

IEEE SusTech2023

SusTech 2023 Report

10th IEEE Conference on Technologies for Sustainability
Portland, OR — April 19-22, 2023

<http://iee.org/sustech>



The 10th IEEE Conference on Technologies for Sustainability (SusTech 2023) was held hybrid on April 19-22, 2023, in Portland, Oregon.

The SusTech 2023 Program featured Keynotes, Panels, Papers, Student Posters, and a Sustainability Forum. See <http://iee-sustech.org/archives> for details on the program and events.

The SusTech conference is designed to explore development that meets the needs of the present without compromising the ability of future generations to meet their own needs. It brings together scientists, engineers, technologists and scholars from multiple disciplines to hold a dialogue on environmental issues and collaborate on ideas to develop and utilize innovative tools and intelligent systems to address the need for Sustainable Infrastructure. Attendees will learn about the emerging technologies, latest tools, and proactive solutions to take their sustainability programs to the next level. Papers are solicited from industry, government, and academia (including collegiate students) covering relevant research, technologies, methodologies, tools and case studies. Conference content that meets IEEE quality review standards and format will be submitted for inclusion into the IEEE *Xplore* Digital Library.

For the 10th Anniversary we looked into policy and economic influences on the diffusion over the past decade of sustainable technologies into general practice (e.g. design and implementation).

Sponsors for SusTech 2023 included the IEEE Oregon, San Fernando Valley, Inland Empire (Foothill), Orange County, and Coastal Los Angeles Sections, IEEE Region 6, IEEE-USA; and co-sponsored by the IEEE Industry Applications Society (IAS), Oceanic Engineering Society, Power and Energy (PES) Society, Society on Social Implications of Technology (SSIT), Standards Association (IEEE-SA) and Technology and Engineering Management Society (TEMS).



PROGRAM

SusTech 2023 was organized as a 3 ½ Day Program Featuring:

- Interactive Workshop
- 11 Keynotes
- 4 Panels
- Over 50 papers in 15 sessions
- Sustainability Forum
- Student Poster Competition (virtual)
- Welcome Reception
- YP Networking Event with online Talk by IEEE President Rahman
- Conference Dinner

ATTENDEES

Total registrations 109

- In person author 25
- Virtual author 22
- In person attendee 39
- Virtual attendee 11
- Student poster only 11
- Guest 1
- Conference plus Student Poster 4

Speakers and Panelists:

- Speakers 11
- Panelists 14

WORKSHOP

Planet Positive 2030: Imagine the Future We can Build Together: Sustainability by Design

What happens when sustainability programs and products are designed with a specific end in mind? By using a “backcasting” (versus forecasting) methodology, attendees can discover how to pragmatically work towards a 2030 where the world’s temperatures stay under 1.5 and we keep 30% of our planet’s land and water safe for all. These boundary conditions leverage engineer’s systems thinking capabilities in a pragmatic and positive context.



An overview was presented of the IEEE Standards Association’s Planet Positive 2030 Initiative, <https://sagroups.ieee.org/planetpositive2030/>.

During the second and highly interactive part of the workshop, attendees had an opportunity to contribute to this initiative by adding your thoughts, comments, and recommendations: about the challenges posed by Climate Change and the UN Sustainable Development Goals and how to meet those challenges – utilizing science around climate change combined with technological solutions applied in the context of societal and economic reality.

Workshop Panelists:

- Maïke Luiken, chair of [Planet Positive 2030](https://sagroups.ieee.org/planetpositive2030/) – an initiative of the IEEE Standards Association – as well as the [P7800 Standards Working Group](#)
- David E. González, co-chair and co-author of the IEEE Standards Association (IEEE-SA) P7800
- John C. Havens, Lead of the Sustainability Practice of the IEEE Standards Association

STUDENT POSTER COMPETITION

There were 18 entrants, of which there were 15 posters presented in the online competition held Wednesday April 19 from 4:00-7:30 pm (PT). The abstracts can be viewed on the website [here](#).

Entrant Name	School	Location
Aditi Bhattamishra	Amity Regional High School	Orange, CT, USA
Duc Minh Nguyen	King Abdullah University of Science and Technology (KAUST)	Saudi Arabia
Yujie Qin	King Abdullah University of Science and Technology (KAUST)	Saudi Arabia
Jiajie Xu	King Abdullah University of Science and Technology (KAUST)	Saudi Arabia
Hussam Ibraiwish	King Abdullah University of Science and Technology (KAUST)	Saudi Arabia
Salah Abdeljabar	King Abdullah University of Science and Technology (KAUST)	Saudi Arabia
Anna Talgat	King Abdullah University of Science and Technology (KAUST)	Saudi Arabia
Amanat Kafizov	King Abdullah University of Science and Technology (KAUST)	Saudi Arabia
Omkar Bhat	Northern Kentucky University	Santa Clara, CA, USA
Kashif Liaqat	Rice University	Houston, TX, USA
Ahmed Saad Karsani	Santa Clara University	Santa Clara, CA, USA
Jason Knight-Han	Sonoma State University	Rohnert Park, CA USA
Syed Ashhad Ibrar	University of Engineering and Technology Lahore (Narowal Campus)	Pakistan
Ramesh Doddaiah	Worcester Polytechnic Institute (WPI)	Worcester MA USA

First Place Winner

“DNI Prediction Using Deep Learning for Optimization of Concentrated Solar Power (CSP) Plants”

Kashif Liaqat, Rice University, Houston, TX (USA)

Second Place Winner

“3H-UWAC based on SOFAR Plane: A Novel Relay Deployment Technique”

Jiajie Xu, King Abdullah University of Science and Technology (KAUST), Saudi Arabia

Third Place Winner

“RIS-Assisted Visible Light Communication for Outdoor Applications”

Salah Abdeljabar, King Abdullah University of Science and Technology (KAUST), Saudi Arabia

Third Place Winner

“Energy Management of Microgrid using Virtual Inertia and Energy Storage”

Ahmed Saad Karsani, Santa Clara University, Santa Clara, CA (USA)

TECHNICAL PROGRAM

The technical program was presented on April 20-21 and consisted of fifteen technical sessions with 55 papers grouped into twelve topical areas, plus five Keynotes and three Panels. The technical sessions each consisted of nominally 4 20-minute slots with live and recorded paper presentations (in MP4) and live Q&A with the authors.

The topical areas were:

- Agriculture Technology
- Societal Implications
- Smart and Micro Grids
- Sustainable Electronics
- Energy Efficiency-Buildings
- Aviation Technology
- Energy Efficiency-Grid
- Machine Learning for Intelligent Transportation
- Software
- Renewable/Alternate Energy I
- Machine Learning for Sustainable Technology I
- Intelligent Transportation
- Internet of Things (IOT)

YP RECEPTION – CLIMATE CHANGE AND SUSTAINABILITY

Thursday April 20, 2023
organized by the Oregon Section Young Professionals
with - Special remote guest presentation
“Climate Change and Sustainability”
by **Professor Saifur Rahman**, 2023 IEEE President & CEO



This lecture addressed what is climate change, what is causing it and how it is impacting the daily lives of citizens around the world. In the context the author will discuss the issue of greenhouse gas emissions and how it can be reduced to help mitigate the effect of climate change.

PLENARY AND KEYNOTE SPEAKERS

SusTech 2023 featured 11 keynote and plenary speakers, split across the technical program and the sustainability forum.

- Technology, Policy, and Societal Dimensions of Decarbonization: Where We Are Now, Where Did We Come From, and Where Are We Headed, K John Holmes, National Academies of Sciences
- Engineers + AI: The New Environmental Stewards, Jennifer M. Huffstetler, Chief Product Sustainability Officer, VP & GM, Intel Future Platforms and Sustainability Group

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- Energy Equity or Energy Divide, John Borland, J.O.B. Technologies
- Electric Island, Ian Beil, Portland General Electric
- Everything that moves is going electric, Jeff Allen, Forth
- Where We Thought We Would Be and Where We Think We're Going, Eric Olson, Northwest Energy Efficiency Alliance (NEEA)
- Electronics materials and components enabling sustainability, Dan Donahoe
- Distributed Power Generation and Storage for a Renewable Energy Dominant Future, Mahima Gupta, Portland State University
- Second-Life EV Batteries for Renewable and Smart Grid Storage Applications, Chris Mi, San Diego State University
- IEEE-USA's policy efforts to support sustainable technology, Russell Harrison, IEEE-USA
- From Boundaries to Beauty – The Human Side of Sustainability, John C Havens, IEEE-SA

 Jeff Allen	 Ian Beil	 John Borland	 Dan Donahoe
 Mahima Gupta	 Russ Harrison	 John Havens	 K John Holmes
 Jen Huffstetler	 Chris Mi	 Eric Olson	

PANELS

Electricity Transmission Future

Organized by Oregon Department of Energy

Transmission line infrastructure is expanding across the U.S. and the world. Local, state, and national decarbonization policies; economics; and national security interests are driving an unprecedented demand for large-scale renewable electricity generation projects across the world – which in turn is driving the need to proactively plan and develop a vast expansion of bulk, high-voltage transmission networks to deliver renewables to load centers. This panel will discuss the history, current driving forces, benefits, and challenges of expanding transmission infrastructure in the context of the Pacific Northwest.

Organizer & Moderator: Jason Sierman, Oregon Department of Energy

Panelists:

- **Ricky Bustamante**, Bonneville Power Administration (BPA)
- **Shaun Foster**, Portland General Electric (PGE)
- **Scott Beyer**, PacifiCorp
- **Adam Schultz**, California Independent System Operator (CAISO)



Sustainable Ocean Energy Technology and Policy,

Organized by the IEEE Oceanic Engineering Society (OES)

This panel focused on the various ways in which the ocean can be harnessed as a source of clean and sustainable energy. Panelists discussed the current state of technology in this field, as well as the potential for future growth and development and the public policy and financial barriers to fully realize the potential of ocean energy.

Moderator: Jason Busch, Executive Director of the Pacific Ocean Energy Trust (POET)

Panelists:

- **Bryson Robertson**, Associate Professor at Oregon State University and Director of the Pacific Marine Energy Center
- **Varner Seaman, CPA**
- **Joseph H. Prudell, PE**, Director Oregon Corporate Operations, C-Power
- **Jonathan Z. Bird**, Associate Professor, Portland State University
- **Jason Sierman**, Sr. Energy Policy Analyst, Oregon Department of Energy



Maintaining Energy Resilience

Organized by Oregon Department of Energy

This panel will address why resiliency is becoming increasingly important in the context of the electricity system. While our economy and communities become increasingly reliant on electricity, climate change is creating unpredictable and extreme conditions that increase the risk of disruptive grid events. What strategies and technologies are available to help increase resiliency in the electricity system, and what are some of the major trade-offs, challenges, opportunities, and next steps associated with those strategies? This panel will discuss these issues and describe actions utilities and transmission operators are taking to increase resiliency in the electricity system.

Organizer & Moderator: Amy Schlusser, Oregon Department of Energy

Panelists:

- **Molly Hatfield**, Bonneville Power Administration (BPA)
- **Greg Alderson**, Portland General Electric (PGE)
- **Jeni Hall**, Energy Trust of Oregon
- **Les Perkins**, General Manager, Farmers Irrigation District



Implementing a Sustainable Future for Aviation: An Ecosystem Approach

Organized by the American Institute of Aeronautics and Astronautics (AIAA)

Sustainable aviation is a cross-industry priority requiring cooperation across aerospace disciplines, including both classical aeronautics science and engineering, as well as adjacent fields such as chemical engineering and transportation planning, to determine the priorities and implement a vision which can be both scaled and maintained. In this panel, organized by the American Institute of Aeronautics and Astronautics (AIAA), speakers will share their perspectives on sustainable aviation developments in policy, practice, and implementation. Panel discussion will emphasize an inclusive ecosystem approach that attempts to embrace a comprehensive view of all technology elements—vehicles, fuels, infrastructure—necessary for a sustainable future for aviation.

Moderator: Ashira Beutler-Greene, Senior Manager, Content and Product Strategy at the American Institute of Aeronautics and Astronautics (AIAA)

Panelists:

- **Carol Sim**, Assistant Director of the Aviation Sustainability Center (ASCENT) at Washington State University
- **Matt Orr**, Associate Technical Fellow in Product Development at The Boeing Company



Sustainability Forum

One-day event on Saturday April 22, 2023

SusTech 2023 Sustainability Forum Agenda

Time	Session	Speaker(s)
8:00 am	Opening Remarks and Keynote 1:	Where We Thought We Would Be and Where We Think We're Going, Eric Olson, Northwest Energy Efficiency Alliance (NEEA)
9:00 am	Keynote 2	Electronics materials and components enabling sustainability, Dan Donahoe
10:00 am	Panel 1	Implementing a Sustainable Future for Aviation: An Ecosystem Approach (organized by AIAA)
11:45 am	Special Session	IEEE-USA's policy efforts to support sustainable technology, Russell Harrison, Managing Director, IEEE-USA
12:15 pm	LUNCH	
1:15 pm	Keynote 3	Distributed Power Generation and Storage for a Renewable Future, Mahima Gupta, Portland State University
2:15 pm	Keynote 4	Second-Life EV Batteries for Renewable and Smart Grid Storage Applications, Chris Mi, San Diego State University
3:15 pm	Keynote 5	From Boundaries to Beauty – The Human Side of Sustainability, John Havens, Lead of Sustainability Practice, the IEEE Standards Association
4:15 pm	Student Poster Awards	Prof. Sean Monemi, Cal Poly Pomona
4:30 pm	Closing Remarks & SusTech 2024	

The Sustainability Forum was a unique conference track at SusTech 2023 that focuses on the aspirations and goals of industry practitioners and technical professionals.

This one-day event featured a unique blend of experts in policy, leadership, and technology. It features talks on: energy efficiency goals and barriers to achieve them; the role advances in electronic materials and components play in advancing sustainability; policy efforts to support sustainability; distributed power generation and storage; and the role of people in achieving sustainability. There was also a panel on “Implementing a Sustainable Future for Aviation: An Ecosystem Approach” organized by the American Institute of Aeronautics and Astronautics (AIAA).

CEU/PDH credit was available upon request.

PAPER STATISTICS

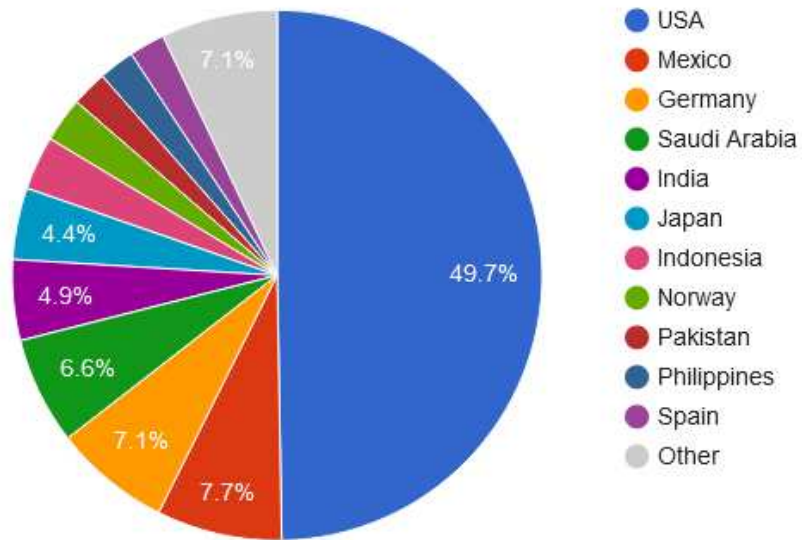
Acceptance

Accepted with major revision	14
Accepted with minor revisions	28
Accepted	8
Extended Abstract accepted	5
Total	55
Rejected	8
Withdrawn	8
Pending (not uploaded)	7
Total under review, accepted and rejected	71
Total reviewed (incl. withdrawn)	72
Acceptance ratio (% , incl revs)	77.5

Authors of Accepted Papers by Region

Region	Authors	%
United States	91	49.7
Europe, Middle East, Africa	44	24.0
Asia/Pacific	33	18.0
Europe	29	15.8
Middle East and Africa	15	8.2
Latin America	15	8.2
Canada	0	0.0

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