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Program

Program by Session

See Workshop Tab for info on the Workshop.

See Keynotes Tab for the Keynote Speaker Program.

See Panels Tab for Panels Program.

See Sustainability Forum Tab for Wednesday Program.

See Special Events Tab for Poster Contest, Receptions and the Dinner.

See the Schedule Tab for the schedule-at-a-glance and meeting room maps.

Download the SusTech 2024 Sustainability Forum Program (PDF)

Download the SusTech 2024 Program Guide (PDF)

Time	Elowah	Multnomah	Wakeenah	Willamette
Sunday, April 14				
08:00-15:00		WKSHP: Workshop - Roadmap to Low Carbon Emission Building Materials and Architecture		
15:00-17:00	SPC: Student Poster Competition			
17:00-18:00				
18:00-18:30			WR: Welcome Reception	
18:30-19:00				
Monday, April 15				
07:45-08:00		OPEN: Opening Remarks		
08:00-08:50		K1: Keynote 1: IEEE Climate Change Update		

09:00-10:20	PS1B: Societal Implications I	PS1A: Energy Efficiency I	PS1C: Smart and Micro Grids I	
10:30-12:00		PNL1: Panel 1: Ethics, Energy and Environment		
12:00-13:00				L1: Lunch
13:00-13:45		K2: Keynote 2: Solar Trends		
14:00-15:20	PS2B: Societal Implications II	PS2A: Energy Efficiency II	PS2C: Smart and Micro Grids II	
15:30-16:50		PNL2: Panel 2: Electrifying Agriculture		
17:00-18:30	PS3B: eWaste & Circular Economy	PS3A: Energy Efficiency III	PS3C: Sustainable Electronics I	
18:30-20:00		YPR: WIE/YP Reception and Panel		

Tuesday, April 16

08:00-08:50		ORK3: Opening Remarks and Keynote 3:		
09:00-10:20	PS4B: Sustainable Management	PS4A: Renewable / Alternate Energy I	PS4C: Sustainable Electronics II	
10:30-12:00		PNL3: Panel 3: Novel Technologies for Sustainable Ocean Energy Generation		
12:00-13:00				L2: Lunch
13:00-13:45		K4: Keynote 4; ReCell: Working to Advance Battery Recycling		
14:00-15:20	PS5B: IOT I	PS5A: Renewable / Alternate Energy II	PS5C: Sustainable Electronics III	
15:30-16:15		K5: Keynote 5: A Vision for Mid-Century Sustainable Urban Transportation		
16:30-17:40	PS6B: IOT II	PS6A: ML Application	PS6C: Water	
18:30-20:30				CD: Reception/

				Dinner
Wednesday, April 17				
08:00-08:50		SFK1: Opening Remarks and Keynote 1		
09:00-09:45		SFK2: Keynote 2: Electrification and the Grid		
10:00-11:30		SFP1: Panel 1: Promising Heat Pump Developments: Perspectives from the Pacific Northwest		
11:45-12:15		SFSS: Special Session: Hot Topics is Sustainability		
12:15-13:15				L3: Lunch
13:15-14:00		SFK3: Keynote 3: Increasing Computing Energy Efficiency is Key Requirement for Sustainability		
14:15-15:00		SFK4: Keynote 4: Efficient, Cost-Effective Polymeric Materials Design for Clean Energy and Biomedical Technologies via Biomass Valorization		
15:15-16:00		SFK5: Keynote 5: Off-shore Wind Power Studies		
16:15-16:30		SPCA: Student Poster Awards		
16:30-16:45		CLOS: Closing Remarks & SusTech 2025		

Sunday, April 14

Sunday, April 14 8:00 - 17:00 (America/Los_Angeles)

WKSHP: Workshop - Roadmap to Low Carbon Emission Building Materials and Architecture

A free Hybrid workshop organized by IEEE Future Directions SusTech Initiative in collaboration with SusTech 2024.

Moderators:

* Maike Luiken, PhD, SMIEEE, IEEE-HKN, FEIC, chairs Planet Positive 2030 - an initiative of the IEEE Standards Association - as well as the P7800 Standards Working Group: Recommended Practice for Addressing Sustainability, Environmental Stewardship and Climate Change Challenges in Professional Practice.
* Professor Wei-Jen Lee, University of Texas at Arlington, Electrical Engineering Department and director of the Energy Systems Research Center.

Speakers:

Webly Bowles, Associate Director of Codes and Policy at New Buildings Institute (NBI) with 20 years of experience in architecture, sustainable building design, advocacy, and code development.
Beth Lavelle, Senior Associate and Sustainability Manager at SERA Architects in Portland, OR.
Lona Rerick, Architect and Sustainable Materials Leader at ZGF Architects.
Hellen Chen, Research Analyst in the Industry Program at the American Council for an Energy-Efficient Economy (ACEEE).
Clinton J. Andrews, Director, Center for Urban Policy Research at Rutgers University.
Yashima Jain, Lawrence Berkeley National Laboratory.
Marc Elliott, Eaton Corp.
Room: Multnomah

Sunday, April 14 15:00 - 18:30 (America/Los_Angeles)

SPC: Student Poster Competition

Moderated by Prof Sean Monemi, CPP
Room: Elowah

Sunday, April 14 18:00 - 19:00 (America/Los_Angeles)

WR: Welcome Reception

Room: Wakeenah

Monday, April 15

Monday, April 15 7:45 - 8:00 (America/Los_Angeles)

OPEN: Opening Remarks

Welcome and Introductory Remarks by Oregon Section Chair, IEEE Region 6 Director and SusTech 2024 Chair

Dan Goodrich, IEEE Oregon Section Chair
Kathy Hayashi, IEEE Region 6 Director

Ed Perkins, SusTech 2024 Chair

Overview of the IEEE SusTech Inititive and the IEEE Humanitarian Technologies Board (HTB).
Room: Multnomah

Monday, April 15 8:00 - 8:50 (America/Los_Angeles)

K1: Keynote 1: IEEE Climate Change Update

Overview of the IEEE SusTech Inititive.

Maike Luiken, co-Chair, IEEE SusTech Initiaitve

The IEEE SusTech Initiative seeks to contribute technical expertise and solutions to address sustainability challenges, including climate change. This initiative is growing rapidly and new volunteers are always welcome.
Room: Multnomah

Monday, April 15 9:00 - 10:20 (America/Los_Angeles)

PS1A: Energy Efficiency I

Room: Multnomah

9:00 ***Design of HVAC Control System for Building Energy Management Systems***
Daniel Fernando Espejel-Blanco (Mexico National Technological Hermosillo Institute of Technology, Mexico); Jose Hoyo-Montano (Instituto Tecnológico de Hermosillo, Mexico); Jose Manuel Chavez, Fredy Alberto Hernandez-Aguirre, Ingrid Ayleen Cruz-Flores and Francisco Javier Valenzuela-Soriano (Mexico National Technological Hermosillo Institute of Technology, Mexico)
pp. 1-5

9:20 ***Energy Efficiency: From Desire to an Integrated Management Solution***
Alexandru G. Berciu, Timea Farkas, Andrei Ceclan, Levente Czumbil and Stefan Ungureanu (Technical University of Cluj-Napoca, Romania); Dan Micu (Technical University of Cluj-Napoca, United Kingdom (Great Britain))
pp. 6-11

9:40 ***GRMS: A Generalized Risk Modeling Approach for Sustainable Systems Design***
Dilip Krishnaswamy and Anuradha Krishnaswamy (QWalks, USA)
pp. 12-18

10:00 ***Field Demonstration of Residential DER Service-Oriented Load Participation***
Zhongkai Zeng, Robert Bass, Midrar A Adham and Dana Paresa (Portland State University, USA)
pp. 19-25

PS1B: Societal Implications I

Room: Elowah

9:00 ***A New Method for Measuring Food-Aid Accessibility Considering Sustainability Constraints***
Monirehalsadat Mahmoudi and Khadijeh Shirzad (Michigan State University, USA); Ying Song (University of Minnesota, USA)
pp. 26-33

9:20 ***Comprehensive Techno-Economic Analysis of Electrified and Fuel-Cell Vehicle Technologies for Sustainable***

Transportation: Insights from TechScape

Charbel Mansour (Argonne National Laboratory & Vehicle and Mobility Systems Department, USA); Amarendra Kancharla, Michel Alhajjar, Paul Phillips and Natalia Zuniga Garcia (Argonne National Laboratory, USA)

pp. 34-35

9:40 ***Driving Forces of Green Cryptocurrency Acceptance A Systematic Review***

Alberic Aptatio Astri, Siti Elda Hiererra and Lindrianasari Lindrianasari (Bina Nusantara University, Indonesia)

pp. 36-42

10:00 ***A Cost Optimization Tool for Smart Integrated Renewable Energy Systems (SIRES)***

Zeel Maheshwari, Tuyet Do and Andrea Cardenas Echavarria (Northern Kentucky University, USA)

pp. 43-49

PS1C: Smart and Micro Grids I

Room: Wakeenah

9:00 ***Development for Electrical Fault Detection and Classification Analysis Model Based on Machine Learning Algorithms***

Junho Kim (University of Keimyung, Korea (South)); Sunhwa Sim and Seokjun Kim (Kumoh National Institute of Technology, Korea (South)); Seokheon Cho (University of California, San Diego & Qualcomm Institute, USA); Changhee Han (Gyeongsang National University, Korea (South))

pp. 50-56

9:20 ***Improving Energy Flexibility in Photovoltaic-Battery Systems Through Switching Reinforcement Learning Control***

Siebe Paesschesoone (University of Ghent & Flanders Make and VITO, Belgium); Nezmin Kayedpour and Guillaume Crevecoeur (Ghent University, Belgium); Carlo Manna (Vito, Belgium)

pp. 57-62

9:40 ***Charting the Course for Sustainable Energy Development: The State of Energy Storage in South Africa's Decarbonization Efforts***

Oluwagbenga Apata (University of Johannesburg, South Africa)

pp. 63-69

10:00 ***Distributionally Robust Optimization-Based Stochastic Operation Strategy of Soft Open Points in Distribution Networks***

Changhee Han (Gyeongsang National University, Korea (South)); Seokheon Cho (University of California, San Diego & Qualcomm Institute, USA); Ramesh Rao (University of California San Diego, USA)

pp. 70-77

Monday, April 15 10:30 - 12:00 (America/Los_Angeles)

PNL1: Panel 1: Ethics, Energy and Environment

How can we meet our energy needs and still care for the environment in the era of anthropogenic climate change? Organized by IEEE Society on Social Implications of Technology (SSIT)

IEEE SSIT has been bringing together diverse areas of expertise, including researchers, industry, and communities to address and collectively answer this vital societal question. Ethics takes cognizance of the intrinsic value of nature, the interconnection of all living things, and the responsibility of humans to act in accordance with ethical principles. In creating ethically aligned IEEE Recommended Practices for technology, SSIT members must consider the values of care,

fairness, privacy, trust, sustainability and respect. The panelists share their practical experience and insights in evaluating what practices produce human well being while preserving the natural world.

Co-organizer & Moderator: Susan Dickey, secretary of IEEE SA P7800 "Recommended Practice for Addressing Sustainability, Environmental Stewardship and Climate Change Challenges in Professional Practice."

Panelists:

• Clinton Andrews, Center for Urban Policy Research, Rutgers University
• Wei Jen Lee, Energy Systems Research Center, University of Texas Arlington
• Ann M. Marcus, The Marcus Consulting Group Inc., Portland, Oregon
Room: Multnomah

Monday, April 15 12:00 - 13:00 (America/Los_Angeles)

L1: Lunch

Room: Willamette

Monday, April 15 13:00 - 13:45 (America/Los_Angeles)

K2: Keynote 2: Solar Trends

Wei-Jen Lee, University of Texas at Arlington
Room: Multnomah

Monday, April 15 14:00 - 15:20 (America/Los_Angeles)

PS2A: Energy Efficiency II

Room: Multnomah

14:00 ***Energy Management Optimization for Retail Electricity Customers Under CUF-Based Contracts***
Elvin D. Dulce (University of the Philippines Diliman, Philippines); Michael Angelo Pedrasa (University of the Philippines, Philippines)
pp. 78-83

14:20 ***Data-Driven Building Energy Efficiency Prediction Using Physics-Informed Neural Networks***
Vasilis Michalakopoulos, Sotiris Pelekis, Georgios Korbakis, Vagelis Karakolis, Spiros Mouzakitis and Dimitris Askounis (National Technical University of Athens, Greece)
pp. 84-91

14:40 ***Lighting Analysis of Campus Classrooms***
Saurav Basnet (550 Huntington Ave & Wentworth Institute of Technology, USA); Douglas E Dow (Wentworth Institute of Technology, USA)
pp. 92-96

15:00 ***Power Delivery and Communication with an Infrared Laser (PaCIR)***
Brayden M Vargas-Calderon, Pranay Eedara and Sunil Khatri (Texas A&M University, USA)
pp. 97-104

PS2B: Societal Implications II

Room: Elowah

14:00 ***Granger Causality Analysis of Global Warming and Precipitation on Vegetation in the Himalayan Region***

Tulsi Paudel (Sanming University, China); Thakur Dhakal (Yeungnam University, Korea (South))

pp. 105-108

14:20 ***An Investigation into Total Quality Management Practices in a Retail Bank in Bahrain***

Minwir Al-Shammari and Saleh Isa (University of Bahrain, Bahrain)

pp. 109-114

14:40 ***Impact Assessment of Residential Electric Vehicle Charging on the LV Distribution Network in Uganda***

Ronella Faith Nambi, Shem Christopher Luwandaga, Jane Namaganda-Kiyimba, Michael Alvin Mulumba and Jonathan Serugunda (Makerere University, Uganda)

pp. 115-119

15:00 ***Exploring the Nexus Between Digital Transformation and Sustainability***

Oluwagbenga Apata (University of Johannesburg, South Africa)

pp. 120-127

PS2C: Smart and Micro Grids II

Room: Wakeenah

14:00 ***Identifying Electric Water Heaters from Low-Resolution Smart Meter Data***

Markus Kreft, Tobias Brudermueller and Tyler Anderson (ETH Zurich, Switzerland); Thorsten Staake (University of Bamberg, Germany)

pp. 128-135

14:20 ***Incorporating Fairness in Transmission and Energy Storage Planning Utilizing Min-Max Formulation for Load Shedding Operations***

Noah Allison, Leonardo Weber Stringini and Josue Campos do Prado (Washington State University Vancouver, USA)

pp. 136-143

14:40 ***Modeling and Parameter Estimation of Electric Thermal Storage Utilizing Residual Components for Residential Consumer***

Sameer Sabir (Université du Québec à Trois-Rivières, Canada); Luis Rueda (Energy Technologies Laboratory, Canada); Michael Fournier (Hydroquebec, Canada); Shaival Hemant Nagarsheth (Smart Energy Research and Innovation Laboratory. Hydrogen Research Institute, Canada); Kodjo Agbossou (Universite du Quebec à Trois-Rivieres, Canada); Nilson Henao (Univesité du Québec à Trois Rivieres, Canada); Sousso Kelouwani (Université du Québec à Trois-Riviéres, Canada)

pp. 144-150

15:00 ***A Comprehensive Test Infrastructure for the Evaluation of Energy Management Systems of the Household and Grid Level***

Stephan Stieren (Fraunhofer IEM Paderborn, Germany); Achim Werner and Christian Henke (Fraunhofer IEM, Germany); Ansgar Trächtler (Universität Paderborn, Germany)

pp. 151-155

Monday, April 15 15:30 - 16:50 (America/Los_Angeles)

PNL2: Panel 2: Electrifying Agriculture

Hosted/Moderated by Wendy Simons, Energy Policy Analyst, Oregon Department of Energy

Panelists:

• Robert Wallace CEM, Executive Director, Wy'East Resource Conservation and Development (Wy'East RCD), The Dalles (OR): "Oregon E-Farms Program"
• Marcelo Moretti, PhD, Associate Professor, Department of Horticulture, OSU: "Electricity for Weed Management"
• Chris Toman, PhD candidate, College of Agricultural Sciences, OSU: "Agrivoltaics"
Room: Multnomah

Monday, April 15 17:00 - 18:30 (America/Los_Angeles)

PS3A: Energy Efficiency III

Room: Multnomah

17:00 ***On the Use of an Electret-Based Wind Energy Harvester to Power a Vibration Sensor - A Feasibility Study for the City of Freiburg***

Seyedali Sabzpoushan, Dhruv Shah and Peter Woias (University of Freiburg, Germany)
pp. 156-163

17:20 ***Cyber Attack on Smart Grid Database***

Sean Monemi (California State Polytechnic University at Pomona, USA); Aaron Aparicio (Cal Poly Pomona, USA); Andrew Zarour (Cal POly Pomona, USA)
pp. 164-168

17:40 ***Computational Dynamic Performance of Thermal Mass in Hot & Dry Climate***

Yesaswini Chilukuri (Smart Integrated Design Consultants, India); Adil Usman (National Renewable Energy Laboratory, USA); Wei-Jen Lee (Energy Systems Research Center, USA)
pp. 169-174

18:00 ***Forecasting Weather and Energy Demand for Optimization of Renewable Energy and Energy Storage Systems for Water Desalination***

Om Sanan (Scarsdale High School & Day Zero Water, USA); Joshua Sperling and David Greene (National Renewable Energy Laboratory, USA); Ross Greer (University of California, San Diego, USA)
pp. 175-182

PS3B: eWaste & Circular Economy

Room: Elowah

17:00 ***Sustainable Energy Generation from Recycled Household Waste: A Low-Cost and Facile Rubber and Cardboard Based Triboelectric Nanogenerator***

Muhammad Umaid Bukhari (Information Technology University, Pakistan); Kashif Riaz (Information Technology University, Pakistan & Hamad Bin Khalifa University, Qatar); Arshad Khan (Hamad Bin Khalifa University, Qatar); Khawaja Qasim Maqbool (Bahria University Lahore Campus, Pakistan); Bo Wang and Amin Bermak (Hamad Bin Khalifa University, Qatar)
pp. 183-187

17:20 ***RecyLink: Innovating Recycling Management Through Localized Drop-Off Zones and Machine Learning Integration***

Aaron Li (USA); Ambrose Luo (Troy High School, USA); Yu Sun (California State Polytechnic University, Pomona, USA)

pp. 188-195

17:40 ***The Challenges and Opportunities of Transitioning to Modular Smartphones***

Kevin L Lomax (University of Testing & Central Washington University, USA); Jaap Donker and Jonah J Milnor (University of Testing, USA); Charles Pringle (University of Testing & Central Washington University, USA); Susan Rivera (IT Management, USA & Central Washington University, USA)

pp. 196-203

18:00 ***Implementing BIM Technology for Effective Construction and Demolition Waste Management***

Chukwumaobi N Ibe (Sheffield Hallam University, United Kingdom (Great Britain))

pp. 204-211

PS3C: Sustainable Electronics I

Room: Wakeenah

17:00 ***Designing Regenerative and Sustainable High Endurance Unmanned Ariel Vehicles***

Maggie Hoang (California State Polytechnic University Pomona, USA); Shawn Chen (California State Polytechnic University at Pomona, USA); Nathan Kim (California State Polytechnic University, Pomona, USA); Matthew Go and Zhen Yu (California State Polytechnic University at Pomona, USA); Alton Lo (California State Polytechnic University Pomona, USA); Arriana Brumley, Matthew Li, Rebecca Santiago, Steven Dobbs and Justin Ocampo (California State Polytechnic University at Pomona, USA)

pp. 212-219

17:20 ***Design and Implementation of a Low-Cost LoRa-Based Sensor Node for Environmental Monitoring in Uganda***

Patricia Esther Nyabel and Christopher Tumuhaise (Makerere University, Uganda); Edwin Mugume (Carnegie Mellon University Africa, Rwanda); Jonathan Serugunda (Makerere University, Uganda); Abel Kamagara (Kyambogo University, Uganda)

pp. 220-225

17:40 ***Accessible Remote Electronic Education: Affordable DIY Paper-Based Tunable RC Oscillator Circuits***

Muhammad Nasir (Information Technology University, Pakistan); Kashif Riaz (Information Technology University, Pakistan & Hamad Bin Khalifa University, Qatar); Muhammad Hamza Zulfiqar and Muhammad Mateen Fawad (Information Technology University, Pakistan); Arshad Khan, Bo Wang and Amin Bermak (Hamad Bin Khalifa University, Qatar)

pp. 226-229

18:00 ***Eco-Reliability: A New Metric for the Eco-Design of the Electronic Systems***

Chiara Sandionigi (CEA, France)

pp. 230-236

Monday, April 15 18:30 - 20:00 (America/Los_Angeles)

YPR: WIE/YP Reception and Panel

Amritesh Rai, Moderator

Climate change presents one of the most pressing challenges of our time, demanding concerted efforts from individuals, organizations, and governments worldwide. In this context, harnessing the potential of young professionals is crucial for driving innovative solutions and catalyzing meaningful change.

Moderator: Amritesh Rai - IEEE YP Oregon Affinity Group Chair - Intel

Speakers: (from IEEE Climate and Sustainability Taskforce (CTSF))
1. Sajith Wijesuriya - Postdoctoral Researcher, National Renewable Energy Laboratory, Clean Energy Solutions Center (CESC), USA
2. Sneha Hegde - Postdoctoral Researcher / R&D Engineer at Ecole Centrale Lyon and Kapteos, France
3. Sukanya S Meher - Member of Technical Staff at Hypres Inc, NY, USA and IEEE YP CSTF Communications Lead
4. Naznin Akter - Module Development Engineer, Intel Corporation, USA
5. Prantik Saha - Clean Energy Consultant at Black & Veatch, USA
6. Kayna Trujillo - IEEE Humanitarian Technologies Board / Materials Engineer & PhD Fellow, Northwestern University & Argonne National Laboratory, USA
7. Cybele Ghanem - Support and Implementation Engineer, Invigo Offshore Lebanon
Room: Multnomah

Tuesday, April 16

Tuesday, April 16 8:00 - 8:50 (America/Los_Angeles)

ORK3: Opening Remarks and Keynote 3:

Data Center Efficiency and Sustainability

Eric Dahlen, Senior Principal Engineer, Intel Data Center and AI Group

Data Center (DC) energy growth accelerated by AI proliferation and generative AI evolution is catalyzing demand for disclosure and improvement of DC energy efficiency and sustainability. The recently adopted Delegated Act to the EU Energy Efficiency Directive is the start of an expected wave of regulations intended to improve sustainability. This talk will tie together ongoing efforts across Climate Neutral Data Centre Pact (CNDCP), the Green Grid, Open Compute Project® (OCP) and iMasons to facilitate and harmonize credible metrics to help meet these demands.
Room: Multnomah

Tuesday, April 16 9:00 - 10:20 (America/Los_Angeles)

PS4A: Renewable / Alternate Energy I

Room: Multnomah

9:00 ***Regression Model for Tree Trunk Temperature for Energy Harvesting***
Yajun An (University of Washington-Tacoma, USA); Orlando Baiocchi (University of Washington Tacoma, USA); Heather E Dillon (University of Washington, USA); Cleonilson Protasio de Souza (Federal University of Paraiba, Brazil); Yanqi Qiu (University of Washington, USA)
pp. 237-244

9:20 ***Optimal Scheduling of Spinning Reserve for Enabling Microgrid Seamless Islanding***
Tarek Masaud and Emmanuel Nwaulu (University of Colorado Colorado Springs, USA)
pp. 245-249

9:40 ***Modified DC-DC Converter Based on Step-Up Voltage Cells for Nano-Grids***
John Lennon Nunes de Souza, Osian Meykson Bezerra Soares and Rafael Luz Espindola (The Federal University of the Semi-Arid Region - UFERSA, Brazil); Antônio Alisson Alencar Freitas (Universidade Federal Rural do Semi-Árido, Brazil)
pp. 250-256

10:00 ***Integration of the Centralized Grid and Decentralized Renewable Energy Off-Grid Systems: A Techno-Economic Analysis***

Edward Nekemeya Seremba (Makerere University & NetLabs!UG, Uganda); Frank Ssemakula, Jane Namaganda-Kiyimba and Josephine Nakato Kakande (Makerere University, Uganda)

pp. 257-263

PS4B: Sustainable Management

Room: Elowah

9:00 ***Value Chain Co-Creation in Public Service Organizations: A Proposed Model***

Minwir Al-Shammari (University of Bahrain, Bahrain)

pp. 264-268

9:20 ***Prevalence of Social Responsibility in Construction Company Performance***

Ramyani Sengupta, Emad Elwakil and Yi Jiang (Purdue University, USA)

pp. 269-272

9:40 ***Enhancing Agricultural Development in Rural Indian Communities: The Contribution of NGOs Through Corporate Social Responsibility Initiatives***

Kochukrishna Kurup and Rangasami P (Amrita Vishwa Vidyapeetham, India); Sreelakshmi S Pillai (Amrita Viswa Vidyapeetham, India)

pp. 273-280

10:00 ***On-Site Zero Energy by Integrating Photovoltaic Technologies into Buildings***

Elsayed Salem and Emad Elwakil (Purdue University, USA)

pp. 281-288

PS4C: Sustainable Electronics II

Room: Wakeenah

9:00 ***Flexible Paper-Based Capacitive Touchpad for Wireless Switching Control Fabricated via Facile and Solvent-Free Method***

Muhammad Mateen Fawad (Information Technology University, Pakistan); Kashif Riaz (Information Technology University, Pakistan & Hamad Bin Khalifa University, Qatar); Muhammad Hamza Zulfiqar and Muhammad Nasir (Information Technology University, Pakistan); Arshad Khan, Bo Wang and Amin Bermak (Hamad Bin Khalifa University, Qatar)

pp. 289-293

9:20 ***Analyzing Frequency Event Detection Algorithm Performance Using Different Denoising Methods***

Hussain A Alghamdi, Midrar A Adham and Robert B Bass (Portland State University, USA)

pp. 294-301

9:40 ***MorteSense DIY Home Security***

Shohin Abdulkhamidov, Diego R Cruz, Diego Garcia-Carrasco, Spartak Gevorgyan and Faramarz Mortezaie (San Jose State University, USA)

pp. 302-309

10:00 ***Incorporating Machine Learning Algorithms and Finding Optimum Operation Point for Waste Heat Recovery in Industrial Applications: A Case Study***

Mohammad Hadi Katooli (Indiana University, USA); Ali Razban (Purdue University, Indianapolis, USA); Javad Katooli (University of Kashan, Iran)

Tuesday, April 16 10:30 - 12:00 (America/Los_Angeles)

PNL3: Panel 3: Novel Technologies for Sustainable Ocean Energy Generation

Organized by Bill Wilson, IEEE Oceanic Engineering Society

The IEEE SusTech 2024 conference panel on "Novel Technologies for Sustainable Offshore Energy Generation" brings together leading experts, researchers, and innovators to explore groundbreaking advancements in the realm of offshore renewable energy. With the pressing need to mitigate climate change and reduce dependence on fossil fuels, offshore energy generation presents a promising avenue towards achieving sustainability goals. The panel aims to showcase emerging technologies and discuss their potential to revolutionize the offshore energy landscape while addressing environmental concerns.

Panelists:

• Dr. Peter F. Green, National Energy Research Laboratory (NREL
• Dr. Daniel Deng, Pacific Northwest National Laboratories
• Dr. Landon Mackey, C-Power, Corvallis, OR
• Andy Stough, Windlift, Durham, NC
Room: Multnomah

Tuesday, April 16 12:00 - 13:00 (America/Los_Angeles)

L2: Lunch

Room: Willamette

Tuesday, April 16 13:00 - 13:45 (America/Los_Angeles)

K4: Keynote 4; ReCell: Working to Advance Battery Recycling

Eva Allen, Argonne National Laboratory

End-of-life lithium-ion batteries in electric and hybrid-electric vehicles are just now starting to reach their end of life. Battery recycling is needed to recover the valuable materials needed to support new battery production and reduce waste and environmental impact. The ReCell Center is working to develop, scale up, and demonstrate battery recycling processes that reduce cost and increase the profit of battery recycling. ReCell has developed direct recycling processes to recover cathode materials intact, reducing the processing steps for reuse. Four focus areas are targeted: direct cathode recycling, recovery of other materials, design for recycling, and modeling and analysis. Additionally, ReCell uses advanced characterization with synchrotron sources to study the directly recycled cathode materials in 3D to determine their composition after regeneration and gain a fundamental understanding of the direct recycling processes.
Room: Multnomah

Tuesday, April 16 14:00 - 15:20 (America/Los_Angeles)

PS5A: Renewable / Alternate Energy II

Room: Multnomah

14:00 ***Comparison Between a Photovoltaic System and a Wind Power System in the Brazilian Semi-Arid Region***
Osian Meykson Bezerra Soares, John Lennon Nunes de Souza and Rafael Luz Espindola (The Federal University of

the Semi-Arid Region - UFERSA, Brazil); Antônio Alisson Alencar Freitas (Universidade Federal Rural do Semi-Árido, Brazil)
pp. 310-316

14:20 ***WE-Validate: An Open-Source Framework for Wind Power Validation***
Malcolm Moncheur de Rieudotte, Allison Campbell, Larry Berg, Ye Liu, Nader Samaan, Lindsay Sheridan and Heng Wang (Pacific Northwest National Laboratory, USA)
pp. 317-323

14:40 ***Advancing the Economic Frontier of Green Hydrogen: A Systematic Modeling and Optimization Approach***
Abdulaziz Alturki (King Abdulaziz University, Saudi Arabia)
pp. 324-331

15:00 ***Solar Powered Water Pumping System for Remote Areas***
Mounica Gopisetty and Cameron Adlawan (San Diego State University, USA)
pp. 332-338

PS5B: IOT I

Room: Elowah

14:00 ***Trust Model Utilization for Energy Grid Communication***
Sonali Fernando, John M Acken and Robert Bass (Portland State University, USA)
pp. 339-344

14:20 ***Decentralized, Distributed, and Hybrid ICT Architectures: Hierarchical Multitier Big Data Driven Management for Smart, Sustainable, Scalable and Reliable Cities***
Amir Sinaeepourfard (IEEE Member, Norway); Shehenaz Shaik (East Tennessee State University, USA); Niusha Mesgaribarzi (USN, Norway)
pp. 345-355

14:40 ***Generative AI-Based Land Cover Classification via Federated Learning CNNs: Sustainable Insights from UAV Imagery***
Oleksandr Jockusch (Southern Illinois University, USA); Md Zarif Hossain (Southern Illinois University Carbondale, USA); Ahmed Imteaj and Abdur Rahman Bin Shahid (Southern Illinois University, USA)
pp. 356-361

15:00 ***IoT Waste Management Conversion Kit***
Daniil Slutskiy, Miroslaw J. Wierzbicki, Marina Chuery and Douglas E Dow (Wentworth Institute of Technology, USA)
pp. 362-366

PS5C: Sustainable Electronics III

Room: Wakeenah

14:00 ***Facile and Wearable Textile-Based Temperature Sensor for Human Healthcare Monitoring***
Umer Zahid and Muhammad Umaid Bukhari (Information Technology University, Pakistan); Kashif Riaz (Information Technology University, Pakistan & Hamad Bin Khalifa University, Qatar); Khawaja Qasim Maqbool (Bahria University Lahore Campus, Pakistan); Arshad Khan, Bo Wang and Amin Bermak (Hamad Bin Khalifa University, Qatar)
pp. 367-370

14:20 ***A Gap Analysis of Technical Standards for Active Safety Online Monitoring and Fire Hazards for Lithium-Ion Batteries***

Yujie Yuan (Civil Aviation University of China, China); Xiaoyue Ji (Tsinghua University, China); Zhekang Dong (Hangzhou Dianzi University, China); Chun Sing Lai (Guangdong University of Technology, China)

pp. 371-377

14:40 ***An IoT Based Weather Monitoring System for Smart Agriculture***

Hassan Ali (UDST, Qatar)

pp. 378-382

Tuesday, April 16 15:30 - 16:15 (America/Los_Angeles)

K5: Keynote 5: A Vision for Mid-Century Sustainable Urban Transportation

Tyler Folsom, University of Washington Bothell

Near-term sustainability goals focus on eliminating greenhouse gases. Transportation is a major contributor to GHG and sustainability requires eliminating petroleum as well as fossil fuels used for vehicle electrification. To effectively guide that action, this talk envisions how sustainable transportation improves on business as usual. The present paradigm of wasting energy on a 4000-pound vehicle to haul one or two people is not sustainable. The future requires going beyond bike share, automated automobile and automated transit networks. When these technologies are merged, small, choreographed pods could end congestion. People move faster, and at lower economic and energy costs. Freight can be moved more efficiently. A key to efficient energy use for passengers and freight is to make the vehicles lighter than the load. Light vehicles require fewer batteries, with beneficial effects on the grid.

Room: Multnomah

Tuesday, April 16 16:30 - 17:40 (America/Los_Angeles)

PS6A: ML Application

Room: Multnomah

16:30 ***Machine Learning Based Electric Vehicle Drivers Charging Satisfaction Analysis and Prediction***

Shahab Sabzi and Laszlo Vajta (Budapest University of Technology and Economics, Hungary)

pp. 383-389

16:50 ***Prediction of Electric Vehicle Penetration and Its Impacts on Distribution Systems: A Real-World Case Study in Maryland***

Wenyu Wang, Zuzhao Ye and Nanpeng Yu (University of California, Riverside, USA); Po-Chen Chen (Exelon Corporation, USA)

pp. 390-396

17:10 ***The Environmental Price of Intelligence: Evaluating the Social Cost of Carbon in Machine Learning***

Syed Mhamudul Hasan, Abdur Rahman Bin Shahid and Ahmed Imteaj (Southern Illinois University, USA)

pp. 397-403

PS6B: IOT II

Room: Elowah

16:30 ***Home Grown Automated Garden***

Douglas E Dow, Michael A Fiorino, Kyle D Lawless and Ben A Doucette (Wentworth Institute of Technology, USA); Saurav Basnet (550 Huntington Ave & Wentworth Institute of Technology, USA)

pp. 404-409

16:50 ***Automated Control and IoT-Based Water Quality Monitoring System for a Molobicus Tilapia Recirculating Aquaculture System (RAS)***

Franz Joseph D Libao (Department of Science and Technology - Metals Industry Research and Development, Philippines); Oscar Sheen M Villaverde II (Department of Science and Technology - Metals Industry Research and Development Center & University of the Philippines Diliman, Philippines); Nicole Ann Portia U de Luna (DOST-Metals Industry Research and Development Center, Philippines); Von Jansen G Comedia, Manuel O Luna, Jr and Ana Marie C Atienza (Department of Science and Technology - Metals Industry Research and Development, Philippines); Glen D Espeña (Department of Science and Technology, Philippines)

pp. 410-415

PS6C: Water

Room: Wakeenah

16:30 ***Energy for Desalination of Saline Water and Brackish Groundwater - A Case Study of the Metropolitan Region of Recife***

Débora dos Santos Carvalho (University of Sao Paulo, Brazil); Jose Baesso Grimoni, Sr (Universidade de Sao Paulo, Brazil)

pp. 416-423

16:50 ***Analysis of the Impacts of Urban Development on Flood Risk and Frequency in the Municipality of Angono, Rizal Using Urban Flood Modelling***

Jasper Alain G. Viernes and Jay Arr R Formento (Philippines); Ian Patrick Darap Reyes (Mapúa University, Philippines)

Tuesday, April 16 18:30 - 20:30 (America/Los_Angeles)

CD: Reception/Dinner

Room: Willamette

Wednesday, April 17

Wednesday, April 17 8:00 - 8:50 (America/Los_Angeles)

SFK1: Opening Remarks and Keynote 1

Electrification is a key strategy for decarbonizing all sectors of the U.S. economy, Hellen Chen, ACEEE

The Energy Information Administration reports that renewable sources comprised 21% of U.S. electricity generation in 2023, and more than 45% in leading states. The growth of carbon-free electricity makes electrification a key pillar for decarbonization in our economy that complements energy efficiency. ACEEE, historically known for ground-breaking work in the energy efficiency space, has found that 90% of U.S. energy use can be electrified while the remaining hard-to-electrify 10% has other decarbonization solutions. We support efficient beneficial electrification and energy efficiency to save energy, save money, and reduce emissions, especially as energy sources become cleaner. We describe the different sectors in which our work focuses and offer examples of key barriers, technologies, policies, and other considerations (i.e., workforce, equity).

Room: Multnomah

Wednesday, April 17 9:00 - 9:45 (America/Los_Angeles)

SFK2: Keynote 2: Electrification and the Grid

C. E. (Ted) Witham & Joe Cappeta, Eaton Corp.

This talk will discuss how electrification is affecting the modern-day grid and how distributed energy resources strategies can mitigate those impacts.
Room: Multnomah

Wednesday, April 17 10:00 - 11:30 (America/Los_Angeles)

SFP1: Panel 1: Promising Heat Pump Developments: Perspectives from the Pacific Northwest

Hosted/moderated by Stephanie Kruse, P.E., Facilities Engineer, Oregon Department of Energy

Join us for a panel discussion featuring industry experts tasked with deploying heat pumps in the Pacific Northwest. Panelists will be sharing current opportunities and challenges that they are facing. This is a great opportunity to hear updates on how technology and policy developments may offer solutions for heat pump incentive programs.

Panelists:

• Christopher Dymond, Senior Product Manager, Northwest Energy Efficiency Alliance
• Thomas Elzinga, Energy Services Manager, Central Electric Cooperative, Inc.
• Rick Wittgraf, Southern Region Equipment Sales Manager, from Gensco, Inc.
Room: Multnomah

Wednesday, April 17 11:45 - 12:15 (America/Los_Angeles)

SFSS: Special Session: Hot Topics is Sustainability

Maike Luiken, IEEE SusTech Initiative

Maike Luiken, PhD, SMIEEE, IEEE-HKN, FEIC, chairs Planet Positive 2030 - an initiative of the IEEE Standards Association - as well as the P7800 Standards Working Group: Recommended Practice for Addressing Sustainability, Environmental Stewardship and Climate Change Challenges in Professional Practice.
Room: Multnomah

Wednesday, April 17 12:15 - 13:15 (America/Los_Angeles)

L3: Lunch

Room: Willamette

Wednesday, April 17 13:15 - 14:00 (America/Los_Angeles)

SFK3: Keynote 3: Increasing Computing Energy Efficiency is Key Requirement for Sustainability

Tina Kaarsberg, Ph.D. Acting Program Manager at U.S. Department of Energy (DOE), Advanced Materials and

Manufacturing Technologies Office (AMMTO)

The future has arrived for climate change and unsustainable computing energy use. AI-driven exponentially increasing energy demands for computing (e.g. data centers) that are quadrupling forecasts for electricity use. Other drivers of exponentially increasing microelectronics energy use-such as proliferation of web-connected smart devices and the build up to 6G and beyond in wireless communications, have yet to manifest.

Against this backdrop, our 2022 DOE initiative on microelectronics Energy Efficiency Scaling over 2 Decades (EES2)--the topic of this talk-seems prescient.

The talk will detail our efforts in the DOE's Advanced Materials & Manufacturing Technologies Office (AMMTO) to develop an RD&D plan in 2023. Next steps are to get public input and to deploy the technologies-including at least a dozen that are commercially ready-as quickly as possible starting by the end of 2024. In addition to spreading the word on EES2 RD&D Roadmap and the workforce needed to perform the RD&D and manufacture the technologies-we will use the bully pulpit of the EES2 Initiative which so far includes 61 organizations that have pledged to join the DOE to stay on the path of doubling microelectronics' energy efficiency every two years.
Room: Multnomah

Wednesday, April 17 14:15 - 15:00 (America/Los_Angeles)

SFK4: Keynote 4: Efficient, Cost-Effective Polymeric Materials Design for Clean Energy and Biomedical Technologies via Biomass Valorization

Shudipto Konika Dishari, Ross McCollum Associate Professor, Chemical and Biomolecular Engineering, University of Nebraska-Lincoln

Addressing the technical challenges through cutting-edge materials research is the key to excel in sustainable, clean energy technologies, like fuel cells and electrolyzers. Some of the major challenges of current H-fuel cells include ion transport limitation (low-temperature), stability (high-temperature), expensive materials, and environmental sustainability.

To overcome these obstacles, we need to rethink the design of ion-conducting polymers (ionomers) playing the pivotal roles in separators and catalyst layers of these devices. Converting the untapped, industrial/agricultural lignin-rich wastes to design efficient, cost-effective ionomeric materials for eco-friendly electrochemical devices can aid in bio- and energy economies simultaneously. The major application of lignin in sustainable energy materials has so far been porous carbon materials for charge storage and/or electron conduction in electrodes. We have designed ion-conducting materials using lignin from plant-based sources.

This talk will primarily show how these lignin-based polymers improve the ion-transport at low- and high-temperature conditions. We consolidate the findings on average as well as distributed physical, mechanical and ion transport properties across lignin-based ionomeric materials to understand the ion transport process which can inform and guide the future design of sustainable energy technologies. The talk will also give a glimpse of how we are designing functional materials using lignin for biomedical applications.
Room: Multnomah

Wednesday, April 17 15:15 - 16:00 (America/Los_Angeles)

SFK5: Keynote 5: Off-shore Wind Power Studies

Dmitry Kosterev, Bonneville Power Administration (BPA)

Dmitry Kosterev is a senior transmission planning engineer at Bonneville Power Administration. He is involved in wide range of transmission planning projects, power plant modeling, testing and verification, synchrophasor technology application, and technology innovation projects.

He is involved in several off-shore wind generation integration studies at BPA, Western Power Pool, and serves as a technical adviser for DOE West Coast Off-Shore Wind study.
Room: Multnomah

Wednesday, April 17 16:15 - 16:30 (America/Los_Angeles)

SPCA: Student Poster Awards

Sean Monemi, SusTech 2024 Student Poster Contest Chair

Student Poster Awards for first, second and third places as determined by the judges. First place $1000; second $500; third(x2) $250. will be presented.
Room: Multnomah

Wednesday, April 17 16:30 - 16:45 (America/Los_Angeles)

CLOS: Closing Remarks & SusTech 2025

Room: Multnomah