



IEEE GHTC 2021

11th IEEE Global Humanitarian Technology Conference
Virtual Event | October 19 - 23, 2021 |
www.ieeeghtc.org



GHTC 2021 Report

The IEEE Global Humanitarian Technology Conference (IEEE GHTC 2021) 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).

IEEE GHTC 2021 had an exciting and varied program of workshops, panels, keynotes and technical presentations. GHTC 2021 was held virtually via Zoom on October 19-22, 2021. (The October 23rd date was not needed.)

Student Poster Contest

Our 4th Student Poster Contest was held online on Tuesday October 19 from 4-6pm. Three cash prizes were awarded.

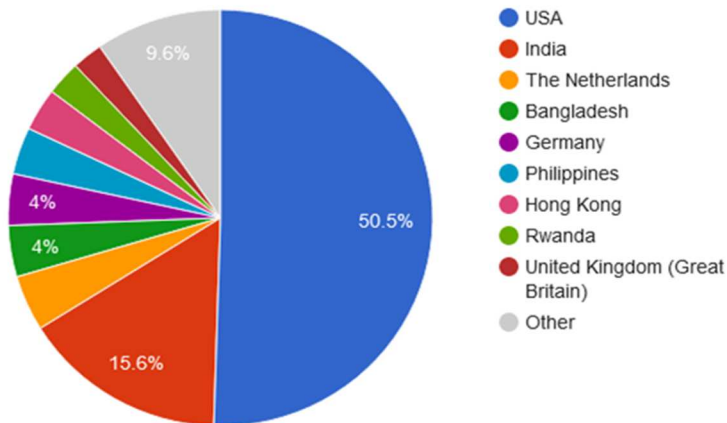
Papers: The Technical Program featured 68 papers in 18 sessions:

Thematic Area	Number of Final Papers Accepted	Sessions
Agriculture & Food Security (SDG2)	12	3
Connectivity & Communication in Support of Development	4	1
Disaster Mitigation, Preparedness, Response & Recovery	10	3
Quality Education (SDG4)	10	3
Affordable & Clean Energy (SDG7)	14	4
Good Health and Well Being (SDG3)	12	3
Clean Water & Sanitation (SDG6)	3	1

Authors distribution:

Region	Authors	%
United States	152	50.5
Asia/Pacific	89	29.6
Europe, Middle East, Africa	45	15.0
Latin America	5	1.7
Canada	2	0.7
Other	8	2.7

Author distribution by country



ATTENDEES

118 registrations: 70 presenters (incl speakers/panels); 48 attendees (incl committee)
59 IEEE Members (HG); 14 IEEE Student; 31 non-member; 14 student non-member

Grants: IEEE SCV ComSoc Chapter provided registration grants for up to 7 applicants.
Three applied and were approved.

Complementary offer: access to Plenary sessions via vTools registration; 19 comp attendees

SPONSORS



WORKSHOPS

Tuesday morning featured these 1/2 day workshops included with GHTC full registration:

- Frugal Innovation and the Design Thinking Process, by Frugal Innovation Hub (SoE of Santa Clara University) and Latin America Frugal Innovation Network
- Application of IoT During Pre- and Post-COVID 19 Pandemic (A Humanitarian Services Workshop)
- Fundamentals of Off-Grid Electrical Systems, with Prof. Henry Louie, Kilowatts for Humanity and Seattle University
- Distributed Energy meets Humanitarian Needs, by IEEE Standards Association SCC 21
Presenters: Mark Siira and Wayne Stec, IEEE Standards Association SCC 21 and Panos Moutis, CMU

SPECIAL SESSIONS AND PANELS

- Meet the Editors: *Thinking About Publishing for a Transdisciplinary Outlet: What do you need to know?* with Katina Michael, founding Editor in Chief and Roba Abbas, co-editor, the *IEEE Transactions on Technology and Society* (Tuesday)
- Tech Innovations for Healthy Aging – Panel (Wednesday)
- Social Media Disinformation and its Impact on Public Health During the COVID-19 Pandemic – Panel (Tuesday)
- Advancing IEEE Leadership Through New Initiatives on Sustainable Development and Energy Transformation – Panel (Wednesday)
- Think Global, Act Local: Fostering Engineering Knowledge and Capacity for Impact (Friday)

PLENARY SPEAKERS

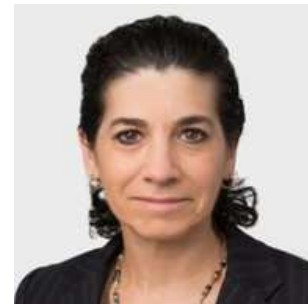
- Elizabeth M. Belding, Professor in the Department of Computer Science at the University of California, Santa Barbara (ICTD) (Wednesday AM)
- Octav Chipara, Associate Professor of Computer Science at the University of Iowa (mHealth) (Friday AM)
- Deborah Estrin, Professor of Computer Science at Cornell Tech (public interest technology) (Thursday AM)
- Farid Farahmand, Chair, Engineering Science Department (Electrical Engineering) at Sonoma State University (Friday AM)
- Anna Förster, Sustainable Communication Networks group, University of Bremen (Thursday AM)
- Aline McNaull, energy, space, defense and research policy at IEEE-USA (Friday PM)
- Grayson Randall, Operations Lead, IEEE MOVE (Mobile Outreach Vehicle) (Wednesday PM)
- Vijay Janapa Reddi, Associate Professor at Harvard University, VP and a founding member of MLCommons (machine learning) (Wednesday AM)



Elizabeth M. Belding



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Aline McNaull



Grayson Randall



Vijay Janapa Reddi

AWARDS

Best Paper Award

Offloading an Energy Efficient IoT Solution to the Edge: A practical Solution for Developing Countries

by Gibson Kimutai (University of Rwanda & Moi University, Kenya); Alexander Ngenzi (Jain University, Rwanda); Said Ngoga (University of Rwanda, Rwanda); Anna Förster (ComNets, University of Bremen, Germany)

Runner-up Best Paper

Upgrading the Digital Intranet in the Galapagos Islands

by Javier Urquizo, Olivia Lajeunesse, Paige Bonvallet and Michael Carrigan (Villanova University, USA); Nathaly Simuy Sanchez Chan (Chalmers University of Technology, Sweden); Pritpal Singh (Villanova University, USA); David Lansdale (Beyond Chacay Foundation & USFQ, Ecuador); Cesar Martin (Escuela Superior Politécnica del Litoral, Ecuador)

Student Poster Awards

Congratulations to the winners of the GHTC 2021 virtual Student Poster Competition held on Tuesday, Oct. 19. Awards were presented on Oct. 22 in the GHTC 2021 Closing Session.



1st Place

[Investigating Clay Pot Coolers for Food Storage in Developing Nations](#)

by Max Burns (Massachusetts Institute of Technology, MIT D-Lab)



2nd Place

[Investigating the use of Wearable Technology to Improve the Safety of Humanitarian Workers in Dangerous Situations](#)

by A. Moodie, M. Senadeera & A. van der Winden (Queensland University of Technology)



3rd Place – Tie

[Monitoring Coastal Habitats Through Machine Learning](#)

by Kalib Perkins (DeVry University)

[Virtual Reality Education](#)

by Imran Jahangir, Jay Perez, Rolando Reyes, Rohail Khan, Blien Mahari (University of Houston)

PANELS-Abstracts & Panelists

- **Social Media Disinformation and its Impact on Public Health During the COVID-19 Pandemic
Wednesday October 20, 2021 | 1-1:50 PM (PT)**

Attempts to influence people's beliefs through misinformation have a long history. Recently, the pervasiveness of social media makes the massive propagation of misinformation much cheaper and influential, raising great concerns from the public. During the COVID-19 pandemic, however, the circulation of false or misleading claims is more dangerous than ever. Beyond the possibility of physical harm, what is its impact on people's political opinions, emotions, physical safety and personal autonomy? What factors may influence people's resistance against misinformation? Is it possible and desirable to control misinformation spread by regulating it?

Moderator: Yuhong Liu, Associate Professor of Computer Science and Engineering, Santa Clara University

Panelists:

- Laura Robinson: Affiliated faculty at the Harvard Berkman Klein Center, and an associate professor in the Department of Sociology at Santa Clara University
 - Étienne Brown: Assistant Professor in the Department of Philosophy at San Jose State University
 - Subramaniam Vincent: Director, Journalism and Media Ethics, Markkula Center for Applied Ethics, at Santa Clara University
- **Panel on Tech Innovations for Healthy Aging
Thursday October 21, 2021 | 1-1:50 PM (PT)**

The United Nations General Assembly declared 2021-2030 the Decade of Healthy Aging that brings together governments, civil society, international agencies, professionals, academia, the media, and the private sector to improve the lives of older people, their families. CTA Foundation's mission is to link seniors and people with disabilities with technologies that enhance their lives. AARP's mission is to enhance the quality of life for all as we age, leading positive social change and delivering value to members through advocacy, service and information. In this panel discussion, the speakers will share past and on-going programs they have been working on that bring innovative solutions to the older adults.

Moderator: Joseph Wei, Managing Director, Technology Ventures Group; Past-sponsorship Chair, GHTC, Advisor/Past-chair of IEEE SCV Section

Panelists:

- Steve Ewell: Executive Director, Consumer Technology Association Foundation
 - Michael Philips: Technology Strategy and Relationships Director, AARP
- **Advancing IEEE Leadership Through New Initiatives on Sustainable Development and Energy Transformation
Thursday October 21, 2021 | 2-2:50 PM (PT)**

Sustainability has a global focus at the United Nations, national and local levels, along with multiple facets that are highly interrelated. While Affordable and Clean Energy is a UN SDG itself, it also provides the infrastructure supporting goals for health, education, clean water and many more elements of international focus. This session will provide an overview of IEEE initiatives and leadership in sustainable development. IEEE has a wide breadth of programs ranging from global perspectives to local level projects and communities working towards a more sustainable world. Recently, IEEE has embarked on amplifying its visibility in sustainability through cross-

organizational efforts, as well as external engagement in key global alliances on renewable energy. As IEEE communities of interest continue to grow and accelerate, this session will highlight key programs and opportunities for greater participant engagement in support of sustainability.

Moderator: Rudi Schubert, Director, New Initiatives for the IEEE Standards Association

Panelists:

- Maike Luiken, IEEE Vice President – Member & Geographic Activities
 - Juan Carlos Montero, Part-Time Lecturer Professor at the University of Costa Rica
 - Sampath Veeraraghavan, Global Chair, IEEE Humanitarian Activities Committee
- **Think Global, Act Local: Fostering Engineering Knowledge and Capacity for Impact**
Friday October 22, 2021 | 1-2 PM PT

Moderator: Iana Aranda, Director, Engineering Global Development, ASME and President, Engineering for Change

Panelists:

- Nishant Agarwal, Founder & CEO, Life and Limb (P) Ltd., (India)
- Abdul Rashid Mussah, Graduate Assistant at the University of Missouri-Columbia (USA)
- Valentina Ospira, Architect (Colombia)
- Brandon Simons, Graduate Assistant at Villanova University (USA)

WORKSHOPS – Abstracts

- **Frugal Innovation and the Design Thinking Process**

October 19th, 2021 – 9AM to 12 PM (PST)

By: Frugal Innovation Hub (SoE of Santa Clara University) and Latin America Frugal Innovation Network

Despite the advancements in water purification systems, water remains inaccessible to 1.1 million people globally; moreover, 5,000 people die worldwide every day due to illnesses associated with unclean water (OCDE).

Very commonly, socio-technological projects such as water purification projects fail to positively impact a population due to the lack of understanding of the social ecosystem where the need emerges from. Frugal Innovation is a frame of work ideal for engineers interested in improving the sustainability and replicability of their solutions by utilizing a human-centric design approach and by visualizing non-technical factors that directly impact the design process of your solution.

Join Santa Clara University's Frugal Innovation Hub and the Latin America Frugal Innovation Network ESAN University (Peru) on learning how to use Frugal Innovation and the Design Thinking Process to help solve a real-world water challenge in Perú at a local scale.

- **Application of IoT During Pre- and Post-COVID 19 Pandemic (A Humanitarian Services Workshop)**

October 19th, 2021 – 9AM to 12 PM (PST)

This workshop provides theory and tutorials on how to build IoT systems to monitor temperature of vaccination at all stages from vaccine manufacturer, and shipment logistics up to all the way to the last stop of delivery at hospitals and clinics. Participants have an opportunity to learn complete design aspects of IoT solutions for monitoring temperature at all levels as described above. The workshop also intended to learn in designing IoT enabled solutions for hospital/clinic settings for

access to information of vaccine storage conditions, route information and patient dashboard to increase trust and reliability between patients and facilities administering the vaccine. The workshop also covers the topics of how to send real time measured data from temperature sensor to web enabled SMS services, PM tools and social media networking platform such as twitter.

- **Fundamentals of Off-Grid Electrical Systems**

October 19th, 2021 – 9AM to 12 PM (PST)

Instructor: Prof. Henry Louie, Seattle University

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”.

- **Distributed Energy meets Humanitarian Needs**

October 19th, 2021 – 9AM to 12 PM (PST)

Presenters: Mark Siira, Wayne Stec, IEEE Standards Association SCC 21 and Panos Moutis, CMU

The emphasis is now shifting toward a more decentralized energy infrastructure, where a mix of dispersed and low-carbon, renewable energy sources such as solar, wind, geothermal, fuel cell, and battery installations – collectively called distributed energy resources (DER) – are integrated with the large centralized power plants in the power grid.

Several trends are driving this transformation. Society’s desire for more sustainable ways to produce energy have spurred R&D advances, and many new products for DER applications, along with growing use of these systems, are already deployed in the market. In turn, their greater performance and expanding functionality have led to new regulations which have created compelling new business opportunities.

More recent focus on Stand-alone or remote systems or electric power in areas that do not have reliable electric delivery. These areas include application tiers, microgrids and DC systems.

2021 SPONSORS

Financial:



Grants:



IEEE Seattle Section

Registration Grants



IEEE COMMUNICATIONS SOCIETY
Santa Clara Valley Chapter

Technical:

