ASME POWER 2022

Power Conference

Responsible. Reliable. Power for All.

Program

CONFERENCE
July 18–19, 2022

Omni William Penn
Pittsburgh, PA

https://event.asme.org/POWER

The American Society of Mechanical Engineers®
ASME®

ASME
SETTING THE STANDARD

Welcome

FROM THE CONFERENCE CHAIRS & THE EXECUTIVE ADVISORY COMMITTEE

Dear Colleagues:

Welcome to the ASME 2022 Power Conference and to the Steel City, Pittsburgh, PA!

The ASME Power Conference is an annual event brought to you by the Power Division, one of ASME's largest technical divisions. While the pandemic sent us into the virtual world for 2020 and 2021, we are back in person for 2022! For this year's conference, the Division has put together a program packed with authors presenting their peer-reviewed technical papers and expert panels sharing their experiences with today's hot topics in the Power Industry.

In addition to the multitude of technical presentations, we have additional opportunities available for you to engage and network with industry colleagues while you're here. A Round Table session will allow you to discuss Cybersecurity and Heat Rate with experts working on projects and standards on those topics as well as finding out from those in the know how extra letters (PhD, PE, CEM, etc.) may benefit your career, and how diversity of thought and experience can benefit your team.

Beyond the two-day conference program, we have a few select workshops and industry tours to extend your time with us this week.

A special thank you to our sponsors and exhibitors, who have supported us through thick and thin. They will be available to talk with you about their products and services at the evening events on Monday and Tuesday. And this conference would never happen without our Division volunteers and Track Chairs who have spent countless hours putting together a top-notch technical program. Finally, I would like to personally thank you, our attendees, for joining us. We look forward to meeting you all this week at the conference Face to Face!

One more note—We chose to meet in Pittsburgh for its ties to the history and future of the Power Industry, but it is a great city with many exciting things to do and see. If you are looking for places to go while here in the area, check with the concierge at the hotel, or better yet, ask our own Pittsburgh Expert and Power Division Committee member, George Mesina. Have a great conference and thank you again for attending this year's event.

ASME 2022 POWER CONFERENCE

Conference Chair
Tina Toburen
T2E3, Inc. - Energy Efficiency Enterprises

Technical Program Chair
Navid Goudarzi
Cleveland State University

Technical Program Co-Chair
André Teixeira
Soja de Portugal

Student Programs Coordinator
Sarvenaz Sobhansarbandi
University of Missouri-Kansas City

ASME 2022 NUCLEAR FORUM

Conference Chair
Jovica Riznic
Canadian Nuclear Safety Commission

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RMF Engineering

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Riley Power Inc.

Frank Michell
Power Industry Consulting, LLC

Mike Smiarowski
Siemens Energy, Inc.

THANK YOU!

Thank you to our volunteers! Without their dedication and time commitment, Power could not be a successful conference.

TRACK CHAIRS

Track 1: Fuels, Combustion & Material Handling

Chair: Ashwani Gupta, University of Maryland

Co-Chair: Jeongmin Ahn, Syracuse University

Track 2: Combustion Turbine Combined Cycles

Chair: Jeffrey Cobb, Sargent Lundy

Co-Chair: Nick Gritz, POWER Engineers

Track 3: Boilers & Heat Recovery Steam Generators

Chair: David Fitzgerald, P.E., Retired

Track 4: Advanced Tools for Cyber-Physical Systems and Digital Twins

Chair: Paolo Pezzini, U.S. Department of Energy, Ames Laboratory

Co-Chair: Biao Zhang, U.S. Department of Energy, National Energy Technology Laboratory

Track 5: Risk Management, Cyber Security and Safety

Chair: Tina Toburen, T2E3, Inc.

Co- Chair: Jason Lee, Babcock Power

Track 6: Plant Construction, Supply Chain Management & Economics

Chair: Frank Michell, Power Industry Consulting, LLC

Track 7: Renewable Energy Systems

Chair: Gopal Singh, Siemens Gamesa Renewable Energy, University of Central Florida

Co-Chair: Anthony DiCarlo, MITRE Corporation

Co-Chair: Navid Goudarzi, Cleveland State University

Track 8: Power Plant Heat Exchangers & Cooling Technologies

Chair: Andrew Rister, Duke Energy

Track 9: Steam Turbines, Generators and Auxiliaries

Chair: Steve Radke, Siemens Energy, Inc.

Co-Chair: Davi Squaiella, Black & Veatch

Co-Chair: Mike Smiarowski, Siemens Energy, Inc.

Track 10: Plant Performance and Operations

Chair: Ed Dundon, Dominion Energy

Co-Chair: Brian Wodka, RMF Engineering

Track 11: Robotics and Drones

Chair: Frank Michell, Power Industry Consulting, LLC

Co-Chair: Navid Goudarzi, Cleveland State University

Track 12: Hydraulics and Computational Fluid Dynamics and Data Analytics

Chair: Donna Guillen, Idaho National Lab

Co-Chair: George Mesina, Idaho National Lab

Track 13: Water Management, Beneficial Reuse, & Environmental Issues

Chair: Nick Siefert, U.S. Department of Energy, National Energy Technology Laboratory

Co-Chair: Heather Hunter, U.S. Department of Energy, National Energy Technology Laboratory

Co-Chair: Jessica Mullen, U.S. Department of Energy, National Energy Technology Laboratory

Track 14: Nuclear Forum

Chair: Jovica Riznic, Canadian Nuclear Safety Commission

Track 15: Student Competition

Chair: Sarvenaz Sobhansarbandi, University of Missouri-Kansas City

Co-Chair: Andre Teixeira, SDP

Co-Chair: Steve Greco, Lectrodryer

SESSION ORGANIZERS

1-01 Fuels/Combustion

Chair: Ashwani Gupta, University of Maryland

2-01 Combustion Turbines and Combined

Chair: Jeffrey Cobb, Sargent Lundy

Co-Chair: Nick Gritz, POWER Engineers

3-01 Boilers / HRSG

Chair: Paul Weitzel, Paul Weitzel Technical Consulting LLC

4-01 Advanced Tools for Cyber-Physical Systems and Digital Twins

Chair: Paolo Pezzini, U.S. Department of Energy, Ames Laboratory

4-02 Advanced Tools for Cyber-Physical Systems and Digital Twins

Chair: George Mesina

Co-Chair: Donna Guillen

7-01 Hydrogen, Battery, Thermal Energy Storage

Chair: Gopal Singh

Co-Chair: Anthony Di-Carlo

7-02 Wind Energy & Green Hydrogen

Chair Mustafa Erguvan

Co-Chair: Anthony Di-Carlo, MTRE Corporation

7-03 Solar Energy

Chair Navid Goudarzi

Co-Chair: Mustafa Erguvan

7-04 Thermal Energy Storage & Bio-Energy

Chair: Anthony Di-Carlo, MTRE Corporation

Co-Chair: Gopal Singh

8-01 Heat Exchangers & Cooling Technology I

Chair: Andrew Rister, Duke Energy

9-01 Steam Turbines, Generators, and Auxiliaries

Chair: Mike Smiarowski, Siemens Energy, Inc.

9-02 Steam Turbines, Generators, and Auxiliaries

Chair: Steve Radke, Siemens Energy, Inc.

9-03 Steam Turbines, Generators, and Auxiliaries

Chair: Steve Radke, Siemens Energy, Inc.

9-04 Nuclear Renaissance

Chair: Mike Smiarowski, Siemens Energy, Inc.

9-05 Operational Flexibility Workshop

Chair: Steve Radke, Siemens Energy, Inc.

10-01 Plant Performance & Operation

Chair: Brian Wodka

11-01 Robotics & Drones

Chair: Frank Michell, Power Industry Consulting, LLC

Co-Chair: Navid Goudarzi, Cleveland State University

12-01 Experimental and Computational Fluid Dynamics and Thermal Hydraulics and Data Analytics

Chair: Donna Guillen, Idaho National Laboratory

Co-Chair: George Mesina, Idaho National Laboratory

13-01 Water Management, Beneficial Reuse, & Environmental Issues

Chair: Nick Siefert, U.S. Department of Energy, National Energy Technology Laboratory

14-01 Nuclear Forum

Chair: Jovica Riznic, Canadian Nuclear Safety Commission

15-01 Student Competition

15-02 Student Competition

15-03 Student Competition

15-04 Student Competition

Chair: Sarvenaz Sobhansarbandi, University of Missouri-Kansas City

REGISTRATION HOURS AND LOCATION

Registration will be located on the mezzanine level of the Omni William Penn.

Sunday
July 17 12:00PM–6:00PM

Monday
July 18 8:00AM–6:00PM

Tuesday
July 19 8:00AM–5:00PM

Wednesday
July 20 7:45AM–10:00AM

ON-SITE REGISTRATION FEES

Registration Type	On-Site Registration
ASME Member	$975.00
Track Chair/Session Chair	$975.00
Non-Member	$1,125.00
ASME Student Member	$525.00
Student Non-Member	$575.00
One-day Member	$450.00
One-day Non-Member	$475.00
ASME Life Member	$525.00
Guest Ticket to Reception	$50.00
Guest Ticket to Banquet	$75.00

REGISTRATION POLICIES

1. Conference registration fees include admission to all technical sessions, exhibits, receptions, keynote breakfast, refreshment breaks, plenary lunch, awards lunch, and electronic access to technical presentations. **Tickets to the seminar/workshop, tours, and functions for guests are an additional fee.
2. All attendees, including member, non-members, authors, panelists, chairs, and co-chairs, must pay the appropriate registration fee.
3. One-day registration allows access to the conference activities only on that particular day.
4. No one will be allowed to attend the technical sessions or exhibits without first registering and obtaining the official ASME 2022 Power and Nuclear Conference badge.

ASME COMPLIMENTARY MEMBERSHIP

Any attendee that pays a non-member conference registration fee will receive a four-month ASME membership free of charge. ASME will activate this complimentary membership for qualified attendees approximately four weeks after the conclusion of the conference.

PHEEDLOOP APP

Download the ASME Pheedloop App and hold the entire program in the palm of your hand! The ASME Pheedloop App allows you to easily look up sessions, search for abstracts or people, message with other attendees, and create your own schedule. Be sure to download the app for the latest information.

Wi-Fi

Enjoy complimentary wi-fi in the meeting space using the credentials below:

Network: Omni Meeting
Password: Power2022

SPEAKERS' PRACTICE ROOM:

The speaker ready room is located in the Heinz Room of the hotel.

The room will be equipped with an LCD projector, computer, and screen, Sunday through Tuesday. Authors are encouraged to use this facility to meet with their co-authors and review presentations. Please bring your presentation on a memory stick.

It will be available as follows:

Sunday
July 17 1:00PM–5:00PM

Monday
July 18 7:30AM–5:00PM

Tuesday
July 19 7:30AM–3:00PM

SESSION ROOM EQUIPMENT

Each session room is equipped with a screen, LCD projector and laptop. Speakers should have a copy of their presentation loaded onto a memory stick. It is recommended that authors/speakers bring all visual aids with them.

CONFERENCE PAPERS ELECTRONIC ACCESS

All Full Conference Registrants will receive online access to papers and presentations made at the 2022 Power Conference & Nuclear Forum. Access will be granted using your registration email address. Papers that were not presented on site in Pittsburgh will not be published in the conference proceedings and cannot be cited or indexed.

EXHIBIT HOURS

Visit our exhibitors during the opening reception and banquet cocktail hour in the William Penn Ballroom Room.

Monday
July 18 12:30PM–2:00PM and 5:30PM–7:00PM

No one will be permitted into the reception without a badge. If you have any questions or need assistance, an ASME representative will be located in the registration area.

LUNCH

Lunch will be served in the William Penn Ballroom Room on:

Monday, July 18	12:30PM–1:00PM
Tuesday, July 19	12:00PM–12:30PM

REFRESHMENT BREAKS

Morning Break -Registration Area
Tuesday, July 19 10:00AM–10:30AM

Afternoon Break- Registration Area
Tuesday, July 19 3:00PM–3:30PM

NAME BADGES

Please wear your name badge at ALL times during the conference. Your name badge is required in order for you to attend the sessions and/or the exhibition. If you misplaced your badge, please go to the ASME registration desk and ask for a replacement.

SPECIAL NEEDS & HANDICAPPED ATTENDEES

Whenever possible, we are pleased to make arrangements for special needs or handicapped registrants. Advance notice may be required for certain requests. For on-site assistance, please visit the ASME registration area at the hotel and ask to speak to a staff member.

RECEPTION & AWARDS LUNCHEON

Opening Reception
Monday, July 18
5:30PM–7:00PM

All registrants are invited to this special event to celebrate the opening of the exhibits. Come grab a drink and some food, meet this year's group of exhibitors, and learn about their products and services.

Power Division Awards Luncheon
Monday, July 18
12:30PM–2:00PM

Join the Power Division in celebrating the volunteers and recognizing our award winners. Meet us in the William Penn Ballroom Room at 12:30PM. Lunch will be served from 12:30PM – 1:00PM before the program begins.

SCHEDULE AT A GLANCE—POWER

MONDAY, JULY 18

TIME	EVENT	LOCATION
9:00AM–10:30AM	Keynote Breakfast	William Penn Ballroom
10:30AM–11:00AM	Break	
11:00AM–12:30PM	Technical Sessions	
	15-1 Student Competition	Carnegie 3
	4-1 Advanced Tools for Cyber-Physical Systems and Digital Twins	Oliver
	7-1 Hydrogen, Battery, Thermal Energy Storage	Phipps
	9-1 Steam Turbines, Generators, and Auxiliaries	Vandergrift
11:00AM–12:30PM	Panel	
	Surface Condenser Testing and Maintenance	Lawrence Welk
12:30PM–2:00PM	Awards Luncheon	William Penn Ballroom
2:00PM–3:30PM	Technical Sessions	
	15-2 Student Competition	Phipps
	1-1 Fuels/Combustion	Oliver
	9-2 Steam Turbines, Generators, and Auxiliaries	Vandergrift
	8-1 Heat Exchangers & Cooling Technology I	Carnegie 3
2:00PM–3:30PM	Hydrogen Panel	Lawrence Welk
3:30PM–4:00PM	Break	
4:00PM–5:00PM	Roundtables	Lawrence Welk
4:30PM–5:30PM	Technical Committee Meetings	
	Digital Twin Meeting	Phipps
	Heat Exchanger Meeting	Oliver
5:30PM–7:00PM	Opening Reception	William Penn Ballroom

TUESDAY, JULY 19

TIME	EVENT	LOCATION
8:30AM–10:00AM	Technical Sessions	
	7-2 Wind Energy & Green Hydrogen	Phipps
	10-1 Plant Performance & Operations	Oliver
	15-3 Student Competition	Carnegie 3
8:30AM–10:00AM	Panel	
	BEX (Brownfield Exchange) and Bolting Technologies Presentation/Tutorial	Lawrence Welk
10:00AM–10:30AM	Morning Coffee Break	Registration Area
10:30AM–12:00PM	Technical Sessions	
	7-3 Solar Energy	Phipps
	1-2 Fuels/Combustion	Oliver

	2-01 Combustion Turbines and Combined Cycle & 03-01 Boilers/HRSG	Carnegie 3
10:30AM–12:00PM	Panel/Workshop	
	Robotics Panel	Lawrence Welk
	Operational Flexibility Panel Discussion	Vandergrift
12:00PM–1:30PM	Plenary Luncheon	William Penn Ballroom
1:00PM–5:00PM	PTC 46 Overall Plant Performance	Three Rivers
1:00PM–5:00PM	PTC 6.2 Steam Turbines in Combined Cycle	Anchor
1:30PM–3:00PM	Technical Sessions	
	12-1 Experimental and Computational Fluid Dynamics and Thermal Hydraulics and Data Analytics & 04-02 Advanced Tools for Cyber-Physical Systems and Digital Twins	Oliver
	7-4 Thermal Energy Storage & Bio-Energy	Carnegie 3
	13-1 Water Management, Beneficial Reuse, & Environmental Issues	Vandergrift
1:30PM–3:00PM	Panels	
	Nuclear Renaissance	Lawrence Welk
	Student Panel	Phipps
3:00PM–3:30PM	Afternoon Break	Registration Area
3:30PM–5:00PM	Technical Committee Meetings	
	Combined Cycle Power Plant Meeting	Phipps
	Renewables Meeting	Oliver
	Steam Turbine Generator and Auxiliary Track Meeting	Vandergrift

WEDNESDAY, JULY 20

TIME	EVENT	LOCATION
8:00AM–5:00PM	PTC 46 Overall Plant Performance	Three Rivers
8:00AM–5:00PM	PTC 6.2 Steam Turbines in Combined Cycle	Anchor
8:15AM–1:00PM	Westinghouse Waltz Mill Operations	Grant Street Entrance

THURSDAY, JULY 21

TIME	EVENT	LOCATION
8:00AM–3:00PM	PTC Performance Test Codes standards Committee Meeting	Three Rivers

SCHEDULE AT A GLANCE—NUCLEAR FORUM

MONDAY, JULY 18

TIME	EVENT	LOCATION
9:00AM–10:30AM	Keynote Breakfast	William Penn Ballroom
10:30AM–11:00AM	Break	
11:00AM–12:30PM	Panel	
	Surface Condenser Testing and Maintenance	Lawrence Welk
12:30PM–2:00PM	Awards Luncheon	William Penn Ballroom
2:00PM–3:30PM	Hydrogen Panel	Lawrence Welk
3:30PM–4:00PM	Break	
4:00PM–5:00PM	Roundtables	Lawrence Welk
4:30PM–5:30PM	Technical Committee Meetings	
	Digital Twin Meeting	Phipps
	Heat Exchanger Meeting	Oliver
5:30PM–7:00PM	Opening Reception	William Penn Ballroom

TUESDAY, JULY 19

TIME	EVENT	LOCATION
8:30AM–10:00AM	Technical Session	
	14-01 Nuclear Forum	Vandergrift
8:30AM–10:00AM	Panel	
	BEX (Brownfield Exchange) and Bolting Technologies Presentation/Tutorial	Lawrence Welk
10:00AM - 10:30AM	Morning Coffee Break	Registration Area
10:30AM–12:00PM	Panel/Workshop	
	Robotics Panel	Lawrence Welk
	Operational Flexibility Panel Discussion	Vandergrift
12:00PM–1:30PM	Plenary Luncheon	William Penn Ballroom
1:00PM–5:00PM	PTC 46 Overall Plant Performance	Three Rivers
1:00PM–5:00PM	PTC 6.2 Steam Turbines in Combined Cycle	Anchor
1:30PM–3:00PM	Panels	
	Nuclear Renaissance	Lawrence Welk
	Student Panel	Phipps
3:00PM–3:30PM	Afternoon Break	Registration Area
3:30PM–5:00PM	Technical Committee Meetings	
	Combined Cycle Power Plant Meeting	Phipps
	Renewables Meeting	Oliver
	Steam Turbine Generator and Auxiliary Track Meeting	Vandergrift

WEDNESDAY, JULY 20

TIME	EVENT	LOCATION
8:00AM–5:00PM	PTC 46 Overall Plant Performance	Three Rivers
8:00AM–5:00PM	PTC 6.2 Steam Turbines in Combined Cycle	Anchor
8:15AM–1:00PM	Westinghouse Waltz Mill Operations	Grant Street Entrance

THURSDAY, JULY 21

TIME	EVENT	LOCATION
8:00AM–3:00PM	PTC Performance Test Codes standards Committee Meeting	Three Rivers

TOURS

Please note that, due to security clearance requirements, attendees needed to pre-register. Unfortunately, we will not be able to accommodate last-minute registrations.

Westinghouse Waltz Mill Operations

Wednesday, July 20, 2022
Departure Time: 8:15AM
Tour time: 9:00AM–12:00PM
Estimated Return Time: 1:00PM
*Meet at the Grant Street entrance for departure.

KEYNOTE

Monday, July 18, 2022
9:00AM–10:30AM
Room: William Penn Ballroom

Michael B. House
Vice President of Infrastructure and Energy Solutions
Siemens Government Technologies (SGT)

Title: Maximizing Renewables Penetration Through Smart Grid Control

Description: Reducing the emissions from distributed generation systems with a very high percentage of renewables is possible in combination with smart grid control. Traditional energy master plans sometimes underestimate the amount of installable photovoltaic or wind, but proper simulations and hardware selections can avoid these pitfalls, ensuring sufficient power quality, uptime, and availability.

In this keynote session, Michael House will discuss some of the risk mitigation techniques needed to ensure successful renewable power projects for mission critical facilities, leveraging today's technology, and reducing the project's carbon footprint.

Biography: Michael B. House is the Vice President of Infrastructure and Energy Solutions at Siemens Government Technologies (SGT) and has been with Siemens since August 2020. SGT exclusively serves U.S. Government customers through Energy Savings Performance Contracts, Utility Monitoring and Control projects, and Cooperative Research and Development projects centered on resiliency, energy, and advanced electrical systems.

Prior to his current position, Michael was the Vice President of Energy Consulting Services in the Americas for AECOM, meeting client needs in energy planning, distributed generation, microgrids, modeling, and program management.

From 2004 to 2011, Michael worked as Program Manager and Business Leader for Northrop Grumman in topics ranging from manufacturing of power control and distribution units for satellite payloads to R&D for U.S. Government customers.

From 1992 to 2004, Michael worked as an engineer and Six Sigma Blackbelt at various locations for General Electric and Lockheed Martin and helped drive the commercialization of GE's Mark Ve gas turbine control system.

Michael earned a Bachelor's degree in Engineering Science from The Pennsylvania State University, a Master's degree in Engineering Mechanics from The Pennsylvania State University, and a Master of Business Administration from Rensselaer Polytechnic University.

Michael is married and loves spending time with his family. He enjoys leisure travel, playing golf, or just relaxing at the beach.

PLENARY

Tuesday, July 19, 2022
12:00PM–1:30PM
Room: William Penn Ballroom

Brian J. Anderson, Ph.D.
NETL Director
National Energy Technology Laboratory

Title: Integrated Carbon Management Solutions to Enable the Transformation to a Net-Zero Energy Future

Description: Join Dr. Brian Anderson for an overview of how the National Energy Technology Laboratory (NETL) is at the forefront of technology development to accelerate our nation's transition to a clean energy future. Coverage includes pathways associated with advancing carbon management approaches toward deep decarbonization and technologies that lead to sustainable energy resources. NETL is the nation's premier energy technology laboratory. The lab advances vital energy technologies needed to decarbonize our nation's energy infrastructure and industries, improve electrical grid reliability and resilience, expand critical mineral production, educate America's future scientists and engineers, create good-paying jobs, expand access to energy efficiency and clean energy for families, communities, and businesses and support national energy and security goals.

Biography: As director of the National Energy Technology Laboratory (NETL), Brian J. Anderson, Ph.D., manages the complete NETL complex, including delivery and execution of the Laboratory's mission and national programs in carbon-based energy and program support to the U.S. Department of Energy (DOE) Offices of Energy Efficiency and Renewable Energy; Electricity; and Cybersecurity, Energy Security and Emergency Response. Anderson leads NETL's more than 1,300 employees and guides more than 1,000 R&D projects in 50 states with a total award value of $5 billion. As director, Anderson fosters strategic relationships with utility and academic institutions, state and local governments, and important carbon management stakeholders. Under Anderson's leadership, NETL initiated critical technology development and deployment projects including direct air capture technologies for decarbonization, chemical looping combustion with potential to reduce greenhouse gas emissions, and non-variable renewable energy for future low-carbon power systems. Anderson also guided the development and maturation of key technologies proven to have significant industry impact including microwave ammonia synthesis and carbon nanomaterials manufactured from coal. In April 2021, the Biden Administration named Anderson executive director of the Interagency Working Group on Coal and Power Plant Communities and Economic Revitalization. In this role, Anderson strategically leverages NETL's resources and expertise to help ensure the shift to a clean energy economy creates good-paying union jobs, spurs economic revitalization, remediates environmental degradation and supports energy workers in coal, oil and gas, and power plant communities across the country.

Anderson is the recipient of the 2020 Federal Laboratory Consortium Laboratory Director of the Year award, and Secretary's Honor Award and Presidential Early Career Award for Scientists and Engineers for his research. Anderson earned his bachelor's degree in chemical engineering at West Virginia University and his master's and doctorate in chemical engineering from the Massachusetts Institute of Technology.

PANELS AND TECHNICAL WORKSHOPS

Sunday, July 17, 2022
1:30PM–5:00PM
Room: Lawrence Welk
Cost: $20

Instructor: Nael Barakat, Ph.D. P.Eng. FASME
Professor and Chair
Department of Mechanical Engineering

Engineering Ethics Seminar (one hour including Q&A)
Description: A seminar discussing foundations of Engineering Ethics and how engineering impacts society. Codes of Engineering Ethics, particularly from ASME, are emphasized as a reference for professionals when faced with any type of ethical dilemma.

Professional Communication Workshop (2 hours – interactive)
Description: This workshop covers professional communication essentials, both oral and written. Attendees will be asked to compose a professional email or memo or some slides and present them to peers for feedback.

Monday, July 18, 2022
11:00AM–12:30PM
Room: Lawrence Welk

Panelists: Andrew Rister

Surface Condenser Testing and Maintenance:
Description: The steam condenser is the heat exchanger which can have the largest impact to overall plant efficiency. Regular inspection and maintenance is key to ensuring optimum condenser performance and this panel of experts will discuss how to get the most benefit from typical condenser inspection and maintenance work. The panelists will present brief presentations on air in-leakage testing, eddy current tube testing, and maintenance/repair strategies before opening the floor for a Q&A-style discussion of the these and related topics. Particular emphasis will be given to getting the most impact from these activities at fossil plants facing reduced budgets and early retirement dates, but the strategies can apply to any type of thermal power plant featuring a steam surface condenser.

Monday, July 18, 2022
2:00PM–3:30PM
Room: Lawrence Welk

Hydrogen Panel:

Description: Experts involved in bringing increased use of green hydrogen to power generation will discuss options for upgrades to gas turbine systems, along with piping requirements and green hydrogen production technologies available now.

Tuesday, July 19, 2022
8:30AM–10:00AM
Room: Lawrence Welk

9-04 BEX (Brownfield Exchange) and Bolting Technologies Presentation/Tutorial:

Description:
Hytorc Bolting Technologies - Hytorc Industrial Bolting Systems – non thermally stretched bolting using Hytorc's self-reacting fastener technology by way of the Hytorc Nut which is a 3-part mechanical tensioner providing cold stretch to load with no measuring. This bolting method substantially increases safety, quality and schedule.

Brownfield Exchange Primer: "Brownfeld Exchanges" meaning adapting new latest technology and standard design equipment into existing power plants. A high-level review on approaches for Gas Turbine, Steam Turbine-Generator Sets and Footprint Generators will presented utilizing presentation and video content.

Tuesday, July 19, 2022
10:30AM–12:00PM
Room: Lawrence Welk

Robotics Panel:
Description: Join the panel as they discuss Fossil, Nuclear, and other electric generation facilities and how they can benefit by leveraging robotics and drone technology. Robotics and drone technologies enhance productivity of inspection and maintenance practices. Utilizing robotics and drones, particularly deployed in confined and other hazardous applications, improves safety and reduced inspection and maintenance costs. Included are the latest developments in robotic and drone technologies for non-destructive testing, case studies, and best practices for data collection and processing.

Tuesday, July 19, 2022
10:30AM–12:00PM
Room: Vandergrift

9-05 Enhancing Power Plant Flexible Operational Capabilities Workshop

Panelists: Steve Radke, Russell Chetwynd, Davi Squaiella and Jason Crum

This panel discussion pertains to the needs and challenges created in turbine and generator operational flexibility. In addition, the operator perspective will be discussed.

Tuesday, July 19, 2022
1:30PM–3:00PM
Room: Lawrence Welk

Panelists: Bill Turkowski and Norman Hanley

Nuclear Renaissance / Nuclear Plant Uprate and Upgrades:
Description: Many nuclear power plants are experiencing a "new lease on life" with carbon free nuclear produced electricity filling the production gap as much of the world transitions from coal, oil, and natural gas produced power to renewables in the on-going effort to curtail global greenhouse gases. One part of this renaissance is focused on preserving the existing fleet of nuclear plants which produce about 20% of the electricity in the United States.

Through financial incentives and funding being provided at both the state and federal level, many nuclear plants are taking steps to extend their operating licenses, uprate their steam production and subsequent electrical output, and correspondingly modify and upgrade their equipment, such as the steam turbine-generator and auxiliaries to operate seamlessly for up to an additional 40 years beyond their original operating licenses.

This panel discussion will include industry experts to discuss the current issues relating to nuclear plant thermal uprates and equipment upgrades that are needed to support the additional steam production. Uprate steps include nuclear steam supply system thermal uprates, analyses, and equipment changes, steam turbine generator engineering studies and typical modifications, as well as the impacts to the balance of plant components.

Each panelist will give a presentation on their area of expertise followed by a question and answer period with the session attendees.

Tuesday, July 19, 2022
1:30PM – 3:00PM ET
Room: Phipps
Student Panel

Inanc Senocak
Associate Professor
University of Pittsburgh

Presentation Title: Computational Technologies for Wind Power Forecasting and Dynamic Powerline Rating

Description: The interest to increase the amount of electricity produced from wind energy resources continues to grow. Due to the adverse effects of wind's natural variability, short-term power forecasting is viewed as an essential capability for grid integration of wind energy. Information about wind speed and its direction and turbulence levels are important for reliable and profitable operation of both on-shore and off-shore wind farms. For this information to be useful for grid integration, it needs to be forecast accurately at fine temporal and spatial resolutions. These expectations are beyond the capability of current weather forecasting models. Therefore, microscale wind prediction and forecasting models have been developed. This presentation will describe the current state in this area and underlying computational technologies in microscale wind prediction model. Additionally, the use of microscale wind prediction models in increasing the transmission capacity of powerlines will be explained.

Eric Grol
Energy Systems Analyst
National Energy Technology Laboratory

Presentation Title: Perspectives on an Engineering Career in the Office of Fossil Energy and Carbon Management at the U.S. Department of Energy

Description: This presentation will summarize professional experiences working at a government R&D laboratory. The discussion will cover such diverse topics as how engineering analysis supports in-house research and program direction, typical assignments and work products, and challenges/opportunities related to a government engineering career. Finally, general perspectives on transitioning into the professional workforce will be offered.

TECHNICAL COMMITTEE MEETINGS

Monday, July 18, 2022
4:30PM–5:30PM
Room: Phipps
Digital Twin Meeting

Monday, July 18, 2022
4:30PM–5:30PM
Room: Oliver
Heat Exchanger Meeting

Tuesday, July 19, 2022
3:30PM–5:00PM
Room: Phipps
Combined Cycle Power Plant Meeting

Tuesday, July 19, 2022
3:30PM–5:00PM
Room: Oliver
Renewables Meeting

Tuesday, July 19, 2022
3:30PM–5:00PM
Room: Vandergrift
Steam Turbine Generator and Auxiliary Track Meeting (TG&A)

ROUNDTABLES

Monday, July 18, 2022
4:00PM–5:00PM
Room: Lawrence Welk

The Power conference will offer several informal discussions on topics important to the power industry led by a Moderator/Leader. Each Roundtable will be organized into two 25-minute discussions during the scheduled hour, which will provide the audience the opportunity to participate in a couple of different discussions. You are encouraged to spend time with multiple topics. The Roundtable topics include:

- **Heat Rate –** With experts on hand to discuss all things heat rate, including new efficiency regulations and standards being developed to help plants plan for and execute long term/annual heat rate analysis programs.
  Moderator: Frank Michell

- **Cybersecurity –** The professionals at the table with information on the different levels of security needed within power plant digital systems will cover how to address potential areas of concern.
  Moderator: Tina Toburen

- **Diversity in Power –** An open discussion on how to develop, encourage, and support personnel diversity within the power industry, including some voices from successful women working in the industry.
  Moderator: Sarvenaz Sobhansarbandi, Ph.D.

- **Early Career Development –** An open discussion on available career pathways within power, resources ASME can provide, education and licensing options, and how best to position yourself to move along your chosen path and attain your professional goals.
  Moderator: Andre Teixeira

STANDARDS AND CERTIFICATIONS MEETINGS

Tuesday, July 19, 2022
1:00 PM- 5:00 PM
Room: Three Rivers
PTC 46 Overall Plant Performance

1:00 PM- 5:00 PM
Room: Anchor
PTC 6.2 Steam Turbines in Combined Cycle

Wednesday, July 20, 2022
8:00 AM- 5:00 PM
Room: Three Rivers
PTC 46 Overall Plant Performance

8:00 AM- 5:00 PM
Room: Anchor
PTC 6.2 Steam Turbines in Combined Cycle

Thursday, July 21, 2022
8:00 AM- 3:00 PM ET
Room: Three Rivers
PTC Performance Test Codes standards Committee Meeting – 8:00 – 3:00 PM (Three Rivers)

EXHIBITORS

HYTORC has over 50 years of experience focused entirely on developing the safest, fastest, and highest quality bolting systems. HYTORC has developed solutions for every bolting application. Our latest product line features patented industry-firsts like hands-free operation to keep tool operators at a safe distance from the application, onboard documentation systems to provide job accountability and assurance, and industry-leading bolt load accuracy to reduce nut loosening and joint failure.

Website: https://www.hytorc.com/

Lectrodryer provides engineered and manufactured gas and liquid process solutions through knowledge and expertise of drying technology, purification, process control, and equipment through safety, operational improvement, and cost-reduction strategies. Lectrodryer partners with customers to add value to the power generation, refinery, chemical, government, heat-treating, and compressed-air markets.

Website: https://lectrodryer.com/

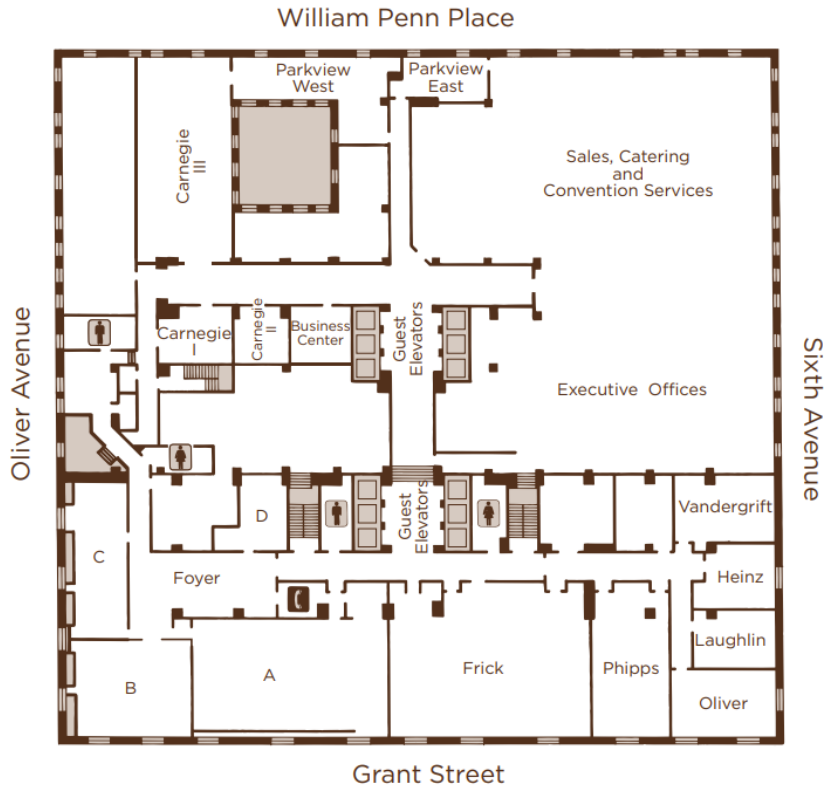
Siemens Energy is a global team of more than 91,000 dedicated employees. Together, we're responsible for meeting the growing energy demand while ensuring our climate is protected. We keep the best of our 150-year legacy and push the boundaries of what is possible. We strive for sustainability in our decarbonization journey, innovation centered on future technologies, and transformation among future focused offerings, portfolio and mindset. Together as one team across 90 countries, we are committed to making sustainable, reliable and affordable energy possible. This is how we shape the energy of tomorrow.

Website: https://www.siemens-energy.com/global/en.html

FLOORPLANS

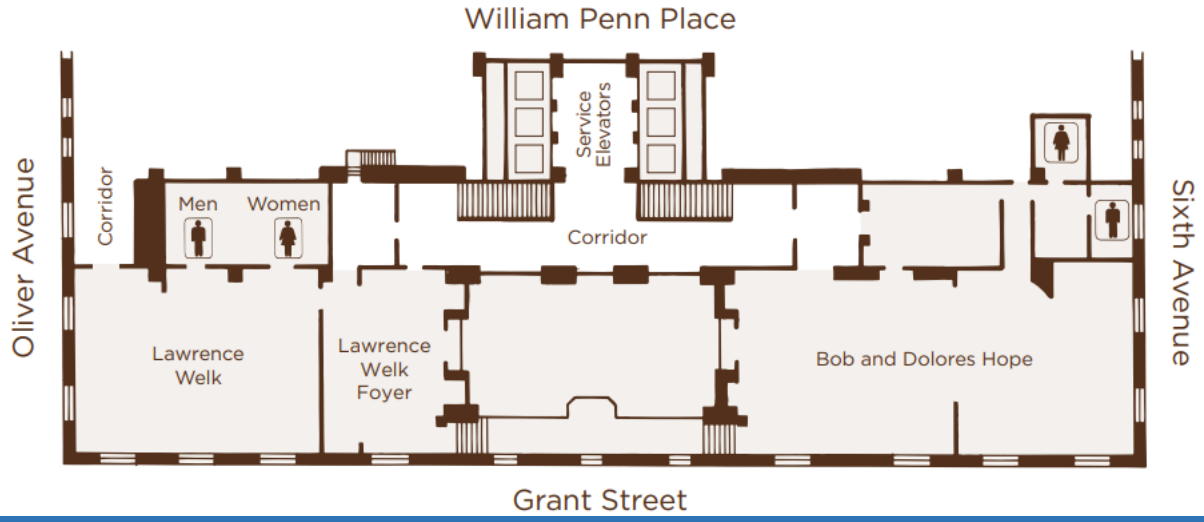
Conference Level

William Penn - Conference Level



Mezzanine Level

William Penn - Mezzanine Level



TECHNICAL PROGRAM

MONDAY, JULY 18, 2022

11:00AM–12:30PM

04-01 Advanced Tools for Cyber-Physical Systems and Digital Twins
Room: Oliver

Chair: **Paolo Pezzini - U.S. Department of Energy, Ames Lab**

Publications/Presentations

Integration of Dynamic Models and Virtual Reality for the Training of Steam Generator Operators
11:00AM–11:18AM
Technical Paper Publication: POWER2022-85548
Luca Mantelli - University of Genoa
Marco Ferrando - University of Genoa
Alberto Traverso - University of Genoa
Franca Giannini - Consiglio Nazionale delle Ricerche
Katia Lupinetti - Consiglio Nazionale delle Ricerche
Marina Monti - Consiglio Nazionale delle Ricerche
Sara Anastasi - Istituto nazionale Assicurazione Infortuni sul Lavoro
Giuseppe Augugliaro - Istituto Nazionale Assicurazione Infortuni sul Lavoro
Luigi Monica - Istituto Nazionale Assicurazione Infortuni sul Lavoro

Hyperparameter Optimization of Deep Learning Models for Compressor Air Leak Prediction in a Gas Turbine
11:18AM–11:36AM
Technical Paper Publication: POWER2022-85800
Diego Nogueras-Rivera - Universidad Ana G. Méndez
Lemuel Mojica-Vazquez - Universidad Ana G. Méndez
Harry Bonilla-Alvarado - Ames Laboratory
Kenneth Bryden - Ames Laboratory
David Tucker - National Energy Technology Laboratory
Luis Traverso-Avilés - Universidad Ana G. Méndez
Diego Aponte-Roa - Universidad Ana G. Méndez

Enhanced Capabilities Through Automated Machine Learning Characterization of Natural Gas Powered Assets
11:36AM–11:54AM
Technical Paper Publication: POWER2022-86449
Christopher Perullo - Turbine Logic
Steven Seachman - EPRI
David Noble - EPRI
Jamie Lim - Turbine Logic
Lea Boche - EPRI
Woosung Choi - EPRI

An Introduction to Cyber-Physical Modeling for an Sofc/icehybrid Cycle
Technical Presentation Only- POWER2022-86933
11:54AM-12:12PM

Harry Bonilla-Alvarado - Ames Laboratory Iowa State University
Paolo Pezzini - U.S. Dept of Energy, Ames Lab
David Tucker - National Energy Technology Laboratory
Kenneth "Mark" Bryden - Ames Laboratory Iowa State University

Evaluation of the Agent-Based Control Strategy Using a Cyber-Physical Fuel Cell/Gas Turbine Hybrid Facility
12:12PM–12:30PM
Technical Presentation Only: POWER2022-85789
Nana Zhou - National Energy Technology Laboratory
Paolo Pezzini - Ames Lab
Lawrence Shadle - National Energy Technology Laboratory
Kenneth Bryden - Ames Lab
David Tucker - National Energy Technology Laboratory

07-01 Hydrogen, Battery, Thermal Energy Storage
Room: Phipps

Chair: **Gopal Singh - Siemens Gamesa Renewable Energy/University of Central Florida**
Co-Chair: **Anthony Di Carlo - Merrimack College**

Publications/Presentations

A Dual-Layer Coating Using Nanoparticle-Polymer Hybrid Materials for Daytime Passive Radiative Cooling
11:00AM–11:18AM
Technical Paper Publication: POWER2022-82380
Kaixin Lin - City University of Hong Kong
Tong Zhu - City University of Hong Kong
Yihao Zhu - City University of Hong Kong
Tsz Chung Ho - City University of Hong Kong
Hau Him Lee - City University of Hong Kong
Luke Chao - City University of Hong Kong
Chi Yan TSO - City University of Hong Kong

Using Temperature Variations to Demonstrate Analogous Carnot Heat Engines for Salinity Gradient Energy via Capacitive Mixing
11:18AM–11:36AM
Technical Paper Publication: POWER2022-85430
Daniel Moreno - Missouri State University

Normal Electrolyte Flow Helps in Controlling Dendrite Growth in Zinc Metal Batteries
11:36AM–11:54AM
Technical Paper Publication: POWER2022-85501
Mihir Parekh - University of South Carolina
Christopher Rahn - Pennsylvania State University

Design Considerations and Analysis of Purification Challenges in Green Hydrogen Systems
11:54AM–12:12PM
Technical Presentation Only: POWER2022-98083
Clayton Tucker - Lectrodryer, LLC

Techno-Economic Analysis of Solar PV-Assisted Hydroponic System: A Case Study in Johannesburg, South Africa
12:12PM–12:30PM
Technical Paper Publication: POWER2022-86265-VIRTUAL

Paul Adedeji - University of Johannesburg
Obafemi Olatunji - University of Johannesburg
Nkosinathi Madushele - University of Johannesburg
Nickey Janse Van Rensburg - Process Energy and Environmental Technology Station

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15-01 Student Competition
Room: Carnegie 3

Chair: **Sarvenaz Sobhansarbandi - University of Missouri-Kansas City**

Publications/Presentations

A Lifetime Techno-Economic Analysis of a Residential Hybrid Solid Oxide Fuel Cell Water Heater
11:00AM–11:18AM
Technical Paper Publication: POWER2022-83711
Joseph Elio - Arizona State University
Brent Skabelund - Arizona State University
Ryan Milcarek - Arizona State University

An Analysis of Different Techniques for Cooling Direct Drive Generators
11:18AM–11:36AM
Technical Paper Publication: POWER2022-85123
Austin Hayes - University of Colorado Boulder
Gregory Whiting - University of Colorado Boulder

Switchgear for Industrial Applications and Auxiliaries Services: Technologies Comparison
11:36AM–11:54AM
Technical Paper Publication: POWER2022-86605
Luis Ivan Ruiz Flores - ETAP/Operation Technology Inc.
Leoncio Esau Morales Ocampo - Instituto Tecnologico de Acapulco

Effect of Porous Walls and Nanofluids on the Thermo-Hydraulic Performance of Tapered Double-Layered Microchannel Heat Sink
11:54AM–12:12PM
Technical Paper Publication: POWER2022-86626-VIRTUAL
Avinash Kumar - Indian Institute of Technology Kharagpur
Chirodeep Bakli - Indian Institute of Technology Kharagpur

09-01 Steam Turbines, Generators, and Auxiliaries
Room: Vandergrift

Chair: **Michael Smiarowski - Siemens Energy, Inc.**

Publications/Presentations

Case Study: Steam Turbine Modernization – Successful Brownfield Exchange of a 55-Year-Old Steam Turbine-Generator at GRU's JR Kelly Unit 8 CCPP
11:00AM–11:30AM
Technical Paper Publication: POWER2022-85284
Lonnie Little - Gainesville Regional Utilities
Chuck Heidt - Gainesville Regional Utilities
Mary Ann Bunn - Siemens Energy, Inc.

Hydrogen Cooled Generator Fast Degas Purge System Benefits and Real-World Results
11:30AM–12:00PM
Technical Paper Publication: POWER2022-86567
Clayton Tucker - Lectrodryer, LLC
Ted Warren - Lectrodryer, LLC

Partnering Approach on Providing Steam Turbine Modernizations on Other-OEM Equipment
12:00PM–12:30PM
Technical Presentation Only: POWER2022-94322
Michael Smiarowski - Siemens Energy, Inc.

2:00PM–3:30PM

01-01 Fuels/Combustion
Room: Oliver

Chair: **Ashwani Gupta - University of Maryland**

Publications/Presentations

A Modified F-Factor Approach for Real-Time Performance Monitoring of Fossil Fuel Power Plants
2:00PM–2:18PM
Technical Paper Publication: POWER2022-79166
Joseph Staller - Tennessee Tech University
Robert Craven - Tennessee Tech University
Stephen Idem - Tennessee Tech University
Sastry Munukutla - Shakti Consulting
Keith Kirkpatrick - McHale and Associates
Dudley Benton - McHale and Associates
Susan Eisenstadt - McHale and Associates
Karsten Kopperstad - McHale and Associates
Seth Leedy - McHale and Associates
Joseph McHale - McHale and Associates
Anthony Licata - Licata Energy & Environmental Consulting, Inc.
Dan Andrei - ASME

Internal Cathode Tubular Solid Oxide Fuel Cell Operating on Model Methane Combustion Exhaust
2:18PM–2:36PM
Technical Paper Publication: POWER2022-84995
Alexander Hartwell - Syracuse University
Jeongmin Ahn - Syracuse University

Advancements in Nitric Oxide Emission Control With a Perovskite Based Membrane via High Frequency Electric Potential Oscillations
2:36PM–2:54PM
Technical Paper Publication: POWER2022-85154
Aliza Willsey - Syracuse University
Thomas Welles - Syracuse University
Jeongmin Ahn - Syracuse University
Kassidy Fields - Syracuse University

Performance and Emission Characteristics of a Marine Diesel Engine Fueled by Nano-Emulsified Biodiesel Produced From Waste Vegetable Oil
2:54PM-3:12PM
Technical Paper Publication: POWER2022-86270

Oyetola Ogunkunle - University of Johannesburg
Nsizwazonke Nkosi - University of Johannesburg
Opeyeolu Laseinde - University of Johannesburg

08-01 Heat Exchangers & Cooling Technology I
Room: Carnegie 3

Chair: **Andrew Rister - Duke Energy**
Publications/Presentations

Cooling System Evaluation of 15 Kwe Class Proton Exchange Membrane Fuel Cell for Power Source of Aerial Vehicle
2:00PM–2:18PM
Technical Paper Publication: POWER2022-85779
Hyeyoung Son - Chungnam National University
Younghyeon Kim - Chungnam National University
Sangseok Yu - Chungnam National University

Investigation of Cascade Cooling System for Dynamic Operation of Proton Exchange Membrane Fuel Cell
2:18PM–2:36PM
Technical Paper Publication: POWER2022-85786
Sangseok Yu - Chungnam National University
Jongbin Woo - Chungnam National University
Younghyeon Kim - Chungnam National University

Dry Air Humidification With Reaction Water of Proton Exchange Membrane Fuel Cell Under Dynamic Load Follow-Up
2:36PM–2:54PM
Technical Paper Publication: POWER2022-85795
Chanhee Lee - Chungnam National University
Younghyeon Kim - Chungnam National University
Sangseok Yu - Chungnam National University

Catastrophic High Pressure Feedwater Heater Overpressure Event at Stuart Power Station
2:54PM–3:12PM
Technical Paper Publication: POWER2022-86318
Frank Michell - Power Industry Consulting LLC

Compression Method and Cooling Method Applying the Pitot Tube Effect
3:12PM–3:30PM
Technical Paper Publication: POWER2022-85514-VIRTUAL
Haruo Morishige - Kitamura Co., Ltd.

09-02 Steam Turbines, Generators, and Auxiliaries
Room: Vandergrift

Chair: **Steve Radke - Siemens**

Publications/Presentations

Comparison of Isolation Technologies in Electrical Substations of Transmission Systems Operators (Tso's) for Auxiliary Services
2:00PM–2:30PM

Technical Presentation Only: POWER2022-86609
Luis Ivan Ruiz Flores - IEEE Morelos Section
Maria Esmeralda Plancarte Hernandez - Instituto Tecnológico de Acapulco

Increased Cyclic Operation of Generators Requires Heightened Awareness of Potential Effects on Various Components
2:30PM–3:00PM
Technical Presentation Only: POWER2022-86447
Russell Chetwynd - National Electric Coil

Diagnosis and Resolution of Functional Failure of Oil Operated Trip and Throttle Extraction Steam Valve Installed on HTC 15 Mw Steam Turbine
3:00PM–3:30PM
Technical Paper Publication: POWER2022-85345
Fahad Qureshi - Engro Polymer and Chemicals
Muhammad Saad - Engro Polymer and Chemicals
Faheem Ahmed - Engro Polymer and Chemicals

15-02 Student Competition
Room: Phipps

Chair: **Sarvenaz Sobhansarbandi - University of Missouri-Kansas City**

Publications/Presentations

Thermal Analysis of a Li-Ion Battery Coupled With Phase Change Material (Paraffin Wax RT-35) Filled With Copper Metal Foam: A Numerical Study
2:00PM–2:18PM
Technical Paper Publication: POWER2022-86263- Virtual
Vivek Saxena - Indian Institute of Technology Indore
Anuj Kumar - Indian Institute of Technology Indore
Akhalesh Sharma - Indian Institute of Technology Indore
Santosh K. Sahu - Indian Institute of Technology Indore
Shailesh I. Kundalwal - Indian Institute of Technology Indore

A Novel Computationally Efficient Numerical Model for Thermal Behavior Prediction of an Evacuated Tube Solar Collector Incorporated With Phase Change Materials: A Preliminary Analysis
2:18PM–2:36PM
Technical Paper Publication: POWER2022-86324
Arman Nokhosteen - University of Missouri-Kansas City
Sarvenaz Sobhansarbandi - University of Missouri-Kansas City

Study of the Behavior of Compressible and Incompressible Fluids in a Centrifugal Pump
2:36PM–2:54PM
Technical Presentation Only: POWER2022-86071
Mohammed El Khalil Bendadi - University Mustapha Stambouli Mascara

Thermodynamic Analysis and Optimization of Molten Salt Reactors Coupled With Desalination Solutions
2:54PM–3:12PM
Technical Paper Publication: POWER2022-86548
Isabella Alcorn - Texas A&M University
Ethan Louis - Texas A&M University
Robert Gonzales - Texas A&M University
Diego Aguilar - Texas A&M University
Mark Kimber - Texas A&M University

TUESDAY, JULY 19, 2022

8:30AM–9:30AM

10-01 Plant Performance & Operations
Room: Oliver

Chair: **Brian Wodka - RMF Engineering**

Publications/Presentations

Impact of Wind & Solar Generation on Electric Grid Reserve Margin
8:30AM–8:48AM
Technical Paper Publication: POWER2022-81980
Anthony Licata - Licata Energy & Environmental Consulting, Inc.
Angelos Kokkinos - Consultant
Frank Michell - Power Industry Consulting, LLC

Effect of Climate on Air Brayton Power Conversion Cycles for Microreactor Deployment
8:48AM–9:06AM
Technical Presentation Only: POWER2022-84604
Donna Guillen - Idaho National Laboratory
Michael McKellar - University of Idaho

The Research and Application of Innovative Deep Peak Shaving Technologies that Reach as Low as 20% of the Rated Load-PRE-RECORDED
9:06AM–9:24AM
Technical Paper Publication: POWER2022-85019
Li Li - Shanghai Shenergy Power Technology Co., Ltd.
Weizhong Feng - Shanghai Shenergy Power Technology Co., Ltd.

14-01 Nuclear Forum
Room: Vandergrift

Chair: **Jovica Riznic - Canadian Nuclear Safety Commission**

Publications/Presentations

CODAP Programme Insights Into Operating Experience in PHWR and LWR Piping Components
8:30AM–8:48AM
Technical Presentation Only: POWER2022-85009
Jovica Riznic - Canadian Nuclear Safety Commission

Energy and Exergy Analysis of Nuclear Power Plant
8:48AM–9:06AM
Technical Paper Publication: POWER2022-85619
Tim Benčin - University of Maribor
Jurij Avsec - University of Maribor
Urška Novosel - University of Maribor

Summary of Property-Related Parameters and Its Effect on the Simulated Thermo-Mechanical Behavior of U-10Mo Monolithic Fuel Plate
9:06AM–9:24AM
Technical Paper Publication: POWER2022-86012
Walid Mohamed - Argonne National Laboratory
Hakan Ozaltun - Idaho National Laboratory
Hee Seok Roh - Argonne National Laboratory

Effect of Operational Parameters and Their Effects on the Simulated Thermo-Mechanical Behavior of U-10Mo Monolithic Fuel Plate
9:24AM–9:42AM
Technical Paper Publication: POWER2022-86574
Hee Seok Roh - Argonne National Laboratory
Walid Mohamed - Argonne National Laboratory
Hakan Ozaltun - Idaho National Laboratory

Generalization of RELAP5-3D Molecular Diffusion Model to a Noncondensable Gas Primary Coolant
9:42AM–10:00AM
Technical Paper Publication: POWER2022-87071
George Mesina - Idaho National Laboratory
Robert P. Martin - BWX Technologies, Inc.

07-02 Wind Energy & Green Hydrogen
Room: Phipps

Chair: **Mustafa Erguvan - The University of Alabama**

Publications/Presentations

Wind Farm Clustering Methods for Power Forecasting
8:30AM–8:48AM
Technical Paper Publication: POWER2022-86666
Navid Goudarzi - Cleveland State University
Dorsa Ziaei - Independent Consultant

Study on Experimental Analysis and Effects of Structural Characteristics of Horizontal Axis Wind Turbine Blades Measuring Deflection and Frequency
8:48AM–9:06AM
Technical Paper Publication: POWER2022-81384
William Flores - Tarleton State University
Hoe-Gil Lee - Tarleton State University
Silverio Ruiz - Tarleton State University

Design Considerations and Analysis of Drying/Purifying Challenges in Green Hydrogen Systems
9:06AM–9:24AM
Technical Presentation Only: POWER2022-85594
Clayton Tucker - Lectrodryer, LLC
John Mcphearson - Lectrodryer, LLC
Blanca Ramirez - Lectrodryer, LLC

Introduction of Hydrogen in Industrial Remote Applications to Promote Variable Renewable Energy Sources
9:24AM–9:42AM
Technical Presentation Only: POWER2022-86397
Amartya Mukherjee - AFRY Switzerland Ltd.

Amanda Grannas - AFRY Switzerland Ltd.

15-03 Student Competition
Room: Carnegie 3

Chair: **Sarvenaz Sobhansarbandi - University of Missouri-Kansas City**

Publications/Presentations

Performance Evaluation of Oil Drilling Pumps
8:30AM–8:48AM
Technical Presentation Only: POWER2022-86072
Mohammed El Khalil Bendadi - University Mustapha Stambouli Masacara

Physics-Informed Deep Learning-Based Modeling of a Novel Elastohydrodynamic Seal for Supercritical CO_2 Turbomachinery
8:48AM–9:06AM
Technical Paper Publication: POWER2022-86597
Karthik Reddy Lyathakula - North Carolina State University
Sevki Cesmeci - Georgia Southern University
Matthew Demond - Georgia Southern University
Hanping Xu - Ultool, LLC
Jing Tang - Ultool, LLC

CFD Analysis of Additively Manufactured Conformal Cooling Channels for the Stator of a Direct Drive Generator
9:06AM–9:24AM
Technical Paper Publication: POWER2022-85155
Henry Vennard - Penn State
Austin Hayes - University of Colorado Boulder
Greg Whiting - University of Colorado Boulder

Optical Performance of a Novel Tube-Bundle Cavity Receiver for Solar Parabolic Trough Collectors
9:24AM–9:42AM
Technical Paper Publication: POWER2022-85631-VIRTUAL
Hossein Ebadi - Politecnico diTorino
Shahdad Kamfiroozi - Shiraz University
Antonio Cammi - Politecnico di Milano
Laura Savoldi - Politecnico di Torino

10:30 AM - 12:00 PM

02-01 Combustion Turbines and Combined Cycle and 03-01 Boilers/HRSG
Room: Carnegie 3

Chair: **Jeffrey Cobb - n/a**
Co-Chair: **Nick Gritz**

Chair: **Paul Weitzel - n/a**

Publications/Presentations

Flexible Use of Hydrogen Fueled Duct Burners in Combined Cycle Power Plant HRSG
10:30AM–10:48AM
Technical Paper Publication: POWER2022-81967
David Moelling - Tetra Engineering Group, Inc.
Early Femiana - Tetra Engineering Group Inc.
Darby Burns - Tetra Engineering Group, Inc.

Energy and Exergy Modelling of a Two Black Start Diesel Engines Integration in the Combined Cycle Gas Turbine
10:48AM–11:06AM
Technical Paper Publication: POWER2022-85203
Dušan Strušnik - Energetika Ljubljana
Marko Agrež - Energetika Ljubljana
Jurij Avsec - University of Maribor

Predicting and Preventing Risk of Vibration Induced Failures in Boilers & HRSGs
11:06AM–11:24AM
Technical Paper Publication: POWER2022-82445
Andreas Fabricius - Tetra Engineering
James Malloy - Tetra Engineering
Mark Taylor - Tetra Engineering
David Moelling - Tetra Engineering

Flow Accelerated Corrosion Failures in Nominally Low-Risk HRSG Tube Locations
11:24AM–11:42AM
Technical Paper Publication: POWER2022-82532
Andreas Fabricius - Tetra Engineering
James Malloy - Tetra Engineering
Mark Taylor - Tetra Engineering
Kasper Vestdam - R&R Consult
Jan Rusaas - R&R Consult

01-02 Fuels/Combustion
Room: Oliver

Chair: **Ashwani Gupta - University of Maryland**

Publications/Presentations

Co-Processing of Municipal Solid Wastes With Gypsum Wastes for Enhanced Product Recovery
10:30AM–10:48AM
Technical Paper Publication: POWER2022-85550
Kiran Raj Goud Burra - University of Maryland, College Park
Ashwani Gupta - University of Maryland, College Park

Study of a Non-Premixed Methane/Air Pilot Flame
10:48AM–11:06AM
Technical Paper Publication: POWER2022-86073
Mohammed El Khalil Bendadi - University Mustapha Stambouli Mascara

Characteristics of Swirl-Stabilized Distributed Combustion With Hydrogen-Enriched Methane
11:06AM–11:24AM
Technical Paper Publication: POWER2022-85402
Rishi Roy - University of Maryland

Ashwani Gupta - University of Maryland

07-03 Solar Energy
Room: Phipps

Chair: **Navid Goudarzi - CSU Ohio**
Co-Chair: **Mustafa Erguvan - The University of Alabama**

Publications/Presentations

Optimization of a Horizontal Single Axis Tracking Solar Array on Skewed Topography With Interrow Shading
10:30AM–10:48AM
Technical Paper Publication: POWER2022-78392
Andrew Davol - California Polytechnic State University, San Luis Obispo
Jacques Belanger - California Polytechnic State University, San Luis Obispo
Logan Smith - California Polytechnic State University, San Luis Obispo
Byungyu Kim - California Polytechnic State University, San Luis Obispo
Shea Charkowsky - California Polytechnic State University, San Luis Obispo

Design of Solar Powered Greywater Treatment Plant for Residential Applications
10:48AM–11:06AM
Technical Paper Publication: POWER2022-85201
Abdul Waris - Heriot Watt University
Fadi Ghaith - Heriot Watt University

Validation of Panel Temperature Correlation Models Using Data From a Utility Scale Solar Field
11:06AM–11:24AM
Technical Paper Publication: POWER2022-85261
Jacques Belanger - California Polytechnic State University
Andrew Davol - California Polytechnic State University
Katelynn Dinius - California Polytechnic State University
Ryan Dubois - California Polytechnic State University
Sophie Getty - California Polytechnic State University

Influence of Efficiency Advancement on Solar PV Module Choice and Energy Yield: A Case of a Residential Building in Lagos Nigeria
11:24AM–11:42AM
Technical Paper Publication: POWER2022-86437
Sogo Mayokun Abolarin - University of the Free State
Manasseh Babale Shitta - National Centre for Energy Efficiency and Conservation
Michael Chuks Aninyem - National Centre for Energy Efficiency and Conservation
Louis Lagrange - University of the Free State
Olatunji O. Obafemi - University of Johannesburg

11-01 Robotics & Drones
Room: Lawrence Welk

Chair: ***Frank Michell - Power Industry Consulting LLC***
Co-Chair: ***Navid Goudarzi - CSU Ohio***

Publications/Presentations

Unmanned Aerial Vehicle Solid Oxide Fuel Cell and Internal Combustion Engine Hybrid Powertrain: An Experimental and Simulation Centered Review
10:30AM–10:48AM
Technical Paper Publication: POWER2022-86357
Alexander Metcalf - Syracuse University
Thomas Welles - Syracuse University
Yuki Murakami - Tohoku University
Hisashi Nakamura - Tohoku University
Jeongmin Ahn - Syracuse University

2:00PM–3:30PM

12-01 Experimental and Computational Fluid Dynamics and Thermal Hydraulics and Data Analytics and 04-02 Advanced Tools for Cyber-Physical Systems and Digital Twins
Room: Oliver

Chair: **Donna Guillen - Idaho National Laboratory**
Co-Chair: **George Mesina - Idaho National Laboratory**

Publications/Presentations

Computational Fluid Dynamics Investigation of a Novel Bi-Directional Axial Flow Turbine for Wave Energy Conversion
2:00PM–2:18PM
Technical Paper Publication: POWER2022-86495
Mohammad Nasim Uddin - North Carolina A&T State University
Michael Atkinson - North Carolina A&T State University
Tapas Kumar Das - Queen's University Belfast
Simon Esau - North Carolina A&T State University

Heat Transfer Effect From Floating Cold Cap Motion in a Waste Glass Melter
2:18PM–2:36PM
Technical Paper Publication: POWER2022-85715
Donna Guillen - Idaho National Laboratory
Alexander Abboud - Idaho National Laboratory

Experimental Analysis of Innovative Seal Concept for Supercritical Power Cycles
2:36PM–2:54PM
Technical Presentation Only: POWER2022-85966
Hanping Xu - Ultool, LLC
Mohammad Fuad Hassan - Georgia Southern University
Sevki Cesmeci - Georgia Southern University
Jonah Henry - Georgia Southern University
Joshua Bunting - Georgia Southern University
James Bradley Willis - Georgia Southern University
Jing Tang - Ultool, LLC
Shuangbiao Liu - Ultool, LLC

A Proof-of-Concept Study of a Novel Elasto-Hydrodynamic Seal for Supercritical CO_2 Turbomachinery Applications
2:54PM–3:12PM
Technical Paper Publication: POWER2022-86607
Karthik Reddy Lyathakula - North Carolina State University
Sevki Cesmeci - Georgia Southern University
Mohammad Fuad Hassan - Georgia Southern University

Hanping Xu - Ultool, LLC
Jing Tang - Ultool, LLC

Rapid Load Response of a Solid Oxide Fuel Cell – Gas Turbine – Super Capacitor Hybrid System to Grid Demand
3:12PM–3:30PM
Technical Presentation Only: POWER2022-85027
Biao Zhang - U.S. Department of Energy National Energy Technology Laboratory
Cory Toribio - Grove City College
Francisco Matos Ortiz - Universidad Ana G. Méndez
Anudeep Medam - Idaho National Laboratory
Nor Farida Harun - U.S. Department of Energy National Energy Technology Laboratory
Rupen Panday - U.S. Department of Energy National Energy Technology Laboratory
Nana Zhou - U.S. Department of Energy National Energy Technology Laboratory
David Tucker - U.S. Department of Energy National Energy Technology Laboratory
Samuel Bayham - U.S. Department of Energy National Energy Technology Laboratory

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13-01 Water Management, Beneficial Reuse, & Environmental Issues
Room: Vandergrift

Chair: **Nicholas Siefert - U.S. Department of Energy, National Energy Technology Laboratory**

Publications/Presentations

Precise and Continuous Management of Chlorination/Dechlorination and Suspended Solids in Reverse Osmosis as Part of Power Generation Water Preparation Cycle
2:00PM–2:18PM
Technical Presentation Only: POWER2022-86264
Denton Slovacek - Hach Company
Vadim Malkov - Hach Company

Overview of the Water Management Research and Development Program at NETL
2:18PM–2:36PM
Technical Presentation Only: POWER2022-98121
Heather Hunter - National Energy Technology Laboratory

Treating and Co-Treating Fossil Energy Effluent Streams
2:36PM–2:54PM
Technical Presentation Only: POWER2022-94232
Nicholas Siefert - U.S. Department of Energy, National Energy Technology Laboratory

Treatment Technology Assessment of Landfill Leachate
2:54PM–3:12PM
Technical Presentation Only: POWER2022-93908
Chad Able - KeyLogic Systems
Eric Grol - National Energy Technology Laboratory
Danny Rellergert - Black & Veatch
Vincent Mazzoni - Black & Veatch

07-04 Thermal Energy Storage & Bio-Energy
Room: Carnegie 3

Chair: **Gopal Singh - Siemens Gamesa Renewable Energy, University of Central Florida**

Publications/Presentations

Modelling of an Energetically Self-Sufficient Wastewater Treatment Plant With Zero Emission
2:00PM–2:18PM
Technical Paper Publication: POWER2022-86440
Mustafa Erguvan - The University of Alabama
David MacPhee - Carleton University
Shahriar Amini - The University of Alabama

ADMS Technology: The Challenges of Modeling to Operating Electrical Systems With Digital Twins
2:18PM–2:36PM
Technical Paper Publication: POWER2022-86577
Luis Ivan Ruiz Flores - ETAP/Operation Technology Inc.

Analyzing the Operating Parameters of a Compression Ignition Diesel Engine Using Artificial Neural Network
2:36PM–2:54PM
Technical Paper Publication: POWER2022-86409
Jyotirmoy Kakati - Indian Institute of Technology Guwahati
Shubham M More - Indian Institute of Technology Guwahati
Sukhomay Pal - Indian Institute of Technology Guwahati
Ujjwal K. Saha - Indian Institute of Technology Guwahati

Baseline Evaluation of Methanogenic Potential for Mono and Codigested Wastewater Biosolids and Brewery Spent Yeast
2:54PM–3:12PM
Technical Paper Publication: POWER2022-86510
Zelda Zenzile Rasmeni - University of Johannesburg
Daniel Madyira - University of Johannesburg
Obafemi Olatunji - University of Johannesburg
Paul Adedeji - University of Johannesburg
Anthony Matheri - University of Johannesburg

Effect of Fin Shape on Constraint Melting of PCM in a Spherical Enclosure for Latent Heat Storage: A Numerical Study
3:12PM–3:30PM
Technical Paper Publication: POWER2022-86314
Akhalesh Sharma - Indian Institute of Technology Indore
Vivek Saxena - Indian Institute of Technology Indore
Santosh Kumar Sahu - Indian Institute of Technology Indore
