



# 12th IEEE Global Humanitarian Technology Conference (GHTC)

Technology for the Benefit of Humanity

<https://ieeeghtc.org/>

September 8 - 11, 2022 | Santa Clara University, California, USA



## GHTC 2022 Report

The 2022 IEEE Global Humanitarian Technology Conference (IEEE GHTC 2022) was the 12<sup>th</sup> annual 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 2022 was a return to in-person, with hybrid access for remote attendees. GHTC 2022 was held on September 9-11, 2022 at Santa Clara University, California. The university provided the meeting space at no charge. Note this was a month earlier than past conferences, due to the fall term schedule.

### Student Poster Contest

The Student Poster Contest had to be cancelled due to lack of entrants. Most likely due to the earlier timing of the conference before schools started.

### PROGRAM SUMMARY

GHTC 2022 featured 3 ½ days of workshops, events, keynotes, panels and technical sessions and exhibits.

The first day of GHTC 2022 featured three half-day Workshops, Networking Social and Special Event. The workshops were: “**Machine Learning for Social Good,**” “**Building Wireless Sensing Systems,**” and “**GHTC and IEEE Consulting Network Synergies.**”, and the Special evening Event was produced with the IEEE Consultants’ Network of Silicon Valley (CNSV) on “**Communications, Computing, and Power during Disaster Response**”.

The conference program included 13 keynote and plenary presentations by professionals from academia, industry, and non-profit organizations.

Our keynote and plenary speakers were: Neha Kumar (Associate Professor, Georgia Tech); Janice Zdankus, (Vice President, CTO Technology Strategy and Innovation for Social Impact, HPE); Tim Lee (Director, IEEE Region 6); Puneet Sharma (Distinguished Technologist, Hewlett Packard Labs); Kithinji Muriungi and Chris Murimi (Moi University Nairobi, Kenya); Stephanie Gillespie (Chair, EPICS in IEEE Committee); Vishnu S. Pendyala (Professor, San Jose State University); Maya Ackerman (Assistant Professor, Santa Clara University); Eric Goldman (Professor, Santa Clara University); Kelly Yamanishi and Eric Hess (Maker Nexus, USA); Paul Shmotolokha (New Use Energy), and Aline D. McNaull (IEEE-USA).

The conference program included six panels: “Diversity in the Workplace: Retaining Early Career Women and Minority Engineers” (organized by CNSV), “Quality Education Online and the Way Forward,” “Communications, Computing, and Power during Disaster Response,” “Advancing DEI in Journalism with Tech: Opportunities and Guardrails,” “Web3 and Human Rights”, and “IEEE HAC Capacity Building.”

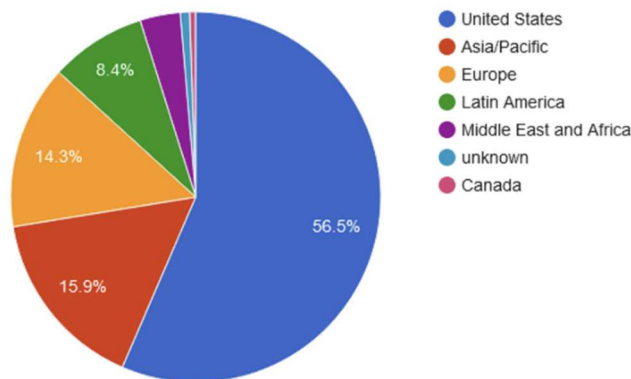
**Papers:** The Technical Program featured 84 papers in 27 sessions covering 11 tracks:

Thematic Area	Final Papers Accepted	Sessions
Agriculture & Food Security (SDG2)	12	4
Connectivity & Communication in Support of Development	6	2
Disaster Mitigation, Preparedness, Response & Recovery	4	2
Quality Education (SDG4)	9	3
Technologies that promote gender equality and the empowerment of women and girls (SDG5)	4	2
Decent Work and Economic Growth (SDG8)	3	1
Affordable & Clean Energy (SDG7)	10	3
Good Health and Well Being (SDG3)	21	6
Clean Water & Sanitation (SDG6)	4	1
Other Related United Nations Sustainable Development Goals	7	2
Technology Impacts on Societal Evolution	4	1

**AUTHORS:**

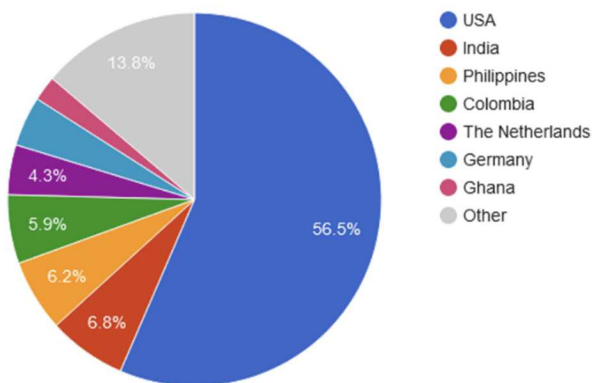
- 436 Authors of accepted papers
- 127 Submissions; 84 Accepted
- Acceptance ratio: 66%

Regional distribution of authors



Region	Authors	%
United States	209	56.5
Asia/Pacific	59	15.9
Europe	53	14.3
Latin America	31	8.4
Middle East, Africa	13	3.5
Canada	2	0.5
Other	3	0.8

Author distribution by country



Country	Authors	%
USA	209	56.5
India	25	6.8
Philippines	23	6.2
Colombia	22	5.9
The Netherlands	16	4.3
Germany	16	4.3
Ghana	8	2.2
Other	51	13.8

### ATTENDEES

- Total attendance: 160 in-person plus 38 remote
- In-person Author Presenter: 63
- Remote Author Presenter: 26
- In-person Attendee: 97
- Remote Attendee: 12

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

**Geographical distribution of attendees**



- In-Person (Attendee)
- In-Person (Presenter)
- Virtual (Presenter)
- Virtual (Attendee)

### SPONSORS



## WORKSHOPS

Thursday afternoon featured these 1/2 day workshops included with GHTC full registration:

- Machine Learning for Social Good; Rakshit Agrawal, Vice President of Research & Development, Camio Inc. and Charles Delahunt, Senior Research Scientist, GH Labs
- Building Wireless Sensing Systems (using Infineon Wireless IoT Devices); Patrick Kane, Infineon, San Jose, USA
- GHTC and IEEE Consulting Network Synergies; Joel Kent, IEEE-CNSV Board Member, IEEE Consultants' Network of Silicon Valley (IEEE-CNSV) and Kim Parnell, Ph.D., P.E. Parnell Engineering & Consulting & IEEE-CNSV Board Member)

### Workshop Speakers



Rakshit Agrawal



Charles Delahunt



Joel Kent



Kim Parnell



Andrew Wolfe, Ph.D.



Daniel K. Lottis, Ph.D.



Thomas M. Coughlin,  
Ph.D.

## PANEL SESSIONS

- **\*\*Special Session: Diversity in the Workplace: Retaining Early Career Women and Minority Engineers (September 8, 2022 evening)**
- Quality Education Online and the Way Forward (September 9, 2022 | 1:00 PM – 2:00 PM)
- **\*\*Special Session: Communications, Computing and Power during Disaster Response (September 9, 2022 evening)**
- Advancing DEI in Journalism with Tech: Opportunities and Guardrails (September 10, 2022 afternoon)
- Web3 and Human Rights (September 11, 2022 morning)
- IEEE HAC Capacity Building (September 11, 2022 afternoon)

**\*\* co-located event open to public; separate registration required**



### Panel Speakers



Clare Wemp



Erin Shelby



David Snyder



Dustin Li



Kevin Cox



Dave Crocker



Paul Shmotolokha



William Torre

### PLENARY and KEYNOTE SPEAKERS

- Keynote: To Care, and How We Get There; Neha Kumar, Associate Professor from Georgia Tech, USA
- Keynote: Technology's True Promise Lies in the Good we can Do; Janice Zdankus, Vice President of Quality from Hewlett Packard Enterprise
- Plenary: Federal humanitarian engineering: what programs are out there?; Aline D. McNaull Senior Legislative Representative, IEEE-USA
- Plenary: One Week Wonder – Emergency PPE Delivery via A Global Humanitarian Collaboration of Makers; Kelly Yamanishi and Eric Hess from Maker Nexus, a non-profit Makerspace
- Plenary: Introducing the West Coast IEEE MOVE Truck; Tim Lee, IEEE Region 6 Director
- Plenary: Academic Programs in Humanitarian Engineering; Moderator: Pritpal Singh Villanova University; Allan Baez Morales, Santa Clara University and Khanjan Mehta, Lehigh University
- Keynote: IT for Sustainability; Puneet Sharma, Distinguished Technologist from Hewlett Packard Labs, USA
- Plenary: Revolutionizing the Retail Informal Sector in Africa: Use Case of the Smart Kibanda Project; Kithinji Muriungi; Chris Murimi from Moi University in Nairobi, Kenya
- Plenary: Introduction to EPICS in IEEE; Stephanie Gillespie, EPICS in IEEE Committee Chair, and Associate Dean from Tagliatela College of Engineering of University of New Haven
- Keynote: Minimizing the Ecological Footprint using Machine Learning; Vishnu S. Pendyala from San Jose State University
- Keynote: Does Gender Impact Startup Funding Success? A Data-Driven Perspective; Maya Ackerman, Assistant Professor of Computer Science and Engineering from Santa Clara University
- Keynote: How the Internet Improves Humanity; Eric Goldman, Professor of Law from Santa Clara University
- Plenary: Clean energy solutions replacing portable fossil fuel generators: Technology and lessons from Ukraine and Hurricane Ida; Paul Shmotolokha from New Use Energy

### Keynote and Plenary Speakers



Neha Kumar



Janice Zdankus



Aline McNaull



Tim Lee



Kelly Yamanishi



Eric Hess



Puneet Sharma



Stephanie Gillespie



Vishnu S. Pendyala



Maya Ackerman



Eric Goldman



Paul Shmotolokha

### AWARDS

#### Best Paper Awards

- Ashley Mo and Emma Gui (University of Toronto Schools, Canada); Richard Fletcher (MIT, USA & Massachusetts General Hospital, USA)  
“Use of Voluntary Cough Sounds and Deep Learning for Pulmonary Disease Screening in Low-Resource Areas”
- Brandon K Simons, Pritpal Singh, Iain Hunt and Jordan Ermilio (Villanova University, USA)  
“The repurposing of nickel metal hydride hybrid electric vehicle batteries for solar energy storage applications in rural Pacific Island communities”

#### Best Paper Honorable Mention

- Anne Schneibel, Nina Merkle, Marc Wieland, Konstanze Lechner, Seyedmajid Azimi, Fabian Henkel, Corentin Henry, Ralph Kiefl, Xiangtian Yuan and Monika Gaehler (German Aerospace Center, Germany)  
“User-driven flood response & monitoring information – Key findings of the Data4Human project”

### PANELS-Abstracts & Panelists

- **Special Session: Diversity in the Workplace: Retaining Early Career Women and Minority Engineers**

**September 8th, 2022, 7:00 PM – 9:00 PM,**

Moderator: Erin Shelby, Shelby HR Solutions

Facilitators for this session include:

- [Erin Shelby, PHR, Shelby HR Solutions,](#)
- [Claire Wemp, Ph.D.,](#) Thermal Applications Engineer, DuPont,
- [Juan Vargas, M.S.,](#) Senior Project Engineer, Devcon Construction, and
- [Jeewika Ranaweera, Ph.D.,](#) Principal Hardware Engineer, Oracle.

Organized by:

[Kim Parnell, Ph.D., P.E., Parnell Engineering & Consulting](#) & [IEEE-CNSV Board Member](#)

Gender equality is one of the UN Sustainable Development Goals on which GHTC is focused. Additionally, the technology industry is increasingly aware of the need to include a variety of backgrounds and capabilities in the workforce. This session will be an open discussion on challenges and opportunities facing young engineers, women in engineering, and minorities in academia and industry. Topics to be covered include opportunities for networking, mentoring, and finding role models.

- **Panel Discussion: Quality Education Online and the Way Forward**  
**September 9th, 2022, 1:00 PM – 2:00 PM,**

Moderator: Patrick Kane – Director of University Alliance Program, Infineon (formerly Cypress)

Panelists:

- David Parent (Professor of Electrical Engineering, SJSU)
- C. Wang (Director, DigiKey Academic Program)

This panel will bring together industry and academic experts to discuss “quality education: a post-pandemic view.” Panelists will describe how they were able to carry on teaching during the pandemic and what lessons and methods they learned that they will continue using going forward.

- **Special Session: Communications, Computing, and Power during Disaster Response**  
**September 9th, 2022, 7:00 PM – 9:00 PM**

IEEE-CNSV organized free event open to the public

Moderator: David Snyder (PE, CISSP, CCSP, 42TEK LLC & IEEE-CNSV Board Member)

Panelists:

- Dustin Li, Special Programs Director, Information Technology Disaster Resource Center;
- Kevin Cox, CEO & Founder, Hope Crisis Response Network – Disaster Resource Village;

- Dave H. Crocker, Volunteer, Silicon Valley Chapter, Information & Planning Coordinator, American Red Cross, principal with Brandenburg InternetWorking, and Senior Member of IEEE
- Paul Shmotolokha, New Use Energy, USA
- William Torre, IEEE MOVE WEST Operations Lead

In conjunction with the presence of the MOVE Community Outreach truck at the conference, this is a panel discussion among representatives from organizations involved with emergency response and disaster recovery. MOVE also offers educational outreach. The focus will be on communications, computing, and power, but may expand from there. After a brief description of the MOVE truck, the emphasis will be on stories about what works and lessons learned.

- **Panel Discussion: Advancing DEI in Journalism with Tech: Opportunities and Guardrails  
September 10th, 2022, 2:00 PM – 2:50 PM**

Moderator: Subbu Vincent, Markkula Center for Applied Ethics, SCU

Panelists:

- Lisa Armstrong, Associate Dean and Professor, UC Berkeley Graduate School of Journalism
- Yi Fang, Associate Professor, Department of Computer Science and Engineering, Santa Clara University
- Subbu Vincent, Director of Journalism and Media Ethics, Markkula Center for Applied Ethics, Santa Clara University

Diversity, equity, and inclusion (DEI) are fundamental to promoting robust journalism that supports a healthy society, by fostering well-researched, complex stories that explore different perspectives and voices. News stories can be audited for how often they are quoting people around a diversity categorization, e.g., gender, race/ethnicity, expertise, etc. DEI audits are high touch and expensive to do manually. Not surprisingly, they are usually done only once a year and retroactively by a few well funded, large news organizations. But for everyday reporters and editors who are part of large and small newsrooms, there is no “everyday system” to monitor their own quoting patterns and nudge themselves towards DEI norms. To start addressing this gap with human-augmented technology, the Markkula Center for Applied Ethics and the School of Engineering at SCU joined hands to prototype an on-demand DEI audit toolkit for US newsrooms based on AI and NLP technologies, funded partly by the Google News Initiative and Facebook Research. This panel will discuss the “What, So What, and Now what” of technology solutions for DEI audits from an opportunities and guardrails perspective.

- **Panel Discussion: Web3 and Human Rights  
September 11th, 2022, 10:00 AM – 10:50 AM**

Moderator: Michael Kleinman, Director, Silicon Valley Initiative, Amnesty, AIUSA

Panelists:

- Lia Holland (Campaigns and Communications Director, Fight for the Future)
- Mai Ishikawa Sutton (Co-founder and editor of COMPOST, an online magazine about the digital commons, as well as a Digital Commons Fellow with the Commons Network and a contributor to the Internet Archive’s work on the decentralized web)
- Nathan Schneider (Assistant Professor, Media Studies at the University of Colorado Boulder and Director, Media Enterprise Design Lab)



The internet in the West today is dominated by a handful of companies, including Amazon, Apple, Google, Meta (Facebook), Microsoft, TikTok, and Twitter. Each company sets the terms and conditions for how individuals engage with their platform and can potentially ban them according to those terms, including for their speech. In return for free access to these platforms, individuals provide personal information and effectively lose control over that information. In some countries, governments have pressured tech companies to censor and provide information on individuals and groups that the government disfavors.

Web3 – sometimes called the Distributed Web – potentially represents a fundamental change in this dynamic, especially as regards the question of control. The number “3” implies a specific historical view of how the web evolved, from an initial “open” state in the 1990s and early 2000s (web1) towards ever greater corporate centralization and power, leading to the dominance of a handful of Big Tech corporations today (web2). It posits web3 as the next step in this evolution, towards a more decentralized future, in which our online experience is not shaped (or not only shaped) by these companies.

This panel will examine the positive and negative implications that web3 has for human rights, including access and equity, privacy, social mobilization online, and other issues.

- **Panel Discussion: IEEE HAC Capacity Building**  
**September 11th, 2022, 1:00 PM – 1:50 PM**

Moderator: Pritpal (Pali) Singh, IEEE Humanitarian Activities Committee

Panelists:

- Sampathkumar Veeraraghavan, Global Chair, IEEE Humanitarian Activities Committee
- Lwanga Herbert, Chair, IEEE SIGHT Steering Committee

This session will present various global programs offered by HAC and the best practices for the design and development of the IEEE HAC/SIGHT sustainable development program. The audience will have an opportunity to network and learn about the successfully implemented HAC projects.

## **WORKSHOPS – Abstracts**

### **Machine Learning for Social Good**

**September 8th, 2022, 12:30 PM – 3:30 PM**

#### **Organizers**

- Rakshit Agrawal, Vice President of Research & Development, Camio Inc.
- Charles Delahunt, Senior Research Scientist, GH Labs

This session will focus on topics around the applications of machine learning in the social good domains. We will discuss a framework centered around identifying the important societal challenges where problems can be defined for ML capabilities. We then describe the process to develop machine learning models and deploy them in the real world. We will also include case studies of ML driven systems actively being used in real-world scenarios.

### **Building Wireless Sensing Systems (using Infineon Wireless IoT Devices)**

**September 8th, 2022, 12:30 PM – 3:30 PM**

#### **Organizer**

- Patrick Kane, Infineon, San Jose, USA

In this workshop, you learn how to use low-cost and energy efficient IoT devices for sensing and communication purposes. You will be building sample applications to collect environmental information and transmit them wireless. This three-hour hands-on IoT and sensor workshop will feature the ultra-low power PSoC™ 6 (Programmable System on Chip) and ModusToolbox™ software. The workshop will consist of an overview of Infineon's technology portfolio and continue with hands-on exercises programming the PSoC™ 6 to interface with various sensors and Bluetooth® via your mobile device. The attendees will leave with a knowledge of Infineon products that can be used to create low-power, greener projects and the ModusToolbox™ software design flow. Attendance is limited to 30. As we get closer to the conference date confirmed attendees will receive information on which software to install for the hands-on portion of the workshop.

### GHTC and IEEE Consulting Network Synergies

September 8th, 2022, 12:30 PM – 3:30 PM

#### Organizers

- Joel Kent, IEEE-CNSV Board Member, IEEE Consultants' Network of Silicon Valley (IEEE-CNSV) and
- Kim Parnell, Ph.D., P.E. (Parnell Engineering & Consulting (PEC) & IEEE-CNSV Board Member)

Consultants' Network of Silicon Valley (CNSV) is a network that promotes the skills of its consultants, fosters collaboration among its members, creates alliances with other IEEE chapters, and provides educational opportunities in Silicon Valley. With a membership of nearly 200 consulting engineers, IEEE-CNSV is a premier source of high-tech consulting talent. This session will discuss how CNSV can work with the GHTC community. For example, initiatives by people and organizations in the GHTC community may find help from technology experts within CNSV. Also, people in the GHTC community may speak at CNSV meetings to expand awareness of their work.

## SPECIAL EXHIBITS



### IEEE MOVE Truck Demonstration

GHTC 2022 featured the **West Coast IEEE MOVE Truck** on display Sept 9<sup>th</sup>.

[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.



### New Use Energy Solar Generator Trailer

Highly mobile alternatives to using portable fossil fuel generators in disaster or humanitarian relief efforts to provide critical power when the grid is down or where it does not exist.

2022 SPONSORS

Financial



Grants:



IEEE Santa Clara Valley Section

Registration Grants



Technical:



**Event Promotion on YouTube**

The woman in the video is an avatar created by FocusAI reading a script. FocusAI created search keywords to promote the video on YouTube that generated over 3k and 11k views for the two videos

Video	Visibility	Restrictions	Date ↓	Views	Comments	Likes (vs. dislike...)
<p>IEEE: Global Humanitarian Technology... Learn More: <a href="https://ieeeghtc.org/">https://ieeeghtc.org/</a> Global Humanitarian Technology Conference...</p>	Public	None	Aug 18, 2022 Premiered	11,727	0	100.0% 2 likes
<p>IEEE Wearable IoT Review 2022 Wearable &amp; IoT Devices: 2022 Silicon ... Learn More: <a href="https://ieeeghtc.org/">https://ieeeghtc.org/</a> This is a segment of the annual event presented ...</p>	Public	None	Jun 28, 2022 Premiered	2,139	0	100.0% 4 likes
<p>IEEE Humanitarian Technology Confer... Learn More: <a href="https://ieeeghtc.org/">https://ieeeghtc.org/</a> IEEE GHTC focuses on advancing technology...</p>	Public	None	Jun 20, 2022 Premiered	3,042	0	100.0% 9 likes

**SCV Section created a LinkedIn Event**

**IEEE GLOBAL HUMANITARIAN TECHNOLOGY CONFERENCE (GHTC)**

Event ended

**IEEE Global Humanitarian Technology Conference (in-person/online)**

Event by IEEE Santa Clara Valley Section

Sep 8, 2022, 9:00 AM - Sep 11, 2022, 6:00 PM (your local time)

Online

Event link - <https://ieeeghtc.org/program-2022/>

121VAM FAJU SOMALRAJU and 123 other attendees

121 comments · 0 reposts

Reactions: 121 reactions