



Pioneering innovation for sustainable flight



Table of Contents

CLICK ANY CHAPTER BELOW TO SKIP TO THE SELECTED CONTENT.

CLICK ON ANY PAGE TO RETURN TO THE TABLE OF CONTENTS.

Sponsors & Exhibitors

4

Boston, Massachussetts

7

Grand Opening & Awards Information

13

Technical Sessions

22

Tutorials of Basics

36

Exhibit at Turbo
Expo 2023

44

Networking Events

51

Industry Participants

54

Registration Information

55

IGTI Structure

59

Student News

61

Schedule at a Glance

65

Sponsors

Thank you to our Sponsors and Exhibitors! _ Be sure to visit their booths during the event.

PLATINUM SPONSORS





Ansys

Women in Engineering

SILVER SPONSORS



Celebrating Women in Turbomachinery



BRONZE SPONSORS



Solar Turbines

A Caterpillar Company

. . . .

ADDITIONAL SPONSORS



Attendee Bags





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Lanyards



Early Career Engineer & Student Mixed

PIEZOCRYST ADVANCED SENSORICS GMBH

Attendee Bag Inserts



GAS COMPRESSION magazine







SUPPORTING ORGANIZATIONS





Exhibitors

Be sure to plan time to visit the exhibition _ during the Conference. Click here for details.

Aalberts Surface Technologies-Accurate Brazing

ADS CFD Inc.

Advanced Design Technology Ltd.

Aerodyn

AIKOKU ALPHA Corporation

ANSYS

APEX Turbine Testing Technologies

ASME Turbo Expo 2024, London

Cadence Design Systems, Inc.

Calspan Systems Corporation

Cambridge Flow Solutions Ltd

CEROBEAR GmbH

CFturbo Inc.

Combustion Science & Engineering

Concepts NREC

Cross Manufacturing

datatel Telemetry

DEWESoft LLC

e+a

Ergon Research

Flownex Simulation Environment

FOGALE Sensors

Fracture Analysis

Consultants, Inc.

Franke Industrie AG

GadCap Technical Solutions Ltd.

Gas Turbine Society of Japan

GasTurb GmbH

GE

Haynes International, Inc.

IfTA GmbH

IHI Bernex AG

IHI Hauzer Techno Coating B.V.

ILT Energia

ILT TECNOLOGIE

IPETRONIK Inc.

Kingsbury, Inc US

Kulite Semiconductor Products, Inc.

LG Tech-Link Global, LLC

m+p international, inc.

Mechanical Engineering Magazine

MIT Gas Turbine Laboratory

MMP Technology EU

MTU Aero Engines AG

National Aeronautics and Space Administration

Notre Dame Turbomachinery Laboratory

OROS

Parker Hannifin Corporation

PCA Engineers Limited

PCC Metals Group

Penn State University

Piezocryst Advanced Sensorics GmbH

Präwest Präzisionswerkstätten GmbH & Co. KG.

Precision Filters, Inc.

Scanivalve

Sensor Coating
Systems Limited

Sensorade

SoftInWay Inc.

Southwest Research Institute

TEES - Turbomachinery Laboratory

TEMA ENERGY srl

TNS Teknologi Ltd.

Torquemeters Ltd.

Turbine Services

Turbocam International

Turbostream Ltd

Tutco SureHeat

Jniversity of Stuttgart, ITSM

Vectoflow GmbH

Wärtislä

Waukesha Bearings Corporation US



BOSTON, MASSACHUSETTS

Boston: America's Walking City

ummer is a great time to explore
Boston. Affectionately known as
"America's Walking City," you can
stroll the city's sidewalks, wander its
abundance of green parks, or just
people-watch at one of the many outdoor cafés.

Discover Boston's vibrant culture while strolling historic streets through diverse neighborhoods. The unique personality of each neighborhood can be found in the cuisine of the restaurants and in the style of the shops, galleries, and open markets and above all, in its people.

CLICK TO LEARN MORE ABOUT THE CITY OF BOSTON'S HISTORICAL SITES & ACTIVITIES



BOSTON SUMMER HAPPENINGS



Summer Festivals



Food, Wine & Craft Beer Events



Performing Arts: Theater & Concerts



Sports & Recreation



Visitor Center & Digital Guidebooks



Labor Day Weekend Guide



Explore Boston Neighborhoods



Beyond Boston



Great Deals & Free Things to Do



GETTING AROUND BOSTON

It may be "America's Walking City," but Boston also features an extensive transportation system to help you navigate smoothly, from Harvard to the Harbor.

Boston's public transportation system is operated by the Massachusetts Bay Transportation Authority (MBTA), but locals know it simply as the "T". It offers subway, bus, trolley car and boat service to just about everywhere in the Greater Boston area and beyond. Subway stops are color coded - Red Line, Green Line, Blue Line, Orange Line or Silver Line.

Other options include the Commuter Rail, taxi, bus, and bicycles.

CLICK TO EXPLORE TRANSPORTATION OPTIONS



TIPPING

- Taxi drivers, bartenders and waiters:
 15-20% for standard service
- Hotel doormen and valet parkers: between \$2 and \$5
- Bellhops: \$2 per bag
- Chambermaids: \$2 per day which can be left on the pillow of your hotel room

CURRENCY

International travelers can exchange currency at several booths in Logan Airport upon arrival and:

Boston Currency Exchange

International Copley Place, Second Floor 100 Huntington Avenue; 170 Federal Street

Travelex Currency Exchange

745 Boylston Street

Currency exchange is also available at local banks.

FOOD & DRINK

Boston's ever-evolving food and drink scene makes dining out the perfect way to experience the cultural fabric of our great city. From hot pot, dumplings and noodles in the nation's third-largest Chinatown to soul-warming Italian plates in the North End, Boston's restaurant scene truly brings something to the table for everyone.

ELECTRICAL OUTLET

In the United States of America the power plugs and sockets are of type A and B. The standard voltage is 120V and the standard frequency is 60 Hz.



A visitor, or temporary, visa is required of all visitors seeking to enter the USA with the exception of nationals of Canada and countries that are part of the Visa Waiver Program.

The **Visa Waiver Program (VWP)** allows citizens of participating countries to travel to the United States without having to obtain a visa, for stays of no more than 90 days for the purposes of business, tourism, visiting or pleasure. Transiting or traveling through the United States to Canada or Mexico is generally permitted for VWP travelers. To enter the US citizens of VWP countries must still receive approval through the Electronic System for Travel Authorization (ESTA) prior to boarding any US bound flight.

CLICK TO LEARN ABOUT VWP

Currently, 37 countries participate in the **Visa Waiver Program**:

Andorra	Iceland	Portugal
Australia	Ireland	San Marino
Austria	Italy	Singapore
Belgium	Japan	Slovakia
Brunei	Latvia	Slovenia
Czech Republic	Liechtenstein	South Korea
Denmark	Lithuania	Spain
Estonia	Luxembourg	Sweden
Finland	Malta	Switzerland
France	Monaco	Taiwan
Germany	the Netherlands	United Kingdom

New Zealand

Norway

Greece

Hungary

HYNES PARKING

Within a three-block walk of the Hynes Convention Center are numerous parking garages totaling over 4,400 spaces. There is limited meter parking available around the Hynes and adjacent streets.

CLICK TO VIEW NEARBY GARAGES

WEATHER

Summer can be delightful with the ocean breezes helping keep the humid temps in control. Evening temperatures can be cool and may require a light sweater. And a pop-up thunderstorm is not uncommon, so you may want to include an umbrella in your bag. Summers average high temperatures in July are above 80 °F (26.7 °C) and overnight lows above 60 °F (15.5 °C).





RESTAURANTS

Boston's ever-evolving food and drink scene makes dining out the perfect way to experience the cultural fabric of our great city. From hot pot, dumplings and noodles in the nation's third-largest Chinatown to soul-warming Italian plates in the North End, Boston's restaurant scene truly brings something to the table for everyone.

LOCATION & VENUE

The ASME 2023 Turbo Expo Conference and Exhibition will be held at the Hynes Convention Center in Boston, at 900 Boylston St, Boston, MA 02115.

Conveniently located just 15 minutes from Logan International Airport, with direct shuttle access via the Back Bay Logan Express.

Connected to over 3,100 hotel rooms and two premier shopping destinations – all under one roof.

CLICK TO LEARN ABOUT THE VENUE

HOTEL INFORMATION

The Sheraton Boston Hotel 39 Dalton Street Boston, Massachusetts 02199 United States

Nestled in the affluent and historic Back Bay neighborhood and directly connected to the Prudential Center and the Hynes Convention Center, the hotel provides a modern backdrop for work and play. Experience iconic Boston attractions like nearby Fenway Park or stroll along Newbury Street, home to exceptional shopping and dining.

The ASME room block will be available until May 24, 2023. After this date rates are subject to increase.

You may reserve your room by clicking here or by calling 617-236-2000 and requesting a room in the ASME Turbo Expo room block.



Revolutionary innovations will fuel the future

Because we believe the world works better when it flies

With the steadfast determination and means to successfully demonstrate a hydrogen propulsion system, we're committed to helping create zero emissions in flight.

This unrelenting desire to make a difference has led GE Aerospace and our partners to work with one of the world's leading aircraft manufacturers on plans to flight test a direct combustion engine fueled by hydrogen. The journey to decarbonize flight is full speed ahead.

See what we're doing today for the benefit of us all tomorrow.



2023 CONFERENCE THEME

Collaborate, Innovate and Empower: Propulsion and Power for a Sustainable Future

he climate grand challenge calls for urgent action and high-impact solutions. The pathways addressing the 2050 sustainability goal cut across disciplines and geography and demand multi-disciplinary and diverse teams. The IGTI Turbo Expo Technical Conference and Exposition convenes world experts in a wide range of technical areas and thus offers a unique platform to actively address the challenges with respect to propulsion and power.

TUESDAY PLENARY

Gas Turbines for a Sustainable Future

WEDNESDAY PLENARY

Workforce Development and Diversity: The Engineer of the Future

KEYNOTE

Pathways to Net-Zero Carbon Emission

MONDAY, JUNE 26 10:30 AM - 12:00 PM / BALLROOM A,B,C

What leaps in innovation and technology are required to meet the net-zero goal by 2050? In this keynote session, industry leaders will examine solutions and pathways forward that strive to balance sustainability, reliability, and affordability.

The conversation will be driven by speakers from a variety of professional backgrounds who bring multiple perspectives to this complex challenge. Paul Eremenko, Co-Founder and CEO of Universal Hydrogen, is a leading aviation pioneer, having served as CTO of both Airbus and United Technologies Corp., leading both companies aggressively

toward electrification. Flavio Leo, Director, Aviation Planning and Strategy for the Massachusetts Port Authority, is responsible for near- and long-term aviation planning and policy development related to airport physical planning, airfield and airspace safety, and efficiency initiatives. And Anne E. White, Department Head of the Nuclear Science and Engineering Department at MIT, currently co-chairs the MIT Climate Nucleus, charged with managing and implementing MIT's new climate action plan. Additional participants will be announced soon.



TUESDAY PLENARY

Gas Turbines for a Sustainable Future

TUESDAY, JUNE 27, 10:30 AM - 12 PM BALLROOM A. B. C

How will the gas turbine industry respond to the challenge se forth by net-zero goals? This plenary panel will feature leading executives of several gas turbine manufacturers. Given the challenges and opportunities of sustainable aviation and power generation, they will discuss their company's efforts and envisioned technologies to achieve sustainability goals.

WEDNESDAY PLENARY

Workforce Development and Diversity: The Engineer of the Future

WEDNESDAY, JUNE 28, 10:30 AM - 12 PM BALLROOM A. B. C

Amid this technology push to meet the 2050 sustainability goals, how must the industry navigate workforce development in a dynamic labor market while also tackling the diversity, equity, and inclusion of that workforce? In this plenary panel, speakers will discuss the Engineer of the Future in light of this challenge.

CHILDCARE SERVICES

We are pleased to offer childcare reimbursement for attendees of Turbo Expo 2023.

For those who need childcare services, ASME will reimburse up to a total of \$250/per registered attendee for services incurred by a licensed service provider in Boston, Massachusetts.

This offering will be available from **June 26 - 30, 2023**, during the hours of days in which technical presentations are offered.

CLICK HERE TO LEARN HOW TO TAKE ADVANTAGE OF THIS BENEFIT

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TURBO EXPO 2023

Awards & Scholarships

ASME Turbo Expo Early Career Engineer Travel Award

The Turbo Expo Early Career Engineer Travel Award (TEECE) is intended for early career engineers working in industry.

is intended for early career engineers working in industry, in government or in academia to obtain travel funding to attend ASME Turbo Expo to present a paper which they have authored or co-authored. The purpose is to provide a way for more individuals to participate in the annual Turbo Expo.

The nominee must have obtained an academic degree (Bachelor, Master, PhD, or equivalent degrees) in

an engineering discipline related to turbomachinery within five years from the year of the Turbo Expo that the applicant wishes to attend. The paper or poster being presented can be research results from work completed either while pursuing an academic degree, or after leaving school and entering the job field. Post-doctoral researchers in academic institutions are eligible so long as they have been in post no longer than five years full time equivalent.

CONGRATULATIONS TO THE 2022 AWARD WINNERS:

Amit Kumar

Indian Institute of Technology Bombay

Bogdan Cernat

von Karman Institute for Fluid Dynamics

Brian Knisely

Carrier Corporation

Brian Connolly

Southwest Research Institute

Elissavet Boufidi

von Karman Institute for Fluid Dynamics

Eric DeShong

Pennsylvania State University

Francesco Crespi

University of Seville

Hui Tang

University of Bath

Ivan Monge-Concepcion

Honeywell Aerospace of Puerto Rico

Jeong-Won Kim

Georgia Institute of Technology

Loris Simonassi

von Karman Institute for Fluid Dynamics

Manas Madasseri

Payyappalli von Karman Institute for Fluid Dynamics

Owen Pryor

Southwest Research Institute

Penghao Duan

Univresity of Oxford

Richard Hollenbach III

Duke University

Shreyas Hegde

Pratt & Whitney

Spencer Sperling

Honeywell Aerospace

Stavros Vourus

Malardalen University

The 1/e

Thomas Kerr Southwest Research Institute

2023 WINNERS RECEIVE:

One Complimentary ASME Turbo Expo Technical Conference Registration

Up to \$1,000 toward approved travel expenses

Complimentary hotel accommodations (Sunday to Friday)

Click Here to Learn More



ASME IGTI Student Scholarship Program

ASME IGTI has a long and proud history of providing scholarships to students who show promise for their future profession in the turbomachinery field. The aim is to attract young talent to the profession and reward their commitment,

favoring their upcoming enrollment and active participation. The scholarship is to be used for tuition, books, and other University expenses. The check will be made out to the University on the student's behalf.

CONGRATULATIONS TO THE 2022-2023 STUDENT SCHOLARSHIP WINNERS:

Troy Crooks

Purdue University-Main Campus

Douglas Dillion

Rose-Hulman Institute of Technology

Malcolm Doster Jr

North Carolina A & T State University

Gerald Fattah

George Washington University

George Gonzalez

University of Florida

Caedmon Gouldthorpe

University of California-Los Angeles

Noah Greeson

Oklahoma State University-Main Campus

William Gunn

Worcester Polytechnic Institute

Muhammad Ibraheem

Warsaw University of Technology

Zachary Karg

South Dakota School of Mines and Technology Joel Krakower

Drexel University

Goutam Mandal

Indian Institute of Technology Kharagpur

Adarsh P Nair

Federal Institute of Science and Technology

Samuel Nichols

University of Connecticut

Brody Oliver

Georgia Institute of Technology-Main Campus Peyton Pierson

Oklahoma State University-Main Campus

Dylan Salber

Minnesota State University-Mankato

Elisa Schmitt

Cedarville University

Britney Tran

University of California-Irvine

Malika Zghal

Cranfield University

ELIGIBILITY OF THE APPLICANTS

ASME Scholarships are awarded annually to eligible ASME Student Members. You must be a current ASME student member in good standing (for login to the ASME online scholarship application).

CLICK TO JOIN ASME

CLICK TO RENEW YOUR DUES

To be eligible, you must be a community college, college, or university student who is enrolled full-time in Mechanical Engineering (ME), Mechanical Engineering Technology (MET), or closely related engineering studies.

For your major to be considered closely related to a Mechanical Engineering major, you must be taking at least 25% of your credits each semester in courses from the Mechanical Engineering Department.

When you complete the online application, you will be considered for all ASME scholarships for which you qualify, not just the ASME IGTI scholarship.

Click Here to Learn More



Student Advisory Committee Travel Award (SACTA)

The Student Advisory Committee Travel Awards (SACTA) have been made available for students in 2023, with priority given to students who both participate in the conference and actively contribute to the growth of the SAC. The award will consist of reimbursement of approved expenses to attend and participate in ASME Turbo Expo up to \$2,000 USD. Applicants for these awards must be seeking a degree. Preference will

be given to students who have previously worked and/or have applied to work as a student liaison for Turbo-Expo. The applicant must agree to participate in the SAC Annual Meeting and be willing to help the SAC leadership team review student posters. Communication with the SAC leadership team may be requested prior to, during, and following Turbo Expo.



Click Here to Learn More

The ASME R. Tom Sawyer Award

The **R. Tom Sawyer Award** is bestowed on an individual who has made important contributions to advance the purpose of the Gas Turbine Industry and to the International Gas Turbine Institute over a substantial period of time. The contribution may be in any area of institute activity but must be marked by sustained forthright efforts. The award was established in 1972 to honor R. Tom Sawyer who, for over four decades, toiled zealously to advance gas turbine technology in all of its aspects and includes a US \$1000 honorarium and a plaque presented during ASME Turbo Expo.

The nomination must be complete and accompanied by three to five Letters of Recommendation from individuals who are well acquainted with the nominees' qualifications. Candidate nominations remain in effect for three years and are automatically carried over. The completed reference form from a minimum of 3 people will need to be sent in with the nomination package. It is up to the "Nominator" to submit all required information.

Nomination package must be submitted to the ASME Office by August 15, 2023 (hard deadline). Completed nomination packages should be sent to **persaudl@asme.org**.

Congratulations to the 2022 ASME R. Tom Sawyer Award winner

Timothy C. Lieuwen *Regents Professor,* Georgia
Institute of Technology



Nomination Deadline

August 15, 2023

CLICK HERE TO LEARN MORE



The ASME Gas Turbine Award

The Gas Turbine Award is given in recognition of an outstanding individual--or multiple--author contribution to the literature of combustion gas turbines or gas turbines thermally combined with nuclear or steam power plants. The paper may be devoted to design aspects or overall gas turbines or individual components and/or systems such as compressors, combustion systems, turbines, controls and accessories, bearings, regenerators, inlet air filters, silencers, etc. It may cover topics specifically related to gas turbines such as high temperature materials or fuel considerations, including

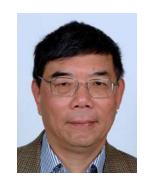
erosion and corrosion complications. It can also be devoted to application or operational aspects of gas turbines for aircraft propulsion and ground power units, or automotive, electric utility, gas pipeline pumping, locomotive, marine, oil field pumping, petrochemical, space power, steel, and similar uses. This award was established in 1963 and includes a \$1000 USD honorarium and a plaque presented during ASME Turbo Expo.

CLICK HERE TO LEARN MORE

Congratulations to the 2020 ASME Gas Turbine Award winners:

Li He Statutory Professor Computational Aerothermal Engineering, University of Oxford **Tom Hickling** *University of Oxford*

For their paper: Some Observations on the Computational Sensitivity of Rotating Cavity Flows





John P. Davis Award

Awarded to a paper that focuses on new or continuing gas turbine applications, identifies planning, installation, operating and/or maintenance problems and their solutions, and exemplifies candid exposure of real-world problems and solutions.

Congratulations to the 2022 ASME Gas Turbine Award winners

Dr. David John Rajendran and Dr. Vassilios Pachidis For their GT2020-14174 paper: Flow Distortion Into the Core Engine for an Installed Variable Pitch Fan in Reverse Thrust Mode





ASME Dedicated Service Award

The **ASME Dedicated Service Award** honors unusual dedicated voluntary service to the Society marked by outstanding performance, demonstrated effective leadership, prolonged and committed service, devotion, enthusiasm and faithfulness.

Congratulations to the 2022 Dedicated Service Award winner

David G. Bogard *Professor,* University of Texas at Austin





The ASME IGTI Aircraft Engine Technology Award

The Aircraft Engine Award recognizes sustained personal creative contributions to aircraft gas turbine engine technology. Eligible areas of accomplishment are aircraft engine design, and/or research and development performed in an industrial, academic or research laboratory environment in one or more of the following fields:

- Aircraft Engine Propulsion Heat Transfer
- Airframe-Propulsion Integration
- Combustion & Fuels
- Controls
- Diagnostics

- · Manufacturing Materials & Metallurgy
- Operability
- Structures & Dynamics
- Turbomachinery

The Aircraft Engine Technology Award will include an optional opportunity to deliver a lecture or present an invited technical paper on the work for which the award is being bestowed, at ASME Turbo Expo. The recipient of the award will very desirably, but not necessarily, be a member of The American Society of Mechanical Engineers. The award will be made to a single individual.

Details on application submission can be found at the link below.

Nominating letters should contain all information on the nominee's relevant qualifications. The Award Committee will not solicit or consider materials other than those described below. The selection committee will hold nominations active for a period of three years.

A minimum of two supporting letters from individuals, other than the nominator, must accompany the nominating letter. Supporting letters should reflect peer recognition of the nominee's breadth of experience with various aspects of industrial gas turbine technology.

Congratulations to the 2022 Aircraft **Engine Technology** Award winner

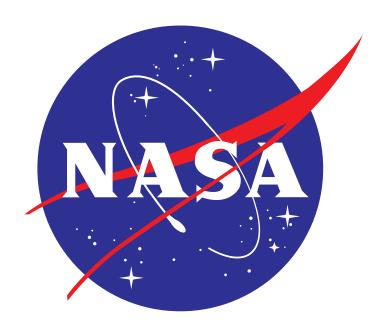
Dr. Luis San Andrés Mast-Childs Chair Professor of Mechanical Engineering, Texas A & M University



Nomination Deadline

October 15, 2023

CLICK HERE TO LEARN MORE





The ASME IGTI Industrial Gas Turbine Technology Award

The Industrial Gas Turbine Award recognizes sustained personal creative scientific or technological contributions unique to electric power or mechanical drive industrial gas turbine technology. Eligible areas of accomplishment are gas turbine design, application, operations/maintenance, and research/development/deployment, performed in an industrial, academic or research laboratory environment in one or more of the following fields:

- Combustion, Fuels, & Emissions Abatement
- Controls
- Diagnostics
- Electric Power Plant Integration
- Fluid Dynamics & Thermal Sciences

Operation, Maintenance,
 & Life Cycle Cost

- Manufacturing, Materials,
 & Metallurgy
- · Structures & Dynamics
- · Thermodynamic Cycles
- Turbomachinery

The award will include an optional opportunity to deliver a lecture or present an invited technical paper on the work for which the award is being bestowed, at ASME Turbo Expo. The recipient of the award will very desirably, but not necessarily, be a member of The American Society of Mechanical

Engineers. The award will be made to a single individual.

Details on application submission can be found at the link below.

Nominating letters should contain all information on the nominee's relevant qualifications. The Award Committee will not consider materials other than those described below. Nominations are held active for a period of three years.

A minimum of two supporting letters from individuals, other than the nominator, must accompany the nominating letter. Supporting letters should reflect peer recognition of the nominee's breadth of experience with various aspects of industrial gas turbine technology.

Congratulations to the 2022 Industrial Gas Turbine Technology Award winner

Richard Tuthill

Principal, RST Associates, LLC



Nomination Deadline

October 15, 2023

CLICK HERE TO LEARN MORE

ASME IGTI Dilip R. Ballal Early Career Award

Early Career Awards honor individuals who have outstanding accomplishments during the beginning of their careers. Historically, there has been no such award to recognize early career engineers working in the area of turbomachinery.

The award is for those starting a professional career, typically after a relevant terminal degree: BS, MS, or PhD. A criterion of seven-years-from-degree will be used to define

NOMINATION REQUIREMENTS

The nomination package should include the following:

- A paragraph (under 50 words) from nominator highlighting nominee's contributions
- · Nomination letter
- · Two supporting letters
- · Nominee's current resume

Nomination submission is available through the link below.

the nominee's eligibility. The nominee must receive the award prior to the end of the seventh year after the terminal degree.

The recipient of the Dilip Ballal Early Career Award will be presented with the award at Turbo Expo. The award consists of a plaque, funds to support the travel and registration costs to Turbo Expo, free ASME membership registration for five years, and a \$2000 USD honorarium.

Congratulations to the 2022 Dilip R. Ballal Early Career Award winner

Natalie R. Smith

Senior Research Engineer, Southwest Research Institute



Nomination Deadline

August 1, 2023

CLICK HERE TO LEARN MORE





Aircraft Engine

Sessions within this track address issues of interest across a broad spectrum of aircraft engine technology subjects.

Presenters will cover a range of topics including:

- Modeling, Simulation and Validation
- Whole Engine Performance and Novel Concepts
- · Operability
- Inlets (incl. Boundary Layer Ingestion), Nacelles, Nozzles and Mixers
- · Propellers and Open Rotors
- · Propulsion System Integration in Conventional and Hybrid-Electric Aircraft
- · Thermal Management Systems and Aero-Engine Oil Systems
- · Aero-Engine Controls and Diagnostics

Ceramics and Ceramic Composites

Ceramics are important materials for consideration in the extreme environments found in the gas turbine engine hot sections due to their high temperature mechanical and physical properties as well as lower density than metals. The advantages of utilizing ceramic hot section components include weight reduction, improved efficiency as well as enhanced power output and lower emissions. In order to realize the potential of rotating and static ceramic components, some unique technical challenges are being overcome by the engineering community.

Specific areas of research and development include:

- Design, development and processing of monolithic ceramic matrix composite (CMC) Materials
- Development, processing and characterization of Thermal and Environmental Barrier Coatings (TBCs/ EBCs)
- Modeling and validation of material performance
- Life Prediction
- NDE
- Test Methods and standards
- Design and fabrication of components
- Engine & laboratory testing of components

The technical and panel sessions sponsored by the ceramics committee cover breakthrough developments and demonstrations critical for the incorporation of ceramic hot section components for gas turbine engines.

- Ceramic Matrix Composites: Properties and Performance
- · Ceramic Matrix Composites: Modeling and Life Prediction

Coal, Biomass, and Alternative Fuels

Sessions focus on high-interest topics in the area of alternative fuel systems for gas turbines, including Hydrogen fuel systems, steam turbines and other turbomachinery technologies. Alternative and renewable fuels including gaseous and liquid hydrocarbon fuels, alcohols and ethers; as well as pure hydrogen, or high hydrogen content fuels. Alternative liquid hydrocarbon fuels derived from coal or biomass feedstocks or other technologies. Technical, tutorial, and panel sessions will cover the fundamental physical and chemical properties of alternate and renewable fuels, important to their use in gas-turbine engines and other power systems, as well as their application in different power systems. Sessions will be of interest to researchers/technologists/computational methods involved in the generation and utilization of non-conventional fuels in gas-turbine-based energy systems and for those wishing to start a new activity in this field.

- · Hydrogen Fuel delivery systems
- Hydrogen and hydrogen content fuels for Gas Turbine Applications
- Alternative Fuel Chemistry and Fundamentals
- Alternative Fuel Use in Gas-Turbine Engines

- · Basics of Hydrogen and Alternative Fuels
- Liquid Fuel Atomization and Combustion
- Computational Methods for Hydrogen and other Alternate Fuels
- Basics of Combustion Computational Fluid Dynamics



Combustion, Fuels & Emissions

Aero and Industrial Gas turbines with low specific fuel consumption and reduced CO2 emissions require high combustor outlet temperatures with a continued emphasis on reducing emissions, without sacrificing operability or durability. In addition, Combustion systems are increasingly expected to operate with synthetic gaseous fuels or alternative liquid fuels, including novel fuels such as hydrogen or ammonia. The Combustion, Fuels & Emissions sessions will highlight new technology and design approaches, using both experimental and computational techniques, employed to achieve improved combustor performance including ultra-low pollutant emissions and enhanced operability such as turndown and transient response. Broad trends include a continued focus on combustion dynamics for lean-staged combustion systems, significant innovation in the development of combustion system such as Dry Low NOx or novel rotary detonation, maturation of large eddy simulation analyses, as well as continued research of fundamental and applied topics in automation, mixing, ignition, autoignition, blowout and chemical kinetics.

Technical sessions include:

- Ignition & Auto ignition
- Atomization & Sprays
- · Fundamental Combustion
- Novel Combustion Concepts
- Flashback & Blowout
- Pollutant Emissions Formation & Control: Combustor Performance
- · Combustor Design & Development
- · Chemical Kinetics
- · Combustion Noise
- Pollutant Emissions: Modeling, Soot and Particulates

- Combustion Dynamics: Basic Mechanisms, Flame Response to Perturbations, Instability, Analysis, Model Development and Damping & Control
- Combustion Modeling: Combustor
 Simulations and Large Eddy Simulations
- High Hydrogen Combustion
- Dry Low-NOx Combustor Development
- · Micro Devices
- · Jet-in-crossflow & Swirling Flows
- Combustor Diagnostics

Controls, Diagnostics & Instrumentation

The Controls, Diagnostics & Instrumentation Committee will host technical, panel and tutorial sessions that will closely examine the global challenges associated with Gas Turbine Engine Technology. These will include the latest developments in gas turbine engine control, prognostics, diagnostics and health management, artificial intelligence, and instrumentation technology, and the impact these technologies have in enabling more efficient and reliable engines, lowering engine emissions, and reducing engine operating costs. More precisely, the exchange of information between experts from Government, Academia and Industry is promoted on the following topics:

- Control System Technology
- · Optimal and Intelligent Controls
- · Active Component Control
- Distributed Engine Control
- Engine Health Management
- Gas Path Performance Diagnostics
- Structural and Mechanical Component Health Management
- On-Board Engine Monitoring and Diagnostics
- Prognostics for Gas Turbine Engines
- Modeling for Controls and Diagnostic Applications
- Life Usage Monitoring and Life Extending Control Algorithms and Sensors
- Optical and Non-intrusive Measurement Techniques
- Flow, Temperature, Pressure and Acoustic Instrumentation

- Advanced Data Reduction Methods
- · Integrated Controls and Diagnostics
- · Novel Sensors and Sensor Technologies
- Development of Standard and High Temperature Test Rigs and Probes

Cycle Innovations

The Cycle Innovations Committee is dedicated to the advancement of technology and innovation, with a particular focus on the thermodynamic cycles of gas turbine—based plants for power generation and propulsion. Special attention is also devoted to energy storage technology and management aspects. The Committee traditionally attracts paper submissions from a wide range of disciplines and scientific areas. Some of the thematic areas the Committee currently encompasses are listed below:

- Low or no emissions thermal cycles
- H2 production and utilization
- Polygeneration cycles and process integration (power, heat, cooling, fuels, chemicals) for centralized and distributed power generation
- · Advanced steam and humid air cycles
- · (Semi)-Closed cycle gas turbine technology
- Novel propulsion systems for aircraft, rotorcraft and marine
- Innovative low and high temperature heat recovery cycles
- Renewable and bio-energy concepts and innovative cycles

- · Fuel cell driven cycles and hybrid systems
- Externally fired gas turbines and high temperature heat exchangers
- Externally fired gas turbines and high temperature heat exchangers
- Thermo-economic and environmental impact analysis
- Cycle simulation and analysis for performance and health assessment
- · Innovative control systems for power plants
- Optimization of traditional and innovative energy and propulsion systems

OBJECTIVES:

Authors and presenters are invited to participate in this event to expand international cooperation, understanding and promotion of efforts and disciplines in the area of Cycle Innovations. Dissemination of knowledge by presenting research results, new developments, and novel concepts in Cycle Innovations will serve as the foundation upon which the conference program of this area will be developed.

A variety of sessions are available for presentations as it allows flexibility to the authors. All sessions are quality driven.

Education

Sessions encompass gas turbine/ turbomachinery education both in the university and in industry. Specific teaching tools and techniques will be discussed, including web-based and large-scale remote education, along with industry opportunities for gas turbine engineers. Anyone interested in gas turbine/turbomachinery engineering education is welcome, from students to PhDs. Academics will be exposed to ideas and best practices being used at other institutions as well as innovative approaches for gas turbine/turbomachinery education. Industry will have an opportunity to interact with educators to discuss relevant topic areas and to express the expectations with regard to changing needs. Discussions here have the potential to influence engineering education for a positive impact on future engineers. The sessions provide an active and constructive dialogue about gas turbine/turbomachinery education among practitioners from the industry, students, educators and researchers.

Electric Power

The Electric Power Committee promotes the exchange of significant technical information about the application and operation of gas turbine power plant systems. This committee organizes panels and technical sessions that deal with the gas turbine as a major component of a power plant, its integration into the power plant and optimization of power plant components, as well as optimization of the overall plant. Paper sessions on these topics will be complemented by panel sessions to address current topics of the gas turbine industry. Presenters will include owner/operators, original equipment manufacturers and industry service providers.



The EPC sessions will include the following:

- The Pathway Forward: Future Gas Turbine Products & Technologies— OEM Perspective
- Voice of the Customer: User Experience with Gas Turbine Technology
- · Gas Turbine Developments

- · Combined Cycle Power Plants
- · Enabling Technologies
- Gas Turbine Industry Updates
- Tutorial: Managing Operational Risks

Energy Storage

The mission of the committee is to provide opportunities for knowledge dissemination and professional networking related to non-battery energy storage for industry, academia, and government. The focus of these activities is on turbomachinery-based energy storage systems. Technical and panel sessions and tutorials on the following topics are welcomed:

- · General Energy Storage
- Pumped Heat (Thermal) Energy Storage
- · Carnot/Brayton Batteries
- · Compressed Air Energy Storage
- · Liquid Air Energy Storage
- · Pumped Hydro Energy Storage
- Power plants including thermochemical energy storage in the form of synthetic fuels (energy vectors)
- Flywheel Energy Storage
- Hybrid Energy Storage combining different power generation and energy storage technologies (photovoltaics, gas/steam turbines, thermal energy storage...). Even though the focus of the committee is on non-battery energy storage, hybrid energy storage systems incorporating batteries are of interest for the committee.

The Energy Storage Committee provides an excellent forum for industry, academic and governmental institutions to discuss and exchange ideas within the general scope of energy storage.

Fans and Blowers

Improvements in fans and blowers are means to address the global energy challenge, with manufacturers increasingly focusing on improvement in fan efficiency under legislative pressure and as a part of their response to global climate change.

The academia-industry collaboration and the up-front use of Computational Fluid Dynamics (CFD) and Experimental Fluid Dynamics (EFD) are the key ingredients to facilitate the advancement from traditional empirical design methodologies. In response to these challenges, the ASME-IGTI Fans and Blowers Technical Committee consider all technical aspects associated with fans and blowers, with a special emphasis on:

- · Design and optimization
- CFD and Artificial Intelligence methods for unsteady aerodynamics
- Noise generation, prediction, innovative noise reduction design
- Experimental challenges in- and out-of-lab

- Structural mechanical aspects (vibration, fatigue and flutter)
- Operations and system effects and interactions
- · Maintenance, repair & life-time management
- Standards, compliance with legislation & regulations
- Smart industrial applications of fans and blowers
- Fan solutions for improved indoor air quality

Heat Transfer: Combustors

This track is jointly sponsored by the Heat Transfer and Combustion, Fuels & Emissions committees and includes all research activities in the area of combustor related heat transfer and cooling as well as topics related to combustor-turbine interactions. Papers describing research and technical advances in this area are invited to be submitted to this track.

Relevant topic areas include:

- Experimental, analytical, and numerical studies of heat transfer in combustors, including combustor liners, dome/splash plate, injector tip, and backside cooling of combustor liners
- Studies on new cooling designs for low-NOx combustors, liners, and dome/splash plate
- Combustor simulators to study the impact of hot combustor exit flow on hot gas path components

Heat Transfer: Film Cooling

Papers describing research and technical advances in application of film cooling in turbomachinery are invited to be submitted to this track.

Relevant topic areas include:

- Blade/Vane Leading Edge Film Cooling
- Blade/Vane Trailing Edge Film Cooling
- · Vane End-Wall Film Cooling
- · Blade Platform Film Cooling
- · Blade Tip Film Cooling

- Novel Film Cooling Designs
- Film Cooling Design Optimization
- · Unsteady Effects in Film Cooling
- Effusion Film Coolina
- · Deposition Effects on Film Cooling

Heat Transfer: General Interest / Additive Manufacturing Impacts on Heat Transfer

Papers describing research and technical advances in the area of heat transfer in turbines which do not fit into blades/vanes internal and film cooling applications are invited to be submitted to this track.

Relevant topic areas include:

- Gas-path heat transfer
- Vane end-wall and blade tip/platform heat transfer
- Probabilistic methods in heat transfer analysis
- Experimental methods for heat transfer
- Numerical analysis of heat transfer
- Design tool development and validation

- · Rotational effects on heat transfer
- · Additive manufacturing impacts on heat transfer
- Radiation heat transfer
- Multimode heat transfer
- · Heat exchangers and recuperators
- · Innovative concepts relating to heat transfer

Heat Transfer: Internal Air Systems

This track is jointly sponsored by the Heat Transfer and Turbomachinery committees and includes both fluid dynamics and heat transfer aspects of turbomachinery internal air systems and seals. Papers describing research and technical advances in this area are invited to be submitted to this track.

Relevant topic areas include:

- Actively controlled sealing systems
- Internal air & seal, experimental, analytical, and numerical studies of flow and heat transfer phenomena in rotating cavities, rotor/stator systems and seals
- Heat transfer in rotor support and oil systems
- Secondary air systems analysis involving component interactions and system performance
- Two-phase flow phenomena in internal air systems involving oil jet and oil film disintegration, oil migration in secondary air systems and air/oil interaction including heat transfer, oil fires, film flows, bearing chamber and gearbox flows.

Heat Transfer: Internal Cooling

Papers describing research and technical advances in internal cooling schemes for turbomachinery components are invited to be submitted to this track.

Relevant topic areas include:

- · Blade/vane internal cooling
- Internal cooling with impingement
- Internal cooling with heat transfer augmentation devices such as turbulators/pin-fins
- Internal cooling design optimization

- · Innovative internal cooling designs
- · Numerical studies of internal cooling
- · Validation studies in internal cooling
- · General internal cooling

Heat Transfer: Tutorials

Two heat transfer tutorials will be offered at Turbo Expo 2023. One will describe the techniques and intricacies of computing and measuring heat transfer coefficients in turbine relevant flows. Another tutorial will offer a review of advanced technology for internal cooling of turbine blades and vanes.

Industrial & Cogeneration

Representing gas turbine applications within the cogeneration and process industries, technical sessions in this track cover a wide range of topics on cogeneration/CHP (Combined Heat & power) systems, including but not limited to the following: thermoeconomic analysis, optimization and simulation methods, design, operation & maintenance aspect of Heat Recovery Steam Generators, operation & maintenance issues of cogeneration plants, gas turbine power augmentation technologies (inlet chilling, high pressure fogging, and wet compression or overspray, dry/humid air inject, steam injection, etc.), compressor fouling, inlet air filtration systems, compressor washing, gas turbine upgrades and modifications, environmental and regulatory issues, and lessons learned from field experiences.

Other applications such as non-gas turbine-based cogeneration/ CHP systems (steam turbine and reciprocating engine based systems, solar energy based systems, etc.), cogeneration and cold energy recovery in LNG plants, hybrid cogeneration systems (combined with fuel cells), and organic Rankine cycle based systems are also included.

Panel/Tutorial sessions cover topics on cogeneration technologies, compressor washing technologies, inlet air filtration systems, gas turbine power augmentation technologies, dynamic modeling of cogeneration/CHP systems, gas turbine combustion processes and emissions issues, fuel related issues, and impact of Shale energy market.

- Design and Evaluation Considerations of Waste Heat Recovery TechnologiesThermo-Economic Analysis of CHP/Cogeneration Systems
- Techno-Economic Analysis of CHP Systems
- Operational & Maintenance Aspects
- Gas Turbine Power Augmentation Technologies
- HRSG's Design & Operational Issues
- Inlet Air Filtration for Gas Turbines

- · Combustion & Emissions
- Gas Turbine Applications Involving Heavy Fuel Oils and Crude Oils
- Dynamic Modeling of CHP Systems
- · Condition monitoring and diagnostics for CHP Systems
- Integration of cogeneration systems with energy storage technologies, and Artificial intelligence for energy and economic optimization

Manufacturing Materials & Metallurgy

The field of materials and metallurgy associated with gas turbine manufacturing has traditionally been the source of numerous disruptive technologies such as the development of superalloys, precision single-crystal investment casting and



ceramic coatings. These in turn have allowed an incredibly accelerated pace of innovation. Next generation materials and processes will allow even higher efficiency and reliability as well as greater flexibility operational mode. A major goal is to balance these with lower emissions and lower life-cycle cost of turbomachinery. Materials with higher strength, lighter weight and improved durability are required for these applications. The continuing development in metallurgy and materials science has resulted in newer materials, better surface protecting methods, and more reliable component life. Development in manufacturing technologies, including better process planning/optimization, advance machining operations, additive manufacturing, newer coating and repair methods, helps to reduce the manufacturing cost and decrease overall operating cost of gas turbines. Condition assessment of parts after service and advanced repairs are required to further reduce life cycle cost and impact to the environment. The MMM committee is organized to disseminate the latest developments and research results in the areas of manufacturing, materials and metallurgy to gas and steam turbine designers, manufacturers, users, repair and service vendors, researchers and consultants. In addition to technical paper sessions, panel sessions are planned where highly experienced panel members will discuss their latest experiences and knowledge in manufacturing methods, repair/coating processes and component inspections. Tutorials and lectures will be given on gas turbine materials.

- · Additive Manufacturing
- Advanced Manufacturing Technologies
- Thermal Barrier Coatings
- Gas Turbine Component Degradation and Life Prediction

- Advances in Gas Turbine Materials
- · Advanced Repair Technologies
- Metallurgy for Non-Metallurgists
- Advanced Turbomachinery Manufacturing

Microturbines, Turbochargers & Small Turbomachines

- Microturbines & Small Turbomachines
- Alternate/Opportunity Fuels: Technical issues and economic viability (bio-fuels, landfill gas, etc.)
- Auxiliary systems (such as generators, power electronics and high speed alternators)
- Energy markets and the competitiveness of microturbines vs. recips in DG applications
- Heat exchangers (recuperators, regenerators, CHP) design and optimization (CFD, heat transfer, stress analysis) and associated materials and materials degradation
- Intelligent control/engine health monitoring/life evaluation
- Microturbine technologies for long life, fuel efficiency, high power density, wide operability and robust design
- Microturbines systems and concepts for Distributed Power
- Materials for microturbines and small turbomachines: materials issues including durability and high temperature capability (creep, oxidation, fatigue, etc.), and raw material cost (i.e., the need for lower cost materials)
- Microturbine and small turbomachines component design & optimization (compressors, turbines, rotordynamics, bearings, etc.)
- Turbochargers and Superchargers

- Aero, aerothermal, and aeroacoustical analysis of radial, axial, and mixed-flow compressors and turbines (effects of downscaling, heat transfer, map enhancement, surge, choke, etc.)
- Novel charging solutions for downsized and low-emission engines (regulated multi stage charging, turbo compound, electrically assisted charging, variable compressor and turbine geometries, exhaust gas recirculation, etc.)
- Interaction between turbocharger and SI
 / CI engines (Transient performance, e.g.
 ball/air/magnetic bearings,TiAl /ceramic
 turbine wheel, charging concepts, etc.)
- Optimization techniques for multidisciplinary design challenges (e.g. boost pressure vs. efficiency vs. map width vs. transience vs. mechanical constraints vs. packaging vs. etc.)
- Microturbines: Design and Testing of Microturbines
- Microturbines: Innovative Microturbine Design and Uses
- Microturbines: Innovative fuels and uses in microturbines. Recuperator materials
- Turbochargers: Heat transfer & Systems
- Turbochargers: Concepts & Performance
- Turbochargers: Turbines design, testing and modelling
- Turbochargers: Compressors
- Turbochargers & Small Turbomachinery:
 Bearing systems & NVH

Oil & Gas Applications

The Oil and Gas Industry is a large user of turbomachinery. The demand for oil and gas is consistently growing and changing market conditions require innovative solutions. Operation and optimization of turbomachinery in a variety of Oil & Gas applications is therefore of great interest. Moreover, potentially extreme operation environments require the consideration of innovative design and operational attributes. Sessions in the Oil & Gas Applications Committee address both theoretical and practical Oil & Gas industry perspectives. The technical sessions provide the latest information on gas turbines and compressors in pipeline and compression stations. Particular emphasis is given to design, operation and maintenance, management, dynamic behavior, diagnostics and vibration and noise, as well as to all engineering issues in Oil & Gas applications.

Wet gas compression and multi-phase pumping are also addressed, due to the increasing interest in many installations. The Oil & Gas Applications Committee brings industry experts together in panel and tutorial sessions jointly held by both academic educators and industry professionals. Both basics of Oil & Gas installations and off-design operation issues will be covered, aimed to ensure improved efficiency and safe and reliable operation. The latest information about environmental impact, product upgrade, risk assessment, standards and legislation of gas turbines and compressors in Oil & Gas applications is also provided.

- LNG Liquefaction Plants
- Wet Gas and Multiphase Compression
- Gas Turbine Degradation and Water Washing
- · Partical Behavior and Degradation
- Turbomachinery Performance Testing
- · Design Details
- Compressor Stations
- · Machinery Issues
- Oil and Gas Applications
- Surge Control and System Dynamics

- Hydrodynamic Torque Converters for Oil & Gas Compression and Pumping Applications: Basic Principles, Performance Characteristics and Applications
- · Natural Gas Pipelines: Equipment Technology
- Wet Gas Compression
- Compact Compression
- Subsea Compression
- Gas Turbine Upgrades and Uprates
- Turbomachinery Instrumentation
 Components, Practices, and Uncertainty

Steam Turbine

Turbo Expo 2023 includes a track dedicated to Steam Turbines. While many of the analyses, computational methods, and experimental techniques are common for steam turbines and gas turbines, there are some unique features on steam turbines that warrant special consideration. Separate, co-located, steam turbine sessions at Turbo Expo provide a natural way of sharing many of the cutting-edge technologies while giving the steam turbine community a dedicated forum for the unique technical challenges associated with wet steam, long last stage blades, industrial and co-generation steam turbines, the unique mechanical integrity challenges for steam and more.

Structures and Dynamics: Aerodynamics Excitation & Damping

Authors are invited to present and discuss the following topics:

- Aerodynamic Forcing in Axial Fan and Compressors
- Aeroelastic Stability in Axial Fans and Compressors
- Non-synchronous Vibrations
- Non-Synchronous Vibrations in Fans
- Methods for Aerodynamic Forcing and Damping Prediction
- Aerodynamic Forcing and Damping in Radial Turbomachinery

 Turbine Aerodynamic Forcing and Damping and Seal Aeroelastic Stability

Structures and Dynamics: Bearing & Seal Dynamics

The field of materials and metallurgy associated with gas turbine manufacturing has traditionally been the source of numerous disruptive technologies such as the development of superalloys, precision single-crystal investment casting and ceramic coatings. The type of bearings discussed in this track include but are not limited to gas bearings, tilting pad bearings, fluid film bearings, magnetic bearings as well as squeeze film bearings.

Structures and Dynamics: Emerging Methods in Design & Eng.

Authors and presenters are invited to share and promote efforts and methods in the area of Structures & Dynamics: Emerging Methods in Design & Engineering, also expanding on new design and analysis approaches for additive manufactured technology. Dissemination of knowledge by presenting research results, new developments, and novel concepts in Structures & Dynamics: Emerging Methods in Design & Engineering will serve as the foundation for the conference program on this area. A variety of sessions are available for presentations, as it allows flexibility to the authors.

Structures and Dynamics: Fatigue, Fracture & Life Prediction

Structures & Dynamics: Fatigue, Fracture & Life Prediction Committee creates a forum to discuss theoretical and empirical approaches to determine the lifetime and maintenance requirements of turbo machinery. This includes theoretical prediction approaches for damage mechanisms which govern component lifetime; observations on material or component behavior which relate to component lifetime; experimental methods to generate data to support these topics; empirical approaches based on inspection and evaluation of part condition and damage during service and at end of life. Cyclic, time dependent and pseudo-static damage mechanisms are covered as well as operational history and environments, and material behavior at these conditions. This includes Low and High Cycle Fatigue (LCF & HCF); the combination of cyclic and time dependent mechanisms, Thermo-Mechanical Fatigue (TMF); creep and stress rupture; fracture mechanics and processes relating to fatigue crack initiation and crack growth; any other damage mechanisms which affect component life.

Structures and Dynamics: Probabilistic Methods

Authors are invited to present and discuss various developments in the area of probabilistic analysis, post processing and process modelling.

Structures and Dynamics: Rotordynamics

Main topics of the Rotordynamics Track of the S&D Committee are related to:

- Dynamic Analysis and Stability
- Modeling and Experiments
- · Field Balancing and Case Studies
- · Active Components and Vibration Control
- Nonlinear Rotordynamics
- Rotordynamics of Micro-machinery
- · Rotordynamics of Industrial Fans
- Condition Monitoring and Malfunctions
- Case Studies of Rotating Machinery, and other subjects dealing with dynamic behavior of the rotors

Structures and Dynamics: Structural Mechanics & Vibration

Authors are invited to present and discuss on various developments with regard to structural mechanical and vibrational analysis, prediction and experimental validation.

Student Advisory

The Student Advisory Committee organizes events at Turbo Expo aimed to engage all degree-seeking individuals in the conference. The Student Advisory Committee (SAC) sponsors a Student Poster Competition, Student and Early Career Engineer Mixer and tutorial sessions each year to promote the sharing of technical knowledge and encourage meaningful networking opportunities for students and professionals alike.

Student Poster

The Student Advisory Committee is once again sponsoring a student poster session at ASME Turbo Expo. Student posters will be on display on the main exposition floor.



- 10 MWe-scale sCO₂ pilot plant
- Large-scale combustion facility with hydrogen and ammonia fuel capability
- Pumped thermal energy storage demonstration system
- Multi-MW drivetrains
- HPHT piping loops



Tim Allison tim.allison@swri.org 210-522-3561

Supercritical CO2

Supercritical CO2 based power cycles provide significant efficiency and cost of electricity benefits to waste heat, thermal solar, nuclear, ship-board propulsion and fossil fuel power generation applications. They also provide for separation, compression, transportation, and storage (geologic) of CO2 from fossil fuel power plants. The approach to geologic storage of CO2 benefits greatly from the existing technology and knowledge amassed around CO2 utilization and management in the oil & gas industry. While the end goals of the CO2 based power cycles and the CO2 storage applications are different, the properties of the working fluid, thermodynamics, technology and machinery used for these applications are very similar. The confluence of interests related to the use and management of supercritical CO2 has created an imperative to further the understanding of these applications. The Supercritical CO2 Power Cycle committee organizes sessions that focus on the dissemination of machinery and cycle related technologies of sCO2 power plant applications.

- Fundamentals of sCO2 Power Cycles
- sCO2 Heat Exchangers
- Turbomachinery for sCO2 Cycles
- sCO2 Cycle Analysis and Optimization
- sCO2 Combustion and Heat Transfer

- Materials for sCO2 Cycles
- sCO2 Cycle Testing
- sCO2 Cycle Modeling
- sCO2 Cycle Components

Turbomachinery: Axial Flow Fan & Compressor Aerodynamics

The field of materials and metallurgy associated with gas turbine manufacturing has traditionally been the source of numerous disruptive technologies such as the development of superalloys, precision single-crystal investment casting and ceramic coatings.

- · Compressor Design
- · Compressor Experiments
- Transonic Compressor Design
- Fan Design
- · Design Concepts
- · Test Rig & Facility Design
- Stall & Inlet Distortion
- End-Wall Flows & Passage Contouring

- Water Ingestion, Fogging & Pre-Cooling
- Transition & Roughness Effects
- Manufacturing & Deterioration Effects
- Tip-Clearance Flows
- Seal & Leakage Flows
- · Casing Treatment
- · Tandem Airfoils
- Flow Control

Turbomachinery: Axial Flow Turbine Aerodynamics

- Aerodynamic Performances and Design
- Aerodynamic Losses
- Aerodynamic Studies
- · Unsteady Flows and Transition

- · Tip Leakage Flows
- End-wall Profiling
- Low Pressure Turbine Aerodynamics

Turbomachinery: Deposition, Erosion, Fouling, and Icing

- Multi-phase (Water/Ice) Deposition in Gas Turbines
- Modeling Deposition in Turbine Cooling Passages
- Erosion in Turbines
- Deposition Modeling



Turbomachinery: Design Methods & CFD Modeling for Turbomachinery

- Compressor Design Methods & Applications
- Fan Design Methods & Applications
- Turbine Design Methods & Applications
- Radial Turbomachinery Design Methods & Applications
- Cavity, Bearings & Seal Design Methods & Applications
- Methods & Application for Hydrodynamics
- Component Interaction & Multi-Physics Coupling
- · Preliminary Design Methods

- LES & DNS Methods & Applications
- · Optimization Methods & Applications
- · Novel Methods for CFD
- · Novel Solver & Simulation Frameworks
- · Application & Methods for Unsteady Flow
- · Geometry Design & Meshing
- Flow Separation, Loss & Boundary Layer Interaction Methods

Turbomachinery: Ducts, Noise & Component Interactions

- · Compressor & Combustion Noise
- Fan & Engine Noise
- Gas Turbine Engine Intakes, Exhaust Diffusers, and Ejectors

Gas Turbine Engine Transition
 Ducts and Flow Interactions

Turbomachinery: Multidisciplinary Design Approaches, Optimization, and Uncertainty Quantification

- Parameterization Approaches
- Manufacturing Tolerances and Uncertainties
- Surrogate-Assisted Approaches, including Sampling and Data Mining
- Axial Compressors, Propellers and Fans
- · Turbine Design and Cooling

- · Preliminary Design Systems and Approaches
- · Adjoint Methods
- Multidisciplinary Optimization and Sensitivity Analysis (fluid, structure)
- · Sensitivity Analysis and Design for AM

Turbomachinery: Radial Turbomachinery Aerodynamics

- · Centrifugal Compressors
- · Radial & Mixed Flow Turbines

Turbomachinery: Turbomachinery General Interest

Papers will cover topics of interest to the Turbomachinery Design & Maintenance community which may not be covered by the Turbomachinery primary topic tracks.



Turbomachinery: Tutorials

The tutorials will be of interest for all engineers & researchers concerned with understanding and improving the design process, testing and in-service performance of land and flight-based turbomachinery.

Turbomachinery: Unsteady Flows in Turbomachinery

- Unsteady Flows in Compressors
- Unsteady Flows in Turbines
- · Stall & Surge

- Stall & Surge in Centrifugal Compressors
- Unsteady Flows in Centrifugal Compressors
- Analysis & Processing Techniques for Unsteady Flows

Wind Energy

Climate change, the rapid expansion of wind power, and the steady decrease in the cost of wind-generated electricity have made wind power an indispensable part of the global energy mix. Thus, the Wind Energy Technical Program will focus on innovations driving technological advances in the wind industry. The technical presentations cover aerodynamics, aeroelasticity, structures, condition monitoring of wind turbines, the interaction of wind turbines with other energy systems, wind farms, and floating offshore wind turbines. These topics are addressed for small and large machines and vertical and horizontal axis wind turbines. Special panel sessions highlight the industry's challenges, as well as research being undertaken in universities and research laboratories.

For experts and beginners, tutorial sessions and workshops will be presented to detail developments and tools employed in the rapidly growing wind industry.

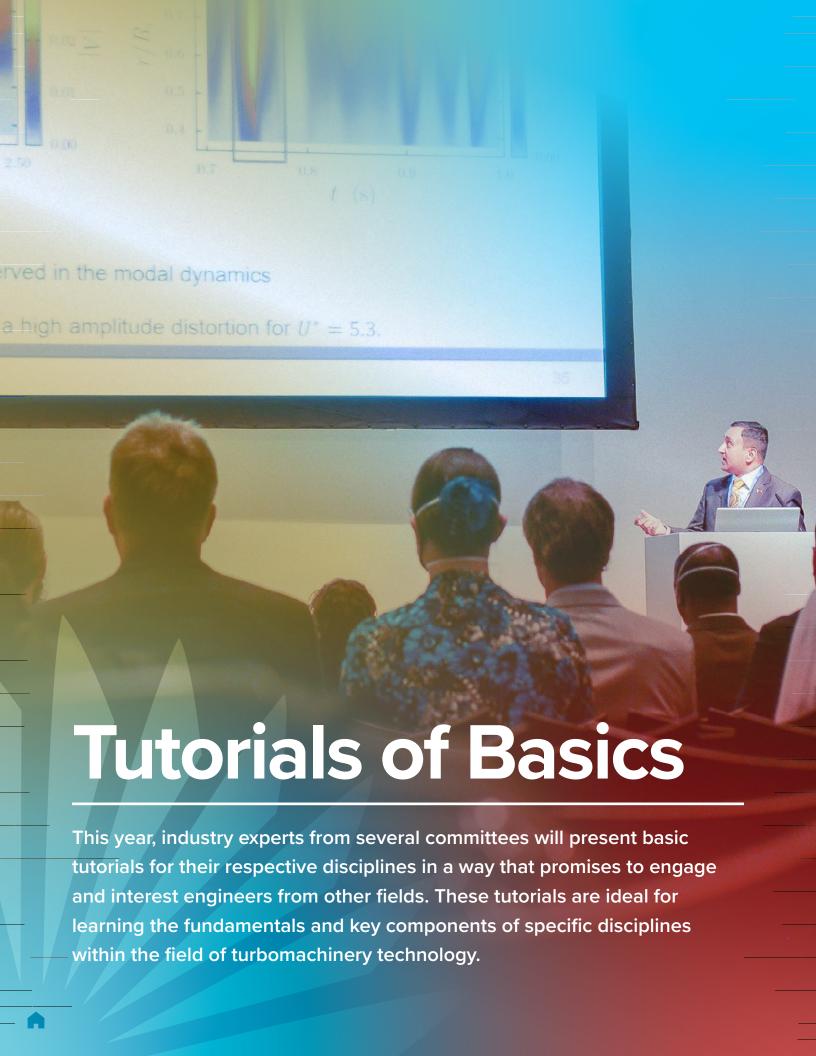
- · Measurements and Simulations
- · Structures and Aeroelastic Behavior
- · Design and Optimization
- Wind Energy Systems
- · Modelling of Wind Turbine Flows
- Vertical Axis Wind Turbines
- · Operation & Condition Monitoring
- Small Wind Turbines
- Noise
- Blade Aerodynamics
- Reliability and Risk Analysis
- Wind Farms
- · Offshore wind turbines

Ideal for cogeneration and H₂ mixes up to 100%

NovaLT™ gas turbines deliver best-in-class plant efficiency and reliability, which drives down your operating costs, plus proven hydrogen capability up to 100% for decarbonized operation. With power outputs from 5.5 MW to 16.9 MW (ISO) and high exhaust temperatures for steam/hot-air production, NovaLT turbines are the best choice for industrial cogeneration and renewables integration.







Ceramics and Ceramic Composites

107761 Environmental Barrier Coatings for Gas Turbine Applications

Michael Presby, NASA, United States

107774 Environmental Barrier Coating Processing and Challenges

Bryan Harder, NASA Glenn Research Center, United States

107833 A Review of the History of Sic/sic Ceramic Matrix Composite (Cmc) Development in the United States for Commercial Aircraft Engine Applications, With Emphasis on Events and Programs That Supported Increasing Trl to 5

Doug Kiser, NASA Glenn Research Center, United States

107852 Use of Acoustic Emission and Electrical Resistance to Assess Non-Oxide Cmc Damage Development And/or Defect Content

Gregory N. Morscher, University of Akron, United States

Coal, Biomass, Hydrogen & Alternative Fuels

104161 Hydrogen for Power and Energy Storage

Brain Connolly, Southwest Research Institute, United States

106602 Life Cycle Assessment Basics and Application to Optimize the Environmental Sustainability of Gas Turbines During New Product Development

Angela Serra, Baker Hughes, Italy

106713 Design of Fuel Cells-Based Power & Propulsion Systems for Different Applications: Automotive, Aircraft, Power Generation

Clement Joly, Softinway, Inc, United States

108283 Challenges of Combustion Computational Fluid Dynamics [Ccfd] for the Design and Analysis of Low Emissions Industrial Gas Turbine Engines

Pierre Gauthier, Siemens, Canada

Combustion, Fuels & Emissions

105391 Combustion Fundamentals

Mike Klassen, Combustion Science and Engineering, United States

105392 Tutorial of Basics: Combustion Dynamics

Jacqueline O'Connor, Pennsylvania state university, United States

107258 Introduction to Data Assimilation, With Application to Thermoacoustics

Matthew Juniper, Cambridge university, United Kingdom

Controls, Diagnostics & Instrumentation

103106 Optical Diagnostics for Turbomachinery Applications

Tamara Guimaraes Bucalo, Penn State, United States

Cycle Innovations

107791 Micro-Gas Turbine: Technological Advancements and Market Research

Antonio Escamilla Perejã³N, Universidad de Sevilla, Spain

107849 Hybrid Power and Storage Solution at Power Plant Scale

Alessandro Sorce, University of Genoa, Italy

107900 Closed Thermodynamic Cycle Analysis and Optimization

Owen Pryor, Southwest Research Institute, United States

Electric Power

106067 "Numbers to Live By" or the Physics Behind the Energy Transition

Alessandro Ramaglia, Ansaldo Energia, Italy

107655 Hydrogen Impacts 101: Are You Asking the Right Questions?

Christopher Perullo, Turbine Logic, United States

107817 Leveraging Operational Gas Turbine Data at Scale: Tips and Techniques

Steven Koskey, Turbine Logic, United States

Energy Storage

107749 Introduction to Asme Ptc 53: Performance Test Code for Mechanical and Thermal Energy Storage Systems

William Conlon, Pintail Power, United States

107873 Current and Foreseen Needs of the Grid: North/south America, Europe, Asia

David Sánchez Martínez, University of Seville, Spain

107886 Overview of Long-Duration Energy Storage Systems and Technologies: Part 1

Timothy Allison, Southwest Research Institute (SwRI), United States

107889 Overview of Long-Duration Energy Storage Systems and Technologies: Part 2

Timothy Allison, Southwest Research Institute (SwRI), United States

Fans and Blowers

107863 Normalization and Preprocessing of Cfd Data for Machine Learning Algorithms

Giovanni Delibra, Sapienza University of Rome, Italy

Heat Transfer

106798 Internal Cooling of Turbine Blades and Vanes: A Review and Application of Advanced Cooling Technology

Lesley Wright, Texas A&M University, United States

108007 Computing and Measuring the Heat Transfer Coefficient

Tom Shih, Purdue University, United States

Industrial & Cogeneration

107332 Combustion and Emissions Tutorial

Manfred Klein, Environment Canada, Canada

Manufacturing Materials & Metallurgy

107211 Ecological Assessment and Sustainable Productivity for Aircraft Engine Machining

Kilian Fricke, Fraunhofer Institute for Production Technology, Germany

107255 Component Degradation and Damage Mechanisms in Industrial Gas Turbines

William Day, PSM, United States

107438 Metallurgy for the Non-Metallurgist

Paul Lowden, Liburdi, Canada

Microturbines, Turbochargers & Small Turbomachines

107891 The Surge Greitzer Model

Grzegorz Liskiewicz, Łódź University of Technology, Poland

107670 Radial Turbines: Thermal Effects, Off-Design Operation, Pulsating Flow and Acoustics

Luis Miguel Garcia -Cuevas, CMT - Motores Termicos. Universitat Politecnica De Valencia, Spain

Oil & Gas Applications

100499 Oil and Gas Applications for Turbomachinery

Rainer Kurz, Solar Turbines, United States

106905 Decarbonization: Oil and Gas Compressor Applications for Hydrogen and Co2

Rainer Kurz, Solar Turbines, United States

108360 Gas Turbines for Lng Production Processes Tutorial

Manfred Klein, Environment Canada, Canada

Steam Turbine

107765 Introduction to Steam Turbine Performance Testing

Tao Guo, GE Power, United States

107845 Complexities in Creep-Fatigue Lifetime Assessment - Past, Current & Future Needs

Christian Kontermann, Darmstadt University, Germany

Structures and Dynamics: Bearing & Seal Dynamics

107924 A Review of Active Magnetic Bearing Technology: Past, Present, and Future

Rasish Khatri, Calnetix, United States

Structures and Dynamics: Rotordynamics

102560 How to Apply Api Standards to Turbomachinery Rotordynamics – an Introduction

Clement Joly, Softinway, Inc, United States

107882 Torsional Vibration: State-of-the-Art in Modeling, Measurement and Model-Based Monitoring for Power Generation and Mechanical Drive Applications

Mateusz Golebiowski, GE Gas Power, Switzerland

Supercritical CO,

107887 Heat Exchangers for Supercritical CO₂ Power Cycle Applications

Michael Marshall, Southwest Research Institute, United States

107903 Materials for Supercritical Carbon Dioxide Applications

Henry Saari, Carleton University, Canada

107908 Turbomachinery Design and Operation for Supercritical CO₂ Applications

Timothy Allison, Southwest Research Institute (SwRI), United States

108271 Everything You Always Wanted to Know About SCO₂ Compression but Were Afraid to Ask

Martina Ricci, Baker Hughes, Italy

Turbomachinery

100900 Turbomachinery Cfd With Openfoam

Jeffrey Defoe, University of Windsor, Canada

106714 Reduced Order Modelling Approach for Turbomachinery Secondary Flow Systems

Clement Joly, Softinway, Inc, United States

107799 Adjoint-Based Turbomachinery Shape Optimization: Basic Concepts, Challenges and Applications

Matteo Pini, Propulsion & Power, Delft University of Technology, Netherlands

Wind Energy

107881 Modern Vertical-Axis Wind Turbines: Design Optimization, System Modelling, Performance Analysis, and Future Trends

Taha Sherif, Faculty of Engineering - Menoufia University, Egypt

109113 Introduction to Offshore Wind Development

Ramy Imam, Ramy Imam, Egypt

Ansys

TAKE A LEAP OF CERTAINTY



VISIT US AT BOOTH 405

ANSYS.COM



EXHIBITION INFORMATION

Exhibit at Turbo Expo 2023

urbo Expo 2023 has value added activities to promote traffic to your booth! Daily lunches and afternoon open bars in the exhibit hall are included in the registration package for exhibit booth staff.

ASME Turbo Expo is known for its highquality exhibitions of leading companies in the turbomachinery industry. This is your chance to attract new clients, visit with current ones, learn more about the changing needs of the international turbomachinery industry - and ultimately, increase your sales.

SECURE YOUR BOOTH NOW

for prime space availability, and see how this event can generate bottom-line results for your marketing dollars

CLICK TO VIEW THE FLOOR PLAN
AND RESERVE YOUR BOOTH TODAY

BOOTH SPACE PRICING -

\$36.00 USD

per sq. ft.

For corner booth, add \$2.00 USD per sq. ft. Contact igtiexpo@asme.org for more information.

ALL EXHIBITORS RECEIVE:

- 1 technical conference badge per 100 square feet of exhibit space.
- 3 booth personnel badges per 100 square feet of exhibit space
 - Monday Welcome Reception, Monday Keynote and Opening Luncheon.
 - Tuesday, Wednesday, and Thursday exhibit hall lunch
- Complimentary entrance to the exhibit hall passes to share with customers and prospects

- Complimentary Lead Retrieval
- Significantly discounted Technical Conference registration for company employees
- 40-word company listing in the digital Conference Program
- Discounted advertising opportunities
- Product category and company description in the online exhibitor directory with press releases, logo, chat function, meeting setting and brochure.



Become a Featuri designed the spot ways to most of

Featuring a variety of sponsorship opportunities designed to maximize your company's visibility, the sponsorship program provides even more ways to stand out from the crowd and make the most of your budget.

ALL SPONSORS RECEIVE RECOGNITION:



On the official Show Web and Event App



In the Advance and Final Programs



In announcements made during the Show



Recognition on the Conference App



On signage posted during the Show



In the GGTN reaching over 135,000 ASME members



Sponsor ribbons for employees

Click Here for More Information on the Exhibition and Sponsorship Opportunities



Power Package Prices

PLATINUM CLUB

\$20,000.00

- √ Reduced exhibit space rate by 10%
- √ 5 complimentary 5-day Technical Conference badges
- √ Special discounted Technical Conference registration rate for employees
- √ Full-page, 4-color ad in Advance and Final Programs
- √ Attendee giveaway placed in attendee bags, provided by Sponsor
- √ Special sign for booth
- Company provided banner prominently displayed during the Show
- Complimentary exhibit booth cleaning during Show
- √ Pre-show email to registered attendees
- √ Ad in Conference App

GOLD CLUB

\$15,000.00

- √ Reduced exhibit space rate by 7%
- 4 complimentary 5-day Technical Conference badges
- Half-page, 4-color ad in Advance and Final Programs
- Attendee giveaway placed in attendee bags
- ✓ Special sign for booth
- Complimentary exhibit booth cleaning during Show
- \checkmark Pre-show emails to registered attendees

SILVER CLUB

\$10,000.00

- √ Reduced exhibit space rate by 5%
- 3 complimentary 5-day Technical Conference badges
- Quarter-page, 4-color ad in Advance and Final Programs
- ✓ Special sign for booth
- Complimentary exhibit booth cleaning during Show
- Pre-show emails to registered attendees

BRONZE CLUB

\$5,000.00

- √ Reduced exhibit space rate by 2%
- 2 complimentary 5-day Technical Conference badges
- Quarter-page, 4-color ad in Advance and Final Programs
- ✓ Special sign for booth
- Complimentary exhibit booth cleaning during Show
- ✓ Pre-show email to registered attendees



Additional Sponsorship Opportunities

ATTENDEE BAG INSERT

\$3,000 + Giveaway

Include company literature, promotional items or giveaways in the attendee registration packets. We will place up to two items in the tote bags for attendees as they register. Include invitations to visit your booth or announcements of product demonstrations or other giveaways. This is a great way to ensure you reach everyone in attendance at TURBO EXPO!

CONFERENCE BAG CHECK -

\$3,500 (Limit one sponsor)

Consider sponsoring the bag check during the Conference. Every attendee appreciates having a place to stow their luggage during their time at an event. Your company name and logo will be prominently displayed in the bag check area during the entire conference. Opportunity to place flyers at the space.

CONFERENCE AUDIO-VISUAL -

\$10,000 (Limit one sponsor)

For maximum visibility in over 300 sessions, your logo will be posted on the audio-visual screens in the session rooms prior to presentations. Don't miss this opportunity.

CONFERENCE COFFEE BREAK-

\$5,000 (Limit one sponsor)

For great conference visibility, sponsor the session coffee breaks. Select the day of your choice. You may place literature or giveaways on the break stations.

CONFERENCE WI-FI

\$15,000 (Limit one sponsor)

Wi-fi will be available for delegates in the conference area compliments of your company. This is a valuable sponsorship opportunity for high visibility to all registered attendees with a logoed landing page.

DELEGATE LUNCHES

\$10,000 (Limit one sponsor)

This sponsorship will allow for you to provide brochures and/or giveaways for the attendees on the lunch tables. Logo signage will be provided. Sponsor can have attendant at the entrance to hand out materials to attendees, if desired.



EXHIBIT HALL RECEPTION

\$3,500 (Limit two sponsors)

A refreshing way to get the visibility you want! Signage with your company name and logo will be included on the carts throughout the exhibit hall during the afternoon receptions.

RECHARGE STATION KIOSKS

\$10,000 (Limit one sponsor)

Allow attendees to power up while visiting the exhibit hall. Place your literature next to the stations that will have your logo.

STUDENT/EARLY CAREER ENGINEER MIXER

\$5,000 (Limit three sponsors)

Excellent opportunity to meet with rising engineers in the turbine industry. Sponsoring company may provide company literature at the event along with the company logo displayed on signage at the event. Perfect for organizations with open staff positions

NEW THIS YEAR A speed networking opportunity with students for sponsors

WATER STATIONS

\$6,500 (Limit one sponsor)

This sponsorship includes your company logo at all of the Show water stations (exhibit hall, conference area and Keynote). You are encouraged to showcase your "green" message by providing environmentally friendly cups with your company name or logo.

WELCOME RECEPTION

\$5,000 (Limit five sponsors)

Support the Welcome Reception, the largest social event during ASME Turbo Expo. Opportunity to have a promotional banner at the event.

CUSTOM SPONSORSHIPS

Click Here to Contact Us

Contact ASME today to discuss the sponsorship that works best for you. ASME will work with you to customize a sponsorship that allows you the best visibility and return on your investment.





RESOURCE'S FOR TODAY'S PROBLEMS

A membership packed with tools for engineers to succeed:



PUBLICATIONS

Stay up to date on industry trends via Mechanical Engineering magazine, ASME SmartBrief, journal discounts, and more.



NETWORKING

Build your network through conferences, technical divisions, sections, or student competitions and events.



CAREER RESOURCES

Search for engineering jobs, read articles tailored to engineers, or engage in a meaningful mentoring relationship.



LEARNING & EVENTS

Gain insight from industry leading experts, or immerse yourself in complimentary Learning & Development courses.



DISCOUNTS & OFFERS

Enjoy travel and merchandise discounts, insurance programs, and opportunities for scholarships and loans.



Join ASME today to gain a full suite of ASME member benefits for an entire year AND become eligible for exclusive member registration rates for next year's Turbo Expo.



SAVE 25% WITH CODE TURBO25

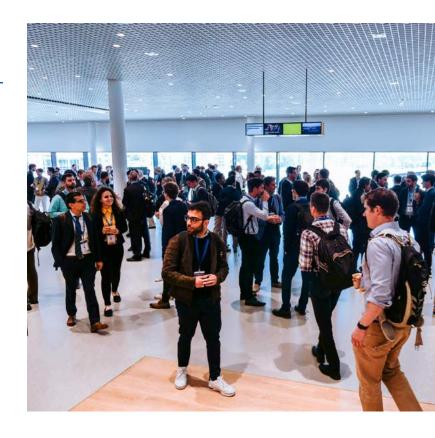


Welcome Reception and ASME/IGTI Awards

MONDAY, JUNE 26, 7:00 - 8:30 P.M.

All Conference registrants are invited for complimentary light refreshments during the Monday evening event. Join colleagues to celebrate IGTI award winners and meet thinkers from around the world who are shaping the future of turbomachinery. The prestigious IGTI awards that will be announced at the Welcome Reception include:

- R. Tom Sawyer Award
- Gas Turbine Award
- Dedicated
 Service Award
- Aircraft Engine Technology Award
- Industrial Gas Turbine Technology Award
- John P. Davis Award
- Dilip R. Ballal Early
 Career Engineer Award
- Scholar Award



Networking Lunches

MONDAY - THURSDAY

All Technical Conference delegate badges as well as exhibit booth staff badges include a daily lunch. Additional lunches for guests can be purchased onsite during registration. Take the time during lunch to walk the exhibit floor and visit the many exhibitors from around the world showcasing their products and services.



Expo Hall Networking Receptions

TUESDAY & WEDNESDAY, JUNE 27 & 28 5:00 - 6:30 P.M.

All registered delegates are invited to the Exhibit Hall for complimentary drinks and networking with industry colleagues, while viewing the exhibits of the industry's leading companies.







Early Career TURBOCAN Engineer & Student Networking Mixer

SUNDAY, JUNE 25, 7:30 - 9:30 P.M. HYNES CONVENTION CENTER

Looking to kickstart your networking for the conference week ahead? ASME IGTI and the SAC will host a fast-paced networking and social event to help students expand their network and connect them with experienced professionals from around the world.

Students will have the opportunity to participate in up to 3 roundtable discussions with distinguished Turbo Expo Technical Committee Chairs. They will be able to answer questions, foster new relationships, and build relationships, and learn how to develop long-term connections with IGTI. In addition, students can enjoy complimentary refreshments and mingle with their peers in a relaxed atmosphere.





cādence°



Celebrating Women in Turbomachinery Dinner

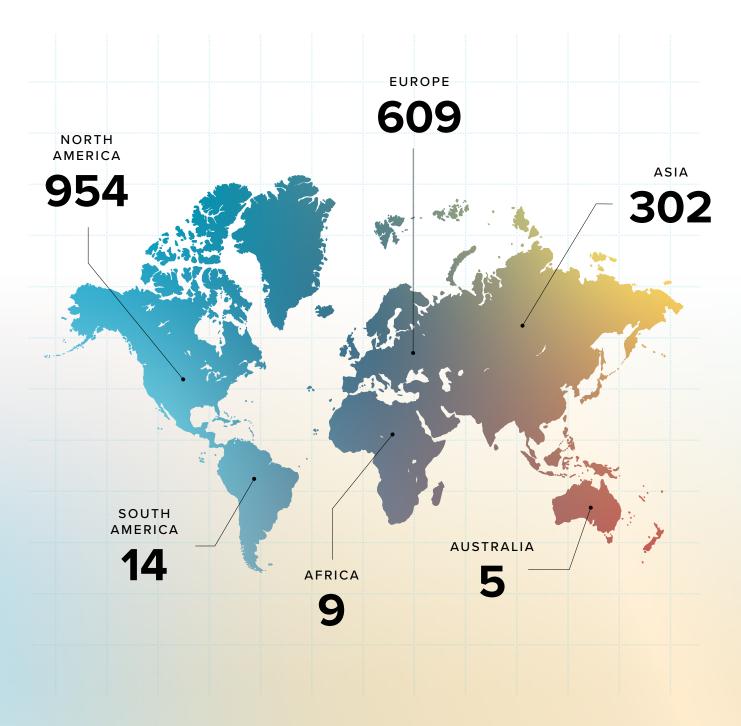
\$15 REGISTRATION FEE
WEDNESDAY, JUNE 28 | 7:45 - 10:00 P.M.

Cadence, GE and Pratt & Whitney are proud to support the Celebrating Women in Turbomachinery Dinner at this year's ASME Turbo Expo. The evening provides an opportunity to have discussions on career strategies, work/life balance issues, and professional leadership approaches for women in engineering. These strategies and more will be the topic of dinner speakers who will provide their work and life experiences. We hope you will join us!



Industry Participants

ASME Turbo Expo is proud to have Industry participants from all over the world. These individuals are active within the technical conference and participate as authors, panelists, reviewers, session organizers, session chairs, etc.







Registration Details

Turbo Expo will be held at the Haynes Convention Center, Boston, Massachusetts, USA June 26-30, 2023.

FULL CONFERENCE REGISTRATION INCLUDES:



Access to all conference sessions

including technical presentations, keynote sessions, panel discussions, tutorial of basics sessions, and award ceremonies



Admission to networking sessions

including the Welcome Reception, Student/Early Career Engineer Reception & Exhibit Hall receptions



Opportunity to register for the Celebrating Women in Turbomachinery Dinner



Access to the Student Poster Session



Online access to all Turbo Expo 2023 final accepted papers



Admittance into the Turbo Expo exhibition hall



Opportunity to attend facility tours



Access to daily lunches



Conference Registration Pricing

Registration Category

Author/Presenter

REGISTER BY

April 11, 2023

\$850.00

All authors must be registered by April 11, 2023 to submit their final paper.

PARICIPANT ONLY REGISTRATION (ASME MEMBERS)

	REGISTER BY	REGISTER AFTER
Registration Category	May 26, 2023	May 26, 2023
Member (5 Days)	\$850.00	\$1,000.00
Member (3 Days)	\$650.00	\$800.00
Lifetime (5 days)	\$375.00	\$525.00
Student (5 days)	\$375.00	\$525.00

PARICIPANT ONLY REGISTRATION (NON-ASME MEMBERS)

Registration Category	May 26, 2023	May 26, 2023
Non-Member (5 Days)	\$1,000.00	\$1,150.00
Non-Member (3 Days)	\$675.00	\$825.00
Student Non-Member (5 days)	\$425.00	\$575.00

PARTICIPANT ONLY - GROUPS AND SPONSORS

	REGISTER BY	REGISTER AFTER
Registration Category	May 26, 2023	May 26, 2023
Group 10+	\$665.00	\$815.00
Group 20+	\$625.00	\$775.00
Exhibiting Company Employee	\$665.00	\$815.00
Platinum Sponsor Employee	\$625.00	\$775.00

ADMITTANCE

Full Payment is required to attend Turbo Expo. Badges will not be given to anyone with an outstanding payment.

BADGE PICK-UP

Badges will not be mailed. All badges must be picked-up onsite. Photo identification is required for badge pick-up at the on-site registration desk. Full Payment is required to attend Turbo Expo. Badges will not be given to anyone with an outstanding payment.

LETTERS OF INVITATION

You will be able to request your Conference Letter of Invitation during the Registration process which will be sent as a PDF attachment via email. Once your fee is paid in full, your PDF letter will be sent. If you require a hard copy invitation letter to be mailed to you, you may request and pay for a hard copy invitation letter during the registration process.

PROFESSIONAL DEVELOPMENT HOURS (PDH)

A PDH Certificate will be emailed to you after the conference indicating the number of PDHs earned during the conference.

STUDENT REGISTRATION RATES

- Student registration rates are only available to undergraduate and graduate students who are enrolled full-time and have not yet received their Ph.D. Post-docs may not register as students.
- Persons who register at the Student Member or Student Non-Member rate will be required to submit current valid student identification to ASME. If the identification is not validated, the attendee will need to register in one of the non-student registration categories.

GROUP REGISTRATION RATES

Group registration is for groups of 10+ or 20+. Please contact igtiprogram@asme.org for assistance with group registration.
All group registrations must be paid in full by June 3.

SUBSTITUTIONS

Registrations may not be transferred or substituted at any time

CANCELLATION/REFUND POLICY

- Cancellations received on or before May 26, 2023 will receive a full refund, less a \$150 administrative fee.
- No refunds will be granted after May 26, 2023. NO EXCEPTIONS. No-shows will not be eligible for refunds.

PHOTOGRAPHS/VIDEO/AUDIO RECORDINGS

Participants are reminded that material presented at ASME conferences is under the copyright of ASME. As a result, participants are prohibited from recording, screen-capturing, or photographing presentations in their entirety with the intent to distribute them to others.

INSURANCE AND LIABILITY

Participation in Turbo Expo 2023 is at your own risk. Please make your own health and travel insurance arrangements.

AUTHOR REGISTRATION REQUIREMENTS

For each Technical Publication and Technical Presentation, a minimum of one author must be registered at the Full Conference Author rate.

CLICK TO REVIEW PUBLICATION REQUIREMENTS

COMPLIMENTARY MEMBERSHIP

Attendees who pay the Non-Member registration rate will be offered a complimentary 4-month ASME trial membership following the conference. ASME will contact eligible registrants and invite them to join ASME within 90 days after the conference. For more information, visit ASME Membership website.

Leadership Team

TURBO EXPO ORGANIZING COMMITTEE 2023



Conference Chair
Dr. Natalie Smith
Southwest Research Institute



Executive
Conference Chair
Zolti Spakovszky
MIT Gas Turbine Laboratory



Technical Program ChairDale Van Zante

NASA Glenn Research Center



Review Chair Tom Verstraete von Karman Institute, Ghent University



Vice Review Chair Marc Polanka Air Force Institute of Technology



Vice Review Chair Virginie Chenaux German Aerospace Center (DLR)



Vice Review Chair Andrew Nix West Virginia University



Tutorial Chair
Stephen Spence
Trinity College Dublin



TEOC RepJaroslaw Szwedowicz
Siemens Energy AG



LLC Chair Sara Campbell *GE Aerospace*

ASME GAS TURBINE TECHNOLOGY GROUP (GTTG)



Chair Sean Bradshaw *Pratt & Whitney*



IGTI EC Representative Akin Keskin *Rolls-Royce*



Member Nateri Madavan *NASA*



Member Caroline Marchmont *Ansaldo Energia*



MemberRichard Sandberg *University of Melbourne*



Member Susan Scofield *Siemens*



Member Charles Soothill *Sulzer*



MemberSina C. Stapelfeldt
Imperial College London



MemberPeter Stuttaford *Thomassen Energy*



Member Liping Wang GE Global Research



AdvisorZolti Spakovszky *MIT Gas Turbine Laboratory*



2023 IGTI EXECUTIVE COMMITTEE



Chair Akin Keskin *Rolls-Royce*



Vice Chair Karen Thole The Pennsylvania State University



Past Chair Kenneth Suder *NASA Glenn Research Center*



Turbo Expo Representative Jaroslaw Szwedowicz Siemens Energy AG



Member Vassilios Pachidis *Cranfield University*



MemberJacqueline O'Connor
The Pennsylvania
State University



MemberDouglas Hofer
Southwest Research Institute

#TurboExpo

Share with your friends and colleagues that you plan to attend the conference, author a technical paper, exhibit, or sponsor! Contact IGTI if you would like to use the Conference logo.



facebook.com/asmeigti



twitter.com/IGTI



instagram.com/asmeigti



linkedin.com/company/asmeinternational-gas-turbine-institute



linkedin.com/groups/4058160



Advanced Technology Through

Engineering Excellence

Where Engineering Careers Excel







ASME TURBO EXPO 2023

Student News

he Student Advisory Committee (SAC) is a group of students who work to foster student engagement in the IGTI community and improve the Turbo Expo conference every year. Towards this goal, the SAC organizes various sessions and events during the conference, provides opportunities for students to work behind the scenes with leaders in their technical area, and awards travel funds to eligible degree seeking individuals.

SAC SESSIONS AT TURBO EXPO

The sessions organized by the SAC during the technical conference are focused on professional development and are open to all conference attendees. In previous years, the SAC has curated panel sessions led by community leaders on Turbomachinery Careers and Networking, as well as tutorial sessions titled "Effective Technical Presentations", and "The Art of the Peer Review Process".

SAC COMMITTEE MEMBERS



Chair Dimitra Eirini Diamantidou *Mälardalen University, Sweden*



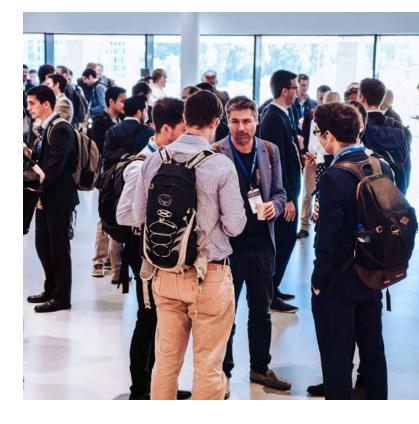
Vice Chair Mohammed Ibrahim Kittur University of Malaya, Kuala Lumpur



SecretaryDimitrios Bermperis *Mälardalen University, Sweden*



Past-Chair Mavroudis Kavvalos Mälardalen University, Sweden



Poster Sessions

The Student Advisory Committee is once again sponsoring a student poster session at ASME Turbo Expo. Student posters will be on display on the main exposition floor on Tuesday, June 27th from 12:30 – 1:30 p.m. Be sure to stop by the poster session to see the results of their work and encourage them to become active in the ASME IGTI community.



SUNDAY, JUNE 25, 7:30 - 9:30 P.M. HYNES CONVENTION CENTER

Looking to kickstart your networking for the conference week ahead? Join the ASME IGTI and SAC's fast-paced networking and student mixer event to connect with experienced professionals from around the world and expand your professional network.

At the event, students can participate in up to three roundtable discussions with distinguished ASME IGTI Technical Committee Chairs, where they can ask questions, build relationships, and learn how to develop long-term connections with IGTI. In addition, students can enjoy complimentary refreshments and mingle with their peers in a relaxed atmosphere.



Empowering the Next Generation: A Student-Focused Panel Discussion on Sustainable Turbomachinery

WEDNESDAY, JUNE 28, 4:00 - 5:30 P.M.

A student-focused panel session organized by the SAC and the Gas Turbine Technology Group (GTTG) will take place during ASME Turbo Expo 2023. Four panelists will be invited to discuss challenges, trends and key elements around sustainability. Special focus will be given to how students can contribute to the journey of becoming more sustainable and industry goals.





ASME IGTI Student Scholarship Program

The ASME Foundation and ASME Auxiliary distributed over \$586,000 in scholarships to over 160+ students for the 2022-23 academic year, and we want to maintain the trend for next September 2023-24 enrollments. We have over 60+ scholarships through a universal application, and students can be awarded more than one.

Scholarship recipients are selected based on scholastic ability, character, integrity, leadership, and potential contribution to the mechanical engineering profession.

ELIGIBILITY OF THE APPLICANTS

- An ASME student member to access the scholarship portal
- A full-time student enrolled at a university in an ABET accredited program; student in their last year of study, graduating can be part-time
- Enrolled at a community college/2-year technical program or in an associate degree program. Students can be part-time
- And have financial need

Click Here to Learn More and Apply

The International Gas Turbine
Institute scholarship of \$2,000
USD is awarded to 20 honorees.
Completing the application
one time will afford you the
opportunity to be considered
for all of the scholarships – so
do not delay and complete
the application today!

CLICK TO LEARN MORE





Schedule at a Glance

sunday June 25	MONDAY June 26	TUESDAY June 27	wednesday June 28	thursday June 29	FRIDAY June 30
	Registration 7:00 am - 5:30 pm	Registration 7:00 am - 6:30 pm	Registration 7:00 am - 6:30 pm	Registration 7:00 am - 5:30 pm	Registration 7:00 am - 3:00 pm
	Speaker Ready Room 7:00 am - 5:30 pm	Speaker Ready Room 7:00 am - 5:30 pm	Speaker Ready Room 7:00 am - 5:30 pm	Speaker Ready Room 7:00 am - 5:30 pm	Speaker Ready Room 7:00 am - 3:30 pm
	Open Meeting Room 7:00 am - 7:30 pm	Open Meeting Room 7:00 am - 7:30 pm	Open Meeting Room 7:00 am - 7:30 pm	Open Meeting Room 7:00 am - 7:30 pm	Open Meeting Room 7:00 am - 7:30 pm
Gas Turbine Technology Group Meeting	Conference Sessions 8:00 am - 10:00 am	Conference Sessions 8:00 am - 10:00 am	Conference Sessions 8:00 am - 10:00 am	Conference Sessions 8:00 am - 10:00 am	Conference Sessions 8:00 am - 10:00 am
1:00 pm - 5:00 pm	Networking Coffee Break 10:00 am - 10:30 am (Conference Hall)	Networking Coffee Break 10:00 am - 10:30 am (Conference Hall)	Networking Coffee Break 10:00 am - 10:30 am (Conference Hall)	Networking Coffee Break 10:00 am - 10:30 am (Exhibit Hall)	Networking Coffee Break 10:00 am - 10:30 am (Conference Hall)
	Opening Ceremony & Keynote 10:30 am - 12:00 pm	Plenary Session 10:30 am – 12:00 pm	Plenary Session 10:30 am – 12:00 pm	Conference Sessions 10:30 am - 12:00 pm	Conference Sessions 10:30 am – 12:00 pm
	Opening Lunch 12:00 pm – 1:30 pm	Expo Open 12:00 pm – 6:30 pm Networking Lunch 12:00 pm – 1:30 pm Poster Session 12:00 pm – 1:30 pm	Expo Open 12:00 pm – 6:30 pm Networking Lunch 12:00 pm – 1:30 pm	Expo Open 10:00 am – 2:30 pm Final Networking Lunch 12:00 pm – 1:30 pm Closing Ceremony 1:00 pm	Conference Close 12:00 pm
Registration 3:00 pm - 6:00 pm	Conference Sessions 1:30 pm – 3:30 pm	Conference Sessions 1:30 pm – 3:30 pm	Conference Sessions 1:30 pm – 3:30 pm	Conference Sessions 1:30 pm – 3:30 pm	IGTI Committee Meeting
Speaker Ready Room 3:00 pm - 6:00 pm	Networking Coffee Break 3:30 pm - 4:00 pm (Conference Hall)	Networking Coffee Break 3:30 pm - 4:00 pm (Exhibit Hall)	Networking Coffee Break 3:30 pm - 4:00 pm (Exhibit Hall)	Networking Coffee Break 3:30 pm - 4:00 pm (Conference Hall)	1:00 pm – 5:30 pm
Council of Chairs Meeting 6:00 pm - 7:30 pm	Conference Sessions 4:00 pm – 5:30 pm	Conference Sessions 4:00 pm – 5:30 pm	Conference Sessions 4:00 pm – 5:30 pm	Conference Sessions 4:00 pm – 5:30 pm	
	Scholar Lecture 5:45 pm - 7:00 pm	Expo Hall Networking Reception 5:00 pm - 6:30 pm	Expo Hall Networking Reception 5:00 pm - 6:30 pm		
Early Career & Student Mixer 7:30 pm - 9:30 pm		Technical Committee Meetings 6:00 pm - 7:30 pm	Technical Committee Meetings 6:00 pm - 7:30 pm	Technical Committee Meetings 6:00 pm - 7:30 pm	
	Welcome Reception & ASME/IGTI Awards 7:00 pm - 8:30 pm		Celebrating Women in Turbomachinery Event/ Dinner 7:45 pm - 10:00 pm		

REGISTRATION CO	ONFERENCE SESSIONS	COFFEE BREAKS	LUNCH & EXHIBIT
MEETINGS	PEAKER READY ROOM	NETWORKING	SPECIAL SESSIONS

