incubator/accelerator programs.

Sustainable Development and Humanitarian Activities by IEEE Members in the USA

Tom Coughlin, President, IEEE-USA

Abstract:

IEEE's tagline is "advancing technology for the benefit of humanity." IEEE-USA is a special part of the IEEE that can address public policy issues with the US government and works closely with the IEEE Regions in the USA. Among the things that IEEE-USA has supported are some notable sustainability and humanitarian activities. These include the MOVE truck that is deployed with the Red Cross to disaster sites. This talk will present information on some of the sustainable development and humanitarian activities that have been going on in the USA, including work on relevant public policies. There are many opportunities within the US, as well as outside of the USA, to make significant contributions towards sustainable development and to help underserved communities. It is time that we addressed these opportunities, no matter where they reside.

Tom Coughlin, President, Coughlin Associates is a digital storage analyst and business and technology consultant. He has over 37 years in the data storage industry with engineering and management positions at several companies. Coughlin Associates consults, publishes books and market and technology reports (including *The Media and Entertainment Storage Report),* and puts on digital storage-oriented events. He is a regular storage and memory contributor for forbes.com and M&E organization websites. He is an IEEE Fellow, President of IEEE-USA and is active with SNIA and SMPTE. For more information on Tom Coughlin and his publications and activities go to www.tomcoughlin.com.

Tess Russo, Global Good

Abstract:

Millions of people suffer and die each year in poor countries from causes that humanity has the scientific and technical ability to solve. Funded by Bill Gates and focused on a shared vision with Nathan Myhrvold, Global Good invents technology to solve some of humanity's most daunting problems. This talk will include discussion of one product currently in development — a hand-held soil analysis device to inform and optimize crop selection and soil management. This soil property-detecting spectrometer is battery-operated and designed to be appropriate for our target users in rugged conditions in low-resource settings.

Tess Russo, Portfolio Lead and Research Scientist at Global Good, uses domain expertise in hydrology and broader Earth sciences to support technology development for smallholder farmers in Africa and South Asia. Tess was previously the R.L. Slingerland Early Career Professor of Geosciences at Penn State. She holds a B.S. in Mechanical Engineering from Tufts University, a Ph.D. in Earth and Planetary Sciences from the University of California, Santa Cruz, and was an Earth Institute Postdoctoral Fellow at Columbia University.

Panel on Disaster Recovery, Disadvantaged Communities and Displaced People

Friday, October 18, 8am

The topic of this panel is disasters, displaced and indigenous peoples - providing aid and assistance where the infrastructure has been destroyed or is nonexistent, and how can evolving technologies serve to support or enable this.

Panelists

- John Berglund, Territorial Emergency/Disaster Services Director, The Salvation Army USA
- Stanley Atcitty, Navajo Nation
- Jim Conrad, IEEE MOVE, UNC-Charlotte USA

Stanley Atcitty, Navajo Indians

Dr. Stan Atcitty is a member of the Navajo Tribe and he received his BS and MS degree in electrical engineering from New Mexico State University in 1993 and 1995, respectively. In 2006, he was the first American Indian male to receive a Ph.D. in electrical and computer engineering from Virginia Tech University. He is presently a Distinguish Member of Technical Staff at Sandia National Laboratories in the Energy Storage Technology and Systems department. He leads the power electronics subprogram as part of the DOE Energy Storage Program and has gained international recognition for its state-of-the-art research and development under his leadership. Five of his projects have won the prestigious R&D 100 award from the Research & Development magazine. His interest in research is power electronics necessary for integrating energy storage and distributed generation with the electric utility grid. Stan has over 50 publications and holds four patents and another two pending. In 2007, he received the American Indian Science and Engineering Society Technical Excellence Award for his American Indian community involvement and technical achievement. He was recently featured in a middle school level children's book titled "Energy Basics – Energized!" published by Sally Ride Science book in 2012. In 2013, he coauthored a book titled Power Electronics for Renewable and Distributed Energy Systems. In addition, President Barack Obama presented Stan with the Presidential Early Career Award for Scientist and Engineers on July 31, 2012. This is the highest honor bestowed by the US government for outstanding scientist and engineers who show exceptional leadership at the frontiers of scientific knowledge during the twenty-first century.

John Berglund, Territorial Emergency/Disaster Services Director, The Salvation Army USA

John Berglund serves as the Territorial Emergency Services Director for The Salvation Army's US Western Territory, based in Rancho Palos Verdes, California. The territory's service area includes thirteen Western states, including Alaska, Hawaii, Guam, the Marshall Islands, and Micronesia.

Previously, John served as the National Emergency Services Director at Salvation Army National Headquarters in Alexandria, VA, as well as the Emergency Services Director for the Greater New York Division (NYC), the Intermountain Division (Denver), and the Southwest Division (Phoenix). He also serves as a team leader and trainer for The Salvation Army's International Emergency Services (IES), based in London, UK.

Mr. Berglund's career in nonprofit arts and social services includes instructing nonprofit management at Arizona State University in Tempe, Arizona (1995-2005). For the past two decades, his focus has been on the role of the nonprofit sector in both domestic and international humanitarian work.

James Conrad, IEEE-USA President-elect and a professor of Electrical and Computer Engineering at the University of North Carolina at Charlotte USA

MOVE Community Outreach, an IEEE-USA Initiative, is an emergency relief program committed to assisting victims of natural disasters with short-term communications, computer, and power solutions. These temporary emergency relief provisions help those affected stay connected and make sure they can access the help they need. Services include phone charging, internet & communications support, and lighting to disaster victims. Partnering with the American Red Cross, IEEE's U.S. highly-skilled volunteers provide this technical assistance via a Mobile Outreach VEhicle which is accessible during a disaster. Dr. Conrad is a charter member of the MOVE Community Outreach Project, serves as a driver of the vehicle, and serves as a volunteer who responds to natural disasters and other outreach activities where the vehicle's technology is needed.

Energy Panel

Friday, October 18, 6pm

The majority of projects in developing communities in the past few decades have been based on donation of technologies or "intervention" strategies. It can be argued that both of these strategies can actually be detrimental to communities and result in projects that fail within a few years of deployment due to a wide range of factors.

Instead, it is recommended that project take an approach based on bottom-up, trust-based community entrepreneurship focused on creating locally-owned holistically sustainable businesses. This strategy will be discussed from the perspective of a series of success stories told from the standpoint of a set of global development experts.

The panel will be led by IEEE Smart Village (ISV), a priority initiative of IEEE Foundation, which has seed-funded a series of in-country startups delivering electricity, intranet, education, and economic development to over 300,000 people worldwide. ISV also has an unparalleled track record of success in Africa, with nearly a dozen successful startups and zero project failures.

Questions to panelists:

- How did you develop an interest in sustainable development and/or the concept of smart villages?
- Where do you see the opportunity for Smart Village Entrepreneurs to generate revenue from productive applications of electricity?
- What are the challenges for women entrepreneurs?
- What opportunities exist for professional organizations (e.g IEEE) and NGOs to help create sustainable businesses?
- How can we raise funds to support the startup of these businesses?
- Where are your favorite locations for building smart villages?

Moderator: Alexander Anderson, Engagement Chair, IEEE Smart Village; CEO, EmpowerPack SPC

Panelists:

- Robin Podmore, Co-founder and Vice-Chair, IEEE Smart Village; President, Incremental Systems Corporation
- Ruomei Li, Secretary General (retired) of the Chinese Society of Electrical Engineering; Research Fellow, Tsinghua University
- Monica L. Brown, Founder and Executive Director, Africa Development Promise
- Olga Anderson, Education Chair, IEEE Smart Village
- Taylor Hudson, Technical Designer, Kilowatts for Humanity

Plenary Panels

Alexander Anderson

Robin Podmore

Ruomei Li

Monica L. Brown

Olga Anderson

Taylor Hudson

Panel on Health-Related Issues in Resource Constrained Environments

Saturday, October 19, 8am

The **Health-Related Issues in Resource Constrained Environments Plenary Panel** will share perspectives on the importance of multi-stakeholder, inter-disciplinary/cross-disciplinary collaboration, with representatives from different stakeholder groups (including the public, education and research, policy, societal and funding sectors).

Moderator

Paul Cunningham

Panelists

- Tim Wood, Senior Program Officer, Bill & Melinda Gates Foundation
- Skye Gilbert, Deputy Director, Digital Health, PATH

Tim Wood, Senior Program Officer, Bill & Melinda Gates Foundation

Tim Wood specializes in applying information technology to address the problems of poverty and health in developing countries. After 12 years at Microsoft working on software development, in 2002 Mr. Wood joined the Grameen Foundation's Technology Center where he pioneered replication of the Grameen Village Phone program, launching sustainable initiatives in Uganda and Rwanda and co-authoring the *Village Phone Replication Manual*. Mr. Wood went on to implement money pilot programs for microfinance institutions in the Philippines and Kenya and spent four years as the Director of Mobile Health Innovation at the Grameen Foundation, creating the MOTECH platform to deliver multiple mobile-service initiatives at scale in India and Africa. Tim joined the Bill & Melinda Gates Foundation in 2013 and is working across a wide range of information technology initiatives with a particular focus on "digital health tools", country data systems, and aligning global efforts around country-defined priorities.

Skye Gilbert, Executive Director, Digital Square

Skye Gilbert serves as the Executive Director of Digital Square, a consortium (housed at PATH) of 40+ leading digital health organizations working together with countries to strengthen digital health systems. From 2016 to 2019, Skye supported strategy, business development, adaptive management, and data use efforts as deputy director of PATH's Digital Health program. Her work touched on projects including the Data Use Partnership in Tanzania, the BID Initiative, the Joint Learning Network's Information Technology Initiative, and many others. Prior to joining PATH in 2016, Skye worked on health and information systems, first as an academic researcher living in Senegal and China, then as a consultant at the Boston Consulting Group, and finally as a program and strategy officer at the Bill & Melinda Gates Foundation. Skye has a Global Executive MBA from INSEAD and a bachelor's degree in economics, international studies, and psychology from the University of Pennsylvania.

Prof. Judd Walson, START Center, University of Washington

The Strategic Analysis, Research & Training (START) Center is a research consulting group established in 2011 by the Bill & Melinda Gates Foundation (BMGF) and the University of Washington (UW) Department of Global Health. Since 2011, START's expert researchers have completed more than 150 projects for clients.

Judd Walson, MD, MPH is a Professor in the Departments of Global Health, Medicine (Allergy and Infectious Diseases), Pediatrics and Epidemiology (Adjunct). He has an extensive history of conducting large observational studies and clinical trials in Africa and Asia, including ongoing studies in Benin, Burkina Faso, Malawi, Kenya, Uganda, Ethiopia, Pakistan, Bangladesh and India. Dr. Walson's research focuses on studies of neglected tropical diseases, enteric and diarrheal disease, HIV and endemic co-infections, and their relationship to child survival and early childhood development. Dr. Walson is the Principal Investigator of the DeWorm3 Project, a large multi-country cluster randomized trial designed to demonstrate the feasibility of interrupting the transmission of soil-transmitted helminths and is the co-Principal Investigator of the Childhood Acute Illness and Nutrition Network (CHAIN). He has extensive experience in the design and implementation of observational research and clinical trials, and works closely with numerous government and non-governmental organizations. Dr. Walson has mentored over 60 post-doctoral, doctoral and masters levels trainees both in the US and overseas.

Contributing to IEEE Sustainable Development Activities Around the World

Participatory Workshop (Friday 10:30 – 12:00)
Room: Cascade 7&8

This workshop is an opportunity to learn more about opportunities to contribute to Sustainable Development Activities around the world as an IEEE Member.

Prof. Paul Cunningham, Past Chair, IEEE Humanitarian Activities Committee will moderate a participatory workshop, providing an opportunity for conference delegates to learn more about and share insight into volunteer opportunities at home and abroad as well as share challenges, success stories and practical insights based on personal experience. If you would like to contribute experiences or suggest topics for discussion, please contact pcunningham@ieee.org

SU-PW1/PW2: Unconference Sessions

Sunday 0830 – Noon
Room: Cascade 9

On Sunday morning, conference delegates will enjoy the opportunity to suggest topics for discussion with colleagues and peers from around the world related to Sustainable Development.
Complementing the Plenary Panels and paper sessions in this year's program, Unconference Sessions facilitate participant-driven discussion, whether sharing expertise and experiences, answering questions as a subject matter expert or having the opportunity to ask questions of a subject matter expert or experienced practitioner or researcher.

A notice board beside registration will allow conference delegates to propose topics for discussion from Thursday evening until Saturday evening. Conference delegates can confirm if they would like to contribute. Depending on the level of interest, more than one discussion may be scheduled simultaneously, or alternatively specific time slots will be assigned to the most popular topics.

Outputs from these Unconference Sessions will inform Program Design and the Call for Papers for the 10th Anniversary Celebrations of GHTC in 2020.

Networking Opportunities

Lunches and Social Events (Friday & Saturday Lunches and Saturday Evening)

A number of tables will be dedicated to networking during lunch and social events. Important thematic areas such as Agriculture, Energy, Health and Education will have specific tables dedicated to facilitate knowledge sharing and relationship building.
If there are specific topics for which you would like to propose a networking table, please contact pcuningham@ieee.org, cc to e.perkins@ieee.org

IEEE Smart Village Session

How to get engaged with IEEE Smart Village (ISV) as a volunteer, ambassador or entrepreneur

Sunday 08:30 – Noon

Room: Cascade 1&2

Moderator: Robin Podmore, Co-Founder IEEE Smart Village

IEEE Smart Village (ISV) is an IEEE program that supports the world's energy-impoverished communities by providing a comprehensive solution combining renewable energy, community-based education, and entrepreneurial opportunities. ISV provides seed-funding to carefully selected community entrepreneurs based upon a credible business plan that will impact significant number of people with electricity, education and small enterprise development. See https://smartvillage.ieee.org/

This will be an introductory session on ISV. Members of the IEEE Smart Village Steering committee will provide guidance on:

(1) How to volunteer on one of the ISV Committees: Technology, Education, Fund Development, Marketing, Operations

(2) The role of ISV Ambassadors and the application process

(3) How to write a proposal and receive funding as an ISV Entrepreneur

The format will be a workshop with some presentations.

Friday, October 18 8:00 - 10:00

F-PL: Welcome Address and Opening Plenary Panel

Room: NW Ballroom

Opening Remarks: Paul M Cunningham (IIMC / mHealth4Afrika / IST-Africa Institute, Ireland)

Panel: "Disaster Recovery, Disadvantaged Communities and Displaced People"

The topic of the panel is disasters, displaced and indigenous peoples - providing aid and assistance where the infrastructure has been destroyed or is nonexistent, and how can evolving technologies serve to support or enable this.

Moderator: Edward G Perkins (Self-employed, USA)

Panelists:

- John Berglund, Territorial Emergency/Disaster Services Director, The Salvation Army USA
- Stanley Atcitty, Navajo Nation
- Jim Conrad, IEEE MOVE, UNC-Charlotte USA

Friday, October 18 10:00 - 10:30

F-B1: Break

Room: Cascade (2nd) Level

Friday, October 18 10:30 - 12:00

F-AG1: Agriculture 1: Smart Farming

Room: Cascade 5&6

Session Chair: Wenbo Wang (Intellectual Ventures Lab, USA)

10:30 ***Smart Agriculture in Uganda***
Ruben Vargas (University of Colorado, USA); Bennett Miller (University of Colorado at Boulder, USA); Gabriel Anhalzer and Mohammed Hasani (University of Colorado, USA); Heinz Boehmer Fiehn and Jiashu Yang (University of Colorado at Boulder, USA); Soham Tamhane (University of Colorado, USA); Alan Mickelson (University of Colorado at Boulder, USA)

10:50 ***Low-cost instrumentation of high-tunnels for a small co-op farm***
Jeremy Ziemer and Austin Stokes (University of St Thomas, USA); Janssen Hang (Hmong American Farmers Association, USA); Kundan Nepal (University of St. Thomas, USA)

11:10 ***Aquaponics Water Monitoring and Power System***
Joseph C Decuir (University of Washington & IEEE Region 6 Seattle Section, USA)

11:30 ***Identifying Beehive Frames Ready For Harvesting***
Navid Shaghaghi, Liying Liang, Yuya Yabem, Sami Lama, Jesse Mayer and Peter Ferguson (Santa Clara University, USA)

F-C1: Connectivity 1

Room: Cascade 9

Session Chair: Patrick Ndayizigamiye (University of Johannesburg, South Africa)

10:30 ***Application of the V-HUB Standard using LoRa Beacons, Mobile Cloud, UAVs, and DTN for Disaster-Resilient Communications***
Dominic B. Solpico, Marion Ivan Tan, Elijah Joshua Manalansan, Francesca Andrea Zagala, Jose Angelo Leceta, Dennis Francisco Lanuza, Johanan Bernal, Ralph Danielle Ramos, Rosiel Jazmine Villareal and Xander Mari Cruz (Ateneo de Manila University, Philippines); Jane Arleth L dela Cruz (Ateneo de Manila University & Ateneo Innovation Center, Philippines); Daniel Lagazo (Ateneo, Philippines); Jaime Luis E Honrado (Ateneo de Manila University & Skyeye, Inc., Philippines); Nathaniel Joseph C Libatique (Ateneo de Manila University, Philippines); Gregory L Tangonan (Ateneo de Manila University, USA)

10:50 ***Bluemergency: Mediating Post-disaster Communication Systems using the Internet of Things and Bluetooth Mesh***
Flor Álvarez and Lars Almon (Technische Universität Darmstadt & Secure Mobile Networking Lab, Germany); Hauke Radtki (Technische Universität Darmstadt, Germany); Matthias Hollick (Technische Universität Darmstadt & Secure Mobile Networking Lab, Germany)

11:10 ***Smart Street Lights and Mobile Citizen Apps for Resilient Communication in a Digital City***
Lars Baumgärtner (Technische Universität Darmstadt, Germany); Jonas Höchst and Patrick Lampe (University of Marburg, Germany); Ragnar Mogk and Artur Sterz (University of Darmstadt, Germany); Pascal Weisenburger (Technische Universität Darmstadt, Germany); Mira Mezini (University of Darmstadt, Germany); Bernd Freisleben (Philipps-Universität Marburg, Germany)

11:30 ***Communications Lessons Learned from Operation of the IEEE MOVE Disaster Relief Vehicle***
James M. Conrad (University of North Carolina at Charlotte, USA); Mary Ellen Randall and Grayson W. Randall (Ascot Technologies, USA); Gregg Vaughn (University of Alabama Birmingham, USA)

F-EN1: Energy 1: Mini-Grids

Room: Cascade 1&2

Session Chair: Henry Louie (Seattle University, USA)

10:30 ***Distribution Loss Analysis of DC Microgrids for Rural Electrification***
Rabia Khan and Noel Schulz (Washington State University, USA); Mashood Nasir (Lahore University of Management Sciences (LUMS), Pakistan)

10:50 ***Cost Optimization of Hybrid Microgrid for Rural Electrification along Western Alignment of China-Pakistan Economic Corridor (CPEC) in Pakistan***
Rabia Khan (Washington State University, USA); Ayesha Khan (Comsats Institute of Islamabad, Pakistan); Anam Zahra (NUST, USA)

11:10 ***Roadmapping Minigrid Innovations for Cost Reduction***
Katia Benson and Daniel Zimmerle (Colorado State University, USA); Samuel Booth and Ian Baring-Gould (National Renewable Energy Laboratory, USA)

11:30 ***An energy justice based approach for electrification planning - An agent-based model***
Bethel Tarekegne and Mark Rouleau (Michigan Technological University, USA)

F-H1: Health 1: Assistive Solutions

Room: Cascade 3&4

Session Chair: Charles B. Delahunt (Intellectual Ventures Lab, USA)

10:30 ***NavSense: A Navigation Tool for Visually Impaired***
John Ryan, Daniel Okazaki, Michael Dallow and Behnam Dezfouli (Santa Clara University, USA)

10:50 ***Novel Hybrid Teleophthalmology: Technological Case for Oculofacial Surgery***
Roopak R. Tamboli, Vikram Sandu and Sreenivasulu Nerasala (Indian Institute of Technology Hyderabad, India); Ashutosh Richhariya (LV Prasad Eye Institute Hyderabad, India); Kiran Kumar Vupparaboina (IIT Hyderabad, India); Soumya Jana (Indian Institute of Technology, Hyderabad, India)

11:10 ***Non-Invasive Bilirubin Level Quantification and Jaundice Detection by Sclera Image Processing***
Md. Messal Monem Miah, Rafat Jamal Tazim, Fatema Tuj Johora, Md. Ibrahim Al Imran, Sanzida Sayedul Surma, Fariba Islam and Rashid Shabab (Bangladesh University of Engineering and Technology, Bangladesh); Celia Shahnaz (BUET, Bangladesh); Arik Subhana (Bangladesh University of Engineering and Technology (BUET), Bangladesh)

11:30 ***Memhans: an Assistive Device for Dementia Patients***
Unais Sait and Vandana Ravishankar (PES University, India); Tarun Kumar (Indian Institute of Science, Bangalore, India & University of Florida, USA); Sanjana Shivakumar (Ramaiah Institute of Technology, India); Gokul Lal K v (East Point College of Engineering and Technology, India); Kriti Bhalla (Ramaiah Institute of Technology, Bangalore, India); Manvendra Singh and Rahul

Bhaumik (PES University, India)

F-WK: Contributing to IEEE Sustainable Development Activities Around the World (Workshop)

Room: Cascade 7&8

Moderator: Paul M Cunningham (IIMC / mHealth4Afrika / IST-Africa Institute, Ireland)

This workshop is an opportunity to learn more about opportunities to contribute to Sustainable Development Activities around the world as an IEEE Member.

Prof. Paul Cunningham, Past Chair, IEEE Humanitarian Activities Committee will moderate a participatory workshop, providing an opportunity for conference delegates to learn more about and share insight into volunteer opportunities at home and abroad as well as share challenges, success stories and practical insights based on personal experience.

Friday, October 18 12:00 - 14:00

F-LU: Friday Lunch & Keynote

Room: NW Ballroom

Keynote: "AI is the Disruptor: How to Wield the Tool Building the 21st Century"

Neil Sahota, University of California (Irvine)

Abstract: With the advent of artificial intelligence (AI) solutions (e.g. IBM Watson, DeepMind AlphaGo), organizations are the precipice of a major change. Much like the iPhone (released just 10 years ago), we are at a pivotal time where AI will be incorporated into so many aspects of our professional and personal lives. Organizations that have suffered through pain points they could not resolve or opportunities they could not achieve may now have a solution through cognitive computing. To bring the next generation of products and solutions to the forefront, organizations will need fresh ideas and new techniques and practices to best leverage AI capabilities. In turn, this means developing people who understand cognitive computing and how to use it for future product development. This presentation will illustrate the path ahead of you and how to begin your journey with AI.

Friday, October 18 14:00 - 15:30

F-AG2: Agriculture 2: Soil & Land Management

Room: Cascade 5&6

Session Chair: Silvia Figueira (Santa Clara University, USA)

14:00 ***UAV Image Processing Algorithms for Analyzing Reforestation Efforts in Tanzania***
Steven Bucher, Christopher Kitts and Michael Neumann (Santa Clara University, USA); J. Michael Tritchler (Community Forests Pemba, USA)

14:20 ***Mining Spectral Libraries with Machine Learning for Soil Sensing in Low Resource Settings***
Wenbo Wang, Liming Hu and James Stafford (Intellectual Ventures Lab, USA); Marie Connett (Intellectual Ventures, USA); Benjamin Wilson and Matthew Keller (Intellectual Ventures Lab, USA)

14:40 ***A digital twin for smart farming***
Rafael Alves and Gilberto Souza (Centro Universitário FEI, Brazil); Rodrigo Filev Maia (Centro Universitario FEI, Brazil); Anh L.H. Tran (Coventry University, United Kingdom (Great Britain)); Carlos Kamienski (Universidade Federal do ABC, Brazil); Juha-Pekka Soininen (VTT Technical Research Centre, Finland); Plinio Thomaz Aquino Junior (Centro Universitário da FEI, Brazil); Fabio Lima (Centro Universitario FEI, Brazil)

F-C2: Connectivity 2

Room: Cascade 9

Session Chair: Patrick Ndayizigamiye (University of Johannesburg, South Africa)

14:00 ***Alternative Backhaul link for Community Cellular Network in Rural Coastal Areas***
Mar Francis De Guzman and Calvin Artemies Hilario (Advanced Science and Technology Institute & University of the Philippines - Diliman, Philippines); Ronel Vincent P. Vistal (University of the Philippines, Electrical and Electronics Engineering Institute, Philippines); Ian Mosquera (Advanced Science and Technology Institute, Philippines); Julius M. Judan (Department of Science and Technology - Advanced Science and Technology Institute, Philippines); Joel Joseph Jr. S. Marciano (University of the Philippines & Wireless Communications Engineering Laboratory, Philippines)

14:20 ***Sustainable Development by Internet Backpack in the Democratic Republic of the Congo, Liberia and Costa Rica***
Lee McKnight and Danielle Smith (Syracuse University, USA); Alvaro Salas-Castro (Democracy Lab & Imcon Latin America, USA); Luca Belli (Fundacao Getulio Vargas, Brazil)

14:40 ***Low-cost Remote Monitoring System for Small-Scale UPS Installations in Developing Countries***
Seth Truitt, Timothy Gage, Benjamin E Vincent and Seunghyun Chun (California Baptist University, USA)

15:00 ***Increasing Human Development in Rural Mexico through Policies for Internet Access***
Manuel Ochoa (University of California & CITRIS Policy Lab, Mexico); Brandie Nonnecke (UC Berkeley, USA)

F-ED1: Education 1: Supporting Training and Innovation

Room: Cascade 7&8

Session Chair: Alan Mickelson (University of Colorado at Boulder, USA)

14:00 ***Humanitarian Organization ICT field specialists training: Bridging theoretical and practical humanitarian knowledge***
Mariana Vallo Docampo and Pascal Bruegger (HES-SO, University of Applied Sciences and Arts Western Switzerland, Switzerland)

14:20 ***Improving the Quality of Education on the Galapagos Islands through a Community Intranet***
Javier Urquizo (Villanova University, USA); David Lansdale (Beyond Chacay Foundation & USFQ, Ecuador); Pritpal Singh, Sarah Chen, Lauren Henderson, Karol Pierre, Gibel Sowe and Kellimarie Cooper (Villanova University, USA); Jimmy Cordova and Cesar Martin (Escuela Superior Politécnica del Litoral, Ecuador)

14:40 ***Frugal Innovation in a Jesuit University in Puebla Mexico***
Maria Guadalupe Lopez Molina and Ramiro Bernal Cuevas (Universidad Iberoamericana Puebla, Mexico)

15:00 ***A Mobile Educational Lab Kit for Fragile Contexts***
Claudio Freitas and Jennifer DeBoer (Purdue University, USA)

F-EN2: Energy 2: Small-Scale Solar

Room: Cascade 1&2

Session Chair: Chad Stillinger (George Fox University, USA)

14:00 ***Rehabilitation of Solar Home Systems and Sustainable Development for an Island Community in Ecuador***
Javier Urquizo and Pritpal Singh (Villanova University, USA); Ruben Hidalgo, Viviana Villavicencio and Guillermo Soriano (Escuela Superior Politécnica del Litoral, Ecuador)

14:20 ***Estimation of the Potential of Small-scale Photovoltaic Systems in Underdeveloped Area of North Korea for Humanitarian Purposes***
Myeongchan Oh, Younghyun Koo, Aran Yang and Hyeong-Dong Park (Seoul National University, Korea)

14:40 ***Techno-Economic Analysis of Wireless Community Grid for Rural Communities***
Tejan Adhikari and Robert J Stevens (Rochester Institute of Technology, USA)

F-H2: Health 2: Supporting Vaccination and Immunisation

Room: Cascade 3&4

Session Chair: Daniel K Lottis (CLSE Consulting, USA)

14:00 ***Leveraging Geographic Information Systems Technology and Local Insight to Improve Polio Vaccination Coverage in Borno State***
Anupma Sud and Iheanyichukwu Uzoma (eHealth & Information Systems Africa, Nigeria); Sule Meleh (Borno State Primary Health Care Development Agency, Nigeria); Adeshina Aladeshawe (Bill & Melinda Gates Foundation, Nigeria); Aron Aregay and Musa Audu (World Health Organisation (WHO), Nigeria); Musa Melton (AFENET, Nigeria); Babafemi Adebola (Solina Centre for International Development and Research (SCIDaR), Nigeria); Jennifer Bencivenga and Benedetta Ludovisi (eHealth & Information Systems Africa, Germany)

14:20 ***Geospatial Data Management Support for the Planning and Delivery of Polio Vaccination Campaigns in Borno State, Northeast Nigeria***
Iheanyichukwu Uzoma and John Momoh (eHealth & Information Systems Africa, Nigeria); Musa Audu (World Health Organisation (WHO), Nigeria); Aliyu Shettima (Polio Emergency Operation Center (EOC), Nigeria); Anupma Sud (eHealth & Information Systems Africa, Nigeria); Adeshina Aladeshawe (Bill & Melinda Gates Foundation, Nigeria); Bamusa Bashir (World Health Organisation (WHO), Nigeria); Salawu Musa (Bill and Melinda Gates Foundation, Nigeria); Nnamdi Njeakor (eHealth & Information Systems Africa, Nigeria)

14:40 ***Development of Sahabat Vaksin, a Vaccine Knowledge Portal to Support Immunization Willingness and Timeliness in Indonesia***
Yoke Irawan (Institut Teknologi Bandung, Indonesia); Allya Paramita Koesoema (Institut Teknologi Bandung & IEEE SIGHT on eHealth and Telemedicine Indonesia, Indonesia); Soegijardio Soegijoko (Institut Teknologi Bandung & Biomedical Eng. Program, School of Electrical Eng. & Informatics, Indonesia); Dody Utama (Institut Teknologi Bandung, Indonesia); Annisa Riyani (Telkom University, Indonesia); Masyitah Aulia (Institut Teknologi Bandung, Indonesia)

15:00 ***Nomadic Route Identification and Polio Vaccination Activities for Unreached Mobile Population in Borno State, Northeast Nigeria***
Iheanyichukwu Uzoma and Kehinde Adewara (eHealth & Information Systems Africa, Nigeria); Bamusa Bashir (World Health Organisation (WHO), Nigeria); Manu Idris (CDC/AFENET/NSTOP, Nigeria); Musa Melton (AFENET, Nigeria); Kabiru Mohammed (National Primary Health Care Development Agency, Nigeria); Kunle Ijaya and Aron Aregay (World Health Organisation (WHO), Nigeria)

Friday, October 18 15:30 - 16:00

F-B2: Break

Room: Cascade (2nd) Level

Friday, October 18 16:00 - 17:50

F-AG3: Agriculture 3: Leveraging Sensors and Smart Technology

Room: Cascade 5&6

Session Chair: Joseph C Decuir (University of Washington & IEEE Region 6 Seattle Section, USA)

16:00 ***Enhancing Agricultural Practices Through Mobile Technology Interventions: A Case of The Democratic Republic of Congo***
Itulelo Imaja (University of KwaZulu-Natal, South Africa); Patrick Ndayizigamiye (University of Johannesburg, South Africa)

16:20 ***Farm-to-Fork Computing: Sensor Networks in Agriculture's Coldchain***
Jennifer M Williams (Oregon State University & Intel Corporation, USA); Rahul Khanna (Intel Corporation, USA); Laura Rumbel (Intel Corporation, USA); Yi Qian (Intel Corporation, P.R. China); Huaping Liu (Oregon State University, USA)

16:40 ***Low-Cost Sensor Network for Collecting Real-Time Data for Agriculture by Combining Energy Harvesting and LPWA Technology***
Junxiao Dai (Osaka Prefecture University, Japan); Masashi Sugano (Osaka Prefecture University, Japan)

F-C3: Connectivity 3

Room: Cascade 9

Session Chair: Paul Gardner-Stephen (Flinders University, Australia)

16:00 ***Mobile technologies as assistive technologies in humanitarian and development contexts***
Clara B Aranda-Jan, Jenny Casswell and Michael Nique (GSMA, United Kingdom (Great Britain))

16:20 ***Image-based Bengali Sign Language Alphabet Recognition for Deaf and Dumb Community***
Abdul Muntakim Rafi (Bangladesh University of Engineering and Technology & Reve Systems Ltd., Bangladesh); Nowshin Nawal, Nur Sultan Bayev, Lusain Nima, Celia Shahnaz and Shaikh Anowarul Fattah (Bangladesh University of Engineering and Technology, Bangladesh)

16:40 ***Sense of Community in Online Social Networks at University Environments***
Alberto Un Jan, Javier Canchano, Renzo Estrada, Paulo Sarrín and Juan Canchano (Universidad Nacional de Ingeniería, Peru)

17:00 ***Design and Development of Khadi-Kart: A Web-based application for rejuvenating the Handloom Industry in India***
Vishal Mishra (Vijaya Vittala Institute of Technology, India); Tarun Kumar (Indian Institute of Science, Bangalore, India & University of Florida, USA); Sanjana Shivakumar (Ramaiah Institute of Technology, India); Vandana Ravishankar (PES University, India); Kriti Bhalla (Ramaiah Institute of Technology, Bangalore, India); Brajesh Dhiman (Indian Institute of Technology (IIT), Guwahati, India)

17:20 ***The Enabling Power of Mobile Devices***
Silvia Figueira (Santa Clara University, USA)

F-ED2: Education 2: Addressing Challenges

Room: Cascade 7&8

Session Chair: Pritpal Singh (Villanova University, USA)

16:00 ***Affordable Custom Three-Dimensional Anatomy Atlases***
Nayra Pumar-Carreras and Carlos Luque (University of Las Palmas de Gran Canaria, Spain); Michael Halle (Brigham and Women's Hospital, USA); Babacar Diao (Military Medical School, Senegal); Cheikh Tidiane Diop (Centre Hospitalier National Universitaire de Fann, Spain); Juan Ruiz-Alzola (University of Las Palmas de Gran Canaria & Instituto de Astrofísica de Canarias, Spain)

16:20 ***Affordable Medical Ultrasound Navigation Training***
Guillermo V. Socorro-Marrero and Carlos Luque (University of Las Palmas de Gran Canaria, Spain); Csaba Pinter (Queen's University, Canada); Babacar Diao (Military Medical School, Senegal); Tamas Ungi, Andras Lasso, and Gabor Fichtinger (Queen's University, Canada); Juan Ruiz-Alzola (University of Las Palmas de Gran Canaria & Instituto de Astrofísica de Canarias, Spain)

16:40 ***Participatory design innovation to solve challenges in rural Uganda: A model for the future***
Aloysius Wilfred Raj Arokiaraj (Lingnan University, Hong Kong); Joshua Schapiro, Jessica Pachuta and Illah Nourbakhsh (Carnegie Mellon University, USA); Taihua Hu (Lingnan University, Hong Kong); Ka Wing Jessica Wong (Lingnan University, Hong Kong); Albert Ko (Lingnan University, USA)

17:00 ***Analyzing the Factors Contributing to Graduate Unemployment***
Zannatul Ferdous (North South University, Bangladesh); Ishtiaque Asad (BRAC University, Bangladesh); Shohana Rahman Deeba (North South University, Bangladesh)

17:20 ***Serve an Hour: A Service-Learning model Paving the Pathway to a Sustainable Future***
Dhivvya J P (Amrita Vishwa Vidyapeetham, India); Vimisha Valsan, vandhana (Amrita School of Engineering & Amrita Vishwa Vidyapeetham, India); Johanna von Lieres (Amrita Vishwa Vidyapeetham, India)

F-EN3: Energy 3: Energy for Irrigation & Productive Uses

Room: Cascade 1&2

Session Chair: Henry Louie (Seattle University, USA)

16:00 ***Irrigation Optimization for Agriculture Productivity: Case Study of a Hybrid Solar Microgrid in Rural India***
Janani Jayaraman and Taruna Sudhakar (Sri Sivasubramaniya Nadar College of Engineering, India); Sai Shankar Muthukrishnan (Solarillion Foundation, India); Aswin Gopikanna (Rajalakshmi Engineering College, India); Vineeth Vijayaraghavan (Solarillion Foundation, India)

16:20 ***A Method for Evaluating Unregulated Solar Irrigation Pumping Systems: Results and Observations***
Christopher Lute (Colorado State University, USA); Thomas Decker (Factore Ventures, USA); James Cale (Colorado State University, USA); Amanda Delcore (Factore Ventures, USA)

16:40 ***Intelligent Interconnection of Operating Micro-Grid and Irrigation System in Dharnai - A Rural Indian Scenario***
Hari Vignesh Baskar (SRM Institute of Science and Technology, India); Marjerie S (SSN College of Engineering, India); Abishek Coimbatore Sridhar (Easwari Engineering College, India); Sai Shankar Muthukrishnan and Vineeth Vijayaraghavan (Solarillion Foundation, India)

17:00 ***Techno-Economic Analysis of PAYG Productive Uses of Energy in Malawi***
Kyle Smith, Aran Eales, Damien Frame and Stuart Galloway (University of Strathclyde, United Kingdom (Great Britain))

F-H3: Health 3: Global Health

Room: Cascade 3&4

Session Chair: Adil Usman (Indian Institute of Technology Mandi, India)

16:00 ***mHealth4Afrika Pilot Validation in Healthcare Facilities in Ethiopia, Kenya and Malawi***
Miriam Cunningham (IIMC / IST-Africa, Ireland); Paul M Cunningham (IIMC / mHealth4Afrika / IST-Africa Institute, Ireland)

16:20 ***Managing Knowledge Incorporated into Solutions for Customisable Global Health Technologies***
Kudakwashe Dube (Massey University, New Zealand); Scott McLachlan (Queen Mary University of London, United Kingdom (Great Britain)); Ngonidzashe Zanamwe (University of Zimbabwe, Zimbabwe); Evangelia Kyrimi (Queen Mary University of London, United Kingdom (Great Britain)); Jasmine Thomson (Fonterra, New Zealand); Norman Fenton (Queen Mary University of London, United Kingdom (Great Britain))

16:40 ***A case study on integrating a diagnostic medical device into the health care system of Sierra***

Leone
Jordan Wolman, Naakesh Gomanie, Cassidy Drost, Sage Herrick, Zachary Day, Rohan Ekambaram and Khanjan Mehta (Lehigh University, USA)

17:00 ***Analysis of Failure Modes: Case study of Ruggedizing a low-cost Screening Technology in Sub-Saharan Africa***
Rohan Ekambaram, Naakesh Gomanie and Khanjan Mehta (Lehigh University, USA)

17:20 ***Mechanical properties of ESM-UBT: An ultra-low cost uterine balloon tamponade device***
Kamyar Mollazadeh-Moghaddam (Harvard Medical School, USA); Michelle Dundek (Vayu Global Health Innovations, LLC & Massachusetts General Hospital Division of Global Health Innovation, USA); Anuj Bellare (Vayu Global Health Innovations, USA); Anderson Borovac-Pinheiro and Alice Won (Massachusetts General Hospital, Boston, Harvard Medical School, USA); Thomas Burke (Vayu Global Health Innovations, USA)

Friday, October 18 18:00 - 19:30

F-NR: Networking Reception & ISV Energy Panel

Room: NW Ballroom

Cash Bar

Energy Panel organized by IEEE Smart Village

This session will be a moderated interactive Q&A panel. After some introductory remarks and initial questions for the panelists it will open for the audience to contribute.

Moderator: Alexander Anderson, Engagement Chair, IEEE Smart Village; CEO, EmpowerPack SPC

Panelists:

- Robin Podmore, Co-founder and Vice-Chair, IEEE Smart Village; President, Incremental Systems Corporation
- Ruomei Li, Secretary General (retired) of the Chinese Society of Electrical Engineering; Research Fellow, Tsinghua University
- Monica L. Brown, Founder and Executive Director, Africa Development Promise
- Olga Anderson, Education Chair, IEEE Smart Village
- Taylor Hudson, Technical Designer, Kilowatts for Humanity

Saturday, October 19

Saturday, October 19 8:00 - 10:00

SA-PL: Saturday Plenary Panel

Room: NW Ballroom

Panel: "Health-Related Issues in Resource Constrained Environments"

The Health Plenary Panel will share perspectives on the importance of multi-stakeholder, inter-disciplinary/cross-disciplinary collaboration, with representatives from different stakeholder groups (including the public, education and research, policy, societal and funding sectors).

Moderator: Paul M Cunningham (IIMC / mHealth4Afrika / IST-Africa Institute, Ireland)

Panelists:

- Tim Wood, Senior Program Officer, Bill & Melinda Gates Foundation
- Skye Gilbert, Deputy Director, Digital Health, PATH

Saturday, October 19 10:00 - 10:30

SA-B1: Break

Room: Cascade (2nd) Level

Saturday, October 19 10:30 - 12:00

SA-AG4: Agriculture 4: Applications & Case Studies

Room: Cascade 5&6

Session Chair: Michael Brisbois (IEEE & Sigma Six, USA)

10:30 ***Complete diet in minimal area***
Nicolas M di Tada (InSTEDD, USA)

10:50 ***Low cost Brussels sprouts harvester for small farms***
Milad Audi, William Frost, Jose Henriquez and Nathan Jones (University of St Thomas, USA); Janssen Hang (Hmong American Farmers Association, USA); Kundan Nepal (University of St. Thomas, USA)

11:10 ***Combating Food Insecurity with Large Scale Aquaponics: A Case Study in Silicon Valley***
Riley Albright-Borden, Petra Nelken, Sophia Sparagana, Sydney Thompson, James Wang, Laura Doyle, Hohyun Lee, Michele Parker and Sarah Kate Wilson (Santa Clara University, USA)

SA-EN4: Energy 4: Innovations

Room: Cascade 1&2

Session Chair: Aran Eales (University of Strathclyde, United Kingdom (Great Britain))

10:30 ***Solar Electric Cookstove - A First Generation, High Efficiency Solar Electric Cooking Device Prototype***
Jagmohan Singh and Pritpal Singh (Villanova University, USA)

10:50 ***Synergy: A Smart and Scalable Energy Measurement Platform for Electricity Consumers***
Sarah Johnson, Pearce Ropion and Behnam Dezfouli (Santa Clara University, USA)

11:10 ***A Sustainable 3D-printed casing for Hydro-System Automation Sensing Units***
Navid Shaghaghi and Jesse Mayer (Santa Clara University, USA)

11:30 ***Development of a Technology Solution for Cooling of Milk by Biogas in Farms***
Alvaro Leiva, Norman A Reyes and Alden Jiron (Technological University La Salle, Nicaragua)

SA-H4: Health 4: Diagnosis

Room: Cascade 3&4

Session Chair: Khanjan Mehta (Lehigh University, USA)

10:30 ***Fully-automated patient-level malaria assessment on field-prepared thin blood film microscopy images***
Charles B. Delahunt (Intellectual Ventures Lab, USA); Mayoore Selvarasa Jaiswal (IBM, USA); Matthew Horning (Intellectual Ventures Laboratory, USA); Samantha Janko (Arizona State University, USA); Clay Thompson (Creative Creek LLC, USA); Sourabh Kulhare (IV/GGR, USA); Liming Hu (Intellectual Ventures Laboratory, USA); Travis Ostbye, Grace Yun and Roman Gebrehiwot (IV/GGR, USA); Benjamin Wilson (Intellectual Ventures Laboratory, USA); Earl Long (LSHTM, USA); Stephane Proux (SMRU, Thailand); Dionicia Gamboa (UPCH, Peru); Peter Chiodini (HTD, United Kingdom (Great Britain)); Jane Carter (AMREF, Kenya); Mehul Dhorda (WWARN, Thailand); David Isaboke (AMREF, Kenya); Bernhards Ogutu (KEMRI, Kenya); Wellington Oyibo (DMSA, Myanmar); Elizabeth Villasis (UPCH, Peru); Kyaw Tun (DMSA, Myanmar); Christine Bachman and David Bell (IV/GGR, USA); Courosh Mehanian (Intellectual Ventures Laboratory, USA)

10:50 ***Schistoscope: Towards a locally producible smart diagnostic device for Schistosomiasis in Nigeria***
Temitope Agbana and G-Young Van (Delft University of Technology, The Netherlands); Oladimeji Oladepo (University of Ibadan, Nigeria); Gleb Vdovin (Delft University of Technology, The Netherlands); Wellington Aghoghovwia Oyibo (University of Lagos, Nigeria); Jan-Carel Diehl (Delft University of Technology, The Netherlands)

11:10 ***WIPO Re:Search: Driving Progress Toward the SDGs by Catalyzing Drug, Diagnostic, and Vaccine Development for Neglected Diseases***
Noah Hunthausen, Analise LeJeune, Michelle Lee, Callie Weber, Joseph Hargan-Calvopina, Katy Graef, Cathyryne K. Manner and Jennifer Dent (BIO Ventures for Global Health, USA)

11:30 ***Tracing infectious agents with mobile location information: A simple and effective countermeasure against epidemic risks***
Takashi Okumura (Kitami Institute of Technology, Japan)

SA-SD1: Sustainable Development - Applications

Room: Cascade 9

Session Chair: Mostafa Mortezaie (DeVry University, USA)

10:30 ***CompostNet: An Image Classifier for Meal Waste***
Sarah Frost, Bryan Tor, Rakshit Agrawal and Angus G. Forbes (University of California, Santa Cruz, USA)

10:50 ***Leveraging Big Data to Identify Corruption as an SDG Goal 16 Humanitarian Technology***
Jiawei Li, Wen-Hao Chen, Qing Xu, Neal Shah and Timothy Mackey (University of California, San Diego, USA)

11:10 ***Geo-Referenced Infrastructure and Demographic Data for Development***
Io Blair-Freese (Bill & Melinda Gates Foundation, USA)

SA-W1: Water 1: Supporting Sanitation

Room: Cascade 7&8

Session Chair: Daniel K Lottis (CLSE Consulting, USA)

10:30 ***The Shifting Global Trends in Practice of Basic Sanitation Services: An In-depth Comparative Analysis of the Current Conditions and Future Policy Recommendations***
Muhammad Hassan Bin Afzal (Kent State University, USA)

10:50 ***Seeing the forest for the trees: A systems approach for rural water and sanitation service management and operation***
Jeffrey P Walters, Ben Giudice, Jonathan Wilson and Natalie Klingsporn (George Fox University, USA)

11:10 ***An Inclusive Community Based Water Purification and Monitoring System for the Base of the Pyramid***
Rahul Bhaumik (PES University, India); Sunny Prajapati (Indian Institute of Science, India); Tarun Kumar (Indian Institute of Science, Bangalore, India & University of Florida, USA); Vishal Mishra (Vijaya Vittala Institute of Technology, India); Kriti Bhalla (Ramaiah Institute of Technology, Bangalore, India)

11:30 ***Rwanda Ecological Sanitation Latrine Design***
Brooke Baugher (Virginia Polytechnic Institute and State University, USA)

Saturday, October 19 12:00 - 14:00

SA-LU: Saturday Lunch & Keynote

Room: NW Ballroom

Keynote: "Sustainable Development and Humanitarian Activities by IEEE Members in the USA"

Tom Coughlin, President, IEEE-USA

Abstract: IEEE's tagline is "advancing technology for the benefit of humanity." IEEE-USA is a special part of the IEEE that can address public policy issues with the US government and works closely with the IEEE Regions in the USA. Among the things that IEEE-USA has supported are some notable sustainability and humanitarian activities. These include the MOVE truck that is deployed with the Red Cross to disaster sites. This talk will present information on some of the sustainable development and humanitarian activities that have been going on in the USA, including work on relevant public policies. There are many opportunities within the US, as well as outside of the USA, to make significant contributions towards sustainable development and to help underserved communities. It is time that we addressed these opportunities, no matter where they reside.

Saturday, October 19 14:00 - 15:30

SA-DM1: Disaster Mitigation 1: Leveraging Appropriate Technologies

Room: Cascade 5&6

Session Chair: John Gershenson (The Pennsylvania State University, USA)

14:00 ***Towards Practical Utilization of Unmanned Aerial Vehicle in Disaster Mitigation - UAV Operation Drill -***
Shigeru Kashihara (Nara Institute of Science and Technology, Japan); Atsushi Yamamoto, Kenta Matsuzaki, Kosei Miyazaki and Tomoya Seki (Kochi City Fire Bureau, Japan); Go Urakawa (University of Hyogo, Japan); Masahiro Fukumoto (Shikoku RC, National Institute of Information and Communication Technology, Japan); Chikara Ohta (Kobe University & Graduate School of Science, Technology and Innovation, Japan)

14:20 ***Using Drones in Disaster Areas: Perspectives of Disaster Responders in North Carolina, Virginia and Maryland***
Victoria D Tanner, Erol Ozan, Leslie Pagliari and Kanchan Das (East Carolina University, USA)

14:40 ***Wi-SF: Aerial Wi-Fi Sensing Function for Enhancing Search and Rescue Operation***
Shigeru Kashihara (Nara Institute of Science and Technology, Japan); Atsushi Yamamoto, Kenta Matsuzaki, Kosei Miyazaki and Tomoya Seki (Kochi City Fire Bureau, Japan); Go Urakawa (University of Hyogo, Japan); Masahiro Fukumoto (Shikoku RC, National Institute of

Information and Communication Technology, Japan); Chikara Ohta (Kobe University & Graduate School of Science, Technology and Innovation, Japan)

15:00 ***Autonomous Navigation and Collision Avoidance Surface Watercraft for Flood Relief Operations***
Christy Jose, Dhivvya J P and Devika Das (Amrita Vishwa Vidyapeetham, India)

SA-EN5: Energy 5: Supporting Adoption

Room: Cascade 1&2

Session Chair: Pritpal Singh (Villanova University, USA)

14:00 **From Beneficiary to Community Leader: Capacity Building through a Renewable Energy Project in Rwanda**
Kenneth Wai Kwan Lo, Stephen Chi Fai Chan and Grace Ngai (The Hong Kong Polytechnic University, Hong Kong); John Kalenzi, Phanuel Sindayehaba and Innocent Habiyaremye (African Evangelistic Enterprise, Rwanda)

14:20 **Sustainable model for rural electrification projects in Non-Interconnected Areas in Colombia**
Maximiliano Bueno (Universidad de La Salle & Norwegian University of Science and Technology, Colombia); Patricia Rodriguez (Universidad Militar Nueva Granada, Colombia); Marta Molinas (NTNU, Norway)

14:40 **Women-Specific Training Programs for the Development of a Renewable Energy Workforce**
Carol Weis (Remote Energy, USA)

15:00 **Strategies for Near-total Decarbonization of the Human Enterprise: Deep Hot Dry Rock (HDR) Geothermal and Hydrogen-based Integrated Energy Systems at Global Scales**
William C Leighty (The Leighty Foundation & Alaska Applied Sciences, Inc., USA)

SA-H5: Health 5: Diagnosis & Screening

Room: Cascade 3&4

Session Chair: Silvia Figueira (Santa Clara University, USA)

14:00 **Non-invasive Blood Glucose Estimation Using Multi-sensor Based Portable and Wearable System**
Tasfin Mahmud, Mehedi Hossen Limon, Sabbir Ahmed, Mohammad Zunaed Rafi, Borhan Ahamed, Shadman Shahriar Nitol, Md. Yeasin Mia, Rafat Emtiaz Choudhury, Adnan Sakib, Arik Subhana and Celia Shahnaz (Bangladesh University of Engineering and Technology (BUET), Bangladesh)

14:20 **A Low-Cost, Point-of-Care Sickle Cell Anemia Screening Device for Use in Low and Middle-Income Countries**
Jannah Wing, Ashleigh Crawford, Maria Lancia, Paola Lopez Olivia O'Donnell, Jaro Pereram, Khanjan Mehta and Xuanhong Cheng (Lehigh University, USA)

14:40 **Integrated Robotic System for the Development Lateral Flow Assays**
Toan Huynh, Caitlin Anderson, David Gasperino, Stephen Harston, Helen Hsieh, Rosemichelle Marzan, John Williford, Ciela Oncina, Veronika A Glukhova, David Cate and Kevin Nichols (Intellectual Ventures, USA); Bernhard Weigl (Intellectual Ventures Laboratory, USA)

15:00

SA-SD2: Sustainable Development - Case Studies 1

Room: Cascade 9

Session Chair: Adil Usman (Indian Institute of Technology Mandi, India)

14:00 ***Evaluating Progress of a Social Venture in Wakiso District Uganda***
Ruben Vargas (University of Colorado, USA); Bennett Miller (University of Colorado at Boulder, USA); Gabriel Anhalzer (University of Colorado, USA); Alan Mickelson (University of Colorado at Boulder, USA); Karthik Kulkarni (IEEE, USA)

14:20 ***IEEE SIGHT Hits The Road - Capacity Building Workshops to Accelerate Humanitarian Technologies Applications Growth in Indonesia***
Allya Paramita Koesoema (Institut Teknologi Bandung & IEEE SIGHT on eHealth and Telemedicine Indonesia, Indonesia); Yoke Irawan (Institut Teknologi Bandung, Indonesia); Soegijardio Soegijoko (Institut Teknologi Bandung & Biomedical Eng. Program, School of Electrical Eng. & Informatics, Indonesia)

14:40 ***"NAVIDAD FIEEELIZ", 10 Years in Vulnerable Communities***
Vivianne Estefania Niño Vega (WorleyParsons, Colombia); Óscar Javier Rodríguez (IEEE SIGHT COLOMBIA, Colombia)

SA-W2: Water 2: Effective Water Reuse

Room: Cascade 7&8

Session Chair: Laura Doyle (Santa Clara University, USA)

14:00 ***A Homemade Arsenic Filter for Santiago del Estero Forest***
Guillermo Ariel Blason, sj, John Martínez, Agustina Rodriguez Tartac, Hernán Santa Cruz and Héctor Zanoni (Universidad Catolica de Cordoba, Argentina)

14:20 ***Open-Source IoT Framework for Mobile Household Water Reuse System***
Aaron Dotson (University of Alaska Anchorage, USA); Martin Cenek (University of Portland, USA); Gregory Michaelson (University of Alaska Anchorage, USA)

14:40 ***Rwanda Water Distribution***
Brianna Friedman and Brooke Baugher (Virginia Polytechnic Institute and State University, USA)

15:00 ***Modeling the Viability of a Refrigeration-Based Atmospheric Water Generator under the Present-Day Climate***
Alexei J Sondergeld (Boston University, USA); Guiling Wang (University of Connecticut, USA); Abhishek Dutta (University of Connecticut, USA)

Saturday, October 19 15:30 - 16:00

SA-B2: Break

Room: Cascade (2nd) Level

Saturday, October 19 16:00 - 17:50

SA-DM2: Disaster Mitigation 2: Leveraging Information Systems

Room: Cascade 5&6

Session Chair: Albert Ko (Lingnan University, USA)

16:00 ***Reducing cost while increasing the resilience & effectiveness of tsunami early warning systems***
Paul Gardner-Stephen, Angus Wallace, Kimberley Hawtin and Ghassan Al-Nuaimi (Flinders University, Australia); Anh L.H. Tran (Coventry University, United Kingdom (Great Britain)); Matthew Lloyd (New Zealand Red Cross, New Zealand); Thomas Le Mozo (ENSTA, France)

16:20 ***Fire detection in video sequences using a machine learning system and a clustered quantitative image marker***
Abolfazl Zargari Khuzani,Rakshit Agrawal and Najmeh Mashhadi (University of California, Santa Cruz, USA, USA)

16:40 ***Design of a Disaster Information System using Mobile Cloud Wireless Mesh with Delay Tolerant Network***
Jane Arleth L dela Cruz (Ateneo de Manila University & Ateneo Innovation Center, Philippines); Nathaniel Libatique and Gregory Tangonan (Ateneo Innovation Center, Philippines)

17:00 ***Comprehensive Air Quality Management System for Rapidly Growing Cities in Developing Countries***
Anand Kakarla, Venkata Satish Kumar Reddy Munagala, Asif Qureshi and Shashidhar Thatikonda (IIT HYderabad, India); Swades De (Indian Institute of Technology Delhi, India); Tetsuhiro Ishizaka (Nihon University, Japan); Atsushi Fukuda (Nihon University, Japan); Soumya Jana (Indian Institute of Technology, Hyderabad, India)

17:20 ***A Sustainable Approach to turn Plastic Waste into Useful Construction Blocks***
Kalathuru M and John Jesuran (Amrita Vishwa Vidyapeetrham, India); Sreevalsa Kolathayar (Vellore Institute of Technology, India)

SA-EN6: Energy 6: Field Experiences

Room: Cascade 1&2

Session Chair: Adil Usman (Indian Institute of Technology Mandi, India)

16:00 ***Analysis of Field Collected Data for a Prototype Photovoltaic System in Nauta, Peru***
Kyler Stephens and Chad Stillinger (George Fox University, USA); Joel McGee (JungleMaster Ministries, USA)

16:20 ***Assessing a Refugee Camp in Mayukwayukwa Zambia***
Janelle Isenhart, Erika Ervin, Jiashu Yang, Jacob Moss and Alan Mickelson (University of Colorado at Boulder, USA)

16:40 ***Impact Assessment of Energy Kiosks in Rural Zambia***
Peter Dauenhauer (University of Strathclyde & Snohomish County PUD, USA); Wes Lauer and Henry Louie (Seattle University, USA); J McLean Sloughter (Seattle University & KiloWatts for Humanity, USA); Christopher Lacrampe (Seattle University, USA); Carrie Smith (KiloWatts for Humanity, USA); Elias Smith, Joshu Ohara and Naod Sebhat (Seattle University, USA)

17:00 ***Sustainability of Solar PV Energy Kiosks for Off-Grid Energy Access: Malawi Case Study***
Damien Frame (University of Strathclyde, United Kingdom (Great Britain)); Peter Dauenhauer (University of Strathclyde & Snohomish County PUD, USA); Aran Eales and Stuart Galloway (University of Strathclyde, United Kingdom (Great Britain))

17:20 ***Charcoal Distribution Chain in Kisumu, Kenya***
Nicole Dato, Annaliese Long, Aisa Sam, Angelique Santiago, Hartini Margot and John Gershenson (The Pennsylvania State University, USA)

SA-H6: Health 6: Supporting Diagnosis & Treatment

Room: Cascade 3&4

Session Chair: Charles B. Delahunt (Intellectual Ventures Lab, USA)

16:00 ***A Mobile Application for Early Diagnosis of Pneumonia in the Rural context***
Unais Sait (PES University, India); Sanjana Shivakumar (Ramaiah Institute of Technology, India); Gokul Lal K v (East Point College of Engineering and Technology, India); Tarun Kumar (Indian Institute of Science, Bangalore, India & University of Florida, USA); Vandana Ravishankar (PES University, India); Kriti Bhalla (Ramaiah Institute of Technology, Bangalore, India)

16:20 ***Ultra-low-cost, high quality bubble CPAP for low resource settings***
Michelle Dundek (Vayu Global Health Innovations, LLC & Massachusetts General Hospital Division of Global Health Innovation, USA); Kamyar Mollazadeh-Moghaddam (Harvard Medical School, USA); Anuj Bellare, Thomas Burke, Rupam Sharma and Joseph Owuor (Vayu Global Health Innovations, USA)

16:40 ***Driven By Africa, For Africa - Improving Access to Cancer Medicines and Technologies through the African Access Initiative (AAI)***
Analise LeJeune (BIO Ventures for Global Health (BVGH), USA); Faruk Mohammed (Ahmadu Bello University, Nigeria); Daniel Seymour, Noah Hunthausen, Delaney Lake, Michelle Lee, Callie Weber, Joseph Hargan-Calvopina, Cathyryne K. Manner, Katy Graef andJennifer Dent (BIO Ventures for Global Health, USA)

17:00 ***Development of CERVIS: Cervical cancer Early Response Visual Identification System***
Nicola Gerbino, Dave Heil, Claire Hultquist, Julia Lanoha, Rosie McDonagh, Hallie McNamara, and Mason Seely (Santa Clara University, USA); Hiram Lozano (Anaerobe Systems, USA); Prashanth Asuri, Michele Parker and Craig Stephens (Santa Clara University, USA)

17:20 ***Towards Universal Cardiac Care: Telecardiology for Resource-constrained and Economically Disadvantaged Communities***
Bollepalli S Chandra, Rahul L R, Ramu Pittala and Soumya Jana (Indian Institute of Technology, Hyderabad, India)

SA-SD3: Sustainable Development - Case Studies 2

Room: Cascade 9

Session Chair: Catherine Tran

16:00 ***Predicting Biker Density at Bikeshare Station Intersections in San Francisco***
Mahika Dubey, Alan Antonio Peral Ortiz, Rakshit Agrawal and Angus G. Forbes (University of California, Santa Cruz, USA)

16:20 ***Ergonomic Design Issues in Roadside Motorcycle Repairing in India***
Akshay Vinod Manke and Prabir Mukhopadhyay (Indian Institute of Information Technology Design and Manufacturing Jabalpur, India)

16:40 ***Design Analysis of the Wooden Palanquin used in Yamunotri Dham***
Suraj Bhat (Indian Institute of Technology, India); Subir Saha (Indian Institute of Technology Delhi, India); Vinay Gupta (IEC College of Engineering, India)

17:00 **Community Approaches To Recycling Plastics**
Paige Hapeman, Andrew Fugh, Elizabeth Falk, Rachel Case, Devin Yeatter, Ganesh Balasubramanian and Khanjan Mehta (Lehigh University, USA)

17:20 **Power Wearable Medical Device Components Via Thermoelectric Circuit Integration**
Joshua Vincent (1554 Rose Anna Dr. & Santa Clara University, USA); Hohyun Lee (Santa Clara University, USA)

SA-W3: Water 3: Supporting Access to Water

Room: Cascade 7&8

Session Chair: Albert Ko (Lingnan University, USA)

16:00 ***Solar Domestic Water supply in the Mountains of Rural Haiti: Five Years Operational Experience***
Eric Sabelman (If Pigs Could Fly - Helping Hillside Haiti & Santa Clara University, USA); Elisee Abraham (If Pigs Could Fly - Helping Hillside Haiti, Haiti); Randy Mont-Reynaud (If Pigs Could Fly - Helping Hillside Haiti, USA)

16:20 ***A Water System Using a DC Pump for Remote Solar Installations***
Steve J Szablya (Development Off The Grid (DOTG) & Washington State University, USA); George Goldsmith (Kilowatts for Humanity, USA); Kevin Allen (Washington State University, USA); Nathan Gray (Washington State University & EWB-WSU, USA)

16:40 ***Can Desalination be an Economically Viable Solution for Water Scarcity?***
Farshad Mohammadi and Mostafa Sahraei-Ardakani (University of utah, USA); Yousef Al-Abdullah (Kuwait Institute for Scientific Research & Energy & Building Research Center, Kuwait); Gerald Heydt (Arizona State University, USA)

17:00 ***Water Treatment Systems by Ozone and UV Technology using Non-Conventional Sources of Energy***
Alexander I Jittu (AIJ Engineering Consulting LLC, USA)

Saturday, October 19 18:00 - 19:00

SA-NR: Networking Reception

Room: NW Ballroom

Saturday, October 19 19:00 - 21:00)

SA-NDK: Networking Dinner & Keynote

Room: NW Ballroom

Keynote: "Developing Technology for Low-resource Settings"

Tess Russo, Global Good

Abstract: Millions of people suffer and die each year in poor countries from causes that humanity has the scientific and technical ability to solve. Funded by Bill Gates and focused on a shared vision with Nathan Myhrvold, Global Good invents technology to solve some of humanity's most daunting problems. This talk will include discussion of one product currently in development - a hand-held soil analysis device to inform and optimize crop selection and soil management. This soil property-detecting spectrometer is battery-operated and designed to be appropriate for our target users in rugged conditions in low-resource settings.

Sunday, October 20

Sunday, October 20 8:30 - 10:00

SU-DM3: Disaster Mitigation 3: Supporting Rapid Response

Room: Cascade 5&6

Session Chair: Paul Gardner-Stephen (Flinders University, Australia)

8:30 ***Developing High-Value Technologies for First Responders***
Patricia Collins (IncidentAid, USA); Navid Shaghaghi (Santa Clara University, USA); Sean Lanthier (IncidentAid, USA)

8:50 ***Implementing Communications and Information Dissemination Technologies for First Responders***
Navid Shaghaghi, Semal Patel, Brinda Pabari and Maya Francis (Santa Clara University, USA)

9:10 ***Designing a combined personal communicator and data entry terminal for disaster relief & remote operations***
Paul Gardner-Stephen, Angus Wallace and Lucas Moss (Flinders University, Australia); Loic Lagadec (ENSTA-Bretagne & LABSTICC - UMR 6285, France); Matthew Lloyd (New Zealand Red Cross, New Zealand)

9:30 ***Low-Cost Open-Source Solution to Optimize Emergency Medical Services in Developing Communities by Tracking, Dispatching, and Simulating***
Timothy Lam, Hans Yuan, and Maurício de Oliveira (University of California, San Diego, USA)

SU-H7: Health 7: Supporting Mobility

Room: Cascade 3&4

Session Chair: Miriam Cunningham (IIMC / IST-Africa, Ireland)

8:30 ***Low-Cost Textile Myoelectric Control of Knee-Ankle-Foot-Orthosis***
Samuel Pitou and Brendan Michael (King's College London, United Kingdom (Great Britain)); Ganesh Madhav Bapat and S Sujatha (Indian Institute of Technology Madras, India); Matthew Howard (King's College London, United Kingdom (Great Britain))

8:50 ***Designing and Prototyping the Human-centered ELectric Prosthetic (HELP) Hand***
Maddie Bolinger, Mira Diwan, Kirsten Dodroe, Jamie Ferris, Shiyin Lim, Michael Mehta, Evan Misuraca, John Paul Norman, Prashanth Asuri, Christopher Kitts and Michele Parker (Santa Clara University, USA)

9:10 ***Simple Gait Segmentation Method Using a Novel Plantar Pressure Measurement System with Custom-Made Capacitive Sensors: Preliminary Results***
Pablo Aqueveque, Enrique Germany, Rodrigo Osorio, Francisco Pastene (University of

Concepcion, Chile)

9:30 ***Measurement of the Human Balance with one Inertial Sensor in Lower Back***
Daniela Pinto, Britam Gómez, Julio Godoy, Pablo Aqueveque (University of Concepcion, Chile)

SU-ISV1: IEEE Smart Village

How to get engaged with IEEE Smart Village (ISV) as a volunteer, ambassador or entrepreneur

Room: Cascade 1&2

Session Chair: Robin Podmore, Co-Founder IEEE Smart Village et al

Members of the IEEE Smart Village (ISV) Steering committee will provide guidance on:

(1) How to volunteer on one of the ISV Committees: Technology, Education, Fund Development, Marketing, Operations

(2) The role of ISV Ambassadors and the application process

(3) How to write a proposal and receive funding as an ISV Entrepreneur

The format will be a workshop with some presentations.

SU-PW1: UnConference Session

Room: Cascade 9

In this UnConference format session, conference delegates will enjoy the opportunity to suggest topics for discussion with colleagues and peers from around the world related to Sustainable Development. Complementing the Plenary Panels and paper sessions in this year's program, UnConference Sessions facilitate participant-driven discussion, whether sharing expertise and experiences, answering questions as a subject matter expert or having the opportunity to ask questions of a subject matter expert or experienced practitioner or researcher.

A notice board beside registration will allow conference delegates to propose topics for discussion from Thursday evening until Saturday evening. Conference delegates can confirm if they would like to contribute. Depending on the level of interest, more than one discussion may be scheduled simultaneously, or alternatively specific time slots will be assigned to the most popular topics.

Outputs from these Unconference Sessions will inform Program Design and the Call for Papers for the 10th Anniversary Celebrations of GHTC in 2020.

Sunday, October 20 10:00 - 10:30

SU-B: Break

Room: Cascade (2nd) Level

Sunday, October 20 10:30 - 12:00

SU-DM4: Disaster Mitigation 4: Supporting Disaster Recovery

Room: Cascade 5&6

Session Chair: Catherine Tran

10:30 ***Scenario Planning for Disaster Relief Networks***
Parmis Emadi and Zbigniew J Pasek (University of Windsor, Canada)

10:50 ***3D Printing for Humanitarian Relief: The Printer Problem***
Simon Lipsky, Andrew, Marcela Velasquez and John Gershenson (The Pennsylvania State University, USA)

11:10 ***Socio-Economic Disaster Recovery Captured by Big Housing Market Data***
Yuya Shibuya and Hideyuki Tanaka (The University of Tokyo, Japan)

11:30 ***Towards Vulnerability Mapping on High Resolution Aerial Images: Roof Detection, GIS, and Machine Learning Techniques***
Dean Karlo D Bardeloza (Ateneo de Manila University & Ateneo Innovation Center, Philippines); Nathaniel Libatique (Ateneo de Manila University, Philippines); Gregory L Tangonan (Ateneo de Manila University, USA); May Celine Thelma Vicente (Manila Observatory, Philippines); Jaime Luis E Honrado (Ateneo de Manila University & Skyeye, Inc., Philippines)

SU-H8: Health 8

Room: Cascade 3&4

Session Chair: Chair: Miriam Cunningham (IIMC / IST-Africa, Ireland)

10:30 ***A Novel Optimization Approach for Developing Foods that Address Childhood Malnutrition***
Chris Fereno, Sudharsh Shankar, Seanna Corr, Janos Pinter and Lori Herz (Lehigh University, USA)

10:50 ***Predicting Substance Misuse Admission Rates via Recurrent Neural Networks***
Matthew J Howard and Rakshit Agrawal (University of California, Santa Cruz, USA)

11:10 ***Robots in the Home: A Novel Suite of Interactive Devices for Assisting with Disease Prevention and Meal Preparation***
Zach Hawks, Md. Islam, Michael C Lastinger, Henry Rutland, Marshall Trout, Ian D Walker,

Keith E Green (Clemson University, USA)

11:30 ***Development of a simplified reader for digital droplet assays performed in limited resource settings***
Samantha Byrnes, Tim Chang, David Nash (Intellectual Ventures Laboratory, USA); Toan Huynh (Intellectual Ventures, USA); Bernhard Weigl (Intellectual Ventures Laboratory, USA); Kevin Nichols (Intellectual Ventures, USA)

SU-ISV2: IEEE Smart Village

How to get engaged with IEEE Smart Village (ISV) as a volunteer, ambassador or entrepreneur

Room: Cascade 1&2

Session Chair: Robin Podmore, Co-Founder IEEE Smart Village et al

Members of the IEEE Smart Village (ISV) Steering committee will provide guidance on:

(4) How to volunteer on one of the ISV Committees: Technology, Education, Fund Development, Marketing, Operations

(5) The role of ISV Ambassadors and the application process

(6) How to write a proposal and receive funding as an ISV Entrepreneur

The format will be a workshop with some presentations.

SU-PW2: UnConference Session

Room: Cascade 9

In this UnConference format session, conference delegates will enjoy the opportunity to suggest topics for discussion with colleagues and peers from around the world related to Sustainable Development.

Complementing the Plenary Panels and paper sessions in this year's program, UnConference Sessions facilitate participant-driven discussion, whether sharing expertise and experiences, answering questions as a subject matter expert or having the opportunity to ask questions of a subject matter expert or experienced practitioner or researcher.

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