ASME 2022 TURBO EXPO

Final Program

June 13-17, 2022
Rotterdam, The Netherlands

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Mechanical Engineers® (ASME®)


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Table of Contents

Rotterdam Welcomes

All Turbo Expo Participants

After two years of virtual conferences, the 67th Turbo Expo welcomes participants from all over the world in Rotterdam. A five-day conference and a three-day exhibition will present the current state of knowledge, the technologies in development, and the products available on the road to zero-impact energy production, power generation, propulsion, and transportation. That's why this year's conference theme is "Road Mapping the Future of Propulsion & Power". On this topic on Monday, I am very pleased to invite everyone to the Keynote Session which will be moderated by Christer Björkqvist, the Executive Conference Chair and myself. The session will be opened by strategies and needs for the future given by Mr. Pedro Lopez Estebaranz, Chief Operating Officer at Uniper SE energy company, Mr. Michael Grootenboer, Senior Vice President of Engines Product at Air France Industries, KLM Engineering & Maintenance, Prof. Dr. Thomas Thiemann, Senior Vice President for Energy Transition Technologies, Siemens Energy AG, and Ms. Priscilla Chandrasekaran, Global LNG Technology Innovation Manager, Shell Global Solutions International.

The explicit knowledge of Turbo Expo will be published in more than 1,000 papers in the conference proceedings as well as in many student posters. In addition, the tacit knowledge will be actively shared with expected 1,800 attendees in various tutorials, dozens of panel sessions, and plenary sessions.

Digitalization and Additive Manufacturing are integral solutions needed in today's gas turbines as well as in the Predictive Maintenance. On Tuesday, well-experienced leaders representing various companies and universities will introduce all participants to the most important topics related to "Industrializing Terabytes for Propulsion & Power" of the first plenary session.

In order to facilitate access to knowledge related to energy transformation, a special day on Wednesday is arranged "Hydrogen and Energy Storage". In 90 minutes, well-recognized experts of the 2nd plenary session "Unlocking Hydrogen & Energy Storage for Propulsion & Power" will present the state of the art for hydrogen generation and transport, energy storage, and the use of hydrogen for power and propulsion. On the third day of the Turbo Expo 2022 all technical sessions, tutorials, and panel discussions will be related to transformation of propulsion and power.

All attendees of Turbo Expo 2022 are kindly invited to the Welcome Reception on Monday evening. The Women in Engineering Networking Event always is on Tuesday evening. Finally, students and young engineers shall participate in the mixer on Wednesday evening, which offers the best networking opportunity with established engineers and ASME representatives.

From Tuesday through Thursday, the Turbo Expo Exhibition awaits with more than 100 companies' booths offering conference attendees the latest solutions, products and services ready to use. Although each day of the conference is completely full, participants can take part in tech tours (please check the program and register as soon as possible due to limited spaces).

On behalf of ASME IGTI, I wish to thank our sponsors who have ensured the success of Turbo Expo 2022 through their generous support. I also wish to thank our Executive Conference Chair, Christer Björkqvist, our Local Liaison Committee Chair, Piero Colonna and his strong team, Technical Program Chair, Keun Ryu, this year's Review Chair, Natalie Smith and the Vice Review Chairs, Virginie Chenaux, Tom Verstraete, and Alberto Traverso; Tutorial Chair, Harald Schoenenborn and Gas Turbine Segment Liaison, Karen Thole.

An extraordinary thank to the keynote speakers and panelists, as well as all the volunteers who make Turbo Expo the premier turbomachinery technology conference in the world. The 67th Turbo Expo and Exhibition in Rotterdam is the result of a tremendous amount of work of more than 1000 authors, 2000 reviewers, hundreds of session organizers, liaisons, vanguard chairs, committee chairs, and many students working together in the ASME IGTI Student Advisory Committee (SAC). As always, the whole event is professionally and friendly support by the ASME team.

Thank you all for your participation in Turbo Expo 2022, which is sure to become a five-day platform for the exchange of knowledge, views and ideas for carbon-free propulsion and power. See you in Rotterdam.

Jaroslaw Szwedowicz
Conference Chair
Siemens Energy AG

Welcome to

Rotterdam and Europe

We hope that you will enjoy and be energized by Rotterdam, a young, dynamic and Innovative global city full of energy and "Make it Happen" mentality. Sparkling skyscrapers, an impressive port, trendy restaurants and food markets, renowned museums and awesome festivals that are best experienced by bike, boat, or on foot. We should all be inspired by the spirit of this city and bring this "Make it Happen" attitude into the turbomachinery community as we make the energy transition to carbon neutral society net zero power and propulsion systems have all the aspects of a great vision that we should take on board and be proud to be part of.

The market demand from the gas turbine user community is on the rise. It is supported by a strong and rising decarbonization commitment by policy makers, not only from a regulatory point of view by putting a prize on carbon, but also from a sustainable financial point of view that will be an essential element to fund this transition. The turbomachinery technology providers and R&D community should work to ensure the development of safe, secure and cost-efficient low carbon and net-zero power solutions that can secure a successful transition.

Gas turbines dispatchability, decarbonisation options, and power density, combined with a wide range of applications across many sectors, offer great potential to enable and support the present and future power & heat needs of a carbon-neutral society and beyond. The reliance of our technology by so many sectors also demonstrates the need and relevance of continuous support for R&D efforts as gas turbines is a destination technology in the quest for net zero power and propulsion systems.

However, to "Make it Happen" we need a mix of experienced experts and a massive amount of enthusiastic engineers with the inspiration to make it possible.

ASME 2022 Turbo Expo is the perfect platform that can accelerate this development through closer cooperation. Together we can "Make our vision Happen" in true Rotterdam spirit!

I am looking forward to meeting you in person in Rotterdam and wish you an enlightening, inspiring and enjoyable conference with lots of networking!

Christer Björkqvist
Executive Conference Chair,
ASME Turbo Expo 2022
ETN Global

Rotterdam Cube Houses

Erasmusbrug Bridge

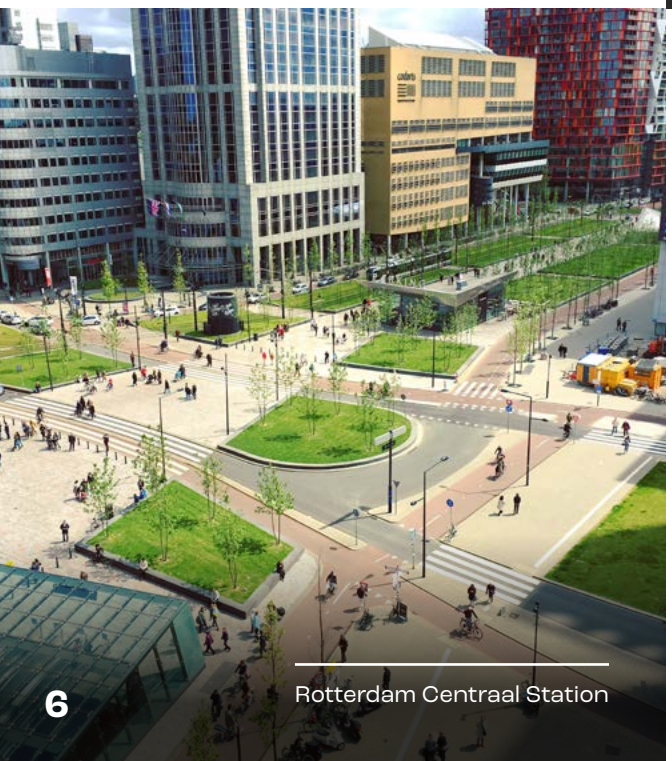
Rotterdam,
The Netherlands

Rotterdam is a city of many faces: a tough port city, a trendy nightlife city, a sophisticated shopping city, and a hip artistic city. Above all, Rotterdam is the architecture city of Holland that stimulates innovation. Its skyline is always changing. There are many things to do amid Rotterdam's skyscrapers. You can go on a shopping spree, enjoy some excellent food, and visit a range of museums and attractions in and around the city centre.

10 Must-See Sights and Activities in Rotterdam:

1. Depot Boijmans Van Beuningen
2. Rotterdam Centraal Station
3. Euromast
4. Markthal
5. S.S. Rotterdam
6. Historisch Delfshaven
7. Spido
8. Cube Houses
9. Erasmusbrug
10. Museumpark

Erasmusbrug Bridge



Rotterdam Centraal Station

Do Rotterdam like a Local

For local delicacies, visit the Rotterdamse Oogstmarkt, a delicious and sustainable farmers' market on Noordplein. Look for yourself in the 1664 mirrors of Depot Boijmans Van Beuningen, the very first public art depot in the world. Take a watertaxi to Marconistraat: the port industry can still be felt here, alongside the new Makers District M4H, which houses a lot of creatives (Studio Roosegaarde, Atelier Van Lieshout). Rent a bike to explore the area, take a look at the Floating Farm where futuristic farming takes place. Then visit the nearby Weelde, a creative free state where you can stop for a drink and a snack. The most beautiful park is Het Park at the Euromast, where lush greenery and iconic architecture meet right next to the city centre. When visiting Het Park, don't forget to stop by the hidden historic gardens of Schoonoord. **More local tips? Check www.dorotterdam.com.**

Transportation

Within Rotterdam you can travel well with public transport, bicycle, car and on foot. In the city with the largest port in Europe, water transport is of course also an option. Note that everyone travelling on public transport might be required to wear a non-medical face mask so be sure to have one as guidelines frequently change.

It is easy to travel by metro or tram in Rotterdam. The water taxi is a special means of transport, taking you at high speed to over 50 spots in Rotterdam and the surrounding area. The basic metro fare is around €3.50 and is valid for two hours. The Rotterdam Metro schedule runs from approximately 5:45 AM to 12:45 AM. The website for more information is www.ret.nl. (English version button found at bottom left corner of page.)

Rotterdam Ahoy is easily accessible by bus, metro & train. From bus and metro station Zuidplein, it is approximately a 5-minute walk to Ahoy. If you did not purchase a Welcome Card, you will need to purchase your metro ticket using the ticket machines at the stations. **Please note they only accept MasterCard or Visa.** Follow the instructions on the screen to purchase a 2 hour or 1 day ticket.

The Zudplein stop has a mall – Primark. This mall has a bank teller and a grocery store. To enter the Registration area, use the Ahoy Entrance: RTM Stage B.

Markthal

Historisch Delfshaven

Currency

The Netherlands, like most of Europe uses the euro as its form of currency. The euro symbol is €. Euros are divided into euro cents; each euro cent is one one-hundredth of a euro. There are seven denominations: €5, €10, €20, €50, €100, €200, and €500.

You can use a credit card in Rotterdam, but keep in mind not everywhere will accept cards. The American Express card is not widely accepted. Visa or MasterCard is more widely accepted. The metro ONLY accepts Visa or MasterCard. Ask before being seated at a restaurant if all you have is a credit card.

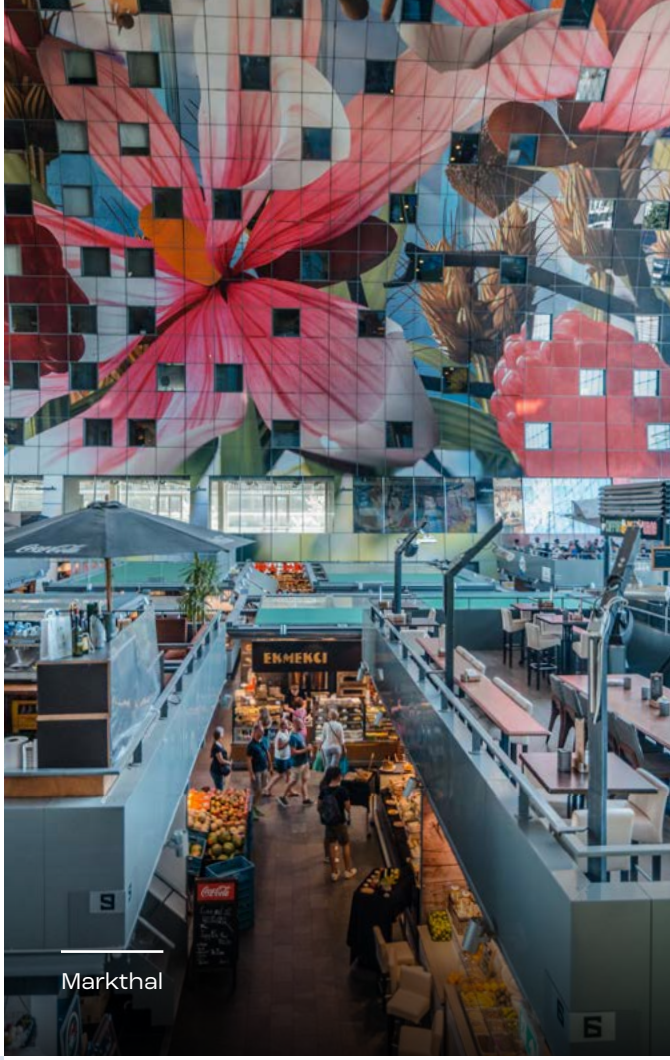
The Netherlands has a system that is built on Maestro and V- Pay. So, if a debit card is from VISA it is on the VISA network. This means, if a store doesn't accept credit cards, they won't accept your debit card from a credit card company either. If a store accepts credit cards, then you can use your VISA debit card.

Tipping

In Rotterdam, tipping is not compulsory. It is, however, usual to leave a tip in restaurants and bars if the customer is happy about the service. If you received good service or thoroughly enjoyed the food, it's customary to give a small tip — around 5-10% of the bill. If your service was just average, round up the bill or leave some change. It is not required, but one may also tip for taxi and hotel services.

Electrical Outlet

The Netherlands uses the Type F electrical plug. This plug has two round pins, spaced about 2 cm apart, and is the same as those used in many countries in Continental Europe. The standard voltage is 230-volts, but some hotels have special plugs for 110 or 120-volt shavers.



Markthal

S.S. Rotterdam

Rotterdam AHOY Parking

Rotterdam Ahoy has 2000 parking spaces. The price per car for a parking spot will normally cost you between €15.00 and €17,50. This varies per event. See more information here: ahoy.nl/en/accessibility.

Weather

In Rotterdam, the summers are comfortable and partly cloudy. Average temperature in June ranging between minimum 12.3°C (54.1°F) and maximum 19.7°C (67.5°F). Bring a light jacket for cool evenings and temperature variances in meeting rooms. June is the month with the most rainfall. Be sure to pack an umbrella.

Restaurants

Rotterdam is the only Dutch city to boast a real skyline. It is devoted to fashionable trends and modernity. Countless culinary developments follow each other in quick succession, so this is definitely the place for you if you are looking for trendy, flavourful eating establishments. It goes without saying that no day or evening is complete without good food and drink.

At Rotterdam Ahoy there are two restaurants where foodies can sit back and enjoy culinary delights before, during and/or after an event.

Location and Venue

The ASME 2022 Conference and Exhibition will be held at the Rotterdam Ahoy, Ahoyweg 10, 3084BA Rotterdam.

Zuidplein is the metro exit for the Ahoy. The Ahoy is then a less than 5-minute walk across the street. The Zudplein stop has a mall – Primark. This mall has a bank teller and a grocery store. To enter the Registration area, use the Ahoy Entrance: RTM Stage B.

Local Liaison Committee

Piero Colonna, Chair
Delft University of Technology

Paul Chün
KLM

Okko Ebens
Dutch Gas Turbine Association

Sikke Klein
Delft University of Technology

Jim Kok
University of Twente

Michèle Konkol
Thomassen

Geert Laagland
Vattenfall

Yolande Verbeek
Uniper

Thank you LLC for making us feel welcome to Rotterdam!

Rotterdam Ahoy

Euromast

Travel in Rotterdam

Big City on a Small Scale

Airport to Conference Centre

The Rotterdam Ahoy Convention Centre can be easily reached from both Rotterdam The Hague Airport as Schiphol International Airport.

Rotterdam The Hague Airport

- Bus & Metro (30 min)
- Taxi (30 min)

Schiphol International Airport

- Train & Metro (40 min)
- Taxi (55 min)

City Centre to Conference Centre

Rotterdam has a very compact city centre. Rotterdam Ahoy can be reached by a direct metro line (8 min). Most hotels are situated near the same metro line (D/E) between Rotterdam Ahoy and Rotterdam Central Station (11 min).

The metro in Rotterdam runs from 06:00 AM up to 01:00 AM.

Hotels Near Metro Line

BW Art Hotel
★ ★ ★ ★

ss Rotterdam
★ ★ ★ ★

nhow Rotterdam
★ ★ ★ ★

Room Mate Rotterdam
★ ★ ★ ★

Hotel new York
★ ★ ★ ★

Thon Hotel
★ ★ ★

Inntel Hotel Rotterdam
★ ★ ★ ★

Mainport by Inntel Hotel
★ ★ ★ ★ ★

City hub
BUDGET

Bilderberg Parkhotel
★ ★ ★ ★

Ibis Rotterdam City Centre
★ ★ ★

CitizenM
★ ★ ★ ★

Easyhotel Rotterdam
★ ★ ★

NH Atlanta
★ ★ ★ ★

The Student Hotel
BUDGET

Hilton Rotterdam
★ ★ ★ ★ ★

Hotel Rotterdam
★ ★ ★ ★

Holiday Inn Express
★ ★ ★

Rotterdam Marriott Hotel
★ ★ ★ ★ ★

Rotterdam Central Station

View a full detailed map at
event.asme.org/Events/media/library/resources/turbo/TE22-Rotterdam-Hotels.pdf

Sponsors

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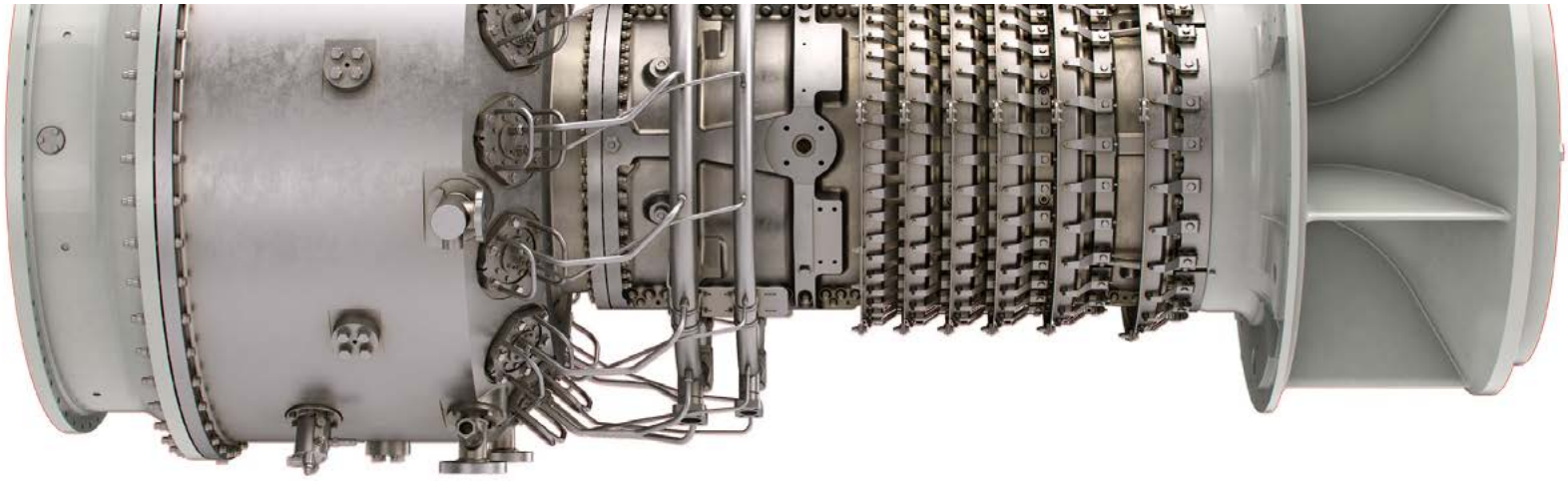

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2022 Conference Theme

Road-Mapping the Future of Propulsion and Power

Turbo Expo Keynote & ASME IGTI Annual Awards

MONDAY, JUNE 13, 2022, 10:30 AM - 12:00 PM

Switching gears towards a rapid energy transition has never been more important!

Russia's invasion of Ukraine and the climate crisis with recent catastrophic extreme weather events has sparked an energy revolution of a new dimension with the need of a revised timeline.

The 2022 TurboExpo opening session will set the scene for the conference by highlighting the important role of turbomachinery both for the energy transition and in a carbon-neutral society.

The relevant stakeholders will in the opening session highlight the common vision and commitment to solving the "Energy Trilemma". You will receive essential information for the design of a future road map to be built on dispatchable, efficient and reliable energy and storage solutions that can work together with intermittent renewable energy solutions without compromising security of supply.

Overall, the opening session will provide valuable input to the road mapping of the future of propulsion and power and address how we can accelerate our common journey towards secure, climate neutral energy solutions. Are the policy makers, the gas turbine user community, the suppliers and distributers of sustainable fuels and the gas turbine industry all onboard? Any guidance to the Turbomachinery R&D community that enable an even stronger and more dedicated support?

Astonishing achievements in this direction have already been made by the R&D community and as usual the ASME IGTI's annual award program will at the end of this session present and honor the individuals who have made significant contributions to advancing the turbomachinery industry.

Keynote Moderators

Jaroslaw Szwedowicz
Conference Chair
Siemens Energy AG

Jaroslaw is the former chairman of the IGTI and Gas Turbine Segment of ASME. Sharing good engineering practices & enabling innovative technologies to industrial-scale use are key drivers of Jaroslaw's work.

Christer Björkqvist
Executive Conference Chair, ASME Turbo Expo 2022
ETN Global

Christer Björkqvist is the Managing Director and founder of ETN Global that brings together gas turbine users, OEMs, suppliers & service companies and R&D community.

Keynote Panelists

Pedro Lopez Estebaranz
COO, *Uniper*

During his 17 years of professional life Pedro gained an extensive international experience in the energy business, including engineering of conventional and renewables technologies, asset management experience in coal, gas and hydro assets as well as CCGT operations.

Michael Grootenboer
Senior VP Engine Products, *Air France KLM Group*

Until joining Air France-KLM, aircraft engineer Michael Grootenboer spent his entire working life in the Airbus Group, occupying a range of technical and management functions, especially as part of the airframer's A350 and A330neo programs.

Dr. Thomas Thiemann
Senior VP Energy Transition Technologies, *Siemens Energy*

In April 2020 Dr. Thiemann became the Senior Vice President for Energy Transition Technologies. In this role, he helps to shape the Siemens Energy decarbonization portfolio according to the future needs.

Priscilla Chandrasekaran
Global LNG Technology Innovation Manager, *Shell Global Solutions International*

As the Global LNG Innovation Manager, Priscilla's role is to ensure the delivery of sustainable, deep decarbonization solutions for the existing portfolio as well as envision ground breaking new pathways to support Shell's strategy.

Plenary #1

Industrializing Terabytes for Propulsion and Power

TUESDAY, JUNE 14, 10:30 AM - 12:00 PM

Today's propulsion and power industry is in the middle of a Digitalization Journey which requires large investments and cultural changes to achieve challenging goals.

With invited speakers from cross-industrial organisations, this plenary session will explore and discuss the utilization and management of data in organisations and the application of modern data analytics and data science techniques to help with the Digitalization Journey in the Propulsion and Power community.

Plenary Speakers

Dr. Timothy C. Lieuwen
Executive Director, *Strategic Energy Institute*

Frida Björneld
Head of Technology & Innovation Industrial Applications division, *Siemens Energy*

David Robert Noble
Generation Gas Turbine Programs Manager, *Electric Power Research Institute*

Professor Bill Dawes
Founding Director, *CTO and Chairman, Cambridge Flow Solutions Ltd*

Plenary Moderators

Dr. Eva Verena Klapdor, *VP Generation Service Global Operations, Siemens Energy*

Dr. Akin Keskin, *Engineering Associate Fellow - Design Systems, Rolls-Royce*

Plenary #2

Hydrogen & Energy Storage for Propulsion and Power

WEDNESDAY, JUNE 15, 10:30 AM - 12:00 PM

Developing and deploying hydrogen technologies for generating electricity and for powering aviation is critical to reducing carbon emissions to address climate change and improve the environment. This panel of recognized experts will present the state of the art for hydrogen generation and transport, energy storage, and the use of hydrogen for power and propulsion.

Plenary Speakers

Dr. Steven R. Wellborn
Head of Aerothermal and Functional Design Senior Fellow – Turbomachinery Systems, *Rolls-Royce*

Dr. Tim Allison
Machinery Department Director, *Southwest Research Institute*

Christian Sattler
Head of Solar Chemical Engineering, *DLR*

Arnie Feldman
President/ Principal, *JJDS Environmental*

Sarah Hopkin
Hydrogen Researcher: H2 Mobility and Supply, *ESPTG / Shell Oil*

Plenary Moderators

Frank Michell, *Founder, Power Industry Consulting, LLC*

Dr. Natalie Smith, *Southwest Research Institute*

ASME & Turbo Expo

Leadership Team

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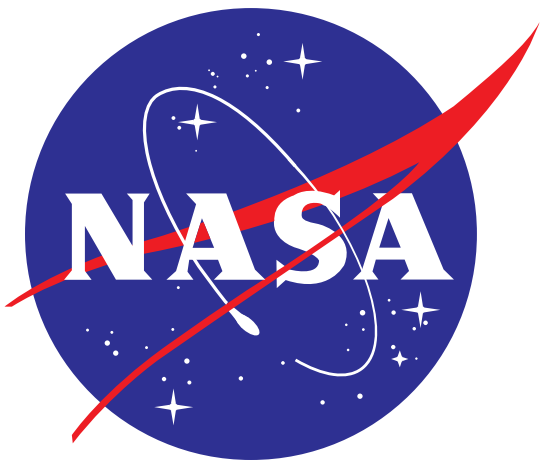

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linkedin.com/company/asme-international-gas-turbine-institute

Congratulations to all

Award Recipients

Congratulations to all award recipients and thank you to all ASME IGTI committee award representatives whose work assists the awards and honors chair and the awards committee in the recognition of important gas turbine technological achievements. Thank you to William T. Cousins for serving as the IGTI Honors and Awards Committee Chair, John Gülen as Industrial Gas Turbine Technology Award Committee Chair, and Wilfried Visser as the Aircraft Engine Technology Award Committee Chair.

2022 ASME R. Tom Sawyer Award

Awarded to...

Dr. Tim Lieuwen

Awarded to an individual who has made important contributions to advance the purpose of the gas turbine industry and the ASME 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.

2020 ASME Gas Turbine Award

Awarded to...

Tom Hickling

Li He

The Gas Turbine Award was established in 1963 to be given in recognition of an outstanding contribution to the literature of combustion gas turbines or gas turbines thermally combined with nuclear or steam power plants.

2020 John P. Davis Award

Awarded to...

Dr. David John Rajendran

Dr. Vassilios Pachidis

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.

2022 ASME Dedicated Service Award

Awarded to...

David G. Bogard

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.

2022 Aircraft Engine Technology Award

Awarded to...

Luis San Andrés

For outstanding contribution to air breathing propulsion through inspiring leadership, education, and research having major impacts on aircraft engine operational capability, performance, and design.

2022 Industrial Gas Turbine Technology Award

Awarded to...

Richard Tuthill

For outstanding contributions to the electric power and mechanical drive industries through his leadership, research and development, and advocacy on behalf of industrial gas turbines.

2022 Dilip R. Ballal Early Career Award

Awarded to...

Natalie R. Smith

Awarded to an individual who has made significant contributions in the gas turbine industry within the first five years of their career.

For more details on the award winners, please refer to the 2022 Awards Program: event.asme.org/Events/media/library/resources/turbo/Turbo-2022-Awards-Program.pdf. Programs will be available during the Grand Opening: Keynote and Awards Program on Monday.

Upcoming

Award Opportunities

2023 ASME R. Tom Sawyer Award

Nominations due to igtiawards@asme.org by...

August 15, 2022

2023 Dilip R. Ballal Early Career Award

Nominations due to igtiawards@asme.org by...

August 1, 2022

2023 Aircraft Engine Technology Award

Nominations due to igtiawards@asme.org by...

October 15, 2022

2023 Industrial Gas Turbine Technology Award

Nominations due to igtiawards@asme.org by...

October 15, 2022

For more information on how to submit a nomination for an award, visit asme.org/about-asme/honors-awards/honors-policy/how-to-nominate.

Featured Sessions

2022 IGTI Aircraft Engine Technology Award Winner Special Lecture

Measurements and Models for Squeeze Film Damper Forced Response: A Bird View to Air Ingestion and Entrapment

TUESDAY, JUNE 14, 4:00 PM - 5:30 PM | PORT 7

Speaker: Luis San Andres, *Turbomachinery Laboratory Mast-Childs Chair Professor, Mechanical Engineering – TAMU*

Moderator: Adolfo Delgado, *Turbomachinery Laboratory, Associate Professor, TAMU*

The lecture will show how squeeze film dampers (SFDs) work, and how their damping affects the stability and dynamic response of rotor-bearing systems. The system damping ratio and not the physical damping is of consequence; hence, engineering SFD(s) that work must fit the system, aircraft in particular. A review of the existing models, simple to complex, accompanied by exhaustive experimentation for validation of various SFD types demonstrate that fluid inertia and persistent air ingestion and entrapment are paramount to the proper quantification of damper forced performance. The bridge between actual SFD performance and sound modeling is a little shorter.

Luis San Andrés is the Mast-Childs Chair Professor of Mechanical Engineering at Texas A & M University (TAMU). Through 30 plus years conducting funded research at the TAMU Turbomachinery Laboratory, professor San Andrés and students have produced experimentally verified models of squeeze film dampers for aircraft engines, hybrid bearings for cryogenic turbopumps, nonlinear dynamics of turbochargers, gas foil bearings for oil-free machinery, lubricated bearings for high performance turbomachinery, and multiple-phase flow seals for wet gas compressors.

2022 Industrial Gas Turbine Technology Award Winner Special Lecture

When Dinosaurs Roamed the Earth

MONDAY, JUNE 13, 8:00 AM - 10:00 AM | PORT 7

Speaker: Richard S. Tuthill, *RST Associates, LLC*

Moderator: John Gulen, *Electric Power Committee Chair, Bechtel Corporation*

A half century gas turbine R&D retrospective to inform and facilitate a discussion of whether we are currently on foot or on horseback. The obvious disconnects will be explored. (Audience participation will be encouraged.)

Richard Tuthill, of Bolton, CT, [USA] will be awarded the IGTI Industrial Gas Turbine Technology Award at ASME Turbo Expo in Rotterdam in June. Tuthill's career in gas turbines has spanned more than fifty years, primarily in the areas of combustion research and development, advocacy on behalf of the gas turbine industry, and technical advising. He is being honored for his contributions to clean air through ground power emissions reductions, developing the ability to burn abundant alternate fuels cleanly, his early support for engineering profession diversity, and for leadership of the Gas Turbine Association.

Ansys

Providing the best-in-class simulation software to design the next generation of sustainable turbomachinery

- Empowering the net-zero movement
- Enabling more efficient aircraft
- Leveraging hydrogen combustion for decarbonization
- Optimizing overall performance

Networking Events

Welcome Reception

MONDAY, JUNE 13 | 6:00 – 7:30 P.M.
AHOY CONFERENCE CENTER
ROTTERDAM A

All Conference registrants are invited to join their colleagues for complimentary light refreshments during the Monday evening event. In a casual atmosphere, greet friends, and meet the thinkers from around the world who are shaping the future of turbomachinery.

Daily Lunches

MONDAY, THURSDAY, FRIDAY | 12:00 P.M. | HALL 6
TUESDAY, WEDNESDAY | 12:30 P.M. | EXHIBIT HALL

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 Receptions

TUESDAY & WEDNESDAY, JUNE 14 & 15
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.

Networking Events

Early Career Engineer & Student Mixer

WEDNESDAY, JUNE 15 | 6:45 – 8:00 P.M.
AHOY CONVENTION CENTER
ROTTERDAM A

Unwind after a full day of technical sessions and exhibits with fellow engineering students and early career engineers. This popular event allows students to make new friends and build their professional network in a casual evening atmosphere.

Complimentary refreshments will be provided.

DGTA Dutch Hour Reception

TUESDAY, JUNE 14 | 5:30 P.M. – 6:30 P.M.
BY THE DUTCH GAS TURBINE ASSOCIATION

The Dutch Gas Turbine Association (DGTA) and exhibitors at the Holland pavilion want to invite you to the Dutch Hour during the ASME Turbo Expo on Tuesday, 5:30-6:30pm in the exhibition hall!

DGTA is the sector association for the gas turbine industry in the Netherlands. The association was established in 1981 with the support of the Ministry of Economic Affairs. The aim is to strengthen the technological, commercial, and labor market position of this industry. DGTA acts as a Dutch Community in the international gas turbine world for manufacturers, suppliers, users, and research organizations which express an interest in joint activities and business development with DGTA members.

If you are interested in co-sponsoring this event, please contact igtiexpo@asme.org.

Exposition Closing Ceremony

THURSDAY, JUNE 16 | 1:00 P.M.
EXHIBITION HALL: EXHIBITOR THEATER STAGE

Be sure to stop by the exhibition on Thursday at 1pm for your chance to win the People's Choice cash prizes. Names will be drawn live—you must be present to win.

Along with a chance to win a cash prize, Boston (host city of ASME Turbo Expo 2023) has sponsored an opportunity to win a Lobster and Chowder dinner from Legal Sea Foods Marketplace. Win a gift certificate for dinner for two of the best seafood from the Boston docks shipped right to your door.

Stop by the ASME Turbo Expo 2023 Booth in the Hall and pick up Boston collateral and plan your trip to the 68th Turbo Expo June 26-30, 2023 – our first time hosted in Boston. Make it a family affair and stay for their great 4th of July Weekend festivities.

Networking Events

Celebrating Women in Turbomachinery Event

TUESDAY, JUNE 14 | 7:45 P.M. – 9:00 P.M.
THE LOFT, NHOW ROTTERDAM,
WILHELMINAKADE 137, 3072 AP, ROTTERDAM
SPONSORED BY CADENCE DESIGN SYSTEMS AND GE

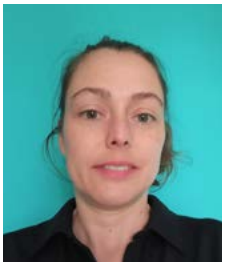
Registrants are invited to join their colleagues for a networking event. Attendees will have the opportunity to network with industry colleagues and learn about their successful career paths. Further details will be available on the Turbo Expo 2022 event website.

Dr. Natalie Smith, Ph.D.
Group Leader - R&D, *Rotating Machinery Dynamics, Southwest Research Institute*

Dr. Natalie Smith is a Group Leader in the Machinery Department at Southwest Research Institute. Her research experience includes aerothermal design and testing of turbomachinery and advanced system analysis for programs related to power generation, aviation, oil & gas and energy storage both in academia and industry. She is a demonstrated leader in energy storage in which she has designed and operated first-of-kind laboratory-scale facilities. Her contributions in turbomachinery have resulted in 18 journal publications, three book chapters, over 30 conference papers, and three best paper awards.

Dr. Smith serves on the ASME Global Gas Turbine News editorial committee, has served on the ASME PTC-10 update committee, and has held leadership positions in Turbo Expo at the technical committee and organizing committee levels. She served as the Review Chair for Turbo Expo 2022.

Dr. Smith received a Ph.D. and M.S. in Aeronautics and Astronautics from Purdue University. Finally, she teaches thermodynamics at a local university, coaches a high school mountain bike team, and holds two national titles in mountain biking.



Virginie Barbieux
Sr. Product Engineering Manager, *Cadence*

Since a young age, Virginie has been interested in science, especially in space and aeronautics.

Virginie completed her studies at the Faculty of Engineering in Mons, Belgium, where she graduated with a master's degree in Mechanical Engineering in 2004. Virginie's interest in Computational Fluid Dynamics (CFD) software was sparked when she had the chance to work on several industrial projects related to fluid mechanics in the last year of her studies.

After graduating, Virginie joined a Belgian company active in the space industry, after which she joined NUMECA in 2005 as CFD Engineer in the Consulting Group. This group provided services using NUMECA software for a wide range of industries. They also work on R&D projects together with the developers of the NUMECA software.

In 2021, NUMECA was acquired by Cadence Design Systems and Virginie joined the CFD R&D team at Cadence as Senior Product Engineering Manager.

ASME SETTING THE STANDARD

ASME INTERNATIONAL GAS TURBINE INSTITUTE

Turbo Expo 2023

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JUNE 26 - 30, 2023

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USA

Whether you're looking for your next R&D partner or employer, discovering new research ideas, or building your company's brand, ASME Turbo Expo is where the turbomachinery community gathers. Join 2,800 professionals from around the globe to advance your career and advance the industry.

THE AMERICAN SOCIETY OF MECHANICAL ENGINEERS® (ASME®)

WWW.TURBOEXPO.ORG

Photo Credit: Kyle Klein

2023 Turbo Expo Publication Dates

2022
October 21
Abstract Submission Deadline

2022
November 18
Abstract Acceptance Notification

2023
January 6
Submission of Draft for Review

2023
February 3
Draft Reviews Completed

2023
February 10
Notification of Draft Acceptance

2023
February 24
Revised Paper Submission

2023
March 10
Notification of Revised Paper Acceptance

2023
April 4
Copyright Submission Deadline

2023
April 11
Final Paper Submission Deadline

GET READY TO DOWNLOAD THE

Conference App

TURBO 2022 will utilize a mobile event app in place of a printed program to enhance the conference experience for attendees, speakers, exhibitors, and sponsors; whether you are attending in-person or virtually.

You will be able to:

- **Connect** with Attendees
- **View** Speaker Profiles
- **Access** Session Information
- **Watch** On Demand Content
- **Download** Final Papers
- **And More!**

Keep an eye on your email for more information on how to access and navigate the App!

Conference WiFi

Please improve your conference experience by connecting to the dedicated conference WiFi.

ASME Turbo Expo 2022

SSID

Netzero2050

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Student News

The 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 Committee Members

CHAIR
Mavroudis Kavvalos
Malardalen University, Sweden

VICE CHAIR
Dimitra Eirini Diamontidou
Malardalen University, Sweden

SECRETARY
Vamsi Krishna Undavalli
The University of Alabama, Tuscaloosa

PAST-CHAIR
Deepanshu Singh
University of Oxford, United Kingdom

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".

Please join SAC and the Education Committee for their joint panel session 08-03: Student Preparedness for Academic and Industry Careers on **Tuesday, June 14, 1:30 PM - 3:30 PM located in Dock 11**. Also, don't miss this year's Student Advisory Committee Meeting on **Thursday, June 16th at 9:00 AM in Dock 2**.

Poster Session

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 14th 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.

Cash Prizes for Poster Session Winners

1st Place	*2nd Place*	*People's Choice*
€430	€215	€85

Early Career Engineer & Student Mixer

WEDNESDAY, JUNE 15 | 6:45 – 8:00 P.M.
AHOY CONVENTION CENTRE
ROTTERDAM A

Unwind after a full day of technical sessions and exhibits with fellow engineering students and early career engineers. This popular event allows students to make new friends and build their professional network in a casual evening atmosphere.

Complimentary refreshments will be provided.

The Student Advisory Committee and Early Career Engineer Travel Awards help to cover travel costs for the young engineers to attend ASME Turbo Expo.

2022 Student Advisory Committee Travel Award Winners

Majid Asli
Technical University of Berlin

Jessica Baker
University of Central Florida

Dimitrios Bermperis
Malardalen University

Thomas Michael Corbett
The Pennsylvania State University

Gonçalo Granjal Cruz
von Karman Institute

Nicola Detomaso
Institut national polytechnique de Toulouse (INP)

Molly Donovan
University of Dayton

Anjali Dwivedi
Indian Institute of Technology Kanpur

Erhan Ferhatoglu
Politecnico di Torino

Gauthier Fieux
University of Bath

Aggelos Gaitanis
Université catholique de Louvain

Ritesh Ghorpade
University of Central Florida

Nathaniel Gibbons
University of Virginia

Dimitris Graikos
University of Bath

Wu Hangkong
Northwestern Polytechnical University

Md Abir Hossain
The University of Texas at El Paso

Mohammed Ibrahim Kittur
University of Malaya

Gustavo Lopes
von Karman Institute for Fluid Dynamics (Be) / Université de Liège (Be)

Matthew Meier
Purdue University

Omar Sherif Mohamed
The University of Florence

Oguzhan Murat
University of Oxford

Noraiz Mushtaq
Politecnico di Milano

Andrea Notaristefano
Politecnico di Milano

Mizuki Okada
von Karman Institute for Fluid Dynamics

Antonio Escamilla Perejón
University of Seville

Hien Minh Phan
University of Oxford

Michael Pierro
University of Central Florida

Avinash Renuke
University of Genova, Italy

Adil Riahi
University of Central Florida

Maria Rozman
The Pennsylvania State University

Smruti Sahoo
Mälardalen University

Antonino Federico Maria Torre
Univesité de Liège

Dimitra Tsakmakidou
Loughborough University, Loughborough, Leicestershire, UK

Ryan Wardell
The University of Central Florida

Peter Warren
University of Central Florida

Alexander Wildgoose
Pennsylvania State University

Peter Wilkins
Pennsylvania State University

Sen Zhang
Northwestern Polytechnical University

Emma Michelle Veley
Penn State University

2022 Turbo Expo Early Career Engineer Travel Award Winners

Elissavet Boufidi
von Karman Institute for Fluid Dynamics

Bogdan Cernat
von Karman Institute for Fluid Dynamics

Ivan Monge-Concepcion
Honeywell Aerospace of Puerto Rico

Brian Connolly
Southwest Research Institute

Francesco Crespi
University of Seville

Eric DeShong
Pennsylvania State University

Penghao Duan
Univresity of Oxford

Shreyas Hegde
Pratt & Whitney

Richard Hollenbach III
Duke University

Thomas Kerr
Southwest Research Institute

Jeong-Won Kim
Georgia Institute of Technology

Brian Knisely
Carrier Corporation

Amit Kumar
Indian Institute of Technology Bombay

Manas Madasseri Payyappalli
von Karman Institute for Fluid Dynamics

Owen Pryor
Southwest Research Institute

Hui Tang
University of Bath

Loris Simonassi
von Karman Institute for Fluid Dynamics

Spencer Sperling
Honeywell Aerospace

Stavros Vourus
Malardalen University

Student Poster Presenters

Ahoy Exhibit Hall: Tuesday, June 14, 2022 12:30 PM – 1:30 PM

Abdullah Mankola, *Arab Academy for Science Technology & Maritime Transport (AASTMT)*
GT-2022, 87974: An Enhanced Midstream Design Method for Cryogenic Turbomachinery

Luca Fantaccione, *Baker Hughes*
GT-2022, 88350: Sustainability Benefits by Redesign a Gas Turbine 1° Stage Nozzle Ring from Investment Casting to Additive Manufacturing

James Bain, *Cardiff School of Engineering*
GT-2022, 88647: Investigating the Effect of Turbulence on the Ignition of Inhomogeneous Hydrogen Enriched Fuels and Oxidants Mixtures Under Reheat Combustion Conditions.

Hwabhin Kwon, *Chang Won National University*
GT-2022, 88630: Numerical Investigation of Cooling Performance Considering the Degradation of Thermal Barrier Coatings for Optimizing the Thickness of Thermal Barrier Coatings in the Regenerative Maintenance of Gas Turbines

Sajan Tamang, *Changwon National University*
GT-2022, 88676: Numerical Investigation on the Combustion Characteristics and Thermal Emission of the Propane/hydrogen Mixed Fuel in Gas Turbine Combustor

Jaehun Choi, *Chanwon National University*
GT-2022, 88669:A Study of Experiment and Numerical Simulation of Cooling Performance According to Regenerative Process on the Gas Turbine Vane Surface With the Thermal Barrier Coating

Kecheng Wang, *Duke University Aeroelasticity Group*
GT-2022, 88750: Unsteady Pressures Analysis on Frequency Lock-in of Non-Synchronous Vibrations in Turbo Machinery

Lukasz Witanowski, *Institute of Fluid-Flow Machinery PAS*
GT-2022, 83887: Impact of Rotor Geometry Optimization on the Off-Design Orc Microturbine Performance

Marie Meulemans, *McGill*
GT-2022, 88645:The Contribution of the No Formation Pathways Under Gas Turbine Engine Relevant Conditions

Dylan Rubini, *Osney Thermofluids Institute*
GT-2022, 88690:New Opportunities for Turbomachinery-Based Energy Conversion in Decarbonizing High-Temperature Industrial Processes

Liam Parker, *Oxford University*
GT-2022, 88734: Modification of Three Layer Warmed Surface Extended Messinger Model to Three-Dimensions: Emm-C/3d

Kelsey McCormack, *Pennsylvania State University*
GT-2022, 88771: Considerations of Spatial Temperature Mapping Using Infrared Imaging on Rotating Turbine Blades

Luuk Altenburg, *TU Delft*
GT-2022, 88717: Flashback Characteristics of Turbulent Hydrogen-Air Jet Flames

Antonio Escamilla Perejón, *Universidad de Sevilla*
GT-2022, 88095: Footprint Analysis of a Power-to-Power Energy Storage System With Micro Gas Turbines

Manas Madasseri Payyappalli, *von Karman Institute for Fluid Dynamics*
GT-2022, 88685: Design and Numerical Characterisation of a Closed-Loop High-Speed Wind Tunnel for Distortion Screen Testing

Hyung-Hee Cho, *Yonsei University*

GT-2022, 88626: Effect of Inclined Impinging Jet Cooling for Gas Turbine Blade Leading Edge
GT-2022, 88627: Enhancement of Film Cooling Effectiveness in Shelf Squealer Tip Cavity Through Partially Discontinuous Rim
GT-2022, 88628: Effect of Lattice Structure on Heat Transfer of
GT-2022, 88661: The Cooling Effect of Oil in a Linear Compressor on Thermal Performance and Heat Transfer
GT-2022, 88663: Effect of Upstream Transition Piece Wall on Local Heat Transfer of Vane Endwall
GT-2022, 88713: Effect of Blowing Ratios on Heat Transfer and Film Cooling Performance of the First Stage Turbine Blade
GT-2022, 88716: Effect of Misallignment on Heat Transfer on Profiled Endwall With Purge and Film Cooling Flows
GT-2022, 88763: Effect of Fin Angle on Heat Transfer of Offset Strip Fin Heat Exchangers

Jessica Baker

GT-2022, 88190: Chemical Kinetics of Hydrogen/ ammonia/natural Gas Mixtures Ignition

Dimitrios Bermperis

GT-2022, 87951: Electrical Power System Modelling for Hybrid-Electric Aircraft Conceptual Design and Performance Assessment

Gonã§Alo Cruz

GT-2022, 87944: Improvement of Measurement Accuracy Using Bayesian Inference – Reduction of Instrumentation Effort in an Axial Compressor

Ritesh Ghorpade

GT-2022, 88158: An Experimental and Computational Investigation of Methane Injection Characteristics in Subcritical to Supercritical Co2 Environment

Kevin Hanekom

GT-2022, 88821: Optimization and Analysis of the Governing Parameters of Yield Criteria

Michael Pierro

GT-2022, 88194: High-Fuel Loading Ignition Delay Time Measurements of Hydrogen/natural Gas/ammonia

Madison Pugh

GT-2022, 88138: Mitigating Wake for Offshore Wind Turbines Using Passive and Active Parameters

Dimitra Tsakmakidou

GT-2022, 88783: Taking Advantage of Increased Rotor Secondary Flows to Design More Aggressive Compressor Transition Ducts for Future Aeroengines

Thank You ASME Turbo Expo Student Poster Judges!

The ASME IGTI Student Advisory Committee would like to take this opportunity to thank the Turbo Expo Student Poster Judges for their diligent and meticulous judging efforts.

Tim Allison
Southwest Research Institute

Reid Berdanier
Penn State University

Massimiliano Cecconi
Baker Hughes

Lorenzo Ferrari
University of Pisa

Raghu Kancherla (Ph.D)
Power Systems Mfg. LLC

Konstantinos Kyprianidis
Chair of Aircraft Engine Committee, Full Professor Mälardalen University

Ingrid Lepot
Cenaero

Stephen Lynch
Penn State

Andrew Nix
West Virginia University

Bronwyn Power
Pratt & Whitney

Simone Pupeschi
Baker Hughes

Martina Ricci
Baker Hughes

Angela Serra
Baker Hughes

Hongzhou Xu
Solar Turbines Incorporated

Ideal for cogeneration and H_2 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.

It's just one of the ways we're taking energy forward.

bakerhughes.com/NovaLT

Baker Hughes

Session Participant Information

Session Participant Folders

Each Session Participant must have a Session Participant Folder to successfully manage their assigned session.

Monday, June 13

Student Session Participant folders will be in the meeting room on Monday when you arrive.

Tuesday, June 14 - Friday, June 17

Student Session Participant folders will be available for pick up daily at the information desk.

Presentation Uploads

Presenters (authors, panelists, tutorial instructors, lecturers) should plan to upload their presentations only on the computer in their session room. Please arrive 15 to 30 minutes prior to your session to upload your presentation. Presentations may be uploaded from a USB flash drive. There will not be a central network server for the sessions. ****It is recommended that presentations be removed from the computer as soon as the presentation has ended.**

Audiovisual Equipment Provided

Standard AV equipment provided in meeting rooms: LCD Projector, Laptop Computer, Projection Screen, Microphone(s), Wireless Remote/Pointer and microphone. Aspect Ratio is 16:9

Registration

As a non-profit organization, ASME requires all presenters to register for the conference and pay an appropriate fee. We are pleased to offer all presenters the discounted ASME Member registration rate. Onsite registration is located in in the registration area at the entrance of the AHOY.

Speaker Ready Room

Sunday, June 12	3:00 pm – 6:00 pm
Monday, June 13	7:00 am – 5:30 pm
Tuesday, June 14	7:00 am – 5:30 pm
Wednesday, June 15	7:00 am – 5:30 pm
Thursday, June 16	7:00 am – 5:30 pm
Friday, June 17	7:00 am – 12:00 pm

Badge Ribbons

Role and attendance ribbons are available at the Information Desk in Registration. See the display for available options.

Need Assistance?

ASME staff (red badges) and Hall Monitors are circulating the session room hallways to provide assistance as needed.

Exhibition Stage

Presentation Schedule

Every visitor, delegate and exhibitor at the EXPO can attend any of the following presentations, FREE OF CHARGE. Each is delivered by one of the Exhibitors at the EXPO - all of them leading experts in their field.

Tuesday, June 14, 2022	
1:00 – 1:30 pm	“Generative Design for Cutting-Edge Turbomachinery Development” presented by Dr. Vasileios Pastrikaki.
1:45 – 2:15 pm	“Advanced Pneumatic Fluid Measurement Solutions” presented by Marcel Börner from Vectoflow GmbH.
2:30 – 3:00 pm	"Review of 10 Years of Designing Micro Turbomachines" presented by Enogia.
3:15 - 3:45 pm	“The Vibration Expert Onboard – Remote Vibration Monitoring Benefits” presented by Ronald Janzee from Advituro.
4:00 – 4:30 pm	“Fluid Topology Optimization for Gas Turbines and Electrification” presented by Francesco Montomoli from TOffeeAM ltd.
4:45 – 5:15 pm	“High Channel Count Systems for Vibration and Multiphysics Measurements on Turbine Test Benches” presented by Guillaume Cousin from OROS.
5:30 – 6:00 pm	Design Better, Develop Smarter and Decarbonize Faster Using Advanced Turbomachinery Engineering Simulations presented by Erik Munktell, Siemens Digital Industries Software.
Wednesday, June 15, 2022	
1:00 – 1:30 pm	“How Solid-Rotor Technology Extends the Capabilities of Standard Induction Electric Machines” presented by Giulio Martorelli from Yaskawa Environmental Energy / The Switch.
1:45 – 2:15 pm	“Functional Benefits of Additively Manufactured Turbomachinery Impellers” presented by Roberto Esposito from Velo3D.
2:30 – 3:00 pm	“Using Digital Engineering to Support Development and Operation of Next Generation Gas Turbines” presented by Razvan Apetrei from Norton Straw Consultants.
3:15 - 3:45 pm	“Advanced Thermal Mapping for Large and Small Gas Turbines” co-presented by Dr Jim Hickey & Mike Connolly from Sensor Coating Systems Ltd
4:00 – 4:30 pm	“PROOSIS Simulation tool”. PROOSIS is a state-of-the-art tool for modelling the performance of gas turbines. Presented by Antonio Ruiz-Rico from EA Internacional (Ms Aerospace Engineering).
4:45 – 5:15 pm	“Eddy Groove Technology - How to drop hydrodynamic journal tilting pad bearing maximum oil film and bearing metal temperatures significantly using grooves machined into the tilting pads” presented by Dipl.-Ing. Eckhard Schueler from Miba Industrial Bearings Germany.
Thursday, June 16, 2022	
12:30 – 1:00 pm	“Combustion Testing” presented by Alessio Fabrizi from Sesta Lab.
1:00 - 2:15 p.m.	Closing Ceremony and Kick-off to Boston 2023

Exhibition Information

Exhibit Hall: Best Exhibit Display and Student Poster Awards

People's Choice for Best Booth Display

Enter for a chance to win 1 of 3 Euro cash prizes by Casting Your Ballot for the People's Choice Best Booth Award Winners.

100€ 225€ 450€

Three cash prize winners will be announced during the Closing Ceremony in the Exhibit Hall on Thursday, 1:00 pm.

Cast Your Ballot for:

- Most creative display design
- Best display of technology
- Best overall exhibit
- Best method of crowd attraction

One vote per attendee. Entrant must be present to win at the Closing Ceremony. To qualify for the prize drawings, votes must be cast by 6:30pm on Wednesday.

Place your vote for both categories:

Small Display **AND** Large Display

People's Choice for Best Student Poster

Please take a moment to also vote for the Best Student Poster.

Voting kiosk can be found at the entrance of the exhibit hall! Stop by and vote Tuesday and Wednesday.

Turbo Expo Exhibit Advisory Committee Roster

Mission: To assist in the growth and expansion of the Turbo Expo exhibit with continued support to exhibiting companies and ASME IGTI expositions staff. Representatives serve as experts for fielding questions and providing resources and initiatives for continued success of the exposition.

JT Stone
MMP Technology/BINC Industries
5579 Spellmire Dr
West Chester, Ohio 45246 USA
Term: 2022-2026

Kate Guerrina
Concepts NREC
217 Billings Rd
White River, Junction, Vermont 05001 USA
Term: 2020-2024

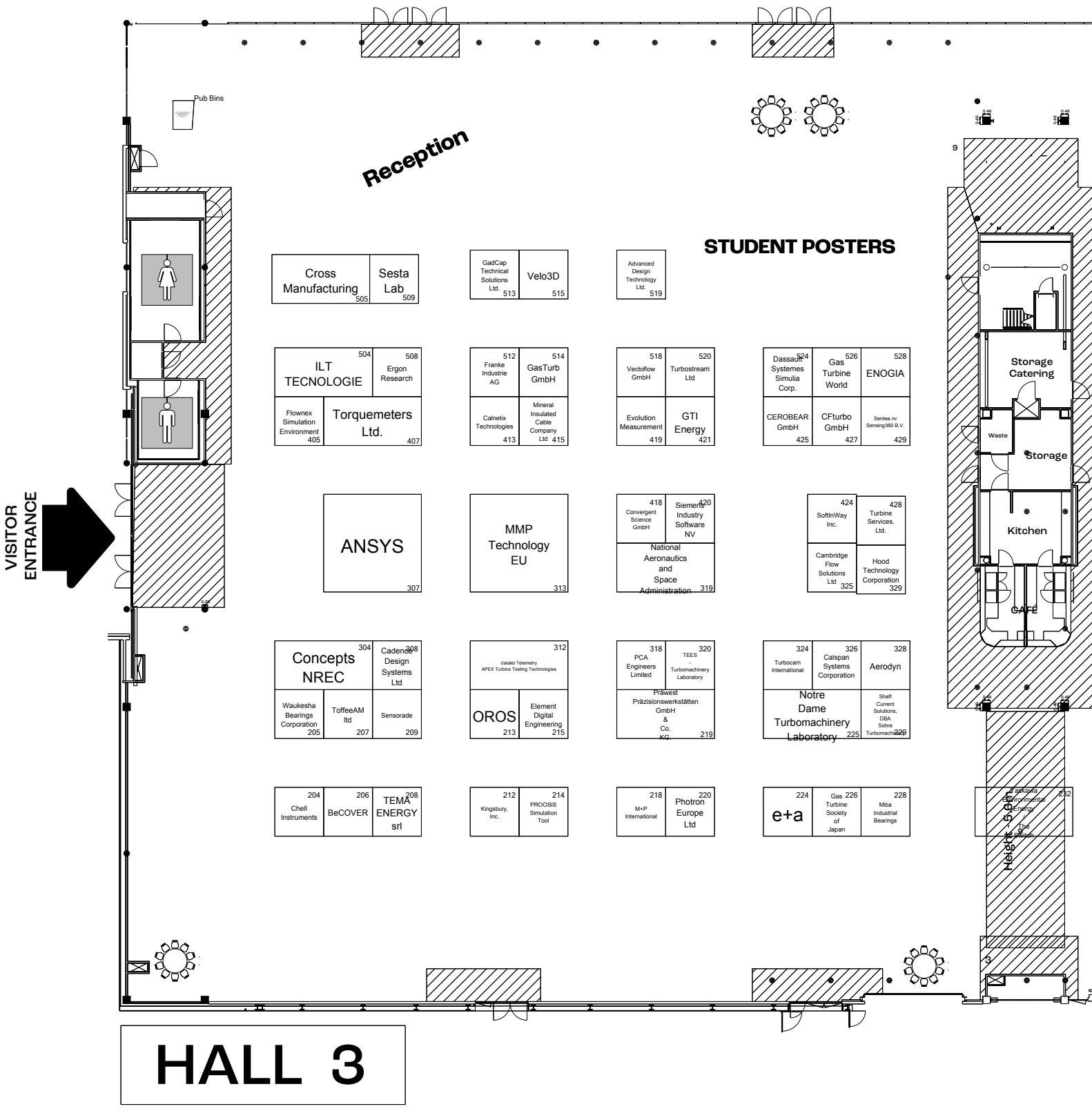
Dr. Jakob Hermann
IfTA Systems GmbH
Junkersstrasse 8
D-82178 Puchheim, Germany
Term: 2018-2022

Dr. Leonid Moroz
SoftInWay Inc.
15 New England Executive Park
Burlington, Massachusetts 01803 USA
Term: 2018-2022

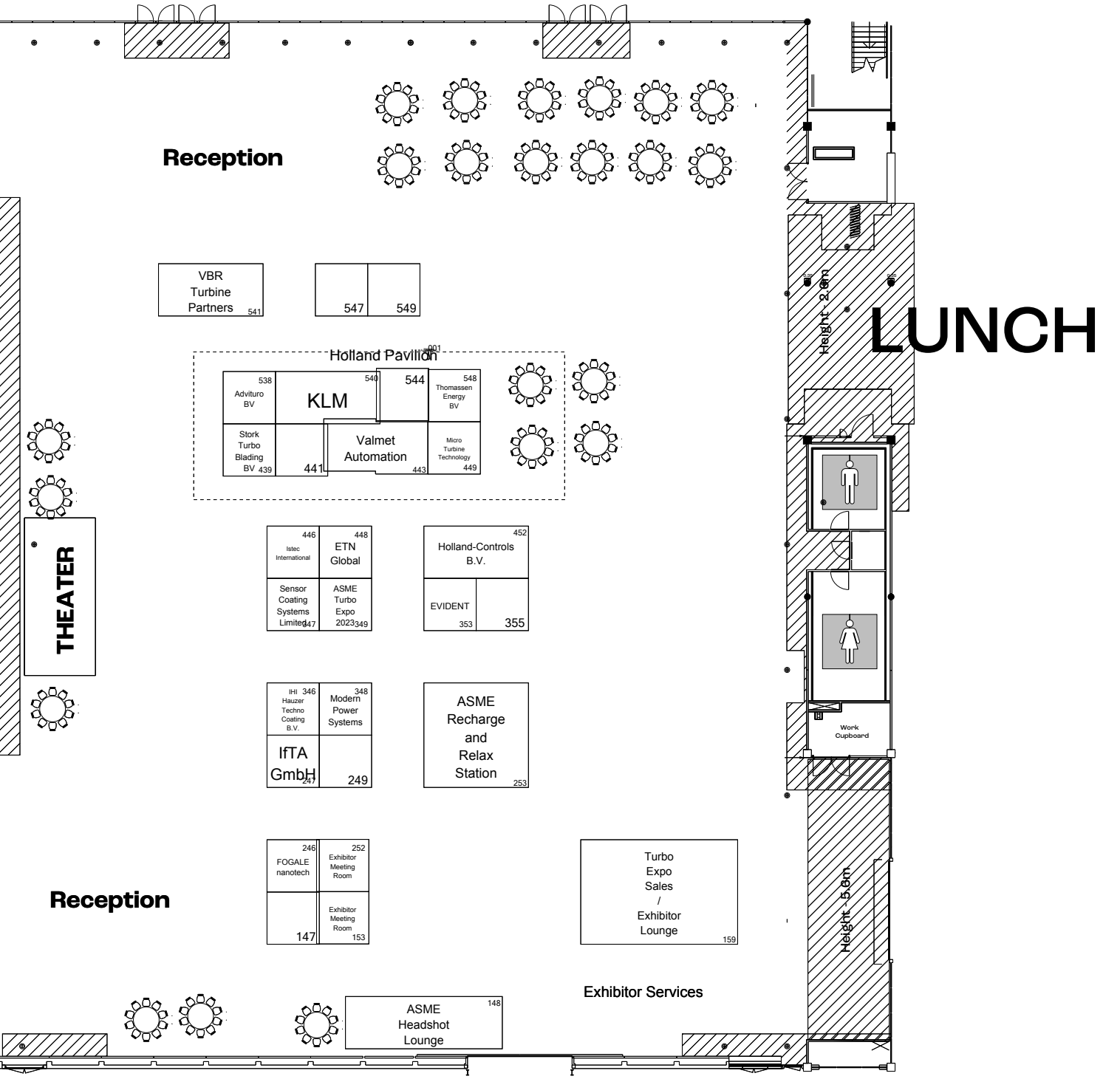
Kristin Barranger
ASME TEC
barrangerk@asme.org
Term: Staff Liaison

If you are interested in joining this committee, contact Kristin Barranger at igtiexpo@asme.org.

Exposition Floor Plan



Exposition Floor Plan



Exhibitors

BOOTH 519

Advanced Design Technology Ltd.

30 Millbank, London, SW1P 4DU, UK

www.adtechnology.com

ADT's software gives you full control of the aerodynamic design process to revolutionize your turbomachinery components.

BOOTH 538

Advituro BV

Leeuwenveldseweg 5f, Weesp 1382 LV, The Netherlands

www.advituro.com

Let's solve your vibration issues. Advituro don't leave downtime through vibrations to chance. We prevent and manage the risk.

BOOTH 328

Aerodyn

Unit 1, Anglers Business Centre, Nottingham Rd, Derby DE21 7NJ, UK

www.aerodyn-global.com

Aerodyn specialise in high speed slip rings, design and analysis, precision manufacturing, instrumentation, assembly, component and subsystem test, in-house and on-site validation and test support using in house instrumentation labs, machine shops and test capabilities.

BOOTH 540

Air France Industries KLM Engineering & Maintenance

Van Weerdenpoelmanweg 1 Schiphol, Noord-Holland 1117 EX

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We are a world-leading multi-product MRO (Maintenance Repair & Overhaul) provider. The company offers its 200 customers comprehensive technical support, including line maintenance, engine overhaul, aerostructure maintenance, and more.

BOOTH 307

ANSYS

Southpointe, 2600 ANSYS Dr, Canonsburg, PA 15317, USA

www.ansys.com

If you've ever seen a rocket launch, flown on an airplane, driven a car, used a computer, touched a mobile device, crossed a bridge, or put on wearable technology, chances are you've used a product where Ansys software played a critical role in its creation. Ansys is the global leader in engineering simulation. We help the world's most innovative companies deliver radically better products to their customers. By offering the best and broadest portfolio of engineering simulation software, we help them solve the most complex design challenges and create products limited only by imagination Visit www.ansys.com for more information.

BOOTH 312

APEX Turbine Testing Technologies

1039 Parkway Dr, Spring Hill, TN 37174, USA

www.apexturbine.com

APEX Turbine Testing Technologies is a supplier of turbomachinery test and analysis solutions with a proven record of delivering integrated, reliable, industry-leading software applications world-wide for over 20 years.

BOOTH 148

ASME Headshot Lounge

Come on by for a professional headshot to use on your social media accounts or for whatever you would like. A copy of the photo will be sent to you to use as you would like. Open every day during exhibition hours!

BOOTH 253

ASME Recharge and Relax Station

Stop by and relax while charging up your electronics. Play a game with a colleague and enjoy some down-time.

Exhibitors

BOOTH 349

ASME Turbo Expo 2023

11757 Katy Freeway, Ste 380, Houston, TX 77079, USA

www.asme.org/events/turbo-expo

ASME Turbo Expo will be heading to Boston June 26 - 30, 2023. Pick up some pamphlets to get your planning started.

BOOTH 159

ASME Turbo Expo Sales

11757 Katy Freeway, Ste 380, Houston, TX 77079, USA

www.asme.org/events/turbo-expo

Come by the 2023 Sales Booth to secure a space on the 2023 Show floor in Boston. Sponsorships are available to meet your needs!

BOOTH 206

BeCOVER

Route de Liers 121, 4041 Herstal, Belgium

www.becover.eu

BeCOVER is a state-of-the-art center to test compressors (both LPC and HPC) for aviation of the future.

BOOTH 308

Cadence Design Systems Ltd.

Maxis 1, Western Road, Bracknell, RG12 1RT, UK

www.cadence.com

Cadence is a worldwide provider of computational fluid dynamics (CFD) and optimization software. With an industry-leading meshing approach and a robust host of solver and post-processing capabilities, Cadence CFD technology enables designers to reach superior product quality and performance at a reduced engineering cost and time to market. Cadence CFD customers are the world's most innovative companies in markets such as turbomachinery, marine, automotive, and aerospace.

BOOTH 413

Calnetix Technologies

16323 Shoemaker Avenue, Cerritos, CA 80703, USA

www.calnetix.com

Calnetix specializes in high-performance, high-speed motor generators and best-in-class advanced control systems and magnetic bearings. Calnetix's patented, underlying technologies, since the company's inception in 1998, have made Calnetix a world leader in the design and production of high-speed machines.

BOOTH 326

Calspan Systems Corporation

703 City Center Blvd, Newport News, VA 23606 USA

www.calspan.com

Calspan Systems Corporation is an industry leader in designing and manufacturing turbomachinery test rigs.

BOOTH 325

Cambridge Flow Solutions Ltd.

Sute 1, 200 Cambridge Science Park, Cambridge, CB4 0GA, UK

www.cambridgeflowsolutions.com

BOXERgeom's Digital GeometryTM kernel supports voxel-based AI and Machine Learning. Visit us in the Exhibit Hall to learn how we can help you Digitalize your workflow to support innovative design, Digital Twins & MRO. Cambridge Flow Solutions conducts strategic, long-term research with Development Partners. Our work is focused on BOXER – a fully scalable simulation environment coupling an advanced digital geometry model, mesh generation and CFD – aimed at complex, real world, conjugated applications.

Exhibitors

BOOTH 425

CEROBEAR GmbH

Kaiserstrasse 100, Herzogenrath, 52134, Germany

www.cerobear.com

CEROBEAR engineers and manufactures ball and roller bearings in ISO dimensions or fully customized (All-Steel, All/Hybrid Ceramic). Applications comprise Aero-Engines & APUs, Aeroderivative Gas Turbines, Turbo Chargers, Pumps, Compressors, Expanders, ORC Turbines, and Auxiliary Bearings (to Active Magnetic Bearings).

BOOTH 427

CFturbo GmbH

Unterer Kreuzweg 1, Dresden, 1097, Germany

www.cfturbo.com

We are a Turbomachinery Software and Engineering company. Develop and sell Turbomachinery Software. Provide CAE Engineering Services.

BOOTH 204

Chell Instruments

Suite 1, Cringleford Business Centre, Intwood Road, Norwich, Norfolk, NR4 6AU, UK

www.chell.co.uk

Chell Instruments have supplied & manufactured pressure & gas flow measurement & control instrumentation since the 1970's. Their products are used for high accuracy pressure, temperature and flow testing within sectors including motorsport, aerospace, pharmaceuticals and energy.

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Dedicated To Gas Compression Products & Applications

PUB BINS

COMPRESSORtech2

20855 Watertown Road, Waukesha, WI 53186 USA

www.compressortech2.com

Dedicated to global gas compression products and applications.

Concepts NREC
TURBOMACHINERY
SOFTWARE ENGINEERING MANUFACTURING EDUCATION

BOOTH 304

Concepts NREC

217 Billings Farm Road, White River Junction, VT 05001, USA

www.conceptsnrec.com

For over 65 years, Concepts NREC has been partnering with the world's leading companies, universities, and government agencies to improve the performance and manufacturability of their turbomachines. We are the only company in the world whose in-house capabilities span the entire process - from conceptual design through manufacturing, software, testing, training, and installation. This unique perspective creates powerful synergies that drive innovation across our entire offering. Our clients benefit from having a trusted partner who can see the big picture and provide valuable insights that save them time and money. ISO 9001 & AS9100 certified.

BOOTH 418

Convergent Science GmbH

Haupstrasse 10, Linz, 4040, Austria

www.convergecfd.com

Convergent Science is an innovative, rapidly expanding computational fluid dynamics (CFD) company. Our flagship product, CONVERGE, is a revolutionary CFD software with truly autonomous meshing capabilities that eliminate the grid generation bottleneck from the simulation process.

BOOTH 505

Cross Manufacturing

South Site, Hopton Road, Devizes, Wiltshire, SN10 2EU, UK

www.crossmanufacturing.com

Specializing in design, development and manufacture of high temperature metallic Sealing Rings, Retaining Rings and Brush Seals. Trusted by OEM's globally, providing precision high quality solutions for Aerospace, Automotive, Power Gen and many other industries by combining technology with innovation.

BOOTH 524

Dassault Systemes Simulia Corp.

Strelley Hall, Main Street, Strelley, Nottingham, NG8 6PE, UK

www.3ds.com

Dassault Systèmes, the 3DEXPERIENCE Company, provide collaborative virtual environments to imagine sustainable innovations. By creating 'virtual experience twins' of the real world with our 3DEXPERIENCE platform and applications, our customers push the boundaries of innovation, learning and production.

Exhibitors

BOOTH 312

datatel Telemetry

Berliner Allee 42, Langenhagen
D-30855, Germany

www.datatel-telemetry.de

datatel provides a wide range of turnkey telemetry systems to measure physical parameters on rotating components e.g. torque on drive shafts, temperature, force and torque in gears, clutches and combustion engines, temperature in electric motors (eDrive Testing), brakes, clutches, automatic transmissions and tires, torsional vibration on dampers etc.

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www.dieselgasturbine.com

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DGTA

BOOTH 1

Dutch Gas Turbine Association

Einsteinbaan 1, Nieuwegein,
The Netherlands 3439 NJ

www.dgta.nl

The Dutch Gas Turbine Association is the sector association for the gas turbine industry in the Netherlands. The aim is to strengthen the technological, commercial and labour market position of this industry.

BOOTH 224

e+a

964 Autumn Oak Circle,
Concord, CA 94521, USA

www.eandausa.com

e+a makes hi-speed, hi-power rotors and stators for Turbo-machinery applications like Power Generation from Gas Turbine Engines, LNG/LH-2 Cryo pumps, Micro-Turbines, HVAC, Waste Water Treatment blowers, Fuel Cell blowers, automotive range extenders, and torque motors for electric aircraft.

BOOTH 215

Element Digital Engineering

The East Mill, Darley Abbey Mills,
Darley Abbey, Derby, DE22 1DZ, UK

www.element.com

Element Digital Engineering is the simulation, digital and data arm of Element Materials Technology. We work with turbomachinery companies around the world to optimise design, operational performance and safety using a range of engineering analysis, simulation, digital twinning and data mining.

BOOTH 528

ENOGIA

19 Rue Paul Heroult,
Marseille, 13015, France

www.enogia.com/en/home

As a global player in the design of micro-turbomachinery, ENOGIA relies on its unique technology to offer innovative solutions in heat-to-electricity conversion systems (ORC) and air compressors for hydrogen fuel cells.

BOOTH 508

Ergon Research

Via Campani 50, Firenze,
50127, Italy

www.ergonresearch.it

Ergon Research is a consulting firm operating in the mechanical, energy and informatics engineering fields, specialized in: CFD and multi-physics simulations, design of experimental test rigs and facilities, development of customized software applications for the integrated design of complex systems.

ETN Global

BOOTH 448

ETN Global

Chaussée de Charleroi
146-148/20, Brussels,
1050, Belgium

www.etn.global

ETN Global is a non-profit membership association bringing together the entire value chain of the gas turbine technology. Through cooperative efforts and by initiating common activities and projects, ETN encourages and facilitates information exchange and cooperation to accelerate research, development, demonstration, and deployment of safe, secure, affordable and dispatchable carbon-neutral energy solutions by 2030. ETN Global members are composed of experts within gas turbine community: power generation and oil & gas companies, OEMs, R&D institutes, suppliers, service providers and technology consultancies. Currently ETN has 112 members from 21 countries around the world.

Exhibitors

BOOTH 353

EVIDENT

50 Avenue Robert Schuman,
Rungis, 94150, France

www.olympus-ims.com/fr/evident

Evident Industrial's solutions range from microscopes and videoscopes to nondestructive testing equipment and X-ray analyzers for maintenance, manufacturing and environmental applications. Backed by state-of-the-art technologies, Evident products are widely used for quality control, inspection, and measurement.

BOOTH 419

Evolution Measurement

7 Regents Ct, South Way,
Walworth Business Park,
Andover, Hampshire SP10 5NX UK

www.evolutionmeasurement.com

Evolution Measurement is based in the UK and provide bespoke solutions in multi-point pressure and temperature measurement, engineering automated calibration and test systems and delivering turnkey measurement solutions. They represent leading manufacturers, whilst manufacturing their own EvoScann® miniature pressure scanners.

FLOWNEX® SIMULATION ENVIRONMENT

BOOTH 405

Flownex Simulation Environment

24 Totius Street, Totius Park,
Block E & F, Potchefstroom, West
North-West, 2531 South Africa

www.flownex.com

Flownex Simulation Environment is an 1D simulation tool allowing users to use detailed component models in integrated system simulation, opening new frontiers in engineering simulations of Gas Turbine systems. Flownex is designed with easy workflow, fast solving and performance optimisation algorithms and over 30 years of industry experience and is certified to the ISO9001:2015 standard and is ASME NQA-1 compliant. Accurately model thermal-fluid behaviour of secondary air systems, evaluate multiple combustions chamber design configurations, simulate lubrication systems and investigate the future impact of design decisions on the overall cycle performance such as hydrogen conversions: saving you engineering time and costs.

BOOTH 246

FOGALE nanotech

125, rue de l'Hostellerie, Ville
Active, Bât A - Parc Acti plus,
Nimes, 30900, France

www.fogale.com/turbomachinery

Fogale Nanotech is a world leader in the procurement, installation and maintenance of non-contact clearance and vibration measurement systems for gas turbine blade and shaft monitoring in the power generation and aeronautics sectors.

BOOTH 512

Franke Industrie AG

Franke-Strasse 2, Aarburg,
CH-4663, Switzerland

www.industech.ch

When it comes to fabricated and machined components, Franke Industries is your reliable partner within the Gas Turbine, Aerospace and Space industry. With experience since the 1950's, we inventively support your projects from the very first concept to the engine-ready component.

BOOTH 513

GadCap Technical Solutions Ltd.

3 Rutherford Road, Washington,
Tyne and Wear, NE37 3HX, UK

www.capacisense.com

With over 30 years of experience, the GadCap CapaciSense system combines contactless blade tip clearance and blade vibration monitoring measurements, using high temperature captive capacitive sensor withstanding temperatures up to 1400°C/2552°F, enabling to monitor in real-time every blade during operation.

Exhibitors

BOOTH 226

Gas Turbine Society of Japan

7-5-13-402, Nishi-Shinjuku, Shinjuku-ku, Tokyo 160-0023, Japan

www.gtsj.or.jp/english

"GTSJ is the only Japanese domestic professional society on the area of gas turbine, propulsion, and energy systems. GTSJ aims to promote science, technology and social development through information exchange, publication, technology research and other activities in the fields of all types of gas turbines, and energy conversion systems."

BOOTH 526

Gas Turbine World

652 Hillside Ave, Fairfield, CT 06824, USA

www.gasturbineworld.com

Gas Turbine World is the one industry publication that's GT-focused, globally-aware and dedicated to covering the development and application of industrial gas turbine power in all its forms.

BOOTH 514

GasTurb GmbH

Melatener Str. 70, Aachen, 52074, Germany

www.gasturb.de

GasTurb is a powerful and flexible software for calculating design and off-design performance of gas turbines. It simulates the most common types of both aircraft and power generation turbines. The latest version GasTurb 14 also features hybrid/electric propulsion systems.

BOOTH 421

GTI Energy

1700 S. Mount Prospect Road, Des Plaines, IL 60018, USA

www.gti.energy

GTI Energy is a leading research and training organization. Our trusted team works to scale impactful solutions that shape energy transitions by leveraging gases, liquids, infrastructure, and efficiency. We embrace systems thinking, open learning, and collaboration to develop, scale, and deploy the technologies needed for low-carbon, low-cost energy systems.

BOOTH 452

Holland-Controls B.V.

Adam Smithstraat 6, Hengelo, 7559 SW, The Netherlands

www.holland-controls.com

Holland-Controls owns key competence in control systems for gas turbine installations. This accounts for the software and hardware design, parts procurement, in-house and on-site testing, subcontracting and supervision for on-site construction, commissioning, handover, customer training and support.

BOOTH 329

Hood Technology Corporation

3345 Cascade Ave, Hood River, OR 97031, USA

www.hoodtech.com

Hood Technology Corporation is a small, innovative engineering company located in Hood River, Oregon, USA, specializing in blade vibration & monitoring (BVM) for rotating machinery including gas turbine engines, turbochargers, steam turbines and compressors.

BOOTH 247

IfTA GmbH

Junkersstrasse 8, Puchheim, 82178, Germany

www.ifta.com/en

Real-time measurement, analysis, long-term condition monitoring and protection solutions specialized on combustion dynamics, rotor dynamics and test beds.

BOOTH 346

IHI Hauzer Techno Coating B.V.

Van Heemskerckweg 22, LL Venlo, 5928, The Netherlands

www.hauzer.nl

Hauzer is specializes in PVD coating technologies with a wide range of batch and inline equipment. Bernex is a CVD expert, they provide the best coating equipment to the market.

Exhibitors

BOOTH 504

ILT TECNOLOGIE

Via Torino, 1, Ponsacco PI, 56038, Italy

ilttecnologie.eu/en

We work with precision special materials such as alloys, stainless steel, titanium and aluminum for the energy gas turbine marker as well as engines for the aeronautical sector.

BOOTH 446

Istec International

Meer en Duin 8, Lisse, 2163 HA, The Netherlands

www.istec.com/en/product/speedsys-200

Istec is an expert in the field of (over) speed measurements and protection and has developed the next generation of overspeed detection systems: SpeedSys.

BOOTH 212

Kingsbury, Inc.

Wilhelm-Lambrecht-Str. 2, Göttingen, 37079, Germany

www.kingsbury.com

Kingsbury, in business since 1912, is the first and leading manufacturer of fluid-film thrust and journal bearings. Our products are used in a wide variety of turbo machinery, including steam and gas turbines, compressors, gearboxes and pumps, with shaft sizes ranging from 25 to 1400 mm, and sliding velocities up to 130 m/sec. Please visit www.kingsbury.com for more details.

PUB BINS

Linquip Corp

440 North Wolfe Road, Unit #283, Sunnyvale, CA 94085, USA

www.linquip.com

A professional network for equipment manufacturers, industrial customers, and service providers.

BOOTH 218

M+P International

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www.mpihome.com

m+p international is a worldwide supplier of high-quality measurement systems. Many years of close cooperation with our customers, expertise of our engineers and a policy of ongoing research and development are the guarantee for the convincing performance of our products.

PUB BINS

Mechanical Engineering Magazine

Two Park Avenue, New York, NY 10016, USA

www.asme.org/membership/mechanical-engineering-magazine

Mechanical Engineering® is the award-winning flagship publication of ASME.

BOOTH 228

Miba Industrial Bearings

Dr.-Mitterbauer-Strasse 3, Laakirchen, Austria 4663

www.miba.com/en/product-areas/industrial-bearings

Miba Industrial Bearings produces hydrodynamic bearings for use in critical rotating equipment, such as turbines, compressors, generators and industrial pumps. Our bearings are used in power generation as well as in the oil and gas industry and the petrochemical industry.

BOOTH 449

Micro Turbine Technology

Esp 310, Eindhoven, 5633AE, The Netherlands

www.mtt-eu.com

MTT developed its patented micro turbine technology in the period 2006 - 2009. This technology was initially used in the EnerTwin micro CHP system, a small power plant for domestic and SME applications.

BOOTH 415

Mineral Insulated Cable Company Ltd

21 Sedling Road, Washington, Sunderland, Tyne and Wear, NE38 9BZ, UK

www.miccltd.com

MICC (Mineral Insulated Cable Company) are the World's only manufacturers of the full range of mineral insulated cable products

Exhibitors

BOOTH 313

MMP Technology

5579 Spellmire Dr, Cincinnati, OH 45246, USA

www.mmptechnology.com

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BOOTH 214

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www.modernpowersystems.com

Published for over 40 years, Modern Power Systems (MPS) examines the subjects that are changing the electricity sector, from low carbon generation, to smart grid, digitisation and beyond. Reaching over 30,000 power industry professionals worldwide with every issue, MPS is the only truly global business journal for the international power industry, offering a trusted and targeted platform for your marketing activities.

BOOTH 319

National Aeronautics and Space Administration

21000 Brookpark Rd, MS 142-1, Cleveland, OH 44135, USA

www.nasa.gov

NASA Aeronautics is engaging with industry, academia, and other agencies to advance turbine engine technologies to meet the extreme challenge of aviation decarbonization. Visit the NASA booth to learn about our turbine work in the Sustainable Flight National Partnership.

BOOTH 225

Notre Dame Turbomachinery Laboratory

100 White Field, Notre Dame, IN 46556, USA

www.turbo.nd.edu

NDTL is a research and development facility combining an academic research program with a mid-TRL development and validation test facility serving the aerospace and power generation industries. NDTL supports high energy, high complexity tests to validate technologies for product insertion.

BOOTH 213

OROS

23 Chemin Des Pres, Inovalle 4403, Meylan Cedex, 38944, France

www.oros.com

OROS designs and manufactures noise and vibration testing systems (instruments and software) for more than 35 years, meeting the requirements and expectations of automotive, aerospace, marine energy & process, manufacturing and automation industries.

BOOTH 318

PCA Engineers Limited

Studio 2, Deepdale Enterprise Park, Deepdale Lane, Nettleham, LINC, LN2 2LL, UK

www.pcaeng.co.uk

PCA Engineers Limited is a UK consultancy specialist in aero-mechanical design of turbomachinery and the supply of engineering software. Experienced in radial and axial flow technologies, PCA has supported many of the world's leading manufacturers for over 30 years.

BOOTH 220

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www.photron.com

Photron is a developer and manufacturer of high-speed imaging systems for applications in research and industry. Offering full mega-pixel resolution at up to 20,000fps and >2 million fps at reduced resolution with high light sensitivity and image quality.

Exhibitors

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Präwest Präzisionswerkstätten GmbH & Co. KG.

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www.praewest.com

Twenty-four hours a day, 365 days a year, we are meeting the challenges of our customers in our workshop with its ultra-modern machine park. A relationship of mutual trust has grown between ourselves and our customers based on decades of successful cooperation. The basis for this is our highly qualified and motivated staff.

BOOTH 214

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www.empresariosagrupados.es/?lang=en

Empresarios Agrupados Internacional S.A. (EAI) is an engineering company based in Madrid (Spain). EAI is one of the biggest engineering companies in the world in the energy sector. Since 1971, EAI has been involved in the design of 65 Combined Cycle, 8 Nuclear and 27 Coal and Oil-Fired Power plants in the world, with a total installed power of over 47000 megawatts.

BOOTH 429

Sensing360 B.V.

www.sensing360.com/products

Sensing360 used optical sensors to optimize your rotation, we improve reliability by design, availability by condition monitoring and efficiency by operation control.

BOOTH 347

Sensor Coating Systems Limited

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www.sensorcoatings.com

Advanced heat transfer diagnostic: SCS provides advanced thermal mapping, digitizing thousands of temperature data points on mission-critical components. The thermal history technology measures a range of 150°C – 1,600°C +/ 300°F – 2,900°F+, with increased capabilities enabling faster product delivery.

BOOTH 209

Sensorade

151 Rue des Ormes, Lambermont, B-4800, Belgium

www.sensorade.eu

Created in 2019, SENSORADE is specialized in unique ultra-miniaturized pressure sensors for harsh environments. We serve especially the Fluid Mechanics Analysis applications (Wind Tunnel and Testing Engineering community) e.g. turbomachinery, automotive (F1), aerospace and other industrial fluid dynamic applications.

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Technologiepark-Zwijnaarde 122, Gent, 9052, Belgium

www.senteatech.com

Sentea develops small and cost-effective data acquisition systems for fiber optic sensors. Sentea interrogators enable continuous monitoring in even the harshest environments, for a wide range of industries including wind energy, oil & gas, transport, civil infrastructure, and heavy industry.

BOOTH 509

Sesta Lab

Co.Svi.G. Scrl, S.P. 35 Km 2,7, Radicondoli, 53030, Italy

www.sestalab.com

Sesta Lab is an industrial area to test combustion system for gas turbine. The test size is between 1MW to 100MW in particular conditions. Sesta Lab is leader in fuel flex thanks to syngas systems, hydrogen, and many others. One of our test cell has optical analysis instrumentations.

BOOTH 229

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Exhibitors

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www.siemens.com/software

Siemens Digital Industries Software is driving transformation to enable a digital enterprise where engineering, manufacturing and electronics design meet tomorrow. The Xcelerator portfolio helps companies of all sizes create and leverage digital twins to drive innovation.

BOOTH 424

SoftInWay Inc.

1500 District Avenue,
Burlington, MA 01803, USA

www.softinway.com

SoftInWay is an international engineering R&D company specializing in the development of clean, efficient, reliable turbomachinery & propulsion systems. SoftInWay supports its customers through its integrated & automated software, AxSTREAM ® for all steps of the turbomachinery design, redesign, analysis, & optimization process (including complete 3D design, thermodynamic cycles, rotor dynamics, & secondary flow & cooling system simulation). We also offer a number of engineering services & educational courses. SoftInWay is ISO 9001:2015 & AS9100:2016 certified. We currently support more than 450 companies, research labs/universities & government organizations worldwide.

BOOTH 439

Stork Turbo Blading BV

Kamerlingh Onnesstraat 21,
Sneek, The Netherlands

www.stork.com/en/capabilities/equipment-manufacturing-repair/turbine-blades-components

Stork Turbo Blading supplies high-quality blades and complex components for all turbomachinery equipment. We work for and deliver to all major Original Equipment Manufacturers (OEMs), Independent Service Providers (ISPs) and end users.

BOOTH 320

TEES - Turbomachinery Laboratory

Texas A&M University, 3254 TAMU,
College Station, TX 77843, USA

www.tps.tamu.edu

The Turbomachinery and Pump Symposia (TPS) serves as the premier training and networking opportunity for professionals in both pump and turbomachinery industries. TPS 2022 will be held September 12-15, 2022 at the George R. Brown Convention Center in Houston, Texas. The annual event combines a world-class program with an international exhibit hall. Each year the event attracts more than 4,500 people and 350 exhibiting companies from 48 countries.

BOOTH 208

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PUB BINS

The Energy Industry Times

Man in Black Media, 43 Woodend Road, London, E17 4JS, UK

www.teitimes.com

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BOOTH 548

Thomassen Energy BV

Havelandseweg 8D, Rheden,
The Netherlands

www.thomassen.energy

Thomassen Energy, in partnership with PSM, delivers innovative, clean energy solutions to gas turbine plants worldwide as part of the Hanwha Impact division of Hanwha Group gas turbine services organization. We are the leading high-technology aftermarket service provider for multi-OEM platform gas turbine plants worldwide.

Exhibitors

BOOTH 207

ToffeeAM ltd

Mappin House, 4 Winsley Street, London, W1W 8HF, UK

www.toffeeam.co.uk

TOffeeAM is a robust fluid topology optimization, cloud-based platform (Software as a Service) that automates the design and optimisation process for engineering components such as heat exchangers, thermal management systems, cold plates, electrical components, and more.

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www.torquemeters.com

Pioneers in driveline development, Torquemeters designs and manufactures high-performance power transmission & measurement systems, for the test and performance monitoring of turbomachinery and high-performance rotating machinery applications, for the world's leading independent R&D organisations, aerospace & industrial turbomachinery companies.

BOOTH 428

Turbine Services, Ltd.

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www.turbineservices.com/landing

Turbine Services Ltd. provides new replacement parts for GE and Westinghouse Gas and Steam Turbines. We ensure the same fit, form and function as the original OEM parts, with the highest quality and competitive pricing and lead times.

BOOTH 324

Turbocam International

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www.turbocam.com

TURBOCAM International We specialize in manufacturing core turbomachinery flow path components for aviation, rocketry, automotive turbocharger, and power generation, offering bold and creative solutions to today's challenges.

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Turbostream Ltd

3 Charles Babbage Road, Cambridge, CB3 0GT, UK

www.turbostream-cfd.com

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BOOTH 443

Valmet Automation

Lentokentänkatu 11, PO Box 237, TAMPERE, FI-33101, Finland

www.valmet.com

Valmet Automation is an independent Control Systems supplier for turbomachinery, like gas, steam and hydro turbines. The Valmet system includes the turbine control system with integrated solution for driven equipment and auxiliaries. Machine protection and vibration protection & diagnostics included.

BOOTH 541

VBR Turbine Partners

Industrieweg Oost 6, Elst, Gelderland, 6662NE, The Netherlands

www.vbr-turbinepartners.com

VBR Turbine Partners is an independent global competence centre for GE LM aeroderivative gas turbines and their control systems, auxiliary systems & enclosures: LM2500(+,G4,DLE) LM6000 (PA-PH)TM2500(+) Speedtronic Woodward.

BOOTH 518

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www.vectoflow.de/en

Vectoflow makes standard and customized measurement solutions to determine the state of a flow! Our customized multi-hole-probes and fluid measurement solutions determine, e.g., pressure, velocity, flow angle, and temperature and can be easily customized using advanced additive manufacturing processes.

Exhibitors

BOOTH 515

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Am Technologiezentrum 5,
Augsburg, 86159, Germany

www.velo3d.com

Velo3D is a technology company that helps innovators 3D-metal print their most ambitious designs. We provide an end-to-end solution, which is a combination of hardware, software, and underlying manufacturing process. Some of our customers include SpaceX, Honeywell, and Lam Research.

BOOTH 205

Waukesha Bearings Corporation

Trinity Court, Batchworth Island,
Church Street, Rickmansworth,
Hert, WD3 1RT, UK

www.waukbearing.com

Custom-Engineered Fluid Film & Magnetic Bearing Solutions for High-Performing Rotating Equipment.

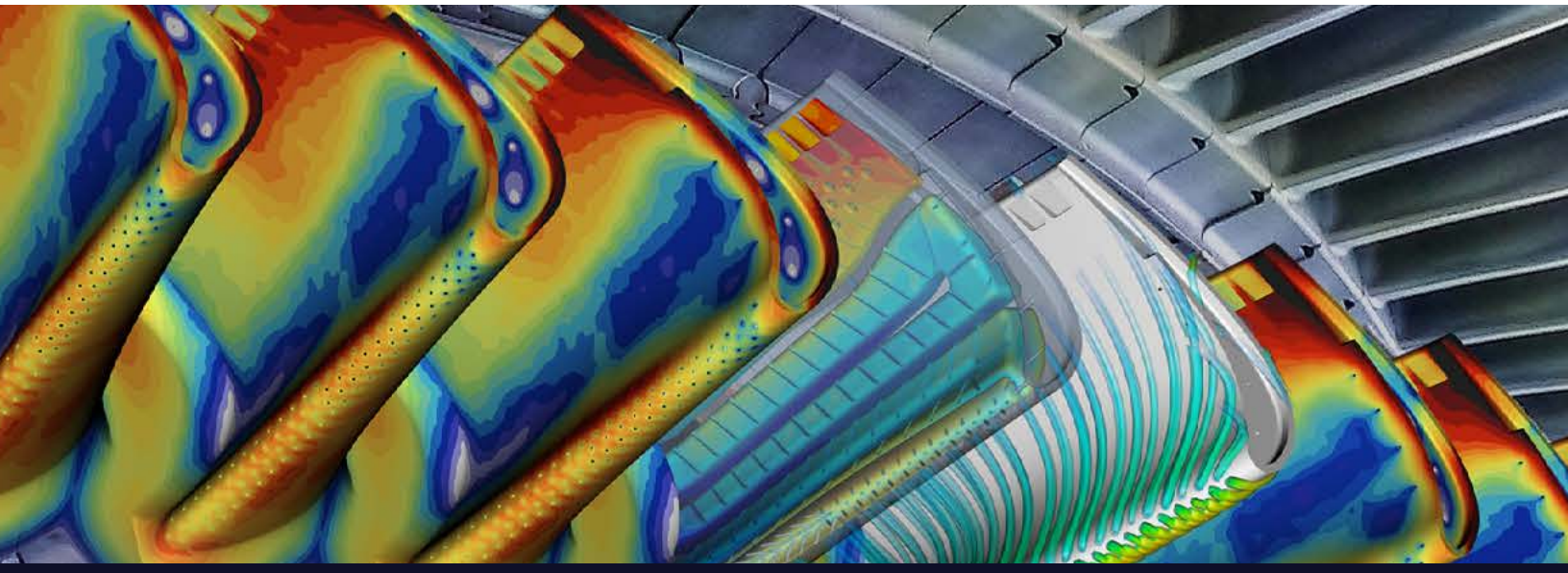
BOOTH 232

Yaskawa Environmental Energy / The Switch

Elimäenkatu 17-19,
Helsinki, Finland 510

www.theswitch.com

A gap exists in the high-speed electrical motor market between machines rated up to 200 kW using permanent magnet technology and induction machines rated for multi-megawatt power. The Switch solid-rotor technology fills this gap with integrated and standalone direct-drive machines.



Exhibitor Social Media

Advanced Design Technology Ltd.
@ADT_TURBO
Advanced Design Technology, Ltd.

Advituro BV
Advituro BV

ASME Turbo Expo 2023
@ASMEIGTI
@IGTI
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Cadence CFD

Calnetix Technologies
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CEROBEAR GmbH
cerobear-gmbh

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Chell Instruments Limited

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@ConceptsNREC
Concepts NREC

Convergent Science GmbH
@ConvergentScience
@convergecfd
convergent-science-inc

Cross Manufacturing
cross-manufacturing-company-1938-ltd

Dassault Systemes Simulia Corp.
Dassault Systèmes

Dutch Gas Turbine Association
dutch-gas-turbine-association

Ergon Research
@ergonresearch
Ergon Research

ETN Global
@etngasturbine
ETN Global

Evolution Measurement
@EvolutionMeasurement
@EvoMeasurement
evolutionmeasurement

Flownex Simulation Environment
@Flownex
Flownex® SE

Franke Industrie AG
Franke Industries

GadCap Technical Solutions Ltd.
gadcap

Holland-Controls B.V.
holland-controls-b.v.

IfTA GmbH
ifta-ingenieurb-ro-f-r-thermoakustik-gmbh

IHI Hauzer Techno Coating B.V.
@HauzerTechnoCoating
hauzer-techno-coating-bv

Istec International
istec-international-b-v-

Kingsbury, Inc.
Kingsbury, Inc.

M+P International
m-p-international

Miba Industrial Bearings
@mibagroup
Miba Industrial Bearings

Micro Turbine Technology
OROS

OROS
@scanivalve

Photron Europe Ltd
@Photron
@Photron_HSV
photron

Präwest Präzisionswerkstätten GmbH & Co. KG.
Präwest Präzisionswerkstätten Dr.-Ing H.-R. Jung GmbH&Co KG

Sensing360 B.V.
Sensing360 B.V.

Sentea nv
sentea-technologies

Sesta Lab
sesta-lab

Shaft Current Solutions, DBA Sohre Turbomachinery
carstenbuchholz

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Thomassen Energy

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turbine-services-ltd

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@Turbocam
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Turbostream Ltd
Turbostream

VBR Turbine Partners
VBR Turbine Partners

Vectoflow GmbH
Vectoflow

Yaskawa Environmental Energy / The Switch
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@theswitchenergy
the-switch-energy

Exhibitor Product Categories

3D Inspection and Measurements

Präwest Präzisionswerkstätten GmbH & Co. KG.

Additive Manufacturing

Cambridge Flow Solutions Ltd
Cross Manufacturing
Dassault Systemes Simulia Corp.
Ergon Research
IHI Hauzer Techno Coating B.V.
MMP Technology EU
Präwest Präzisionswerkstätten GmbH & Co. KG.
TEMA ENERGY srl
Vectoflow GmbH

Aeroderivative Gas Turbine Repair & Overhaul

Cambridge Flow Solutions Ltd
Cross Manufacturing
Holland-Controls B.V.
Präwest Präzisionswerkstätten GmbH & Co. KG.
VBR Turbine Partners

Air Systems

Cambridge Flow Solutions Ltd
Convergent Science GmbH
Dassault Systemes Simulia Corp.
Ergon Research
Evolution Measurement
Sensorade

Analytical

Advanced Design Technology Ltd.
Chell Instruments
Evolution Measurement
GasTurb GmbH
Sensing360 B.V.

Ancillary Equipment

Shaft Current Solutions, DBA Sohre Turbomachinery
VBR Turbine Partners

Automated 3d Inspection And Measurements

Präwest Präzisionswerkstätten GmbH & Co. KG.

Axial & Centrifugal Compressors

Advanced Design Technology Ltd.
Calnetix Technologies
Convergent Science GmbH
Cross Manufacturing
e+a
Ergon Research
Evolution Measurement
Holland-Controls B.V.
PCA Engineers Limited
Sensing360 B.V.
Sensorade
Shaft Current Solutions, DBA Sohre Turbomachinery
SoftInWay Inc.
Turbostream Ltd

Bearings, Seals & Lubricants

Calnetix Technologies
CEROBEAR GmbH
Cross Manufacturing
Dassault Systemes Simulia Corp.
Ergon Research
Kingsbury, Inc.
Miba Industrial Bearings
MMP Technology EU
Sensing360 B.V.
Shaft Current Solutions, DBA Sohre Turbomachinery
SoftInWay Inc.
Turbine Services, Ltd.
VBR Turbine Partners

Components

Dassault Systemes Simulia Corp.
e+a
IHI Hauzer Techno Coating B.V.
Miba Industrial Bearings
MMP Technology EU
Präwest Präzisionswerkstätten GmbH & Co. KG.
Sensing360 B.V.
Shaft Current Solutions, DBA Sohre Turbomachinery
TEMA ENERGY srl
Turbine Services, Ltd.
Yaskawa Environmental Energy / The Switch

Consulting & Engineering Services

Advanced Design Technology Ltd.
Cambridge Flow Solutions Ltd
Chell Instruments
Concepts NREC
Convergent Science GmbH
Dassault Systemes Simulia Corp.
Ergon Research
Evolution Measurement
Flownex Simulation Environment
GasTurb GmbH
Hood Technology Corporation
IfTA GmbH
Istec International
Miba Industrial Bearings
Micro Turbine Technology
PCA Engineers Limited
Präwest Präzisionswerkstätten GmbH & Co. KG.
Sensing360 B.V.
Sentea nv
Shaft Current Solutions, DBA Sohre Turbomachinery
SoftInWay Inc.
ToffeeAM ltd
Turbostream Ltd

Exhibitor Product Categories

VBR Turbine Partners

Controls/Instrumentation

Chell Instruments
Evolution Measurement
Holland-Controls B.V.
Hood Technology Corporation
IfTA GmbH
Sensorade
Sentea nv
VBR Turbine Partners
Vectoflow GmbH

Design Process & Methodoligies

Advanced Design Technology Ltd.
Cambridge Flow Solutions Ltd
Convergent Science GmbH
Dassault Systemes Simulia Corp.
Ergon Research
Evolution Measurement
Flownex Simulation Environment
GasTurb GmbH
Micro Turbine Technology
Sensing360 B.V.
SoftInWay Inc.
ToffeeAM ltd
Turbostream Ltd

Drive Train Equipment

Convergent Science GmbH
Cross Manufacturing
Dassault Systemes Simulia Corp.
e+a
MMP Technology EU
Shaft Current Solutions, DBA Sohre Turbomachinery
Yaskawa Environmental Energy / The Switch

Education

Concepts NREC
Dassault Systemes Simulia Corp.
GasTurb GmbH
SoftInWay Inc.
TEES - Turbomachinery Laboratory
VBR Turbine Partners

Expanders

Calnetix Technologies
Cross Manufacturing
Dassault Systemes Simulia Corp.
e+a
Ergon Research
PCA Engineers Limited
Präwest Präzisionswerkstätten GmbH & Co. KG.
SoftInWay Inc.

Fans & Blowers

Advanced Design Technology Ltd.
Calnetix Technologies
Cambridge Flow Solutions Ltd
Convergent Science GmbH
Cross Manufacturing
Dassault Systemes Simulia Corp.
e+a
PCA Engineers Limited
Präwest Präzisionswerkstätten GmbH & Co. KG.
Sensorade
Shaft Current Solutions, DBA Sohre Turbomachinery
SoftInWay Inc.
Turbine Services, Ltd.

Filters

Convergent Science GmbH
Cross Manufacturing
Dassault Systemes Simulia Corp.
Turbine Services, Ltd.

Fire Protection Systems

Convergent Science Gmbh
Dassault Systemes Simulia Corp.

Fuel Systems

Convergent Science GmbH
Cross Manufacturing
Dassault Systemes Simulia Corp.
Evolution Measurement
IHI Hauzer Techno Coating B.V.
MMP Technology EU
Sensorade
SoftInWay Inc.

Gas Turbines

Advanced Design Technology Ltd.
Cambridge Flow Solutions Ltd
Convergent Science GmbH
Cross Manufacturing
Dassault Systemes Simulia Corp.
e+a
Ergon Research
Evolution Measurement
Flownex Simulation Environment
GasTurb GmbH
Holland-Controls B.V.
IHI Hauzer Techno Coating B.V.
Micro Turbine Technology
MMP Technology EU
PCA Engineers Limited
Präwest Präzisionswerkstätten GmbH & Co. KG.
Sensorade
Shaft Current Solutions, DBA Sohre Turbomachinery
SoftInWay Inc.
TEES - Turbomachinery Laboratory
TEMA ENERGY srl
Thomassen Energy BV
Turbine Services, Ltd.
Turbostream Ltd
VBR Turbine Partners
Vectoflow GmbH

Gear Type Compressors

Cross Manufacturing
Dassault Systemes Simulia Corp.

Exhibitor Product Categories

MMP Technology EU
Präwest Präzisionswerkstätten GmbH & Co. KG.
Sensorade

Isotherm Compressors

Dassault Systemes Simulia Corp.
Evolution Measurement
Präwest Präzisionswerkstätten GmbH & Co. KG.

Laser And Optical 3d Scanning

Dassault Systemes Simulia Corp.

Laser Drilling

TEMA ENERGY srl

Laser Machining

TEMA ENERGY srl

Laser Welding

Präwest Präzisionswerkstätten GmbH & Co. KG.
TEMA ENERGY srl
Vectoflow GmbH

Maintenance And Operation

Cambridge Flow Solutions Ltd
Chell Instruments
Dassault Systemes Simulia Corp.
Evolution Measurement
Istec International
Miba Industrial Bearings
Sensing360 B.V.
Sentea nv
Thomassen Energy BV
VBR Turbine Partners

Management & Maintenance Of Rotating Equipment

Cambridge Flow Solutions Ltd
Dassault Systemes Simulia Corp.
Evolution Measurement
IfTA GmbH
Istec International
Sensing360 B.V.
Sentea nv
Shaft Current Solutions, DBA Sohre Turbomachinery
VBR Turbine Partners

Manufacturing Processes

Concepts NREC
Cross Manufacturing
Dassault Systemes Simulia Corp.
IHI Hauzer Techno Coating B.V.
MMP Technology EU
Präwest Präzisionswerkstätten GmbH & Co. KG.
TEMA ENERGY srl
Turbine Services, Ltd.
Vectoflow GmbH

Monitoring Software

GasTurb GmbH
Hood Technology Corporation
IfTA GmbH
Istec International
M+P International
OROS
Sensing360 B.V.
Sentea nv
VBR Turbine Partners

Oem Gas Turbine/ Power Turbine

Calnetix Technologies
Convergent Science GmbH
Cross Manufacturing
Dassault Systemes Simulia Corp.
e+a
Evolution Measurement
Miba Industrial Bearings
Micro Turbine Technology
Präwest Präzisionswerkstätten GmbH & Co. KG.
Sensorade
SoftInWay Inc.
Thomassen Energy BV

Oil Systems

Cross Manufacturing
Dassault Systemes Simulia Corp.
Evolution Measurement
Sensorade
SoftInWay Inc.

Package/Turnkey Applications

Dassault Systemes Simulia Corp.
Evolution Measurement

Process Control Systems

Chell Instruments
Dassault Systemes Simulia Corp.
Evolution Measurement
Sensing360 B.V.
Sensorade

Process Gas Screw Compressors

Cross Manufacturing
Dassault Systemes Simulia Corp.
Evolution Measurement
Holland-Controls B.V.
Sensorade

Service For Turbines & Compressors

Advanced Design Technology Ltd.
Cambridge Flow Solutions Ltd
Dassault Systemes Simulia Corp.
Ergon Research
Hood Technology Corporation
MMP Technology EU
Präwest Präzisionswerkstätten GmbH & Co. KG.
Shaft Current Solutions, DBA Sohre Turbomachinery
SoftInWay Inc.
TEMA ENERGY srl

Exhibitor Product Categories

Thomassen Energy BV
VBR Turbine Partners

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Advanced Design Technology Ltd.
Cadence Design Systems Ltd
Cambridge Flow Solutions Ltd
Concepts NREC
Convergent Science GmbH
Convergent Science GmbH
Dassault Systemes Simulia Corp.
Dassault Systemes Simulia Corp.
Ergon Research
Flownex Simulation Environment
GasTurb GmbH
Hood Technology Corporation
IfTA GmbH
PCA Engineers Limited
SoftInWay Inc.
SOLAR
ToffeeAM ltd
Turbostream Ltd

Special Materials

Cross Manufacturing
Dassault Systemes Simulia Corp.
IHI Hauzer Techno Coating B.V.
MMP Technology EU
Vectoflow GmbH

Steam Turbines

Advanced Design Technology Ltd.
Cambridge Flow Solutions Ltd
Convergent Science GmbH
Cross Manufacturing
Dassault Systemes Simulia Corp.
Ergon Research
Evolution Measurement
Holland-Controls B.V.
PCA Engineers Limited
Präwest Präzisionswerkstätten GmbH & Co. KG.
Sensorade
Shaft Current Solutions, DBA Sohre Turbomachinery
SoftInWay Inc.
Turbine Services, Ltd.
Turbostream Ltd

Testing

Chell Instruments
Concepts NREC
Convergent Science GmbH
Cross Manufacturing
Evolution Measurement
IfTA GmbH
IHI Hauzer Techno Coating B.V.
M+P International
OROS
Sensorade
Sesta Lab
Shaft Current Solutions, DBA Sohre Turbomachinery
TEES - Turbomachinery Laboratory
VBR Turbine Partners
Vectoflow GmbH
Yaskawa Environmental Energy / The Switch

Vacuum Heat Treating And Brazing Services

IHI Hauzer Techno Coating B.V.
Präwest Präzisionswerkstätten GmbH & Co. KG.

Waterjet Cutting/Drilling

Convergent Science GmbH
TEMA ENERGY srl

Wind Turbines

Cambridge Flow Solutions Ltd
Convergent Science GmbH
Cross Manufacturing
Dassault Systemes Simulia Corp.
Ergon Research
Evolution Measurement
Präwest Präzisionswerkstätten GmbH & Co. KG.
Sensing360 B.V.
Sensorade
Shaft Current Solutions, DBA Sohre Turbomachinery
Turbostream Ltd

Committee Leaders

Aircraft Engine

Current Chair: Konstantinos Kyprianidis
Current Vice Chair: Oscar Kogenhop
Incoming Chair: Oscar Kogenhop
Incoming Vice Chair: Prof. Dr.-Ing. Harald Funke

Ceramics

Current Chair: Rajesh S. Kumar
Current Vice Chair: Michael Presby

Coal, Biomass & Alternative Fuels

Current Chair: Pierre Q. Gauthier
Current Vice Chair: Dr Marina Braun-Unkhoff
Incoming Chair: Dr Marina Braun-Unkhoff
Incoming Vice Chair: Angela Serra

Combustion, Fuels & Emissions

Current Chair: Rudy Dudebout
Current Vice Chair: Dr. Sebastien Ducruix

Controls, Diagnostics & Instrumentation

Current Chair: Liang Tang
Current Vice Chair: Igor Loboda
Incoming Chair: Igor Loboda
Incoming Vice Chair: Dr. Lubomir A. Ribarov

Cycle Innovations

Current Chair: Panos Laskaridis
Current Vice Chair: Ward De Paepe

Education

Current Chair: Subith Vasu
Current Vice Chair: Ioanna Aslanidou
Incoming Chair: Lamyaa El-Gabry
Incoming Vice Chair: Subith Vasu

Electric Power

Current Chair: John Gülen
Current Vice Chair: Richard Tomlinson
Incoming Chair: Richard Tomlinson
Incoming Vice Chair: Thomas Christiansen

Fans and Blowers

Current Chair: Dr. Giovanni Delibra
Current Vice Chair: Dr Zhiping Wang
Incoming Chair: Zhiping Wang
Incoming Vice Chair: Till M. Biedermann

Heat Transfer

Current Chair: Marc D. Polanka
Current Vice Chair: Atul Kohli
Incoming Chair: Atul Kohli
Incoming Vice Chair: Eric Ruggiero

Industrial & Cogeneration

Current Chair: Clement Joly
Current Vice Chair: Sergio M. Camporeale

Manufacturing Materials & Metallurgy

Current Chair: William David Day
Current Vice Chair: Sascha Gierlings
Incoming Chair: Sascha Gierlings
Incoming Vice Chair: Scott Keller

Marine

Current Chair: Jeffrey S. Patterson
Current Vice Chair: Richard Garrett McKay Jr (Garrett)

Microturbines, Turbochargers & Small Turbomachines

Current Chair: Jose R. Serrano
Current Vice Chair: Grant Musgrove

Oil & Gas Applications

Current Chair: Mauro Venturini
Current Vice Chair: Jason Wilkes

Steam Turbine

Current Chair: Grant Ingram
Current Vice Chair: Kane Chandler

Structures & Dynamics

Current Chair: Michael Gorelik
Current Vice Chair: Thomas Weiss
Incoming Chair: Thomas Weiss
Incoming Vice Chair: Mateusz Golebiowski, Ph.D.

Student Advisory

Current Chair: Mavroudis Kavvalos
Current Vice Chair: Dimitra Eirini Diamantidou

Supercritical CO_2

Current Chair: Nathan Weiland
Current Vice Chair: Timothy Allison

Turbomachinery

Current Chair: Luca Porreca
Current Vice Chair: Dr Bronwyn Power

Wind Energy

Current Chair: Juan Carlos Juaregui Correa
Current Vice Chair: Giacomo Persico

Committee Meeting Schedule

Committee	Meeting Date	Time	Location	Room Location
Aircraft Engine	Thursday, June 16	6:00 pm - 7:30 pm	AHOY	Dock 10A
Ceramics	Wednesday, June 15	6:00 pm - 7:30 pm	AHOY	Dock 1A
Coal, Biomass & Alternative Fuels	Wednesday, June 15	6:00 pm - 7:30 pm	AHOY	Dock 2
Combustion, Fuels & Emissions	Tuesday, June 14	5:30 pm - 7:00 pm	AHOY	Port 3
Controls, Diagnostics & Instrumentation	Wednesday, June 15	6:00 pm - 7:30 pm	AHOY	Dock 4
Cycle Innovations	Thursday, June 16	6:00 pm -7:30 pm	AHOY	Dock 12
Education	Thursday, June 16	6:00 pm - 7:00 pm	AHOY	Dock 4
Electric Power	Wednesday, June 15	6:00 pm - 7:30 pm	AHOY	Dock 5
Exhibitor Advisory Committee	Wednesday, June 15	10:30 am - 11:30 am	AHOY	Exhibitor Theater Stage
Fans and Blowers	Wednesday, June 15	6:00 pm - 7:30 pm	AHOY	Dock 10A
Gas Turbine Technology Group	Sunday, June 12	1:00 - 5:00 pm	AHOY	Dock 6
Heat Transfer	Wednesday, June 15	6:00 pm - 7:30 pm	AHOY	Port 1B
IGTI Executive Committee	Friday, June 17	1:00 - 5:30pm	AHOY	Rotterdam B
Industrial & Cogeneration	Wednesday, June 15	6:30 pm - 7:30 pm	AHOY	Dock 1B
Manufacturing Materials & Metallurgy	Wednesday, June 15	6:00 pm - 7:00 pm	AHOY	Dock 13
Microturbines, Turbochargers & Small Turbomachines	Wednesday, June 15	6:00 pm - 7:30 pm	AHOY	Dock 10B
Oil & Gas Applications	Thursday, June 16	6:00 pm - 7:30 pm	AHOY	Dock 1B
Steam Turbine	Wednesday, June 15	6:00 pm - 7:30 pm	AHOY	Dock 11
Structures & Dynamics	Tuesday, June 14	6:00 pm - 7:30 pm	AHOY	Port 1A
Student Advisory	Thursday, June 16	9:00 am - 10:00 am	AHOY	Dock 2
Supercritical CO2	Wednesday, June 15	6:00 pm - 7:30 pm	AHOY	Dock 12
Turbomachinery	Tuesday, June 14	6:00 pm - 7:30 pm	AHOY	Rotterdam D
Wind Energy	Thursday, June 16	6:00 pm - 7:30 pm	AHOY	Dock 11

Tracks and Track Chairs

Track 01 - Aircraft Engine

Oscar Kogenhop, *National Aerospace Laboratory NLR*
Konstantinos Kyprianidis, *Mälardalen University*
Vassilios Pachidis, *Cranfield University*
Charles Krouse, *SWRI*

Track 02 - Ceramics and Ceramic Composites

Michael Presby, *NASA*
Rajesh Kumar, *United Technologies Research Ctr*

Track 03 - Coal, Biomass, Hydrogen & Alternative Fuels

Pierre Gauthier, *Siemens Energy Canada*
Pietro Bartocci, *CRB*
Marina Braun-Unkhoff, *Institute of Combustion Technology*
Angela Serra, *Baker Hughes - Nuovo Pignone*

Track 04 - Combustion, Fuels & Emissions

Rudy Dudebout, *Honeywell*
Vishal Acharya, *Gatech*
Sebastien Ducruix, *Laboratoire EM2C - CNRS*
Gilles Bourque, *Siemens Canada*
Jacqueline O'Connor, *Pennsylvania State University*

Track 05 - Controls, Diagnostics & Instrumentation

Liang Tang, *Pratt & Whitney*
Lubomir Ribarov, *U.S. Merchant Marine Academy*
Lorenzo Ferrari, *University of Pisa - DESTEC*
Igor Loboda, *National Polytechnic Inst*
Peter Loftus, *Evalu8ion Ltd*

Track 06 - Cycle Innovations

Alessandro Sorce, *University of Genoa*
Ward De Paepe, *University of Mons*
Dr. Panagiotis Laskaridis, *Cranfield University*

Track 07 - Cycle Innovations: Energy Storage

David Sanchez, *AICIA*
Klaus Brun, *Elliot Group*
Tim Allison, *Southwest Research Institute*

Track 08 - Education

Manikantachari (Raghu) k.r.v, *UCF*
Lamyaa El-Gabry, *Princeton University*

Track 09 - Electric Power

Rick Tomlinson, *Chevron*
John Gulen, *Bechtel Infrastructure & Power, Inc.*
Bin Jou, *FM Global*

Track 10 - Fans and Blowers

Zhiping Wang, *Morrison Products Inc*
Giovanni Delibra, *Sapienza University of Rome*
Chunill Hah, *NASA GRC*
Massimo Masi, *University of Padova - DTG*
Sybrand Johannes Van Der Spuy, *Stellenbosch University*

Track 11 - Heat Transfer: Combustors

Steven Burd, *Pratt & Whitney*
Harika Kahveci, *Middle East Technical University (METU)*
Alexander Mirzamoghadam, *Northrop Grumman*
James Rutledge, *Air Force Institute of Technology*

Track 12 - Heat Transfer: Film Cooling

David Bogard, *University of Texas At Austin*
Robert Krewinkel, *MAN Energy Solutions*
Alexander Mirzamoghadam, *Northrop Grumman*
James Rutledge, *Air Force Institute of Technology*

Track 13 - Heat Transfer: General Interest

Zhirui Dong, *GE Power*
Riccardo Da Soghe, *Ergon Research*
Alexander Mirzamoghadam, *Northrop Grumman*
James Rutledge, *Air Force Institute of Technology*

Track 14 - Heat Transfer: Internal Air Systems

Carl M. Sangan, *University of Bath*
Peter Smout, *Rolls-Royce Plc*
Axel Glahn, *Pratt & Whitney*
Alexander Mirzamoghadam, *Northrop Grumman*

Track 15 - Heat Transfer: Internal Cooling

Mohammad Taslim, *Northeastern University*
Lesley M. Wright, *Texas A&M University*
Alexander Mirzamoghadam, *Northrop Grumman*
James Rutledge, *Air Force Institute of Technology*

Track 16 - Heat Transfer: Tutorials

Andrew Nix, *West Virginia University*
Marc Polanka, *AFIT/ENY*
Alexander Mirzamoghadam, *Northrop Grumman*
James Rutledge, *Air Force Institute of Technology*

Track 17 - Industrial & Cogeneration

Clement Joly, *Softinway, Inc*
Sergio Camporeale, *Politecnico Di Bari*

Track 18 - Manufacturing Materials & Metallurgy

William Day, *W. David Day, Inc.*
Sascha Gierlings, *Fraunhofer-Institute for Production Technology*

Track 20 - Microturbines, Turbochargers & Small Turbomachines

Grant Musgrove, *Southwest Research Institute*
Jose Ramon Serrano, *Universitat Politècnica De València. ESQ4618002B*

Track 21 - Oil & Gas Applications

Jason Wilkes, *SOUTHWEST RESEARCH INSTITUTE*
Klaus Brun, *Elliot Group*
Mauro Venturini, *Università Degli Studi Di Ferrara*

Track 23 - Steam Turbine

Grant Ingram, *Durham University*
Christian Siewert, *Siemens Energy*
Kane Chandler, *GE*
Sebastian Schuster, *University of Duisburg-Essen*

Track 24 - Structures and Dynamics: Aerodynamics Excitation & Damping

Sina Stapelfeldt
Mateusz Golebiowski, *Alstom (Switzerland) Ltd*
Thomas Weiss, *Rolls Royce Deutschland Ltd & Co. KG*
Michael Gorelik, *FAA*

Track 25 - Structures and Dynamics: Bearing & Seal Dynamics

Adolfo Delgado, *Texas A&M University*
Mateusz Golebiowski, *Alstom (Switzerland) Ltd.*
Thomas Weiss, *Rolls Royce Deutschland Ltd & Co. KG*
Michael Gorelik, *FAA*

Track 26 - Structures and Dynamics: Emerging Methods in Design & Eng.

Partha Das, *Honeywell*
Mateusz Golebiowski, *Alstom (Switzerland) Ltd.*
Thomas Weiss, *Rolls Royce Deutschland Ltd & Co. KG*
Michael Gorelik, *FAA*

Track 27 - Structures and Dynamics: Fatigue, Fracture & Life Prediction

Alessandro Ramaglia, *Ansaldo Energia*
Mateusz Golebiowski, *Alstom (Switzerland) Ltd.*
Thomas Weiss, *Rolls Royce Deutschland Ltd & Co. KG*
Michael Gorelik, *FAA*
Dipankar Dua, *Siemens Energy Inc.*

Track 28 - Structures and Dynamics: Probabilistic Methods

Mateusz Golebiowski, *Alstom (Switzerland) Ltd.*
Thomas Weiss, *Rolls Royce Deutschland Ltd & Co. KG*
Michael Gorelik, *FAA*
Liping Wang, *GE Corporate Res & Develop*

Track 29 - Structures and Dynamics: Rotordynamics

Theodore Brockett, *Honeywell Aerospace*
Mateusz Golebiowski, *Alstom (Switzerland) Ltd.*
Thomas Weiss, *Rolls Royce Deutschland Ltd & Co. KG*
Michael Gorelik, *FAA*

Track 30 - Structures and Dynamics: Structural Mechanics & Vibration

Azzedine Dadouche, *National Res Council Canada*
Mateusz Golebiowski, *Alstom (Switzerland) Ltd.*
Thomas Weiss, *Rolls Royce Deutschland Ltd & Co. KG*
Michael Gorelik, *FAA*

Track 31 - Student Advisory

Mavroudis Kavvalos, *Mälardalen University*
Dimitra-Eirini Diamantidou, *Mälardalen University*

Track 32 - Student Posters

Mavroudis Kavvalos, *Mälardalen University*
Dimitra-Eirini Diamantidou, *Mälardalen University*

Track 33 - Supercritical CO_2

Nathan Weiland, *National Energy Technology Laboratory*
Tim Allison, *Southwest Research Institute*

Track 34 - Turbomachinery: Axial Flow Fan & Compressor Aerodynamics

Lisa Brilliant, *UTC/Pratt & Whitney*

Track 35 - Turbomachinery: Axial Flow Turbine Aerodynamics

Emil Göttlich, *Graz University of Technology*

Track 36 - Turbomachinery: Deposition, Erosion, Fouling, and Icing

Reid Berdanier, *Penn State University*
Luca Porreca, *MAN Energy Solutions Schweiz AG*
Bronwyn Powe, *Pratt & Whitney*

Track 37 - Turbomachinery: Design Methods & CFD Modeling for Turbomachinery

Mahmoud Mansour, *Honeywell International Inc*

Track 38 - Turbomachinery: Ducts, Noise & Component Interactions

A. Duncan Walker, *Loughborough University*

Track 39 - Turbomachinery: Multidisciplinary Design Approaches, Optimization, and Uncertainty Quantification

Ingrid Lepot, *Cenaero*

Track 40 - Turbomachinery: Radial Turbomachinery Aerodynamics

Hamid Hazby, *Mercedes AMG High Performance Powertrains Ltd*

Track 41 - Turbomachinery: Turbomachinery General Interest

Bronwyn Powe, *Pratt & Whitney*

Track 42 - Turbomachinery: Tutorials

Andreas Peters, *GE Aviation*

Track 43 - Turbomachinery: Unsteady Flows in Turbomachinery

Natalie Smith, *Southwest Research Institute*

Track 44 - Wind Energy

Juan Jauregui, *University of Queretaro*

Registration Details

We are back in person and look forward to seeing you all face-to-face! Turbo Expo will be a live in-person event held at the AHOY Convention Centre in Rotterdam, The Netherlands June 13-17, 2022

Please be aware of the spamming non-official vendors contacting you. ASME does NOT sell the conference attendee list.

Registration Location and Hours

AHOY Convention Center, First Level Entrances RTM Stage Oost & Noord

Sunday, June 12	3:00 pm - 6:00 pm
Monday, June 13	7:00 am - 5:30 pm
Tuesday, June 14	7:00 am - 6:30 pm
Wednesday, June 15	7:00 am - 6:30 pm
Thursday, June 16	7:00 am - 5:30 pm
Friday, June 17	7:00 am - 12:00 pm

All fees include 21% Dutch Value-Added Tax (VAT). *The standard rate of VAT in effect at the time of the event. Please note that your registration may be VAT exempt with a valid Dutch VAT number and that Dutch VAT may be refundable under certain conditions (not guaranteed). For more information, please refer to the FAQ on the Dutch VAT. If you have any questions regarding VAT refunds you may contact bc-a@bc-a.com.*

Registration Category	REGISTER AFTER May 12, 2022
Full Conference (Member) **The following may register at the Member rate(s): ASME Members, Point Contacts, Vanguard Chairs, Session Chairs/Co-Chairs, Authors, Presenters, Speakers, Committee Members, Active Military*	€1,355
Full Conference (Non Member)	€1,560
Full Conference (Student Member)	€575
Full Conference (Student Non-Member)	€600
Life Member	€575
Member 3-Days	€1,145
Non-Member 3-Days	€1,355
Group 10+	€1,165
Group 20+	€1,115
Exhibiting Company Employee	€1,140
Platinum Sponsor Employee	€1,115

Technical Conference Registration (In-Person) 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 Grand Opening Turbo Expo Keynote & Awards.
- Program, Welcome Reception, Women in Turbomachinery Networking Event and the Student/Early Career Engineer Receptions.
- Access to on-demand recorded content of technical presentations, keynote sessions, and plenary sessions.
- Admittance into the Turbo Expo exhibition hall and exhibit hall receptions.
- Access to the Student Poster Session.
- Online access to all Turbo Expo 2022 final accepted papers.
- Opportunity to attend facility tours.
- Access to daily lunches.

Registration Details

ASME will comply with local safety regulations during the event. We recommend wearing face coverings. Online registration will close June 6 and onsite registration will open June 12, 2022

For Turbo Expo 2022 Technical Publication Guidelines, Author and Presenter Attendance Policies, visit the Author Resources.

VAT Information

The invoice for your participation shall be issued by:
VMC
1 Rond-Point de l'Europe
92250 La Garenne Colombes, France
French VAT Number: FR75523098614
Dutch VAT Number: NL822669481B01

For Authors Only

Please utilize the same Username and Password for Single Sign On for both the conference webtool and the conference registration site (Note: You should use the same for ALL your ASME interactions).

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 at one of the non-student registration categories.

Visitor/Guest 3-Day Registration (€160) Includes

- Admission to the Grand Opening Turbo Expo Keynote & Awards Program and Welcome Reception.
- Admittance into the Turbo Expo exhibition hall and exhibit hall receptions.

AVOID DELAYS!

Confirm your existing ASME membership status now or join/renew your membership to register at the reduced member rate. Contact customercare@asme.org to confirm or renew your ASME membership. Allow approximately one week to process/renew memberships before registering for this year's Turbo Expo.

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 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.

Badge Pick-Up Information

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. The COVID-19 regulations are expected to change, so please ensure you check the requirements before making travel arrangements, and especially in the weeks before travelling to Turbo Expo, to ensure you are aware of and adhere to all health and safety regulations.

Registration Details

Technical Conference Registration (Virtual Attendance)

We understand that as we go back to a face-to-face event, some individuals may not be ready to travel. Therefore, we will be offering technical content and plenary sessions on-demand. Whether you attend in-person or virtually, you will have access to the technical presentations via video on-demand, pre- and post-conference. Please note if you are attending virtually, all content will be on-demand, there will be no live-streamed content.

What is on-demand content? On-demand content is video recorded presentations of the keynote session, plenary sessions, and technical paper sessions. You will also have access to all technical papers pre- and post-conference. Simply register for the event as if you were attending in-person.

Payment Information

- **Credit Card – American Express, Visa and Master Card.** If paying by credit card, Sea to Sky Meeting Management Ltd. will appear as the vendor on your credit card statement.

Technical Conference Registration (Virtual Attendance) Includes...

- Access to on-demand recorded content of technical presentations, keynote sessions, and plenary sessions.
- Online access to all Turbo Expo 2022 final accepted papers.
- Online exhibition.

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.

Cancellation/Refund Policy

- No refunds will be granted after May 12, 2022. **NO EXCEPTIONS.** No-shows will not be eligible for refunds.
- Registrations may not be transferred or substituted at any time.
- All cancellations must be received in writing by Sea to Sky Meeting Management at turbo@seatoskymeetings.com.

Insurance and Liability

Participation in Turbo Expo 2022 is at your own risk. Please make your own health and travel insurance arrangements.

Professional Development Hours (PDH)

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

Language

The official language of the Turbo Expo 2020 is English.

Facility Tours

We are excited to be offering technical facility tours during the Conference this year. These tours are held during the week of Turbo Expo and are included in your full conference registration fee. Some tours will require registration and pre-screening. This is done at the discretion of the touring company.

Registration Details

Childcare Options

We are pleased to offer childcare reimbursement for attendees. 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 Rotterdam. This offering will be available from **Monday, June 13 through Friday, June 17, 2022**, during the hours of day in which technical presentations are offered.

To be reimbursed, you must complete an ASME Volunteer Travel Expense Contribution form provided to you from ASME Staff upon request (igtiprogram@asme.org). All requests for reimbursements must be received by ASME, with itemized receipts, no later than two weeks from the last day of the Conference.

If you have questions related to this benefit, please contact Stephanie Heinricks at heinrickss@asme.org.

The **Holiday Sitters** website includes babysitter bios, sightseeing recommendations, and more. Booking and payment are also done through their website. Visit www.holiday-sitters.com for more information.

NOTE: ASME suggests you may also wish to consult with your local hotel concierge for licensed service provider suggestions. Please also do your own due diligence.

Galit Bauer, co-founder, can also be directly contacted by email (galitb@holiday-sitters.com) or by WhatsApp (+31617292579). She is happy to answer any questions concerning your trip to the Netherlands with children.

Registration Inquiries

Contact us at turbo@seatoskymeetings.com.
ASME Turbo Expo 2022: Turbomachinery
Technical Conference and Exposition
c/o Sea to Sky Meeting and
Association Management Inc.
Suite 206, 201 Bewicke Avenue
North Vancouver, BC, Canada V7M 3M7
Phone: +1-604-984-6455
Email: turbo@seatoskymeetings.com
Web: event.asme.org/Turbo-Expo

Conference FAQ's

Why didn't I receive any tickets with my badge?

The tickets and/or products you purchased with your registration are encoded onto your badge. Please wear this badge to all Turbo Expo related events.

What do the letters at the beginning of the session ID mean?

See the beginning of the technical session pages the Final Program for the Session ID key.

Is there a bank or ATM close by?

The nearest ATM is located across the street from the Ahoy in the Primark Mall.

What business services are available?

The nearest postal service is "PostNL Postkantoor." It is located in the "Winkelcentrum Zuidplein" shopping mall across the street.

Is there any Wi-Fi access at the Ahoy?

There is complimentary Wi-Fi in the Ahoy Conference Center.

Where can I purchase coffee or lunch?

There are scheduled coffee/tea breaks each morning and afternoon of the Conference. Lunch is included with all technical conference badges as well as exhibitor badges. There is also a restaurant located on the first floor of the AHOY convention center.

Where are the first aid services?

For first aid assistance, contact an IGTI staff person or a security officer.

Is there a coat check/luggage check service available?

There is a coat and bag check service available to attendees located on the first floor of the Ahoy Conference Center. The cost to check an item is €2.

Where can I find information about the city of Rotterdam, restaurants and tourist information?

There is city information provided at the information desk.

Where can I get information on public transit services?

Please refer to page 7 in the Final Program.

Where is the nearest metro/bus stop?

It is across the street from the convention center. "Zudplein" station. The station only accepts Visa and Mastercard.

Is there a shuttle service between the convention center and my hotel?

No. Please refer to public transportation information on page.

What about parking at the Ahoy?

Rotterdam Ahoy has 2000 parking spaces. The price per car for a parking spot will normally cost you between €15.00 and €17,50. This varies per event. For more information, visit https://www.ahoy.nl/en/accessibility

Where is the nearest grocery store?

It is located across the street in Primark.

Are there any Spouse/Guest Tours, and where can I get tickets or information?

See the Final Program for details. We have two vendors to choose from and you may reach out to the Point of Contact directly.

Registration Questions:

Refer to the registration desk onsite.

Is there a limit to the number of registrants accepted for Turbo Expo?

No limit. Registration may be advance or onsite.

Do you have a list of registrants?

ASME does not share attendee lists.

Can I attend the Keynote Session?

The keynote session is open to all Turbo Expo badged registrants.

Conference FAQ's

Can I pay cash onsite for the registration fees?

Yes. Payment must be made in Euros.

How do I become a member of ASME?

http://www.asme.org/Membership/Join/

Will I receive a receipt onsite for the fees paid?

There is a registration receipt station in registration.

Do I need to pay to visit the exposition?

Yes. You may register as an exposition visitor to gain access to the exhibit hall at onsite registration if you do not have a technical conference badge or exhibitor badge.

I lost my badge. What should I do?

Go to the registration counter and ask for another badge to be printed. Registrant must have ID.

What audiovisual equipment is in the meeting rooms?

Each room will have a laptop and microphone, and pointer. Authors should plan to have their presentation on a flash drive.

Do I have to upload my presentation onto a central network before my session?

No. Presenters (authors, panelists, lecturers, tutorial instructors) should plan to use their flash drive presentations only on the laptop in the session room in which they will be presenting. Please arrive 15 to 30 minutes prior to your session to prepare your presentation.

Session and Schedule Details:

See complete session details in the Final Program or on the APP.

Can I take pictures in the exhibit hall?

If you are an exhibitor, you may take pictures of your own booth. Otherwise, there is no photography allowed in the hall without the permission of the exhibitor.

Am I supposed to get a CD-ROM/ DVD of Conference Papers?

No, there is no CD or DVD for the Conference. Conference papers are available online.

Where is my booth?

Refer to the Exhibit Directory in the Final Program.

When is the Expo open?

The exhibit hall is open Tuesday and Wednesday from 12:30-6:30pm and Thursday from 11:30-2:30pm.

Where are the Priority meetings for TURBO EXPO 2023 exhibit space?

IGTI Exhibit Sales Office in the exhibit hall.

Where/when is my committee meeting?

Refer to the Final Program for the schedule.

Where do I pick up the Best Paper Awards for my committee?

Committee awards should be picked up by the designated leader at the Information Desk in Registration.

Where do I sign up for Facility Tours?

Online using the direct links of the touring facilities.

Where is the exhibitor service contractor desk?

GES is available in the exhibit hall.

How do I become involved in an IGTI Committee?

See the Final Program for a Summary of Committee Activities scheduled for TURBO EXPO. IGTI Committee meetings are open to all.

Will I be issued a PDH certificate?

Technical Conference delegates will receive an email in July with a certificate of their attendance (Professional Development Hours).

Guest Tours

Rotterdam Food Tours

One thing is certain, Rotterdam is booming! The combination of its modern architecture, the harbor, the sense of space, the public art, the fantastic museums, and the many international influences make it a unique city in the Netherlands. The culinary scene is evolving rapidly as well, as Bike & Bite will gladly show you.

Bike & Bite takes people from all over the world on delicious cultural food tours of Rotterdam. They believe that the best way to experience the city and its people is through a language everyone knows: food! They offer it all: cheese, poffertjes, herring and bitterballen, but also a Surinam chicken curry sandwich, the finest craft beers, various Moroccan pastries, and so much more. Guides will show you around the wonderful sights and tell you Rotterdam's many different stories while you enjoy the best local food in town. When you're done you'll feel like a true 'Rotterdammert'!

Bike & Bite Tour: the most popular option gives you everything the city of Rotterdam has to offer, both highlights and hidden gems. A local and knowledgeable guide will tell you wonderful stories while you stop to taste the best local food in town. This tour takes 4 hours and includes 7 stops for bites, and also includes a 'borrel' at the end (Dutch for a cosy drink with friends). The food is comparable to a big lunch, so come hungry!

You can check out their other tours including "Hike & Bite" and "Boat & Beer" at www.bikeandbite.nl/rotterdam-food-tours.

Point of Contact: Paul Fitzpatrick

info@bikeandbite.nl · (+31) 6 174 794 20

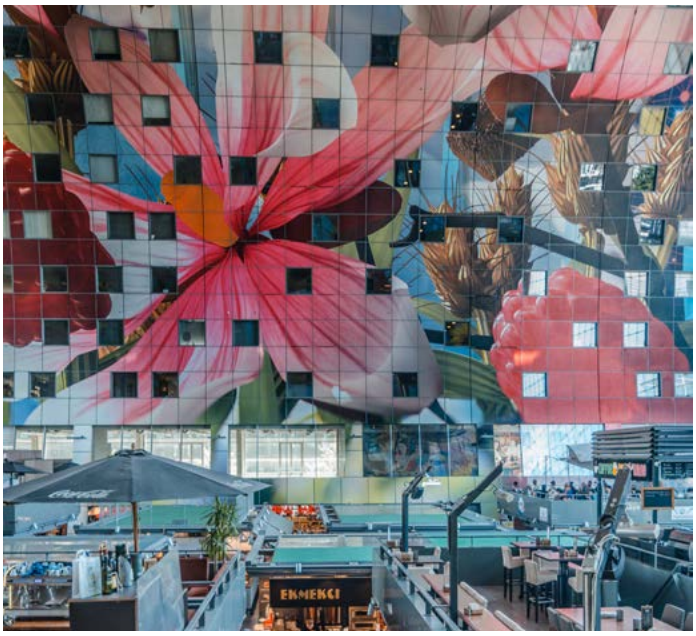
Guest Tours

De Rotterdam Tours

With this tour you will explore Rotterdam in a unique way. A beautiful walk over the Wilhelminapier where you can enjoy the skyline of the city, a spectacular trip with the water taxi, a walk in the Oude Haven (Old Harbour), a visit to the rooftop of Het Witte Huis with a spectacular view over the whole city for the most beautiful pictures, a visit at the Cube Houses and a Meet & Taste in the Markthal. This tour got everything! Included:

- Professional, local guide
- Rooftop view
- A tasty bite
- Water taxi ride
- A beautiful architectural postcard

Please note that the tours will be in English, however their website is in Dutch.



Point of Contact: Brenda Kamphuis

brenda@derotterdamtours.nl

+31 (0)6 29 24 25 25

Ancillary Events

Flownex-Ansys SAS Co-Simulation

WEDNESDAY, JUNE 15

MEETING 1: 10:00 A.M. – 11:00 A.M.
MEETING 2: 3:00 P.M. – 4:00 P.M.

DOCK 9, 2ND FLOOR, ROTTERDAM AHOY

The latest version of Flownex now enables engineers to couple transient Ansys Mechanical simulations to secondary air system simulations in Flownex. This presentation will show a live demonstration of this coupling and will provide an overview of the capabilities of Flownex for Gas Turbine simulation.

Visit Booth 405 for More Information.

Cadence Learning Session

TUESDAY, JUNE 14

MEETING 1: 12:30 PM -1:30 PM – BOXED LUNCH AND BEVERAGES
MEETING 2: 3:30 PM -4:30 PM – LIGHT REFRESHMENTS ARE SERVED

DOCK 9, 2ND FLOOR, ROTTERDAM AHOY

You are invited to attend one of two sessions on Tuesday, June 14, being hosted by Cadence. In these sessions, Cadence CFD experts will discuss several new and challenging applications, such as hydraulic turbines, fans and drones, and show how to use Cadence®'s new dedicated pressure-based solver to estimate design and off-design performances. You will also learn how to port previous projects into Cadence Fidelity™ CFD for either performing advanced post-processing, or adding new components and taking advantage of a fully-integrated structured and unstructured workflow.

AGENDA

A New Generation of Industrial CFD Solvers for Scale Resolving Simulations
Prof Charles Hirsch, *Cadence Fellow*

Discover Fidelity CFD Software for Faster, High-Accuracy Turbomachinery Simulation
Yannick Baux, *CFD Product Engineering Director, Cadence*

Fidelity-Agile: Turbomachinery Design on the Cadence Fidelity Platform
Peter Weitzman, *President, Agile Engineering Software, Concepts NREC*

SCAN ME

To save your seat, register at
events.cadence.com/Y7Yx3d?RefId=ASME
Seats are limited and will be reserved on a first come first served basis.

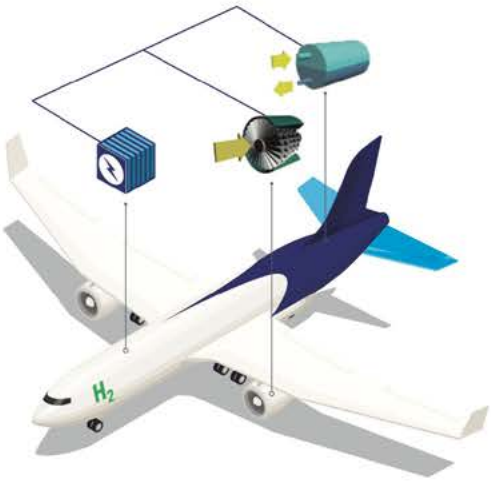
Visit Cadence at booth 308 in the exhibition hall to meet with CFD experts.

FLOWNEX®
SIMULATION ENVIRONMENT

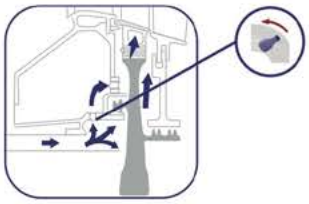
INTEGRATED SYSTEM SIMULATION

Flownex® SE is an industry leader in system modelling tools for the design, analysis and optimisation of various gas turbine systems. Our software provides turbo machinery engineers with an easy to use, off-the-shelf tool for modelling secondary air systems, combustion chambers, lubrication systems and integrated cycle operation.

Through a powerful graphical user interface coupled with a fast and robust solver based on fundamental physics principles, gas turbine systems can be modelled rapidly, leading to significant cost-savings.

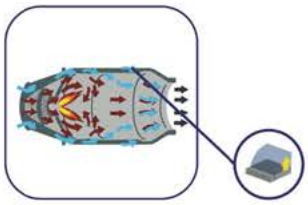


HYDROGEN CONVERSION



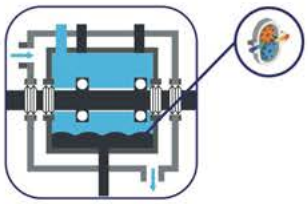
SECONDARY AIR SYSTEMS

- Bleed air consumption
- Wind age power loss, heat transfer
- Flow and pressure distribution
- Coupled flow and structural/FEA simulations



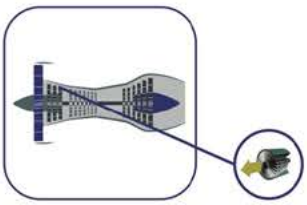
COMBUSTION CHAMBER

- Liner wall ingress air distribution
- Model conjugate heat transfer: combustion, radiation, convection, film convection, conduction, etc.



LUBRICATION SYSTEMS

- Oil and air mixtures
- Scavenge pumps sizing and requirement
- Approximate oil temperatures
- Model oil to fuel and air to oil heat exchangers
- Secondary seal air requirements



INTEGRATED SYSTEM ANALYSIS

- Model different cycle configurations and layouts
- Evaluate recuperative cycles
- Coupling with subsystems for full mission simulations
- Alternative fuels

FLOWNEX.COM

FLOWNEX Ansys

ANSYS COUPLING AND WORKBENCH INTEGRATION

Tutorials of Basics

This year, industry experts from several committees will present basic tutorials for their respective disciplines in a way that promises to engage and interest engineers from other fields. These tutorials are ideal for learning the fundamentals and key components of specific disciplines within the field of turbo technology.

Aircraft Engine

- **01-10,** Climate Impact of Aviation Emissions and the Implications to Aircraft Engine Design
- **01-11,** Basics of Turboshaft Engine Cycle Design and Optimization
- **01-12,** Basics of Gas Turbine Engine Core

Ceramics and Ceramic Composites

- **02-04,** Environmental Barrier Coatings for Gas Turbine Applications
- **21-23,** Ceramic Matrix Composites: Variations and Properties

Combustion, Fuels & Emissions

- **04-28,** Gas Turbine Combustion Tutorial
- **04-29,** Combustion Dynamics Tutorial

Controls, Diagnostics & Instrumentation

- **05-08,** Gas Turbine Transient Simulation and Controls

Cycle Innovations

- **06-12,** Power Plant Hybridization for Enhanced Flexibility and Energy Storage
- **06-13,** Micro-Gas Turbine: Technological Advancements and Market Research
- **06-14,** Closed Thermodynamic Cycle Analysis and Optimization

Cycle Innovations: Energy Storage

- **07-05,** Hydrogen for Power and Energy Storage
- **07-06,** Overview of Long-Duration Energy Storage Systems and Technologies

Electric Power

- **09-09,** Understanding Digital Twins & Machine Learning/AI for Gas Turbine Applications

Fans and Blowers

- **10-05,** Introduction to the Aerodynamic Design of Axial Flow Industrial Fans
- **10-06,** Unsupervised Learning Methods for Design Space Exploration

Heat Transfers

- **16-01,** Rotating Disc Cavity Flows
- **16-03,** Fundamental of Mist Cooling and Its Applications in Gas Turbine System

Industrial & Cogeneration

- **17-04,** Combustion and Emissions Tutorial

Liquid Fuels

- **03-07,** Design of Fuel Cells-Based Power & Propulsion Systems for Different Applications: Automotive, Aircraft, Power Generation
- **03-08,** Life Cycle Assessment Basics and Application to Optimize the Environmental Sustainability of Gas Turbines During New Product Development
- **03-10,** Challenges of Combustion Computational Fluid Dynamics for Industrial Gas Turbine Engines

Manufacturing Materials & Metallurgy

- **18-10,** Metallurgy for the Non-Metallurgist
- **18-11,** Sustainable Production of Advanced Turbomachinery Components in a Digitized Environment

Microturbines, Turbochargers & Small Turbomachines

- **20-06,** Unsteady Flow in Small Radial Compressors: From Surge to Noise Emissions

Tutorials of Basics

Oil & Gas Applications

- **21-21,** Industrial Gas Turbines 78487 Industrial Gas Turbines
- **21-22,** Oil and Gas Applications for Turbomachinery 80079 Oil and Gas Applications for Turbomachinery

Steam Turbine

- **23-06,** Two Phase Flow in Steam Turbines
- **24-07,** Introduction to Turbomachinery Aeromechanics (No Equations, Only Pictures and Movies)

Structures and Dynamics: Structural Mechanics & Vibration

- **30-11,** Time-Frequency Spectral Analysis of Vibration Signals by Wavelet Transform
- **30-12,** Tutorial: Reduced Order Modeling and Identification of Mistuned Bladed Disks

Structures and Dynamics: Aerodynamics Excitation & Damping

- **24-07,** Introduction to Turbomachinery Aeromechanics (No Equations, Only Pictures and Movies)

Supercritical CO_2

- **33-21,** Turbo Machinery Design for Supercritical CO_2 Applications
- **33-22,** Heat Exchangers for Supercritical CO_2 Power Cycle Applications
- **33-20,** An Introduction to Supercritical CO_2: Basics, Cycles, and Applications
- **33-23,** Materials for Supercritical CO^2 Applications

Turbomachinery

- **30-12,** Order Modelling Approach for Turbomachinery Secondary Flow Systems
- **42-02,** Introduction to Large Eddy Simulations
- **42-03,** Introduction to Low Pressure Turbine Aerodynamic Design and Its Challenges

Wind Energy

- **44-08,** Challenges in Developing the New Generation of Wind Turbines

Turbo Expo Technical Conference Program Information

Sessions are detailed vertically. The top rows contain general information, and the bottom rows list the organizer and paper details. The name of the presenting author is underlined. Presentation start times are noted to the left.

Column Detail

	COMMITTEE NAME
	Session Title
	Session Type • Room • Session ID
	Session Chair, Affiliation **Session Co-Chair**, Affiliation
Presentation Time	**ASME Paper Number** **Paper Title** FirstAuthor Name[1] SecondAuthor Name[2] ThirdAuthor Name[1] *1. First Affiliation; 2. Second Affiliation*

Example

	HEAT TRANSFER: INTERNAL COOLING
	Jet Impingement
	Technical • Dock 13 • 15-01
	Session Organizer: **Lamyaa El-Gabry**, Princeton University Session Co-Chairs: **Sandip Dutta**, Clemson University; **Jaideep Pandit**, Virginia Polytechnic Institute & State University
8:00	**GT2022:79362** **Heat Transfer and Pressure Loss Correlations for Leading Edge, Jet Impingement Using Racetrack-Shaped Jets with Filleted Edges** Ritwik Vijaykumar Kulkarni[1] Lesley Wright[2] *1. Texas A&M University, USA; 2. Texas A&M University - College Station, USA*
8:30	**GT2022:81749** **Assessment of Computational Fluid Dynamic Modeling of Multi-Jet Impingement Cooling and Validation with the Experiments** Sadiya Tabassum, Robin Georg Anthony Brakmann, Michael Hilfer, Marcel Matha, Christian Morsbach, Michael Markus Manfred Schroll, Christian Willert *German Aerospace Center (DLR), Germany*

MONDAY JUNE 13 — 8:00 AM – 10:00 AM

	AIRCRAFT ENGINE	COAL, BIOMASS, HYDROGEN & ALTERNATIVE FUELS	COMBUSTION, FUELS & EMISSIONS
	Inlets, Ducts & BLI	**Design of Fuel Cells-Based Power & Propulsion Systems for Different Applications: Automotive, Aircraft, Power Generation**	**Fuel Flex**
	Technical • Dock 10 A • 01-04	**Tutorial • Rotterdam C • 03-07**	**Technical • Port 1 C • 04-01**
	Session Organizer: **Curtis Vedder**, Honeywell Session Co-Chairs: **Vassilios Pachidis**, Cranfield University; **Keith Boyer**, Practical Aero	Session Organizer: **Angela Serra**, Baker Hughes Session Co-Chairs: **Pierre Gauthier**, Siemens Energy Canada; **Marina Braun-Unkhoff**, Institute of Combustion Technology	Session Organizer: **Jacqueline O'Connor**, Purdue University Session Co-Chairs: **Adrian Spencer**, Loughborough University; **Rudy Dudebout**, Honeywell; **Vishal Acharya**, Georgia Institute of Technology; **Sebastien Ducruix**, CM2C - CNRS; **Gilles Bourque**, Siemens Canada; **Mike Whiteman**, Loughborough University
8:00	**GT2022:80894** **Inlet Flow Distortion Dependencies for Tail Mounted Ducted Fans on Hybrid-Electric Commuter Aircraft** E. Geoffrey Engelbrecht[1] Vasilis G. Gkoutzamanis[2] Christos P. Nasoulis[2] Anestis I. Kalfas[2] *1. Limmat Scientific AG, Switzerland; 2. Aristotle University of Thessaloniki, Greece*	**GT2022:83727** **Design of Fuel Cells-Based Power & Propulsion Systems for Different Applications: Automotive, Aircraft, Power Generation** Clement Joly, Vlad Goldenberg, Leonid Moroz *SoftInWay, Inc., USA*	**GT2022:78304** **Lean Stability Limits and Exhaust Emissions of Ammonia-Methane-Air Swirl Flames at Micro Gas Turbine Relevant Pressure** Cristian Avila[1] Guoqing Wang[1] Xuren Zhu[1] Et-Touhami Es-Sebbar[1] Marwan Abdullah[2] Mourad Younes[2] Aqil Jamal[2] Thibault Guiberti[1] William L. Roberts[2] *1. King Abdullah University of Science and Technology, Saudi Arabia; 2. Saudi Aramco, Saudi Arabia*
8:30	**GT2022:82472** **Impact of Boundary Layer Ingestion on the Performance of Propeller Systems for Hybrid Electric Aircraft** David Hiebl, Stavros Vouros, Konstantinos Kyprianidis *Mälardalen University, Sweden*	**T U T O R I A L**	**GT2022:83039** **Experimental Study on Combustion of Methane / Ammonia Blends for Gas Turbine Application** Inge Saanum[1] Mario Ditaranto[1] Jenny Larfeldt[2] *1. SINTEF Energy Research, Norway; 2. Siemens Energy AB, Sweden*
9:00	**GT2022:82699** **Upgrades to the Single Stage Axial Compressor and Fan Facility for Low Pressure Ratio and Boundary Layer Ingesting Fan Research** Julia Stephens, Christopher Hughes *NASA Glenn Research Center, USA*		**GT2022:83131** **Numerical Investigation of Rich-Lean Staging in SGT-750 Scaled DLE Burner with Partially-Decomposed Ammonia** Thomas Indlekofer[1] Andrea Gruber[1] Samuel Wiseman[2] Karl-Johan Nogenmyr[3] Jenny Larfeldt[2] *1. SINTEF, Norway; 2. Norwegian University of Science and Technology, Norway; 3. Siemens Energy, Sweden*
9:30	**GT2022:81805** **Unsteady Analysis of Aeroengine Intake Distortion Mechanisms: Vortex Dynamics in Crosswind Conditions** Anirudh Rao[1] Prathiban Sureshkumar[1] Sina Stapelfeldt[1] Bharat Lad[2] Kuen-Bae Lee[2] Ricardo Puente Rico[1] *1. Imperial College London, United Kingdom; 2. Rolls Royce, United Kingdom*		**GT2022:82881** **Development of a Fuel Flexible H2-Natural Gas Gas Turbine Combustion Technology Platform** Benjamin Witzel[1] Daniel Moell[2] Nishant Parsania[3] Michael Koenig[4] Ertan Yilmaz[4] *1. Siemens Energy Global GmbH und Co KG, Germany; 2. Siemens Energy AB, Sweden; 3. Siemens Energy Industrial Turbomachinery Ltd., United Kingdom; 4. Siemens Energy, Inc., USA*

MONDAY JUNE 13 — 8:00 AM – 10:00 AM

	COMBUSTION, FUELS & EMISSIONS	COMBUSTION, FUELS & EMISSIONS	CONTROLS, DIAGNOSTICS & INSTRUMENTATION
	Ignition I	**Combustion Dynamics - Flame Transfer Functions**	**Advanced Controls for Propulsion Systems**
	Technical • Port 2 • 04-12	**Technical • Port 3 • 04-21**	**Technical • Dock 2 • 05-01**
	Session Organizer: **Jacqueline O'Connor**, Purdue University Session Co-Chairs: **Brandon A. Sforzo**, Argonne National Laboratory; **Vishal Acharya**, Georgia Institute of Technology; **Sebastien Ducruix**, CM2C - CNRS; **Gilles Bourque**, Siemens Canada; **Pedro M. de Oliveira**, University of Cambridge	Session Organizer: **Vishal Acharya**, Georgia Institute of Technology Session Co-Chairs: **Jacqueline O'Connor**, Purdue University; **Sebastien Ducruix**, CM2C - CNRS; **Gilles Bourque**, Siemens Canada; **Abdulla Ghani**, TU Berlin	Session Organizer: **Liang Tang**, P&W Session Co-Chairs: **Alex Tsai**, US Coast Guard Academy; **Igor Loboda**, University of Mexico
8:00	**GT2022:79181** **Effect of Strong Azimuthal Swirl on Ignition and Light-Around in an Annular Combustor** Yi Hao Kwah[1] Pasquale Walter Agostinelli[2] Stéphane Richard[3] Gorka Exilard[3] Stéphane Pascaud[3] Laurent Gicquel[4] James Dawson[1] *1. Norwegian University of Science and Technology, Norway; 2. Safran Helicopter Engines - CERFACS, France; 3. Safran Helicopter Engines, France; 4. CERFACS, France*	**GT2022:83014** **The Effect of Rectangular Confinement Aspect Ratio on the Flame Transfer Function of a Turbulent Swirling Flame** Aksel Ånestad, Byeonguk Ahn, Håkon T. Nygård, Nicholas A. Worth *Norwegian University of Science and Technology, Norway*	**GT2022:80650** **Estimation of Dynamical Thermoacoustic Modes Using an Output Only Observer Kalman Filter-Based Identification (O3KID) Algorithm** Nikhil Balasubramanian, Driek Rouwenhorst, Jakob Hermann *IfTA GmbH, Germany*
8:30	**GT2022:82951** **Numerical Study of High-Altitude Relight for an Aviation Gas-Turbine Engine** Giuliana Litrico[1] Sourabh Shrivastava[2] Ellen Meeks[1] Pravin Nakod[2] Fang Xu[3] Dhanya T[4] Sivaprakasam Muthuraj[4] *1. Ansys Inc, USA; 2. Ansys Inc, India; 3. Honeywell Aerospace, USA; 4. Honeywell Technology Solutions, India*	**GT2022:82871** **Dynamic Response of Stratified Flames to Acoustic Excitation in a Multi-Swirler Model Combustor** Weijie Liu[1] Ming Jin[2] Bing Ge[2] Ranran Xue[1] He Su[1] Shusheng Zang[2] *1. Aero-Engine Academy of China, China (Mainland); 2. Shanghai Jiao Tong University, China (Mainland)*	**GT2022:81310** **Real Time Precursor Calculation for the Early Detection of Combustion Instabilities** Roberto Meloni, Nicola Giannini *Baker Hughes, Italy*
9:00	**GT2022:82592** **Stabilization of Auto-Igniting Flames Within a Gas Turbine Sequential Combustor, Through the Control of Static Temperature Variation - Detailed Numerical Investigation** Fernando Biagioli, Holger Luebcke, Ammar Lamraoui, Khawar Jamil Syed, Andre Theuer, Ennio Pasqualotto *Infosys Ltd, Switzerland*	**GT2022:84357** **From Pressure Time Series Data to Flame Transfer Functions: A Framework for Perfectly-Premixed Swirling Flames** Abdulla Ghani, Alp Albayrak *TU Berlin, Germany*	**GT2022:82219** **Method of Analysis for Impact of Input Uncertainty Error Propagation in a Highly Nonlinear System: Applied to Modern Aircraft Engine** Timothy Castaldo *Johns Hopkins University, USA*
9:30	**GT2022:81134** **Ignition Chemistry of Syngas Highly Diluted in CO2** Sean P Cooper, Darryl J Mohr, Olivier Mathieu, Eric L Petersen *Texas A&M University, USA*	**GT2022:83298** **Flame Transfer Functions for Turbulent, Premixed, Ammonia-Hydrogen-Nitrogen-Air Flames** Samuel Wiseman[1] James Dawson[1] Andrea Gruber[2] *1. Norwegian University of Science and Technology, Norway; 2. SINTEF, Norway*	**GT2022:82644** **Secure Embedded Distributed Control and Instrumentation Architecture for Aircraft Propulsion Systems: Framework, Process, Methods, Challenges, and Opportunities** Alireza R. Behbahani[1] John J. Costello[2] Mehrdad Pakmehr[3] Richard Skertic[4] *1. Turbine Engine Division/Aerospace Systems Directorate, USA; 2. Rolls-Royce Corporation, USA; 3. ControlX, Inc., USA; 4. Rolls-Royce North American Technologies, Inc., USA*

MONDAY JUNE 13 — 8:00 AM – 10:00 AM

	CYCLE INNOVATIONS	EDUCATION	ELECTRIC POWER
	Innovative Combined Cycle	**Education Issues II: Student Preparedness for Academic and Industry Careers**	**IGTTA Award Lecture: When Dinosaurs Roamed the Earth**
	Technical • Dock 12 • 06-01	**Technical • Dock 9 • 08-02**	**Lecture • Port 7 • 09-10**
	Session Organizer: **Majed Sammak**, GE Gas Power Session Co-Chairs: **Alessandro Sorce**, University of Genoa; **Ward De Paepe**, University of Mons	Session Organizer: **Lamyaa El-Gabry**, Princeton University Session Co-Chairs: **Veeraraghava Raju Hasti**, Purdue University; **Manikantachari (Raghu) K.R.V**, Power Systems Mfg. LLC	Moderator: **John Gulen**, Bechtel Infrastructure & Power, Inc.
8:00	**GT2022:82494** **Gas Turbine Combined Cycle Range Enhancer – Part 1: Cyber-Physical Setup** Tommaso Reboli[1] Marco Ferrando[1] Luca Mantelli[1] Lorenzo Gini[1] Alessandro Sorce[1] Jose Garcia[2] Rafael Guedez[2] *1. University of Genoa, Italy; 2. KTH Royal Institute of Technology, Sweden*	**GT2022:83102** **Energy and the University: The Role of Gas Turbines at US Universities and Strategies for Enhancing Energy Literacy** Erica Winegardner, Emma Lemay, Stephen Lynch, Karen Thole, Jacqueline O'Connor *Pennsylvania State University, USA*	**IGTTA Award Lecture: When Dinosaurs Roamed the Earth** Richard S. Tuthill *RST Associates, LLC, CT, USA* Invited lecture by the winner of the 2022 Industrial Gas Turbine Technology Award, Richard Tuthill. A half century gas turbine R&D retrospective to inform and facilitate a discussion of whether we are currently on foot or on horseback. The obvious disconnects will be explored. (Audience participation will be encouraged.) **L E C T U R E**
8:30	**GT2022:82516** **"Gas Turbine Combined Cycle Range Enhancer – Part 2: Performance Demonstration"** Tommaso Reboli, Marco Ferrando, Luca Mantelli, Lorenzo Gini, Alessandro Sorce, Alberto Traverso *University of Genoa, Italy*	**GT2022:82814** **Interactive Learning Platform for the Preliminary Design of Axial Turbines and Its Use for Graduate Courses** George Silva, Jesuino Takachi Tomita, Cleverson Bringhenti, Luiz Whitacker, Daniel da Silva Tonon *ITA - Aeronautics Institute of Technology, Brazil*	
9:00	**GT2022:82693** **Performance Optimization of Semi-Closed Oxy-Combustion Combined Cycle (SCOC-CC) for Current and Future Blade Materials** Gabriele Pio Risimini, Matteo Martinelli, Paolo Chiesa, Emanuele Martelli *Politecnico di Milano, Italy*	**GT2022:84535** **Pioneering Turbomachinery Education with Multi-Platform App for Blading Design** Michail Tsinoglou, Dionyisis Chala, Anestis Kalfas *Aristotle University of Thessaloniki, Greece*	
9:30	**GT2022:83003** **Market Opportunities for Power-to-X Solutions for Combined Cycles Flexibilization** Stefano Barberis[1] Alessandra Cuneo[1] Daria Bellotti[2] Alessandro Sorce[2] Alberto Vannoni[2] *1. RINA Consulting SpA, Italy; 2. Università degli Studi di Genova, Italy*	**GT2022:81021** **Undergraduate HYPERsonics Research: Lessons From Two Years of the REU Site HYPER** Jeffrey Kauffman, Ali Gordon *University of Central Florida, USA*	

MONDAY JUNE 13 — 8:00 AM – 10:00 AM

	HEAT TRANSFER: FILM COOLING	HEAT TRANSFER: FILM COOLING	HEAT TRANSFER: INTERNAL AIR SYSTEMS
	Turbine Film Cooling	**Optimization of Film Cooling Geometries**	**Systems**
	Technical • Dock 1B • 12-01	**Technical • Port 1 B • 12-07**	**Technical • Dock 5 • 14-04**
	Session Organizer: **Antonio Andreini**, University of Florence Session Co-Chairs: **Alexander Mirzamoghadam**, ; **David Bogard**, University of Texas at Austin; **Robert Krewinkel**, MAN Energy Solutions; **Ardeshir Riahi**, Honeywell; **James L. Rutledge**, Air Force Institute of Technology	Session Organizer: **Shane Haydt**, Pratt & Whitney Session Co-Chairs: **Alexander Mirzamoghadam**, ; **David Bogard**, University of Texas at Austin; **Robert Krewinkel**, MAN Energy Solutions; **Khosro Mollahosseini**, Honeywell; **Michael Benson**, West Point; **James L. Rutledge**, Air Force Institute of Technology	Session Organizer: **Wontae Hwang**, Seoul National University Session Co-Chairs: **Carl M. Sangan**, University of Bath; **Alexander Mirzamoghadam**, ; **Peter Childs**, Imperial College London; **Axel Glahn**, Pratt & Whitney; **James L. Rutledge**, Air Force Institute of Technology
8:00	**GT2022:81360** **Film Cooling and Cold Streaks Tracking on a Fully Cooled Nozzle Guide Vane Under Representative Combustor Outflow Conditions** Giulia Babazzi[1] Tommaso Bacci[1] Alessio Picchi[1] Bruno Facchini[1] Simone Cubeda[2] *1. University of Florence, Italy; 2. Baker Hughes, Italy*	**GT2022:82358** **Shape Optimization of the Laidback Fan-Shaped Film Cooling Hole on Pressure Surface of Turbine Guide Vane** Jiang Yan[1] Li Haiwang[2] Tao Zhi[2] Zhou Zhiyu[2] *1. University, China (Mainland); 2. Beihang University, China (Mainland)*	**GT2022:81791** **Effect of Jet-to-Plate Temperature Ratio on Flow and Heat Transfer Features of Active Clearance Control Systems** Riccardo Da Soghe[1] Lorenzo Mazzei[1] Lorenzo Tarchi[1] Niccolo Casini[1] Lorenzo Cocchi[2] Alessio Picchi[2] Bruno Facchini[2] Niccolò Castelli[2] Maxime Rotenberg[3] *1. Ergon Research, Italy; 2. University of Florence, Italy; 3. Safran Aircraft Engines, France*
8:30	**GT2022:82755** **Effect of Inlet Preswirl on the Film Cooling Characteristics of Turbine Vane Surface** Xinnan Chen[1] Zhigang Li[1] Jun Li[1] Qingzong Xu[2] Qiang Du[2] *1. Institute of Turbomachinery, Xi'an Jiaotong University, China (Mainland); 2. Institute of Engineering Thermophysics, Chinese Academy of Sciences, China (Mainland)*	**GT2022:82726** **Evaluation of Adjoint Optimized Hole – Part II: Parameter Effects on Performance** Christopher Yoon, Daniel Gutierrez, Michael Furgeson, David Bogard, Todd Oliver *University of Texas at Austin, USA*	**GT2022:83129** **Experimental Investigation of a High-Speed Turbine with Rainbow Rotor and Rim Seal Purge Flow** Bogdan Cezar Cernat, Jorge Pinho, Mizuki Okada, Sergio Lavagnoli *von Karman Institute, Belgium*
9:00	**GT2022:80377** **Influence of Porosity on Double-Walled Effusion-Cooled Systems for Gas Turbine Blades** Matthew Courtis, Peter Ireland *Oxford Thermofluids Institute, United Kingdom*	**GT2022:83436** **Evaluation of Adjoint Optimized Holes – Part I Baseline Performance** Daniel Gutierrez[1] Christopher Yoon[1] Michael Furgeson[1] Emma Veley[2] David Bogard[1] Karen Thole[2] *1. University of Texas at Austin, USA; 2. The Pennsylvania State University, USA*	**GT2022:84308** **Gas Turbine Secondary Air Systems Modeling** Mustafa Kocagul[1] Ahmet Cihat Arıkan[1] Omer Uyav[1] Avni Ertas[1] James Bruns[2] Aditya Jayanthi[2] *1. TEI TUSAS Engine Industries, Turkey; 2. Altair Engineering Inc., USA*
9:30	**GT2022:82178** **Experimental Investigation of Effusion Film Cooling on a Cylindrical Leading Edge Model** I-Cheng Huang[1] Kuan-Hsueh Lin[1] Chih-Yung Huang[2] Yao-Hsien Liu[1] *1. National Yang Ming Chiao Tung University, Taiwan (Greater China); 2. National Tsing Hua University, Taiwan (Greater China)*	**GT2022:79923** **Large Eddy Simulation Based Optimization of a Fan-Shaped Cooling Hole Geometry to Enhance Cooling Performance** Shubham Agarwal[1] Laurent Gicquel[1] Florent Duchaine[1] Nicolas Odier[1] Jérôme Dombard[1] Damien Bonneau[2] Michel Slusarz[2] *1. CERFACS, France; 2. Safran Aircraft Engines, France*	

MONDAY JUNE 13 — 8:00 AM – 10:00 AM

	HEAT TRANSFER: INTERNAL COOLING	STRUCTURES AND DYNAMICS: BEARING & SEAL DYNAMICS	STRUCTURES AND DYNAMICS: STRUCTURAL MECHANICS & VIBRATION
	Jet Impingement	**Seals**	**Reduced Order Modeling**
	Technical • Dock 13 • 15-01	**Technical • Port 1 A • 25-04**	**Tutorial • Dock 1A • 30-12**
	Session Organizer: **Lamyaa El-Gabry**, Princeton University Session Co-Chairs: **Sandip Dutta**, Clemson University; **Jaideep Pandit**, Virginia Polytechnic Institute & State University	Session Organizer: **Min Zhang**, Praxair, Inc., Tonawanda, NY Session Co-Organizer: **Adolfo Delgado**, Texas A&M University	Session Organizer: **Harald Schoenenborn**, MTU Aero Engines AG Session Co-Organizer: **Azzedine Dadouche**, National Research Council Canada
8:00	**GT2022:79362** **Heat Transfer and Pressure Loss Correlations for Leading Edge, Jet Impingement Using Racetrack-Shaped Jets with Filleted Edges** Ritwik Vijaykumar Kulkarni[1] Lesley Wright[2] *1. Texas A&M University, USA; 2. Texas A&M University - College Station, USA*	**GT2022:82094** **Research on Aerodynamic Axial Force in Single Rotor-Stator Cavity of a Gas Turbine** Xingyun Jia, Qiyang Hou, Le Zhang *Beijing University of Chemical Technology, China (Mainland)*	**GT2022:85316** **Tutorial: Reduced Order Modeling and Identification of Mistuned Bladed Disks** Bogdan Epureanu, Sean Kelly *University of Michigan, USA*
8:30	**GT2022:81749** **Assessment of Computational Fluid Dynamic Modeling of Multi-Jet Impingement Cooling and Validation with the Experiments** Sadiya Tabassum, Robin Georg Anthony Brakmann, Michael Hilfer, Marcel Matha, Christian Morsbach, Michael Markus Manfred Schroll, Christian Willert *German Aerospace Center (DLR), Germany*	**GT2022:78289** **Effect of Bristle Diameter on Operational Modal Assessment and Seating Load of Brush Seals** Ertugrul Tolga Duran *American University of the Middle East, Kuwait*	
9:00	**GT2022:82152** **Flow Visualization Study From a Flat Plate with Multiple Impinging Jets for Different Cross-Flow Schemes** Radheesh Dhanasegaran[1] Ssheshan Pugazhendhi[2] *1. LUT University, Finland; 2. Indian Institute of Technology Madras, India*	**GT2022:82235** **Investigation of the Transient Closing Behavior of a Radially Adaptive Seal** James Lofts[1] Corina Schwitzke[1] Hans-Jörg Bauer[1] Vincent Peltier[2] Kunyuan Zhou[2] *1. Institut für Thermische Strömungsmaschinen, Karlsruher Institut für Technologie, Germany;* *2. Siemens Energy, Gas and Power, Germany*	
9:30	**GT2022:82346** **Experimental Investigation on Heat Transfer Characteristics in an Impingement/Effusion Cooling System of a Ribbed Turbine Casing** Guodong Li[1] Tao Guo[1] Changbo Qiu[2] Cunliang Liu[1] Huiren Zhu[1] Jichen Li[1] *1. Northwestern Polytechnical University, China (Mainland); 2. AECC Hunan Aviation Powerplant Research Institute, China (Mainland)*	**GT2022:82221** **Dynamic Seal Test Rig: O-Ring Leakage and Sliding Friction Measurements** Thomas Kerr[1] Jordan Nielson[2] *1. Texas A&M University, USA;* *2. Southwest Research Institute, USA*	

MONDAY JUNE 13 — 8:00 AM – 10:00 AM

	SUPERCRITICAL CO2	TURBOMACHINERY: AXIAL FLOW FAN & COMPRESSOR AERODYNAMICS	TURBOMACHINERY: AXIAL FLOW TURBINE AERODYNAMICS
	Tutorial - An Introduction to Supercritical CO2	**Endwall, Seal & Leakage Flows II**	**CFD Analyses**
	Tutorial • Dock 16 • 33-20	**Technical • Dock 15 • 34-03**	**Technical • Rotterdam D • 35-01**
	Session Organizer: **Jason Wilkes**, Southwest Research Institute Session Co-Organizer: **Nathan Weiland**, National Energy Technology Laboratory	Session Organizer: **Simon Evans**, Pratt & Whitney Session Co-Organizer: **Stefano Bianchi**, Airbus Commercial Aircraft	Session Organizer: **Giacomo Bruno Azzurro Persico**, Politecnico di Milano
8:00	**GT2022:84294** **An Introduction to Supercritical Co2: Basics, Cycles, and Applications** Jason Wilkes[1] Robert Pelton[2] Aaron Rimpel[1] *1. Southwest Research Institute, USA;* *2. HPSA, USA*	**GT2022:78443** **Numerical Analysis of Blade Platform Leakage in Axial Compressors** Jannik Petermann[1] Marvin Pommerening[1] Volker Gümmer[1] Bernd Becker[2] *1. TU Munich, Germany; 2. Rolls-Royce Deutschland Ltd & Co KG, Germany*	**GT2022:80681** **Assessment of RANS Turbulence Models on Simplified Geometries Representative of Turbine Blade Tip Shroud Flow** Fatih Uncu[1] Benjamin François[1] Nicolas Buffaz[2] Sébastien Le Guyader[2] *1. ONERA, France; 2. Safran Helicopter Engines, France*
8:30	**T U T O R I A L**	**GT2022:81904** **The Influence of Shrouded Stator Cavity Boundary Conditions on Performance of a 1.5-Stage Low-Speed Research Compressor** Runzhu Shao, Mingmin Zhu, Jinfang Teng, Xiaoqing Qiang *Shanghai Jiao Tong University, China (Mainland)*	**GT2022:83387** **Influence of the Convergent-Divergent Nozzles Arrangement Parameters on Aerodynamic Losses and Overall Supersonic Turbine Performance** Maksym Burlaka[1] Leonid Moroz[1] Aleksandr Yudin[2] *1. SoftInWay Inc., USA; 2. SoftInWay Switzerland GmbH, Switzerland*
9:00		**GT2022:82361** **Loss Analysis of Cavity Leakage Flow in a Compressor Cascade** He-fang Deng[1] Kailong Xia[2] Jinfang Teng[2] Shaopeng Lu[2] Mingmin Zhu[2] Xiaoqing Qiang[2] *1. Shanghai Jiao Tong University, China (Mainland); 2. School of Aeronautics and Astronautics, Shanghai Jiao Tong University, China (Mainland)*	**GT2022:78239** **Influence of RANS Turbulent Inlet Set-Up on the Swirled Hot Streak Redistribution in a Simplified Nozzle Guide Vane Passage: Comparisons with Large-Eddy Simulations** Christopher Wingel[1] Nicolas Binder[2] Yannick Bousquet[2] Jean-François Boussuge[3] Nicolas Buffaz[1] Sébastien Le Guyader[1] *1. Safran Helicopter Engines, France;* *2. ISAE-Supaero, France; 3. CERFACS, France*
9:30		**GT2022:82868** **Leakage Flow Impact on Shrouded Stator Cavity Flow Topology and Associated High Speed Axial Compressor Stage Performance** Cedric Babin[1] Xavier Ottavy[2] Fabrizio Fontaneto[1] *1. von Karman Institute, Belgium; 2. Laboratoire de Mécanique des Fluides et d'Acoustique, France*	**GT2022:80951** **The Influences of Trailing Edge Base Pressure on the Profile Loss of Low-Pressure Turbine Blades** Hidekazu Kodama, Ken-Ichi Funazaki *Iwate University, Japan*

MONDAY JUNE 13 — 8:00 AM – 10:00 AM

	TURBOMACHINERY: DEPOSITION, EROSION, FOULING, AND ICING	TURBOMACHINERY: DESIGN METHODS & CFD MODELING FOR TURBOMACHINERY	TURBOMACHINERY: DESIGN METHODS & CFD MODELING FOR TURBOMACHINERY
	Deposition and Erosion Effects	**CFD Solver Methods**	**Unsteady Flow Modeling**
	Technical • Dock 11 • 36-01	**Technical • Dock 10 B• 37-02**	**Technical • Dock 14 • 37-04**
	Session Organizer: **Nagaraja Rudrapatna**, Honeywell Session Co-Organizer: **Eric Ruggiero**, GE Aviation	Session Organizer: **Koen Hillewaert**, Université De Liege | Aerospace and Mechanics Department Session Co-Chairs: **Luca Porreca**, MAN; **Mahmoud Mansour**, Honeywell International Inc; **Bronwyn Power**, Pratt & Whitney; **Gorazd Medic**, United Technologies Research Center	Session Organizer: **Roque Corral**, UPM Session Co-Chairs: **Luca Porreca**, MAN; **Mahmoud Mansour**, Honeywell International Inc; **Bao Nguyen**, Honeywell Aerospace; **Bronwyn Power**, Pratt & Whitney; **Ankit Tiwari**, Gentherm Inc.
8:00	**GT2022:78116** **The Importance of Shape in Particle Rebound Behaviors** Jacob Wilson[1] Rui Qiao[1] Matthew Kappes[2] James Loebig[2] Rory Clarkson[3] *1. Virginia Tech, USA; 2. Rolls-Royce Corp., USA; 3. Rolls-Royce plc, United Kingdom*	**GT2022:82959** **Analysis of Turbomachinery Averaging Techniques** Christian Frey, Graham Ashcroft, Michael Müller, Jens Wellner *German Aerospace Center (DLR), Germany*	**GT2022:81564** **An Approximate Time Domain Nonlinear Harmonic Method for Analyzing Unsteady Flows with Multiple Fundamental Modes** Sen Zhang, Dingxi Wang *Northwestern Polytechnical University, China (Mainland)*
8:30	**GT2022:79366** **Effect of Temperature and Velocity on Microparticle Erosion/Deposition Into Environmental-Barrier-Coated CMC for Aeroengines** Yoji Okita[1] Masaya Suzuki[1] Takashi Yamane[1] Jun Hasegawa[2] Yosuke Mizokami[2] Takeshi Nakamura[2] *1. Japan Aerospace Exploration Agency, Japan; 2. IHI Corporation, Japan*	**GT2022:82519** **Application of 3D Inverse Design Method on a Transonic Compressor Stage** Luying Zhang[1] Saurya Ray[1] Mehrdad Zangeneh[2] *1. Advanced Design Technology, United Kingdom; 2. University College London, United Kingdom*	**GT2022:81677** **Influence From Nozzle Guide Vane Wakes and Inlet End-Wall Boundary Layers on Turbine Rear Structure Aerodynamics** Pär Nylander, Srikanth Deshpande, Jonas Larsson *GKN Aerospace Sweden, Sweden*
9:00	**GT2022:81715** **Particle Deposition on HPT Nozzle: Full 3D Investigation and Secondary Flows Effect** Nicola Casari[1] Stefano Oliani[1] Michele Pinelli[1] Alessio Suman[1] Mauro Carnevale[2] *1. University of Ferrara, Italy; 2. University of Bath, United Kingdom*	**GT2022:84035** **New Concept for Design in Turbomachinery Applications using Full RANS Gradient Methodology** Armando Del Rio, Ernesto Casartelli, Benno Fleischli, Luca Mangani *Lucerne University of Applied Sciences and Arts, Switzerland*	**GT2022:83460** **Harmonic Method for Simulating Unsteady Multispool Interactions** Feng Wang, Luca Di Mare *University of Oxford, United Kingdom*
9:30	**GT2022:82304** **Unpacking Inter-Mineral Synergies and Reactions During Dust Deposition in an Impingement Coolant Jet** Eric Nied[1] Jeffrey Bons[1] Ryan Lundgreen[2] *1. The Ohio State University, USA; 2. Pratt & Whitney, USA*	**GT2022:82569** **Exploiting GPU-Based HPC Architectures to Accelerate an Unsteady CFD Solver for Turbomachinery Applications** Francesco Poli[1] Michele Marconcini[1] Roberto Pacciani[1] Donato Magarielli[2] Ennio Spano[2] Andrea Arnone[1] *1. University of Florence, Italy; 2. GE AVIO S.r.l., Italy*	**GT2022:84388** **Evaluation of Various Numerical Methods for Blade Row Interaction in Turbomachinery** Yangwei Liu, Xiaosong Yong, Yumeng Tang *Beihang University, China (Mainland)*

MONDAY JUNE 13 — 8:00 AM – 10:00 AM

TURBOMACHINERY: MULTIDISCIPLINARY DESIGN APPROACHES, OPTIMIZATION, AND UNCERTAINTY QUANTIFICATION

Adjoint-based and Adjoint-enhanced Design Optimization Methods and Applications

Technical • Dock 4 • 39-01

Session Organizer: **Francesco Montomoli**, ToffeeAM
Session Co-Chairs: **Ingrid Lepot**, Cenaero; **Shahrokh Shahpar**, Rolls-Royce Plc

8:00

GT2022:80490
Multi-Objective Aerodynamic and Aeroelastic Coupled Design Optimization Using a Fully Turbulent Discrete Adjoint Harmonic Balance Method
Hangkong Wu, Dingxi Wang, Xiuquan Huang
Northwestern Polytechnical University, China (Mainland)

8:30

GT2022:80806
Application of Adjoint-Enhanced First Order Second Moment Method for Robust Design Optimization of a High Pressure Compressor Rotor
Max Dittmann[1] Robin Schmidt[2] Marcus Meyer[2]
1. Technische Universität Dresden, Germany; 2. Rolls-Royce Deutschland Ltd. & Co. KG, Germany

9:00

GT2022:80906
CAD Integrated Gradient-Based Aero Optimization of the NASA Rotor 37
Thanh-Son Tran, Tom De Bruyn, Tom Verstraete
von Karman Institute, Belgium

9:30

GT2022:82218
Comparing Gradient-Free and Gradient-Based Multi-Objective Optimization Methodologies on the VKI-LS89 Turbine Vane Test Case
Romain Hottois[1] Arnaud Châtel[1] Tom Verstraete[1] Grégory Coussement[2] Tom De Bruyn[1]
1. von Karman Institute, Belgium; 2. University of Mons, Belgium

MONDAY JUNE 13 **10:30 AM - 12:00 PM**

KEYNOTE & PLENARIES

Keynote: Road-Mapping the Future of Propulsion and Power

RTM Stage

Moderators:
Jaroslaw Szwedowicz, R&D Senior Principal Key Expert for Gas Turbine Modules, Siemens Energy AG
Christer Björkqvist, Managing Director, ETN Global

Pedro Lopez Estebaranz, COO, *Uniper*
Michael Grootenboer, *Senior Vice President Engine Products, Air France KLM Group*
Ms. Priscilla Chandrasekaran, *Global LNG Technology Innovation Manager, Shell Global Solutions International*
Professor. Dr. Thomas Thiemann, *Senior Vice President, Siemens Energy*

10:30

Switching gear towards a rapid energy transition has never been more important!

Russia's invasion of Ukraine and the climate crisis with recent catastrophic extreme weather events has sparked an energy revolution of a new dimension with the need of a revised timeline.

The 2022 Turbo Expo opening session will set the scene for the conference by highlighting the important role of turbomachinery both for the energy transition and in a carbon-neutral society.

11:00

The relevant stakeholders will in the opening session highlight the common vision and commitment to solving the "Energy Trilemma". You will receive essential information for the design of a future road map to be built on dispatchable, efficient and reliable energy and storage solutions that can work together with intermittent renewable energy solutions without compromising security of supply.

Priscilla Chandrasekaran, Global LNG Technology Innovation Manager at Shell, will explain Shell's strategy to accelerate their business transition in partnership with various sectors. She will focus in particular on the synergies between LNG and hydrogen.

From the utility user community, Pedro Lopez, COO Uniper and President of ETN Global will stress the importance of a wide cooperation and showcase Uniper's dedication to empowering the energy evolution by becoming carbon-neutral and by offering sustainable energy solutions.

11:30

The energy transition in air transport is also underway with hydrogen ecosystem as one of the essential building blocks which will be shown by Michael Grootenboer, Senior Vice President Engine Products for the Air France KLM Group.

Overall, the opening session will provide valuable input to the road mapping of the future of propulsion and power and address how we can accelerate our common journey towards secure, climate neutral energy solutions. Are the policy makers, the gas turbine user community, the suppliers and distributers of sustainable fuels and the gas turbine industry all onboard? Any guidance to the Turbomachinery R&D community that enable an even stronger and more dedicated support?

Astonishing achievements in this direction have already been made by the R&D community and as usual the ASME IGTI's annual award program will at the end of this session present and honor the individuals who have made significant contributions to advancing the turbomachinery industry.

Welcome Speaker

MONDAY JUNE 13 — 01:30 PM - 03:30 PM

	AIRCRAFT ENGINE	CERAMICS AND CERAMIC COMPOSITES	COAL, BIOMASS, HYDROGEN & ALTERNATIVE FUELS
	Basics of Gas Turbine Engine Core	**Mechanical Behavior of Ceramics & Composites**	**Liquid fuels**
	Tutorial • Dock 10 A • 01-12	**Technical • Dock 4 • 02-01**	**Technical • Rotterdam C • 03-06**
	Session Organizer: **Keith Boyer**, Practical Aero Session Co-Chairs: **Vassilios Pachidis**, Cranfield University; **Konstantinos Kyprianidis**, MDU	Session Organizer: **Michael Presby**, NASA Session Co-Organizer: **Rajesh Kumar**, United Technologies Research Ctr	Session Organizer: **Marina Braun-Unkhoff**, Institute of Combustion Technology Session Co-Chairs: **Pierre Gauthier**, Siemens Energy Canada; **Pietro Bartocci**, CRB; **Angela Serra**, Baker Hughes
1:30	**GT2022:83971** **Basics of Gas Turbine Engine Core** Keith Boyer[1] Kenneth Van Treuren[2] *1. Practical Aeronautics, USA; 2. Baylor University, USA*	**GT2022:80583** **Micromechanical Modeling of Time-Dependent Crack Opening Behavior in SiC/SiC Composites** Longbiao Li *Nanjing University of Aeronautics and Astronautics, China (Mainland)*	**GT2022:84359** **Ammonia as an Aircraft Fuel: Thermal Assessment From Airport to Wake** Marcel Otto[1] Ladislav Vesely[2] Jayanta Kapat[1] Michael Stoia[3] Nicholas Applegate[3] Greg Natsui[4] *1. University of Central Florida, USA; 2. University of Central Florida - CATER, USA; 3. Boeing Research and Technology, USA; 4. GE Research, USA*
2:00	T U T O R I A L	**GT2022:83010** **Advancement of Electrical Resistance Towards Monitoring Crack Growth in SiC Based Composites at Elevated Temperatures** Joseph El Rassi, Gregory N. Morscher *The University of Akron, USA*	**GT2022:83166** **Validation and Assessment of a Numerical Methodology for Turbulent Liquid Fuel Jets in High-Speed Crossflow** Malika Zghal[1] Xiaoxiao Sun[1] Pierre Gauthier[2] Vishal Sethi[1] *1. Cranfield University, United Kingdom; 2. Siemens Energy, Canada*
2:30		**GT2022:83270** **To Drill or Not to Drill? - Creep of an Oxide-Oxide Composite with Diamond-Drilled Discharge Holes at Elevated Temperature** Marina Ruggles-Wrenn, Megan Harkins *Air Force Institute of Technology, USA*	**GT2022:80430** **Spray Characterization of a Preheated Bio-Oil Surrogate at Elevated Pressures** Mohsen Broumand[1] Murray Thomson[1] Sean Yun[2] Zekai Hong[2] *1. University of Toronto, Canada; 2. National Research Council Canada, Canada*
3:00		**GT2022:82669** **Reducing Fuel Burn Using SiC/SiC CMC HPT Vanes and Rotor Blades** Robert Boyle *N&R Engineering, USA*	**GT2022:83029** **A Study on Fundamental Combustion Properties of Trimethyl Orthoformate: Experiments and Modeling** John Mburu Ngugi, Sandra Richter, Marina Braun-Unkhoff, Clemens Naumann, Uwe Riedel *German Aerospace Center (DLR), Germany*

MONDAY JUNE 13

01:30 PM - 03:30 PM

	COMBUSTION, FUELS & EMISSIONS	COMBUSTION, FUELS & EMISSIONS	COMBUSTION, FUELS & EMISSIONS
	Flashback and Blowoff	**Kinetics**	**Combustion Dynamics - Experiments I**
	Technical • Port 1 C • 04-02	**Technical • Port 2 • 04-13**	**Technical • Port 3 • 04-22**
	Session Organizer: **Jacqueline O'Connor**, Purdue University Session Co-Chairs: **Vishal Acharya**, Georgia Institute of Technology; **Sebastien Ducruix**, CM2C - CNRS; **Fernando Biagioli**, Infosys Ltd; **Gilles Bourque**, Siemens Canada; **Alberto Amato**, Ansaldo Energia	Session Organizer: **Jacqueline O'Connor**, Purdue University Session Co-Chairs: **Vishal Acharya**, Georgia Institute of Technology; **Sebastien Ducruix**, CM2C - CNRS; **Michael Klassen**, Combustion Science & Engrg; **Gilles Bourque**, Siemens Canada	Session Organizer: **Vishal Acharya**, Georgia Institute of Technology Session Co-Chairs: **Jacqueline O'Connor**, Purdue University; **Santosh Hemchandra**, Department of Aerospace Engineering; **Sebastien Ducruix**, CM2C - CNRS; **Gilles Bourque**, Siemens Canada
1:30	**GT2022:79816** **Validation of Hydrogen Boundary Layer Flashback Model on Gas Turbine Geometries and Conditions** Sikke Klein, Christos Sarakatsanis *Delft University of Technology, Netherlands*	**GT2022:78466** **Bayesian Calibration of Kinetic Parameters in the CH Chemistry Towards Accurate Prompt-NO Modelling** Antoine Durocher[1] Gilles Bourque[2] Jeffrey Bergthorson[1] *1. McGill University, Canada; 2. Siemens Energy, Canada*	**GT2022:83234** **Effect of Flare Geometry on the Flow Field of Radial-Radial Swirlers** Ayse Bay, Firat Kiyici, Mustafa Percin *Middle East Technical University, Turkey*
2:00	**GT2022:82601** **Modeling of Flashback with Different Blends of CH4 and H2 by Using Finite Rate Chemistry with Large Eddy Simulation** Ishan Verma[1] Rakesh Yadav[2] Naseem Ansari[2] Stefano Orsino[2] Shaoping Li[2] Pravin Nakod[1] *1. Ansys Inc, India; 2. Ansys Inc, USA*	**GT2022:82269** **Metamodelling of Ignition Delay Time for Natural Gas Blends Under Gas Turbine Operating Conditions** Sajjad Yousefian[1] Gilles Bourque[2] Rory F. D. Monaghan[1] *1. National University of Ireland, Galway, Ireland; 2. Siemens Energy Canada Ltd, Canada*	**GT2022:80771** **Hysteresis and Bi-Stability in Transversely Excited Swirling Flows** Ravi Gupta, Rajat Gohiya, Chandan Vempati, Santosh Hemchandra, Pratikash Panda *Indian Institute of Science, Bangalore, India*
2:30	**GT2022:82163** **Numerical Investigation of a Coupled Blow-Off/Flashback Process in a High-Pressure Lean-Burn Combustor** Ivan Langella[1] Alessandro Soli[2] *1. Delft University of Technology, Netherlands; 2. Loughborough University, United Kingdom*	**GT2022:82069** **High-Fuel Loading Ignition Delay Time Characterization of Hydrogen/Natural Gas/Ammonia at Gas Turbine-Relevant Conditions Inside a High-Pressure Shock Tube** Michael Pierro, Justin Urso, Cory Kinney, Shubham Kesharwani, Jonathan Mcgaunn, Christopher Dennis, Subith Vasu *University of Central Florida, USA*	**GT2022:79706** **Effect of Counter- and Co-Swirl on Low-Frequency Combustion Instabilities of Jet A-1 Spray Flames** Byeonguk Ahn[1] Kyu Tae Kim[2] *1. Norwegian University of Science and Technology, Norway; 2. Korea Advanced Institute of Science and Technology, Korea*
3:00	**GT2022:79347** **Computational Fluid Dynamics Modeling of Fuel Properties Impact on Lean Blowout in the ARC-M1 Combustor** Debolina Dasgupta[1] Sibendu Som[1] Eric Wood[2] Tonghun Lee[2] Eric Mayhew[3] Jacob Temme[3] Chol-Bum Kweon[3] *1. Argonne National Laboratory, USA; 2. University of Illinois at Urbana-Champaign, USA; 3. Army Research Laboratory, USA*	**GT2022:82305** **The Ignition of C1–C7 Natural Gas Blends and the Effect of Hydrogen Addition in the Low and High Temperature Regimes** Ahmed Mohamed[1] Amrit Bikram Sahu[1] Snehasish Panigrahy[1] Gilles Bourque[2] Henry Curran[1] *1. National University of Ireland Galway, Ireland; 2. Siemens Energy Canada Ltd., Canada*	**GT2022:81590** **Experimental Investigation of Combustion Dynamics in a High-Pressure Liquid-Fueled Swirl Combustor** Aravind Chandh[1] Subodh Adhikari[1] David Wu[1] Randal Mckinney[1] Benjamin Emerson[1] Qingguo Zhang[2] Dibesh Joshi[2] Baris Sen[2] Dustin Davis[2] *1. Georgia Institute of technology, USA; 2. Pratt & Whitney, USA*

MONDAY JUNE 13 — 01:30 PM - 03:30 PM

	CONTROLS, DIAGNOSTICS & INSTRUMENTATION	CYCLE INNOVATIONS	HEAT TRANSFER: FILM COOLING
	Topics on Gas Turbine Diagnostics	**Low Emissions Cycles**	**Endwall Film Cooling**
	Technical • Dock 2 • 05-02	**Technical • Dock 12 • 06-06**	**Technical • Dock 1B • 12-03**
	Session Organizer: **Igor Loboda**, University of Mexico Session Co-Chairs: **Min Zhang**, Praxair, Inc., Tonawanda, NY; **Liang Tang**, P&W	Session Organizer: **Ward De Paepe**, University of Mons Session Co-Chairs: **Alessandro Sorce**, University of Genoa; **Homam Nikpey Somehsaraei**, University of Stavanger	Session Organizer: **Andrew Nix**, West Virginia University Session Co-Chairs: **Alexander Mirzamoghadam**, ; **David Bogard**, University of Texas at Austin; **Robert Krewinkel**, MAN Energy Solutions; **Stephen Lynch**, Pennsylvania State University; **James L. Rutledge**, Air Force Institute of Technology
1:30	**GT2022:81124** **Blade Health Monitoring System for Gas Turbines Subjected to Contaminated Air** Kamel Tayebi[1] Abdurrahman Khalidi[2] Alaaeldin Dawood[1] *1. GE Gas Power, Saudi Arabia; 2. General Electric Gas Power, United Arab Emirates*	**GT2022:80697** **Innovative Cycles for Industrial Combined Heat and Power Generation with Carbon Capture and Storage** Riddhi Kapoor, Sikke Klein *Delft University of Technology, Netherlands*	**GT2022:82799** **Investigations on Cooling Hole Patterns Over a Turbine Endwall for Improving Cooling Effectiveness** Xing Yang, Qiang Zhao, Hang Wu, Zhenping Feng *Xi'an Jiaotong University, China (Mainland)*
2:00	**GT2022:81744** **Acoustic Localisation of High-Pressure Burst in a Confined Space** David Bacci[1] Peter Ireland[1] Zahid Hussain[2] *1. University of Oxford, United Kingdom; 2. Rolls Royce, United Kingdom*	**GT2022:80772** **Micro-Gas Turbine Cycle Configurations for Biomass Combined Heat and Power Plants** Konstantinos Bollas, Theofilos Efstathiadis, Dimitrios Mertzis, Anestis Kalfas *Aristotle University of Thessaloniki, Greece*	**GT2022:83159** **Aero-Thermal Analysis of Non-Axisymmetric and Flat Endwalls Under the Operational and Geometrical Uncertainties** Zhi Tao, Jie Wang, Liming Song, Jun Li *Institute of Turbomachinery, Xi'an Jiaotong University, China (Mainland)*
2:30	**GT2022:83076** **A GTC-CGC Health Assessment Method for Gas Turbine Engine** Ran Ao, Yunpeng Cao, Junqi Luan, Li Yan, Xiaoyu Han, Shuying Li *Harbin Engineering University, China (Mainland)*	**GT2022:82892** **Carbon Capture Performance Assessment Applied to Combined Cycle Gas Turbine Under Part-Load Operation** Antoine Verhaeghe[1] Lionel Dubois[1] Laurent Bricteux[1] Diane Thomas[1] Julien Blondeau[2] Ward De Paepe[3] *1. University of Mons, Belgium; 2. Vrije Universiteit Brussel, Belgium; 3. Univeristy of Mons, Belgium*	**GT2022:82203** **Turbine Vane Passage Cooling Experiments with a Close-Coupled Combustor-Turbine Interface Geometry Part 2: Describing the Coolant Coverage** Kedar Nawathe[1] Aaditya Nath[1] Yong Kim[2] Terrence Simon[1] *1. University of Minnesota, Twin Cities, USA; 2. Solar Turbines Inc., USA*
3:00	**GT2022:83600** **Bearing Diagnostics Using Kurtosis Spectral Correlation Based on Cyclic Modulation Spectrum Estimation** Alexandre Mauricio, Konstantinos Gryllias *LMSD - Mecha(tro)nic System Dynamics, Department of Mechanical Engineering, KU Leuven, Belgium, Belgium*	**GT2022:83472** **Study to Adapt Industrial Gas Turbines for Significant and Viable CO2 Emissions Reduction** Daniel Burnes, Priyank Saxena, Rainer Kurz *Solar Turbines Incorporated, USA*	**GT2022:80225** **Turbine Vane Passage Cooling Experiments with a Close-Coupled Combustor-Turbine Interface Geometry Part 1: Describing the Flow** Kedar Nawathe[1] Aaditya Nath[1] Yong Kim[2] Terrence Simon[1] *1. University of Minnesota, Twin Cities, USA; 2. Solar Turbines Inc., USA*

MONDAY JUNE 13

01:30 PM - 03:30 PM

	HEAT TRANSFER: FILM COOLING	HEAT TRANSFER: INTERNAL COOLING	MANUFACTURING MATERIALS & METALLURGY
	Code Development	**Swirling Flow / Swirl Chambers**	**Metallurgy for the Non-Metallurgist**
	Technical • Port 1 B • 12-11	**Technical • Dock 13 • 15-02**	**Tutorial • Port 7 • 18-10**
	Session Organizer: **Gregory Laskowski**, Dassault Systemes Session Co-Chairs: **Alexander Mirzamoghadam**, ; **David Bogard**, University of Texas at Austin; **Robert Krewinkel**, MAN Energy Solutions; **Gustavo Ledezma**, GE Global Research; **James L. Rutledge**, Air Force Institute of Technology	Session Organizer: **Hongzhou Xu**, Solar Turbines Inc Session Co-Chairs: **Alexander Mirzamoghadam**, ; **Mohammad Taslim**, Northeastern University; **Lesley M. Wright**, Texas A&M University; **Hee Koo Moon**, ; **James L. Rutledge**, Air Force Institute of Technology	Session Organizer: **Paul Lowden**, Liburdi Session Co-Chairs: **William Day**, W. David Day, Inc.; **Sascha Gierlings**, Fraunhofer Institute
1:30	**GT2022:82507** **Predictive Modelling of Local Film-Cooling Flow on a Turbine Rotor Blade** Eric Deshong, Reid Berdanier, Karen Thole *Pennsylvania State University, USA*	**GT2022:79594** **Jet Entrance Configurations and Swirl Motion Effects on Heat Transfer Characteristics Inside Blade Leading Edge of the Gas Turbine** Fifi Elwekeel[1] Qun Zheng[2] Antar Abdala[1] *1. Helwan University, Egypt; 2. Harbin Engineering University, China (Mainland)*	**GT2022:81971** **Metallurgy for the Non-Metallurgist** Paul Lowden[1] Xiao Huang[2] Doug Nagy[3] *1. Liburdi Engineering Ltd, Canada; 2. Carleton University, Canada; 3. Liburdi Turbine Services, Canada*
2:00	**GT2022:80700** **Efficient Modelling of Blade Film Cooling in Gas Turbines** Justin Penrose[1] Laith Zori[2] Juan Carlos Morales[2] Sunil Patil[2] David Pons[2] Samir Rida[2] *1. Ansys UK Ltd., United Kingdom; 2. Ansys Inc, USA*	**GT2022:79595** **Effects of Novel Roughened Wall of Swirl Cooling in Gas Turbine on Heat Transfer Characteristics and Pressure Drop** Fifi Elwekeel[1] Qun Zheng[2] Antar Abdala[1] *1. Helwan University, Egypt; 2. Harbin Engineering University, China (Mainland)*	**TUTORIAL**
2:30	**GT2022:81923** **Effects of Freestream Turbulence on Air-Mist Film Cooling: Two-Phase Flow Simulations** Subrata Sarkar, Anjali Dwivedi *Indian Institute of Technology Kanpur, India*	**GT2022:82198** **The Heat Transfer and Coherent Structures of the Tangential Impingement Jets in the Annular Chamber Studied with Extended Proper Orthogonal Decomposition** Lei Shi, Xiaocheng Zhu, Zhaohui Du *Shanghai Jiao Tong University, China (Mainland)*	
3:00	**GT2022:82787** **Developing a Scalar Flux Model Solely Based on Mean Flow Quantities for the Film Cooling Jet Flow** Bo Shi, Xueying Li, Jing Ren *Gas Turbine Institute, China (Mainland)*	**GT2022:82775** **Heat Transfer Enhancement of Swirl Cooling by Different Crossflow Diverters** Kun Xiao, Juan He, Zhenping Feng *Xi'an Jiaotong University, China (Mainland)*	

MONDAY JUNE 13 — 01:30 PM - 03:30 PM

	MICROTURBINES, TURBOCHARGERS & SMALL TURBOMACHINES	STEAM TURBINE	STRUCTURES AND DYNAMICS: AERODYNAMICS EXCITATION & DAMPING
	Radial Turbocompressors Analysis	**Last Stage Blades and General Design Aspects of Steam Turbines**	**Compressor Aerodynamic Damping**
	Technical • Port 4 • 20-01	**Technical • Dock 9 • 23-08**	**Technical • Dock 5 • 24-01**
	Session Organizer: **Jorge García-Tíscar**, Universitat Politècnica de València Session Co-Chairs: **Grant Musgrove**, Southwest Research Institute; **Jose R. Serrano**, Universitat Politècnica De València. ESQ4618002B; **Silvia Marelli**, University of Genova	Session Organizer: **Tadashi Tanuma**, Teikyo University Session Co-Chairs: **Alexander Stein**, GE Power; **Christian Siewert**, Siemens Energy; **Matthew Montgomery**, Doosan; **Sebastian Schuster**, University of Duisburg-Essen; **Bertold Luebbe**, Siemens AG - Power and Gas Division	Session Organizer: **Sina C. Stapelfeldt**, Imperial College London Session Co-Chairs: **Almudena Vega**, Universidad Politecnica de Madrid; **Mateusz Golebiowski**, Alstom (Switzerland) Ltd.; **Roque Corral**, UPM
1:30	**GT2022:78205** **Physical Insight Into Whoosh Noise in Turbocharger Compressors Using Computational Fluid Dynamics** Rick Dehner[1] Ahmet Selamet[1] Pranav Sriganesh[1] Deb Banerjee[1] Emel Selamet[1] Ahsanul Karim[2] Todd Brewer[2] Anthony Morelli[2] *1. Ohio State University, USA; 2. Ford Motor Co., USA*	**GT2022:80368** **Prediction of Rotating Instabilities in Low Pressure Steam Turbines Operating at Low Load** Oliver Pütz *Siemens Energy, Germany*	**GT2022:81935** **Uncertainty Quantification of Computational Flutter Estimates of a Compressor Cascade** Marco Rauseo, Fanzhou Zhao, Mehdi Vahdati, Quentin Rendu *Imperial College London, United Kingdom*
2:00	**GT2022:81705** **Sensitivity Analysis of Impeller Blade Parameters to Compressor Performance and Aerodynamic Noise** Cao Yipeng, Ma Zequn, Liu Chen *Harbin Engineering University, China (Mainland)*	**GT2022:80523** **Analysis of Turbulent Effects in a Low-Pressure Model Steam Turbine Operating Under Various Operating Conditions Using Detached Eddy Simulation** Ilgit Ercan[1] Damian Vogt[2] *1. Siemens Energy, Germany; 2. Institute of Thermal Turbomachinery and Machinery Laboratory, University of Stuttgart, Germany*	**GT2022:82160** **On the Effect of Frequency Separation, Mass Ratio, Solidity and Aerodynamic Resonances in Coupled Mode Flutter of a Linear Compressor Cascade** Matthias Schuff, Virginie Anne Chenaux *German Aerospace Center, Germany*
2:30	**GT2022:80820** **Advanced Thermal Profiling of Turbocharger Compressor Wheels Using Phosphorescence Thermal History Coatings** Solon Karagiannopoulos[1] Martin Rode[2] David Peral[1] Daniel Castillo[1] Silvia Araguas[1] Kieron Rai[1] Ryosuke Inomata[2] Georgios Iosifidis[2] Jörg Feist[1] *1. Sensor Coating Systems, United Kingdom; 2. IHI Charging Systems International GmbH, Germany*	**GT2022:79398** **History of Steam Expansion Machines Seen as Polytropic Efficiency Achievements** Hans E. Wettstein *HEW Consulting, Switzerland*	**GT2022:82382** **Preliminary Numerical Validation of the Frequency Response Method on the Study of Aero-Damping in a Linear Oscillating Compressor Cascade** Xin Tong, Fanfu Yin, Xin Shen, Xiaoqing Qiang, Hua Ouyang *Shanghai Jiao Tong University, China (Mainland)*
3:00	**GT2022:79574** **Economizer Location Optimization for a Centrifugal Compressor with Refrigerant as Working Fluid** Jin Yan, Jose Urcia, Tadeu Fagundes *Danfoss Turbocor Inc, USA*	**GT2022:82896** **CFD Analysis of the Forces on a Steam Turbine Balance Seal Packing Ring** Cosi Bianchini[1] Lorenzo Arcangeli[2] Lorenzo Cosimo[2] Riccardo Da Soghe[1] Davide Bertini[1] Lorenzo Mazzei[1] *1. Ergon Research, Italy; 2. Baker Hughes, Italy*	**GT2022:82935** **A Digital Twin of Compressor Blisk Manufacturing Geometrical Variability for the Aeroelastic Uncertainty Quantification of the Aerodynamic Damping** Marco Gambitta[1] Bernd Beirow[1] Sven Schrape[2] *1. Brandenburg University of Technology, Germany; 2. Rolls-Royce Deutschland Ltd. & Co. KG, Germany*

MONDAY JUNE 13

01:30 PM - 03:30 PM

	STRUCTURES AND DYNAMICS: BEARING & SEAL DYNAMICS	STRUCTURES AND DYNAMICS: STRUCTURAL MECHANICS & VIBRATION	SUPERCRITICAL CO2
	Annular Seals II	**Damping Evaluation and Effect I**	**Supercritical CO2 Pilot Plants and Commercial Systems**
	Technical • Port 1 A • 25-02	**Technical • Dock 1A • 30-02**	**Panel •Dock 16 • 33-24**
	Session Organizer: **Tingcheng Wu**, Siemens Energy Session Co-Organizer: **Adolfo Delgado**, Texas A&M University	Session Organizer: **Azzedine Dadouche**, National Research Council Canada Session Co-Chairs: **Daniel Gillaugh**, USAF; **Jeff Brown**, USAF; **David Backman**, National Research Council Canada	Moderator: **Timothy Allison**, Southwest Research Institute
1:30	**GT2022:80073** **Measured Leakage and Rotordynamic Force Coefficients for Two Liquid Annular Seal Configurations: Smooth-Rotor/Grooved-Stator Versus Grooved-Rotor/Smooth-Stator** Dara W. Childs[1] Jing Yang[1] Luis San Andres[1] Jose M. Torres[2] J. Alex Moreland[3] *1. Texas A&M University, USA; 2. Energy Recovery, Inc., USA; 3. Lynntech, Inc., USA*	**GT2022:79980** **An Experimental Investigation on the Dynamic Response Variability of a Turbine Blade with Mid-Span Dampers** Erhan Ferhatoglu, Daniele Botto, Stefano Zucca *Politecnico di Torino, Italy*	Panelists: Philipp Jenny, *MAN Energy Solutions* Karl Wygant, *Hanwha Power Systems Americas* Don Stevenson, *Gas Technology Institute* Jitka Špolcová, *European Turbine Network* Brock Forrest, *NET Power* **P** **A** **N** **E** **L**
2:00	**GT2022:83356** **Rotordynamic Performance of Smooth Liquid Annular Seals in the Laminar, Transition, and Turbulent Regimes Over a Range of Imposed Pre-Swirl Ratios** Dara Childs[1] Joshua Bullock[2] *1. Texas A&M University, USA; 2. Valero Energy Corp., USA*	**GT2022:83393** **"The Numerical and Experimental Evaluation of a Coupled Blade Dynamic Limit Response with Friction Contacts"** Kelly Grant[1] Chiara Gastaldi[2] Teresa Maria Berruti[2] Rudolf Kellerer[1] *1. Ansaldo Energia, Switzerland; 2. Politecnico di Torino, Italy*	
2:30	**GT2022:83499** **Leakage and Rotordynamic Performance of a Hole-Pattern Multiphase Pump Seal** Min Zhang[1] Dara Childs[2] *1. Linde, Inc., USA; 2. Texas A&M University, USA*	**GT2022:82840** **Influence of the Contact Interfaces on the Dynamics and Power Flow Behavior of the Bolted Structure** Yongfeng Wang[1] Jie Hong[1] Yanhong Ma[1] Giuseppe Battiato[2] Christian Firrone[2] *1. Beihang University, China (Mainland); 2. Politecnico di Torino, Italy*	
3:00	**GT2022:81010** **Circumferentially Grooved Seal Flow Field Analysis Based on Effective Film Thickness to Improve Bulk Flow Models** Nathaniel Gibbons, Cori Watson-Kassa, Christopher Goyne, Minhui He *University of Virginia, USA*	**GT2022:82960** **Gas Turbine Rotor Damper Lift-Off Study** Manoharan Sambandam[1] Abhimanyu S[1] Babu Santhana Gopalakrishnan[1] Leonardo Tognarelli[2] Guido Peano[2] *1. Baker Hughes, India; 2. Baker Hughes, Italy*	

MONDAY JUNE 13

01:30 PM - 03:30 PM

	TURBOMACHINERY: AXIAL FLOW FAN & COMPRESSOR AERODYNAMICS	TURBOMACHINERY: AXIAL FLOW TURBINE AERODYNAMICS	TURBOMACHINERY: DEPOSITION, EROSION, FOULING, AND ICING
	Flow Control	**High-Fidelity CFD**	**Hot Section Deposition**
	Technical • Dock 15 • 34-05	**Technical • Rotterdam D • 35-02**	**Technical • Dock 11 • 36-02**
	Session Organizer: **Amit Paspulati**, Johnson Controls Inc Session Co-Organizer: **John Trevino**, JCI	Session Organizer: **Alexander Stein**, GE Power Session Co-Organizer: **Florian Herbst**, Leibniz Univ Hannover	Session Organizer: **Ryan Lundgreen**, Pratt & Whitney Session Co-Organizer: **Michele Pinelli**, Università degli Studi Di Ferrara
1:30	**GT2022:82126** **Experimental Flow Investigation Inside an Axial Compressor with Active Flow Control** Joseph Moubogha Moubogha, Pierric Joseph, Olivier Roussette, Antoine Dazin *University of Lille, France*	**GT2022:82109** **High-Fidelity Simulations of the Flow Around T106C Cascade at Low Reynolds Number: The Effects of Freestream Turbulence and Stagger Angle** Antoine Dufau[1] Julien Marty[2] Estelle Piot[2] Daniel Man[1] *1. Safran Aircraft Engines, France; 2. ONERA, France*	**GT2022:79511** **Predicting and Validating Spatial Distributions of Particulate Deposition in Gas Turbine Components** Jack Gaskell[1] Nikul Vadgama[1] Florian Villain[1] Simon Beal[1] Matthew Mcgilvray[1] David Gillespie[1] Benjamin Littley[2] *1. University of Oxford, United Kingdom; 2. Rolls-Royce plc, United Kingdom*
2:00	**GT2022:82258** **Evolution of Turbulence and Its Modification by Axial Casing Grooves in a Multi-Stage Axial Compressor** Subhra Shankha Koley[1] Ayush Saraswat[1] Joseph Katz[2] *1. Johns Hopkins University, USA; 2. The Johns Hopkins University, USA*	**GT2022:82137** **Mixing Mechanism of Multi-Scale Flow in Tip Region of Turbine Rotor** Lin Huang, Zhengping Zou *Beihang University, China (Mainland)*	**GT2022:80013** **Particle Rebound/Deposition Modelling in Engine Hot Sections** Lei-Yong Jiang[1] Patrick Trembath[2] Prakash Patnaik[1] Michele Capurro[1] *1. The National Research Council of Canada, Canada; 2. The Department of National Defence Canada, Canada*
2:30	**GT2022:82834** **Numerical Investigations on the Rotating Stall in an Axial Compressor and Its Control by Flow Injection at Casing** Julien Marty[1] Lionel Castillon[1] Pierric Joseph[2] *1. DAAA, ONERA, Université Paris Saclay, France; 2. Université Lille, CNRS, ONERA, Arts et Metiers Institute of Technology, Centrale Lille Institut, UMR 9014-LMFL, Laboratoire de Mécanique des Fluides de Lille - Kampé de Fériet, France*	**GT2022:82171** **High-Fidelity CFD Analysis of In-Serviced Shrouded High-Pressure Turbine Rotor Blades** Mario Carta[1] Shahrokh Shahpar[2] Tiziano Ghisu[1] *1. University of Cagliari, Italy; 2. Rolls-Royce plc, United Kingdom*	**GT2022:81157** **Numerical Investigation of Particle Deposition in Double Wall Effusion Cooled Systems** Florian Villain, Nikul Vadgama, Jack Gaskell, Peter Ireland, Matthew Mcgilvray, David Gillespie *University of Oxford, United Kingdom*
3:00	**GT2022:83374** **Tip Flow Control in Optimized Large Gas Turbine Compressor Blading** Katja Hummel[1] Anton Streit[2] Dieter Peitsch[3] *1. Technische Universität Berlin, Germany; 2. Siemens Energy AG, Germany; 3. Technische Universität Berlin, Institute for Aeronautics & Astronautics, Chair for Aeroengines, Germany*	**GT2022:84281** **Design Sensitivity of a 1-1/2 Stage Unshrouded High Work Turbine Using Very-Large Eddy Simulations** Ignacio Gonzalez-Martino *Dassault Systèmes, France*	**GT2022:82027** **The Effect of Gas and Surface Temperature on Cold-Side and Hot-Side Turbine Deposition** Chihsiu Lo, Jiaxuan Han, Eric Nied, Jeffrey Bons *The Ohio State University, USA*

MONDAY JUNE 13

01:30 PM - 03:30 PM

	TURBOMACHINERY: DESIGN METHODS & CFD MODELING FOR TURBOMACHINERY	TURBOMACHINERY: DUCTS, NOISE & COMPONENT INTERACTIONS	
	Combustors Design Methods	**Gas Turbine Engine Transition Ducts and Flow Interactions II**	
	Technical • Dock 10 B • 37-11	**Technical • Dock 14 • 38-05**	
	Session Organizer: **Stefano Orsino**, ANSYS Session Co-Chairs: **Luca Porreca**, MAN; **Mahmoud Mansour**, Honeywell International Inc; **Bronwyn Power**, Pratt & Whitney	Session Organizer: **Duncan Walker**, Loughborough University Session Co-Chairs: **Panagiota Tsifourdaris**, Pratt & Whitney Canada; **Markus Brettschneider**, MTU Aero Engines	
1:30	**GT2022:82420** **Flow Design Using CFD for a Constant-Section Recursive Sequential Combustor** Andrea Hofer, Fabrice Giuliani, Nina Paulitsch *CBOne, Austria*	**GT2022:82449** **Experimental Investigation of an Aggressive S-Shaped Intermediate Compressor Duct** Aaron Kasper[1] Marcus Lejon[2] Thomas Dygutsch[3] Sebastian Grund[3] Manfred Beversdorff[3] Sebastian Hakansson[3] Eberhard Nicke[3] *1. DLR German Aerospace Center, Germany; 2. GKN Aerospace Sweden AB, Sweden; 3. German Aerospace Center DLR, Institute of Propulsion Technology, Germany*	
2:00	**GT2022:82419** **A Numerical Study on the Effects of Circumferential Positions of Combustor Hot Streaks on a TCF Configuration** Richard Benauer[1] Stefan Schreck[1] Peter Leitl[1] Ena Badžek[2] Marios Patinios[3] Federica Farisco[4] *1. Bionic Surface Technologies GmbH, Austria; 2. Institute for Thermal Turbomachinery and Machine Dynamics, Graz University of Technology, Austria; 3. Turbomachinery and Propulsion Department, von Karman Institute for Fluid Dynamics, Belgium; 4. Deutsches Zentrum für Luft- und Raumfahrt e.V. (DLR), German Aerospace Center, Institute of Combustion Technology, Germany*	**GT2022:82458** **The Interaction of Main Stream Flow and Cavity Flows in Turbine Center Frames and Turbine Vane Frames** Filippo Merli[1] Asim Hafizovic[1] Nicolas Krajnc[1] Malte Schien[1] Andreas Peters[2] Franz Heitmeir[1] Emil Goettlich[1] *1. Graz University of Technology, Austria; 2. GE Aviation, Germany*	
2:30	**GT2022:81784** **Parametric Studies and Simulations of a Hydrogen Micromix Combustor** Ainslie French, Giuseppe Mingione, Antonio Schettino, Pietro Roncioni, Pier Luigi Vitagliano, Mauro Minervino *CIRA (Centro Italiano di Ricerche Aerospaziali), Italy*	**GT2022:82502** **Aerodynamic Assessment of Turbine Center Frames and Turbine Vane Frames Under the Influence of Purge Flows** Filippo Merli[1] Asim Hafizovic[1] Nicolas Krajnc[1] Malte Schien[1] Andreas Peters[2] Franz Heitmeir[1] Emil Goettlich[1] *1. Graz University of Technology, Austria; 2. GE Aviation, Germany*	
3:00	**GT2022:83376** **Predicting Separated Flow in a Three-Dimensional Prediffuser for Combustor Applications Using Improved Numerical Techniques and Workflow** Adam Norman, Carlo Arguinzoni *Ansys, USA*	**GT2022:82526** **Unsteady Investigation of the Effect of Purge Air on the Flow Field Inside a Turbine Vane Frame Using Particle Image Velocimetry** Malte Schien, Asim Hafizovic, Filippo Merli, Florian Planck, Jakob Woisetschläger, Emil Goettlich *Graz University of Technology, Austria*	

MONDAY JUNE 13 — 04:00 PM - 05:30 PM

	AIRCRAFT ENGINE	CERAMICS AND CERAMIC COMPOSITES	COAL, BIOMASS, HYDROGEN & ALTERNATIVE FUELS
	Advanced Concepts III	**Thermal and Environmental Barrier Coatings**	**Life Cycle Assessment Basics and Application to Optimize the Environmental Sustainability of Gas Turbines During New Product Development**
	Technical • Dock 10 A • 01-03	**Technical • Dock 4 • 02-03**	**Tutorial • Rotterdam C • 03-08**
	Session Organizer: **Guillermo Paniagua**, Purdue University Session Co-Organizer: **Jacopo Tacconi**, Rolls-Royce Plc.	Session Organizer: **Michael Presby**, NASA Session Co-Organizer: **Rajesh Kumar**, United Technologies Research Ctr	Session Organizer: **Angela Serra**, Baker Hughes Session Co-Chairs: **Pierre Gauthier**, Siemens Energy Canada; **Marina Braun-Unkhoff**, Institute of Combustion Technology
4:00	**GT2022:80505** **Modeling and Cycle Parameter Matching of a High-Speed Variable Cycle Turbofan-Ramjet Engine** Yao Yao[1] Xiao Bo Zhang[1] Ming Yang Zhang[2] Zhan Xue Wang[1] *1. Northwestern Polytechnical University, China (Mainland); 2. AECC Guiyang Aero-Engine Research Institute, China (Mainland)*	**GT2022:80853** **The Pore Size Dependence of the Radiative Scattering Coefficient in Yttria-Stabilized Zirconia Films** Yao Wang, Pei-Feng Hsu, Mary Helen Mccay *Florida Institute of Technology, USA*	**GT2022:83930** **Life Cycle Assessment Basics and Application to Optimize the Environmental Sustainability of Gas Turbines During New Product Development** Angela Serra[1] Francesco Fantozzi[2] Pietro Bartocci[2] Alessandro Musacchio[3] *1. Baker Hughes - Nuovo Pignone, Italy; 2. Department of Engineering, University of Perugia, Italy; 3. Baker Hughes, Italy*
4:30	**GT2022:83409** **Parametric Analysis for On-Board Thermal Regulation in a Hybrid-Electric Aircraft** Orestis S. Valsamis Mylonas, Vasilis G. Gkoutzamanis, Anestis I. Kalfas *Aristotle University of Thessaloniki, Greece*	**GT2022:81964** **Assessing the Structural Integrity of Plasma-Sprayed Multilayer Thermal Barrier Coatings** Marcel Adam, Matthias Oechsner, Christian Kontermann *Technical University of Darmstadt, Germany*	TUTORIAL
5:00	**GT2022:81629** **Select Trade-Offs in Parallel Hybrid Turboprop Cycle Design** Michael Sielemann[1] Mavroudis D. Kavvalos[2] Jim Claesson[3] Nithish Selvan[4] Konstantinos Kyprianidis[2] *1. Modelon, Germany; 2. Mälardalen University, Sweden; 3. Modelon, Sweden; 4. Modelon, India*	**GT2022:83469** **ICME Computational Framework for Ceramic APS Coatings** Dr. Frank Abdi[1] Vasyl Harik[1] Reza Yaghmaie[1] Harsh Baid[1] Daniel Balint[2] Gregory Morscher[3] Larry Zawada[4] George Jefferson[5] Surekha Achanta[1] *1. AlphaSTAR Technology Solutions, USA; 2. Imperial College London, United Kingdom; 3. University of Akron, USA; 4. Arctos Technology Solutions, USA; 5. Airforce Research Laboratory, AFRL/RXCC, USA*	

MONDAY JUNE 13

04:00 PM - 05:30 PM

	COMBUSTION, FUELS & EMISSIONS	COMBUSTION, FUELS & EMISSIONS	COMBUSTION, FUELS & EMISSIONS
	Pressure Gain Combustion I	**Combustion Dynamics - Numerical Methods I**	**Combustion Fundamentals**
	Technical • Port 2 • 04-18	**Technical • Port 3 • 04-23**	**Tutorial • Port 1 C • 04-28**
	Session Organizer: **Vishal Acharya**, Georgia Institute of Technology Session Co-Chairs: **Jacqueline O'Connor**, Purdue University; **Scott Drennan**, Convergent Science Inc; **Sebastien Ducruix**, CM2C - CNRS; **Gilles Bourque**, Siemens Canada	Session Organizer: **Vishal Acharya**, Georgia Institute of Technology Session Co-Chairs: **Jacqueline O'Connor**, Purdue University; **Sebastien Ducruix**, CM2C - CNRS; **Gilles Bourque**, Siemens Canada; **Mirko Bothien**, Zurich University of Applied Sciences	Session Organizer: **Michael Klassen**, Combustion Science & Engrg Session Co-Organizer: **Gilles Bourque**, Siemens Canada
4:00	**GT2022:83528** **Evaluation of Pressure Gain and Turbine Inlet Conditions in a Pulse Combustion Gas Turbine** Takashi Sakurai, Takehiro Sekiguchi, Sora Inoue *Tokyo Metropolitan University, Japan*	**GT2022:82397** **LES of Turbulent Premixed CH4/H2/Air Flames with Stretch and Heat Loss for Flame Characteristics and Dynamics** Halit Kutkan[1] Alberto Amato[2] Giovanni Campa[2] Luis Tay Wo Chong[3] Eirik Æsøy[4] *1. University of Genoa, Italy; 2. Ansaldo Energia, Italy; 3. Ansaldo Energia Switzerland, Switzerland; 4. Norwegian University of Science and Technology, Norway*	**GT2022:81217** **Gas Turbine Combustion Tutorial** Michael Klassen[1] Tim Lieuwen[2] *1. Combustion Science & Engineering, Inc., USA; 2. Georgia Institute of Technology, USA*
4:30	**GT2022:82393** **Experimental Investigations of Hydrogen Fuelled Pulsed Detonation Combustor** Andrei Vlad Cojocea[1] Ionut Porumbel[1] Tudor Cuciuc[1] Bogdan Gherman[1] Mihnea Gall[1] Daniel Eugeniu Crunteanu[2] *1. Romanian Research & Development Institute for Gas Turbines - COMOTI, Romania; 2. Polytehnic University of Bucharest, Romania*	**GT2022:78296** **Prediction of Thermoacoustic Instability and Fluid-Structure Interactions for Gas Turbine Combustor** Yu Xia[1] Ishan Verma[2] Alok Khaware[2] Patrick Sharkey[1] Davor Cokljat[1] *1. Ansys UK Ltd., United Kingdom; 2. Ansys Software Pvt. Ltd., India*	T U T O R I A L
5:00	**GT2022:83423** **Channel Geometry Effects on the Operation of an Axial Air Inlet Rotating Detonation Combustor** Joshua Shepard, Alex Feleo, Mirko Gamba *University of Michigan, USA*	**GT2022:81552** **Numerical Study of Flow Characteristics of a Central-Staged Swirl Combustor** Xiangzhou Feng, Jianqin Suo, Pengfei Zhu, Yue Li, Qiandong Li *Northwestern Polytechnical University, China (Mainland)*	

MONDAY JUNE 13 — 04:00 PM - 05:30 PM

	CYCLE INNOVATIONS: ENERGY STORAGE	HEAT TRANSFER: FILM COOLING	HEAT TRANSFER: FILM COOLING
	Air-Based Energy Storage Systems	**Film Cooled Rotor Blades**	**General Film Cooling I**
	Technical • Dock 5 • 07-01	**Technical • Dock 1B • 12-02**	**Technical • Port 1 B • 12-13**
	Session Organizer: **David T. Sanchez Martinez**, AICIA	Session Organizer: **Robert Krewinkel**, MAN Energy Solutions Session Co-Chairs: **Alexander Mirzamoghadam**, ; **David Bogard**, University of Texas at Austin; **Lorenzo Mazzei**, Ergon Research; **James L. Rutledge**, Air Force Institute of Technology	Session Organizer: **Michael Barringer**, Pennsylvania State University Session Co-Chairs: **Alexander Mirzamoghadam**, ; **David Bogard**, University of Texas at Austin; **Robert Krewinkel**, MAN Energy Solutions; **Seth Lawson**, US Department of Energy; **James L. Rutledge**, Air Force Institute of Technology
4:00	**GT2022:82263** **Organic Rankine Cycle Turbine and Heat Exchanger Sizing for Liquid Air Combined Cycle** Owen Pryor[1] Aaron Rimpel[1] William Conlon[2] *1. Southwest Research Institute, USA; 2. Pintail Power LLC, USA*	**GT2022:82189** **Effect of Location and Rotational Reynolds Number on Film Cooling of Rotating Blade Pressure Side** Long Meng, Haiwang Li, Gang Xie, Zhiyu Zhou *Beihang University, China (Mainland)*	**GT2022:82675** **Computational and Experimental Study of Film-Cooling Effectiveness with and without Downstream Vortex Generators** Chien-Shing Lee[1] Tom Shih[1] Douglas Straub[2] Justin Weber[2] Edward Robey[2] *1. Purdue University, USA; 2. National Energy Technology Laboratory-DOE, USA*
5:00	**GT2022:80426** **Liquid Air Combined Cycle** William Conlon[1] Milton Venetos[1] Aaron Rimpel[2] *1. Pintail Power LLC, USA; 2. Southwest Research Institute, USA*	**GT2022:83216** **Effects of Part-to-Part Flow Variations on Overall Effectiveness and Life of Rotating Turbine Blades** Brian Knisely[1] Reid Berdanier[1] Joel Wagner[1] Karen Thole[1] Allan Arisi[2] Charles Haldeman[2] *1. Pennsylvania State University, USA; 2. Pratt & Whitney, USA*	**GT2022:78286** **Experimental Evaluation of a Wavy Trailing Edge Cooling Design as an Alternative to Pressure Side Cutback Cooling** Izhar Ullah[1] Timothy Burdett[1] Lesley Wright[1] Je-Chin Han[1] Ching-Pang Lee[2] *1. Texas A&M University, USA; 2. Independent Consultant, USA*
5:30		**GT2022:83169** **Interaction Mechanism of Transonic Squealer Tip Cooling with the Effect of High-Speed Relative Casing Motion** Wenbo Xie, Hongmei Jiang, Shaopeng Lu, Xu Peng, Qiang Zhang *Shanghai Jiao Tong University, China (Mainland)*	**GT2022:78519** **Optimized Film Cooling Flow on a Contoured Endwall Within a Transonic Annular Cascade** Timothy Burdett[1] Izhar Ullah[1] Lesley Wright[1] Je-Chin Han[1] John Mcclintic[2] Daniel Crites[2] Ardeshir Riahi[2] *1. Texas A&M University, USA; 2. Honeywell Aerospace, USA*

MONDAY JUNE 13 — 04:00 PM - 05:30 PM

	HEAT TRANSFER: INTERNAL COOLING	MANUFACTURING MATERIALS & METALLURGY	MICROTURBINES, TURBOCHARGERS & SMALL TURBOMACHINES
	Rotating Heat Transfer II	**Component Degradation, Failure and Life Prediction I**	**Combustion & Heat Transfer**
	Technical • Dock 13 • 15-05	**Technical • Port 7 • 18-08**	**Technical • Port 4 • 20-07**
	Session Organizer: **Robin Prenter**, Pratt & Whitney Session Co-Chairs: **Ding-wei Zhou**, Honeywell International; **Prashant Singh**, Mississippi State University	Session Organizer: **Pontus Slottner**, Siemens Energy Session Co-Chairs: **William Day**, W. David Day, Inc.; **Sascha Gierlings**, Fraunhofer Institute; **Xijia Wu**, xijia.wu@nrc-cnrc.gc.ca; **Scott Keller**, DTS	Session Organizer: **Michael Vick**, Brayton Energy Session Co-Organizer: **Grant Musgrove**, Southwest Research Institute
4:00	**GT2022:81291** **Experimental Investigation of Local Heat Transfer in a Rotating Two-Pass Cooling Channel Using the Transient Thermochromic Liquid Crystal (TLC) Technique** Christian Waidmann[1] Rico Poser[1] David Gutiérrez de Arcos[1] Michael Göhring[1] Jens von Wolfersdorf[1] Klaus Semmler[2] Bernhard Jäppelt[2] *1. Institute of Aerospace Thermodynamics (ITLR), Germany; 2. MTU Aero Engines AG, Germany*	**GT2022:82499** **On the Scatter of Creep Data: Methods to Increase Modelling Accuracy Accounting for Batch-to-Batch Dispersion** Andrea Riva *Ansaldo Energia, Italy*	**GT2022:80805** **The Design and Optimisation of a 100% Hydrogen Micro Gas Turbine Micromix Combustor: Preliminary Hydrogen Injection Depth Characterisation Using Cold Flow Steady RANS** Cedric Devriese[1] Simon Snijders[2] Ward De Paepe[1] Rob Bastiaans[2] *1. University of Mons, Belgium; 2. Eindhoven University of Technology, Netherlands*
4:30	**GT2022:82035** **Heat Transfer in a Rotating, Blade-Shaped, Two-Pass Cooling Channel with Various 45 Deg Rib Turbulators and a Tip Turning Vane** I-Lun Chen[1] Lesley M. Wright[1] Je-Chin Han[1] Robert Krewinkel[2] *1. Texas A&M University, USA; 2. MAN Energy Solutions SE, Germany*	**GT2022:82885** **Deformation and Damage Behavior of a 1 Cr-Cast Steel Under Multiaxial Loading at Elevated Temperatures** Christian Kontermann[1] Alexander Erbe[1] Fabian Conrad[1] Karl Michael Kraemer[1] Matthias Oechsner[2] *1. TU Darmstadt, Germany; 2. Center for Engineering Materials, State Materials Testing Institute Darmstadt (MPA), Chair and Institute for Materials Technology (IfW), Technical University of Darmstadt, Germany*	**GT2022:80808** **Experimental Hydraulic Performance Study of a Primary Surface Recuperator with Cross-Wavy Microchannels for Portable Microturbines** Hui Li, Zhengping Zou, Yiming Chen, Huan Li, Chao Fu *Beihang University, China (Mainland)*
5:00	**GT2022:79846** **Comparison of Experimental and Numerical Local Rotational Heat Transfer Effects in a Two-Pass Cooling Channel Configuration** David Gutiérrez de Arcos[1] Christian Waidmann[1] Rico Poser[1] Jens von Wolfersdorf[1] Bernhard Jäppelt[2] *1. Institute of Aerospace Thermodynamics (ITLR), Germany; 2. MTU Aero Engines AG, Germany*		**GT2022:81963** **Towards Fast Prediction of Flame Stability and Emissions of Mgt Combustion Chambers: a Chemical Reactor Network Approach** Matteo Savarese[1] Jérémy Bompas[2] Ward De Paepe[2] Alessandro Parente[1] *1. Universite Libre de Bruxelles, Belgium; 2. Université de Mons, Belgium*

MONDAY JUNE 13 — 04:00 PM - 05:30 PM

	STRUCTURES AND DYNAMICS: BEARING & SEAL DYNAMICS	STRUCTURES AND DYNAMICS: ROTORDYNAMICS	SUPERCRITICAL CO2
	Annular Seals I	**Active Controls of Rotordynamic Systems**	**Tutorial - Heat Exchangers for Supercritical Co2 Power Cycle Applications**
	Technical • Port 1 A • 25-01	**Technical • Dock 1A •29-01**	**Tutorial • Dock 16 • 33-22**
	Session Organizer: **Giuseppe Vannini**, GE Oil & Gas Session Co-Organizer: **Adolfo Delgado**, Texas A&M University	Session Organizer: **Theodore Brockett**, Honeywell Aerospace Session Co-Chairs: **Almudena Vega**, Universidad Politecnica de Madrid; **Alice Innocenti**, Baker Hughes	Session Organizer: **Michael Marshall**, Southwest Research Institute Session Co-Organizer: **Nathan Weiland**, National Energy Technology Laboratory
4:00	**GT2022:82280** **A Stepped Shaft Labyrinth Seal vs. a Pocket Damper Seal: Leakage and Dynamic Force Coefficients Under Wet Gas Operation** Jose Torres, Luis San Andrés, Jing Yang *Texas A&M University, USA*	**GT2022:81683** **Feasibility Analysis of the Rotor Elastic Support with Piezoelectric Damping** Yu Hu, Lin Li, Ya Guang Wu, Yu Fan *School of Energy and Power Engineering, Beihang University, China (Mainland)*	**GT2022:83734** **Heat Exchangers for Supercritical CO2 Power Cycle Applications** Michael Marshall[1] Renaud Le Pierres[2] Mebrahtu Embaye[2] Marc Portnoff[3] *1. Southwest Research Institute, USA; 2. Heatric, United Kingdom; 3. Thar Energy, USA*
4:30	**GT2022:83164** **Experimental Force Coefficients for a Fully-Partitioned Pocket Damper Seal and Comparison to Other Two Seal Types** Adolfo Delgado[1] Luis San Andrés[1] Jing Yang[1] Jonathan Thiele[2] *1. Texas A&M University, USA; 2. Rotoflow, USA*	**GT2022:82528** **Active Rotor Controller Design for Vibration and Bend Mitigation Utilizing Active Magnetic Bearings and Internal Shaft Actuation** Gauthier Fieux, Nicola Bailey, Patrick Keogh *University of Bath, United Kingdom*	TUTORIAL
5:00	**GT2022:83504** **Negative Centering Forces of Wet-Gas Hole-Pattern Seals at Low Excitation Frequencies** Min Zhang[1] Dara Childs[2] *1. Linde, Inc., USA; 2. Texas A&M University, USA*	**GT2022:82897** **Effect of Constant Time Delay in Active Magnetic Bearings on the Stability of Rotor Shaft Systems** Tukesh Soni[1] Jayanta K Dutt[2] Ranjana Sodhi[3] *1. UIET, India; 2. Indian Institute of Technology Delhi, India; 3. Indian Institute of Technology Ropar, India*	

MONDAY JUNE 13

04:00 PM - 05:30 PM

	TURBOMACHINERY: AXIAL FLOW FAN & COMPRESSOR AERODYNAMICS	TURBOMACHINERY: DEPOSITION, EROSION, FOULING, AND ICING	TURBOMACHINERY: DESIGN METHODS & CFD MODELING FOR TURBOMACHINERY
	Endwall, Seal & Leakage Flows II	**Water, Icing, and Lubricant Deposition**	**Machine Learning and Optimization**
	Technical • Dock 15 • 34-04	**Technical • Dock 11 • 36-04**	**Technical • Dock 12 • 37-01**
	Session Organizer: **Nick Nolcheff**, Honeywell Session Co-Chairs: **Lisa Brilliant**, UTC/Pratt & Whitney; **Darrell James**, Honeywell	Session Organizer: **Paolo Vanacore**, GE Aviation Session Co-Chairs: **Reid Berdanier**, Pennsylvania State University; **Taylan Ercan**, Middle East Technical University; **Luca Porreca**, MAN; **Bronwyn Power**, Pratt & Whitney	Session Organizer: **Ezra Mcnichols**, NGRC Session Co-Chairs: **Jason Bourgeois**, Rolls-Royce Deutschland; **Luca Porreca**, MAN; **Mahmoud Mansour**, Honeywell International Inc; **Bronwyn Power**, Pratt & Whitney
4:00	**GT2022:78805** **Flow Control Mechanism of Non-Axisymmetric Endwall in Compressor Cascades** Hanwen Guo[1] Donghai Jin[1] Xiwu Liu[2] Xingmin Gui[1] *1. Beihang University, China (Mainland); 2. AECC Hunan Aviation Powerplant Research Institute, China (Mainland)*	**GT2022:79505** **Droplet Impact on a Curved Moving Liquid Film** Avick Sinha[1] Vaibhav Ramakrishnan[2] Kathy Johnson[2] *1. Gas Turbine and Transmissions Research Centre, United Kingdom; 2. The University of Nottingham, United Kingdom*	**GT2022:81091** **Multi-Objective Development of Machine-Learnt Closures for Fully Integrated Transition and Wake Mixing Predictions in Low Pressure Turbines** Harshal Akolekar[1] Fabian Waschkowski[1] Roberto Pacciani[2] Yaomin Zhao[3] Richard Sandberg[1] *1. University of Melbourne, Australia; 2. Univeristy of Florence, Italy; 3. Peking University, China (Mainland)*
4:30	**GT2022:83551** **Effects of Pure Shearing and Rigid-Body Rotation on the Evolution of Tip Leakage Vortex in an Axial Compressor Rotor** Yangwei Liu, Weibo Zhong, Yumeng Tang *Beihang University, China (Mainland)*	**GT2022:81178** **Characterization of an Apparatus to Study Solid Deposit Formation in Lubricating Oils at High Temperatures** Raquel Juarez, Noble Gutierrez, Eric L. Petersen *Texas A&M University, USA*	**GT2022:82531** **Development of Machine-Learnt Turbulence Closures for Wake Mixing Predictions in Low-Pressure Turbines** Yuri Frey Marioni[1] Paolo Adami[2] Raul Vazquez-Diaz[3] Francesco Montomoli[1] Andrea Cassinelli[1] Spencer Sherwin[1] *1. Imperial College London, United Kingdom;* *2. Rolls-Royce Deutschland, Germany;* *3. Rolls-Royce plc, United Kingdom*
5:00	**GT2022:82342** **Unsteady Effects of Casing Treatment on Tip Flow Structures in a Subsonic Compressor Rotor** Zhidong Chi, Wuli Chu, Haoguang Zhang, Bo Luo *Northwestern Polytechnical University, China (Mainland)*	**GT2022:83033** **Numerical Prediction of Long Term Droplet Erosion and Washing Efficiency of an Axial Compressors Through the Use of a Discrete Mesh Morphing Approach** Giuliano Agati[1] Domenico Borello[1] Francesca Di Gruttola[1] Domenico Simone[2] Franco Rispoli[1] Alessio Castorrini[3] Serena Gabriele[4] Paolo Venturini[5] *1. Sapienza Università di Roma, Italy; 2. University of Brasilia, Brazil; 3. Università della Basilicata, Italy; 4. Baker Hughes, Italy; 5. Dipartimento di Meccanica e Aeronautica, 'Sapienza, Italy*	**GT2022:82590** **Detailed Design and Optimization of the First Stage of an Axial Supercritical CO2 Compressor** Matthew Ha, Justin Holder, Saugat Ghimire, Adam Ringheisen, Mark Turner *University of Cincinnati, USA*

MONDAY JUNE 13 — 04:00 PM - 05:30 PM

	TURBOMACHINERY: DESIGN METHODS & CFD MODELING FOR TURBOMACHINERY	TURBOMACHINERY: RADIAL TURBOMACHINERY AERODYNAMICS	TURBOMACHINERY: UNSTEADY FLOWS IN TURBOMACHINERY
	Pumps and Hydraulic Systems I	**Centrifugal Compressors II**	**Unsteady Flows in Turbines I**
	Technical • Dock 10 B • 37-06	**Technical • Rotterdam D • 40-04**	**Technical • Dock 14 • 43-01**
	Session Organizer: **Kai Willem Koerber**, MTU Aero Engines AG Session Co-Chairs: **Luca Porreca**, MAN; **Mahmoud Mansour**, Honeywell International Inc; **Bronwyn Power**, Pratt & Whitney	Session Organizer: **Hideaki Tamaki**, IHI Corporation Session Co-Organizer: **Hamid Hazby**, Mercedes AMG High Performance Powertrains Ltd	Session Organizer: **Nateri Madavan**, NASA
4:00	**GT2022:82533** **Numerical Simulation of Multi-Scale Oil Films on a Rotating Cup Using VOF and Coupled Eulerian Thin-Film-DPM Approaches** Andrew Nicoli, Kuldeep Singh, Richard Jefferson-Loveday, Stephen Ambrose, Sandeep Mouvanal *University of Nottingham, United Kingdom*	**GT2022:81968** **Computational Flow Field Assessment of the Inlet Region of Centrifugal Compressor Under Unsteady Flow Conditions Near Surge** Aakeen Parikh[1] Pablo Ale-Martos[1] Maria Esperanza Barrera-Medrano[1] Yoshihiro Hayashi[2] Ricardo Martinez-Botas[1] *1. Imperial College London, United Kingdom; 2. Mitsubishi Heavy Industries, Ltd., Japan*	**GT2022:81707** **The Role of Turbine Operating Conditions on Combustor-Turbine Interaction – Part 1: Change in Expansion Ratio** Andrea Notaristefano, Paolo Gaetani *Politecnico di Milano, Italy*
4:30	**GT2022:82627** **Potential and Evolution of Miniatures Compressed Air Energy Storage Plants Based on Impulse Turbine** Laith Al-Sadawi[1] Ayad Al Jubori[1] Till Biedermann[2] Suliman Alfarawi[3] *1. University of Technology Iraq, Iraq; 2. Institute of Sound and Vibration Engineering, University of Applied Sciences Düsseldorf, Germany; 3. Mechanical Engineering Department, University of Benghazi, Libya*	**GT2022:82108** **Impact of Operating Conditions on Rotor/Stator Interaction of a High-Pressure Ratio Centrifugal Compressor** Fabrizio Lottini[1] Andrea Agnolucci[1] Lorenzo Pinelli[1] Lorenzo Toni[2] Alberto Guglielmo[2] Angelo Grimaldi[2] Roberto Pacciani[1] *1. University of Florence, Italy; 2. Baker Hughes, Italy*	**GT2022:82256** **The Role of Turbine Operating Conditions on Combustor-Turbine Interaction – Part 2: Loading Effects** Andrea Notaristefano, Paolo Gaetani *Politecnico di Milano, Italy*
5:00	**GT2022:78010** **Predictions of Falling Wavy Films Based on the Depth Averaged Thin Film Model and Its Application to Aeroengine Bearing Chamber** Kuldeep Singh[1] Andrew Nicoli[1] Richard Jefferson-Loveday[1] Stephen Ambrose[1] Paloma Paleo Cageao[1] Kathy Johnson[1] Sandeep Mouvanal[1] Jing Cao[2] Adrian Jacobs[3] *1. University of Nottingham, United Kingdom; 2. Ansys Inc, United Kingdom; 3. Rolls Royce plc., United Kingdom*	**GT2022:79368** **Some Properties of the Exit Velocity Triangle of a Radial Compressor Impeller** Michael Casey[1] Chris Robinson[2] *1. PCA Engineers Limited, Switzerland; 2. PCA Engineers Limited, United Kingdom*	**GT2022:82594** **The Effects of Swirling Flows in Entropy Wave Convection Through High Pressure Turbine Stage** Lorenzo Pinelli[1] Michele Marconcini[1] Roberto Pacciani[1] Andrea Notaristefano[2] Paolo Gaetani[2] *1. University of Florence, Italy; 2. Politecnico di Milano, Italy*

TUESDAY JUNE 14

08:00 AM - 10:00 AM

	AIRCRAFT ENGINE	CERAMICS AND CERAMIC COMPOSITES	COAL, BIOMASS, HYDROGEN & ALTERNATIVE FUELS
	Propellers & Noise	**Impact Damage in Ceramics & Composites**	**Challenges of Combustion Computational Fluid Dynamics for Industrial Gas Turbine Engines**
	Technical • Dock 10 A • 01-05	**Technical • Dock 4 • 02-02**	**Tutorial • Rotterdam C • 03-10**
	Session Organizer: **John Spyropoulos**, Navair/ Propulsion & Power Session Co-Chairs: **Vassilios Pachidis**, Cranfield University; **Kenneth Van Treuren**, Baylor University; **John Spyropoulos**, US Navy	Session Organizer: **Rajesh Kumar**, United Technologies Research Ctr Session Co-Organizer: **Michael Presby**, NASA	Session Organizer: **Angela Serra**, Baker Hughes Session Co-Chairs: **Pierre Gauthier**, Siemens Energy Canada; **Marina Braun-Unkhoff**, Institute of Combustion Technology
8:00	**GT2022:81485** **The Importance of Airfoil Selection in the Design of UAS Propellers** Kenneth Van Treuren[1] Charles Wisniewski[2] *1. Baylor University, USA; 2. USAF Academy, USA*	**GT2022:80469** **Improvement of Silicon Nitride Turbine Blade Impact Resistance Under Uniaxial Compression Loading** Francis Beauchamp, Patrick K. Dubois, Jean-Sébastien Plante, Mathieu Picard *Université de Sherbrooke, Canada*	**GT2022:83944** **Challenges of Combustion Computational Fluid Dynamics for Industrial Gas Turbine Engines** *Siemens Energy, Canada*
8:30	**GT2022:81579** **Novel UAS Propeller Design Part 1: Using an Unloaded Tip to Reduce Power Requirements and Lower Generated Sound Levels for Propellers Designed for Minimum Induced Drag** Kenneth Van Treuren[1] Charles Wisniewski[2] *1. Baylor University, USA; 2. USAF Academy, USA*	**GT2022:81787** **Restitution of Impacting Projectiles in Ceramic Matrix Composites (CMCs) Subject to Foreign Object Damage** Sung Choi, David C. Faucett, Jacob Mattison *Naval Air Systems Command, USA*	**T U T O R I A L**
9:00	**GT2022:82330** **Novel UAS Propeller Design Part 2: Design Hub and Tip Angle of Attack Sensitivity of UAS Propellers Designed for Minimum Induced Drag** Kenneth Van Treuren[1] Charles Wisniewski[2] *1. Baylor University, USA; 2. USAF Academy, USA*	**GT2022:83279** **ICME Modeling of Erosion in Gas-Turbine Grade CMC and HVOF Test** Dr. Frank Abdi[1] Amirhossein Eftekharian[1] Dade Huang[1] Sung Choi[2] Gregory Morscher[3] Ragavendra Prasad Panakarajupally[3] *1. AlphaSTAR Technology Solutions, USA; 2. NAVAIR, USA; 3. University of Akron, USA*	
9:30	**GT2022:81955** **Research on Acoustic Resonance Characteristics of Flat Plate Cascades Based on Acoustic Analogy** Feng Tong Zhao[1] Bo Cui[1] Mingsui Yang[2] Yun Dong Sha[1] *1. Liaoning Province Key Laboratory of Advanced Measurement and Test Technology of Aviation Propulsion Systems, Shenyang Aerospace University, China (Mainland); 2. Shenyang Engine Design and Research Institute, Aero Engine (Group) Corporation of China, China (Mainland)*	**GT2022:83465** **Residual Strength of Turbine Grade Ceramic Matrix Composites After Being Subjected to Solid Particle Erosion at Elevated Temperatures** Farhan Mirza[1] Ragav P. Panakarajupally[1] Gregory Morscher[1] Frank Abdi[2] Sung Choi[3] *1. The University of Akron, USA; 2. AlphaSTAR Corporation, USA; 3. NAVAIR, USA*	

TUESDAY JUNE 14 — 08:00 AM - 10:00 AM

	COMBUSTION, FUELS & EMISSIONS	COMBUSTION, FUELS & EMISSIONS	COMBUSTION, FUELS & EMISSIONS
	Blowoff	**Novel Combustors**	**Combustion Dynamics - Experiments II**
	Technical • Port 1 C • 04-03	**Technical • Port 2 • 04-14**	**Technical • Port 3 • 04-24**
	Session Organizer: **Debolina Dasgupta**, Argonne National Laboratory Session Co-Organizer: **Laura McLaughlin**, Queen's University Belfast	Session Organizer: **Jacqueline O'Connor**, Purdue University Session Co-Chairs: **Geoffrey Myers**, MHIA; **Vishal Acharya**, Georgia Institute of Technology; **Sebastien Ducruix**, CM2C - CNRS; **Keith Mcmanus**, GE Global Research Center; **Gilles Bourque**, Siemens Canada	Session Organizer: **Vishal Acharya**, Georgia Institute of Technology Session Co-Chairs: **Jacqueline O'Connor**, Purdue University; **Patrizio Vena**, National Research Council Canada; **Sebastien Ducruix**, CM2C - CNRS; **Joseph Meadows**, Virginia Tech; **Gilles Bourque**, Siemens Canada
8:00	**GT2022:77975** **The Effects of High Centrifugal Acceleration on Bluff-Body Stabilized Premixed Flames** Tim Erdmann[1] Andrew Caswell[2] Ephraim Gutmark[3] *1. Air Force Life Cycle Management Center, USA; 2. Air Force Research Laboratory, USA; 3. The University of Cincinnati, USA*	**GT2022:77959** **Micro-mixing Combustion for Highly Recuperated Gas Turbines: Effects of Inlet Temperature and Fuel Composition on Combustion Stability and NOx Emissions** Alexandre Landry-Blais, Sani Sivić, Mathieu Picard *Université de Sherbrooke, Canada*	**GT2022:80577** **Comparison of Flame Describing Functions Measured in Single and Multiple Injector Configurations** Preethi Rajendram Soundararajan, Daniel Durox, Guillaume Vignat, Antoine Renaud, Jérôme Beaunier, Sébastien Candel *EM2C Laboratory, CentraleSupelec & CNRS, France*
8:30	**GT2022:83239** **Characterization of Flame Behavior and Blowout Limits at Different Air Preheating Temperatures in Plasma Assisted Stabilized Combustor** Maria Grazia De Giorgi[1] Ghazanfar Mehdi[1] Sara Bonuso[1] Mohamed Shamma[2] Stefan Harth[3] Dimosthenis Trimis[2] Nikolaos Zarzalis[2] *1. University of Salento, Italy; 2. Engler-Bunte-Institute, Germany; 3. Engler-Bunte-Institute, Division of Combustion Technology ,Karlsruhe Institute of Technology, Germany*	**GT2022:83025** **Novel Fuel Injector Geometry for Enhancing the Fuel Flexibility of a Dry Low NOx MicroMix Flame** Daniel Kroniger, Atsushi Horikawa, Kunio Okada, Yuji Ashida *Kawasaki Heavy Industries Ltd., Japan*	**GT2022:80725** **Experimental Investigation of Interactions Between Two Closely Spaced Azimuthal Modes in a Multi-Nozzle Can Combustor** Jeongwon Kim[1] Tony John[1] Subodh Adhikari[1] David Wu[1] Benjamin Emerson[1] Vishal Acharya[1] Timothy Lieuwen[1] Mitsunori Isono[2] Toshihiko Saito[2] *1. Georgia Institute of Technology, USA;* *2. Mitsubishi Heavy Industries, Ltd, Japan*
9:00	**GT2022:82517** **Influence of Pressure Gradient on Flame-Vortex Interaction and Flame Stability** Ayse G. Gungor, Yagiz Yalcinkaya, Ogeday E. Bozkurt *Istanbul Technical University, Turkey*	**GT2022:81919** **Experimental Investigation of CH4-Humid Air Flame Characteristic of a Novel Micromix Concept Model Burner** Ce Liu, Weiwei Shao, Zhedian Zhang *Chinese Academy of Sciences, China (Mainland)*	**GT2022:80226** **Impact of Central Piloting on the Static and Dynamic Stability of Swirl-Stabilized Flames** Daniel Doleiden[1] Ashwini Karmarkar[1] Jacqueline O'Connor[1] James Blust[2] *1. Pennsylvania State University, USA;* *2. Solar Turbines Incorporated, USA*
9:30	**GT2022:81339** **Numerical Prediction of a Lean Blow-Out Event of a Lab-Scale, Swirl-Stabilized Spray Flame** Stephan Ruoff, Georg Eckel, Patrick Le Clercq, Manfred Aigner *German Aerospace Center (DLR), Germany*	**GT2022:82157** **Investigating the Mixture Quality in Multi-Injector Burner Systems, Part I: Experimental Setup** Fabian Marquez Macias[1] Christoph Hirsch[1] Thomas Sattelmayer[1] Michael Huth[2] Jürgen Meisl[2] *1. Technical University of Munich / Chair of Thermodynamics, Germany; 2. Siemens Energy, Germany*	**GT2022:81729** **Symmetry Breaking in an Experimental Annular Combustor Model with Deterministic Electroacoustic Feedback and Stochastic Forcing** Sylvain C. Humbert[1] Alessandro Orchini[1] Christian Oliver Paschereit[1] Nicolas Noiray[2] *1. Technische Universitaet Berlin, Germany;* *2. ETH Zuerich, Switzerland*

TUESDAY JUNE 14

08:00 AM - 10:00 AM

	CONTROLS, DIAGNOSTICS & INSTRUMENTATION	CYCLE INNOVATIONS	HEAT TRANSFER: FILM COOLING
	Performance Monitoring and Fault Diagnosis	**microGT Dynamic Simulations**	**Conjugate Heat Transfer**
	Technical • Dock 2 • 05-03	**Technical • Dock 12 • 06-10**	**Technical • Dock 5 • 12-08**
	Session Organizer: **Liang Tang**, P&W Session Co-Chairs: **Donald Simon**, NASA; **Yiguang Li**, Cranfield University; **Igor Loboda**, University of Mexico	Session Organizer: **Valentina Zaccaria**, MLD, Sweden Session Co-Chairs: **Alessandro Sorce**, University of Genoa; **Luca Mantelli**, University of Genoa; **Ward De Paepe**, University of Mons	Session Organizer: **John McClintic**, Honeywell Session Co-Chairs: **Alexander Mirzamoghadam**, ; **David Bogard**, University of Texas at Austin; **Robert Krewinkel**, MAN Energy Solutions; **Todd Davidson**, The US Military Academy; **James L. Rutledge**, Air Force Institute of Technology
8:00	**GT2022:82377** **Transient Engine Condition Monitoring of Micro Gas Turbines in a Highly Dynamic Setting** Tihomir Varchev, Matthias Weiss, Stephan Staudacher, Christian Koch *University of Stuttgart, Germany*	**GT2022:79059** **Development of a Dynamic Model for Simulating the Transient Behaviour of a Solar-Powered Micro Gas Turbine** Shahrbanoo Shamekhi Amiri, Jafar Al-Zaili, Abdulnaser Sayma *City, University of London, United Kingdom*	**GT2022:81508** **Theoretical Considerations for Scaling Convection in Overall Effectiveness Experiments** Carol E. Bryant, James L. Rutledge *Air Force Institute of Technology, USA*
8:30	**GT2022:83001** **Representation of Components Characteristics Under Performance Degradation of Gas Turbine Engine** Zhen Jiang, Xi Wang, Shubo Yang, Jiashuai Liu, Huairong Chen *Beihang University, China (Mainland)*	**GT2022:81300** **Transient Analysis of a Micro Gas Turbine with Fuel Composition Change** Martina Raggio, Daria Bellotti, Mario Luigi Ferrari *University of Genoa, Italy*	**GT2022:81816** **A Resistive Model to Characterize Overall Effectiveness Influenced by Multiple Coolant Temperatures** James L. Rutledge, Matthew Fuqua, Marc D. Polanka, William Baker *Air Force Institute of Technology, USA*
9:00	**GT2022:83233** **A New Health Evaluation Approach for Gas Turbine Using Its Component Performance Parameters** Junqi Luan, Yunpeng Cao, Ran Ao, Xiaoyu Han, Shuying Li *Harbin Engineering University, China (Mainland)*	**GT2022:81577** **Real Time mGT Performance Assessment Tool: Comprehensive Transient Behaviour Prediction with Computationally Effective Techniques** Aggelos Gaitanis[1] Francesco Contino[1] Ward De Paepe[2] *1. Université catholique de Louvain, Belgium; 2. University of Mons, Belgium*	**GT2022:81826** **Scaling Flat Plate Overall Effectiveness Measurements** Luke Mcnamara, Jacob Fischer, Marta Kernan, James L. Rutledge *Air Force Institute of Technology, USA*
9:30	**GT2022:83550** **Nonlinear Surrogate Models for Gas Turbine Diagnosis** Igor Loboda[1] Iván González Castillo[2] Sergiy Yepifanov[3] Roman Zelenskyi[3] *1. Escuela Superior de Ingeniería Mecánica y Eléctrica, Mexico; 2. Centro de Mantenimiento Aeronaval del Golfo, Mexico; 3. National Aerospace University "Kharkiv Aviation Institute", Ukraine*	**GT2022:83071** **Performance Simulation of Micro Gas Turbines for Hydrogen Application** Arias Esmaelpour[1] Homam Nikpey[1] Peter Breuhaus[2] *1. University of Stavanger, Norway; 2. NORCE Research, Norway*	**GT2022:82372** **Multi-Parameters Sensitivity Analysis of Overall Cooling Effectiveness on Turbine Blade and Numerical Investigation of Internal Cooling Structures on Heat Transfer** Runzhou Liu, Haiwang Li, Ruquan You, Zhi Tao *Beihang University, China (Mainland)*

TUESDAY JUNE 14 — 08:00 AM - 10:00 AM

	HEAT TRANSFER: INTERNAL COOLING	HEAT TRANSFER: TUTORIALS	MANUFACTURING MATERIALS & METALLURGY
	Additive Manufacturing & Novel Turbulators	**Rotating Disc Cavity Flows**	**Additive Manufacturing**
	Technical • Dock 13 • 15-03	**Tutorial • Port 1 B • 16-01**	**Technical • Port 7 • 18-04**
	Session Organizer: **Ali Ameri**, Ohio State University Session Co-Chairs: **Alexander Mirzamoghadam**, ; **Mohammad Taslim**, Northeastern University; **Lesley M. Wright**, Texas A&M University; **Lamyaa El-Gabry**, Princeton University; **James L. Rutledge**, Air Force Institute of Technology	Session Organizer: **Andrew Nix**, West Virginia University	Session Organizer: **Nejib Chekir**, Liburdi Session Co-Chairs: **William Day**, W. David Day, Inc.; **Sascha Gierlings**, Fraunhofer Institute; **Timothy Simpson**, Pennsylvania State University; **Robin Day**, Fraunhofer Institut of Productiontechnology
8:00	**GT2022:78356** **Amplitude and Wavelength Effects for Wavy Channels** Thomas Corbett[1] Karen Thole[1] Sudhakar Bollapragada[2] *1. Pennsylvania State University, USA; 2. Solar Turbines, USA*	**GT2022:82969** **Rotating Disc Cavity Flows** John Chew *University of Surrey, United Kingdom* **T U T O R I A L**	**GT2022:80207** **Comparison of Cast, Wrought and LPBF Processed IN718 Concerning Crack Growth Threshold and Fatigue Crack Growth Behavior** Karl Michael Kraemer, Timo Brune, Christian Kontermann, Matthias Oechsner *TU Darmstadt - MPA/IfW, Germany*
8:30	**GT2022:82298** **Heat Transfer and Pressure Loss of Additively Manufactured Internal Cooling Channels with Various Shapes** Alexander Wildgoose, Karen Thole *Pennsylvania State University, USA*		**GT2022:81956** **Laser Additive Manufacturing of Iron-Aluminium for Hybrid Steam Turbine Blades** Silja-Katharina Rittinghaus[1] Rebar Hama-Saleh Abdullah[1] Oliver Brunn[2] Victor Salit[2] Thomas Mokulys[2] *1. Fraunhofer Institute for Laser Technology, Germany; 2. MAN Energy Solutions SE, Germany*
9:00	**GT2022:82673** **Impacts of Pin Fin Shape and Spacing on Heat Transfer and Pressure Losses** Thomas Corbett[1] Karen Thole[1] Sudhakar Bollapragada[2] *1. Pennsylvania State University, USA; 2. Solar Turbines, USA*		**GT2022:82484** **Low Cycle Fatigue Characterization of Additive Manufactured Specimen with as Printed Surface Roughness Made From Multiple Nickel Based Super Alloys** Alex Torkaman, Ramesh Keshava Bhattu *Power Systems Manufacturing LLC, USA*
9:30	**GT2022:83333** **Performance of Additively Manufactured Internally Cooled Airfoils for Small Industrial Gas Turbines** Douglas Straub[1] Sridharan Ramesh[2] Matthew Searle[2] Edward Robey[2] Arnab Roy[2] Tim Floyd[3] Forrest Ames[4] *1. U.S. Dept of Energy, USA; 2. Leidos Inc., USA; 3. Battelle Energy, USA; 4. University of North Dakota, USA*		**GT2022:82512** **Creep Analysis and Microstructural Evaluation of a Novel Additively Manufactured Nickel-Base Superalloy (ABD®-900AM)** Alex Bridges[1] John Shingledecker[1] John Clark[2] David Crudden[2] *1. Electric Power Research Institute, USA; 2. Alloyed, United Kingdom*

TUESDAY JUNE 14 — 08:00 AM - 10:00 AM

	MICROTURBINES, TURBOCHARGERS & SMALL TURBOMACHINES	STRUCTURES AND DYNAMICS: BEARING & SEAL DYNAMICS	STRUCTURES AND DYNAMICS: STRUCTURAL MECHANICS & VIBRATION
	Radial Turbine Analysis	**Fluid Film Bearings**	**Mistuning**
	Technical • Port 4 • 20-03	**Technical • Port 1 A • 25-06**	**Technical • Dock 1A • 30-07**
	Session Organizer: **Michael Deligant**, Arts et Metiers Institute of Technology, LIFSE Session Co-Chairs: **Jose R. Serrano**, Universitat Politècnica De València. ESQ4618002B; **Tommaso Capurso**, Politecnico di Bari; **Grant Musgrove**, Southwest Research Institute	Session Organizer: **Bonjin Koo**, Daikin Applied Session Co-Organizer: **Adolfo Delgado**, Texas A&M University	Session Organizer: **Azzedine Dadouche**, National Research Council Canada Session Co-Chairs: **Bogdan Epureanu**, University of Michigan; **Florence Nyssen**, Polytechnique Montreal
8:00	**GT2022:80150** **Experimental Investigation of Twin Scroll Turbocharger Performance Under Pulsating Conditions** Philipp Brodbeck, Eduard Guse *Technische Universität Berlin, Germany*	**GT2022:83145** **A Self-Sufficient Oil Cooling Mechanism for Fluid-Film Bearing Applications in Remote Operations** Seckin Gokaltun, Richard Rodzwic, Bruce Fabijonas, Louis Krajewski *Kingsbury, Inc., USA*	**GT2022:80643** **Mistuning and Damping of a Radial Turbine Wheel. Part 2: Implementation and Validation of Intentional Mistuning** Alex Nakos[1] Bernd Beirow[1] Arthur Zobel[2] *1. Brandenburg University of Technology Cottbus, Germany; 2. University of Stuttgart, Germany*
8:30	**GT2022:82463** **An Innovative Measurement Technique for the Direct Evaluation of the Isentropic Efficiency of Turbocharger Turbines** Silvia Marelli, Vittorio Usai, Carla Cordalonga, Massimo Capobianco *University of Genoa, Italy*	**GT2022:82655** **The Effect of Pad Materials on the Limits of Operation for Tilting Pad Thrust Bearings** Filippo Cangioli[1] Alex-Florian Cristea[1] Richard Livermore-Hardy[1] Yujiao Tao[2] *1. Waukesha Bearings, United Kingdom; 2. Waukesha Bearings, USA*	**GT2022:82173** **Blisk with Small Geometry Mistuning and Blend Repair: As-Measured FE Model and Experimental Verification** Biao Zhou[1] Jingchao Zhao[1] 0 Ye[1] Teresa Berruti[2] *1. Nanjing University of Aeronautics and Astronautics, China (Mainland); 2. Dipartimento di Ingegneria Meccanica e Aerospaziale, Politecnico di Torino, Italy*
9:00	**GT2022:81976** **Design and Development of a Fast Response Torque Meter for Unsteady Flows in Turbocharger Applications** Aakeen Parikh, Gunin Singh, Harminder Flora, Chris Noon, Ricardo Martinez-Botas *Imperial College London, United Kingdom*	**GT2022:81839** **Effect of a Reduced Oil Flow Rate on the Static and Dynamic Performance of a Tilting Pad Journal Bearing Running in Both the Flooded and Evacuated Conditions** Luis San Andrés, Andy Alcantar *Texas A&M University, USA*	**GT2022:82208** **Application of Intentional Mistuning to Reduce the Vibration Susceptibility of a Steam Turbine Wheel** Bernd Beirow[1] Mark Golze[1] Frederik Popig[2] *1. Brandenburg University of Technology, Germany; 2. Siemens Energy Global GmbH & Co. KG, Germany*
9:30	**GT2022:83069** **Experimental Assessment of a Reverse Brayton Cycle Based on Automotive Turbochargers and E-Chargers for Cryogenic Applications** Jose R. Serrano, Vicente Dolz, Alberto Ponce, Juan A. Lopez-Carrillo *Universitat Politècnica De València, Spain*	**GT2022:83354** **Theoretical and Experimental Comparisons for Rotordynamic Coefficients of a Multi-Scratched Tilting Pad Journal Bearing** Mohamed-Amine Hassini[1] Silun Zhang[1] Paolo Pennacchi[2] Steven Chatterton[2] *1. Electricité de France, France; 2. Politecnico Di Milano, Italy*	**GT2022:82576** **Simulation and Investigation of an Intentionally Mistuned Blisk Rotor in a High Pressure Compressor** Jingjie Yang[1] Bernd Beirow[1] Thomas Giersch[2] *1. Brandenburg University of Technology Cottbus-Senftenberg, Germany; 2. Rolls-Royce Deutschland Ltd & Co KG, Germany*

TUESDAY JUNE 14

08:00 AM - 10:00 AM

	SUPERCRITICAL CO2	TURBOMACHINERY: AXIAL FLOW FAN & COMPRESSOR AERODYNAMICS	TURBOMACHINERY: AXIAL FLOW TURBINE AERODYNAMICS
	Heat Exchangers	**Inlet Distortion**	**Tip Leakage Flows**
	Technical • Dock 16 • 33-05	**Technical • Dock 14 • 34-12**	**Technical • Rotterdam D • 35-03**
	Session Organizer: **Renaud Le Pierres**, Meggitt Session Co-Organizer: **Nathan Weiland**, National Energy Technology Laboratory	Session Organizer: **Julia Stephens**, NASA Glenn Research Center Session Co-Chairs: **Roy Fulayter**, Rolls-Royce Corporation; **Lisa Brilliant**, UTC/Pratt & Whitney	Session Organizer: **Mark Turner**, NASA Glenn Research Center Session Co-Chairs: **Paul Vitt**, GE Aviation; **Francesco Bertini**, GE Aviation
8:00	**GT2022:80558** **Parametric Modeling and Economic Analysis of a 2MWth 3-Stream sCO2 Heat Exchanger** Joshua Neveu[1] Owen Pryor[1] Stefan Cich[1] Ellen Stechel[2] *1. Southwest Research Institute, USA; 2. Arizona State University, USA*	**GT2022:81678** **Investigation of the Impact of Realistic Inlet Distortions on a 1.5-Stage Transonic Compressor** Jan Werner[1] Maximilian Karl[1] Silas Mütschard[1] Heinz-Peter Schiffer[1] Sebastian Robens[2] Christoph Biela[2] *1. Technical University of Darmstadt, Germany; 2. Siemens Energy AG, Germany*	**GT2022:80896** **Investigation of the Interaction Between Tip Leakage and Main Annulus Flow in the Large Scale Turbine Rig: Comparison of Different Rotor Tip Geometries** Dominik Ade[1] Johannes Eitenmüller[1] Sebastian Leichtfuß[1] Christoph Lyko[2] Gregor Schmid[3] Heinz-Peter Schiffer[1] *1. Technical University of Darmstadt, Germany; 2. Rolls-Royce Deutschland Ltd & Co KG, Germany; 3. Siemens Energy AG, Germany*
8:30	**GT2022:82301** **Design of an Additively Manufactured Recuperator with 800 °C Inlet Temperature for sCO2 Power Cycle Application** Michael Marshall[1] Meysam Akbari[2] Ji-Cheng Zhao[2] Kevin Hoopes[3] *1. Southwest Research Institute, USA; 2. University of Maryland, USA; 3. Ball Aerospace, USA*	**GT2022:82394** **Experimental Analysis of an Axial Compressor Operating Under Flow Distortion** Alberto Baretter, Pierric Joseph, Olivier Roussette, Francesco Romanò, Antoine Dazin *Arts et Métiers Institute of Technology, France*	**GT2022:80252** **The Effect of Casing Coolant Injection on Aerodynamic Loss in a Linear Turbine Cascade with Tip Clearance** Dunam Hong[1] Minsuk Choi[2] Myungho Kim[3] Seung Jin Song[1] *1. Seoul National University, Korea; 2. Myongji University, Korea; 3. Agency for Defense Development, Korea*
9:00	**GT2022:82438** **Design of an Air-Cooled Condenser for CO2-Based Mixtures: Model Development, Validation and Heat Exchange Gain with Internal Microfins** Viktoria Illyes[1] Ettore Morosini[2] Michele Doninelli[3] Pierre-Luc David[4] Xavier Guerif[4] Andreas Werner[1] Gioele Di Marcoberardino[3] Giampaolo Manzolini[2] *1. TU Wien, Austria; 2. Politecnico di Milano, Italy; 3. University of Brescia, Italy; 4. Kelvion Thermal Solutions, France*	**GT2022:82465** **Mitigation of BLI Circumferential Distortion Using Non-Axisymmetric Fan Exit Guide Vanes** David Hall[1] Edward Greitzer[2] Choon Tan[2] *1. The Pennsylvania State University, USA; 2. Massachusetts Institute of Technology, USA*	**GT2022:82947** **Aerothermal Performance of Axially Varying Winglet-Squealer Blade Tips** Anmol Garg, Nagabhushana Rao Vadlamani, Balaji Srinivasan *Indian Institute of Technology, Madras, India*
9:30	**GT2022:82511** **Design of a Compact Dry Cooler with an Aluminum Heat Exchanger Core for a Supercritical CO2 Power Cycle Is Evaluated for a Concentrating Solar Power Application** Kelsi Katcher[1] Dereje Shiferaw Amogne[2] Abhay Patil[1] *1. Southwest Research Institute, USA; 2. Vacuum Process Engineering, Inc., USA*	**GT2022:83452** **Experimental Investigation of Inlet Stagnation Pressure Distortion Effects on a Transonic Axial Compressor Rotor** Andrew Oliva, Scott Morris *University of Notre Dame, USA*	

TUESDAY JUNE 14

08:00 AM - 10:00 AM

	TURBOMACHINERY: DEPOSITION, EROSION, FOULING, AND ICING	TURBOMACHINERY: DUCTS, NOISE & COMPONENT INTERACTIONS	TURBOMACHINERY: TUTORIALS
	Compressor Erosion	**Gas Turbine Engine Transition Ducts and Flow Interactions I**	**Reduced Order Modelling Approach for Turbomachinery Secondary Flow Systems**
	Technical • Dock 11 • 36-03	**Technical • Dock 15 • 38-01**	**Tutorial • Dock 10 B • 42-01**
	Session Organizer: **Domenico Borello**, Sapienza University of Rome Session Co-Chairs: **Reid Berdanier**, Pennsylvania State University; **Luca Porreca**, MAN; **Bronwyn Power**, Pratt & Whitney; **Paolo Venturini**, Sapienza Università di Roma	Session Organizer: **Duncan Walker**, Loughborough University Session Co-Chairs: **Panagiota Tsifourdaris**, Pratt & Whitney Canada; **Markus Brettschneider**, MTU Aero Engines	Session Organizer: **Andreas Peters**, GE Aviation
8:00	**GT2022:80389** **A Probabilistic Method for Predicting Particle-Blade Impact Kinematics in Turbomachinery** Dionysios Klaoudatos, Nicholas Bojdo, Antonio Filippone, Stephen Covey-Crump, Merren Jones, Alison Pawley *University of Manchester, United Kingdom*	**GT2022:78065** **The Impact of Inlet Flow Angle on Turbine Vane Frame Aerodynamic Performance** Simon Pramstrahler[1] Andreas Peters[2] Mikel Lucas García De Albéniz[3] Peter Adrian Leitl[3] Franz Heitmeir[1] Andreas Marn[1] *1. Graz University of Technology, Austria; 2. GE Aviation, Germany; 3. Bionic Surface Technologies GmbH, Austria*	**GT2022:83726** **Reduced Order Modelling Approach for Turbomachinery Secondary Flow Systems** Clement Joly[1] Vlad Goldenberg[1] Abdul Nassar[2] *1. SoftInWay, Inc., USA; 2. SoftInWay, Inc., India*
8:30	**GT2022:80923** **Mission Severity Assessment Based on 1Hz Engine Data** Stefano Scarso[1] Stephan Staudacher[1] Christian Keller[2] Jürgen Mathes[3] *1. Institute of Aircraft Propulsion Systems (ILA), Germany; 2. MTU Maintenance Hannover GmbH, Germany; 3. MTU Aero Engines AG, Germany*	**GT2022:80768** **Impact of Inlet Conditions on TVF Exit Flow Field** Mattia Graiff[1] Marian Staggl[1] Christian Wakelam[2] Franz Heitmeir[1] Emil Göttlich[1] *1. TU Graz, Austria; 2. GE Aviation, Germany*	T U T O R I A L
9:00	**GT2022:81752** **The Effect of an Entirely Eroded Airfoil on the Aerodynamic Performance of a Supersonic Compressor Cascade** Jan Hartmann, Max Lorenz, Markus Klein, Stephan Staudacher *University of Stuttgart, Germany*	**GT2022:81083** **Numerical Investigation of a Turbine Vane Frame for Co- and Counter-Rotating Configuration** Nicolas Krajnc[1] Filippo Merli[2] Asim Hafizovic[2] Andreas Peters[3] Emil Göttlich[2] *1. Graz University of Technology, Austria; 2. Institute for Thermal Turbomachinery and Machine Dynamics, Austria; 3. GE Aviation, Germany*	
9:30	**GT2022:82354** **Research on Particle Motion and Erosion Characteristics in the Blade Passage of Multistage Axial Compressors** HE Yao, Cai Liu-Xi, Hou Yan-Fang, Li Yun, Wang Shun-Sen, Mao Jing-Ru *Xi'an Jiaotong University, China (Mainland)*	**GT2022:82399** **The Influence of Combustor Hot Streaks on the Aerodynamic Performance of a Turbine Center Frame** Ena Badžek[1] Marios Patinios[2] Federica Farisco[3] Franz Heitmeir[1] Emil Göttlich[1] *1. Graz University of Technology, Austria; 2. von Karman Institute for Fluid Dynamics, Belgium; 3. Deutsches Zentrum für Luft- und Raumfahrt e.V. (DLR), Institute of Combustion Technology, Germany*	

TUESDAY JUNE 14 **10:30 AM - 12:00 PM**

KEYNOTE & PLENARIES

Plenary 1: Industrializing Terabytes for Propulsion and Power

RTM Stage

Moderators:
Eva Verena Klapdor, VP Generation Service Global Operations, Siemens Energy
Akin Keskin, Engineering Associate Fellow - Design Systems, Rolls-Royce

Frida Björneld, *Head of Technology & Innovation Industrial Applications Division, Siemens Energy*
Dr. Timothy C. Lieuwen, *Executive Director, Strategic Energy Institute, Georgia Institute of Technology*
David Robert Noble, *Generation Gas Turbine Programs Manager, Electric Power Research Institute*
Professor Bill Dawes, *Founding Director, CTO and Chairman, Cambridge Flow Solutions Ltd*

10:30

Today's propulsion and power industry is in the middle of a Digitalization Journey which requires large investments and cultural changes to achieve challenging goals. Digitalization promises significant improvements in workforce efficiency, increase pace in design, manufacture and test, but also interconnectivity driven by more compute power, modern IT hardware and faster digital networks. A significant contributor to the Digitalization Journey is data.

11:00

A vast amount of data exist in organisations which needs to be better managed and utilized in order to support data-driven decisions and to create a data-centric culture. Challenges arise in a multitude of areas, belonging to data gathering, storing, handling and interpretating.

With invited speakers from cross-industrial organisations, this plenary session will explore and discuss the utilization and management of data in organisations and the application of modern data analytics and data science techniques to help with the Digitalization Journey in the Propulsion and Power community.

11:30

TUESDAY JUNE 14 — 01:00 PM - 06:00 PM

STAGE PRESENTATIONS

Tuesday Expo Presentations

Stage Presentations • Exhibit Hall 3

1:00	**Generative Design for Cutting-Edge Turbomachinery Development** *Vasileios Pastrikakis* *SoftInWay Switzerland GmbH., Switzerland*
1:45	**Advanced Pneumatic Fluid Measurement Solutions** Marcel Börner *Vectoflow GmbH, Germany*
2:30	**Review of 10 Years of Designing Micro Turbomachines** *Enogia*
3:15	**The Vibration Expert Onboard – Remote Vibration Monitoring Benefits** Ronald Janzee *Advituro BV, Netherlands*
4:00	**Fluid Topology Optimization for Gas Turbines and Electrification** Francesco Montomoli *TOffeeAM , United Kingdom*
4:45	**High Channel Count Systems for Vibration and Multiphysics Measurements on Turbine Test Benches** Guillaume Cousin *OROS, France*
5:30	**Design Better, Develop Smarter and Decarbonize Faster Using Advanced Turbomachinery Engineering Simulations** Erik Munktell *Siemens Digital Industries Software, Sweden*

TUESDAY JUNE 14 — 01:30 PM – 03:30 PM

	AIRCRAFT ENGINE	CERAMICS AND CERAMIC COMPOSITES	COAL, BIOMASS, HYDROGEN & ALTERNATIVE FUELS
	Basics of Turboshaft Engine Cycle Design and Optimization	**Tutorial of Basics: Environmental Barrier Coatings (EBCs)**	**Life Cycle Assessment**
	Tutorial • Dock 10 A • 01-11	**Tutorial • Dock 4 • 02-04**	**Technical • Rotterdam C • 03-05**
	Session Organizer: **Taylan Ercan**, Middle East Technical University Session Co-Chairs: **Vassilios Pachidis**, Cranfield University; **Konstantinos Kyprianidis**, MDU	Session Organizer: **Rajesh Kumar**, United Technologies Research Ctr	Session Organizer: **Pierre Gauthier**, Siemens Energy Canada Session Co-Chairs: **Manfred Klein**, MA Klein & Associates; **Marina Braun-Unkhoff**, Institute of Combustion Technology; **Angela Serra**, Baker Hughes
1:30	**GT2022:83824** **Basics of Turboshaft Engine Cycle Design and Optimization** Taylan Ercan *Middle East Technical University, Turkey*	**GT2022:82053** **Environmental Barrier Coatings for Gas Turbine Applications** Michael Presby, Bryan Harder, Kang Lee *NASA Glenn Research Center, USA*	**GT2022:77981** **Additive Manufacturing Versus Investment Casting for a Gas Turbine Component: a Social Life Cycle Comparison** Angela Serra[1] Francesco Fantozzi[2] Pietro Bartocci[3] Sergio Gandini[4] Luca Fantaccione[2] Giulio Buia[2] Simone Colantoni[4] *1. Baker Hughes - Nuovo Pignone, Italy; 2. University of Perugia, Italy; 3. Instituto de Carboquímica (C.S.I.C.), Spain; 4. Baker Hughes, Italy*
2:00	T U T O R I A L	T U T O R I A L	**GT2022:78256** **Effects on Sustainability by Redesign of a 1° Stage Gas Turbine Nozzle Ring From Investment Casting to Additive Manufacturing: A Life Cycle Environmental Impact Comparison** Angela Serra[1] Luca Fantaccione[2] Giulio Buia[2] Francesco Fantozzi[2] Pietro Bartocci[2] Sergio Gandini[3] *1. Baker Hughes - Nuovo Pignone, Italy; 2. University of Perugia, Italy; 3. Baker Hughes, Italy*
2:30			**GT2022:83379** **IDAES Platform for Evaluating Thermal Energy Storage for Coal-Fired Indirect sCO2 Power Cycles** Joshua Schmitt[1] Anoop Mathur[2] Fernando Karg Bulnes[1] *1. Southwest Research Institute, USA; 2. Terrafore Technologies, USA*
3:00			**GT2022:84236** **A Method to Describe the Alignment Between Renewable Power Supply and Demand in Order to Derive Storage Needs** Arnd Reichert *Siemens Energy, Germany*

TUESDAY JUNE 14 — 01:30 PM – 03:30 PM

	COMBUSTION, FUELS & EMISSIONS	COMBUSTION, FUELS & EMISSIONS	COMBUSTION, FUELS & EMISSIONS
	Combustion Modeling I	**Combustor Flows**	**Combustion Dynamics - Numerical Methods II**
	Technical • Port 1 C • 04-04	**Technical • Port 2 • 04-15**	**Technical • Port 3 • 04-26**
	Session Organizer: **Jacqueline O'Connor**, Purdue University Session Co-Chairs: **Dustin Brandt**, Honeywell; **Vishal Acharya**, Georgia Institute of Technology; **Sunil James**, Honeywell Aerospace; **Sebastien Ducruix**, CM2C - CNRS; **Gilles Bourque**, Siemens Canada	Session Organizer: **Vishal Acharya**, Georgia Institute of Technology Session Co-Chairs: **Jacqueline O'Connor**, Purdue University; **Samir Rida**, ANSYS; **Sebastien Ducruix**, CM2C - CNRS; **Gilles Bourque**, Siemens Canada	Session Organizer: **Vishal Acharya**, Georgia Institute of Technology Session Co-Chairs: **Jacqueline O'Connor**, Purdue University; **Pinaki Pal**, Argonne National Laboratory; **Sebastien Ducruix**, CM2C - CNRS; **Luis Tay Wo Chong Hilares**, Ansaldo Energia; **Gilles Bourque**, Siemens Canada
1:30	**GT2022:82122** **Assessment of Thickened Flame Model Coupled with Flamelet Generated Manifold on a Low-Swirl Partially Premixed Gaseous Lifted Flame** Leonardo Langone[1] Matteo Amerighi[1] Lorenzo Mazzei[1] Naseem Ansari[2] Rakesh Yadav[2] Stefano Orsino[2] Antonio Andreini[1] *1. University of Florence, Italy; 2. ANSYS, Inc., USA*	**GT2022:78404** **Effect of Compressor Unsteady Wakes on a Gas Turbine Combustor Flow** Alessandro Soli[1] Richard Adoua[2] Ivan Langella[3] Paul Denman[1] Andrew Garmory[1] Gary Page[1] *1. Loughborough University, United Kingdom; 2. Rolls-Royce plc, United Kingdom; 3. Delft University of Technology, Netherlands*	**GT2022:82670** **Cost-Effective CFD Analysis of the Acoustic Response of a Perforated Plate** Nunzio Dimola[1] Michele Stefanizzi[1] Tommaso Capurso[1] Thierry Schuller[2] Marco Torresi[1] Sergio Mario Camporeale[1] *1. Polytechnic University of Bari, Italy; 2. Institut de Mécanique des Fluides de Toulouse, Université de Toulouse, France*
2:00	**GT2022:82506** **Accurate Prediction of Confined Turbulent Boundary Layer Flashback Through a Critically Strained Flame Model** Alex G. Novoselov[1] Dominik Ebi[2] Nicolas Noiray[1] *1. ETH Zurich, Switzerland; 2. Paul Scherrer Institute, Switzerland*	**GT2022:81682** **Study on the Non-Reacting Flowfield Characteristics of Lean Premixed Injector Modules with the Convergent Outlet** Fujun Sun, Jianqin Suo, Luhua Guo *Northwestern Polytechnical University, China (Mainland)*	**GT2022:83810** **Numerical Investigation of the Local Thermo-Chemical State in a Thermo-Acoustically Unstable Dual Swirl Gas Turbine Model Combustor** T. Jeremy P. Karpowski[1] Federica Ferraro[1] Matthias Steinhausen[1] Sebastian Popp[1] Christoph M. Arndt[2] Wolfgang Meier[2] Christian Kraus[3] Henning Bockhorn[3] Christian Hasse[1] *1. Institute for Simulation of Reactive Thermo-Fluid Systems (STFS), Technische Universität Darmstadt, Germany; 2. Institute of Combustion Technology, German Aerospace Center (DLR), Germany; 3. Engler-Bunte-Institute, Division of Combustion Technology, Karlsruhe Institute of Technology, Germany*
2:30	**GT2022:82583** **Turbulent Combustion Modeling of Swirl Stabilized Blended CH4/H2 Flames by Using Flamelet Generated Manifold** Ishan Verma[1] Rakesh Yadav[2] Sourabh Shrivastava[1] Pravin Nakod[1] *1. Ansys Inc, India; 2. Ansys Inc, USA*	**GT2022:83221** **Experiment Study of Pilot Stage Swirler Outlet Angles and Swirl Number on Flame Structures and Flow Field in a Stratified Swirl Combustor** Liang Zhang[1] Xin Xue[1] Qian Yang[2] Huiru Wang[2] Jibao Li[3] *1. Beihang University, China (Mainland); 2. Aero Engine Academy of China, China (Mainland); 3. AECC Commercial Aircraft Engine Co. Ltd., China (Mainland)*	**GT2022:81745** **An Analytical-Empirical Approach to Model Liquid Fuel Combustion Dynamics** Nicholas Magina, Fei Han, Janith Samarasinghe, Krishna Venkatesan *GE Global Research Center, USA*
3:00	**GT2022:82291** **Predicting Emissions Across Design Variations of an Aero-Engine Combustor Using FGM and PISO** Megan Karalus[1] Dustin Brandt[2] Liam Mcmanus[3] Erik Munktell[4] *1. Siemens Digital Industries, USA; 2. Honeywell Aerospace, USA; 3. Siemens Digital Industries, United Kingdom; 4. Siemens Digital Industries, Sweden*	**GT2022:80350** **Investigation of Water Films Shed From an Airfoil in a High-Speed Flow** Brandon Esquvias Rodriguez[1] Brendan Hickey[1] Vincent Mc Donell[1] Sochiro Tabata[2] Shigeki Senoo[2] *1. University of California, Irvine, USA; 2. Mitsubishi Heavy Industries, Japan*	**GT2022:79653** **The Nonlinear Thermoacoustic Eigenvalue Problem and Its Rational Approximations: Assessment of Solution Strategies** Moritz Merk[1] Philip E. Buschmann[2] Jonas Moeck[2] Wolfgang Polifke[1] *1. Technical University of Munich, Germany; 2. Norwegian University of Science and Technology, Norway*

TUESDAY JUNE 14 — 01:30 PM – 03:30 PM

	CONTROLS, DIAGNOSTICS & INSTRUMENTATION	CYCLE INNOVATIONS	CYCLE INNOVATIONS: ENERGY STORAGE
	AI/Machine Learning & Data-driven Approaches	**Micro-Gas Turbine: Technological Advancements and Market Research**	**Overview of Long-Duration Energy Storage Systems and Technologies**
	Technical • Dock 2 • 05-04	**Tutorial • Dock 12 • 06-13**	**Tutorial • Dock 5 • 07-06**
	Session Organizer: **Igor Loboda**, University of Mexico Session Co-Chairs: **Craig Davison**, National Research Council, Institute for Aerospace Research, Canada; **Liang Tang**, P&W	Session Organizer: **Antonio Escamilla Perejon**, Universidad de Sevilla Session Co-Chairs: **Alessandro Sorce**, University of Genoa; **David T. Sanchez Martinez**, AICIA; **Giuseppe Tilocca**, Universidad de Sevilla; **Ward De Paepe**, University of Mons	Session Organizer: **Timothy Allison**, Southwest Research Institute Session Co-Organizer: **David T. Sanchez Martinez**, AICIA
1:30	**GT2022:80777** **Explainable and Interpretable AI-Assisted Remaining Useful Life Estimation for Aeroengines** Georgios Protopapadakis[1] Asteris Apostolidis[2] Anestis Kalfas[1] *1. Aristotle University of Thessaloniki, Greece; 2. Amsterdam University of Applied Sciences, Netherlands*	**GT2022:84017** **Micro-Gas Turbine: Technological Advancements and Market Research** Antonio Escamilla Perejon[1] Tine Seljak[2] Jafar Al-Zaili[3] Giuseppe Tilocca[1] David T. Sanchez Martinez[1] *1. University of Seville, Spain; 2. University of Ljubljana, Slovenia; 3. City, University of London, United Kingdom*	**GT2022:83425** **Overview of Long-Duration Energy Storage Systems and Technologies** Timothy Allison[1] Natalie Smith[1] Aaron Rimpel[1] Antonio Escamilla[2] David Sanchez[2] *1. Southwest Research Institute, USA; 2. University of Seville, Spain*
2:00	**GT2022:82037** **Comparing Different Schemes in a Combined Technique of Kalman Filter, Artificial Neural Network and Fuzzy Logic for Gas Turbines Online Diagnostics** Simone Togni[1] Nikolaidis Theoklis[2] Suresh Sampath[2] *1. Cranfield University, Switzerland; 2. Cranfield University, United Kingdom*	TUTORIAL	
2:30	**GT2022:82406** **Comparative Study of Two Data-Driven Gas Path Fault Quantification Methods for a Single-Shaft Gas Turbine** Shuocheng Xia, Zhongran Chi, Shusheng Zang *Shanghai Jiao Tong University, China (Mainland)*		
3:00	**GT2022:83418** **Shrinkage Prediction Using Machine Learning for Additively Manufactured Ceramic and Metallic Components for Gas Turbine Applications** Peter Warren[1] Nandhini Raju[1] Milos Krsmanovic[1] Hossein Ebrahimi[1] Jayanta Kapat[1] Ramesh Subramanian[2] Ranajay Ghosh[1] *1. University of Central Florida, USA; 2. Siemens Energy Inc., USA*		

TUESDAY JUNE 14

01:30 PM – 03:30 PM

	EDUCATION	HEAT TRANSFER: INTERNAL COOLING	MANUFACTURING MATERIALS & METALLURGY
	Panel Session: Student Preparedness for Academic and Industry Careers	**Rotating Heat Transfer I**	**Sustainable Production of Advanced Turbomachinery Components in a Digitized Environment**
	Panel • Dock 11 • 08-03	**Technical • Dock 13 • 15-04**	**Tutorial • Port 7 • 18-11**
	Moderators: **Lamyaa El-Gabry**, Princeton University; **Mavroudis Kavvalos**, Mälardalen University; **Dimitra Diamantidou**, Mälardalen University	Session Organizer: **Dong-Ho Rhee**, Korea Aerospace Research Institute Session Co-Chairs: **Mounir Ibrahim**, Cleveland State University; **Yao-Hsien Liu**, National Chiao-Tung University; **Cengiz Camci**, Pennsylvania State University	Session Organizer: **Sascha Gierlings**, Fraunhofer Institute Session Co-Chairs: **William Day**, W. David Day, Inc.; **Paul Lowden**, Liburdi
1:30	Panelists: Karen Thole, *Pennsylvania State University* Jeffrey Benoit, *PSM - a Hanwha Company* Asteris Apostolidis, *Amsterdam University of Applied Sciences* Savvas Gkantonas, *University of Cambridge*	**GT2022:82797** **Experimental Study on Heat Transfer in a Rotating, Ribbed Serpentine Cooling Channel with Bleed Holes** Chenghua Zhu, Jie Wen, Guoqiang Xu, Yanan Chen *Research Institute of Aero-Engine, Beihang University, China (Mainland)*	**GT2022:84213** **Sustainable Production of Advanced Turbomachinery Components in a Digital Environment** Sascha Gierlings[1] Robin Day[1] Philipp Ganser[1] Tim Herrig[2] *1. Fraunhofer Institute for Production Technology, Germany; 2. WZL, RWTH Aachen University, Germany*
2:00	**P A N E L**	**GT2022:83271** **Effect of Deflection Angle on Flow and Heat Transfer in a Rotating U-Channel** Honglin Li, Lei Li, Zhonghao Tang, Zhenyuan Zhang, Tianyu Yuan *Northwestern Polytechnical University, China (Mainland)*	
2:30		**GT2022:84169** **Experimental Investigation of Heat Transfer in a Rotating Lateral Outflow Trapezoidal Channel with Pin-Fins** Xuejiao Zhang, Ruquan You, Haiwang Li, Zhi Tao, Song Liu *Beihang University, China (Mainland)*	
3:00			

	MANUFACTURING MATERIALS & METALLURGY	MICROTURBINES, TURBOCHARGERS & SMALL TURBOMACHINES	STRUCTURES AND DYNAMICS: BEARING & SEAL DYNAMICS
	Deformation-Mechanism-Based True-Stress Creep Model and Its Application to Creep Performance Characterization for Haynes 282 Alloy	Radial Turbine Design	Bearings and Dampers
	Lecture • Port 1B • 18-13	Technical • 20-04 • 20-04	Technical • Port 1 A • 25-07
		Session Organizer: **Mihai Mihaescu**, Royal Institute of Technology (KTH) Session Co-Chairs: **Grant Musgrove**, Southwest Research Institute; **Jose R. Serrano**, Universitat Politècnica De València. ESQ4618002B; **Kostandin Gjika**, KG Turbomachinery	Session Organizer: **Jason Cook**, Oak Ridge National Laboratory Session Co-Organizer: **Adolfo Delgado**, Texas A&M University
1:30	**Special Lecture Deformation-Mechanism-Based Creep Modeling** Xijia Wu, National Research Council of Canada A deformation-mechanism-based true-stress (DMTS) creep model has been developed based on Ashby's deformation-mechanism-map concept, which is used to analyze creep test data for nickel-based alloy Haynes 282. The deformation mechanisms are delineated in terms of power-laws for grain boundary sliding (GBS), intragranular dislocation glide (IDG) and intragranular dislocation climb (IDC), within their respective regions of dominance. The DMTS model is shown to be capable of describing the entire creep curve consisting of the primary, secondary, and tertiary stages with variations in creep ductility as controlled by the underlying deformation and failure mechanism. Coupled with a two-parameter failure criterion, the model demonstrates the effectiveness of predicting the creep failure mode and rupture life of Haynes 282 with an average coefficient of determination R2 = 0.93. The predicted failure mode (intergranular or transgranular or mixed) are corroborated by fractographic examinations on the ruptured specimens.	**GT2022:81739** **Design Methodology and Concept Demonstration of Preassembled Additively Manufactured Turbomachinery Systems: Case Study of Turbocharger Based Medical Ventilators** David Linsky[1] Acar Çelik[1] Ron Miezner[1] Alex Kleiman[1] Boris Leizeronok[1] Michael Palman[1] Sercan Acarer[2] Beni Cukurel[1] *1. Technion - Israel Institute of Technology, Israel; 2. Izmir Katip Çelebi University, Turkey*	**GT2022:81990** **A Model and Experimental Validation for a Piston Rings - Squeeze Film Damper: A Step Toward Quantifying Air Ingestion** Bonjin Koo[1] Luis San Andres[2] *1. Daikin Applied, USA; 2. Texas A&M University, USA*
2:00		**GT2022:81741** **Design and CFD Study of an ORC Radial Turbine for Multiple Working Fluids** Tchable-Nan Djaname[1] Marzia Marinelli[2] Tommaso Capurso[2] Michael Deligant[1] Marco Torresi[2] Farid Bakir[1] *1. Arts et Métiers Institute of Technology, France; 2. Politecnico di Bari, Italy*	**GT2022:79386** **A Nonlinear Rotordynamics Model for Automotive Turbochargers Coupled to a Physical Model for a (Semi) Floating Ring Bearing System** Wonbae Jung[1] Luis San Andres[2] Jungbae Kim[1] *1. KeyYang Precision Co., Ltd., Korea; 2. Texas A&M University Turbomachinery Laboratory, USA*
2:30		**GT2022:84333** **Multidisciplinary Optimization of Radial Outflow Turbines with Highly Deformable Blades** Andre Filipe Loureiro Governo, Bayindir H. Saracoglu *von Karman Institute, Belgium*	**GT2022:82332** **Field Testing and Operation of a 300 kW Active Magnetic Bearing Supported Turboexpander-Generator for Natural Gas Pressure Letdown** Rasish Khatri[1] Larry Hawkins[1] Jeremy Liu[2] Massimiliano Ortiz Neri[3] Davide Biliotti[3] Francesco Cangioli[3] *1. Calnetix Technologies, USA; 2. Sapphire Technologies, USA; 3. Baker Hughes, Italy*
3:00		**GT2022:80752** **Study on Titanium Aluminide Turbine Wheel Blade Machining for Turbochargers by Electrochemical Machining (ECM)** Masahiro Aono[1] Tatsuya Shimizu[1] Nobuaki Obi[2] Akihiro Goto[3] *1. Toyota Industries Corporation, Japan; 2. Acritech Corporation, Japan; 3. Shizuoka Institute of Science and Technology, Japan*	**GT2022:82180** **Experimental Investigation Into Oil Film Thickness and Behaviour Near an Aero-Engine Bearing** Avick Sinha, David Hann, Kathy Johnson, Michael Walsh *University of Nottingham, United Kingdom*

TUESDAY JUNE 14

01:30 PM – 03:30 PM

	STRUCTURES AND DYNAMICS: STRUCTURAL MECHANICS & VIBRATION	SUPERCRITICAL CO2	TURBOMACHINERY: AXIAL FLOW FAN & COMPRESSOR AERODYNAMICS
	Modeling, Algorithms and Computational Techniques I	**Supercritical CO2 Technologies Research & Development**	**Stall Inception**
	Technical • Dock 1A • 30-04	**Panel • Dock 16 • 33-25**	**Technical • Dock 15 • 34-08**
	Session Organizer: **Azzedine Dadouche**, National Research Council Canada Session Co-Chairs: **Fabrice Thouverez**, Centrale innovation; **Laurent Blanc**, Ecole Centrale de Lyon	Moderator: **Renaud Le Pierres**, Meggitt	Session Organizer: **Sam D. Grimshaw**, University of Cambridge Whittle Laboratory Session Co-Organizer: **Lisa Brilliant**, UTC/Pratt & Whitney
1:30	**GT2022:82830** **Non-Linear Damper-Blade Coupling Calculations Reduced to Essentials** Chiara Gastaldi, Muzio M. Gola *Politecnico di Torino - DIMEAS, Italy*	Panelists: Marco Ruggiero, *Baker Hughes Company* Dieter Brillert, *University of Duisburg-Essen* Savvas Tassou, *Brunel University* Timothy Allison, *Southwest Research Institute* Nathan Weiland, *National Energy Technology Laboratory* Stefan Glos, *Siemens*	**GT2022:77965** **Numerical and Experimental Investigation of Quantitative Relationship Between Secondary Flow Intensity and Inviscid Blade Force in Axial Compressors** Chenghua Zhou[1] Zixuan Yue[1] Hanwen Guo[1] Xiwu Liu[2] Donghai Jin[1] Xingmin Gui[1] *1. Beijing University of Aeronautics and Astronautics, China (Mainland); 2. AECC Hunan Aviation Powerplant Research Institute, China (Mainland)*
2:00	**GT2022:78367** **Interface Reduction in an Equivalent Linearization Algorithm for Nonlinearly Coupled Systems Under Random Excitation** Alwin Förster, Lars Panning-Von Scheidt *Leibniz University Hannover, Germany*	**P** **A** **N** **E** **L**	**GT2022:81346** **Validation of Steady-State Aerodynamics in a Transonic Linear Cascade at Near Stall Conditions** Carlos Tavera Guerrero[1] Nenad Glodic[1] Pieter Groth[2] *1. KTH Royal Institute of Technology, Sweden; 2. GKN Aerospace Sweden AB, Sweden*
2:30	**GT2022:82040** **Validation of New Numerical Analysis Tools for Nonlinear Forced Response in Anisotropy-Mistuned Bladed Disks with Friction Joints** Adam Koscso[1] Andreas Hartung[1] e.p. Petrov[2] *1. MTU Aero Engines, Germany; 2. University of Sussex, United Kingdom*		**GT2022:82366** **Numerical Research on Near Stall Characteristics of a Transonic Axial Compressor Based on Wavelet Analysis** kailong Xia, Junda Feng, Mingmin Zhu, Hefang Deng, Xiaoqing Qiang, Jinfang Teng *Shanghai Jiao Tong University, China (Mainland)*
3:30			**GT2022:82031** **Simulating Stall Inception in a High-Performance Fan with Clean and Distorted Inlets** Andrew Bedke, Steve Gorrell, Tyler Adams *Brigham Young University, USA*

TUESDAY JUNE 14

01:30 PM – 03:30 PM

	TURBOMACHINERY: AXIAL FLOW FAN & COMPRESSOR AERODYNAMICS	TURBOMACHINERY: AXIAL FLOW TURBINE AERODYNAMICS	TURBOMACHINERY: TUTORIALS
	Transition, ReyNo & Roughness Effects	**Hot Streaks and Sealing Flows**	**Introduction to LPT Aerodynamic Design and Its Challenges**
	Technical • Dock 14 • 34-11	**Technical • Rotterdam D • 35-04**	**Tutorial •Dock 10 B • 42-03**
	Session Organizer: **Herbert Harrison**, NASA Session Co-Organizer: **Marco Manfredi**, Politecnico di Milano	Session Organizer: **Reid Berdanier**, Pennsylvania State University Session Co-Chairs: **Craig McKeever**, Honeywell; **Craig McKeever**, Honeywell	Session Organizer: **Andreas Peters**, GE Aviation
1:30	**GT2022:79522** **The Modelling of Roughness Effect on the Performance of a Controlled Diffusion Airfoil** Grégory Delvaux[1] Riccardo Toracchio[1] Elissavet Boufidi[1] Emma Croner[2] Fabrizio Fontaneto[1] *1. von Karman Institute, Belgium; 2. Safran Tech, France*	**GT2022:78057** **Influence of Purge Flow Injection on the Performance of an Axial Turbine with Three-Dimensional Airfoils and Non-Axisymmetric Endwall Contouring** Lukas Schäflein[1] Johannes Janssen[1] Henri Brandies[1] Peter Jeschke[1] Stephan Behre[2] *1. RWTH Aachen University, Germany; 2. MTU Aero Engines AG, Germany*	**GT2022:81843** **Introduction to Low Pressure Turbine Aerodynamic Design and Its Challenges** Deepak Thirumurthy *Siemens Energy, Inc., USA* **T U T O R I A L**
2:00	**GT2022:80538** **Large Eddy Simulation of an Open Rotor Fan Blade** Stephan Priebe, Trevor Wood, Junsok Yi, Arash Mousavi *GE Research, USA*	**GT2022:83509** **Reconstructing Turbine Non-Uniform Flow Including Hot Streaks Using Spatially Under-Sampled Measurements** Xu Zhu, Fangyuan Lou, Kai Zhou, Xinqian Zheng *Tsinghua University, China (Mainland)*	
2:30	**GT2022:80683** **Large Eddy Simulations of a Transonic Airfoil Cascade** Stephan Priebe[1] Daniel Wilkin[2] Andy Breeze-Stringfellow[2] Arash Mousavi[1] Rathakrishnan Bhaskaran[1] Luke D'Aquila[1] *1. GE Research, USA; 2. GE Aviation, USA*	**GT2022:81623** **Approximating Gas Turbine Combustor Exit Temperature Distribution Factors Using Spatially Under-Sampled Measurements** Fangyuan Lou *Tsinghua University, China (Mainland)*	
3:00	**GT2022:82596** **Study on Unsteady Flow Characteristic in a Transonic Axial Compressor Rotor at Near Stall Condition** Ziyun Zhang, Yanhui Wu, Ziliang Li *Northwestern Polytechnical University, China (Mainland)*		

TUESDAY JUNE 14 — 04:00 PM - 05:30 PM

	AIRCRAFT ENGINE	AIRCRAFT ENGINE	COMBUSTION, FUELS & EMISSIONS
	Advanced Concepts II	**2022 IGTI Aircraft Engine Technology Award Winner Special Lecture**	**Emissions I**
	Technical • Dock 10 A • 01-02	Special Lecture • Port 7 • 01-14	Technical • Port 2 • 04-07
	Session Organizer: **Antonio Ficarella**, University of Salento Session Co-Chairs: **Charles Krouse**, Southwest Research Institute; **Vassilios Pachidis**, Cranfield University; **Ioannis Roumeliotis**, Cranfield University	Moderator: **Adolfo Delgado**, Texas A&M University	Session Organizer: **Jacqueline O'Connor**, Purdue University Session Co-Chairs: **Antonio Ficarella**, University of Salento; **Vishal Acharya**, Georgia Institute of Technology; **Sebastien Ducruix**, CM2C - CNRS; **Gilles Bourque**, Siemens Canada; **Teresa Castiglione**, University of Calabria
4:00	**GT2022:82347** **Aerodynamic Design of Cooling Guide for Electrical Machine in Electric Ducted Fan** Xuanyang Hu[1] Yuping Qian[1] Bijie Yang[2] Chaofan Dong[1] Yangjun Zhang[1] Weilin Zhuge[1] *1. Tsinghua University, China (Mainland);* *2. Imperial College London, United Kingdom*	**2022 IGTI Aircraft Engine Technology Award Winner Special Lecture** Luis San Andres Turbomachinery Laboratory Mast-Childs Chair Professor, Mechanical Engineering, Texas A&M University, TX, USA Measurements and models for squeeze film damper forced response: a bird view to air ingestion and entrapment.	**GT2022:82201** **Impact of HEFA Fuel Properties on Gaseous Emissions and Smoke Number in a Gas Turbine Engine** Vamsikrishna Undavalli[1] Emamode Ubogu[2] Ihab Ahmed[2] Jerry Hamilton[1] Bhupendra Khandelwal[1] *1. The University of Alabama, USA;* *2. The University of Sheffield, United Kingdom*
4:30	**GT2022:79379** **Effect of Channel Size on Air-Cooling Performance in Interior Permanent Magnet (IPM) Motor Driving Aviation Fans at High Altitude** Yu Ito[1] Toshinori Watanabe[1] Naoki Seki[2] Karin Hirakawa[2] Tomoya Inoue[2] Takehiro Himeno[1] *1. The University of Tokyo, Japan;* *2. IHI Corporation, Japan*	L E C T U R E	**GT2022:82735** **Formaldehyde Emissions from Dry Low Emissions Industrial Gas Turbines** Ivan Carlos[1] Leslie Witherspoon[1] Luke Cowell[1] Priyank Saxena[2] *1. Solar Turbines Incorporated, USA;* *2. Solar Turbines, Caterpillar, USA*
5:00	**GT2022:81917** **System-Level Assessment of a Partially Distributed Hybrid Electric Propulsion System** Smruti Sahoo, Mavroudis Kavvalos, Dimitra Diamantidou, Konstantinos Kyprianidis *Mäladalen University, Sweden*		**GT2022:82070** **Emission Characteristics of Aviation Kerosene Combustion Under Near-Critical and Supercritical Fuel Injections** Yue Yang, Xin Xue, Xin Hui, Yaxin Tan, Wei Wei, Cheng Liu, Yuzhen Lin *Beihang University, China (Mainland)*

TUESDAY JUNE 14

04:00 PM - 05:30 PM

	COMBUSTION, FUELS & EMISSIONS	COMBUSTION, FUELS & EMISSIONS	CONTROLS, DIAGNOSTICS & INSTRUMENTATION
	Combustion Dynamics - Nonlinear Dynamics	**Combustion Dynamics**	**Topics in Instrumentation (II)**
	Technical • Port 3 • 04-25	**Tutorial • Port 1 C • 04-29**	**Technical • Dock 2 • 05-06**
	Session Organizer: **Vishal Acharya**, Georgia Institute of Technology Session Co-Chairs: **Jacqueline O'Connor**, Purdue University; **Camilo F. Silva**, Technische Universität München; **Sebastien Ducruix**, CM2C - CNRS; **Jonas Moeck**, NTNU; **Gilles Bourque**, Siemens Canada	Session Organizer: **Jacqueline O'Connor**, Purdue University Session Co-Organizer: **Gilles Bourque**, Siemens Canada	Session Organizer: **Lubomir Ribarov**, U.S. Merchant Marine Academy Session Co-Chairs: **Lorenzo Ferrari**, University of Pisa – DESTEC, Italy; **Igor Loboda**, University of Mexico
4:00	**GT2022:80785** **Interplay of Clusters of Acoustic and Intrinsic Thermoacoustic Modes in Can-Annular Combustors** Guillaume J. J. Fournier[1] Felicitas Schaefer[1] Matthias Haeringer[1] Camilo F. Silva[2] Wolfgang Polifke[1] *1. Technical University of Munich, Germany; 2. Ansaldo Energia Switzerland, Switzerland*	**GT2022:81539** **Combustion Dynamics Tutorial** Jacqueline O'Connor[1] Timothy Lieuwen[2] *1. Pennsylvania State University, USA; 2. Georgia Institute of Technology, USA*	**GT2022:81965** **Experimental Investigation on the Accuracy of Blade Tip Timing Spectral Analysis Methods** Zhicheng Xiao, Yiming Meng, Hua Ouyang *Shanghai Jiao Tong University, China (Mainland)*
4:30	**GT2022:82248** **Experimental and Numerical Characterization of the Self-Excited Dynamics Behavior of a Technically Premixed Burner** Roberto Meloni[1] Stefano Gori[1] Giovanni Riccio[1] Nicola Chiarizia[2] Daniele Pampaloni[2] Antonio Andreini[2] *1. Baker Hughes, Italy; 2. University of Florence, Italy*	T U T O R I A L	**GT2022:82750** **Analytical Methods for Transonic Compressor Rotor Blade Tip Clearance Measurements Using Capacitive Probes** Anthony Gannon, David Magno, Walter Smith, Garth Hobson *Naval Postgraduate School, USA*
5:00	**GT2022:82001** **Effect of Outlet Boundary Condition on the Acoustic Mode Shape and Flame Dynamics of a Partially Premixed Swirl Stabilised Combustor** Sharan Sreedeep, Vikram Ramanan, Aritra Chakraborty, Satyanarayanan R. Chakravarthy *Indian Institute of Technology, Madras, India*		**GT2022:84305** **Sensor System Maturation for Gas Turbine Engine Particulate Ingestion Monitoring** George Papadopoulos, Daniel Bivolaru, Spencer Siu *Innoveering, LLC, USA*

TUESDAY JUNE 14 — 04:00 PM - 05:30 PM

	CYCLE INNOVATIONS	CYCLE INNOVATIONS: ENERGY STORAGE	HEAT TRANSFER: FILM COOLING
	Turbomachinery for Innovative Cycles	**Pumped Thermal Energy Storage Systems**	**Shaped Holes**
	Technical • Dock 12 • 06-09	**Technical • Dock 5 • 07-03**	**Technical • Dock 1B • 12-05**
	Session Organizer: **Vishnu Sishtla**, Carrier Corporation, US Session Co-Chairs: **Alessandro Sorce**, University of Genoa; **Paolo Silvestri**, University of Genoa; **Ward De Paepe**, University of Mons	Session Organizer: **Marco Astolfi**, Politecnico di Milano Session Co-Organizer: **David T. Sanchez Martinez**, AICIA	Session Organizer: **Lamyaa El-Gabry**, Princeton University Session Co-Chairs: **Alexander Mirzamoghadam**, ; **David Bogard**, University of Texas at Austin; **Robert Krewinkel**, MAN Energy Solutions; **Silvia Ravelli**, University of Bergamo - Department of Engineering; **James L. Rutledge**, Air Force Institute of Technology
4:00	**GT2022:80167** **Numerical Investigation of Bladeless Compressor on Different Disk Spaces and Diffuser Configurations** Ravi Nath Tiwari[1] Konstantinos Eleftheriou[2] Mario Luigi Ferrari[1] Theofilos Efstathiadis[2] Anestis Kalfas[2] Alberto Traverso[1] *1. University of Genova, Italy; 2. Aristotle University of Thessaloniki, Greece*	**GT2022:82509** **Optimal Management of Reversible Heat Pump/ORC Carnot Batteries** Noemi Torricelli[1] Lisa Branchini[1] Andrea De Pascale[1] Olivier Dumont[2] Vincent Lemort[2] *1. University of Bologna, Italy; 2. University of Liège, Belgium*	**GT2022:82514** **Effects of Internal Coolant Crossflow on Film-Cooling Performance of Double-Jet and Cylindrical Holes** Huaitao Zhu[1] Gongnan Xie[1] Rui Zhu[1] Bengt Sunden[2] *1. Northwestern Polytechnical University, China (Mainland); 2. Lund University, Sweden*
4:30	**GT2022:81710** **Experimental Validation of a Rotor-Bearings System Model for Tesla Turbines Resonances Prediction** Carlo Alberto Niccolini Marmont Du Haut Champ, Paolo Silvestri, Federico Reggio *University of Genoa, Italy*	**GT2022:83424** **The Design of a Small-Scale Pumped Heat Energy Storage System for the Demonstration of Controls and Operability** Natalie Smith[1] Brittany Tom[1] Kevin Hoopes[2] Aaron Rimpel[1] Joshua Just[1] Michael Marshall[1] George Khawly[1] Thomas Revak[1] *1. Southwest Research Institute, USA; 2. Ball Aerospace, USA*	**GT2022:83961** **Numerical Investigation of Laidback Fan-Shaped Film Cooling Holes with Large Eddy Simulation** Lianfeng Yang[1] Francesca Satta[1] Dario Barsi[1] Pietro Zunino[1] Yigang Luan[2] *1. University of Genoa, Italy; 2. Harbin Engineering University, China (Mainland)*
5:00	**GT2022:82690** **Performance Assessment of Tesla Expander Using 3D Numerical Simulation** Avinash Renuke, Alberto Traverso *University of Genoa, Italy*	**GT2022:83445** **Dynamic Modelling of a Brayton PTES System** Guido Francesco Frate, Matteo Pettinari, Emanuele Di Pino Incognito, Riccardo Costanzi, Lorenzo Ferrari *University of Pisa, Italy*	**GT2022:81520** **The Effect of Diffuser Shape for Film Cooling Holes with Constant Expansion Angles and Area Ratio** Evan Lundburg[1] Stephen Lynch[1] Kevin Liu[2] Hongzhou Xu[2] Michael Fox[2] *1. Pennsylvania State University, USA; 2. Solar Turbines Incorporated, USA*

TUESDAY JUNE 14

04:00 PM - 05:30 PM

	HEAT TRANSFER: INTERNAL COOLING	HEAT TRANSFER: TUTORIALS	MICROTURBINES, TURBOCHARGERS & SMALL TURBOMACHINES
	Supercritical CO2 Cooling and Deep Learning	**Fundamentals of Mist Cooling and Its Applications in Gas Turbine Systems**	**System Modeling**
	Technical • Dock 13 • 15-07	**Tutorial • Port 1 B • 16-03**	**Technical • Port 4 • 20-08**
	Session Organizer: **Shailendra Naik**, Ansaldo Energia Session Co-Chairs: **Alexander Mirzamoghadam**, ; **Jae Su Kwak**, Korea Aerospace University; **Mohammad Taslim**, Northeastern University; **Lesley M. Wright**, Texas A&M University; **James L. Rutledge**, Air Force Institute of Technology	Session Organizer: **Andrew Nix**, West Virginia University	Session Organizer: **Brian Connolly**, Southwest Research Institute Session Co-Organizer: **Grant Musgrove**, Southwest Research Institute
4:00	**GT2022:82044** **A Numerical Study on Conjugate Heat Transfer of Supercritical Carbon Dioxide Cooling in a Staggered Pin Fin Structure** Ryan Wardell, Matthew Smith, Marcel Otto, Erik Fernandez, Jayanta Kapat *University of Central Florida, USA*	**GT2022:83660** **Fundamental of Mist Cooling and Its Applications in Gas Turbine System** Ting Wang *University of New Orleans, USA*	**GT2022:81276** **Dynamic Modelling and Simulation of a 100 kW Micro Gas Turbine Running with Blended Methane/Hydrogen Fuel** Reyhaneh Banihabib, Mohsen Assadi *University of Stavanger, Norway*
4:30	**GT2022:83438** **Heat Load Parameter and Cooling Effectiveness On a Supercritical CO2 Stage One Vane with a Serpentine Internal Cooling Scheme** Weston Olson, Erik Fernandez, Ladislav Vesely, Akshay Khadse, Jayanta Kapat *University of Central Florida, USA*	T U T O R I A L	**GT2022:82661** **Improved Modeling and Experimental Evaluation of a Micro Gas Turbine for Solar-Hybrid Application** Chaz Fenner, Sybrand Van Der Spuy *Stellenbosch University, South Africa*
5:00	**GT2022:82095** **An Iterative Neural Operator to Predict the Thermo-Fluid Information in Internal Cooling Channels** Qi Wang, Li Yang, Yu Rao *Shanghai Jiao Tong University, China (Mainland)*		**GT2022:79194** **100-Hour Test of an Inside-Out Ceramic Turbine Rotor at Operating Conditions** Patrick K. Dubois[1] Benoît Picard[2] Antoine Gauvin-Verville[1] Philippe Méthot[1] Alexandre Landry-Blais[1] Louis-Philippe Jean[2] Simon Richard[1] Jean-Sébastien Plante[1] Mathieu Picard[1] *1. Université de Sherbrooke, Canada; 2. Exonetik, Canada*

TUESDAY JUNE 14

04:00 PM - 05:30 PM

	STRUCTURES AND DYNAMICS: PROBABILISTIC METHODS	STRUCTURES AND DYNAMICS: STRUCTURAL MECHANICS & VIBRATION	SUPERCRITICAL CO2
	Probabilistic Methods	**Modeling, Algorithms and Computational Techniques II**	**Tutorial - Turbo Machinery Design for Supercritical CO2 Applications**
	Technical • Port 1 A • 28-01	**Technical • Dock 1A • 30-05**	**Tutorial • Dock 16 • 33-21**
	Session Organizer: **Liping Wang**, GE Corporate Res & Develop Session Co-Chairs: **Jeff Brown**, USAF; **Andrew Milliken**, Pratt Whitney	Session Organizer: **Azzedine Dadouche**, National Research Council Canada Session Co-Chairs: **Chiara Gastaldi**, Politecnico di Torino - DIMEAS; **Bogdan Epureanu**, University of Michigan; **Teresa Berruti**, Politecnico di Torino; **Sean Kelly**, University of Michigan	Session Organizer: **Jeffrey Moore**, Southwest Research Institute Session Co-Organizer: **Nathan Weiland**, National Energy Technology Laboratory
4:00	**GT2022:80976** **Condition Monitoring Insight Using Bayesian Inference and Rotor Dynamics Modelling for Rotating Machinery** Greg Nelson, Iain Palmer *Frazer-Nash Consultancy, United Kingdom*	**GT2022:82413** **A Linearization Method Based on 3D Contact Model for the Steady-State Analysis Towards Complex Engineering Structures Containing Friction** Fucai Xiao[1] Lin Li[1] Yaguang Wu[1] Yu Fan[1] Hui Zhang[2] *1. Beihang University, China (Mainland); 2. AECC Commercial Aircraft Co., Ltd., China (Mainland)*	**GT2022:83254** **Tutorial: Turbo Machinery Design for Supercritical Co2 Applications** Jeffrey Moore, Timothy Allison *Southwest Research Institute, USA* **T U T O R I A L**
4:30	**GT2022:83372** **Automated Data-Driven Physics Discovery of Turbine Component Damage** Sheng Zhang[1] Ryan Jacobs[2] Sayan Ghosh[2] Ambarish Kulkarni[2] Liping Wang[2] *1. Purdue University, USA; 2. General Electric Research, USA*	**GT2022:82779** **On the Dynamic Response of a Two-Degree-of-Freedom System with Dry Friction and Elastic Stop** Liming Jiang[1] Zhimin Su[2] Jie Hong[1] Yanhong Ma[1] *1. Beihang University, China (Mainland); 2. AECC Hunnan Power Machinery Research Institute, China (Mainland)*	
5:00	**GT2022:83414** **Efficient Surrogate Modeling for Turbine Blade Row Cyclic Symmetric Mode Shapes** Anindya Bhaduri, Jing Li, Sayan Ghosh, Liping Wang *GE Research, USA*	**GT2022:83402** **Gradient Enhanced Kriging Using Modal Sensitivity Approximations in a Reduced Basis Space for As-Manufactured Airfoil Analysis** Jeffrey Brown, Emily Carper, Dan Gillaugh, Alex Kaszynski, Joseph Beck *Air Force Research Laboratory, USA*	

TUESDAY JUNE 14

04:00 PM - 05:30 PM

	TURBOMACHINERY: AXIAL FLOW FAN & COMPRESSOR AERODYNAMICS	TURBOMACHINERY: DESIGN METHODS & CFD MODELING FOR TURBOMACHINERY	TURBOMACHINERY: DESIGN METHODS & CFD MODELING FOR TURBOMACHINERY
	Fan & Propulsor Design	**Whole Engine, Through-flow and Mean-line**	**Turbines Design Methods**
	Technical • Dock 14 • 34-10	**Technical • Dock 4 • 37-05**	**Technical • Dock 10 B • 37-07**
	Session Organizer: **Yuan Dong**, Pratt & Whitney Session Co-Organizer: **Lisa Brilliant**, UTC/Pratt & Whitney	Session Organizer: **Roque Corral**, UPM Session Co-Chairs: **Mahmoud Mansour**, Honeywell International Inc; **Martina Ricci**, Baker Hughes	Session Organizer: **Bao Nguyen**, Honeywell Aerospace Session Co-Chairs: **Anton Streit**, Siemens Energy; **Luca Porreca**, MAN; **Mahmoud Mansour**, Honeywell International Inc; **Bronwyn Power**, Pratt & Whitney
4:00	**GT2022:81748** **Extending Highly Loaded Axial Fan Operability Range Through Novel Blade Design** Diego Lopez[1] Tiziano Ghisu[1] Timoleon Kipouros[2] Shahrokh Shahpar[3] Mark Wilson[3] *1. University of Cagliari, Italy; 2. Cranfield University, United Kingdom; 3. Rolls-Royce plc, United Kingdom*	**GT2022:80698** **Accelerating the Development of a New Turbomachinery Concept in an Environment with Limited Resources and Experimental Data: Challenges** Dylan Rubini[1] Nikolas Karefyllidis[1] Liping Xu[2] Budimir Rosic[1] Harri Johannesdahl[3] *1. University of Oxford, United Kingdom; 2. University of Cambridge, United Kingdom; 3. Coolbrook Oy, Finland*	**GT2022:80958** **Mesh Refinement and Inlet Turbulence Intensity in the Numerical Evaluation of Cooling Effectiveness: A Systematic Study on an Industrial Gas Turbine** Federico Lo Presti[1] Benjamin Winhart[1] Pascal Post[1] Francesca Di Mare[1] Alexander Wiedermann[2] Johannes Greving[2] Robert Krewinkel[2] *1. Ruhr University Bochum, Germany; 2. MAN Energy Solutions SE, Germany*
4:30	**GT2022:82039** **Fan Stability Enhancement with Partial Casing Treatments** Matthew Oldfield[1] Alejandro Castillo Pardo[2] Cesare Hall[2] *1. DCA Design International, United Kingdom; 2. University of Cambridge, United Kingdom*	**GT2022:82229** **New Method for Cycle Performance Prediction Based on Detailed Compressor and Gas Turbine Flow Calculations** Milan Petrovic[1] Alexander Wiedermann[2] Milan B Banjac[3] Srdjan Milic[3] Djordje Petkovic[3] Teodora Madzar[3] *1. University of Belgrade, Serbia; 2. MAN Energy Solutions SE, Germany; 3. University of Belgrade - Fac of Mech Eng, Serbia*	**GT2022:81059** **Numerical Investigation of the Effects of Tip Clearance and Rotor Cavities on the Performance of a 1.5-Stage High-Work Turbine** Thorsten Hansen[1] Erik Munktell[2] Georg Scheuerer[1] Kim Zwiener[3] *1. ISimQ GmbH, Germany; 2. Siemens Industry Software AB, Sweden; 3. Siemens Digital Industries Software, Germany*
5:00	**GT2022:82177** **Effects of Sideslip Direction on a Rear Fuselage Boundary Layer Ingesting Fan** Alejandro Castillo Pardo, Cesare A. Hall *Whittle Laboratory, United Kingdom*		**GT2022:78254** **Design Optimization of Integrated Anti-Rotation Feature for Power Turbine Nozzles** Abhimanyu Soman[1] Simone Colantoni[2] *1. Baker Hughes, India; 2. Baker Hughes, Italy*

TUESDAY JUNE 14

04:00 PM - 05:30 PM

	TURBOMACHINERY: DESIGN METHODS & CFD MODELING FOR TURBOMACHINERY	TURBOMACHINERY: RADIAL TURBOMACHINERY AERODYNAMICS	TURBOMACHINERY: UNSTEADY FLOWS IN TURBOMACHINERY
	Pumps and Hydraulic Systems II	**Centrifugal Compressors III**	**Unsteady Flows in Turbines II**
	Technical • Dock 11 • 37-15	**Technical • Rotterdam D • 40-05**	**Technical • Dock 15 • 43-02**
	Session Organizer: **Kuldeep Singh**, University of Nottingham Session Co-Chairs: **Luca Porreca**, MAN; **Mahmoud Mansour**, Honeywell International Inc; **Bronwyn Power**, Pratt & Whitney; **Ravinder Yerram**, GE	Session Organizer: **Michele Marconcini**, University of Florence Session Co-Organizer: **Hamid Hazby**, Mercedes AMG High Performance Powertrains Ltd	Session Organizer: **Fangyuan Lou**, Tsinghua University
4:00	**GT2022:78025** **Modeling and Simulation of the Cavitation Phenomenon in a Turbopump: A Multiphase Approach** Joris Cazé[1] Fabien Petitpas[1] Eric Daniel[2] Sébastien Le Martelot[3] Matthieu Queguineur[3] *1. IUSTI, France; 2. Aix-Marseille-University, France; 3. CNES, France*	**GT2022:78684** **Investigation of the Map Width Improvement in a Radially Reduced Diffuser Design Concept for a Centrifugal Compressor** Laura McLaughlin[1] Stephen Spence[1] Daniel Rusch[2] Charles Stuart[1] Marco Geron[3] Kwok Kai So[2] Magnus Fischer[2] *1. Trinity College Dublin, Ireland; 2. ABB Schweiz AG, Switzerland; 3. Queen's University Belfast, United Kingdom*	**GT2022:82370** **High-Fidelity Simulation Study of the Unsteady Flow Effects on High-Pressure Turbine Blade Performance** John Leggett[1] Yaomin Zhao[2] Richard D. Sandberg[1] *1. University of Melbourne, Australia; 2. College of Engineering, Peking University, China (Mainland)*
4:30	**GT2022:82196** **Numerical Investigation Into Maximum Pressure Capability of Intershaft Hydraulic Seals** Achinie Warusevitane, Stephen Ambrose, Kathy Johnson *University of Nottingham, United Kingdom*	**GT2022:82423** **On the Effect of Side Clearance in the Vaned Diffuser of a Centrifugal Compressor** Lee Gibson[1] Stephen Spence[2] Charles Stuart[2] Andre Starke[3] Sung In Kim[4] *1. Queen's University Belfast, United Kingdom; 2. Trinity College Dublin, Ireland; 3. IHI Charging Systems International GmbH, Germany; 4. Queens University Belfast, United Kingdom*	**GT2022:78056** **An Efficient Unsteady 1-Way Coupling Method of Combustor and Turbine** Jonathan Gründler[1] Heinz-Peter Schiffer[1] Knut Lehmann[2] *1. Technische Universität Darmstadt, Germany; 2. Rolls-Royce Deutschland, Germany*
5:00	**GT2022:84165** **Predicting Cavitation Erosion on Two-Stage Pumps Using CFD** Tedja Verhulst[1] Eddie Yin Kwee Ng[2] Yongmann Chung[3] David Judt[1] Craig Lawson[1] *1. Cranfield University, United Kingdom; 2. Nanyang Technological University, Singapore; 3. University of Warwick, United Kingdom*	**GT2022:83042** **A Numerical Investigation on the Influence of Wall Roughness on the Performance of Volutes of Centrifugal Compressors** Daniel Wolbert[1] Sven König[1] Manuel Schmitt[1] Michael Wannek[2] Jörg Hartmann[2] *1. Trier University of Applied Sciences, Germany; 2. Siemens Energy Aerodynamics, Germany*	

TUESDAY JUNE 14

04:00 PM - 05:30 PM

WIND ENERGY

Offshore

Technical • Rotterdam C • 44-07

Session Organizer: **Juan Jauregui**, University of Queretaro

4:00

GT2022:82264
Effects of the Surge Motion on the Performance of Floating Wind Turbine Considering Blade Structural Flexibility
Le Zhou, Xin Shen, Jiajia Chen, Fanfu Yin, Zhaohui Du
Shanghai Jiao Tong University, China (Mainland)

4:30

GT2022:83219
Mooring System Design and Analysis for a Floating Offshore Wind Turbine in Pantelleria
Francesco Niosi, Alberto Ghigo, Bruno Paduano, Giovanni Bracco, Giuliana Mattiazzo
Politecnico di Torino, Italy

5:00

GT2022:83332
A Numerical Study of the Wake Turbine Interference Effects for an Offshore Wind Farm
Lei Xue, Liye Zhao, Jundong Wang, Yu Xue
Ocean University of China, China (Mainland)

5:30

GT2022:83860
Optimization Approach for Wind Farm Cable Layout Based on Iterative Self-Organizing Data Analysis Technique Algorithm and Swap Sequence Based Particle Swarm Algorithms
Deqi Yu[1] Ming Li[2]
1. Shanghai Electric, China (Mainland); 2. Dalian University of Technology, China (Mainland)

WEDNESDAY JUNE 15 — 8:00 AM – 10:00 AM

	AIRCRAFT ENGINE	COAL, BIOMASS, HYDROGEN & ALTERNATIVE FUELS	COMBUSTION, FUELS & EMISSIONS
	Modelling & Simulation II	**Hydrogen**	**High-Hydrogen I**
	Technical • Dock 10 A • 01-07	**Technical • Rotterdam C • 03-01**	**Technical • Port 1 C • 04-10**
	Session Organizer: **Charles Krouse**, Southwest Research Institute Session Co-Chairs: **Vassilios Pachidis**, Cranfield University; **Konstantinos Kyprianidis**, MDU	Session Organizer: **Angela Serra**, Baker Hughes Session Co-Chairs: **Pierre Gauthier**, Siemens Energy Canada; **Marina Braun-Unkhoff**, Institute of Combustion Technology	Session Organizer: **Jacqueline O'Connor**, Purdue University Session Co-Chairs: **David Noble**, EPRI; **Vishal Acharya**, Georgia Institute of Technology; **Sebastien Ducruix**, CM2C - CNRS; **Jeffrey Goldmeer**, GE Energy; **Gilles Bourque**, Siemens Canada
8:00	**GT2022:80189** **The New Chapter of Transonic Compressor Cascade Design at the DLR** Edwin J. Munoz Lopez, Alexander Hergt, Sebastian Grund *German Aersopace Center (DLR), Germany*	**GT2022:80886** **An Innovative Concept for the Complete and Low-NOx Combustion of Non-Carbon Eco-Fuels Using a Thermo-Acoustically-Driven, Hydrogen-Powered Pilot Stage** Nina Paulitsch[1] Fabrice Giuliani[1] Johannes Hofer[2] Andrea Hofer[1] Lukas Andracher[3] *1. Combustion Bay One e.U., Austria; 2. PP Industries AG, Austria; 3. FH JOANNEUM GmbH, Austria*	**GT2022:81188** **High-Pressure Laminar Flame Speeds and Markstein Lengths of Syngas Flames Diluted in Carbon Dioxide and Helium** Mattias Turner, Eric Petersen *Texas A&M University, USA*
8:30	**GT2022:81262** **Secondary Air System: A Current Review and Future Investigations** Fabian Fuchs, Laura Cordes *Deutsches Zentrum für Luft- und Raumfahrt, Germany*	**GT2022:80924** **Demonstration of Natural Gas and Hydrogen Co-Combustion in an Industrial Gas Turbine** Hannes Laget[1] Peter Griebel[2] Luc Gooren[1] Fabian Hampp[3] Oliver Lammel[4] Nicolas Jouret[5] *1. Laborelec, Belgium; 2. Institute of Combustion Technology, Germany; 3. DLR - Institute of Combustion, Germany; 4. German Aerospace Center (DLR) - Institute of Combustion Technology, Germany; 5. KU Leuven, Belgium*	**GT2022:83218** **A Numerical Investigation of Reheat Hydrogen Combustion in a Simplified Geometrical Configuration from Atmospheric Pressure to Full Load Conditions** Andrea Gruber[1] Tarjei Heggset[1] Michael Duesing[2] Andrea Ciani[2] *1. SINTEF, Norway; 2. Ansaldo Energia Switzerland, Switzerland*
9:00	**GT2022:82760** **An Integrated Creep Damage Analysis Method of Turbine Blades Based on the Service History** Duoqi Shi, Muwei Cheng, Xiaoguang Yang, Yongsheng Fan *Beihang University, China (Mainland)*	**GT2022:81131** **Analysis of the NOx Emissions Deriving From Hydrogen/Air Combustion in a Swirling Non-Premixed Annular Micro-Combustor** Luca Mazzotta, Orlando Palone, Francesca Di Gruttola, Gabriele Guglielmo Gagliardi, Domenico Borello *La Sapienza Università di Roma, Italy*	**GT2022:81643** **Evaluation of the Performance of a 200kW Recuperated Gas Turbine Engine Operated on Up to 30% Hydrogen Added to Natural Gas** Walther Villatoro[1] Vincent Mc Donell[1] Ray Hu[2] Don Ayers[2] *1. University of California, USA; 2. Capstone Green Energy, USA*
9:30		**GT2022:82711** **Numerical Performance Study of Adsorption Based Hydrogen Storage System in Silica Aerogel** Adil Riahi[1] Sara Algurab[1] Marcel Otto[1] Erik Fernandez[1] Jayanta Kapat[1] Joshua Schmitt[2] Swati Saxena[3] *1. University of Central Florida - CATER, USA; 2. Southwest Research Institute, USA; 3. Ansys Inc, USA*	**GT2022:82110** **Experimental and Numerical Advancement of the MGT Combustor Towards Higher Hydrogen Capabilities** Bernhard Cosic[1] Dominik Wassmer[1] David Kluß[1] Alexander Jaeschke[2] Thoralf Reichel[2] Christian Oliver Paschereit[2] *1. MAN Energy Solutions SE, Germany; 2. Chair of Fluid Dynamics – Hermann-Föttinger-Institut – TU Berlin, Germany*

WEDNESDAY JUNE 15 — 8:00 AM – 10:00 AM

	COMBUSTION, FUELS & EMISSIONS	COMBUSTION, FUELS & EMISSIONS	CYCLE INNOVATIONS
	Pressure Gain Combustion II	**Combustion Dynamics - Transverse Instabilities**	**Renewable Energy Integration in Cycles**
	Technical • Port 2 • 04-19	**Technical • Port 3 • 04-27**	**Technical • Dock 12 • 06-03**
	Session Organizer: **Vishal Acharya**, Georgia Institute of Technology Session Co-Chairs: **Jacqueline O'Connor**, Purdue University; **Sebastien Ducruix**, CM2C - CNRS; **Gilles Bourque**, Siemens Canada; **Bernhard Cosic**, MAN ES	Session Organizer: **Vishal Acharya**, Georgia Institute of Technology Session Co-Chairs: **Jacqueline O'Connor**, Purdue University; **Sebastien Ducruix**, CM2C - CNRS; **Janith Samarasinghe**, GE Global Research; **Gilles Bourque**, Siemens Canada	Session Organizer: **Francesco Crespi**, University of Seville Session Co-Chairs: **Alessandro Sorce**, University of Genoa; **Jafar Al-Zaili**, City University of London; **Ward De Paepe**, University of Mons
8:00	**GT2022:83401** **Use of Convolutional Neural Network Image Classification and High-Speed Ion Probe Data Towards Real-Time Detonation Characterization in a Water-Cooled Rotating Detonation Engine** Kristyn Johnson[1] Donald Ferguson[1] Andrew Nix[2] *1. National Energy Technology Laboratory, USA; 2. West Virginia University, USA*	**GT2022:82281** **Azimuthal Instabilities of an Annular Combustor with Different Swirling Injectors** Preethi Rajendram Soundararajan, Daniel Durox, Antoine Renaud, Sébastien Candel *EM2C Laboratory, CentraleSupelec & CNRS, France*	**GT2022:79378** **Part-Load of Steam Rankine Cycles for Solar Salts-Based Concentrating Solar Power Plants** Davide Belverato[1] Emanuele Martelli[1] Marco Binotti[1] Lorenzo Pilotti[1] Alberto Giaconia[2] *1. Politecnico di Milano, Italy; 2. ENEA Centro Ricerche Casaccia, Italy*
8:30	**GT2022:80673** **An Optimization Methodology for Turbines Driven by Pulsed Detonation Combustors** Majid Asli, Panagiotis Stathopoulos *TU Berlin, Germany*	**GT2022:84211** **Flame Response of a Lean Premixed Swirl Flame to High Frequency Azimuthal Forcing** Tobias O. Mangold[1] Myles D. Bohon[1] Alessandro Orchini[1] Jonas P. Moeck[2] C. Oliver Paschereit[1] *1. Technische Universität Berlin, Germany; 2. Norwegian University of Science and Technology, Norway*	**GT2022:80376** **Techno-Economic Optimization of a Hybrid PV-CSP Plant with Molten Salt Thermal Energy Storage and Supercritical CO2 Brayton Power Cycle** Salvatore Guccione[1] Silvia Trevisan[1] Rafael Guedez[1] Björn Laumert[1] Simone Maccarini[2] Alberto Traverso[2] *1. KTH Royal Institute of Technology, Sweden; 2. Universitá di Genova, Italy*
9:00	**GT2022:81366** **Large Eddy Simulation of a Pistonless Constant Volume Combustor: A New Concept of Pressure Gain Combustion** Nicola Detomaso[1] Davide Laera[1] Paul Pouech[1] Florent Duchaine[1] Thierry Poinsot[2] *1. CERFACS, France; 2. Institut de Mécanique des Fluides de Toulouse, CNRS, France*	**GT2022:81127** **High-Frequency Mode Shape Dependent Flame-Acoustic Interactions in Reheat Flames** Jonathan McClure[1] Mirko Bothien[2] Thomas Sattelmayer[1] *1. Lehrstuhl für Thermodynamik, Technische Universität München, Germany; 2. Institute for Advanced Study, Technische Universität München, Germany*	**GT2022:81785** **Optimization Under Uncertainties of a Biogas-Fueled SOFC-GT Hybrid System** Paolo Finocchi[1] Valentina Zaccaria[2] David Tucker[3] Mario Ferrari[1] *1. University of Genoa, Italy; 2. Mälardalen University, Sweden; 3. National Energy Technology Laboratory, USA*
9:30	**GT2022:81152** **Stress Blended Eddy Simulations for Hydrogen-Air Rotating Detonation Engine with Wall Heat Transfer** Hossam Elasrag[1] Timothy Gallagher[1] Brent Rankin[2] Stephen Schumaker[2] *1. ISSI, USA; 2. AFRL, USA*	**GT2022:83392** **Optimum Injector Parameters for Thermoacoustic Stability in a Multi-Nozzle Can Combustion System** Vishal Acharya *Georgia Institute of Technology, USA*	**GT2022:82918** **Establishment of a Baseline Integrated Energy System to Decarbonise Geographical Islands** Mohammad Mansouri[1] Peter Breuhaus[2] Hossein Madi[3] *1. University of Stavanger, Norway; 2. NORCE, Norway; 3. Paul Scherrer Institute, Switzerland*

WEDNESDAY JUNE 15 — 8:00 AM – 10:00 AM

	CYCLE INNOVATIONS: ENERGY STORAGE	ELECTRIC POWER	ELECTRIC POWER
	General Energy Storage Systems	**Gas Turbines in Energy Transition**	**DOE Gas Turbine Program Successes: Special Session in honor of Richard Dennis**
	Technical • Port 1 B • 07-04	Technical • RTM Stage • 09-01	Panel • Dock 11 • 09-08
	Session Organizer: **Dhinesh Thanganadar**, Cranfield University Session Co-Organizer: **David T. Sanchez Martinez**, AICIA	Session Organizer: **Richard Dennis**, U.S. Department of Energy Session Co-Organizer: **Carlos Koeneke**, Mitsubishi Power	Moderators: **Karen Thole**, Pennsylvania State University; **Timothy Lieuwen**, Georgia Institute of Technology
8:00	**GT2022:83146** **The Pump-Turbine Selection Approach for Geomechanical Storage Facility** Abhay Patil[1] Bunker Hill[2] Jason Wilkes[1] *1. Southwest Research Institute, USA; 2. Quidnet Energy, USA*	**GT2022:80406** **Power and Hydrogen Co-Production in Flexible "Powdrogen" Plants** Alessandro de Cataldo[1] Marco Astolfi[1] Paolo Chiesa[1] Stefano Campanari[1] Emanuele Martelli[1] Paolo Silva[1] Stefano Bedogni[2] Luca Ottolina[2] Marco Tappani[3] Matteo C. Romano[1] *1. Politecnico di Milano, Italy; 2. Edison SpA, Italy; 3. Ansaldo Energia, Italy*	Panelists: Robert Schrecengost, US Department of Energy, Office of Fossil Energy and Carbon Management Jacqueline O'Connor, *Pennsylvania State University* John Intile, *GE* Klaus Brun, *Elliott Group* John Gulen, *Bechtel Infrastructure & Power, Inc.*
8:30	**GT2022:83375** **Techno-Economic Analysis of a Cryogenic Flux Capacitor for Grid Storage** Joshua Schmitt[1] Noemi Collado[2] Adam Swanger[3] Marcel Otto[4] Jayanta Kapat[4] *1. Southwest Research Institute, USA; 2. Air Liquide, USA; 3. NASA, USA; 4. University of Central Florida, USA*	**GT2022:82698** **Combined Cycle, Heat Pump, and Thermal Storage Integration: Techno-Economic Sensitivity to Market and Climatic Conditions Based on a European and United States Assessment** Alberto Vannoni[1] Jose Angel Garcia[2] Rafael Guedez[2] Alessandro Sorce[3] Aristide Fausto Massardo[3] *1. University of Genoa, Italy; 2. KTH Royal Institute of Technology,, Sweden; 3. University of Genova, Italy*	**P** **A** **N** **E** **L**
9:00	**GT2022:82343** **Liquid Salt Combined Cycle** William Conlon[1] Scott Hume[2] Milton Venetos[1] *1. Pintail Power LLC, USA; 2. Electric Power Research Institute, USA*	**GT2022:83437** **Techno-Economic Dispatch Analysis of a Case Study Consisting of Micro Gas Turbines Using Real-Time Data** Hasan Huseyin Uslu[1] Andrea Vinci[2] Matteo Saviozzi[3] Gabriele Mosaico[3] Mohsen Assadi[1] Federico Silvestro[3] Homam Nikpey Somehsaraei[1] *1. University of Stavanger, Norway; 2. IESolutions s.r.l, Italy; 3. DITEN-IEES Università degli Studi di Genova, Italy*	
9:30	**GT2022:83419** **Hybrid Power Systems: Grid Stability Through Spinning Reserve** GB Singh *Solar Turbines, USA*	**GT2022:81802** **Gas Turbine's Role in Energy Transition** John Gulen[1] Martin Curtis[2] *1. Bechtel Infrastructure & Power, Inc., USA; 2. Bechtel Ltd., United Kingdom*	

WEDNESDAY JUNE 15 — 8:00 AM – 10:00 AM

	FANS AND BLOWERS	HEAT TRANSFER: COMBUSTORS	HEAT TRANSFER: INTERNAL COOLING
	Numerical methods and Applications	**Combustor Cooling**	**Advanced Analysis Techniques**
	Technical • Dock 4 • 10-01	**Technical • Dock 1A • 11-01**	**Technical • Dock 13 • 15-06**
	Session Organizer: **Giovanni Delibra**, Sapienza University of Rome Session Co-Organizer: **Lorenzo Tieghi**, Sapienza University of Rome	Session Organizer: **Andrew Nix**, West Virginia University Session Co-Chairs: **Anil Tolpadi**, General Electric; **Alexander Mirzamoghadam**, ; **Steven Burd**, Pratt & Whitney; **Harika Kahveci**, Middle East Technical University; **James L. Rutledge**, Air Force Institute of Technology	Session Organizer: **Hui Tang**, University of Bath Session Co-Chairs: **Alexander Mirzamoghadam**, ; **Mike Barringer**, Pennsylvania State University; **Mohammad Taslim**, Northeastern University; **Lesley M. Wright**, Texas A&M University; **James L. Rutledge**, Air Force Institute of Technology
8:00	**GT2022:78066** **Numerical Investigation of an Automotive Axial Fan: A Comparison Among Different CFD Software Packages and Experimental Validation** Nicola Aldi[1] Nicola Casari[1] Stefano Oliani[1] Michele Pinelli[1] Enrico Mollica[2] Filippo Menichini[2] *1. University of Ferrara, Italy; 2. SPAL Automotive srl, Italy*	**GT2022:81345** **Assessment of a Conjugate Heat Transfer Method on an Effusion Cooled Combustor Operated with a Swirl Stabilized Partially Premixed Flame** Alberto Amerini[1] Simone Paccati[1] Lorenzo Mazzei[2] Antonio Andreini[1] *1. Università degli Studi di Firenze, Italy; 2. Ergon Research, Italy*	**GT2022:79526** **Assessment of the Flow Field and Heat Transfer in an NGV Using Magnetic Resonance Velocimetry, Thermochromic Liquid Crystals and CFD** Martin Bruschewski[1] Carolin Wüstenhagen[1] Clemens Domnick[2] Robert Krewinkel[2] Chao-Cheng Shiau[3] Sven Grundmann[1] Je-Chin Han[3] *1. University of Rostock, Germany; 2. MAN Energy Solutions SE, Germany; 3. Texas A&M University, USA*
8:30	**GT2022:81697** **Performance Investigation of Airfoils for Axial Flow Fans in Low Solidity Cascades Operating at High Inlet Flow Angles** Gabriele Milanese, Carlo Cravero *DIME - Universita' di Genova, Italy*	**GT2022:82067** **Effusion Cooling: Influence of Pressure Drop** Michael Bonds Jr.[1] Ben Wahls[1] Srinath Ekkad[1] Nagaraja Rudrapatna[2] Rudy Dudebout[2] Ryan Meyer[2] *1. North Carolina State University, USA; 2. Honeywell Aerospace, USA*	**GT2022:81510** **Flow Scaling Considerations for Internal Coolant Warming** Connor J. Wiese[1] Carol E. Bryant[2] James L. Rutledge[2] *1. United States Air Force Academy, USA; 2. Air Force Institute of Technology, USA*
9:00	**GT2022:82953** **DMD Analysis of Radial Turbomachinery** Alexander Ludewig, Gunther Brenner, Kathrin Skinder *Technical University of Clausthal, Germany*	**GT2022:83803** **Experimental Investigation of Flame-Film Cooling Interactions with an Academic Test Rig and Optical Laser Diagnostics** Sylvain Petit, Benjamin Quevreux, Romain Morin, Romain Guillot, Frédéric Grisch, Pradip Xavier *CNRS CORIA - INSA ROUEN, France*	**GT2022:82396** **MRI Investigations of Internal Blade Cooling Flow and CFD Optimization Through Data Matching** Carolin Wüstenhagen[1] Clemens Bernhard Domnick[2] Kristine John[1] Martin Bruschewski[1] Sven Olaf Grundmann[1] *1. University of Rostock, Germany; 2. MAN Energy Solutions SE, Germany*
9:30	**GT2022:82283** **Tip Vortex Effects on Air-Cooled Condenser Axial Flow Fan Performance** Johannes P. Pretorius, Sybrand J. Van Der Spuy, Martin Strümpfer *Stellenbosch University, South Africa*	**GT2022:81567** **Experimental and Numerical Study on Effusion Cooling Configuration for the Swirl CMC Combustor Platform** Kun Du, Qihao Chen, Tingrui Liang, Yihao Jia, Cunliang Liu *Northwestern Polytechnical University, China (Mainland)*	**GT2022:82849** **Magnetic Resonance Velocimetry of a Turbine Blade With Engine-Representative Internal and Film Cooling Structures** Haiteng Ma[1] Yisu Liu[1] Youkui Lai[1] Hua Ouyang[1] Jia Ning[2] Xianwang Jiang[2] Qin Xu[2] *1. Shanghai Jiao Tong University, China (Mainland); 2. Shanghai Neusoft Medical Technology Co., Ltd., China (Mainland)*

WEDNESDAY JUNE 15 — 8:00 AM – 10:00 AM

	MANUFACTURING MATERIALS & METALLURGY	MICROTURBINES, TURBOCHARGERS & SMALL TURBOMACHINES	OIL & GAS APPLICATIONS
	Service of Gas Turbine Components - Life Assessment & Repair Processes	**Turbocharged Powertrain Analysis**	**Oil and Gas Applications for Turbomachinery**
	Technical • Port 7 • 18-02	**Technical • Port 4 • 20-05**	**Tutorial • Dock 1B • 21-22**
	Session Organizer: **Paul Lowden**, Liburdi Session Co-Chairs: **William Day**, W. David Day, Inc.; **Sascha Gierlings**, Fraunhofer Institute; **Dheepa Srinivasan**, Pratt & Whitney; **Ramesh Chandra Raju Keshava Bhattu**, PSM	Session Organizer: **Gianluca Montenegro**, Politecnico di Milano - Department of Energy Session Co-Chairs: **Grant Musgrove**, Southwest Research Institute; **Jose R. Serrano**, Universitat Politècnica De València. ESQ4618002B	Session Organizer: **Mauro Venturini**, Università Degli Studi Di Ferrara
8:00	**GT2022:80448** **Hexavalent Chromium Observations on Serviced Components of Oil&Gas Gas Turbines: Formation Mechanism Study** Erica Scrinzi, Gianni Mochi, Antonio Melani, Eugenio Del Puglia, Alice Pranzetti *Baker Hughes, Italy*	**GT2022:82212** **CFD Flow Field Assessment and Performance Map Generation of A Turbocharger Radial Turbine Attempted to Be Matched with a Downsized Diesel Engine** Mohamed Amine El Hameur [1] Mahfoudh Cerdoun[1] Lyes Tarabet[1] Giovanni Ferrara[2] *1. EM Polytechniques, Algeria; 2. University of Florence, Italy*	**GT2022:80079** **Oil and Gas Applications for Turbomachinery** Rainer Kurz[1] Klaus Brun[2] *1. Solar Turbines, USA; 2. Elliott Group, USA*
8:30	**GT2022:80473** **Advanced Tip Repair of Single Crystal HPT Blades with LW3 and LW4280 Welding Materials** Anthony Chan[1] Alexandre Gontcharov[1] Paul Lowden[1] Thomas Mikolajewski[1] J J Sixsmith[2] Robert Tollett[1] Clayton Greer[3] *1. Liburdi Turbine Services, Canada; 2. Liburdi Automation, Canada; 3. Delta Air Lines, USA*	**GT2022:82822** **Investigation on Exhaust Energy Recovery System Using Radial Turbine in High-Power Proton Exchange Membrane Fuel Cells** Wei Jiuxuan, Qi Mingxu, Zhang Hong, Li Xue *Beijing Institute of Technology, China (Mainland)*	**TUTORIAL**
9:00	**GT2022:81916** **Serviced HGP Parts Assessment Using Microstructure-Based Models for New NovaLTTM16 Gas Turbine Validation** Francesco Mastromatteo, Marco Romanelli, Iacopo Giovannetti, Chiara Cinelli *Baker Hughes - Nuovo Pignone Tecnologie, Italy*	**GT2022:82974** **Impact of Compressor and Turbine Operating Range Extension on the Performance of an Electric Turbocharger for Fuel Cell Applications** Sebastian Lück[1] Markus Schödel[2] Marco Menze[2] Jan Göing[1] Jörg R. Seume[2] Jens Friedrichs[1] *1. Institut of Jet Propulsion and Turbomachinery, Germany; 2. Institute of Turbomachinery and Fluid Dynamics, Germany*	
9:30	**GT2022:82537** **Characterization Methods to Evaluate Recrystallization and Weld-Repair in Single Crystal Nickel-Base Superalloys** Alex Bridges[1] John Shingledecker[1] Eeva Griscom[1] Hans Van Esch[2] Stijn Pietersen[2] Robert Zuber[3] Wayne Greaves[4] *1. Electric Power Research Institute, USA; 2. TEServices, USA; 3. Mechanical Dynamics & Analysis, USA; 4. Sulzer, USA*		

WEDNESDAY JUNE 15 — 8:00 AM – 10:00 AM

	STEAM TURBINE	STRUCTURES AND DYNAMICS: AERODYNAMICS EXCITATION & DAMPING	STRUCTURES AND DYNAMICS: STRUCTURAL MECHANICS & VIBRATION
	The Future of Steam Turbines in a Net Zero World	**Tutorial**	**Blade - Casing Interaction: Simulations and Experiments**
	Panel • Dock 2 • 23-07	**Tutorial • Port 1 A • 24-07**	**Technical • Dock 5 • 30-08**
	Moderator: **Grant Ingram**, Durham University	Session Organizer: **Sina C. Stapelfeldt**, Imperial College London Session Co-Organizer: **Christoph Brandstetter**, Technische Univeristät Darmstadt	Session Organizer: **Azzedine Dadouche**, National Research Council Canada Session Co-Chairs: **e.p. Petrov**, The University of Sussex; **Vsevolod Kharyton**, Siemens Industrial Turbomachinary AB; **Luigi Carassale**, University of Genoa
8:00	Panelists: David Noble, *Electric Power Research Institute* Reinhard Kloster, *Siemens Energy* Norbert Suerken, *Siemens Energy* Lubos Prchlik, *Doosan Skoda* Shigeki Senoo, *Mitsubishi Heavy Industries*	**GT2022:83906** **Introduction to Turbomachinery Aeromechanics - No Equations, Only Pictures and Movies** Matthew Montgomery *Doosan ATS America, USA*	**GT2022:82005** **Optimization of a Turbomachinery Blade with Regards to Tip-Rub Events** Marin De Cherisey[1] Alessandra Vizzaccaro[2] Ludovic Renson[1] Chian Wong[3] Loic Salles[1] *1. Imperial College London, United Kingdom;* *2. University of Bristol, United Kingdom;* *3. Rolls-Royce, United Kingdom*
8:30	**PANEL**	**TUTORIAL**	**GT2022:82322** **Stability Analysis of an Industrial Blade Accounting for a Blade-Tip/Casing Nonlinear Interface** Yann Colaitis, Alain Batailly *Ecole Polytechnique de Montreal, Canada*
9:00			**GT2022:83344** **Experimental Determination of Blade Tip Rub Forces in a Multi-Blade System** Robin Reifsnyder, Chris Keener, Randall Mathison, Kiran D'souza *The Ohio State University, USA*
9:30			**GT2022:84205** **Experimental Investigation of Three-Dimensional Shroud Contact Forces in Forced-Vibration Testing of a Shrouded Blade** Rizwan Ahmed, Christian Maria Firrone, Stefano Zucca *Politecnico di Torino, Italy*

WEDNESDAY JUNE 15 — 8:00 AM – 10:00 AM

	SUPERCRITICAL CO2	SUPERCRITICAL CO2	TURBOMACHINERY: AXIAL FLOW FAN & COMPRESSOR AERODYNAMICS
	Fluid Mechanics and Heat Transfer	**Power Cycles and Modeling**	**Tip Clearance Flows**
	Technical • Dock 15 • 33-06	Technical •Dock 16 • 33-11	Technical • Dock 14 • 34-07
	Session Organizer: **Manikantachari (Raghu) K.R.V**, Power Systems Mfg. LLC Session Co-Organizer: **Nathan Weiland**, National Energy Technology Laboratory	Session Organizer: **Timothy Held**, Echogen Power Systems Session Co-Organizer: **Marco Astolfi**, Politecnico di Milano	Session Organizer: **Senthil Krishnababu**, Siemens Energy Session Co-Organizer: **Tianyu Pan**, Beihang University
8:00	**GT2022:82921** **Windage Loss and Flow Characteristics in Impeller Back Clearance of sCO2 Centrifugal Compressor** Lehao Hu, Qinghua Deng, Zhigang Li, Jun Li, Zhenping Feng *Institute of Turbomachinery, China (Mainland)*	**GT2022:82013** **Design of a 2 MW Molten Salt Driven Supercritical CO2 Cycle and Turbomachinery for the SOLARSCO2OL Demonstration Project** Rafael Guedez[1] Stefano Barberis[2] Simone Maccarini[3] Anton Lopez Roman[4] Alberto Milani[5] Emanuel Pesatori[6] Unai Oyarzabal[7] Alvaro Sanchez[8] *1. KTH Royal Institute of Technology, Sweden; 2. RINA Consulting S.p.A., Italy; 3. University of Genoa, Italy; 4. Abengoa Energia SA, Spain; 5. Baker Hughes, Italy; 6. Franco Tosi Meccanica S.p.A., Italy; 7. Lointek, Spain; 8. Magtel, Spain*	**GT2022:77977** **Investigation of Tip Leakage Vortex Breakdown in a High-Speed Multistage Axial Compressor** Ryosuke Seki[1] Toshihiko Azuma[1] Junji Iwatani[1] Akihiro Nakaniwa[1] Hidetaka Okui[1] Takanori Shibata[2] *1. Mitsubishi Heavy Industries, Ltd., Japan; 2. Iwate University, Japan*
8:30	**GT2022:83319** **Investigation of Gas Turbine Internal Cooling Using Supercritical CO2 – Effect of Surface Roughness and Channel Aspect Ratio** Arnab Roy, Matthew Searle, Sridharan Ramesh, Douglas Straub *National Energy Technology Laboratory-DOE, USA*	**GT2022:83440** **Analysis of sCO2 Waste Heat Recovery System for Application in a Cement Plant** Ladislav Vesely[1] Scott Macadam[2] Jayanta Kapat[1] Ganesan Subbaraman[2] *1. University of Central Florida, USA; 2. Gas Technology Institute, USA*	**GT2022:78371** **Unsteady Structure of Compressor Tip Leakage Flows** Josh Maynard[1] Andrew Wheeler[1] James Taylor[1] Roger Wells[2] *1. University of Cambridge, United Kingdom; 2. Siemens Energy, United Kingdom*
9:00	**GT2022:83501** **Numerical Investigation on Mitigation of Heat Transfer Deterioration of Supercritical CO2 Flow by Introducing Multiple Turbulators Along Helices in a Circular Tube** Hangfei Duan, Gongnan Xie, Yuan Ma, Shulei Li *Northwestern Polytechnical University, China (Mainland)*	**GT2022:83021** **Part-Load Behaviour and Control Philosophy of a Recuperated Supercritical CO2 Cycle** Lorenzo Gini[1] Simone Maccarini[1] Alberto Traverso[1] Stefano Barberis[2] Emanuel Pesatori[3] Alberto Milani[4] Valentina Bisio[4] Roberto Valente[4] Rafael Guedez[5] *1. University of Genoa, Italy; 2. Rina Consulting S.p.a., Italy; 3. Franco Tosi Meccanica, Italy; 4. Nuovo Pignone - Baker Hughes, Italy; 5. KTH Royal Institute of Technology, Sweden*	**GT2022:80914** **Effect of the Axial Compressor Tip Clearance Size: Performance and Transition to Rotating Stall** Clémence Rannou[1] Antoine Dazin[2] Julien Marty[1] Lionel Castillon[1] Joseph Moubogha[2] Geoffrey Tanguy[3] *1. DAAA, ONERA, Université Paris Saclay, France; 2. Univ. Lille, CNRS, ONERA, Arts et Metiers Institute of Technology, Centrale Lille Institut, UMR 9014-LMFL, Laboratoire de Mécanique des Fluides de Lille - Kampé de Fériet, F-59000, Lille, France., France; 3. DAAA ONERA Lille, France*
9:30	**GT2022:83412** **Experimental and Numerical Investigation of Effect of Inclination on sCO2 Heat Transfer in a Circular Pipe** Emmanuel Gabriel-Ohanu, Alok Shah, Akshay Khadse, Erik Fernandez, Jayanta Kapat *University of Central Florida, USA*	**GT2022:83205** **Off-Design Modelling and Operational Optimization of Trans-Critical Carbon Dioxide Heat Pumps** Paolo Gabrielli[1] Siddhant Singh[1] Luis Sanz Garcia[2] Emmanuel Jacquemoud[2] Giovanni Sansavini[1] Philipp Jenny[2] *1. ETH Zurich, Switzerland; 2. MAN Energy Solutions, Switzerland*	**GT2022:81587** **Clearance Sensitivity Mitigation in Small Core Compressors** Simon Evans[1] Sean Nolan[1] Barbara Botros[1] Bianca Port[1] Peter Chin[1] Sameer Kulkarni[2] Julia Stephens[2] *1. Pratt & Whitney, USA; 2. NASA Glenn Research Center, USA*

WEDNESDAY JUNE 15 — 8:00 AM – 10:00 AM

	TURBOMACHINERY: AXIAL FLOW TURBINE AERODYNAMICS	TURBOMACHINERY: DESIGN METHODS & CFD MODELING FOR TURBOMACHINERY	
	Low Pressure Turbines	**LES, DES and Scale Resolving Methods**	
	Technical • Rotterdam D • 35-06	**Technical • Dock 10 B • 37-12**	
	Session Organizer: **Jochen Gier**, MTU Session Co-Chairs: **Emil Göttlich**, TU Graz; **Luca Porreca**, MAN; **Bronwyn Power**, Pratt & Whitney	Session Organizer: **Chunill Hah**, NASA GRC Session Co-Chairs: **Luca Porreca**, MAN; **Mahmoud Mansour**, Honeywell International Inc; **Bronwyn Power**, Pratt & Whitney	
8:00	**GT2022:81566** **An Experimental Test Case for Transonic Low-Pressure Turbines – Part I: Rig Design, Instrumentation and Experimental Methodology** Loris Simonassi[1] Gustavo Lopes[1] Antonino Federico Maria Torre[1] Marios Patinios[1] Samuel Gendebien[1] Ludovic Pintat[2] Nicolas Zeller[2] Sergio Lavagnoli[1] *1. The von Karman Institute for Fluid Dynamics, Belgium; 2. Safran Aircraft Engines, France*	**GT2022:80315** **On the Use of Kinetic-Energy Balance for the Feature-Based Mesh Adaptation Applied to Large-Eddy Simulation in Complex Geometries** Adrien Grenouilloux[1] Guillaume Balarac[2] Julien Leparoux[3] Vincent Moureau[1] Ghislain Lartigue[1] Pierre Bénard[1] Paul Ferrey[4] Renaud Mercier[3] *1. C.O.R.I.A., France; 2. LEGI (Laboratoire des Écoulements Géophysiques et Industriels), France; 3. Safran Tech, France; 4. Safran Nacelles, France*	
8:30	**GT2022:82626** **An Experimental Test Case for Transonic Low-Pressure Turbines – Part 2: Cascade Aerodynamics at On- and Off-Design Reynolds and Mach Numbers** Gustavo Lopes, Loris Simonassi, Antonino Federico Torre, Marios Patinios, Sergio Lavagnoli *The von Karman Institute For Fluid Dynamics, Belgium*	**GT2022:80476** **A Coupled Computational Aero-Acoustics (CAA)/ Large-Eddy Simulation (LES) Approach for the Pressure Calculation in Internal Low-Mach Number Flows** Pierre Benez[1] Vincent Moureau[1] Ghislain Lartigue[1] Guillaume Ribert[1] Marine Robin[2] *1. CORIA, France; 2. Safran Helicopter Engines, France*	
9:00	**GT2022:82558** **Profile Loss Reduction of High Lift Turbine Blades with Rough and Ribbed Surfaces** Ananth S M[1] Massimiliano Nardini[2] Aditya Vaid[1] Nagabhushana Rao Vadlamani[1] Richard Sandberg[2] *1. Indian Institute of Technology Madras, India; 2. University of Melbourne, Australia*	**GT2022:83081** **Large Eddy Simulation of Turbulent Flow Through a Compressor Cascade** Syed Anjum Haider Rizvi, Joseph Mathew *Indian Institute of Science, India*	
9:30	**GT2022:82875** **Effects of Ribbed Surfaces on Profile Losses of Low-Pressure-Turbine Blades** Matteo Dellacasagrande[1] Davide Lengani[1] Daniele Simoni[1] Marina Ubaldi[1] Francesco Bertini[2] *1. University of Genova, Italy; 2. Avio Aero, Italy*		

WEDNESDAY JUNE 15 **10:30 AM - 12:00 PM**

KEYNOTE & PLENARIES

Plenary 2: Hydrogen & Energy Storage for Propulsion & Power

RTM Stage

Moderators:
Frank Michell, Founder, Power Industry Consulting, LLC
Natalie Smith, Senior Research Engineer, Southwest Research Institute

10:30

Sarah Hopkin, *Hydrogen Researcher - H2 Mobility and Supply, ESPTG / Shell Oil*
Christian Sattler, *Head of Solar Chemical Engineering, DLR*
Arnie Feldman, *President/Principal, JJDS Environmental*
Tim Allison, *Machinery Department Director, Southwest Research Institute*
Steven R. Wellborn, *Head of Aerothermal and Functional Design, Senior Fellow – Turbomachinery Systems, Rolls-Royce*

11:00

Developing and deploying hydrogen technologies for generating electricity and for powering aviation is critical to reducing carbon emissions to address climate change and improve the environment. This panel of recognized experts will present the state of the art for hydrogen generation and transport, energy storage, and the use of hydrogen for power and propulsion. A detailed overview of the state of art energy storage technologies including status of development and deployment will be presented. Challenges for converting current and installing new infrastructure for handling, transporting, and storing hydrogen for use in power and propulsion will be discussed. Ongoing development for hydrogen for propulsion by the aircraft industry will also be presented.

11:30

WEDNESDAY JUNE 15 — 01:00 PM - 05:15 PM

STAGE PRESENTATIONS

Wednesday Expo Presentations

Stage Presentations • Exhibit Hall 3

1:00

How Solid-Rotor Technology Extends the Capabilities of Standard Induction Electric Machines
Giulio Martorelli
Yaskawa Environmental Energy / The Switch

1:45

Functional Benefits of Additively Manufactured Turbomachinery Impellers
Roberto Esposito
Velo3D, Italy

2:30

Using Digital Engineering to Support Development and Operation of Next Generation Gas Turbines
Razvan Apetrei
Norton Straw Consultants, United Kingdom

3:15

Advanced Thermal Mapping for Large and Small Gas Turbines
Jim Hickey, Mike Connolly
Sensor Coating Systems Ltd, United Kingdom

4:00

PROOSIS Simulation Tool
PROOSIS is a state-of-the-art Tool for Modelling the Performance of Gas Turbines
Antonio Ruiz-Rico
EA Internacional , Spain

4:45

Eddy Groove Technology
How to drop hydrodynamic journal tilting pad bearing maximum oil film and bearing metal temperatures significantly using grooves machined into the tilting pads
Eckhard Schueler
Miba Industrial Bearings, Germany

WEDNESDAY JUNE 15 — 01:30 PM - 03:30 PM

	AIRCRAFT ENGINE	COAL, BIOMASS, HYDROGEN & ALTERNATIVE FUELS	COMBUSTION, FUELS & EMISSIONS
	Climate Impact of Aviation Emissions and the Implications to Aircraft Engine Design	**Environmental Policies for Hydrogen Applications**	**High-Hydrogen II**
	Tutorial • Dock 10 A • 01-10	**Panel • Rotterdam C • 03-11**	**Technical • Port 1 C • 04-11**
	Session Organizer: **Feijia Yin**, Delft University of Technology Session Co-Chairs: **Vassilios Pachidis**, Cranfield University; **Konstantinos Kyprianidis**, MDU	Moderator: **Marina Braun-Unkhoff**, Institute of Combustion Technology	Session Organizer: **Jacqueline O'Connor**, Purdue University Session Co-Chairs: **Vishal Acharya**, Georgia Institute of Technology; **Sebastien Ducruix**, CM2C - CNRS; **Sikke Klein**, TU Delft; **Gilles Bourque**, Siemens Canada; **Peter Stuttaford**, Thomassen
1:30	**GT2022:83658** **Climate Impact of Aviation Emissions and the Implications on Aircraft Engine Design** Feijia Yin, Arvind Gangoli Rao *Delft University of Technology, Netherlands*	Panelists: Andreas Huber, *German Aerospace Center (DLR)* Manfred Klein, *MA Klein & Associates* Angela Serra, *Baker Hughes - Nuovo Pignone*	**GT2022:82888** **Analysis of Combustion Performance of Non-Conventional Syngas in mGT Combustor: Assessment of the Impact of the Quality of Synthesis Gas Towards Flame Stability and Emissions** Jeremy Bompas, Alessio Pappa, Ward De Paepe *Umons, Belgium*
2:00	T U T O R I A L	P A N E L	**GT2022:80651** **Effect of Mixing on the Anchoring and Combustion Regimes of Pure Hydrogen Flames in Sequential Combustors** Roberto Solana-Pérez[1] Sergey Shcherbanev[1] Andrea Ciani[2] Nicolas Noiray[1] *1. ETH Zürich, Switzerland; 2. Ansaldo Energia Switzerland, Switzerland*
2:30			**GT2022:82062** **Performance of Swirl-Stabilized Distributed Combustion with Hydrogen-Enriched Methane: Stability, Blowoff and Emissions** Rishi Roy, Khuong Nguyen, Trevor Stuart, Ashwani Gupta *University of Maryland, USA*
3:00			**GT2022:82652** **High Pressure Testing with Optical Diagnostics of a Hydrogen Retrofit Solution to Eliminate Carbon Emissions** Joris Koomen[1] Tim Dammers[1] Nicolas Demougeot[1] Peter Stuttaford[1] Johannes Heinze[2] Guido Stockhausen[2] Christian Fleing[2] *1. Thomassen Energy, Netherlands; 2. German Aerospace Center (DLR), Germany*

WEDNESDAY JUNE 15

01:30 PM - 03:30 PM

	COMBUSTION, FUELS & EMISSIONS	COMBUSTION, FUELS & EMISSIONS	CONTROLS, DIAGNOSTICS & INSTRUMENTATION
	Combustion Noise	**Combustion Modeling III**	**Gas Turbine Transient Simulation and Controls**
	Technical • Port 2 • 04-20	**Technical • Port 3 • 04-35**	**Tutorial • Dock 2 • 05-08**
	Session Organizer: **Vishal Acharya**, Georgia Institute of Technology Session Co-Chairs: **Jacqueline O'Connor**, Purdue University; **Ben Emerson**, Georgia Institute of Technology; **Sebastien Ducruix**, CM2C - CNRS; **Gilles Bourque**, Siemens Canada; **Subodh Adhikari**, Georgia Institute of Technology	Session Organizer: **Jacqueline O'Connor**, Purdue University Session Co-Chairs: **Antonio Ficarella**, University of Salento; **Rudy Dudebout**, Honeywell; **Vishal Acharya**, Georgia Institute of Technology; **Sebastien Ducruix**, CM2C - CNRS; **Gilles Bourque**, Siemens Canada	Session Organizer: **Liang Tang**, P&W Session Co-Organizer: **Igor Loboda**, University of Mexico
1:30	**GT2022:80431** **Sound Generation in Multicomponent Nozzle Flows with Dissipation** Animesh Jain[1] Luca Magri[2] *1. University of Cambridge, United Kingdom; 2. Imperial College London, United Kingdom*	**GT2022:78581** **Development of an Open-Source Autonomous CFD Meta-Modeling Environment for Small-Scale Combustor Optimization – Part I** Alejandro Briones[1] Brent Rankin[2] *1. University of Dayton Research Institute, USA; 2. Air Force Research Laboratory, USA*	**GT2022:88527** **Transient Engine Simulation and Controls Basics** Syed Khalid *Turbomachinery Systems Solutions, Imc, USA*
2:00	**GT2022:82480** **Computation of Intrinsic Instability and Sound Generation from Autoignition Fronts** Harish Subramanian Gopalakrishnan, Andrea Gruber, Jonas Moeck *Norwegian University of Science and Technology, Norway*	**GT2022:78586** **Development of an Open-Source Autonomous CFD Meta-Modeling Environment for Small-Scale Combustor Optimization – Part II** Alejandro Briones[1] Brent Rankin[2] *1. University of Dayton Research Institute, USA; 2. Air Force Research Laboratory, USA*	T U T O R I A L
2:30	**GT2022:82637** **A Novel Decomposition Approach Preventing Spurious Entropy Generation in Hybrid Thermoacoustic Stability Computations** Gerrit Heilmann, Tong Liu, Pedro Romero Vega, Thomas Sattelmayer *Technical University of Munich, Germany*	**GT2022:82150** **FGM Applied to Grid Plate Flame Stabilisers for NOx Prediction in Non-Premixed Gas Turbine Combustion** José Ramón Quiñonez Arce, Gordon E. Andrews, Herodotos Phylaktou *University of Leeds, United Kingdom*	
3:00	**GT2022:82971** **Modeling the Convection of Entropy Waves in Strongly Non-Parallel Turbulent Flows Using a Linearized Framework** Thomas Ludwig Kaiser[1] Nicolas Noiray[2] Quentin Male[2] Kilian Oberleithner[1] *1. TU Berlin, Germany; 2. ETH Zürich, Switzerland*	**GT2022:81756** **Automatized Experimental Combustor Development Using Adaptive Surrogate Model-Based Optimization** Johann Moritz Reumschuessel[1] Philipp Maximilian Zur Nedden[1] Jakob G. R. von Saldern[1] Thoralf G. Reichel[1] Bernhard Cosic[2] Christian Oliver Paschereit[1] *1. Technische Universitaet Berlin, Germany; 2. MAN Energy Solutions SE, Germany*	

WEDNESDAY JUNE 15

01:30 PM - 03:30 PM

	CYCLE INNOVATIONS	CYCLE INNOVATIONS: ENERGY STORAGE	ELECTRIC POWER
	Power Plant Hybridisation for Enhanced Flexibility and Energy Storage	**Hydrogen for Power and Energy Storage**	**Gas Turbine's Role in Decarbonization**
	Tutorial • Dock 12 • 06-12	**Tutorial • Port 1 B • 07-05**	**Panel • Dock 10 B • 09-06**
	Session Organizer: **John Gulen**, Bechtel Infrastructure & Power, Inc. Session Co-Chairs: **Alberto Traverso**, Università degli Studi di Genova; **Alessandro Sorce**, University of Genoa; **Ward De Paepe**, University of Mons	Session Organizer: **Stefan Cich**, Southwest Research Institute Session Co-Organizer: **David T. Sanchez Martinez**, AICIA	Moderators: **Jeffrey Benoit**, PSM - Ansaldo Energia Group; **Richard Dennis**, U.S. Department of Energy
1:30	**GT2022:81941** **Power Plant Hybridisation for Enhanced Flexibility and Energy Storage** John Gulen[1] Alessandro Ramaglia[2] Alberto Traverso[3] *1. Bechtel Corporation, USA; 2. Ansaldo Energia, Italy; 3. University of Genoa, Italy*	**GT2022:84075** **Tutorial: Hydrogen for Power and Energy Storage** Joshua Neveu[1] Brian Connolly[1] Fassett Hickey[1] Antonio Perejon[2] *1. Southwest Research Institute, USA; 2. University of Seville, Spain*	Panelists: Robert Schrecengost, *US Department of Energy, Office of Fossil Energy and Carbon Management* John Mason, *Solar Turbines* Peter Stuttaford, *Thomassen Energy - a Hanwha Company* Pratyush Nag, *Siemens Energy* Andrew Passmore, *General Electric* Susumu Wakazono, *Mitsubishi Heavy Industries, Ltd.*
2:00	T	T	P
2:30	U T O R	U T O R	A N E
3:00	I A L	I A L	L

WEDNESDAY JUNE 15

01:30 PM - 03:30 PM

	FANS AND BLOWERS	HEAT TRANSFER: GENERAL INTEREST	HEAT TRANSFER: INTERNAL COOLING
	Noise Generation, Prediction, Innovative Noise Reduction Design	**Methods and Technology IV**	**Advanced Cooling Configurations**
	Technical • Dock 4 • 10-02	**Technical • Dock 15 • 13-07**	**Technical • Dock 13 • 15-08**
	Session Organizer: **Janos Vad**, Budapest University of Technology and Economics Session Co-Organizer: **Giovanni Delibra**, Sapienza University of Rome	Session Organizer: **Sanjay Chopra**, GE Aviation Session Co-Chairs: **Alexander Mirzamoghadam**, ; **Riccardo Da Soghe**, Ergon Research; **Zhirui Dong**, GE	Session Organizer: **Changmin Son**, Virginia Tech Session Co-Chairs: **Alexander Mirzamoghadam**, ; **Sanjay Chopra**, GE Aviation; **Mohammad Taslim**, Northeastern University; **Lesley M. Wright**, Texas A&M University; **James L. Rutledge**, Air Force Institute of Technology
1:30	**GT2022:78406** **Influence of Different Flow Solvers and Off-Design Conditions on the Determination of Fan-Rotor Wakes for Broadband Noise Prediction** Robert Meier zu Ummeln, Antoine Moreau, Markus Schnoes *German Aerospace Center (DLR), Germany*	**GT2022:82851** **Analysis of Melting and Solidification Behavior in DED Laser Welding of Inconel 901** Ehtesham Ali, Hwabhin Kwon, Je-Hyun Lee, Heesung Park *Changwon National University, Korea*	**GT2022:81780** **Low Order Heat & Mass Flow Network Modelling for Quasi-Transpiration Cooling Systems** Michael van de Noort, Alexander Murray, Peter Ireland *University of Oxford, United Kingdom*
2:00	**GT2022:79389** **Assessment of the Impeller/Volute Relationship of Centrifugal Fans From an Aerodynamic and Aeroacoustic Perspective** Till M. Biedermann[1] Youssef Moutamassik[2] Frank Kameier[1] *1. University of Applied Sciences Duesseldorf, Germany; 2. Pollrich GmbH, Germany*	**GT2022:82909** **Experimental and Numerical Investigation of a Novel Method for Gradient Temperature Measurement** Markus Schönheit[1] Edward Ginzbursky[2] Anastasia Thomas[2] Marcus Thiele[3] *1. Technische Universität Dresden, Germany; 2. LG Tech-Link Global, LLC, USA; 3. Fraunhofer IWU, Germany*	**GT2022:81928** **A Computational Approach to Aerothermal Analysis of Complex Internal Turbine Cooling Geometries** Ben Coulton, Alexander Murray, Peter Ireland *University of Oxford, United Kingdom*
2:30	**GT2022:82232** **Aeroacoustic Interactions of Blade Skew and Leading Edge Serrations Applied to Low-Pressure Axial Fans** Till M. Biedermann, Nils Hintzen, Frank Kameier *University of Applied Sciences Duesseldorf, Germany*	**GT2022:83031** **Performance Improvement of Heat Exchangers Used in a Hybrid Electric Aircraft** Faezeh Rasimarzabadi, Alexander Crain, Pervez Canteenwalla, Patrick Zdunich, Evan Gibney *National Research Council Canada, Canada*	**GT2022:79391** **Conjugate Heat Transfer Characteristics in a Vane Blade with Different Dimple/Protrusion/ Pin Fin Configuration for Trailing Region** Wei Du, Lei Luo, Songtao Wang *Harbin Institute of Technology, China (Mainland)*
3:00	**GT2022:82455** **Aeroacoustic Improvement in a Contra-Rotating Axial Fan with Large Inlet Distortion** Zhan Dongwen[1] Hu Site[2] Moosania Mostafa[2] Xiaowen Hu[2] Yijun Mao[3] Peng Chen[2] *1. Midea Group, China (Mainland); 2. Corporate Research Center, Midea Group, China (Mainland); 3. Huazhong University of Science and Technology, China (Mainland)*	**GT2022:84063** **Impacts of the Additive Manufacturing Process on the Roughness of Engine Scale Vanes and Cooling Channels** Ramesh Subramanian[1] Karen Thole[2] Lisa Kersting[3] Anand Kulkarni[1] Alexander Wildgoose[2] *1. Siemens Energy, USA; 2. The Pennsylvania State University, USA; 3. Siemens Energy, Germany*	**GT2022:82864** **Design Considerations and Validation of a Near Wall Cooled Stator Heat Shield with Sequential Impingement Cooling** Philip Peschke, Shailendra Naik, Marc Henze *Ansaldo Energia, Switzerland*

WEDNESDAY JUNE 15 — 01:30 PM - 03:30 PM

	MANUFACTURING MATERIALS & METALLURGY	MICROTURBINES, TURBOCHARGERS & SMALL TURBOMACHINES	OIL & GAS APPLICATIONS
	Repair Development Panel	**Unsteady Flow in Radial Compressors**	**Compression Stations with Low Environmental Impact II**
	Panel • Port 7 • 18-12	**Tutorial • Port 4 • 20-06**	**Technical • Dock 1B • 21-01**
		Session Organizer: **Jose R. Serrano**, Universitat Politècnica De València. ESQ4618002B Session Co-Organizer: **Grant Musgrove**, Southwest Research Institute	Session Organizer: **Timothy Allison**, Southwest Research Institute Session Co-Organizer: **Mauro Venturini**, Università Degli Studi Di Ferrara
1:30	GT Repair development becomes more challenging as designs become increasingly more complex and materials more exotic. Whether it is the repair of SX or high gamma prime turbine blades or components that can only be produced with additive manufacturing, there will always be a need for the development of new repairs from academia or industry. The members of this panel will each present a short presentation showing the some of the challenges that they have faced or expect to face in the future, followed by a panel discussion. **P A N E L**	**GT2022:83817** **Unsteady Flow in Small Radial Compressors: From Surge to Noise Emissions** Roberto Navarro, Luis Miguel Garcia-Cuevas, Jorge García-Tíscar *Universitat Politecnica de Valencia, Spain* **T U T O R I A L**	**GT2022:80080** **Compression Applications for Carbon Reduction** Rainer Kurz, Matt Lubomirsky, Gregory Mclorg *Solar Turbines, USA*
2:00			**GT2022:82209** **Carbon Capture: CO2 Compression Challenges and Design Options** Matt Taher *Bechtel Energy, USA*
2:30			
3:00			

WEDNESDAY JUNE 15

01:30 PM - 03:30 PM

	OIL & GAS APPLICATIONS	STRUCTURES AND DYNAMICS: AERODYNAMICS EXCITATION & DAMPING	STRUCTURES AND DYNAMICS: ROTORDYNAMICS
	OGA Plant Components II	**Aerodynamic and Aeroacoustic Non-synchronous Vibrations**	**Morton Effect & Stability in Rotordynamics**
	Technical • Dock 1B • 21-05	**Technical • Port 1 A • 24-06**	**Technical •Dock 5 • 29-03**
	Session Organizer: **Michele Pinelli**, Università Degli Studi Di Ferrara Session Co-Organizer: **Mauro Venturini**, Università Degli Studi Di Ferrara	Session Organizer: **Sina C. Stapelfeldt**, Imperial College London Session Co-Chairs: **Toshinori Watanabe**, The University of Tokyo; **Mateusz Golebiowski**, Alstom (Switzerland) Ltd.	Session Organizer: **Theodore Brockett**, Honeywell Aerospace Session Co-Chairs: **Yujiao Tao**, Waukesha Bearings Corporation; **Rasish Khatri**, Calnetix Technologies
1:30	**GT2022:82170** **An Euler-Based Throughflow Approach for Centrifugal Compressors – Part A: Extension and Modifications of Models** Rebecca Jenzen[1] Christian Woiczinski[2] Sebastian Schuster[1] Dieter Brillert[1] *1. Universität Duisburg-Essen, Germany;* *2. Siemens Energy Global GmbH & Co. KG, Germany*	**GT2022:81689** **Evaluating the Aerodynamic Damping at Shock Wave Boundary Layer Interacting Flow Conditions with Harmonic Balance** Jan Philipp Heners[1] Christian Frey[2] Björn Grüber[3] Thomas Carraro[4] *1. Helmut Schmidt University Hamburg, Germany;* *2. German Aerospace Center (DLR), Germany;* *3. MTU Aero Engines AG, Germany; 4. Helmut Schmidt University, Germany*	**GT2022:80356** **Morton Effect Calculation and Analysis of Shop Test Results for Single-Shaft Multistage Centrifugal Compressors** Naohiko Takahashi[1] Yohei Magara[2] Makoto Hemmi[2] Motoki Sato[2] *1. Hitachi Industrial Products, Ltd., Japan;* *2. Hitachi, Ltd., Japan*
2:00	**GT2022:82114** **An Euler-Based Throughflow Approach for Centrifugal Compressors – Part B: Experimental Investigations and Validation** Tobias Doerr[1] Bastian Dolle[1] Attilla Yildiz[2] Dieter Brillert[1] *1. University Duisburg-Essen, Germany;* *2. Siemens Energy Global GmbH & Co. KG, Germany*	**GT2022:81929** **Aerodynamic Damping Predictions During Compressor Surge: A Numerical Comparison Between a Half and Full Transient Approach** Christoph Reiber, Virginie Chenaux, Joachim Belz *DLR, Germany*	**GT2022:82200** **Stability of a Rotor Partially-Filled with Fluid: Test Facility and Experimental Results** Marie Kasprzyk[1] John Sentmanat[2] Adolfo Delgado[3] *1. Turbomachinery Lab Texas A&M, USA;* *2. Georgia Institute of Technology, USA;* *3. Texas A&M University, USA*
2:30		**GT2022:81777** **Aerodynamic Damping of Composite UHBR Fans Under the Consideration of Acoustic Intake Reflections** Jan Goessling[1] Jan Flüh[2] Nicola Paletta[2] Torben Eggers[3] Jens Friedrichs[3] Nunzio Natale[4] Joerg R. Seume[1] *1. Institute of Turbomachinery and Fluid Dynamics, Germany; 2. IBK Innovation GmbH & Co. Kg, Germany; 3. Institut für Flugantriebe und Strömungsmaschinen, Germany;* *4. Dream Innovation Srl, Italy*	**GT2022:82536** **Dynamic Characteristics of Rotor-SFD-Support System Excited by Base Harmonic Excitations Using MHB-AFT Method** Bo Zhang, Xi Chen, Fengguang Xiang, Guangming Ren, Xiaohua Gan *Southern University of Science and Technology, China (Mainland)*
3:00		**GT2022:82142** **Non-Linear Flutter Analysis of Labyrinth Seals** Roque Corral[1] Michele Greco[1] Luis Matabuena[2] *1. Universidad Politécnica de Madrid, Spain;* *2. Delft University of Technology, Netherlands*	**GT2022:83237** **Measured and Predicted Temperature Differentials Within a Rotor at a Tilting-Pad-Journal Bearing Associated with the Morton Effect** Chris Kulhanek, Seth Cunningham, Hector Delgado, Jeff Moore, Justin Hollingsworth *Southwest Research Institute, USA*

WEDNESDAY JUNE 15 — 01:30 PM - 03:30 PM

	STRUCTURES AND DYNAMICS: STRUCTURAL MECHANICS & VIBRATION	SUPERCRITICAL CO2	TURBOMACHINERY: AXIAL FLOW FAN & COMPRESSOR AERODYNAMICS
	Experimental and Sensing Technologies / Processing Methods I	**Supercritical CO2 Programme Development in Europe**	**Casing Treatment**
	Technical • Dock 1A • 30-09	**Panel • Dock 16 • 33-26**	**Technical • Dock 14 • 34-06**
	Session Organizer: **Azzedine Dadouche**, National Research Council Canada Session Co-Chairs: **Christian Firrone**, Politecnico di Torino; **Giuseppe Battiato**, Politecnico di Torino - DIMEAS	Moderator: **Renaud Le Pierres**, Meggitt	Session Organizer: **Sameer Kulkarni**, NASA Session Co-Chairs: **Anton Streit**, Siemens Energy; **Simon Evans**, Pratt & Whitney
1:30	**GT2022:81753** **Processing Multi Component Blade Tip Timing Experimental Data by Independent Component Analysis** Elena Rizzetto, Luigi Carassale *University of Genoa, Italy*	Panelists: Giacomo Persico, *Politecnico di Milano* David Sanchez, *Universidad de Sevilla* Andrea Pagini, *DESOLINATION* Albannie Cagnac, *sCO2-Flex*	**GT2022:80461** **Casing Treatment: Its Potential and Limitations** Sungho Yoon[1] Patricia Cargill[2] *1. GE Aviation, Germany; 2. GE Aviation, USA*
2:00	**GT2022:82488** **Experimental Study on the Optimization of the Sensor Arrangement for Blade Tip Timing Measurement** Jie Tian, Zhiwei Zhang, Pengfei Chai, Shang Wang, Yong Chen, Hua Ouyang *Shanghai Jiao Tong University, China (Mainland)*	**P** **A** **N** **E** **L**	**GT2022:82242** **Impact of Operating Conditions and Axial Casing Grooves on the Evolution of Flow Structure Across Blade Rows in an Axial Compressor** Ayush Saraswat, Subhra Shankha Koley, Joseph Katz *The Johns Hopkins University, USA*
2:30	**GT2022:83204** **Modal Identification for Integrally Bladed Rotors Under Traveling Wave Excitation** Joseph Beck[1] Jeffrey Brown[2] Daniel Gillaugh[2] Alex Kaszynski[3] *1. Perceptive Engineering Analytics, LLC, USA; 2. U.S. Air Force Research Laboratory, USA; 3. Advanced Engineering Solutions, USA*		**GT2022:83100** **An Evaluation of Passive Wall Treatment with Circumferential Grooves in a High-Performance Multi-Stage Axial Compressor** Ruben Bruno Diaz[1] Jesuino Takachi Tomita[1] Cleverson Bringhenti[1] Daniel da Silva Tonon[1] Diogo Ferraz Cavalca[2] *1. Aeronautics Institute of Technology, Brazil; 2. Avibras Aerospace Industry, Brazil*
3:00	**GT2022:83415** **Accurate Blade Tip Timing Placement on a Centrifugal Impeller Using As-Manufactured Modeling** Daniel Gillaugh[1] Jeff Brown[1] Trevor Tomlin[1] Emily Carper[1] Alexander Kaszynksi[2] Joseph Beck[3] *1. United States Air Force Research Laboratory, USA; 2. Advanced Engineering Solution, USA; 3. Perceptive Engineering Analytics LLC, USA*		**GT2022:83459** **Experimental and Computational Investigation of an Advanced Casing Treatment in a Single Stage High Speed Compressor** Nicholas Maher[1] Mark Ross[1] Scott Morris[1] Stephan Priebe[2] Giridhar Jothiprasad[2] David Allan[3] G. Scott McNulty[3] Michael Macrorie[3] *1. Notre Dame Turbomachinery Laboratory, USA; 2. GE Global Research, USA; 3. GE Aviation, USA*

WEDNESDAY JUNE 15

01:30 PM - 03:30 PM

	TURBOMACHINERY: AXIAL FLOW TURBINE AERODYNAMICS	TURBOMACHINERY: DESIGN METHODS & CFD MODELING FOR TURBOMACHINERY	
	ORC & Supersonic Turbines	**Turbulence Closure Methods and Applications**	
	Technical • Rotterdam D • 35-05	**Technical • Dock 11 • 37-03**	
	Session Organizer: **Guillermo Paniagua**, Purdue University	Session Organizer: **Jason Bourgeois**, Rolls-Royce Deutschland Session Co-Chairs: **Luca Porreca**, MAN; **Mahmoud Mansour**, Honeywell International Inc; **Bronwyn Power**, Pratt & Whitney	
1:30	**GT2022:81908** **Numerical Analysis of an Axial High Pressure Partial Admission Turbine** Heng Hu[1] Per Askebjer[2] Magnus Genrup[1] Narmin Hushmandi[1] *1. Lund University, Sweden; 2. Sweden Climeon Company, Sweden*	**GT2022:82080** **Calibrated Rotation-Helicity-Quadratic Constitutive Relation Spalart-Allmaras (R-H-QCR SA) Model for the Prediction of Multi-Stage Compressor Characteristics** Kotaro Matsui[1] Naoki Tani[1] Ethan Perez[2] Ryan T. Kelly[2] Aleksandar Jemcov[3] *1. IHI Corporation, Japan; 2. Notre Dame Turbomachinery Laboratory, USA; 3. University of Notre Dame, USA*	
2:00	**GT2022:82348** **Numerical Investigation at Nominal and Off-Design Operations of a Supersonic Turbine for Liquid Rocket Engines with Full and Partial Admission Nozzles** Keita Yamamoto[1] Satoshi Ukai[1] Osamu Fukasawa[2] Taro Fukuda[3] Hideyo Negishi[1] *1. Japan Aerospace Exploration Agency (JAXA), Japan; 2. Ryoyu Systems Co. Ltd, Japan; 3. Daiichi System Engineering Co. Ltd, Japan*	**GT2022:80456** **A Turbo-Oriented Data-Driven Modification to the Spalart-Allmaras Turbulence Model** Xiao He, Fanzhou Zhao, Mehdi Vahdati *Imperial College London, United Kingdom*	
2:30	**GT2022:82424** **The Role of Endwall Shape Optimization in the Design of Supersonic Turbines for Rotating Detonation Engines** Noraiz Mushtaq, Giacomo Persico, Paolo Gaetani *politecnico di milano, Italy*	**GT2022:83163** **On the Impact of the Turbulence Model on the Secondary Flow Structure of a Highly-Loaded Compressor Stage** Riccardo Toracchio[1] Fabrizio Fontaneto[1] Koen Hillewaert[2] *1. von Karman Institute, Belgium; 2. University of Liège, Belgium*	
3:00	**GT2022:82852** **Numerical Investigation of Loss Mechanisms in a Partially Loaded Supersonic ORC Axial Turbine Stage** Karl Ziaja[1] Pascal Post[1] Andreas Schramm[1] Ole Willers[2] Joerg R. Seume[2] Francesca Di Mare[1] *1. Ruhr University Bochum, Germany; 2. Leibniz University Hannover, Germany*	**GT2022:81218** **Application of a Distributed Element Roughness Model to Additively Manufactured Internal Cooling Channels** Samuel Altland[1] Xiang Yang[1] Stephen Mcclain[2] Robert Kunz[1] Karen Thole[1] *1. The Pennsylvania State University, USA; 2. Baylor University, USA*	

WEDNESDAY JUNE 15

04:00 PM - 05:30 PM

	AIRCRAFT ENGINE	COAL, BIOMASS, HYDROGEN & ALTERNATIVE FUELS	COMBUSTION, FUELS & EMISSIONS
	Advanced Concepts I	**Hydrogen Numerical Models**	**Combustion Dynamics - Experiments III**
	Technical • Dock 10 A • 01-01	**Technical • Rotterdam C • 03-02**	**Technical • Port 3 • 04-33**
	Session Organizer: **Antonio Ficarella**, University of Salento Session Co-Chairs: **Vassilios Pachidis**, Cranfield University; **Konstantinos Kyprianidis**, MDU	Session Organizer: **Marcel Otto**, University of Central Florida Session Co-Chairs: **Pierre Gauthier**, Siemens Energy Canada; **Manfred Klein**, MA Klein & Associates; **Marina Braun-Unkhoff**, Institute of Combustion Technology; **Angela Serra**, Baker Hughes	Session Organizer: **Vishal Acharya**, Georgia Institute of Technology Session Co-Chairs: **Jacqueline O'Connor**, Purdue University; **Rudy Dudebout**, Honeywell; **Sebastien Ducruix**, CM2C - CNRS; **Gilles Bourque**, Siemens Canada; **Thomas Steinbacher**, IFTA
4:00	**GT2022:78214** **Hydrogen Thermal-Powered Aircraft Combustion and Propulsion System** Paul P. Palies *UTSI, USA*	**GT2022:82937** **Performance of FGM in Bluff-Body Stabilized H2-CO Diffusion Flame** Jesse Hofsteenge, Jim Kok *University of Twente, Netherlands*	**GT2022:82665** **Nonlinear Dynamic Analysis of the Pressure Signals on a Swirl-Stabilized Atmospheric LDI Burner Across Different Operating Conditions** Antonio Torregrosa, Alberto Broatch Jacobi, Jorge García-Tíscar, Marc Rodríguez Pastor *Universitat Politècnica de València, Spain*
4:30	**GT2022:81738** **A Novel Engine Architecture for Low NOx Emissions** Tim Blondeel, Feijia Yin, Arvind Gangoli Rao *Delft University of Technology, Netherlands*	**GT2022:83097** **Sensitivity Study on Species Diffusion Models in Turbulent Combustion of Hydrogen/air Jet in Crossflow Structure** Xiaoxiao Sun[1] Harry Martin[1] Pierre Gauthier[2] Bobby Sethi[1] *1. Cranfield University, United Kingdom;* *2. Siemens Energy, Canada*	**GT2022:81769** **Acoustic Flame Transfer Function Measurements in a Liquid Fueled High Pressure Aero-Engine Combustor** Krishna Venkatesan, Fei Han, Arin Cross *GE Research, USA*
5:00	**GT2022:81603** **Investigation of the Performance of Hydrogen-Fueled Wankel Rotary Engine Using 0-D Model** Yang Du[1] Zhenghao Yang[2] Qi Geng[2] Rui Wang[1] Guangyu He[2] *1. Xian Jiao Tong University, China (Mainland);* *2. Air Force Engineering University, China (Mainland)*	**GT2022:80733** **Numerical Simulations of a Lifted Hydrogen Jet Flame Using Flamelet Generated Manifold Approach** Yu Xia[1] Ishan Verma[2] Rakesh Yadav[3] Stefano Orsino[3] Pravin Nakod[2] Shaoping Li[3] *1. Ansys UK Ltd., United Kingdom; 2. Ansys Software Pvt. Ltd., India; 3. Ansys, Inc., USA*	**GT2022:83006** **System Parameter Identification of a Colored-Noise-Driven Rijke Tube Simulator** Neha Vishnoi[1] Vikrant Gupta[2] Aditya Saurabh[3] Lipika Kabiraj[1] *1. Indian Institute of Technology, Ropar, India;* *2. Southern University of Science & Technology, China (Mainland); 3. Indian Institute of Technology, Kanpur, India*

WEDNESDAY JUNE 15 — 04:00 PM - 05:30 PM

	COMBUSTION, FUELS & EMISSIONS	CONTROLS, DIAGNOSTICS & INSTRUMENTATION	CYCLE INNOVATIONS
	Emissions III	**Topics in Instrumentation (III)**	**Advanced Manufacturing Challenges for the Energy Transition Era**
	Technical • Port 1 C • 04-34	**Technical • Dock 2 • 05-07**	**Panel • Dock 12 • 06-15**
	Session Organizer: **Jacqueline O'Connor**, Purdue University Session Co-Chairs: **Rudy Dudebout**, Honeywell; **Vishal Acharya**, Georgia Institute of Technology; **Gilles Bourque**, Siemens Canada; **Ponnuthurai Gokulakrishnan**, CSE	Session Organizer: **Lubomir Ribarov**, U.S. Merchant Marine Academy Session Co-Chairs: **Lorenzo Ferrari**, University of Pisa – DESTEC, Italy; **Igor Loboda**, University of Mexico	Moderators: **Alberto Traverso**, Università degli Studi di Genova; **Jaroslaw Szwedowicz**, Siemens Energy
4:00	**GT2022:83343** **Numerical Study of Three Gaseous Fuels on the Reactor Length and Pollutant Formation Under Lean Gas Turbine Conditions** Bernhard Stiehl[1] Marcel Otto[1] Malcolm Newmyer[1] Max Fortin[1] Tommy Genova[1] Kareem Ahmed[1] Jayanta Kapat[1] Stefano Orsino[2] Carlo Arguinzoni[2] *1. University of Central Florida, USA; 2. Ansys Inc, USA*	**GT2022:82344** **Development of a Test Article for Acoustic Streaming in High-Speed Flow** Iman Rahbari, Michael Butzen, James Twaddle, Guillermo Paniagua *Purdue University, USA*	Panelists: Vladimir Navrotsky, *Siemens Energy Industrial Application* Alex Torkaman, *Power Systems Manufacturing* Massimiliano Cecconi, *Baker&Huges* Norihiko Motoyama, *Gas Turbine Engineering, Mitsubishi Heavy Industries Ltd* **P A N E L**
4:30	**GT2022:81619** **Study on Emissions/CMC Performance of a Cmc Combustor with Weakly Coupled Stratified Swirl Flames at Engine-Relevant Conditions** Wei Wei, Quanhong Xu, Xin Xue, Yue Yang, Cheng Liu *BUAA, China (Mainland)*	**GT2022:82873** **Highly Time Resolved, Combined Temperature and Heat Flux Measurement Technique Based on ALTP Sensors** Konstantin Huber, Tim Rödiger *UAS Landshut, Germany*	
5:00	**GT2022:80971** **Pollutant Emissions Reporting and Performance Considerations for Hydrogen-Hydrocarbon Fuels in Gas Turbines** Christopher Douglas[1] Benjamin Emerson[1] David Noble[2] Robert Steele[2] Stephanie Shaw[2] Thomas Martz[2] Timothy Lieuwen[1] *1. Georgia Institute of Technology, USA; 2. Electric Power Research Institute, USA*	**GT2022:83152** **Response of Separated Boundary Layers to Steady and Pulsated Flow Injection in Transonic Internal Flows** Hunter Nowak[1] Federico Lluesma-Rodriguez[2] Iman Rahbari[3] John Clark[4] Guillermo Paniagua[3] *1. Purdue Experimental Turbine Aerothermal Lab, USA; 2. Universitat Politècnica de València, Spain; 3. Purdue University, USA; 4. U.S. Air Force Laboratory, USA*	

WEDNESDAY JUNE 15 — 04:00 PM - 05:30 PM

	CYCLE INNOVATIONS: ENERGY STORAGE	CYCLE INNOVATIONS: ENERGY STORAGE	FANS AND BLOWERS
	Hydrogen-Based Energy Storage Systems	**Energy Storage Based on Thermodynamic Cycles - View from the industry**	**Experimental investigations**
	Technical • Port 1 B • 07-02	**Panel • Port 2 • 07-07**	**Technical • Dock 4 • 10-04**
	Session Organizer: **Mohsen Ghavami**, City, University of London Session Co-Organizer: **David T. Sanchez Martinez**, AICIA	Moderators: **Marco Astolfi**, Politecnico di Milano; **David T. Sanchez Martinez**, AICIA	Session Organizer: **Sybrand Van Der Spuy**, Stellenbosch University Session Co-Organizer: **Giovanni Delibra**, Sapienza University of Rome
4:00	**GT2022:82107** **Exergy Analysis of Green Power-to-Hydrogen Chemical Energy Storage** Antonio Escamilla Perejon, David Sanchez Martinez, Lourdes Garcia-Rodriguez *University of Seville, Spain*	Panelists: Claudio Spadacini, *Energy Dome S.p.A.* Tim Held, *Echogen Power Systems* William Conlon, *Pintail Power LLC* William Bartlett, *Hydrostor Inc.*	**GT2022:80525** **Experimentally Validated Design of an Anode Recirculation Blower for PEM Fuel Cells Under Variable Fluid Composition** Philipp Nachtigal, Thorge Kentschke, Joerg R. Seume *Leibniz Universität Hannover, Germany*
4:30	**GT2022:81838** **Thermodynamic Assessment of the Conversion of a Typical CCGT Power Plant to a Fully E-Fuel Fired Unit** Jérôme Rigault[1] Ward De Paepe[1] Hannes Laget[2] *1. University of Mons, Belgium; 2. Engie Laborelec, Belgium*	**P A N E L**	**GT2022:82862** **A Mechanistic Model for the Predictive Maintenance of Heavy-Duty Centrifugal Fans Operating with Dust-Laden Flows** Alessandro Vulpio[1] Stefano Oliani[1] Alessio Suman[1] Nicola Zanini[1] Paolo Saccenti[2] *1. University of Ferrara, Italy; 2. Boldrocchi Group, Italy*
5:00	**GT2022:82609** **Optimal Design and Operation Planning of VPPs Based on Hydrogen Storage and Hydrogen Combined Cycle** Alessandro Francesco Castelli, Lorenzo Pilotti, Emanuele Martelli *Politecnico di Milano, Italy*		**GT2022:82957** **Comprehensive Analysis of a Cycloidal Rotor with Different Types of Blade Profiles** Tomasz Staśko, Mirosław Majkut, Sławomir Dykas, Krystian Smołka *Silesian University of Technology, Poland*

WEDNESDAY JUNE 15 — 04:00 PM - 05:30 PM

	HEAT TRANSFER: INTERNAL AIR SYSTEMS	MANUFACTURING MATERIALS & METALLURGY	STRUCTURES AND DYNAMICS: BEARING & SEAL DYNAMICS
	Special Topics	**Advanced Turbomachinery Manufacturing- New Materials & Methods**	**Gas Bearings**
	Technical • Dock 13 • 14-06	**Technical • Port 7 • 18-06**	**Technical • Dock 5 • 25-08**
	Session Organizer: **Michael J Pekris**, University of Surrey Session Co-Chairs: **Carl M. Sangan**, University of Bath; **Alexander Mirzamoghadam**, ; **Axel Glahn**, Pratt & Whitney; **James L. Rutledge**, Air Force Institute of Technology	Session Organizer: **Thorsten Augspurger**, RWTH Aachen WZL Session Co-Chairs: **William Day**, W. David Day, Inc.; **Sascha Gierlings**, Fraunhofer Institute; **Matthias Brockman**, WZL RWTH Aachen; **Casey Holycross**, US Air Force Research Laboratory; **Firat Irmak**, University of Central Florida; **Matthias Brockmann**, FH Münster	Session Organizer: **Adolfo Delgado**, Texas A&M University Session Co-Chairs: **Jurg Schiffmann**, EPFL; **Karim Shalash**, Teqtoniq Gmbh
4:00	**GT2022:82508** **The Inter-Bristle Pressure Field in a Large-Scale Brush Seal** Joshua Bowen[1] Matthew Jenkins[2] Aaron Bowsher[2] Peter Crudgington[2] Carl Sangan[1] James Scobie[1] *1. University of Bath, United Kingdom; 2. Cross Manufacturing Company (1938) Ltd, United Kingdom*	**GT2022:81166** **Multilayered Fibre-Matrix Interphases Derived from the Electrophoretic Deposition of Ceramic Nano-Powders** Taylor Robertson[1] Xiao Huang[2] Rick Kearsey[1] *1. National Research Council Canada, Canada; 2. Carleton University, Canada*	**GT2022:78401** **Hybrid Air Foil Thrust Bearings Design and Performance Measurement** Fangcheng Xu, Shuoxian Qiu, Jianhua Chu *Dalian University of Technology, China (Mainland)*
4:30	**GT2022:84036** **Investigation of Impeller Backface Cavity Flowfield Using CFD and a One-Dimensional Flow Solver** Erinc Erdem[1] Mustafa Cem Sertcakan[1] Sinan Sal[1] Abdulkadir Yalcinkaya[2] Yahya Dogu[2] *1. TUSAS Engine Industries, Turkey; 2. Kirikkale University, Turkey*	**GT2022:82910** **Life-Cycle-Assessment for Rough Machining of Inconel 718 Comparing Ceramic to Cemented Carbide End Mills** Kilian Fricke, Richard Zimmermann, Philipp Ganser, Sascha Gierlings, Thomas Bergs *Fraunhofer Institute for Production Technology, Germany*	**GT2022:84146** **On the Pneumatic Hammer of Hybrid Gas Bearings: Measurements and Predictions** Hyunsung Jung, Seki Sin, Kyuman Kim, Junwon Heo, Minsoo Wee, Keun Ryu *Hanyang University, Korea*
5:00	**GT2022:80195** **Experimental Analysis of the Leakage Characteristics of Three Types of Annular Segmented Seals** Mihai Arghir[1] Erwan Fourt[1] Pascal Jolly[2] Mohamed Andasmas[3] *1. Institut PPRIME, UPR CNRS 3346, France; 2. Université de Poitiers, France; 3. Safran Aircr afty Engines, France*	**GT2022:83214** **Knowledge-Based Process Design Optimisation in Blisk Manufacturing** Markus Landwehr[1] Philipp Ganser[1] Georg Vinogradov[1] Thomas Bergs[1, 2] *1. Fraunhofer Institute for Production Technology, Germany; 2. Laboratory for Machine Tools and Production Engineering WZL, Germany*	**GT2022:82585** **The Application of the Arbitrary-Order Galerkin Reduction Method to the Dynamic Analysis of a Rotor with a Preloaded Single-Pad Foil-Air Bearing** Ibrahim Ghalayini, Philip Bonello *The University of Manchester, United Kingdom*

WEDNESDAY JUNE 15

04:00 PM - 05:30 PM

	STRUCTURES AND DYNAMICS: EMERGING METHODS IN DESIGN & ENGINEERING	STRUCTURES AND DYNAMICS: PROBABILISTIC METHODS	STRUCTURES AND DYNAMICS: STRUCTURAL MECHANICS & VIBRATION
	Emerging Methods on Advanced Design & Analysis	**Lifing Applications using Probabilistic Methods**	**Mixed topics**
	Technical • Dock 1B • 26-01	**Technical • Port 1 A • 28-02**	**Technical • Dock 1A • 30-01**
	Session Organizer: **Partha Das**, Honeywell International, Inc. Session Co-Chairs: **Onome Scott-Emuakpor**, USAF; **Peter Flassig**, Rolls-Royce Deutschland	Session Organizer: **Liping Wang**, GE Corporate Res & Develop Session Co-Chairs: **Michael Enright**, Southwest Research Institute; **Kai Kadau**, Siemens Energy Inc	Session Organizer: **Azzedine Dadouche**, National Research Council Canada Session Co-Chairs: **Christian Firrone**, Politecnico di Torino; **Christoph Schwingshackl**, Imperial College; **Teresa Berruti**, Politecnico di Torino
4:00	**GT2022:82260** **Methodology for the Redesign of Compressor Blades Undergoing Nonlinear Structural Interactions: Application to Blade-Tip/Casing Contacts** Solene Kojtych[1] Florence Nyssen[1] Charles Audet[1, 2] Alain Batailly[1] *1. Polytechnique Montreal, Canada; 2. GERAD, Canada*	**GT2022:82003** **Simulation and Validation of Creep Damage on Grain Boundary of Polycrystalline Alloy 247** Tuan Duc Nguyen, Lucas Mäde, Dirk Kulawinski *Siemens Energy AG, Germany*	**GT2022:81090** **Reduced Order Modeling of Forced Response in a Multistage Compressor Under Mistuning and Aerocoupling** Niklas Maroldt, Lukas Schwerdt, Ricarda Berger, Lars Panning-Von Scheidt, Raimund Rolfes, Jörg Wallaschek, Joerg R. Seume *Leibniz University Hannover, Germany*
4:30	**GT2022:82383** **A Methodology for a Coupled Structural - CFD Analysis of Compressor Rotor Blades Subjected to Ice Impact with Uncertain Impactor Parameters** Holger Böhm[1] Lars Högner[1] Marcus Meyer[2] Maik Gude[1] Andreas Hornig[1] *1. Technische Universität Dresden, Germany; 2. Rolls-Royce Deutschland Ltd & Co KG., Germany*	**GT2022:82303** **A Probabilistic Model for Forging Flaw Crack Nucleation Processes for Heavy Duty Gas Turbine Rotor Operations** Francesco Radaelli[1] Christian Amann[1] Ali Aydin[2] Igor Varfolomeev[2] Peter Gumbsch[3] Kai Kadau[4] *1. Siemens Energy Global GmbH & Co. KG, Germany; 2. Fraunhofer IWM, Germany; 3. Karlsruhe Institute of Technology, Germany; 4. Siemens Energy, USA*	**GT2022:82540** **Experimental Modal Analysis of a Full-Scale Rotating Fan** Corentin Jorajuria[1] Claude Gibert[2] Fabrice Thouverez[1] Cécile Esteves[3] *1. École Centrale de Lyon, France; 2. CNRS - French National Centre for Scientific Research, France; 3. Safran Aircraft Engines, France*
5:00	**GT2022:84171** **Detuning Optimization of Nonlinear Mistuned Bladed-Disks** Evangeline Capiez-Lernout, Christian Soize *Université Gustave Eiffel, France*	**GT2022:80220** **A Probabilistic Framework for Minimum Low Cycle Fatigue Life Prediction** Michael Enright, Craig Mcclung, Jonathan Moody, James Sobotka, Yasin Zaman *Southwest Research Institute, USA*	**GT2022:81694** **Assessement of Two Harmonic Balance Method-Based Numerical Strategies for Blade-Tip/Casing Interactions: Application to NASA Rotor67** Thibaut Vadcard[1] Yann Colaïtis[1] Alain Batailly[1] Fabrice Thouverez[2] *1. Polytechnique Montreal, Canada; 2. Ecole Centrale de Lyon, France*

WEDNESDAY JUNE 15 — 04:00 PM - 05:30 PM

	SUPERCRITICAL CO2	SUPERCRITICAL CO2	TURBOMACHINERY: DESIGN METHODS & CFD MODELING FOR TURBOMACHINERY
	Economics	**Tutorial - Materials for Supercritical Carbon Dioxide Applications**	**Transitional Flow and Transitional Boundary Layer**
	Technical • Dock 16 • 33-12	**Tutorial • Dock 15 • 33-23**	**Technical • Dock 11 • 37-13**
	Session Organizer: **Nathan Weiland**, National Energy Technology Laboratory	Session Organizer: **Henry Saari**, Carleton University Session Co-Organizer: **Nathan Weiland**, National Energy Technology Laboratory	Session Organizer: **Sunil Patil**, ANSYS Inc Session Co-Chairs: **Luca Porreca**, MAN; **Mahmoud Mansour**, Honeywell International Inc; **Bronwyn Power**, Pratt & Whitney
4:00	**GT2022:82060** **Oxygen Storage Incorporated Into Net Power and the Allam-Fetvedt Oxy-Fuel sCO2 Power Cycle – Technoeconomic Analysis** Jeffrey Moore[1] Owen Pryor[1] Ian Cormier[2] Jeremy Fetvedt[2] *1. Southwest Research Institute, USA; 2. 8 Rivers Capital, LLC, USA*	**GT2022:84323** **Materials for Supercritical Carbon Dioxide Applications** Henry Saari[1] Ganesan Subbaraman[2] Steven Kung[3] *1. Carleton University, Canada; 2. Gas Technology Institute, USA; 3. EPRI, USA*	**GT2022:82100** **High-Order Spectral/hp Compressible and Incompressible Comparison of Transitional Boundary-Layers Subject to a Realistic Pressure Gradient and High Reynolds Number** Guglielmo Vivarelli[1] Joao Anderson Isler[1] Francesco Montomoli[1] Spencer J Sherwin[1] Paolo Adami[2] *1. Imperial College London, United Kingdom; 2. Rolls-Royce Deutschland Ltd. & Co.KG, Germany*
4:30	**GT2022:83380** **Techno-Economic Comparison of Supercritical CO2, Steam and ORC Cycles for WHR Applications** Giovanni Baglietto[1] Simone Maccarini[1] Alberto Traverso[1] Paolo Bruttini[2] *1. University of Genoa, Italy; 2. Baker Hughes, Italy*	TUTORIAL	**GT2022:83277** **Transition Model Extension for Roughness Effects** Dragan Kozulovic[1] Christoph Bode[2] Alexander Führing[3] Nemo Juchmann[3] *1. HAW Hamburg, Germany; 2. Technical University Braunschweig, Germany; 3. Hamburg University of Applied Sciences, Germany*
5:00	**GT2022:83434** **"Technoeconomic Comparison of sCO2 and ORC Systems for Waste Heat Recovery"** Timothy Allison[1] Jason Wilkes[1] Karl Wygant[2] Robert Pelton[2] *1. Southwest Research Institute, USA; 2. Hanwha Power Systems Americas, USA*		

WEDNESDAY JUNE 15

04:00 PM - 05:30 PM

	TURBOMACHINERY: UNSTEADY FLOWS IN TURBOMACHINERY	TURBOMACHINERY: UNSTEADY FLOWS IN TURBOMACHINERY	WIND ENERGY
	Unsteady Flows in Turbines III	**Methods Application**	**VAWT**
	Technical • Dock 14 • 43-03	**Technical • Rotterdam D • 43-08**	**Technical • Port 4 • 44-01**
	Session Organizer: **Florian Herbst**, Leibniz Univ Hannover Session Co-Organizer: **Christoph Bode**, Technische Universitaet Braunschweig	Session Organizer: **Fernando Karg Bulnes**, Southwest Research Institute	Session Organizer: **Juan Jauregui**, University of Queretaro Session Co-Chairs: **Alessandro Bianchini**, University of Florence; **Ahmed El Baz**, British University In Egypt (BUE); **Alessandro Bianchini**, University of Florence; **Giacomo Bruno Azzurro Persico**, Politecnico di Milano
4:00	**GT2022:82103** **Free-Stream Turbulence Induced Boundary-Layer Transition in Low-Pressure Turbines** Luca De Vincentiis[1] Kristina Durovic[1] Davide Lengani[2] Daniele Simoni[2] Jan Pralits[2] Dan Henningson[1] Ardeshir Hanifi[1] *1. KTH Royal Institute of Technology, Sweden; 2. Università di Genova, Italy*	**GT2022:80251** **The Effect of Partial-Load Operation on a Gas Turbine Compressor of an Advanced Combined Cycle Power Plant** Yasuharu Hagita[1] Hironori Miyazawa[1] Takashi Furusawa[1] Satoru Yamamoto[1] Koichi Yonezawa[2] Shuichi Umezawa[3] Shuichi Ohmori[3] Takeshi Suzuki[3] *1. Tohoku University, Japan; 2. Central Research Institute of Electric Power Industry, Japan; 3. Tokyo Electric Power Company Holdings, Inc., Japan*	**GT2022:80201** **Numerical Study on the Performance of Hybrid Darrieus-Savonius Vertical Axis Wind Turbines Having Twisted Blades** Ahmed Salah, Mahmoud Ahmed *E-JUST, Egypt*
4:30	**GT2022:83045** **Transition of a Laminar Separated Boundary Layer Under Varying Adverse Pressure Gradient** Subrata Sarkar, Ravi Kumar, Pradeep Singh *Indian Institute of Technology, Kanpur, India*	**GT2022:79393** **Application of the Harmonic Balance Method for Large Spread Multiple Frequency Scales** Thomas Biesinger[1] Max Kölzer[2] Alexander Schukmann[2] Harald Roclawski[2] Marc Kainz[3] Philippe Godin[4] Juan Carlos Morales[5] Laith Zori[5] *1. BorgWarner, Germany; 2. TU Kaiserslautern, Germany; 3. Ansys Germany GmbH, Germany; 4. Ansys Canada Inc., Canada; 5. Ansys Inc, USA*	**GT2022:82207** **Flow Modal Decomposition of a Vertical-Axis Wind Turbine with the Moving Boundaries of Rotating Blades** Tian Tian, Chong Sun, Xiaocheng Zhu, Zhaohui Du *Shanghai Jiao Tong University, China (Mainland)*
5:00	**GT2022:82335** **Numerical Investigation of the Effect of Trailing Edge Thickness of Simulated CMC Blades on Loss Profiles** Kenji Miki[1] Ali Ameri[2] *1. NASA Glenn Research Center, USA; 2. The Ohio State University, USA*	**GT2022:83197** **Investigation on Strain and Stress Principal Axes in Unsteady DNS Turbine Data** Davide Lengani[1] Daniele Simoni[1] Luca De Vincentiis[2] Kristina Durovic[2] Jan Pralits[1] Dan S. Henningson[2] Ardeshir Hanifi[2] *1. Università degli Studi di Genova, Italy; 2. KTH Royal Institute of Technology, Sweden*	**GT2022:82867** **Parametric Design of Radial Guide Vanes for Power Augmentation of Darrieus-Type Vertical-Axis Wind Turbines** Alessandro Bianchini[1] Pier Francesco Melani[1] Francesco Balduzzi[1] Roberto Bissanti[2] Palmiro Bissanti[2] Giovanni Ferrara[1] *1. Università degli Studi di Firenze, Italy; 2. Studiobissanti S.r.l., Italy*
5:30			**GT2022:80198** **Effect of Twist Angle on the Performance of Darrieus Vertical Axis Wind Turbines** Ahmed Salah, Mahmoud Ahmed *E-JUST, Egypt*

THURSDAY JUNE 16 — 08:00 AM - 10:00 AM

	AIRCRAFT ENGINE	COAL, BIOMASS, HYDROGEN & ALTERNATIVE FUELS	COMBUSTION, FUELS & EMISSIONS
	Modelling & Simulation III	**Alternative Gas**	**Combustion Modeling II**
	Technical • Dock 10 A • 01-08	**Technical • Rotterdam C • 03-03**	**Technical • Port 1 C • 04-05**
	Session Organizer: **Nikolaidis Theoklis**, Cranfield University Session Co-Chairs: **Vassilios Pachidis**, Cranfield University; **Wilfried Visser**	Session Organizer: **Angela Serra**, Baker Hughes Session Co-Chairs: **Donald Ferguson**, Natl Energy Tech Lab-us DOE; **Pierre Gauthier**, Siemens Energy Canada; **Marina Braun-Unkhoff**, Institute of Combustion Technology	Session Organizer: **Jacqueline O'Connor**, Purdue University Session Co-Chairs: **A. Benim**, Duesseldorf University of Applied Sciences; **Vishal Acharya**, Georgia Institute of Technology; **Sebastien Ducruix**, CM2C - CNRS; **Gilles Bourque**, Siemens Canada; **Khawar Jamil Syed**, Infosys
8:00	**GT2022:79112** **Flow Separation Modelling Dowstream of Military Low Pressure Compressors** Javier Ruiz Domingo, Amanda Pieyre *Safran Aircraft Engines, France*	**GT2022:80865** **Quasi-Two-Dimensional Numerical Model for Shock Wave Reformers** Ghislain Madiot[1] Seyyed Vahid Mahmoodi Jezeh[1] Stefan Tüchler[2] Mark Davidson[3] Pejman Akbari[4] Colin D. Copeland[1] *1. Simon Fraser University, Canada; 2. University of Bath, United Kingdom; 3. New Wave Hydrogen, Inc., USA; 4. California State Polytechnic University, USA*	**GT2022:80187** **Investigation of Adaptive Mesh Refinement on an Industrial Gas Turbine Combustor** Liam McManus[1] Erik Munktell[2] Megan Karalus[3] Jim Rogerson[4] *1. Siemens Digital Industries Software, United Kingdom; 2. Siemens Digital Industries, Sweden; 3. Siemens Digital Industries, USA; 4. Siemens Energy Industrial Turbomachinery Ltd., United Kingdom*
8:30	**GT2022:82478** **Design Methodology and Mission Assessment of Parallel Hybrid Electric Propulsion Systems** Raj Ghelani[1] Ioannis Roumeliotis[1] Chana Anna Saias[1] Christos Mourouzidis[1] Vassilios Pachidis[1] Justin Norman[2] Marko Bacic[1] *1. Cranfield University, United Kingdom; 2. Rolls Royce, United Kingdom*	**GT2022:82154** **Methanol Production by a Chemical Looping Cycle Using Blast Furnace Gases** Orlando Palone, Arian Hoxha, Gabriele Guglielmo Gagliardi, Francesca Di Gruttola, Domenico Borello *La Sapienza Università di Roma, Italy*	**GT2022:82620** **Solution-Based Mesh Adaption Criteria Development for Accelerating Flame Tracking Simulations** Sourabh Shrivastava[1] Ishan Verma[1] Rakesh Yadav[2] Pravin Nakod[1] *1. Ansys Inc, India; 2. Ansys, USA*
9:00	**GT2022:82243** **A Predictive Method for Helicopters Engine Installation Losses Determination** Alexandre Di-Marco[1] Claire Lecauchois[1] Benoit Fayard[1] Pierre Sagaut[2] *1. Airbus Helicopters, France; 2. Aix Marseille University, France*	**GT2022:83053** **An Upgraded Chemical Kinetic Mechanism for ISO-Octane Oxidation: Prediction of Polyaromatics Formation in Laminar Counterflow Diffusion Flames** Astrid Yuliana Ramirez Hernandez[1] Trupti Kathrotia[2] Torsten Methling[2] Marina Braun-Unkhoff[2] Uwe Riedel[3] *1. University of Stuttgart, Germany; 2. German Aerospace Center (DLR), Institute of Combustion Technology, Germany; 3. German Aerospace Center (DLR), Institute of Low-Carbon Industrial Processes, Germany*	**GT2022:82272** **Application of an Automatic Mesh Convergence Procedure for the Large Eddy Simulation of a Multipoint Injection System** Stefano Puggelli[1] Julien Leparoux[1] Clement Brunet[2] Renaud Mercier[1] Luce Liberatori[3] Stephan Zurbach[1] Gilles Cabot[2] Frederic Grisch[2] *1. SafranTech, France; 2. CORIA, France; 3. Safran Aircraft Engines, France*
9:30	**GT2022:82113** **Digital Service Twin to Assess Engine Deterioration and Remaining Part Life** Markus Klein[1] Stephan Staudacher[1] Kimon Abu-Taa[2] Jonas Schwengler[2] *1. University of Stuttgart, Germany; 2. Rolls-Royce Deutschland Ltd., Germany*	**GT2022:83250** **Thermodynamic Assessment of Exhaust Gas Recirculation in High-Volume Hydrogen Gas Turbines in Combined Cycle Mode** Silvia Ravelli *University of Bergamo, Italy*	**GT2022:82785** **Large Eddy Simulation of Transcritical / Supercritical Jet** He Shi, Wei Fan, Zhisheng Wang, Rongxiao Dong, Ming Li *Northwestern Polytechnical University, China (Mainland)*

THURSDAY JUNE 16 — 08:00 AM - 10:00 AM

	COMBUSTION, FUELS & EMISSIONS	COMBUSTION, FUELS & EMISSIONS	CYCLE INNOVATIONS
	High Hydrogen III	**Ignition II**	**Power to Heat Solutions**
	Technical • Port 2 • 04-31	**Technical • Port 3 • 04-32**	**Technical • Dock 12 • 06-02**
	Session Organizer: **Jacqueline O'Connor**, Purdue University Session Co-Chairs: **Rudy Dudebout**, Honeywell; **Vishal Acharya**, Georgia Institute of Technology; **Sebastien Ducruix**, CM2C - CNRS; **Sikke Klein**, TU Delft; **Gilles Bourque**, Siemens Canada; **Peter Stuttaford**, Thomassen	Session Organizer: **Jacqueline O'Connor**, Purdue University Session Co-Chairs: **Brandon A. Sforzo**, Argonne National Laboratory; **Rudy Dudebout**, Honeywell; **Vishal Acharya**, Georgia Institute of Technology; **Sebastien Ducruix**, CM2C - CNRS; **Gilles Bourque**, Siemens Canada	Session Organizer: **Alessandro Sorce**, University of Genoa Session Co-Chairs: **Mohsen Ghavami**, City, University of London; **Ward De Paepe**, University of Mons
8:00	**GT2022:82111** **Stabilization of Low-NOx Hydrogen Flames on a Dual-Swirl Coaxial Injector** Maxime Leroy, Clément Mirat, Antoine Renaud, Ronan Vicquelin *EM2C Laboratory, CNRS, CentraleSupélec, Université Paris-Saclay, France*	**GT2022:83667** **A Stochastic and Bayesian Inference Toolchain for Uncertainty and Risk Quantification of Rare Autoignition Events in DLE Premixers** Sajjad Yousefian[1] Sandeep Jella[2] Philippe Versailles[2] Gilles Bourque[2] Rory Monaghan[3] *1. National University of Ireland, Galway, Ireland;* *2. Siemens Energy Canada Ltd, Canada;* *3. National University of Galway Ireland, Ireland*	**GT2022:79399** **Simulation of a Safe Start-Up Maneuver for a Brayton Heat Pump** Johannes Oehler, A. Phong Tran, Panagiotis Stathopoulos *Deutsches Zentrum für Luft- und Raumfahrt (DLR), Germany*
8:30	**GT2022:80619** **A Novel 100% Hydrogen Gas Turbine Combustor Development for Industrial Use** Eun-Seong Cho[1] Hanjin Jeong[1] Jeongjae Hwang[2] Minkuk Kim[2] *1. DHI, Korea; 2. Korea Institute of Machinery and Materials, Korea*	**GT2022:82931** **Quantification of Autoignition Risk in Aeroderivative Gas Turbine Premixers Using Incompletely Stirred Reactor and Surrogate Modelling** Salvatore Iavarone[1] Savvas Gkantonas[1] Sandeep Jella[2] Philippe Versailles[2] Sajjad Yousefian[3] Rory Monaghan[3] Epaminondas Mastorakos[1] Gilles Bourque[2] *1. University of Cambridge, United Kingdom;* *2. Siemens Energy Canada Ltd, Canada;* *3. National University of Ireland, Galway, Ireland*	**GT2022:79404** **On Integrated Fluid Screening and Turbomachinery Design for Optimized Industrial Heat Pumps** Renan Emre Karaefe[1] Pascal Post[1] Francesca Di Mare[1] Valerius Venzik[2] Paul Wotzka[2] Dirk Müller[2] Riley Bradley Barta[3] *1. Ruhr-Universität Bochum, Faculty of Mechanical Engineering, Chair of Thermal Turbomachines and Aeroengines, Germany; 2. RWTH Aachen University, E.ON Energy Research Center, Institute for Energy Efficient Buildings and Indoor Climate, Germany;* *3. Technische Universität Dresden, Bitzer-Chair of Refrigeration, Cryogenics and Compressor Technology, Germany*
9:00	**GT2022:83630** **Impact of High Hydrogen Operation on Combustor Performance** Bassam S. Mohammad, Nicholas Magina, Brian Volk, Keith Mcmanus *GE, USA*	**GT2022:79904** **Estimation of Autoignition Propensity in Aeroderivative Gas Turbine Premixers Using Incompletely Stirred Reactor Network Modelling** Savvas Gkantonas[1] Sandeep Jella[2] Salvatore Iavarone[1] Philippe Versailles[2] Epaminondas Mastorakos[1] Gilles Bourque[2] *1. University of Cambridge, United Kingdom;* *2. Siemens Energy Canada Ltd, Canada*	**GT2022:81959** **Conceptual Study of Thermally Coupled Micro Gas Turbines and High Temperature Heat Pumps for Trigeneration** Jens Gollasch[1] Eleni Agelidou[2] Martin Henke[2] Panagiotis Stathopoulos[1] *1. German Aerospace Center (DLR), Institute of Low-Carbon Industrial Processes, Germany;* *2. German Aerospace Center (DLR), Institute of Combustion Technology, Germany*
9:30	**GT2022:81620** **Combined Heat and Power Supply Demonstration of Micro-Mix Hydrogen Combustion Applied to M1A-17 Gas Turbine** Atsushi Horikawa[1] Mitsugu Ashikaga[1] Masato Yamaguchi[1] Tomoyuki Ogino[1] Shigeki Aoki[1] Manfred Wirsum[2] Harald Funke[3] Karsten Kusterer[4] *1. Kawasaki Heavy Industries.Ltd, Japan;* *2. RWTH Aachen University, Germany; 3. Aachen University Applied Sciences, Germany;* *4. B&B-AGEMA GmbH, Germany*	**GT2022:81808** **Operating Characteristics of a Flameless Combustor Obtained by Experiments Informed Modelling** Rishikesh Sampat, Niek Goselink, Ferry Schrijer, Arvind Gangoli Rao *Delft University of Technology, Netherlands*	**GT2022:82920** **High Temperature Heat Pump Cascade Systems with Water (R718) as Refrigerant** Robert Hegner, Omar Abu Khass, Clement Moller, Panagiotis Stathopoulos *German Aerospace Center (DLR), Germany*

THURSDAY JUNE 16 — 08:00 AM - 10:00 AM

	ELECTRIC POWER	FANS AND BLOWERS	HEAT TRANSFER: COMBUSTORS
	Voice of the Customers – Overcoming the Energy Trilemma Though Road Mapping and International Cooperation	**Tutorials of Basics**	**Combustor and Turbine Interactions**
	Panel • Dock 10 B • 09-05	**Tutorial • Dock 4 • 10-05**	**Technical • Dock 11 • 11-02**
	Moderators: **Christer Björkqvist**, ETN; **Manfred Klein**, MA Klein & Associates	Session Organizer: **Zhiping Wang**, Morrison Products Inc Session Co-Organizer: **Giovanni Delibra**, Sapienza University of Rome	Session Organizer: **Paul Giel**, ASRC Aerospace Session Co-Chairs: **Alexander Mirzamoghadam**, ; **Steven Burd**, Pratt & Whitney; **Harika Kahveci**, Middle East Technical University; **Brian T. Bohan**, Air Force Institute of Technology; **James L. Rutledge**, Air Force Institute of Technology
8:00	Panelists: *Tomas Alvarez, Enel Group* *Geert Laagland, VattenfallBobby Noble, Electric Power Research Institute*	**GT2022:83870** **Introduction to the Aerodynamic Design of Axial Flow Industrial Fans** Massimo Masi[1] Sybrand Johannes Van Der Spuy[2] *1. University of Padova, Italy; 2. University of Stellenbosch, South Africa*	**GT2022:82128** **Numerical Prediction of Heat Transfer Coefficient and Adiabatic Effectiveness on a Nozzle Guide Vane with Representative Combustor Outflow** Stella Grazia Tomasello[1] Tommaso Bacci[1] Antonio Andreini[1] Bruno Facchini[1] Simone Cubeda[2] Luca Andrei[2] *1. University of Florence, Italy; 2. Baker Hughes, Italy*
8:30	P A N E L	T U T O R I A L	**GT2022:82139** **Numerical Study of Combustor-Turbine Interaction by Using Hybrid RANS-LES Approach** Stella Grazia Tomasello[1] Antonio Andreini[1] Roberto Meloni[2] Simone Cubeda[2] Luca Andrei[2] Vittorio Michelassi[2] *1. University of Florence, Italy; 2. Baker Hughes, Italy*
9:00			**GT2022:82697** **Turbine Vane Passage Experiments Documenting Evolution of Secondary Flows with Changes in Combustor Coolant Injection Flowrates** Kedar Nawathe[1] Yong Kim[2] Terrence Simon[1] *1. University of Minnesota, Twin Cities, USA; 2. Solar Turbines Inc., USA*
9:30			**GT2022:82800** **The Cooling Effect of Combustor Exit Louver Scheme on a Transonic Nozzle Guide Vane Endwall** Shuo Mao[1] Daniel Van Hout[1] Kaiyuan Zhang[1] Wing Ng[1] Hongzhou Xu[2] Michael Fox[2] *1. Virginia Tech, USA; 2. Solar Turbines Incorporated, USA*

THURSDAY JUNE 16

08:00 AM - 10:00 AM

	HEAT TRANSFER: FILM COOLING	HEAT TRANSFER: GENERAL INTEREST	HEAT TRANSFER: GENERAL INTEREST
	Advanced Materials with Film Cooling Flows	**External and Internal Flow Heat Transfer I**	**Methods and Technology II**
	Technical • Port 1 B • 12-09	**Technical •Dock 13 • 13-01**	**Technical • Rotterdam A • 13-04**
	Session Organizer: **Michael Benson**, West Point Session Co-Chairs: **Alexander Mirzamoghadam**, ; **David Bogard**, University of Texas at Austin; **Robert Krewinkel**, MAN Energy Solutions; **Shane Haydt**, Pratt & Whitney; **James L. Rutledge**, Air Force Institute of Technology	Session Organizer: **Cosimo Bianchini**, Ergon Research Session Co-Chairs: **Alexander Mirzamoghadam**, ; **Riccardo Da Soghe**, Ergon Research; **Zhirui Dong**, GE; **Mauro Carnevale**, University of Bath; **James L. Rutledge**, Air Force Institute of Technology	Session Organizer: **Stephen Lynch**, Pennsylvania State University Session Co-Chairs: **Alexander Mirzamoghadam**, ; **Riccardo Da Soghe**, Ergon Research; **Seth Lawson**, US Department of Energy; **Zhirui Dong**, GE; **James L. Rutledge**, Air Force Institute of Technology
8:00	**GT2022:83313** **Printability and Overall Cooling Performance of Additively Manufactured Holes with Inlet and Exit Rounding** Emma Veley[1] Michael Furgeson[2] Karen Thole[1] David Bogard[2] *1. Pennsylvania State University, USA;* *2. University of Texas at Austin, USA*	**GT2022:78271** **Effect of Vane/Blade Interaction for a Cooled Turbine Blade – Part I: Comparison of Experimental and Numerical Results** Spencer Sperling[1] Louis Christensen[1] Randall Mathison[1] Hakan Aksoy[2] Jong Liu[2] Jeremy Nickol[2] *1. The Ohio State University, USA; 2. Honeywell Aerospace, USA*	**GT2022:83498** **A Numerical Investigation of Sweeping Air/ Mist Jet Film Cooling Through a Passive Fluidic Oscillator, Part I: Steady vs. Sweeping Air-Only Jets** Ramy Abdelmaksoud, Ting Wang *University of New Orleans, USA*
8:30	**GT2022:83201** **Development and Evaluation of Shaped Film Cooling Holes Designed for Additive Manufacturing** Michael Furgeson[1] Emma Veley[2] Christopher Yoon[1] Daniel Gutierrez[1] David Bogard[1] Karen Thole[2] *1. University of Texas at Austin, USA;* *2. The Pennsylvania State University, USA*	**GT2022:78272** **Effect of Vane/Blade Interaction for a Cooled Turbine Blade – Part II: Unsteady Pressure and Heat Transfer Distributions** Spencer Sperling[1] Louis Christensen[1] Randall Mathison[1] Hakan Aksoy[2] Jong Liu[2] Jeremy Nickol[2] *1. The Ohio State University, USA;* *2. Honeywell Aerospace, USA*	**GT2022:83533** **A Numerical Investigation of Sweeping Air/ Mist Jet Film Cooling Through a Passive Fluidic Oscillator, Part II: Sweeping Air/Mist Jets** Ramy Abdelmaksoud, Ting Wang *University of New Orleans, USA*
9:00	**GT2022:82326** **Impact of Ceramic Matrix Composite Topology on Overall Effectiveness** Ryan Edelson, Karen Thole *Pennsylvania State University, USA*	**GT2022:79662** **Numerical Prediction of Thermomechanical Sensitivity of the First Stage Nozzle Guide Vane with Film Cooling** Siwanart Khumhaeng, Thitapa Suksa, Nutcha Laohalertchai, Benyapa Chaiprasit, Thanapat Chotroongruang, Prasert Prapamonthon *King Mongkut's Institute of Technology Ladkrabang, Thailand*	**GT2022:82538** **Thermal Management for Electrification in Aircraft Engines: Optimization of Coolant System** Nicholas Raske[1] Olivia Ausin Gonzalez[2] Marco Pietropaoli[1] Francesco Montomoli[1] Shahrokh Shahpar[2] Stefano Furino[1] *1. TOffeeAM, United Kingdom; 2. Rolls Royce, United Kingdom*
9:30	**GT2022:83109** **Experimental Investigation Into the Effect of a Ceramic Matrix Composite Surface on Film Cooling** Peter Wilkins[1] Stephen Lynch[1] Karen Thole[1] Tyler Vincent[2] San Quach[2] Eleanor Kaufman[2] *1. Pennsylvania State University, USA; 2. Pratt & Whitney, USA*	**GT2022:81263** **Heat Transfer Coefficient and Adiabatic Wall Temperature Measurements on a High-Pressure Turbine Nozzle Guide Vanes with Representative Inlet Swirl and Temperature Distortions** Tommaso Bacci[1] Alessio Picchi[1] Giulia Babazzi[1] Bruno Facchini[1] Simone Cubeda[2] *1. University of Florence, Italy; 2. Baker Hughes, Italy*	

THURSDAY JUNE 16 — 08:00 AM - 10:00 AM

	MANUFACTURING MATERIALS & METALLURGY	OIL & GAS APPLICATIONS	OIL & GAS APPLICATIONS
	Advanced Turbomachinery Manufacturing - Design, Materials & Processes	**OGA Plant Components I**	**Compression Stations with Low Environmental Impact II**
	Technical • Port 7 • 18-07	**Technical • Dock 1B • 21-04**	**Technical • Dock 1B • 21-06**
	Session Organizer: **Matthias Brockman**, WZL RWTH Aachen Session Co-Chairs: **William Day**, W. David Day, Inc.; **Sascha Gierlings**, Fraunhofer Institute; **Casey Holycross**, US Air Force Research Laboratory; **Thorsten Augspurger**, RWTH Aachen WZL	Session Organizer: **Michele Pinelli**, Università Degli Studi Di Ferrara Session Co-Organizer: **Mauro Venturini**, Università Degli Studi Di Ferrara	Session Organizer: **Timothy Allison**, Southwest Research Institute Session Co-Organizer: **Mauro Venturini**, Università Degli Studi Di Ferrara
8:00	**GT2022:82300** **"FELTMETAL™ Abradable Turbine Seal Materials: Structure and Property Responses to Blade Rub and Oxidation"** Elaine Motyka, Robert Schricker, Kelly Ceiler *Technetics Group, USA*	**GT2022:81797** **Abradable Seal Test Rig for Quantifying Abradable Material Performance During Labyrinth Seal Rubs in Centrifugal Compressors: Design and Test Results** Kelsi Katcher[1] Thomas Revak[1] Aaron Rimpel[1] Jeffrey Ratay[2] Klaus Brun[2] *1. Southwest Research Institute, USA;* *2. Elliott Group, USA*	**GT2022:82293** **The Development of Turboexpander-Generators for Gas Pressure Letdown Part 3: Design Validation** Ovais Ahmed Bln Najeeb[1] Rasish Khatri[1] Jeremy Liu[2] Liping Zheng[1] *1. Calnetix Technologies, USA; 2. Sapphire Technologies, USA*
8:30	**GT2022:83321** **Fused Deposition Modeling Fabrication Evaluation of a Ti-6Al-4V Centrifugal Compressor** Justin Warner[1] Dino Celli[2] Trevor Tomlin[2] Onome Scott-Emuakpor[2] Tommy George[2] *1. ARCTOS Technology Solutions, USA;* *2. Air Force Research Laboratory, USA*	**GT2022:82572** **CFD Based Investigation of Effects of Liquid Contamination on Dry Gas Seal Performance** Abhay Patil[1] Aaron Rimpel[1] Rainer Kurz[2] *1. Southwest Research Institute, USA;* *2. Solar Turbines Incorporated, USA*	
9:00	**GT2022:83489** **Additive Manufacturing of Centrifugal Impellers for Solid Oxide Fuel Cell Anode Offgas Recycle Blowers** Jose Luis Cordova *Mohawk Innovative Technology, Inc., USA*	**GT2022:83091** **Numerical Simulation and Experimental Study on Ejector of Lubricating Oil System of Gas Turbine Engine** Shuo Zhang, Ruishi Feng, Wenjun Gao, Pengfei Zhu *Northwestern Polytechnical University, China (Mainland)*	
9:30			

THURSDAY JUNE 16 — 08:00 AM - 10:00 AM

	STRUCTURES AND DYNAMICS: AERODYNAMICS EXCITATION & DAMPING	STRUCTURES AND DYNAMICS: ROTORDYNAMICS	STRUCTURES AND DYNAMICS: STRUCTURAL MECHANICS & VIBRATION
	Mistuning	**Methods in Rotordynamics**	**Experimental and Sensing Technologies / Processing Methods II**
	Technical • Port 1 A • 24-05	**Technical • Dock 5 • 29-04**	**Technical • Dock 1A • 30-10**
	Session Organizer: **Sina C. Stapelfeldt**, Imperial College London Session Co-Chairs: **Mateusz Golebiowski**, Alstom (Switzerland) Ltd.; **Roque Corral**, UPM	Session Organizer: **Theodore Brockett**, Honeywell Aerospace Session Co-Chairs: **Athanasios Chasalevris**, National Technical University of Athens; **Filippo Cangioli**, Dover Precision Components	Session Organizer: **Azzedine Dadouche**, National Research Council Canada Session Co-Chairs: **Chiara Gastaldi**, Politecnico di Torino - DIMEAS; **Muzio M. Gola**, Politecnico di Torino; **Luigi Carassale**, University of Genoa
8:00	**GT2022:79761** **Effect of System Mode and Structural Damping Perturbation on the Mistuned Forced Response and Aerodynamic Damping of Embedded Compressor Rotors** Shreyas Hegde, Jonathan Inge, Robert Kielb *Duke University, USA*	**GT2022:79691** **A Dedicated Model Reduction Method for Turbo-Machines Using a Critical Speed Subspace** Francesco D'alessandro[1] Hugo Festjens[2] Gael Chevallier[3] Scott Cogan[3] Tariq Benamara[4] Caroline Sainvitu[4] *1. FEMTO-ST, France; 2. Safran Aircraft Engines, France; 3. Univeristy of Bourgogne Franche-Comté, France; 4. Cenaero, Belgium*	**GT2022:82717** **"Design and Characterization of the OSU Rotor 67 Blisk for Future Damping and Mistuning Studies at Design Speed"** Christopher Keener, Kiran D'souza *The Ohio State University, USA*
8:30	**GT2022:80613** **Mistuning Effects on Aero-Elastic Stability of Civil Transonic Fan Blades** Bo Lian, Xiaocheng Zhu, Zhaohui Du *Shanghai Jiao Tong University, China (Mainland)*	**GT2022:79752** **Finite Element Analysis of Bent Rotors** Konrad Juethner[1] Ted Rose[1] J. S. Kumar[1] Jianming Cao[1] Gregory M. Savela[2] Chris J. Zuck[2] Parag H. Mathuria[2] *1. MSC Software Corporation, part of Hexagon, USA; 2. Pratt & Whitney, USA*	**GT2022:83241** **Mechanical Behaviour of Variable Nozzle Guide Vane Systems Based on Full-Scale Testing** Giuseppe Macoretta[1] Bernardo Disma Monelli[1] Paolo Neri[1] Federico Bucciarelli[2] Enrico Giusti[2] Damaso Checcacci[2] Gianfranco Maffulli[2] *1. University of Pisa, Italy; 2. Baker Hughes, Nuovo Pignone Tecnologie s.r.l., Italy*
9:00	**GT2022:82168** **Phasing Structural and Aerodynamic Mistuning For Leveraging Aeroelastic Performance** Hien Phan, Li He *University of Oxford, United Kingdom*	**GT2022:79755** **Mixed Whirl Modes in Numerical Rotordynamics Analysis** Konrad Juethner[1] Ted Rose[1] J. S. Kumar[1] Jianming Cao[1] Gregory M. Savela[2] Chris J. Zuck[2] Parag H. Mathuria[2] *1. MSC Software Corporation, part of Hexagon, USA; 2. Pratt & Whitney, USA*	**GT2022:80464** **Digital Replicas of Low Pressure Steam Turbine Moving Blades - Assessment of Geometrical and Mechanical Quality Requirements Using Roboter-Assisted Optical Scanning** Frederik Popig *Siemens Energy Global GmbH & Co KG, Germany*
9:30		**GT2022:82417** **Simulation Method of Rotor Dynamic Characteristics Considering Temperature Distribution and Aerodynamic Load** Fengguang Xiang, Xi Chen, Bo Zhang, Guangming Ren, Xiaohua Gan *Southern University of Science and Technology, China (Mainland)*	**GT2022:81933** **Development of an Acoustic Excitation Test Bench to Support the Validation of Bladed Disks** Jérôme Ligot[1] Sophie Denis[1] Sébastien Hoffait[1] Jean De Cazenove[2] Jean-Claude Golinval[3] *1. V2i, Belgium; 2. Cenaero, Belgium; 3. University of Liège, Belgium*

THURSDAY JUNE 16 — 08:00 AM - 10:00 AM

	SUPERCRITICAL CO2	TURBOMACHINERY: AXIAL FLOW FAN & COMPRESSOR AERODYNAMICS	TURBOMACHINERY: AXIAL FLOW TURBINE AERODYNAMICS
	Compressors II	**Compressor Design I**	**Aerodynamic Analyses**
	Technical • Dock 16 • 33-02	**Technical • Dock 14 • 34-01**	**Technical • Rotterdam D • 35-07**
	Session Organizer: **Natalie Smith**, Southwest Research Institute Session Co-Chairs: **Nathan Weiland**, National Energy Technology Laboratory; **Stefan Cich**, Southwest Research Institute	Session Organizer: **Sungho Yoon**, GE Global Research Session Co-Chairs: **Lisa Brilliant**, UTC/Pratt & Whitney; **Eberhard Nicke**, DLR	Session Organizer: **Ravikanth Avancha**, GE Research Session Co-Organizer: **Alexander Stein**, GE Power
8:00	**GT2022:80658** **Design and Operability Challenges for Supercritical CO2 Plants: The sCO2-Flex Centrifugal Compressor Test Experience** Manuele Bigi, Valentina Bisio, Silvia Evangelisti, Marco Giancotti, Alberto Milani, Tiziano Pellegrini *Baker Hughes, Italy*	**GT2022:78311** **Design of a Blowing Type Flow Treatment to Complement Casing Treatments for Compact High-Pressure Compressor Rear Stages** Christian Köhler[1] Christofer Kendall-Torry[2] Christian Helcig[1] Volker Gümmer[1] *1. Technical University of Munich, Germany; 2. GE Aviation, Germany*	**GT2022:80607** **A Framework for Estimating Effects of Combustor Turbulence on Turbine Profile Loss Generation** Kanika Gakhar[1] Masha Folk[2] Edward Greitzer[1] Choon Tan[1] *1. Massachusetts Institute of Technology, USA; 2. Rolls Royce, USA*
8:30	**GT2022:83171** **"Computational and Experimental Assessment of a MW-Scale Supercritical CO2 Compressor Operating in Multiple Near Critical Conditions"** Lorenzo Toni[1] Ernani Fulvio Bellobuono[1] Roberto Valente[1] Alessandro Romei[2] Paolo Gaetani[2] Giacomo Persico[2] *1. Baker Hughes, Nuovo Pignone, Italy; 2. Politecnico di Milano, Italy*	**GT2022:80284** **PDA Laser Measurements of Droplet-Laden Flows in a Four Stage Axial Compressor** Tobias Doerr, Sebastian Schuster, Dieter Brillert *University of Duisburg-Essen, Germany*	**GT2022:81890** **Circulation Budget Analysis of the Leading-Edge Vortex in a Wells Turbine Under Steady Inflow Conditions** Kaihe Geng, Ce Yang, Xinyu He, Chenxing Hu, Hanzhi Zhang, Xin Shi *Beijing Institute of Technology, China (Mainland)*
9:00	**GT2022:83503** **Near Critical Point Testing and Performance Results of a sCO2 Compressor for a 10MWe Brayton Cycle** Robert Pelton[1] Jon Bygrave[1] Karl Wygant[1] Kilyoung Kim[2] Jason Wilkes[3] Thomas Revak[3] *1. Hanwha Power Systems Americas, USA; 2. Hanwha Power Systems, Korea; 3. Southwest Research Institute, USA*	**GT2022:81016** **Attributes of Bi-Directional Turbomachinery for Pumped Thermal Energy Storage** Joseph Chiapperi, Edward Greitzer, Choon Tan *Massachusetts Institute of Technology, USA*	**GT2022:82205** **Correlated Pressure-Velocity Instability in a Transonic High-Pressure Turbine Blade** Matteo Dellacasagrande[1] Davide Lengani[1] Ettore Bertolini[2] Wolfgang Sanz[2] *1. DIME - University of Genova, Italy; 2. ITTM - Graz University of Technology, Austria*
9:30	**GT2022:82017** **Numerical Predictions of Mean Performance and Dynamic Behavior of a 10 MWe sCO2 Compressor with Test Data Validation** Ashvin Hosangadi[1] Tim Weathers[1] Zisen Liu[1] Robert Pelton[2] Karl Wygant[2] Jason Wilkes[3] *1. CRAFT Tech, USA; 2. Hanwha Power Systems Americas, USA; 3. Southwest Research Institute, USA*	**GT2022:83073** **Development and Experimental Verification of a "Flowcut" Technology for the New Generation of MAN-ES Industrial Axial Compressors** Roland Emmrich, Dirk Anding, Ruben Van Rennings, Philipp Köster, Bernhard Eisenberg, Christian Tümmers *MAN Energy Solutions SE, Germany*	**GT2022:80388** **Investigation of a High-Pressure Turbine Stage in a High-Speed Rotating Transient Test Facility for Rotor Tip Study and a Parametric Study for Improved Heat Transfer Calculation** Deepanshu Singh, Paul Beard, David Cardwell, Kam Chana *University of Oxford, United Kingdom*

THURSDAY JUNE 16 — 08:00 AM - 10:00 AM

	TURBOMACHINERY: DUCTS, NOISE & COMPONENT INTERACTIONS	TURBOMACHINERY: MULTIDISCIPLINARY DESIGN APPROACHES, OPTIMIZATION, AND UNCERTAINTY QUANTIFICATION	WIND ENERGY
	Fan and Engine Noise	**Radial Compressors Design Optimization**	**Tutorial**
	Technical • Dock 15 • 38-03	**Technical • Port 4 • 39-07**	**Tutorial • Dock 9 • 44-08**
	Session Organizer: **Duncan Walker**, Loughborough University Session Co-Organizer: **Stefano Bianchi**, Airbus Commercial Aircraft	Session Organizer: **Koen Hillewaert**, Université De Liege | Aerospace and Mechanics Department Session Co-Organizer: **Ingrid Lepot**, Cenaero	Session Organizer: **Juan Jauregui**, University of Queretaro Session Co-Organizer: **Giacomo Bruno Azzurro Persico**, Politecnico di Milano
8:00	**GT2022:82141** **Aerodynamic Noise Characteristics of Axial Flow Fan in Narrow Space and Noise Reduction Based on Flow Control** Zonghan Sun, Pengfei Chai, Jie Tian, Zhaohui Du, Hua Ouyang *Shanghai Jiao Tong University, China (Mainland)*	**GT2022:82130** **Multi Operating Point Aerodynamic Optimization of a Radial Compressor Impeller for an Application in High Temperature Heat Pump** Robert Schaffrath, Eberhard Nicke, Bojan Kajasa, Maximilian Kriese, Martino Köhler, Christian Voß *German Aerospace Center, Germany*	**GT2022:82190** **Challenges in Developing the New Generation of Wind Turbines** Alessandro Bianchini *Università degli Studi di Firenze, Italy* **T U T O R I A L**
8:30	**GT2022:84013** **Validation of Broadband Noise Prediction Methodology Based on Linearised Navier-Stokes Analyses** Ricardo Blázquez-Navarro, Roque Corral *Universidad Politécnica de Madrid, Spain*	**GT2022:82530** **Aerodynamic Optimization of the SRV2 Radial Compressor Using an Adjoint-Based Optimization Method** Arnaud Châtel, Tom Verstraete *von Karman Institute, Belgium*	
9:00	**GT2022:83143** **High Accuracy Numerical Investigation of Trailing Edge Noise at Vortex Shedding Critical Angle of Attack** Huabin Zheng[1] Jinqiang Chen[2] Peixiang Yu[1] Hua Ouyang[1] *1. Shanghai Jiao Tong University, China (Mainland); 2. Technische Universiteit Delft, Netherlands*	**GT2022:78306** **Machine-Learning Assisted Optimization of Generalized K-Omega (GEKO) Turbulence Model Parameters for Turbocharger Radial Compressor** Patrick Amstad, Kwok Kai So, Magnus Fischer *ABB Switzerland Ltd., Switzerland*	
9:30	**GT2022:81984** **Validation of an Analytical Model for the Acoustic Impedance Eduction of Multi-Cavity Resonant Liners by a High-Fidelity LES Approach** Simone Giaccherini, Lorenzo Pinelli, Michele Marconcini, Roberto Pacciani, Andrea Arnone *University of Florence, Italy*	**GT2022:82848** **Adjoint Optimization of Centrifugal Compressor Rotor Accounting for Manufacturing Uncertainties** Mohamed Aissa[1] Alberto Racca[2] Lasse Mueller[1] Tom Verstraete[1] Carnell Williams[3] *1. von Karman Institute for Fluid Dynamics, Belgium; 2. PUNCH Torino S.p.A., Italy; 3. General Motors LLC, USA*	

THURSDAY JUNE 16 — 10:30 AM - 12:00 PM

	AIRCRAFT ENGINE	COAL, BIOMASS, HYDROGEN & ALTERNATIVE FUELS	COMBUSTION, FUELS & EMISSIONS
	Modelling & Simulation I	**Alternative Gas Numerical Models**	**Emissions II**
	Technical • Dock 10 A • 01-06	**Technical • Rotterdam C • 03-04**	**Technical • Port 1 C • 04-08**
	Session Organizer: **Charles Krouse**, Southwest Research Institute Session Co-Chairs: **Vassilios Pachidis**, Cranfield University; **Konstantinos Kyprianidis**, MDU	Session Organizer: **Pietro Bartocci**, CRB Session Co-Chairs: **Pierre Gauthier**, Siemens Energy Canada; **Marina Braun-Unkhoff**, Institute of Combustion Technology; **Angela Serra**, Baker Hughes	Session Organizer: **Jacqueline O'Connor**, Purdue University Session Co-Chairs: **Vishal Acharya**, Georgia Institute of Technology; **Sebastien Ducruix**, CM2C - CNRS; **Sayan Biswas**, University of Minnesota; **Gilles Bourque**, Siemens Canada; **Mike Whiteman**, Loughborough University
10:30	**GT2022:81823** **Asynchronous Communication Pattern for Reducing Simulation Time in Engine Performance Models** Charles Krouse, Brian Connolly, Emilio Gordon *Southwest Research Institute, USA*	**GT2022:82282** **A Detailed Modelling of Deposition on Superheater Tubes to Enhance Boiler Flexibility** Dhinesh Thanganadar[1] Nigel Simms[2] Kumar Patchigolla[2] Stefano Mori[2] Anand Kulkarni[3] *1. Cranfield University, India; 2. Cranfield University, United Kingdom; 3. Siemens Corporation, USA*	**GT2022:81277** **A New Approach to Estimate Particulate Matter Emissions From Ground Certification Data: The nvPM Mission Emissions Estimation Methodology (MEEM)** Denise Ahrens[1] Yoann Méry[2] Adrien Guénard[3] Richard Miake-Lye[4] *1. Rolls-Royce Deutschland Ltd & Co KG, Germany; 2. Safran Aircraft Engines, France; 3. CentraleSupelec - Université Paris Saclay, France; 4. Aerodyne Research, Inc., USA*
11:00	**GT2022:82446** **Estimation of Resultant Airframe Forces for a Variable Pitch Fan Operating in Reverse Thrust Mode** David John Rajendran[1] Richard Tunstall[2] Vassilios Pachidis[1] *1. Cranfield University, United Kingdom; 2. Rolls-Royce plc, United Kingdom*	**GT2022:82683** **Numerical Study of Methane Pyrolysis Inside a Single-Channel Shock Wave Reformer** Seyyed Vahid Mahmoodi Jezeh[1] Ghislain Madiot[1] Stefan Tüchler[2] Mark Davidson[3] Pejman Akbari[4] Colin D. Copeland[1] *1. Simon Fraser University, Canada; 2. University of Bath, United Kingdom; 3. New Wave Hydrogen, Inc., USA; 4. California State Polytechnic University, USA*	**GT2022:82945** **Improving Accuracy of Soot Prediction Using Method of Moments Model** Saurabh Patwardhan[1] Pravin Nakod[1] Stefano Orsino[2] Rakesh Yadav[2] Fang Xu[3] Kiran Manoharan[4] *1. Ansys India Pvt Ltd, India; 2. Ansys Inc, USA; 3. Honeywell Aerospace, USA; 4. Honeywell Technology Solutions Lab Pvt. Ltd, India*
11:30	**GT2022:81215** **Axial Compressor Map Generation Leveraging Autonomous Self-Training AI** Maksym Burlaka[1] Leonid Moroz[2] *1. SoftInWay Inc., USA; 2. SoftInWay, Inc., USA*	**GT2022:81004** **Autoignition Delay Time Measurements and Chemical Kinetic Modeling of Hydrogen/Ammonia/Natural Gas Mixtures** Jessica B. Baker, Ramees K. Rahman, Michael Pierro, Jacklyn Higgs, Justin Urso, Cory Kinney, Subith Vasu *University of Central Florida, USA*	**GT2022:80895** **Extension of Fuel Flexibility for Siemens Energy SGT-300-2S Dry Low Emission Combustion System** Phill Hubbard, Jadeed Beita, Kexin Liu, Suresh Sadasivuni, Ghenadie Bulat *Siemens Energy Industrial Turbomachinery Ltd, United Kingdom*
12:00			**GT2022:82184** **Computational Investigation of Using Emulsified Fuels in Heavy Duty Gas Turbines** Baha Suleiman[1] Hatem Selim[1] Alaaeldin Dawood[1] Abdurrahman Khalidi[2] Kamal Al-Ahmadi[3] Ibrahim Al-Ghamdi[3] Eid Badr[3] Mohammed Al-Gahatani[3] Vasudevarao K[4] Jeffrey Goldmeer[5] *1. General Electric, Saudi Arabia; 2. General Electric, United Arab Emirates; 3. Saudi Electricity Company, Saudi Arabia; 4. General Electric, India; 5. General Electric, USA*

	COMBUSTION, FUELS & EMISSIONS	CYCLE INNOVATIONS	HEAT TRANSFER: INTERNAL AIR SYSTEMS
	Plasma Assisted Combustion	**Novel Cycles - Part I**	**Cavity Flows**
	Panel • Port 2 • 04-30	Technical • Dock 12 • 06-07	Technical • Port 1 B • 14-01
	Reduction of CO2 and pollutant emissions with plasma-assisted combustion . Answering the pressing challenge of climate change requires rapid changes in energy production methods. Today, more than 80% of the primary energy production is based on the combustion of fossil fuels, which produce most anthropogenic CO2 emissions (IEA, 2020). Combustion also produces pollutants (nitric oxides-NOx, sulphur oxides-SOx, unburned hydrocarbons, soot) that must be kept below increasingly stringent limits. Europe's vision for aviation targets 75% CO2 and 90% NOx emissions reductions by 2050, relative to 2020 levels. Beyond aviation, CO2 and pollutant emission reductions are also needed for power generation turbines, as well as domestic and industrial furnaces. Because electrification cannot massively replace combustion in the short term, aircraft engine and turbine manufacturers are developing new strategies to switch to CO2-neutral or CO2-free combustion. CO2-neutral combustion can be obtained by burning sustainable fuels (made from waste, sustainable crops, or from CO2 and renewable electricity) and CO2-free combustion is achieved by burning hydrogen or even ammonia. To reduce pollutant emissions, particularly NOx and soot, the strategy of industry is to burn lean flames, but these flames are prone to instabilities and extinction, potentially causing safety issues and mechanical damage. It should be underscored that stoichiometric H2-air flames burn at higher temperatures than hydrocarbon-air flames, and therefore lean flames are required for both H2 and hydrocarbon combustion. A promising strategy to stabilize lean flames is to enhance combustion using plasma discharges. A remarkable property of plasma discharges is their high energy efficiency because the energy is only spent only on accelerating electrons and not on heating the entire gas. Many successful experimental demonstrations of lean flame ignition and stabilization by plasma discharges have been made in laboratory-scale combustors over the past decades. The objective of this session is to gain a clearer picture of the benefits and limitations of plasma-assisted combustion as an answer to the challenge of clean combustion. We will review the chemical, thermal and aerodynamic effects related to plasma-flame interactions and will present illustrative studies of recent advances with practical combustion systems.	Session Organizer: **Mohammad Mansouri**, University of Stavanger Session Co-Chairs: **Alessandro Sorce**, University of Genoa; **Ward De Paepe**, University of Mons	Session Organizer: **Aaron Bowsher**, Cross Mftg Co (1938) Ltd Session Co-Chairs: **Carl M. Sangan**, University of Bath; **Axel Glahn**, Pratt & Whitney; **Alexander Mirzamoghadam**, ; **James L. Rutledge**, Air Force Institute of Technology
10:30		**GT2022:82444** **The Application of an Artificial Neural Network as a Baseline Model for Condition Monitoring of Innovative Humidified Micro Gas Turbine Cycles** Kathryn Colquhoun[1] Homam Nikpey Somehsaraei[1] Ward De Paepe[2] *1. University of Stavanger, Norway; 2. University of Mons, Belgium*	**GT2022:80477** **Plume Model for Buoyancy-Induced Flow and Heat Transfer in Closed Rotating Cavities** Hui Tang, J Michael Owen *University of Bath, United Kingdom*
11:00		**GT2022:81118** **Breaking 70% Net Electric Combined Cycle Efficiency with CMC Gas Turbine Blades** Emanuele Martelli, Marco Girardi, Paolo Chiesa *Politecnico di Milano, Italy*	**GT2022:82023** **Stratified and Buoyancy-Induced Flow in Closed Compressor Rotors** Gary D. Lock, Richard W. Jackson, Mikolaj J. Pernak, Oliver J. Pountney, Carl M. Sangan, J. Michael Owen, Hui Tang, James A. Scobie *University of Bath, United Kingdom*
11:30		**GT2022:81982** **Simulation of the HiPowAR Gas-Steam Power Generation System Using Ammonia as Fuel** Alberto Cammarata, Paolo Colbertaldo, Stefano Campanari *Politecnico di Milano, Italy*	**GT2022:82591** **Fluid-Dynamics of Turbine Rim Seal Structures: A Physical Interpretation Using URANS** Giove De Cosmo, James Scobie, Gary Lock, Carl Sangan, Mauro Carnevale *University of Bath, United Kingdom*

THURSDAY JUNE 16 — 10:30 AM - 12:00 PM

	HEAT TRANSFER: INTERNAL AIR SYSTEMS	INDUSTRIAL & COGENERATION	MANUFACTURING MATERIALS & METALLURGY
	Turbine Rim Seals I	**Session I**	**Nickel & Cobalt Based Alloys for Gas Turbine Applications**
	Technical • Dock 13 • 14-02	**Technical • Dock 4 • 17-01**	**Technical • Port 7• 18-01**
	Session Organizer: **James A. Scobie**, University of Bath Session Co-Chairs: **Carl M. Sangan**, University of Bath; **Alexander Mirzamoghadam**, ; **Axel Glahn**, Pratt & Whitney; **Sebastiaan Bottenheim**, Rolls-Royce PLC; **James L. Rutledge**, Air Force Institute of Technology	Session Organizer: **Christoph Günther**, MTU Aero Engines Session Co-Organizer: **Clement Joly**, Softinway, Inc	Session Organizer: **Matthias Brockman**, RWTH Aachen Session Co-Chairs: **William Day**, W. David Day, Inc.; **Sascha Gierlings**, Fraunhofer Institute; **Paul Lowden**, Liburdi; **Dheepa Srinivasan**, Pratt & Whitney; **Ramesh Chandra Raju Keshava Bhattu**, PSM
10:30	**GT2022:82676** **Design Procedure of a Rotating Cavity Rig for Hot Gas Ingestion Investigation** Lorenzo Orsini[1] Alessio Picchi[1] Alessio Bonini[2] Luca Innocenti[2] Daniele Di Benedetto[2] Riccardo Da Soghe[3] Lorenzo Mazzei[3] *1. University of Florence, Italy; 2. Baker Hughes, Italy; 3. Ergon Research, Italy*	**GT2022:82166** **Integration of Secondary Airflow Modeling Into Synergetic Cycle Calculation of F Class Industrial Gas Turbine** Shanel Staple[1] Gregory Vogel[1] Alex Torkaman[1] Andrii Khandrymailov[2] Viktor Yevlakhov[2] *1. Power Systems Manufacturing, USA; 2. SoftInWay Switzerland GmbH, Switzerland*	**GT2022:79113** **Microstructural Evolution of Wrought and AM Haynes 188 Under Long Term Thermal Exposure** Vamadevan Gowreesan[1] Wayne Greaves[1] Yogi Pardhi[2] Karen Barrios[1] *1. Sulzer RES, USA; 2. Sulzer, United Kingdom*
11:00	**GT2022:83247** **Use of Multiple Tracer Gases to Quantify Vane Trailing Edge Flow Into Turbine Rim Seals** Ivan Monge-Concepcion[1] Michael Barringer[1] Reid Berdanier[1] Karen Thole[1] Christopher Robak[2] *1. Pennsylvania State University, USA; 2. Pratt & Whitney, USA*	**GT2022:82250** **Simulation of the Overall Transient Operation of Gas Turbines** Djordje Petkovic[1] Milan B. Banjac[2] Srdjan Milic[1] Teodora Madzar[1] Milan V Petrovic[2] Alexander Wiedermann[3] *1. University of Belgrade - Faculty of Mech Eng, Serbia; 2. University of Belgrade, Serbia; 3. MAN Energy Solutions SE, Germany*	**GT2022:81438** **Recrystalization/René N4 and N5** Hans Van Esch[1] Stijn Pietersen[2] Alex Bridges[3] John Scheibel[3] Wayne Greaves[4] Robert Zuber[5] *1. TEServices, USA; 2. TEservices, Netherlands; 3. EPRI, USA; 4. Sulzer Turbo Services Houston Inc., USA; 5. Mechanical Dynamics & Analysis LLC, USA*
11:30	**GT2022:83345** **The Effect of Circumferential Lengthscale on Hot Gas Ingestion** Michael Dawson[1] John J Otter[2] Nicholas Atkins[3] *1. University of Cambridge, United Kingdom; 2. Turbostream Ltd., United Kingdom; 3. Cambridge University, United Kingdom*	**GT2022:79392** **Operation of Large Industrial Gas Turbines During Periods of Low Electricity Demands** Steve Ingistov[1] Vladimir Vassiliev[2] Sasha Savic[2] Sebastiaan Mulder[2] *1. Marathon Petroleum, USA; 2. SS&A Power Consultancy, Switzerland*	**GT2022:81454** **Full Rejuvenation Heat Treatment of GTD 111DS** Hans Van Esch[1] Stijn Pietersen[2] Wayne Greaves[3] Alex Bridges[4] John Scheibel[4] *1. TEServices, USA; 2. TEServices, Netherlands; 3. Sulzer Turbo Services Houston, USA; 4. EPRI, USA*

THURSDAY JUNE 16 — 10:30 AM - 12:00 PM

	OIL & GAS APPLICATIONS	STEAM TURBINE	STRUCTURES AND DYNAMICS: BEARING & SEAL DYNAMICS
	Diagnostic and Prognostic Methods	**Wet Steam**	**Annular Seals III**
	Technical • Dock 1B • 21-08	**Technical • Dock 2 • 23-02**	**Technical • Dock 5 • 25-03**
	Session Organizer: **Klaus Brun**, Elliot Group Session Co-Organizer: **Mauro Venturini**, Università Degli Studi Di Ferrara	Session Organizer: **Shigeki Senoo**, Mitsubishi Hitachi Power Systems, Ltd. Session Co-Chairs: **Christian Siewert**, Siemens Energy; **Tim Wittmann**, Technische UniversitãT Braunschweig - IFAS; **Sebastian Schuster**, University of Duisburg-Essen	Session Organizer: **Jing Yang**, Texas A&M University Session Co-Organizer: **Adolfo Delgado**, Texas A&M University
10:30	**GT2022:80372** **Ensemble Learning Approach to the Prediction of Gas Turbine Trip** Enzo Losi[1] Mauro Venturini[1] Lucrezia Manservigi[1] Giovanni Bechini[2] *1. Universitá degli Studi di Ferrara, Italy; 2. Siemens Energy, Germany*	**GT2022:80191** **Experimental and Numerical Investigations of the Non-Equilibrium Condensation on the Performance and the Flow Pattern in Steam Turbine** Soichiro Tabata, Jin Aoyagi, Tadashi Takahashi, Kiyoshi Segawa *Mitsubishi Heavy Industries, Ltd., Japan*	**GT2022:83257** **Rotordynamic Force Coefficient Prediction of an Unshrouded Radial Inflow Expander and Labyrinth Seal Using Transient Computational Fluid Dynamic Analysis** Chris Kulhanek[1] Joseph Lillard[2] Hector Delgado[1] Michael Marshall[1] Yunbae Kim[3] J. Jeffrey Moore[1] *1. Southwest Research Institute, USA; 2. Atlas Copco Mafi-Trench Company LLC, USA; 3. Independent Consultant, USA*
11:00	**GT2022:80666** **Detection of the Onset of Trip Symptoms Embedded in Gas Turbine Operating Data** Enzo Losi[1] Mauro Venturini[1] Lucrezia Manservigi[1] Giovanni Bechini[2] *1. Universitá degli Studi di Ferrara, Italy; 2. Siemens Energy, Germany*	**GT2022:81246** **Numerical Modeling of Water Droplets in Compressible Two-Phase Flows Based on Eulerian-Eulerian Method** Takashi Furusawa[1] Yasuhiro Sasao[2] Ryo Takata[2] Hironori Miyazawa[1] Satoru Yamamoto[1] *1. Tohoku University, Japan; 2. Mitsubishi Heavy Industries, Japan*	**GT2022:82556** **A Comparison of Static and Rotordynamic Characteristics for Three Types of Impeller Front Seals in a Liquid Oxygen Turbopump** Zhihong Jin, Zhigang Li, Jun Li *Xi'an jiaotong University, China (Mainland)*
11:30	**GT2022:82915** **Statistical Rule Extraction for Gas Turbine Trip Prediction** Giovanni Bechini[1] Enzo Losi[2] Lucrezia Manservigi[2] Giovanni Pagliarini[2] Guido Sciavicco[2] Ionel Eduard Stan[2] Mauro Venturini[2] *1. Siemens Energy, Germany; 2. Universitá degli Studi di Ferrara, Italy*	**GT2022:81891** **Experimental and Numerical Assessment of Liquid Film Thickness Under High-Speed Gas Flow** Takayuki Okui[1] Shunsuke Mizumi[2] Soichiro Tabata[2] Toshiyuki Sanada[1] Yuki Mizushima[1] *1. Shizuoka University, Japan; 2. Mitsubishi Heavy Industries, Ltd., Japan*	

THURSDAY JUNE 16 — 10:30 AM - 12:00 PM

	STRUCTURES AND DYNAMICS: PROBABILISTIC METHODS	STRUCTURES AND DYNAMICS: STRUCTURAL MECHANICS & VIBRATION	SUPERCRITICAL CO2
	General Applications using Probabilistic Methods	**Wavelet Transform**	**Compressors I**
	Technical • Port 1 A • 28-03	**Tutorial • Dock 1A• 30-11**	**Technical • Dock 16 • 33-01**
	Session Organizer: **Liping Wang**, GE Corporate Res & Develop Session Co-Organizer: **Michael Gorelik**, FAA	Session Organizer: **Harald Schoenenborn**, MTU Aero Engines AG Session Co-Organizer: **Azzedine Dadouche**, National Research Council Canada	Session Organizer: **Paolo Del Turco**, Baker Hughes
10:30	**GT2022:82323** **Probabilistic Assessment of Gas Turbine Compressor Blade HCF Life** Zhiqiang Meng[1] Senthil Krishnababu[1] Simon Jackson[1] Björn Sjödin[2] *1. Siemens Energy, United Kingdom; 2. Siemens Energy, Sweden*	**GT2022:84012** **Time-Frequency Spectral Analysis of Vibration Signals by Wavelet Transform** Luigi Carassale *University of Genova, Italy*	**GT2022:81699** **Two-Stage Radial Compressor for a Kilowatt Scale Supercritical Carbon Dioxide Power Block: Design Considerations** Lakshminarayanan Seshadri[1] Ashutosh Patel[1] Vijay Biradar[1] Pramod Kumar[1] Pramodchandra Gopi[2] *1. Indian Institute of Science, Bangalore, India; 2. Triveni Turbine Limited, India*
11:00	**GT2022:82628** **Robust Probabilistic Analysis of Deterioration-Induced Aeroelasticity in an Axial Turbine** Lennart Stania, Joerg Seume *Institut of Turbomachinery and Fluid-Dynamics, Germany*	T U T O R I A L	**GT2022:82151** **Influence of Real Gas Properties on Loss in a Super Critical CO2 (sCO2) Centrifugal Compressor** Ruikai Cai[1] Mingyang Yang[1] Kangyao Deng[1] Weilin Zhuge[2] Tao Chen[3] Bijie Yang[3] Ricardo Martinez-Botas[3] *1. Shanghai Jiao Tong University, China (Mainland); 2. Tsinghua University, China (Mainland); 3. Imperial College London, United Kingdom*
11:30	**GT2022:83123** **Application of an Advanced Meta Model Selection Algorithm on the Sensitivity Analysis of a Cooled Turbine Blade** Florian Diermeier[1] Matthias Voigt[1] Ronald Mailach[1] Marcus Meyer[2] *1. TU Dresden, Germany; 2. Rolls-Royce Deutschland Ltd & Co KG, Germany*		**GT2022:84278** **Impact of Inlet Conditions on Performance of a Supercritical CO2 Centrifugal Compressor** Xudong Jiang, Zhiheng Wang, Guang Xi *Xi'an Jiaotong University, China (Mainland)*

THURSDAY JUNE 16 — 10:30 AM - 12:00 PM

	TURBOMACHINERY: DESIGN METHODS & CFD MODELING FOR TURBOMACHINERY	TURBOMACHINERY: DESIGN METHODS & CFD MODELING FOR TURBOMACHINERY	TURBOMACHINERY: MULTIDISCIPLINARY DESIGN APPROACHES, OPTIMIZATION, AND UNCERTAINTY QUANTIFICATION
	Turbines Design Methods II	**Compression System Design Methods II**	**Aerothermal Design and Cooling**
	Technical • Dock 11 • 37-14	**Technical • Dock 10 B • 37-17**	**Technical • Dock 14 • 39-02**
	Session Organizer: **Bao Nguyen**, Honeywell Aerospace Session Co-Chairs: **Anton Streit**, Siemens Energy; **Luca Porreca**, MAN; **Mahmoud Mansour**, Honeywell International Inc; **Bronwyn Power**, Pratt & Whitney	Session Organizer: **Martina Ricci**, Baker Hughes Session Co-Chairs: **Michael Barton**, Honeywell Aerospace; **Mahmoud Mansour**, Honeywell International Inc	Session Organizer: **Marc Nagel**, MTU Aero Engines Session Co-Chairs: **Marcus Meyer**, Rolls Royce; **Ingrid Lepot**, Cenaero
10:30	**GT2022:81670** **Gas Turbine Transition Duct Design Considerations** Aparna Satheesh, Manoharan Sambandam, Sendil Soundiramourty, Babu Santhana Gopalakrishnan *Baker Hughes, India*	**GT2022:82418** **Analysis of Cavity Leakage Effects on Coupled Non-Axisymmetric Endwall-Airfoil Optimization in a Low-Speed Compressor Tandem Stator** Mattia Straccia, Samuele Giannini, Volker Gümmer *Technical University of Munich - Technische Universität München, Germany*	**GT2022:83050** **Design Optimization of Blade Tip in Subsonic and Transonic Turbine Stages - Part I: Stage Design and Preliminary Tip Optimization** Li He, Penghao Duan *University of Oxford, United Kingdom*
11:00	**GT2022:81672** **Gas Turbine Transition Duct Gap Assessment for Unsymmetrical Thermal Boundary Conditions** Manoharan Sambandam[1] Simone Colantoni[2] *1. Baker Hughes, India; 2. Baker Hughes, Italy*	**GT2022:82636** **Development of Translucent Design Philosophy for the Cyclic Pattern Design of Fan Outlet Guide Vanes** Davendu Kulkarni[1] Luca Di Mare[2] *1. Rolls-Royce plc, United Kingdom; 2. University of Oxford, United Kingdom*	**GT2022:83467** **Design Optimization of Blade Tip in Subsonic and Transonic Turbine Stages - Part II: Flow Physics and Augmented Aerothermal Integral Objective Function** Penghao Duan, Li He *University of Oxford, United Kingdom*
11:30			

THURSDAY JUNE 16 — 10:30 AM - 12:00 PM

	TURBOMACHINERY: RADIAL TURBOMACHINERY AERODYNAMICS	TURBOMACHINERY: TUTORIALS	TURBOMACHINERY: UNSTEADY FLOWS IN TURBOMACHINERY
	Centrifugal Compressors IV	**Introduction to Large Eddy Simulations**	**Unsteady Flows in Turbines IV**
	Technical • Port 3 • 40-06	**Tutorial • Rotterdam A • 42-02**	**Technical • Port 4 • 43-04**
	Session Organizer: **Michele Marconcini**, University of Florence Session Co-Organizer: **Hamid Hazby**, Mercedes AMG High Performance Powertrains Ltd	Session Organizer: **Emil Göttlich**, TU Graz	Session Organizer: **David Halstead**, GE
10:30	**GT2022:78626** **Hydrogen Compression - Towards a New Strategy for the Design of Hydrogen Compressors** Jonna Tiainen[1] Teemu Turunen-Saaresti[1] Mikko Mäki-Iso[1] Sebastian Schuster[2] Dieter Brillert[2] *1. LUT University, Finland; 2. University of Duisburg-Essen, Germany*	**GT2022:84133** **Introduction to Large Eddy Simulations** Santosh Hemchandra[1] Joseph Mathew[2] *1. Department of Aerospace Engineering, India; 2. Indian institute of Science, India*	**GT2022:83497** **Turbulence Characteristic and Loss of Transonic Turbine Tip Leakage Vortex with Endwall Motion Effect** Kai Zhou[1] Chao Zhou[2] *1. Tsinghua University, China (Mainland); 2. Peking University, China (Mainland)*
11:00	**GT2022:83269** **Radial Compressors with Advanced Secondary Flow Paths for Extended Operating Range** Mark Anderson *Concepts NREC, USA*	T U T O R I A L	**GT2022:80399** **Unsteady Rotor-Stator Interaction in a Four-Stage Axial Turbine: An Experimental Investigation** Florian von Gosen, Benjamin Winhart, Francesca Di Mare *Ruhr University Bochum, Germany*
11:30	**GT2022:82570** **Calculating Windage Losses: A Review** Fernando Karg[1] Thomas Kerr[2] Aaron Rimpel[1] *1. Southwest Research Institute, USA; 2. Texas A&M University, USA*		**GT2022:82664** **Characterizing Flow Instabilities During Transient Events in the Turbine Rim Seal Cavity** Maria Rozman[1] Eric Deshong[1] Reid Berdanier[1] Karen Thole[1] Christopher Robak[2] *1. The Pennsylvania State University, USA; 2. Pratt & Whitney, USA*

THURSDAY JUNE 16 — 10:30 AM - 12:00 PM

	TURBOMACHINERY: UNSTEADY FLOWS IN TURBOMACHINERY	WIND ENERGY	
	Stall & Surge in Radial Machines I	**Small Turbines**	
	Technical • Rotterdam D • 43-10	**Technical • Dock 9 • 44-03**	
	Session Organizer: **Reid Berdanier**, Pennsylvania State University Session Co-Organizer: **Michael Barton**, Honeywell Aerospace	Session Organizer: **Juan Jauregui**, University of Queretaro Session Co-Chairs: **Giacomo Bruno Azzurro Persico**, Politecnico di Milano; **Kenneth Van Treuren**, Baylor University	
10:30	**GT2022:82861** **Interaction Mechanism of Impeller and Diffuser Stall in a Centrifugal Compressor** Nobumichi Fujisawa, Momoko Naitou, Yutaka Ohta *Waseda University, Japan*	**GT2022:82268** **Impact of Post-Stall Extrapolation and Rotational-Augmentation Models on the Performance of Stall-Controlled Wind Turbines** Francesco Papi, Alberto Nocentini, Pier Francesco Melani, Alessandro Bianchini *Università degli Studi di Firenze, Italy*	
11:00	**GT2022:83018** **Acoustic Signature of Flow Instabilities Present in Industrial Centrifugal Compressor** Grzegorz Liskiewicz, Andrzej Jaeschke, Władysław Kryłłowicz *Lodz University of Technology, Poland*	**GT2022:82052** **Low Wind Speed Characteristics of an Optimized Diffuser Augmented Wind Turbine** Ahmed El Baz[1] Hazem Abdelrahman[2] Ahmed Elkholy[3] *1. The British University In Egypt (BUE), Egypt; 2. Ain Shams University, Egypt; 3. York University, Canada*	
11:30	**GT2022:83036** **Method of the Vaneless Diffuser Rotating Stall Cell Size Assessment Based on the PIV Measurements** Filip Grapow, Grzegorz Liśkiewicz, Władysław Kryłłowicz *Lodz University of Technology, Poland*	**GT2022:82770** **"Powering Telecommunication Towers Using Vertical Axis Wind Turbines: A Feasibility Study in Saudi Arabia "** Zakria Toor, Haitham Bahaidarah, Shafiqur Rehman *King Fahd University of Petroleum and Minerals, Saudi Arabia*	

THURSDAY JUNE 16

12:30 PM - 02:15 PM

STAGE PRESENTATIONS

Thursday Expo Presentations

Stage Presentations • Exhibit Hall 3

12:30

Combustion Testing
Alessio Fabrizi
Sesta Lab, Italy

1:00

Closing Ceremony and Kick-off to Boston 2023

THURSDAY JUNE 16 — 01:30 PM - 3:30 PM

	AIRCRAFT ENGINE	COAL, BIOMASS, HYDROGEN & ALTERNATIVE FUELS	COMBUSTION, FUELS & EMISSIONS
	Controls, Diagnostics & Instrumentation	**Sustainability on the Life Cycle for Industrial Gas Turbines – Are We Ready for the Green Deal? A Manufacturer and Users' Perspective**	**Combustor Design**
	Technical • Dock 10 A • 01-09	**Panel • Rotterdam C • 03-09**	**Technical • Port 2 • 04-06**
	Session Organizer: **Andrew Nix**, West Virginia University Session Co-Chairs: **Vassilios Pachidis**, Cranfield University; **Ioannis Roumeliotis**, Cranfield University	Moderator: **Francesco Fantozzi**, Università di Perugia	Session Organizer: **Jacqueline O'Connor**, Purdue University Session Co-Chairs: **Vishal Acharya**, Georgia Institute of Technology; **Sebastien Ducruix**, CM2C - CNRS; **Gilles Bourque**, Siemens Canada; **Antonio Andreini**, University of Florence
1:30	**GT2022:77985** **Identification and Stability Analysis of a Turbojet Engine in Start-Up Mode** Erkan Abdulhamitbilal[1] Sinan Sal[2] Elbrous M. Jafarov[3] *1. KALE R&D Inc., Turkey; 2. TUSAS Engine Industries Inc. (TEI), Turkey; 3. Istanbul Technical University, Turkey*	Panelists: Angela Serra, *Baker Hughes - Nuovo Pignone* Emmanouil Kakaras, *MHI EMEA Duisburg Branch* Pierre Gauthier, *Siemens Energy* Erik Ausland, *Solar Turbines Incorporated* **P A N E L**	**GT2022:80872** **Parameter Optimization of Combustor Dump Diffuser Based on RSM** Yue Yan, Jianqin Suo, Yanhui Wu *Northwestern Polytechnical University, China (Mainland)*
2:00	**GT2022:83431** **Methods and Apparatus for Real-Time Clearance Assessment Using a Pressure Measurement** Taehong Kim *GE Aviation, USA*		**GT2022:80762** **Numerical Investigation on the Effect of Fuel Injection Location in a Multi-Swirl Lean Direct Injection Burner** Sarath Perikathra, Aditya Jogesh Raparti, Muruganandam T M *Indian Institute of Technology Madras, India*
2:30	**GT2022:81111** **Vibration-Based Diagnostic of Aircraft Bearings Operating Under Strong Speed Variations** Dany Abboud[1] Yosra Marnissi[1] Jose Luis Gomez Chirinos[2] Julien Griffaton[2] Mohammed Elbadaoui[1] *1. SafranTech, France; 2. Safran Aircraft Engines, France*		**GT2022:81692** **Study on the Influence of Fuel Supply and Distribution on the Performance of Concentric Staged High Temperature Rise Combustor** Bolun Sun, Wenyan Song, Jie Li *Northwestern Polytechnical University, China (Mainland)*
3:00			**GT2022:82299** **Advanced Combustion System for High Efficiency (ACE) of the New SGT5/6- 9000HL Gas Turbine** Werner Krebs[1] Samer Wasif[2] Adam Weaver[2] Anatol Schulz[1] Benjamin Witzel[1] Reinhard Schilp[2] Walter Laster[2] Jared Pent[2] Clifford Johnson[2] *1. Siemens Energy, Germany; 2. Siemens Energy, USA*

THURSDAY JUNE 16 — 01:30 PM - 3:30 PM

	COMBUSTION, FUELS & EMISSIONS	CYCLE INNOVATIONS	ELECTRIC POWER
	Atomization & Sprays	**Closed Thermodynamic Cycle Analysis and Optimization**	**Pathway Forward (Gas Turbine OEM Tech Update)**
	Technical • Port 1 C • 04-16	**Tutorial • Dock 12 • 06-14**	**Panel • Dock 10 B • 09-04**
	Session Organizer: **Vishal Acharya**, Georgia Institute of Technology Session Co-Chairs: **Jacqueline O'Connor**, Purdue University; **Gina M. Magnotti**, Argonne National Laboratory; **Vincent Mcdonell**, University of California; **Sebastien Ducruix**, CM2C - CNRS; **Gilles Bourque**, Siemens Canada	Session Organizer: **Alessandro Sorce**, University of Genoa Session Co-Chairs: **Natalie Smith**, Southwest Research Institute; **Ward De Paepe**, University of Mons; **Michael Marshall**, Southwest Research Institute; **Owen Pryor**, Southwest Research Institute	
1:30	**GT2022:80993** **A Computational Investigation of Wall-Film Formation by an Impinging Liquid Jet in Crossflow** Gina M. Magnotti, Brandon A. Sforzo, Christopher F. Powell *Argonne National Laboratory, USA*	**GT2022:84042** **Closed Thermodynamic Cycle Analysis and Optimization** Owen Pryor, Michael Marshall, Natalie Smith *Southwest Research Institute, USA*	Panelists: Marcus Scholz, *Advanced Combined Cycles, General Electric International Inc.* Federico Bonzani, *Ansaldo Energia* Stefan Becher, *Head of Large Gas Turbine Engineering, Siemens Energy* Carlo Koeneke, *Mitsubishi Hitachi Power America*
2:00	**GT2022:81654** **Improvement of the Primary Atomization Model for Jet Into Subsonic Crossflow** Ju Hongyu, Suo Jianqin, Li Yue, Zheng Longxi *Northwestern Polytechnical University, China (Mainland)*	T U T O R I A L	P A N E L
2:30	**GT2022:82020** **Simultaneous Ultra-Small-Angle X-Ray Scattering and X-Ray Transmission Measurements of a Liquid Jet in Crossflow with Film Atomization** Brandon Sforzo, Jan Ilavsky, Christopher F. Powell *Argonne National Laboratory, USA*		
3:00	**GT2022:83526** **On the Dynamics of Asymmetric-Radially Expanding Liquid Sheet Originating From Impact of Like-on-Unlike Impinging Jets** Karthikeyanathan S[1] Satyanarayanan R Chakravarthy[2] Tg Madhavan[1] Shanmugadas Kp[3] Ganesh P[1] *1. ISRO, India; 2. Indian Institute of Technology, Madras, India; 3. Indian Institute of Technology, Jammu, India*		

THURSDAY JUNE 16 — 01:30 PM - 3:30 PM

	HEAT TRANSFER: FILM COOLING	HEAT TRANSFER: GENERAL INTEREST	HEAT TRANSFER: GENERAL INTEREST
	Film Cooling with Thermal Barrier Coatings	**Heat and Fluid Flow Through AM Components**	**External and Internal Flow Heat Transfer II**
	Technical • Port 1 B • 12-10	**Technical • Dock 13 • 13-02**	**Technical • Rotterdam A• 13-05**
	Session Organizer: **Ralph Volino**, United States Naval Academy Session Co-Chairs: **Alexander Mirzamoghadam**, ; **David Bogard**, University of Texas at Austin; **Robert Krewinkel**, MAN Energy Solutions; **Thomas Dyson**, GE Global Research; **James L. Rutledge**, Air Force Institute of Technology	Session Organizer: **Lorenzo Mazzei**, Ergon Research Session Co-Chairs: **Alexander Mirzamoghadam**, ; **Riccardo Da Soghe**, Ergon Research; **Zhirui Dong**, GE; **Eric Deshong**, Pennsylvania State University; **James L. Rutledge**, Air Force Institute of Technology	Session Organizer: **Meinhard Schobeiri**, Texas A & M University Session Co-Chairs: **Alexander Mirzamoghadam**, ; **Deqi Yu**, Shanghai Electric; **Riccardo Da Soghe**, Ergon Research; **Zhirui Dong**, GE; **James L. Rutledge**, Air Force Institute of Technology
1:30	**GT2022:82796** **Wall Curvature Effect on Overall Thermal Performances of Film Cooling Covered by Thermal Barrier Coatings with Various Geometries** Wen-li Zhou[1] Jian Pu[1] Tiao Zhang[1] Jian-Hua Wang[1] Wei-Long Wu[2] Hang Su[2] *1. University of Science and Technology of China, China (Mainland); 2. Shenyang Aero-engine Institute of Aero Engine Corporation of China, China (Mainland)*	**GT2022:80946** **Roughness-Resolved LES of Additive Manufacturing-Like Channel Flows** Serge Meynet[1] Alexis Barge[2] Vincent Moureau[1] Guillaume Balarac[2] Ghislain Lartigue[1] Abdellah Hadjadj[1] *1. CNRS CORIA, France; 2. CNRS LEGI, France*	**GT2022:81569** **Effects of the Ribbed-Squealer Tip on the Blade Tip Aerothermal Performance in a High Pressure Gas Turbine Cascade** Kun Du, Huarong Li, Na Hui, Yuanyuan Gao, Cunliang Liu *Northwestern Polytechnical University, China (Mainland)*
2:00	**GT2022:82118** **Experimental Investigation of the Effects of Thermal Barrier Coating on Twisted Blade Full Film Cooling** haonan Yan[1] Cunliang Liu[2] Li Zhang[1] Yuhang Guo[1] *1. Northwestern Polytechnical University, China (Mainland); 2. Shaanxi Key Laboratory of Thermal Sciences in Aero-Engine System, China (Mainland)*	**GT2022:82391** **Calibration of a CFD Methodology for the Simulation of Additively Manufactured Components Accounting for the Effects of Diameter and Printing Direction on Friction and Heat Transfer** Lorenzo Mazzei, Riccardo Da Soghe, Cosimo Bianchini *Ergon Research, Italy*	**GT2022:83023** **Influence of Gas-To-Wall Temperature Ratio on the Leakage Flow And Cooling Performance of a Turbine Squealer Tip** Dongjie Yan, Jieling Li, Shaopeng Lu, Zhaoguang Wang, Wenbo Xie, Hongmei Jiang, Qiang Zhang *Shanghai Jiao Tong University, China (Mainland)*
2:30	**GT2022:80810** **Conjugate Heat Transfer of Cylindrical and Trenched Film Cooling Designs with Array Jet Impingement** Lukas Fischer[1] Andrés Felipe Sánchez Porras[2] Fabian Schleich[2] Fabian Feller[2] Richard Raffelt[2] Michael Pfitzner[2] *1. Universität der Bundeswehr München, Germany; 2. Institut für Thermodynamik, Germany*	**GT2022:82914** **Numerical Prediction of Surface Roughness Effect on the Performance of Internal Channels** Sandeep[1] Vinayender Kuchana[1] Mahendran Manoharan[1] Jong Liu[2] *1. Honeywell Technology Solutions, India; 2. Honeywell Aerospace, USA*	**GT2022:83024** **Development of a Large-Scale High-Speed Linear Cascade Rig for Turbine Blade Tip Heat Transfer Study** Hongmei Jiang, Wenbo Xie, Shaopeng Lu, Xu Peng, Yongmin Gu, Qiang Zhang *Shanghai Jiao Tong University, China (Mainland)*
3:00	**GT2022:82769** **Crossflow Effect on Heat Transfer and Flow Characteristics of Simplified Double Wall Cooling Structure** Juan He, Qinghua Deng, Kun Xiao, Zhenping Feng *Xi'an Jiaotong University, China (Mainland)*	**GT2022:84253** **Numerical Study of Roughness Effect on Performances in Representative Heat Exchanger Channels** Damien Serret, Joseph Jabbour, Hussein Yassin *TEMISTH, France*	**GT2022:83477** **The Influence of Turbulence and Reynolds Number on Endwall Heat Transfer in a Vane Cascade** Forrest Ames[1] Emmanuel Chukwuemeka[1] Maliha Yel Mahi[1] Yousef Kanani[2] Sumanta Acharya[2] Shaun Donovan[1] *1. University of North Dakota, USA; 2. Illinois Institute of Technology, USA*

THURSDAY JUNE 16 — 01:30 PM - 3:30 PM

	INDUSTRIAL & COGENERATION	MANUFACTURING MATERIALS & METALLURGY	OIL & GAS APPLICATIONS
	Tutorial Session	**Component Degradation, Failure and Life Prediction II**	**OGA Plant Operation and Testing**
	Tutorial • Dock 4 • 17-04	**Technical • Port 7 • 18-09**	**Technical • Dock 1B • 21-07**
	Session Organizer: **Manfred Klein**, MA Klein & Associates Session Co-Organizer: **Clement Joly**, Softinway, Inc	Session Organizer: **Xijia Wu**, xijia.wu@nrc-cnrc.gc.ca Session Co-Chairs: **William Day**, W. David Day, Inc.; **Sascha Gierlings**, Fraunhofer Institute; **Pontus Slottner**, Siemens Energy; **Scott Keller**, DTS	Session Organizer: **Rainer Kurz**, Solar Turbines Session Co-Chairs: **Jason Wilkes**, Southwest Research Institute; **Mauro Venturini**, Università Degli Studi Di Ferrara
1:30	**GT2022:83833** **Combustion and Emissions Tutorial** Manfred Klein[1] Mike Klassen[2] Leonard Angello[3] *1. MA Klein & Associates, Canada; 2. Combustion Science & Engineering, Inc, USA; 3. Electric Power Research Institute, USA*	**GT2022:83276** **Establishing a Generic Stress-Life Framework for Single-Crystal Nickel-Base Superalloys** Firat Irmak[1] Sahil Karim[1] Nathan O'nora[2] Ali Gordon[1] *1. University of Central Florida, USA;* *2. Power Systems Manufacturing, USA*	**GT2022:83222** **Off-Design of a Small-Scale Liquefaction Plant Operating with Biomethane** Andrea Baccioli, Gianluca Pasini, Gregorio Barbieri, Lorenzo Ferrari *University of Pisa, Italy*
2:00	T U T O R I A L	**GT2022:83282** **Refinement of a High Cycle Fatigue Decision-Gate Assessment for Additively Repaired Blades** Onome Scott-Emuakpor[1] Brian Runyon[2] Daniel Gillaugh[2] Lucas Smith[3] Philip Johnson[3] *1. AFRL, USA; 2. Air Force Research Laboratory, USA; 3. ARCTOS, USA*	**GT2022:82390** **Development, Atmospheric Testing and Field Operation of a Fuel Flexible Gas Turbine Combustion System for Crude Oil Volatile Organic Compounds** Thijs Bouten[1] Nick Gralike[2] Lars-Uno Axelsson[1] *1. OPRA Engineering Solutions B.V., Netherlands;* *2. OPRA Turbines International B.V., Netherlands*
2:30		**GT2022:84352** **A Machine Learning Approach for Stress-Rupture Prediction of High Temperature Austenitic Stainless Steels** Md Abir Hossain, Adan J. Mireles, Calvin M. Stewart *The University of Texas at El Paso, USA*	**GT2022:83070** **Microtomography of Soil and Soot Deposits: Analysis Of Three-Dimensional Structures and Surface Morphology** Alessio Suman[1] Alessandro Vulpio[1] Michele Pinelli[1] Lorenzo D'amico[2] *1. University of Ferrara, Italy; 2. Elettra-Sincrotrone Trieste S.C.p.A., Italy*
3:00		**GT2022:83274** **A Novel Yield Criterion for Nickel-Based Superalloys** Firat Irmak[1] Kevin Hanekom[1] Alex Torkaman[2] Ali Gordon[1] *1. University of Central Florida, USA;* *2. Power Systems Manufacturing, USA*	**GT2022:80552** **Modeling Power Constraints Using Maps and Field Data in Optimization Problems for Gas Transportation Systems** Cody Allen *Solar Turbines Inc., USA*

THURSDAY JUNE 16 — 01:30 PM - 3:30 PM

	STEAM TURBINE	STRUCTURES AND DYNAMICS: AERODYNAMICS EXCITATION & DAMPING	STRUCTURES AND DYNAMICS: FATIGUE, FRACTURE & LIFE PREDICTION
	Operational Aspects of Steam Turbines II	**Turbine Flutter**	**Fatigue Analysis of Real Components**
	Technical • Dock 2 • 23-04	**Technical • Dock 5 • 24-03**	**Technical • Dock 11 • 27-03**
	Session Organizer: **Alexander Mirzamoghadam**, Session Co-Chairs: **Cosimo Bianchini**, Ergon Research; **Christian Siewert**, Siemens Energy; **Kane Chandler**, GE Power	Session Organizer: **Sina C. Stapelfeldt**, Imperial College London Session Co-Chairs: **Christoph Brandstetter**, Technische Univeristät Darmstadt; **Lorenzo Pinelli**, University of Florence; **Mateusz Golebiowski**, Alstom (Switzerland) Ltd.	Session Organizer: **Calvin M. Stewart**, University of Texas at El Paso Session Co-Chairs: **Alessandro Ramaglia**, Ansaldo Energia; **Dipankar Dua**, Siemens Energy Inc.; **Dino Celli**, Aerospace Systems Directorate | AFRL
1:30	**GT2022:78969** **Pressure Losses Analysis in Two High-Pressure Steam Turbine Control Valves Situated in One Valve Chamber** Vaclav Slama[1] Bartolomej Rudas[1] David Simurda[2] Jindrich Hala[2] Martin Luxa[2] *1. Doosan Skoda Power, Czech Republic; 2. Institute of Thermomechanics of the CAS, Czech Republic*	**GT2022:77999** **Fully Coupled Analysis of Flutter Induced Limit Cycles: Frequency vs. Time Domain Methods** Christian Berthold[1] Johann Groß[2] Christian Frey[1] Malte Krack[2] *1. German Aerospace Center (DLR), Germany; 2. University of Stuttgart, Germany*	**GT2022:82658** **A Novel Low-Cost Approach to Testing High-Cycle Fatigue Limits** Luis Mendez Betances[1] Samer Armaly[2] Jeffrey Kauffman[1] *1. University of Central Florida, USA; 2. Georgia Institute of Technology, USA*
2:00	**GT2022:80688** **Vortex-Generators Reduce the Dynamic Axial Forces in the Model of a Steam Turbine Control Valve** Stefan Wallat[1] Christian Musch[2] Dieter Brillert[1] *1. University of Duisburg-Essen, Germany; 2. Siemens Energy Global GmbH & Co. KG, Germany*	**GT2022:81979** **Aerodynamic Damping of Last Stage Rotating Blades of Low Pressure Steam Turbine Determined From Vibration Test Data** Philipp Doll[1] Stefan Winkelmann[2] Fabian Müller[2] Damian Vogt[2] Jens Aschenbruck[3] *1. Universität Stuttgart, Germany; 2. Institute of Thermal Turbomachinery and Machinery Laboratory, University of Stuttgart, Germany; 3. Siemens Energy AG, Germany*	**GT2022:81906** **High Cycle Bending Fatigue Failure Mechanism of a Blade-Like Specimen at High Stress Ratios** Zhenlei Li, Hao Xu, Duoqi Shi, Chaoshuo Yang, Xiaoguang Yang *Beihang University, China (Mainland)*
2:30	**GT2022:81921** **Numerical Investigation of Potential Flow Induced Vibrations of Steam Turbine Last Stage Rotor at Low Load Operation - Part 2: Rotating Instabilities Detection** Tommaso Diurno[1] Antonio Andreini[1] Bruno Facchini[1] Nicola Maceli[2] Lorenzo Arcengeli[2] *1. University of Florence, Italy; 2. Baker Hughes, Italy*	**GT2022:82704** **Low Reduced Frequency Theory of Airfoils Vibrating in Complex Modes** Roque Corral, Aitor Pitarch, Yago Blando *Universidad Politécnica de Madrid, Spain*	**GT2022:80229** **Quantification of the Impact of the Crack Shape Constraint Assumption Onto Predicted Remaining Useful Life** Adrian Loghin *Simmetrix Inc., USA*
3:00	**GT2022:82405** **Numerical Investigation of Potential Flow Induced Vibrations of Steam Turbine Last Stage Rotor at Low Load Operation – Part 1: Sensitivity to Flutter Occurrence** Lorenzo Pinelli[1] Filippo Mariotti[1] Andrea Arnone[1] Michele Marconcini[1] Lorenzo Arcangeli[2] Lorenzo Ciuchicchi[2] Nicola Maceli[2] *1. University of Florence, Italy; 2. Baker Hughes, Italy*	**GT2022:83351** **Exploratory Experiments for Simple Approximation of Blade Flutter Aerodynamic Loading Function** Jan Lepicovsky[1] David Simurda[2] Petr Sidlof[3] Martin Luxa[2] *1. Czech Academy of Sciences, USA; 2. Czech Academy of Sciences, Czech Republic; 3. Technical University of Liberec, Czech Republic*	**GT2022:79695** **Component Tests and Numerical Investigations to Determine the Lifetime and Failure Behavior of End Stage Blades** Lukas Frank, Stefan Weihe *Materials Testing Institute University of Stuttgart, Germany*

THURSDAY JUNE 16 — 01:30 PM - 3:30 PM

	STRUCTURES AND DYNAMICS: ROTORDYNAMICS	STRUCTURES AND DYNAMICS: STRUCTURAL MECHANICS & VIBRATION	SUPERCRITICAL CO2
	Tutorial of Basics: Intro to Rotordynamics	**Damping Evaluation and Effect II**	**Turbines**
	Tutorial • Port 1 A • 29-06	**Technical • Dock 1A • 30-03**	**Technical • Dock 16 • 33-03**
	Session Organizer: **Theodore Brockett**, Honeywell Aerospace	Session Organizer: **Azzedine Dadouche**, National Research Council Canada Session Co-Chairs: **Daniel Gillaugh**, USAF; **Jeff Brown**, USAF	Session Organizer: **Timothy Allison**, Southwest Research Institute Session Co-Organizer: **Nathan Weiland**, National Energy Technology Laboratory
1:30	**GT2022:84094** **Introduction to Rotordynamic Fundamentals** Thomas Kerr[1] Aaron Rimpel[2] *1. Texas A&M University, USA; 2. Southwest Research Institute, USA*	**GT2022:79644** **Study on the Vibration Characteristics of Bladed Disks with Damping Mistuning** Yasutomo Kaneko[1] Toshio Watanabe[2] Tatsuya Furukawa[2] *1. Ryukoku University, Japan; 2. Mitsubishi Heavy Industries, Ltd., Japan*	**GT2022:82090** **Specific Speed Considerations for Inward Flow Radial Supercritical CO2 Turbines** Syed Jiaul Hoque[1] Pramod Kumar[1] Pramod Chandra Gopi[2] *1. Indian Institute of Science, India; 2. Triveni Turbine Limited, India*
2:00	T U T O R I A L	**GT2022:82309** **The Impact of Mistuning and Material Damping on Bladed Disks of Similar Geometries** Andres Rodriguez, Jarred Nix, Jeffrey Kauffman *University of Central Florida, USA*	**GT2022:82145** **Influence of Geometric Parameters for a 100 kW Inward Flow Radial Supercritical CO2 Turbine** Syed Jiaul Hoque, Pramod Kumar, Pramod Chandra Gopi *Indian Institute of Science, India*
2:30		**GT2022:79918** **Non-Linear Numerical Simulation of Pre-Loaded Turbine Blades with Frictional Shroud Contact Under Dynamic Conditions** Hugo De Filippis[1] Fabrice Thouverez[1] Laurent Blanc[1] Patrick Girard[2] Fabrice Chevillot[2] *1. Laboratoire de Tribologie et Dynamique des Systèmes, France; 2. Safran Aircraft Engines, France*	**GT2022:83116** **Innovative Expanders for Supercritical Carbon Dioxide Cycles** Alessandro Perri, Avinash Renuke, Alberto Traverso *University of Genoa, Italy*
3:00		**GT2022:81663** **Experimental Investigation of Friction Damping in Blade Root Joints** Daniele Botto, Veronica Iannotti, Federica Cuccovillo *Politecnico di Torino, Italy*	**GT2022:83262** **Leakage Characteristics of a Stepped Balance Piston Labyrinth Seal in Supercritical CO2** Jason Wilkes[1] Natalie Smith[1] Karl Wygant[2] Abhay Patil[3] Chris Kulhanek[1] *1. Southwest Research Institute, USA; 2. HPSA, USA; 3. SwRI, USA*

THURSDAY JUNE 16 — 01:30 PM - 3:30 PM

	TURBOMACHINERY: AXIAL FLOW FAN & COMPRESSOR AERODYNAMICS	TURBOMACHINERY: AXIAL FLOW TURBINE AERODYNAMICS	TURBOMACHINERY: DUCTS, NOISE & COMPONENT INTERACTIONS
	Compressor Design II	**Loss & Performance**	**Compressor and Combustion Noise**
	Technical • Dock 14 • 34-02	**Technical • Rotterdam D • 35-08**	**Technical • Dock 15 • 38-04**
	Session Organizer: **Daniel Wilkin**, GE Session Co-Chairs: **Vicente Fidalgo**, Notre Dame Turbomachinery Lab; **Lisa Brilliant**, UTC/ Pratt & Whitney	Session Organizer: **Martin G. Rose**, Thermo-Fluid Mechanics Research Centre (TFMRC), University of Sussex Session Co-Chairs: **Emil Göttlich**, TU Graz; **Luca Porreca**, MAN; **Bronwyn Power**, Pratt & Whitney	Session Organizer: **Duncan Walker**, Loughborough University Session Co-Organizer: **Stefano Bianchi**, Airbus Commercial Aircraft
1:30	**GT2022:82986** **Three-Dimensional Multi-Objective Design Optimization of a 6.5-Stage Axial Flow Compressor Blades with Lean and Twist** Fan Lei[1] Xiawen Zhang[2] Yaping Ju[2] Chuhua Zhang[2] *1. Jiaotong University, China (Mainland); 2. Xi'an Jiaotong University, China (Mainland)*	**GT2022:81357** **Evaluation of Different Regression Models Tuned with Experimental Turbine Cascade Data** Matteo Dellacasagrande[1] Davide Lengani[1] Pietro Paliotta[1] Daniele Petronio[1] Daniele Simoni[1] Francesco Bertini[2] *1. University of Genova, Italy; 2. Avio Aero, Italy*	**GT2022:81957** **Analytical Modeling of the Injector Response to High Frequency Modes in a Tubular Multi-Jet-Combustor** Jan-Andre Rosenkranz[1] Thomas Sattelmayer[2] *1. Lehrstuhl für Thermodynamik, Germany; 2. Technical University fo Munich / Chair of Thermodynamics, Germany*
2:00	**GT2022:83599** **Compressor Maps and Coupling: Symmetry, Geometry, and Universality** Benjamin Iwrey, Paul Johnson *Rolls-Royce North American Technologies, Inc., USA*	**GT2022:82365** **Calculating Cooled Turbine Efficiency with Weighted Cooling Flow Distributions** Reid A. Berdanier *Pennsylvania State University, USA*	**GT2022:82515** **A Hybrid, Runtime Coupled Incompressible CFD/CAA Method for Analysis of Thermoacoustic Instabilities** Hanna Reinhardt[1] Cetin Alanyalioglu[1] Christian Hasse[1] André Fischer[2] Claus Lahiri[2] *1. Technische Universität Darmstadt, Germany; 2. Rolls-Royce Deutschland Ltd. Co. KG, Germany*
2:30	**GT2022:82075** **Flow Dynamics of a Subsonic Axial Compressor Rotor with Leaned Tandem Blades** Amit Kumar, Jerry T. John, Akshay Kumar, Hitesh Chhugani, A M Pradeep *Indian Institute of Technology Bombay, India*	**GT2022:82486** **The Influence of Boundary Layer State and Trailing Edge Wedge Angle on the Aerodynamic Performance of Transonic Turbine Blades** Alexander Rossiter[1] Graham Pullan[1] Andrew Melzer[2] *1. University of Cambridge, United Kingdom; 2. Rolls-Royce, United Kingdom*	**GT2022:82901** **Acoustic Scattering Behaviour of an Aero Engine Injector: Numerical Investigation Using Compressible CFD and CAA** Cetin Alanyalioglu[1] Hanna Reinhardt[1] Christian Hasse[1] André Fischer[2] Claus Lahiri[2] *1. Technische Universität Darmstadt, Germany; 2. Rolls-Royce Deutschland Ltd. Co. KG, Germany*
3:00	**GT2022:82143** **Numerical Investigation of Near-Tip Modifications for a Highly-Loaded Low-Speed Rotor Under the Influence of Double Leakage** Jannik Eckel, Philipp von Jeinsen, Volker Gümmer *TU Munich Chair of Turbomachinery and Flight Propulsion, Germany*	**GT2022:83473** **Vortical Structures and Loss Mechanism of Tip Leakage Flow In Subsonic and Transonic Turbine Stages** Penghao Duan, Li He *University of Oxford, United Kingdom*	**GT2022:80517** **Acoustic Optimization Approach for Annular Diffusers in Turbomachinery Applications Using Plane Wave Modelling** Felix Fischer, Jörg Seume *Leibniz Universität Hannover, Germany*

THURSDAY JUNE 16 — 01:30 PM - 3:30 PM

	TURBOMACHINERY: MULTIDISCIPLINARY DESIGN APPROACHES, OPTIMIZATION, AND UNCERTAINTY QUANTIFICATION	TURBOMACHINERY: UNSTEADY FLOWS IN TURBOMACHINERY	WIND ENERGY
	Machine Learning-assisted Modeling, Optimization & Analysis	**Unsteady Flows in Compressors II**	**Monitoring and Control**
	Technical • Port 4 • 39-04	**Technical • Port 3 • 43-07**	**Technical • Dock 9 • 44-04**
	Session Organizer: **Lieven Baert**, Cenaero Session Co-Organizer: **Ralf D Baier**, MTU Aero Engines	Session Organizer: **Roy Fulayter**, Zunum Aero	Session Organizer: **Juan Jauregui**, University of Queretaro Session Co-Chairs: **Giacomo Bruno Azzurro Persico**, Politecnico di Milano; **Konstantinos Gryllias**, KU Leaven
1:30	**GT2022:81836** **Improved Design Space Exploration by Machine Learning Estimation for a Parametric Turbofan Model** Chad Foster, Jack Moore *General Electric Aviation, USA*	**GT2022:78033** **Impact of Upstream and Downstream Excitation and Multi-Row Interaction on the Mistuned Forced Response Behavior of an Embedded Compressor Rotor: Higher-Order Mode Aeromechanics** Shreyas Hegde[1] Robert Kielb[1] Laith Zori[2] Rubens Campregher[3] *1. Duke University, USA; 2. Ansys Inc, USA; 3. Ansys Inc, Canada*	**GT2022:80471** **A Study of Onshore Wind Turbine Property Damage** Bin Jou *FM Global, USA*
2:00	**GT2022:82917** **Investigating the Nature and Invariance of Field Inversion Based on Transition in a Turbine Cascade** Alexander Bleh, Jan Backhaus, Christian Morsbach *German Aerospace Center, Germany*	**GT2022:78101** **Impact of Aerodynamic Asymmetry on the Embedded Rotor Forcing and Mistuned Blade Response** Shreyas Hegde[1] Robert Kielb[1] Laith Zori[2] Rubens Campregher[3] *1. Duke University, USA; 2. Ansys Inc, USA; 3. Ansys Inc, Canada*	**GT2022:82462** **Unsupervised Feature Selection of Multi-Sensor SCADA Data in Horizontal Axis Wind Turbine Condition Monitoring** Eric Stefan Miele[1] Fabrizio Bonacina[1] Alessandro Corsini[1] Arianna Peruch[1] Marco Cannarozzo[2] Daniele Baldan[2] Francesco Pennisi[2] *1. Sapienza University of Rome, Italy; 2. ERG Power Generation SpA, Italy*
2:30	**GT2022:83063** **Rotor37 Aerodynamic Optimization: A Machine Learning Approach** Andrea Perrone[1] Marco Sanguineti[1] Klajdi Beqiraj[2] Luca Ratto[3] Gianluca Ricci[3] *1. Deeplabs Srl, Italy; 2. Milano, Italy; 3. NSI srl, Italy*	**GT2022:80277** **A Fluid-Structure Interaction Tool Using a Van der Pol Based Reduced-Order Model for Buffet and Non-Synchronous Vibrations** Richard Hollenbach, Robert Kielb, Kenneth Hall *Duke University, USA*	**GT2022:82624** **Condition Monitoring of Wind Turbines Based on Anomaly Detection Using Deep Support Vector Data Description** Dandan Peng, Chenyu Liu, Wim Desmet, Konstantinos Gryllias *LMSD - Mecha(tro)nic System Dynamics, Department of Mechanical Engineering, Belgium*
3:00	**GT2022:80634** **Automated Component Preliminary Design and Evaluation in the Overall Engine Using Fully Coupled Approaches** Jens Schmeink, Markus Schnoes *German Aerospace Center (DLR), Germany*	**GT2022:83391** **An Improved Preliminary Design Tool for Turbomachinery Blades Using Van der Pol Based Reduced-Order Model for Non-Synchronous Vibrations** Richard Hollenbach, Robert Kielb, Kenneth Hall *Duke University, USA*	**GT2022:81874** **Methodology for the Pitch Controller Wind Prediction System in Small Wind Turbines** Oscar Roberto Lara Mendoza[1] Juan Carlos Jáuregui Correa[1] Ernesto Chavero Navarrete[2] José Román García Martínez[3] *1. Universidad Autónoma de Querétaro, Mexico; 2. Centro de Tecnología Avanzada (CIATEQ AC), Mexico; 3. Universidad Veracruzana, Mexico*

THURSDAY JUNE 16 — 04:00 PM - 5:30 PM

	AIRCRAFT ENGINE	COMBUSTION, FUELS & EMISSIONS	COMBUSTION, FUELS & EMISSIONS
	Herbert I H Saravanamuttoo Memorial Panel Session	**NOx Emissions**	**Liquid Fuel Combustion**
	Panel • Dock 10 A • 01-13	**Technical • Port 1 C • 04-09**	**Technical • Port 2 • 04-17**
	Moderator: **Andrew Nix**, West Virginia University	Session Organizer: **Jacqueline O'Connor**, Purdue University Session Co-Chairs: **Benjamin Akih-Kumgeh**, Syracuse University; **Rudy Dudebout**, Honeywell; **Vishal Acharya**, Georgia Institute of Technology; **Sebastien Ducruix**, CM2C - CNRS; **Gilles Bourque**, Siemens Canada	Session Organizer: **Vishal Acharya**, Georgia Institute of Technology Session Co-Chairs: **Jacqueline O'Connor**, Purdue University; **Sebastien Ducruix**, CM2C - CNRS; **Gilles Bourque**, Siemens Canada; **Tim Snyder**, Pratt & Whitney; **Dustin Davis**, Pratt & Whitney Aircraft; **Wajid Chishty**, Colorado State University
4:00	Panelists: Vassilios Pachidis, *Cranfield University* Pericles Pilidis, *Cranfield University* Anestis Kalfas, *Aristotle University of Thessaloniki*	**GT2022:82622** **Predicting NOx Emissions In Gas Turbines Using Finite Rate Approach** Saurabh Patwardhan[1] Pravin Nakod[1] Stefano Orsino[2] Rakesh Yadav[2] Fang Xu[3] Dustin Brandt[3] *1. Ansys Inc, India; 2. Ansys Inc, USA; 3. Honeywell Aerospace, USA*	**GT2022:82102** **Numerical Modeling of Lean Spray Lifted Flames in Inclined Multi-Burner Arrangements** Leonardo Langone, Matteo Amerighi, Antonio Andreini *University of Florence, Italy*
4:30	**T U T O R I A L**	**GT2022:81792** **Flametube Evaluation of a Lean-Lean Combustor Concept Developed for Supersonic Cruise Aircraft** Kathleen Tacina, Francisco Guzman, Derek Podboy *NASA Glenn Research Center, USA*	**GT2022:82106** **A Multiphase Flamelet Generated Manifold Based on Spray Flame Propagation** C. P. Chen[1] Yujie Tang[2] *1. University of Alabama, USA; 2. Shanghai Jiao Tong University, China (Mainland)*
5:00		**GT2022:81895** **Experimental Study on the Combustion Performance of Concentric Staged Lean Direct Injection Combustor with Two Different Swirler Angles of the Pilot Stage** Peng Fei Zhu, Jianqin Suo *Northwestern Polytechnical University, China (Mainland)*	**GT2022:82766** **Numerical Modeling of Liquid Jet in Non-Uniform Crossflow Using Enhanced Madabhushi Model** Homayoon Feiz[1] Dominik Kubicki[2] Vivek Kumar[3] Pravin Nakod[3] Wei Zhao[1] Marcin Frackowiak[2] Harshrajsinh Jadeja[3] Sourabh Shrivastava[3] Sravan K Nallamothu[3] Markus Lambert[4] Jong Guen Lee[5] Jinkwan Song[5] *1. General Electric, USA; 2. Łukasiewicz Research Network – Institute of Aviation, EDC, Poland; 3. Ansys, India; 4. Ansys, Germany; 5. Department of Aerospace Engineering and Engineering Mechanics, USA*

THURSDAY JUNE 16 — 04:00 PM - 5:30 PM

	CYCLE INNOVATIONS	EDUCATION	ELECTRIC POWER
	Novel Cycles - Part II	**Education Issues I**	**Understanding Digital Twins & Machine Learning/AI for Gas Turbine Applications**
	Technical • Dock 12 • 06-16	**Technical • Dock 11 • 08-01**	**Tutorial • Dock 14 • 09-09**
	Session Organizer: **Mohammad Mansouri**, University of Stavanger Session Co-Chairs: **Alessandro Sorce**, University of Genoa; **Ward De Paepe**, University of Mons	Session Organizer: **Lamyaa El-Gabry**, Princeton University Session Co-Chairs: **Manikantachari (Raghu) K.R.V**, Power Systems Mfg. LLC; **Srinivasa Krishna Addepalli**, Argonne National Laboratory	Session Organizer: **Rick Tomlinson**, Chveron Session Co-Organizer: **Bin Jou**, FM Global
4:00	**GT2022:82941** **Waste Heat Recovery Driven Turbocharger System for Gas Turbine** Majed Sammak[1] Maruthi Jupudi[2] Alaaeldin Dawood[3] Abdurrahman Khalidi[2] *1. GE Gas Power, Sweden; 2. GE Gas Power, United Arab Emirates; 3. GE Gas Power, Saudi Arabia*	**GT2022:79397** **Virtual Centrifugal Pump Test Rig for Laboratory Classes Based on IoT Technology** Harald Roclawski, Laura Sterle, Martin Böhle *Technical University of Kaiserslautern, Germany*	**GT2022:79711** **Understanding Digital Twins & Machine Learning/AI for Gas Turbine Applications** David Noble[1] Jamie Lim[2] Lea Boche[1] Chris Perullo[2] *1. EPRI, USA; 2. Turbine Logic, USA*
4:30	**GT2022:83199** **Techno-Economic Comparison of Several Technologies for the Waste Heat Recovery From Gas Turbine Exhausts** Alessandra Ghilardi[1] Guido Francesco Frate[1] Andrea Baccioli[1] Dario Ulivieri[1] Lorenzo Ferrari[1] Umberto Desideri[1] Lorenzo Cosi[2] Simone Amidei[2] Vittorio Michelassi[2] *1. University of Pisa, Italy; 2. Baker Hughes, Italy*	**GT2022:82041** **A MATLAB Based Set of Functions for Finding Thermodynamic Properties and Solving Gas Turbine and Other Thermodynamics Problems** Ralph Volino *United States Naval Academy, USA*	T U T O R I A L
5:00	**GT2022:81737** **Numerical Investigation on Regenerative Heat-Driven Cryocoolers for Zero Boil-Off Storage of Liquid Hydrogen** Jing Luo[1] Yanyan Chen[1] Limin Zhang[1] Vigneshwaran Sankar[2] Deoras Prabhudharwadkar[2] Saumitra Saxena[2] Deanna A. Lacoste[2] William L. Roberts[2] Ercang Luo[1] *1. Chinese Academy of Sciences, China (Mainland); 2. King Abdullah University of Science and Technology, Saudi Arabia*	**GT2022:81558** **An Alternate Means to Form Non-Dimensional Products in Dimensional Analysis** John Clark *AFRL, USA*	

THURSDAY JUNE 16 — 04:00 PM - 5:30 PM

	HEAT TRANSFER: INTERNAL AIR SYSTEMS	HEAT TRANSFER: INTERNAL AIR SYSTEMS	INDUSTRIAL & COGENERATION
	Cavities	**Turbine Rim Seals III**	**Session III**
	Technical • Port 4 • 14-05	**Technical • Port 1 B • 14-07**	**Technical • Dock 4 • 17-03**
	Session Organizer: **Riccardo Da Soghe**, Ergon Research Session Co-Chairs: **Carl M. Sangan**, University of Bath; **Alexander Mirzamoghadam**, ; **Robert Proctor**, BPTF Consulting; **Axel Glahn**, Pratt & Whitney; **James L. Rutledge**, Air Force Institute of Technology	Session Organizer: **Axel Glahn**, Pratt & Whitney	Session Organizer: **Rakesh Bhargava**, Session Co-Organizer: **Clement Joly**, Softinway, Inc
4:00	**GT2022:81338** **LES Investigation of Low Rossby Number Buoyant Flow in Rotating Cavities** Zixiang Sun[1] Feng Gao[2] John Chew[1] Dario Amirante[1] *1. University of Surrey, United Kingdom;* *2. Beihang University, China (Mainland)*	**GT2022:82430** **A New Interpretation of Hot Gas Ingress Through Turbine Rim Seals Influenced by Mainstream Annulus Swirl** Dimitrios Graikos, Hui Tang, Carl Sangan, Gary Lock, James Scobie *University of Bath, United Kingdom*	**GT2022:81082** **Analysis of a Multi-Generation Renewable Energy System with Hydrogen-Fueled Gas Turbine** Hilal Bahlawan[1] Enzo Losi[1] Lucrezia Manservigi[1] Mirko Morini[2] Pier Ruggero Spina[1] Mauro Venturini[1] *1. Università degli Studi di Ferrara, Italy;* *2. Università degli Studi di Parma, Italy*
4:30	**GT2022:82982** **LES-CHT for a Rotating Cavity with Axial Throughflow** Tom Hickling, Li He *University of Oxford, United Kingdom*	**GT2022:83194** **Effects of Turbine Conditions on Rim Seal Performance and Prediction** Shaun Burden[1] John Chew[2] Feng Gao[3] Olaf Marxen[2] *1. Surrey University, United Kingdom; 2. University of Surrey, United Kingdom; 3. University Beijing, China (Mainland)*	**GT2022:82087** **Design of Annular Thermoelectric Generators System to Recover Waste Heat From Aircraft Jet Engine** Mutabe Aljaghtham *Prince Sattam Bin Abdulaziz University, Saudi Arabia*
5:00	**GT2022:80940** **Design and Development of a Five-Hole Probe Calibrator and Traverse to Investigate Ingestion in Rotating Cavities of HP Compressors** Emma Fox, Mark Puttock-Brown, Simon Davies *University of Sussex, United Kingdom*	**GT2022:83536** **Numerical Investigations of Flow Structures in Radial Rim Seal and a Modification of the Orifice Model** Qichao Xue[1] Xueying Li[2] Jing Ren[2] *1. Institute of Gas Turbine, Department of Energy and Power Engineering, Tsinghua University, China (Mainland); 2. Department of Energy and Power Engineering, Tsinghua University, China (Mainland)*	**GT2022:80385** **Optimal Strategy of the Energy Management Within the Microgrid Using the Hydrogen Fueled Gas Turbine** Maria Alessandra Ancona, Michele Bianchi, Lisa Branchini, Francesco Catena, Andrea De Pascale, Francesco Melino, Saverio Ottaviano, Antonio Peretto *University of Bologna, Italy*

THURSDAY JUNE 16 — 04:00 PM - 5:30 PM

	MANUFACTURING MATERIALS & METALLURGY	OIL & GAS APPLICATIONS	STEAM TURBINE
	Additive Manufacturing - Design and Components for Gas Turbine Engines	**Industrial Gas Turbines**	**Operational Aspects of Steam Turbines I**
	Technical • Port 7• 18-05	**Tutorial • Dock 1B • 21-21**	**Technical • Dock 2 • 23-03**
	Session Organizer: **Robin Day**, Fraunhofer Institut of Productiontechnology Session Co-Chairs: **William Day**, W. David Day, Inc.; **Sascha Gierlings**, Fraunhofer Institute; **Nejib Chekir**, Liburdi; **Timothy Simpson**, Pennsylvania State University	Session Organizer: **Mauro Venturini**, Università Degli Studi Di Ferrara	Session Organizer: **Christian Kontermann**, Technical University of Darmstadt Session Co-Chairs: **Christian Siewert**, Siemens Energy; **Magdalena Speicher**, Materials Testing Insitute University of Stuttgart
4:00	**GT2022:82746** **Design and Validation of an Improved Lower Emission Additively Manufactured Combustor Pilot Nozzle for F Class Industrial Gas Turbine** Ramesh Chandra Raju Keshava Bhattu, Bryan Kalb, Gregory Vogel, Matthew Yaquinto *Power Systems Manufacturing LLC, USA*	**GT2022:78487** **Industrial Gas Turbines** Rainer Kurz *Solar Turbines, USA* **T U T O R I A L**	**GT2022:78258** **Development of a Dynamic Turbine Expansion Model Using a Paired Thermofluid and FEA Methodology** Michael Ross, Wim Fuls *University of Cape Town, South Africa*
4:30	**GT2022:83474** **Characterization of Properties of Laser Powder Bed Fusion 3D-Printed Inconel 718 for Centrifugal Turbomachinery Applications** Hannah Lea[1] Rochelle Wooding[1] John Rotella[2] Jose Luis Cordova[1] Sam Kuhr[3] *1. Mohawk Innovative Technology, Inc., USA; 2. USAF Research Laboratory, USA; 3. Air Force Research Lab, Materials and Manufacturing Directorate, AFRL/RXCM, USA*		**GT2022:80950** **Flow Through a Steam Turbine Cascade with a Single Damaged Blade: Effect of Blade Height on Loss and Outflow Angle Distribution** Michael Schmalacker[1] Leon Cakievski[1] Stefan Aus Der Wiesche[1] Markus Schatz[2] *1. Muenster University of Applied Sciences, Germany; 2. Helmut-Schmidt-Universitaet, Germany*
5:00	**GT2022:83592** **Sintering Behaviour of 3d Printed 17-4PH Stainless Steel** Nandhini Raju[1] Peter Warren[1] Ramesh Subramanian[2] Ranajay Ghosh[1] Erik Fernandez[1] Seetha Raghavan[1] Jayanta Kapat[1] *1. University of Central Florida, USA; 2. Siemens Energy, Inc., USA*		**GT2022:82389** **Thermal Bowing of Steam Turbine Shafts: Prediction Methods and Field Data Matching** Gabriele Girezzi[1] Damaso Checcacci[1] Rama Raju Vegesna[2] *1. Baker Hughes, Italy; 2. Baker Hughes, India*
5:30			**GT2022:83797** **New Generation of Last Stage Blade for Very Flexible Turbine Operation** Tomas Misek, Jan Hlous, Václav Sláma *Doosan Skoda Power, Czech Republic*

THURSDAY JUNE 16 — 04:00 PM - 5:30 PM

	STRUCTURES AND DYNAMICS: BEARING & SEAL DYNAMICS	STRUCTURES AND DYNAMICS: EMERGING METHODS IN DESIGN & ENGINEERING	STRUCTURES AND DYNAMICS: ROTORDYNAMICS
	Bearings	**Emerging Methods on Additive Manufacturing I**	**Non-Linear Rotordynamics**
	Technical • Dock 5 • 25-05	**Technical • Port 3 • 26-02**	**Technical • Port 1 A • 29-05**
	Session Organizer: **Cori Watson-Kassa**, Unviersity of Virginia Session Co-Chairs: **Adolfo Delgado**, Texas A&M University; **Arnaud Ruellan**, SKF Group	Session Organizer: **Partha Das**, Honeywell International, Inc. Session Co-Chairs: **Alain Batailly**, École Polytechnique De Montréal; **Roberto Alonso**, Industria de TurboPropulsores, S.A.; **S. Mehrdad Pourkiaee**, Politecnico di Torino	Session Organizer: **Theodore Brockett**, Honeywell Aerospace Session Co-Chairs: **Alexandrina Untaroiu**, Virginia Tech; **Patrick Keogh**, University of Bath
4:00	**GT2022:83532** **Roller Bearing Skidding for Aero-Engine Applications: All-Steel Versus Hybrid Bearings** Azzedine Dadouche, Rami Kerrouche *National Research Council Canada, Canada*	**GT2022:77983** **Efficient Test Method for Determining the Thermomechanical Fatigue Lifetime of Additively Manufactured Combustion Chamber Tiles Under Component-Related Conditions** Michael Schlesinger[1] Sophie Schackert[1] Igor Sikorski[2] Georg Mathiak[2] *1. Fraunhofer Institute for Mechanics of Materials IWM, Germany; 2. Rolls-Royce Deutschland Ltd & Co KG, Germany*	**GT2022:80107** **Nonlinear Dynamics of Turbine Generator Shaft Trains: Evaluation of Bifurcation Sets Applying Numerical Continuation** Ioannis Gavalas, Athanasios Chasalevris *National Technical University of Athens, Greece*
4:30	**GT2022:82195** **Experimental Investigation Into Oil Shedding From a Rotating Cup Geometry** Paloma Paleo Cagaeo[1] Kathy Johnson[2] Stephen Ambrose[1] Rajab Omar[1] *1. University of Nottingham, United Kingdom; 2. The University of Nottingham, United Kingdom*	**GT2022:78141** **Topological Optimisation and 3d Printing of a Bladed Disc** Vincent Barreau[1] Enora Denimal[2] Loic Salles[1] *1. Imperial College London, United Kingdom; 2. Inria, France*	**GT2022:82784** **Research on the Nonlinear Behavior of the Turbine Rotor Assembled by Rabbet Joints** Zhuoluo Han[1] Yifeng Li[2] Yongfeng Wang[1] Jie Hong[1] *1. School of Energy and Power Engineering, Beihang University, China (Mainland); 2. Research Institute of Aero-Engine, Beihang University, China (Mainland)*
5:00	**GT2022:82275** **Investigation of Droplet Shedding in an Aeroengine Bearing Chamber Using Convolutional Neural Networks** Katrina Farbrother[1] Paloma Paleo Cagaeo[1] Stephen Ambrose[1] Kathy Johnson[2] *1. University of Nottingham, United Kingdom; 2. The University of Nottingham, United Kingdom*		**GT2022:83174** **Vibration Failure Analysis of Multi-Disk High-Speed Rotor Based on Rotary Inertia Load Model** Jie Hong[1] Qi Yan[2] Bo Sun[3] Yanhong Ma[1] *1. Beihang University; Collaborative Innovation Center of Advanced Aero-Engine, China (Mainland); 2. Beihang University, China (Mainland); 3. AECC Shenyang Engine Design and Research Institute, China (Mainland)*

THURSDAY JUNE 16 — 04:00 PM - 5:30 PM

	SUPERCRITICAL CO2	TURBOMACHINERY: DESIGN METHODS & CFD MODELING FOR TURBOMACHINERY	TURBOMACHINERY: DESIGN METHODS & CFD MODELING FOR TURBOMACHINERY
	sCO2 Testing and Component Development	**Compression System Design Methods I**	**Cavities and Secondary Air Systems**
	Technical • Port 1 A • 33-09	**Technical • Dock 10 B • 37-08**	**Technical • Dock 1A • 37-10**
	Session Organizer: **Richard Dennis**, U.S. Department of Energy	Session Organizer: **Michael Barton**, Honeywell Aerospace Session Co-Chairs: **Luca Porreca**, MAN; **Mahmoud Mansour**, Honeywell International Inc; **Bronwyn Power**, Pratt & Whitney; **Martina Ricci**, Baker Hughes	Session Organizer: **Shraman Goswami**, Honeywell India (HTS) Session Co-Chairs: **Luca Porreca**, MAN; **Mahmoud Mansour**, Honeywell International Inc; **Kai Willem Koerber**, MTU Aero Engines AG; **Bronwyn Power**, Pratt & Whitney
4:00	**GT2022:83273** **Update of the sCO2-Test Rig at Cranfield University** Eduardo Anselmi, Pierre Belleoud, Ioannis Roumeliotis, Vassilios Pachidis *Cranfield University, United Kingdom*	**GT2022:81969** **Experimental Verification of a Practical Engineering Design Method for Mixed-Flow Compressor Stages** Guang Xi, Chenxi Zhao, Chenqing Zhang, Yonghong Tang *Xi'an Jiaotong University, China (Mainland)*	**GT2022:80391** **Multi-Fidelity Simulation for Secondary Air System Seal Design in Aero Engines** Adele Nasti[1] Ivan Voutchkov[2] David Toal[2] Andrew Keane[2] *1. Rolls-Royce Deutschland Ltd & Co KG, Germany; 2. University of Southampton, United Kingdom*
4:30	**GT2022:83284** **Design and Testing of a 275 Bar 700 Degree Celsius Expander for an Integrally Geared Supercritical CO2 Compander** Jason Wilkes[1] Karl Wygant[2] Rob Pelton[2] Jon Bygrave[2] Kyle Robinson[1] *1. Southwest Research Institute, USA; 2. HPSA, USA*	**GT2022:82425** **A Microscale-Based Methodology to Predict the Performance Degradation in Turbomachinery due to Particle Deposition** Riccardo Friso, Michele Pinelli, Nicola Zanini, Alessio Suman, Nicola Casari *University of Ferrara, Italy*	**GT2022:79369** **Low Mach Preconditioning for Turbomachinery Flow Simulations with Cavities and Variable Gas Compositions** Pierre Sivel[1] Christian Frey[1] Edmund Kügeler[1] Markus Keil[2] *1. German Aerospace Center (DLR), Germany; 2. MTU Aero Engines AG, Germany*
5:00	**GT2022:83588** **The STEP 10 MWe sCO2 Pilot Demonstration Status Update** John Marion[1] Scott Macadam[1] Aaron Mcclung[2] Jason Mortzheim[3] *1. Gas Technology Institute, USA; 2. South West Research Institute, USA; 3. GE Global Research, USA*	**GT2022:81690** **Design Optimization of a High-Speed Twin-Stage Compressor for Next-Gen Aircraft Environmental Control System** Andrea Giuffre', Piero Colonna, Matteo Pini *Delft University of Technology, Netherlands*	

THURSDAY JUNE 16 — 04:00 PM - 5:30 PM

	TURBOMACHINERY: DUCTS, NOISE & COMPONENT INTERACTIONS	TURBOMACHINERY: RADIAL TURBOMACHINERY AERODYNAMICS	TURBOMACHINERY: UNSTEADY FLOWS IN TURBOMACHINERY
	Gas Turbine Engine Intakes, Exhaust Diffusers, and Ejectors	**Centrifugal Compressors I**	**Stall in Axial Compressors**
	Technical • Dock 15 • 38-02	**Technical • Dock 13 • 40-03**	**Technical • Rotterdam D • 43-09**
	Session Organizer: **Duncan Walker**, Loughborough University Session Co-Organizer: **Mauro Carnevale**, University of Bath	Session Organizer: **Teng Cao**, Imperial College London Session Co-Organizer: **Laura McLaughlin**, Queen's University Belfast	Session Organizer: **Yuan Dong**, Pratt & Whitney
4:00	**GT2022:82964** **Crosswind Aerodynamic Analysis Using Quasi 3D Ducts** Sumit Sarvankar, Adrin Issai Arasu, Nagabhushana Rao Vadlamani *Indian Institute of Technology Madras, India*	**GT2022:82426** **A Numerical Investigation on the Influence of Reynolds Number on the Performance of Volute Stages of Centrifugal Compressors** Daniel Wolbert[1] Sven König[2] Manuel Schmitt[2] Michael Wannek[3] Jörg Hartmann[3] *1. University on Applied Sciences Trier, Germany; 2. Trier University of Applied Sciences, Germany; 3. Siemens Energy Aerodynamics, Germany*	**GT2022:82828** **A Study of Stall Process in an Axial Flow Compressor with Foam Metal Casing Treatment** Jia Li, Dakun Sun, Ruize Xu, Xu Dong, Xiaofeng Sun *Beihang University, China (Mainland)*
4:30	**GT2022:81912** **Analysis of Ultra-High Bypass Ratio Turbofan Nacelle Geometries with Conventional and Short Intakes at Take-Off and Cruise** Andrea Magrini[1] Buosi Denis[2] Ernesto Benini[1] *1. Università degli Studi di Padova, Italy; 2. HIT09 S.r.l., Italy*	**GT2022:84204** **Centrifugal Compressor Retrofit: Geometry Rebuild and 3-D Blade Shape Optimization** Norman Kienzle[1] Duc Huy Marco Hoang[2] Warren Martis[2] Markus Moch[2] Francesca Di Mare[3] Christian Doetsch[2] *1. Fraunhofer Institute UMSICHT, Germany; 2. Fraunhofer Umsicht, Germany; 3. Ruhr-Universität Bochum, Germany*	**GT2022:82072** **On the Mode Characteristics of Rotating Instability with Different Tip Clearances** Zeyuan Yang, Lele Ming, Si Wu, Yadong Wu, Jie Tian, Hua Ouyang *Shanghai Jiao Tong University, China (Mainland)*
5:00	**GT2022:82149** **Investigations of the Unsteady Aerodynamic Characteristics for Intakes at Crosswind** Tommaso Piovesan[1] Pavlos Zachos[1] Zhang Wenqiang[2] Mehdi Vahdati[3] *1. Cranfield University, United Kingdom; 2. University of Nottingham, United Kingdom; 3. Imperial College London, United Kingdom*	**GT2022:82105** **Canned Sealless Pumps for Hazardous Applications?** Abdulrahman Alsultan, Shuja Alharbi *Saudi Aramco, Saudi Arabia*	**GT2022:82101** **Influence of Casing Groove on Rotating Instabilities in a Low-Speed Axial Compressor** Xiangyi Chen[1] Björn Koppe[1] Martin Lange[1] Wuli Chu[2] Ronald Mailach[1] *1. Technische Universität Dresden, Germany; 2. Northwestern Polytechnical University, China (Mainland)*

THURSDAY JUNE 16 — 04:00 PM - 5:30 PM

	TURBOMACHINERY: UNSTEADY FLOWS IN TURBOMACHINERY	WIND ENERGY	
	Stall & Surge in Radial Machines II	**Structures**	
	Technical • Rotterdam A • 43-11	**Technical • Dock 9 • 44-05**	
	Session Organizer: **Herbert Harrison**, NASA Session Co-Organizer: **Matthew Meier**, Purdue University	Session Organizer: **Juan Jauregui**, University of Queretaro Session Co-Chairs: **Giacomo Bruno Azzurro Persico**, Politecnico di Milano; **Juan Jauregui**, Universidad Autónoma de Querétaro	
4:00	**GT2022:81270** **An Investigation of Non-Linear Surge Characteristic in a High-Speed Centrifugal Compressor** Yoshihiro Hayashi[1] Teng Cao[2] *1. Mitsubishi Heavy Industries, Ltd., Japan; 2. Imperial College London, United Kingdom*	**GT2022:81294** **Bearing Fault Detection on Wind Turbine Gearbox Vibrations Using Generalized Likelihood Ratio-Based Indicators** Kayacan Kestel[1] Cédric Peeters[1] Jérôme Antoni[2] Shawn Sheng[3] Jan Helsen[1] *1. Vrije Universiteit Brussel, Belgium; 2. INSA Lyon, France; 3. National Renewable Energy Laboratory, USA*	
4:30	**GT2022:83103** **Turbulence Model Impact on Predicting Precursors to Surge Flow Instabilities in a Turbocharger Compressor** Emelie Trigell, Mihai Mihaescu *KTH Royal Institute of Technology, Sweden*	**GT2022:82500** **Computational Modeling of the Effects of Rain on Wind Turbine Performance** Lakshmi Sankar[1] Aishwerya Gahlot[1] Auraluck Pichitkul[2] *1. Georgia Institute of Technology, USA; 2. Suranaree University of Technology, Thailand*	
5:00	**GT2022:82884** **Modification of Pump Turbine Characteristics with Fluid Injection in Pump Operating Mode** Sabri Deniz[1] Simon In-Albon[2] *1. Lucerne University of Applied Sciences, Switzerland; 2. Lucerne School of Engineering and Architecture, Switzerland*	**GT2022:82584** **Aeroelastic Analysis of Large-Scale Wind Turbines with Biplane Rotors** Pichitkul Auraluck[1] Lakshmi Sankar[2] *1. Suranaree University of Technology, Thailand; 2. Georgia Institute of Technology, USA*	
5:30		**GT2022:81169** **Optimum Control Scheme for Deformable Blades Applied to Horizontal Wind Turbine** Juan Jauregui, Azael Duran-Catillo *Universidad Autónoma de Querétaro, Mexico*	

FRIDAY JUNE 17 — 08:00 AM - 10:00 AM

	CONTROLS, DIAGNOSTICS & INSTRUMENTATION	CYCLE INNOVATIONS	CYCLE INNOVATIONS
	Topics in Instrumentation (I)	**Pressure Gain Combustion and Component Instabilities**	**Hybrid Electric Propulsion**
	Technical • Port 3 • 05-05	**Technical • Dock 12 • 06-08**	**Technical • Dock 12 • 06-11**
	Session Organizer: **Lorenzo Ferrari**, University of Pisa – DESTEC, Italy Session Co-Chairs: **Lubomir Ribarov**, U.S. Merchant Marine Academy; **Igor Loboda**, University of Mexico	Session Organizer: **James Braun**, Purdue University Session Co-Chairs: **Alessandro Sorce**, University of Genoa; **Simone Salvadori**, Politecnico di Torino; **Ward De Paepe**, University of Mons	Session Organizer: **Ioannis Roumeliotis**, Cranfield University Session Co-Chairs: **Alessandro Sorce**, University of Genoa; **Nateri Madavan**, NASA
8:00	**GT2022:81271** **Particle Image Velocimetry in a High-Speed Short-Duration Turbine Rig** Mizuki Okada, Jorge Pinho, Bogdan Cernat, Sergio Lavagnoli *von Karman Institute, Belgium*	**GT2022:83799** **A Review of Pressure Gain Combustion Solutions for Aerospace Propulsion** Sreenath Purushothaman, Avinash Renuke, Alessandro Sorce, Alberto Traverso *University of Genova, Italy*	**GT2022:84037** **Power Flow Optimization for a Hybrid-Electric Propulsion System** Vasilis G. Gkoutzamanis
8:30	**GT2022:81686** **Hot-Wire Anemometry in High Subsonic Organic Vapor Flows** Leander Hake[1] Stephan Sundermeier[1] Leon Cakievski[1] Joshua Bäumer[1] Stefan Aus Der Wiesche[1] Camille Matar[2] Paola Cinnella[2] Xavier Gloerfelt[3] *1. Muenster University of Applied Sciences, Germany; 2. Institut Jean Le Rond d'Alembert Sorbonne Université, France; 3. Arts et Métiers ParisTech, France*	**GT2022:81731** **Compressor Surge Precursors for a Turbocharger Coupled to a Pressure Vessel** Carlo Alberto Niccolini Marmont Du Haut Champ, Federico Reggio, Paolo Silvestri, Mario Luigi Ferrari, Aristide Fausto Massardo *University of Genoa, Italy*	**GT2022:82705** **Ammonia Powered Solid Oxide Fuel Cells for General Aviation Propulsion Systems: Challenges and Opportunities** Giampiero Di Legge[1] Seyed Ali Nabavi[1] Lorenzo Mazzei[2] Riccardo Da Soghe[2] Cosimo Bianchini[2] Amirpiran Amiri[3] Soheil Jafari[1] *1. Cranfield University, United Kingdom; 2. Ergon Research srl, Italy; 3. Aston University, United Kingdom*
9:00	**GT2022:82549** **Vane-Probe Interactions in Transonic Flows** Antonino Federico Torre, Marios Patinios, Gustavo Lopes, Loris Simonassi, Sergio Lavagnoli *von Karman Institute, Belgium*		
9:30	**GT2022:80968** **Design and Commissioning of the Constant Condition Dynamic Test Rig** Robert Pearce[1] Michael Tombs[1] Zahid Hussain[2] *1. University of Oxford, United Kingdom;* *2. Rolls-Royce plc, United Kingdom*		

FRIDAY JUNE 17

08:00 AM - 10:00 AM

	ELECTRIC POWER	ELECTRIC POWER	FANS AND BLOWERS
	Enabling Technologies	**Gas Turbine Power Plant**	**Tutorials of Basics: Machine Learning**
	Technical • Dock 14 • 09-02	**Technical • Dock 11 • 09-03**	**Tutorial • Dock 4 • 10-06**
	Session Organizer: **Bin Jou**, FM Global Session Co-Chairs: **Ali Baghchehsara**, LISA Deustchland Gmbh; **Jeffrey Benoit**, PSM - Ansaldo Energia Group	Session Organizer: **Ben Emerson**, Georgia Institute of Technology Session Co-Chairs: **Rick Tomlinson**, Chveron; **John Gulen**, Bechtel Infrastructure & Power, Inc.; **David Wu**, Georgia Institute of Technology; **Bin Jou**, FM Global; **Tom Christiansen**, Strategic Power Systems	Session Organizer: **Valerio Francesco Barnabei**, Sapienza Università di Roma Session Co-Organizer: **Giovanni Delibra**, Sapienza University of Rome
8:00	**GT2022:82667** **Dry Low NOx (DLN) Combustion System Operability Considerations** Leonard Angello[1] Bobby Noble[1] Rob Steele[1] Mitch Cohen[2] Ben Emerson[3] *1. EPRI, USA; 2. Turbine Technology Services, USA; 3. Turbine Logic, USA*	**GT2022:81807** **Feasibility of Achieving 62% Combined Cycle Efficiency with a 200 MW Gas Turbine** John Gulen[1] Justin Zachary[2] *1. Bechtel Infrastructure & Power, Inc., USA; 2. Expertech Engineering Corp., USA*	**GT2022:83149** **Unsupervised Learning Methods for Design Space Exploration** Francesco Aldo Tucci, Lorenzo Tieghi, Giovanni Delibra, Alessandro Corsini *Sapienza University of Rome, Italy*
8:30	**GT2022:82718** **Using Engineering Enhanced AI to Forecast Combined Cycle Power Plant Performance in the Presence of Uncertain Weather Conditions** Christopher Perullo[1] Lea Boche[2] Alex Redling[1] Jamie Lim[1] Woosung Choi[2] David Noble[2] Timothy Lieuwen[1] *1. Turbine Logic, USA; 2. EPRI, USA*	**GT2022:82146** **Root Cause Analysis of the Lack of Market Success of Micro Gas Turbine Systems** Giuseppe Tilocca, David Sanchez, Miguel Torres *Universidad de Sevilla, Spain*	**T U T O R I A L**
9:00	**GT2022:83085** **Gas Turbine Monitoring Solutions Assessment and Roadmaps** Ben Emerson[1] Leonard Angello[2] Bobby Noble[2] David Wu[1] *1. Turbine Logic, USA; 2. EPRI, USA*	**GT2022:82701** **Improving Gas Turbine Maintenance Quality** Leonard Angello, John Scheibel, Nick Smith, David Noble *EPRI, USA*	
9:30		**GT2022:83026** **A Proven Engine Optimizer for the Aeroderivative Industry: Challenges and Solutions** Nicolas Demougeot[1] Franklin Van Den Hout[1] Danny Grobbe[2] Wenping Wang[3] *1. Thomassen Energy, Netherlands; 2. VBR Turbine Partners, Netherlands; 3. Power Systems Manufacturing, USA*	

FRIDAY JUNE 17

08:00 AM - 10:00 AM

	HEAT TRANSFER: FILM COOLING	HEAT TRANSFER: FILM COOLING	HEAT TRANSFER: GENERAL INTEREST
	Computational Techniques	**General Film Cooling II**	**Methods and Technology I**
	Technical • Port 1 B • 12-12	**Technical • Dock 13 • 12-14**	**Technical • Dock 10 A • 13-03**
	Session Organizer: **Silvia Ravelli**, University of Bergamo - Department of Engineering Session Co-Chairs: **Alexander Mirzamoghadam**, ; **David Bogard**, University of Texas at Austin; **Robert Krewinkel**, MAN Energy Solutions; **Robin Prenter**, Pratt & Whitney; **James L. Rutledge**, Air Force Institute of Technology	Session Organizer: **Robert Krewinkel**, MAN Energy Solutions Session Co-Chairs: **Alexander Mirzamoghadam**, ; **David Bogard**, University of Texas at Austin; **Gongnan Xie**, Northwestern Polytechnical University; **James L. Rutledge**, Air Force Institute of Technology	Session Organizer: **David Flodman**, Mitsubishi Heavy Industries America Session Co-Chairs: **Alexander Mirzamoghadam**, ; **Riccardo Da Soghe**, Ergon Research; **Zhirui Dong**, GE; **Gustavo Ledezma**, GE Global Research; **James L. Rutledge**, Air Force Institute of Technology
8:00	**GT2022:78244** **Film Cooling Hole Shape Effects on Turbine Blade Heat Transfer – Part I: Computational Comparison to Experiment** Spencer Sperling[1] Louis Christensen[1] Randall Mathison[1] Hakan Aksoy[2] Jong Liu[2] Jeremy Nickol[2] *1. The Ohio State University, USA; 2. Honeywell Aerospace, USA*	**GT2022:78240** **Experimental Study of Film Cooling with Favorable and Adverse Pressure Gradients** Ralph Volino, Matthew Gillcrist *United States Naval Academy, USA*	**GT2022:81788** **Accurate and Efficient Computation of Heat Transfer Coefficient From CFD Simulations** Jose M. Chaquet, Carlos Perez, Jaime Quintanal *Industria de Turbo Propulsores SAU, Spain*
8:30	**GT2022:78245** **Film Cooling Hole Shape Effects on Turbine Blade Heat Transfer – Part II: Effects of Mass Flow Rate and Unsteadiness** Spencer Sperling[1] Louis Christensen[1] Randall Mathison[1] Hakan Aksoy[2] Jong Liu[2] Jeremy Nickol[2] *1. The Ohio State University, USA; 2. Honeywell Aerospace, USA*	**GT2022:82555** **Uncertainty Quantification on the Cooling Performance of a Transonic Turbine Vane with Upstream Endwall Misalignment** Mingyang Hao[1] Yuanyuan Li[2] Zhigang Li[1] Jun Li[1] *1. Xi'an Jiaotong University, China (Mainland); 2. Xi'an Thermal Power Research Institute, China (Mainland)*	**GT2022:82132** **Additively Manufactured Guide Vane with Integral Measurement System for Validation on Engine** Oleg Naryzhnyy, Martin Lindbaeck, Petr Laletin, Alexander Rotar *Siemens Energy, Sweden*
9:00	**GT2022:79528** **Identification of Fluctuation Modes for a Cylindrical Film Cooling Hole Using the Spectral Proper Orthogonal Decomposition Method** Nicola Rosafio[1] Giove De Cosmo[2] Simone Salvadori[1] Mauro Carnevale[2] Daniela Misul[1] *1. Politecnico di Torino, Italy; 2. University of Bath, United Kingdom*	**GT2022:81161** **Heat Transfer Coefficient and Adiabatic Effectiveness on a Film-Cooled Pressure Side: Results and Assessment of the IR-Based Measurement Technique Reliability** Tommaso Bacci[1] Alessio Picchi[1] Sofia Galeotti[1] Bruno Facchini[1] Simone Cubeda[2] *1. University of Florence, Italy; 2. Baker Hughes, Italy*	**GT2022:82552** **Axial Ventilation and Blade Row Effects on Transient Natural Convective Shutdown Cooling in a Gas Turbine** Daniel Fahy, Peter Ireland *University of Oxford, United Kingdom*
9:30	**GT2022:81307** **Large Eddy Simulation of Energy Transport in Highly Compressible Transverse Jets** Hao Guo, Yinhai Zhu, Peixue Jiang *Tsinghua University, China (Mainland)*	**GT2022:82778** **Sensitivity of Adiabatic Cooling Effectiveness to Mainstream and Coolant Temperatures in Transonic Flow Over an Idealized Blade Tip Model** Haiteng Ma, Wei Zeng, Siming Dai, Hongmei Jiang *Shanghai Jiao Tong University, China (Mainland)*	

FRIDAY JUNE 17 — 08:00 AM - 10:00 AM

	HEAT TRANSFER: GENERAL INTEREST	MANUFACTURING MATERIALS & METALLURGY	STEAM TURBINE
	Methods and Technology III	**Metallurgy, Coating & Repair**	**Wet Steam Tutorial**
	Technical • Dock 1B • 13-06	**Technical • Port 7 • 18-03**	**Tutorial • Dock 2 • 23-06**
	Session Organizer: **Sanjay Chopra**, GE Aviation Session Co-Chairs: **Alexander Mirzamoghadam**, ; **Riccardo Da Soghe**, Ergon Research; **Sanjay Chopra**, GE Aviation; **Zhirui Dong**, GE; **James L. Rutledge**, Air Force Institute of Technology	Session Organizer: **Scott Keller**, DTS Session Co-Chairs: **William Day**, W. David Day, Inc.; **Sascha Gierlings**, Fraunhofer Institute; **Paul Lowden**, Liburdi; **Dheepa Srinivasan**, Pratt & Whitney; **Ramesh Chandra Raju Keshava Bhattu**, PSM	Session Organizer: **Christian Siewert**, Siemens Energy Session Co-Chairs: **Grant Ingram**, Durham University; **Sebastian Schuster**, University of Duisburg-Essen
8:00	**GT2022:78273** **Comparison of Time-Accurate and Steady-State Predictions of Heat Transfer and Pressure for a Rotating Cooled Turbine** Spencer Sperling[1] Louis Christensen[1] Randall Mathison[1] Hakan Aksoy[2] Jong Liu[2] Jeremy Nickol[2] *1. The Ohio State University, USA; 2. Honeywell Aerospace, USA*	**GT2022:80263** **Nanostructured CVD W/WC Coating Protects Steam and Gas Turbine Blades Against Water Droplet Erosion** Yury Zhuk *Hardide Coatings Ltd, United Kingdom*	**GT2022:83902** **Two Phase Flow in Steam Turbines** Grant Ingram *Durham University, United Kingdom*
8:30	**GT2022:82573** **Development of a Transient Test Facility for Evaluating the Aerothermodynamic Performance of Gas Turbine Cascades** Bo Bai, Yuanyuan Li, Zhigang Li, Jun Li *Xi'an Jiaotong University, China (Mainland)*	**GT2022:82239** **The Evaluation of Ammonia/Hydrogen Combustion on the H Permeation and Embrittlement of Nickel-Base Superalloys** Marina Kovaleva[1] Dominik Dziedzic[2] Syed Mashruk[1] Sam Evans[1] Agustin Valera-Medina[1] Enrique Galindo-Nava[2] *1. Cardiff University, United Kingdom; 2. University College London, United Kingdom*	**T U T O R I A L**
9:00	**GT2022:82353** **Large Eddy Simulation on the Turbulent Heat Transfer of Supercritical Fluid** Junqiang Zhang, Zhengping Zou *Beihang University, China (Mainland)*	**GT2022:82756** **Next Generation APS Porous TBC for Gas Turbine Combustors** Nagaraja Rudrapatna, Bradley Lutz, Harry Kington *Honeywell, USA*	
9:30	**GT2022:79547** **Internal Heat Transfer Measurement on Metal-Based Additively Manufactured Channels Using a Transient Technique** Patrick Lüscher[1] Marin Deflorin[1] Manuel Voggesser[1] Peter Stuber[1] Vincent Galoul[2] Minseok Ko[2] *1. Institute for Thermal and Fluid Engineering, FHNW School of Engineering, Switzerland; 2. Doosan Heavy Industries, Switzerland*		

FRIDAY JUNE 17

08:00 AM - 10:00 AM

	STRUCTURES AND DYNAMICS: AERODYNAMICS EXCITATION & DAMPING	STRUCTURES AND DYNAMICS: AERODYNAMICS EXCITATION & DAMPING	STRUCTURES AND DYNAMICS: FATIGUE, FRACTURE & LIFE PREDICTION
	Aerodynamic Excitation and Damping Under Inflow Distortions	**Forced Response**	**Constitutive Materials Modelling**
	Technical •Port 1 A • 24-02	**Technical • Port 2 • 24-04**	**Technical • Dock 1A • 27-01**
	Session Organizer: **Sina C. Stapelfeldt**, Imperial College London Session Co-Chairs: **Shreyas Hegde**, Duke University; **Marcel Oettinger**, Leibniz Universitaet Hannover; **Mateusz Golebiowski**, Alstom (Switzerland) Ltd.	Session Organizer: **Sina C. Stapelfeldt**, Imperial College London Session Co-Chairs: **Yoon Choi**, GE Aviation; **Mateusz Golebiowski**, Alstom (Switzerland) Ltd.	Session Organizer: **Andrew Moffat**, Frazer-Nash Consultancy Session Co-Chairs: **Alessandro Ramaglia**, Ansaldo Energia; **Dipankar Dua**, Siemens Energy Inc.; **Sachin Shinde**, Siemens Energy
8:00	**GT2022:80839** **Computation of the Unsteady Loading on a Fan Blade Due to Inlet Distortion Using Body Force Methodology** Younes Bouhafid, Thomas Berthelon *ONERA, France*	**GT2022:80481** **Aerodynamic Forcing Models for Compressor Aeromechanics** Valerie Hernley, Aleksandar Jemcov, Scott Morris *University of Notre Dame, USA*	**GT2022:82230** **A Comparative Study of Crystal Visco-Plastic Modeling of Directionally Solidified Nickel-Base Superalloys** Navindra Wijeyeratne, Firat Irmak, Ali Gordon *University of Central Florida, USA*
8:30	**GT2022:81961** **Influence of a Turbulence Control Screen on the Aerodynamic and Aeroelastic Behavior of a UHBR Fan** Alexandra Schneider, Xavier Ottavy, Benoit Paoletti, Christoph Brandstetter *École Centrale de Lyon, France*	**GT2022:81975** **Fast and Integrated Tools for Forced Response Prediction: An Application to a Transonic Compressor Rotor Blisk** Lorenzo Pinelli, Alberto Bandini, Michele Marconcini, Andrea Amedei, Enrico Meli, Andrea Rindi *University of Florence, Italy*	**GT2022:79394** **Influence of Multiaxial Far Field Loadings on the Fatigue Crack-Growth Behaviour by Using Corner-Crack and Cruciform Specimen** Fabian Conrad[1] Christian Kontermann[1] Andreas Blug[2] Alexander Bertz[2] Daniel Carl[2] Matthias Oechsner[1] *1. Technical University of Darmstadt, Germany; 2. Fraunhofer Institute for Physical Measurement Techniques, Germany*
9:00	**GT2022:82983** **Efficient Forced Response Analysis for Asymmetric Vane Spacing** Benedict Geihe, Christian Frey, Graham Ashcroft *German Aerospace Center (DLR), Germany*	**GT2022:82427** **Application of Machine Learning to Forced Response Predictions of an Industrial Axial Compressor Rotor Blade** Giuseppe Bruni, Senthil Krishnababu, Simon Jackson *Siemens Energy, United Kingdom*	**GT2022:79925** **Fracture Mechanics-Based Structural Integrity Assessment of Aero-Engine Turbine Disks Under Overspeed Conditions** Jiangchao Zhu[1] Mauro Madia[1] Michael Schurig[2] Hartmut Schlums[2] Uwe Zerbst[1] *1. Bundesanstalt für Materialforschung und -prüfung, Germany; 2. Rolls-Royce Deutschland Ltd & Co KG, Germany*
9:30	**GT2022:78710** **Aerodynamic and Aeroelastic Effects of Inlet Guide Vane Mistuning in a Transonic Compressor** Daniel Franke[1] Jonas Foret[1] Fabian Klausmann[1] Heinz-Peter Schiffer[1] Thomas Giersch[2] Bernd Becker[2] *1. Technical University of Darmstadt, Germany; 2. Rolls-Royce Deutschland Ltd. & Co KG, Germany*	**GT2022:82368** **Study on Blade Vibration Alleviation in a Nozzleless Radial Turbine via Casing Treatment** Lei Pan[1] Mingyang Yang[1] Shota Murae[2] Wataru Sato[2] Naoto Shimohara[2] Akihiro Yamagata[2] *1. Shanghai Jiao Tong University, China (Mainland); 2. IHI Corporation, Japan*	

FRIDAY JUNE 17

08:00 AM - 10:00 AM

	STRUCTURES AND DYNAMICS: STRUCTURAL MECHANICS & VIBRATION	SUPERCRITICAL CO2	TURBOMACHINERY: AXIAL FLOW FAN & COMPRESSOR AERODYNAMICS
	Modeling, Algorithms and Computational Techniques III	**Oxy-Combustion**	**Transonic Compressors**
	Technical • Dock 5 • 30-06	**Technical • Dock 16 • 33-07**	**Technical • Dock 15• 34-09**
	Session Organizer: **Azzedine Dadouche**, National Research Council Canada Session Co-Chairs: **Eric Kurstak**, The Ohio State University Gas Turbine Lab; **Kiran D'souza**, OSU	Session Organizer: **Seth Lawson**, US Department of Energy Session Co-Organizer: **Subith Vasu**, University of Central Florida	Session Organizer: **Shreyas Hegde**, Pratt and Whitney Session Co-Chairs: **Daniel Wilkin**, GE; **Lisa Brilliant**, UTC/Pratt & Whitney
8:00	**GT2022:83613** **Numerical Investigation on HCF Weak Link Locations of a Wide-Chord Laminated Composite Fan Blade with Coupled Modal Vibrations** Xu Tang[1] Yong Chen[1, 2] Jiguo Zhang[1] *1. School of Mechanical Engineering, Shanghai Jiao Tong University, China (Mainland); 2. Engineering Research Center of Gas Turbine and Civil Aero Engine, Ministry of Education, China (Mainland)*	**GT2022:80881** **An Experimental Study of Supercritical Methane Injection Characteristics in a CO2 Environment** Ritesh Ghorpade[1] Gihun Kim[1] K.R.V (Raghu) Manikantachari[1] Joshua Weiner[1] Daniel Banuti[2] Subith Vasu[1] *1. University of Central Florida, USA; 2. University of New Mexico, USA*	**GT2022:80083** **Effects of Bleed Slot Size on the Shock-Wave/ Boundary-Layer Interactions in a Transonic Compressor Stator** Xun Zhou, Bai Li, Lei Luo, Wei Du *Harbin Institute of Technology, China (Mainland)*
8:30	**GT2022:83289** **A Reduction Technique for the Calculation of the Forced Response of Bladed Disks in Presence of Contact Mistuning at Blade Root Joints** Valeria Pinto, Giuseppe Battiato, Christian Maria Firrone *Politecnico di Torino, Italy*	**GT2022:81576** **The Effect of Nitrogen Impurities on Oxy-Fuel Combustion Under Supercritical-CO2 Conditions** Ponnuthurai Gokulakrishnan[1] Jiankun Shao[2] Michael Klassen[1] David Davidson[2] Ronald Hanson[2] *1. Combustion Science & Engineering, Inc., USA; 2. Stanford University, USA*	**GT2022:81878** **Numerical Investigation of Unsteady Inlet Guide Vane-Rotor Interactions in a Transonic Fan Due to Boundary Layer Ingestion** Ritangshu Giri[1] Mark Turner[2] *1. University of Cincinnati, USA; 2. NASA Glenn Research Center, USA*
9:00	**GT2022:82788** **The Mechanism and Quantitative Evaluation of Slip Damage of Bolted Joint with Spigot** Jie Hong[1] Yongbo Ma[1] Shaobao Feng[2] Yanhong Ma[1] *1. Beihang University, China (Mainland); 2. Shenyang Aero-engine Design and Research Institute, China (Mainland)*	**GT2022:81747** **Design of a 1MW Direct-Fired Oxy Combustor for sCO2 Power Cycles** Steven White, Grey Berry, Brian Connolly *Southwest Research Institute, USA*	**GT2022:82720** **Insights Into the Unsteady Shock Boundary Layer Interaction** Alexander Hergt, Joachim Klinner, Chris Willert, Sebastian Grund, Wolfgang Steinert *German Aerospace Center (DLR), Institute of Propulsion Technology, Germany*
9:30	**GT2022:81696** **Modal Identification of Bladed Disks by Time-Frequency Analysis of the Non-Synchronous Response** Luigi Carassale[1] Roberto Guida[2] Michela Marrè Brunenghi[2] *1. University of Genova, Italy; 2. Ansaldo Energia, Italy*	**GT2022:82220** **Development of a Laser Igniter for Direct Fired sCO2 Combustor** Sreenath Gupta[1] Shashikant Aithal[1] Ashvin Hosangadi[2] Timothy Weathers[2] Jeremy Fetvedt[3] *1. Argonne National Laboratory, USA; 2. CRAFT Tech Inc., USA; 3. 8 Rivers Capital, LLC, USA*	**GT2022:83363** **Stall Margin Improvement in a Transonic Compressor with a Casing Treatment: Flow Mechanism** Chunill Hah *NASA Glenn Research Center, USA*

FRIDAY JUNE 17

08:00 AM - 10:00 AM

	TURBOMACHINERY: AXIAL FLOW TURBINE AERODYNAMICS	TURBOMACHINERY: MULTIDISCIPLINARY DESIGN APPROACHES, OPTIMIZATION, AND UNCERTAINTY QUANTIFICATION	TURBOMACHINERY: RADIAL TURBOMACHINERY AERODYNAMICS
	Secondary & Surface Flows	**Axial Compressors, Propellers and Fans Design Optimization**	**Radial and Mixed Flow Turbines I**
	Technical • Rotterdam D • 35-09	**Technical • Port 4 • 39-03**	**Technical • Dock 10 B • 40-01**
	Session Organizers: **Ravikanth Avancha**, GE Research; **Mark Turner**, NASA Glenn Research Center Session Co-Chairs: **Emil Göttlich**, TU Graz; **Luca Porreca**, MAN; **Bronwyn Power**, Pratt & Whitney	Session Organizer: **Adam Siegel**, Pratt & Whitney Session Co-Chairs: **Ingrid Lepot**, Cenaero; **Ryan Jacobs**, GE	Session Organizer: **Bob Mischo**, MAN Energy Solutions Schweiz AG Session Co-Organizer: **Nicolas Lachenmaier**, Rolls-Royce Power Systems
8:00	**GT2022:79335** **Vortex Unsteadiness in the Endwall Region of a High-Lift Low-Pressure Turbine Passage** Christopher Marks[1] Nathan Fletcher[2] Rolf Sondergaard[1] *1. U.S. Air Force Research Laboratory, USA; 2. Innovative Scientific Solutions Inc., USA*	**GT2022:77969** **From Concept to Wind Tunnel Model: Efficient Design Methodology for Innovative Low-Noise Propellers** Lieven Baert[1] Gabriele Grasso[1] Caroline Sainvitu[1] Ingrid Lepot[1] Marinus Johannus Van Enkhuizen[2] Karel Lammers[2] Nicholas Bown[3] *1. Cenaero, Belgium; 2. Royal NLR – Netherlands Aerospace Centre, Netherlands; 3. Dowty Propellers, United Kingdom*	**GT2022:82266** **Numerical Investigation on Radial Turbines Aerodynamics Aimed at the Definition of Design Rules for Industrial Applications** Fabrizio Lottini[1] Michele Marconcini[1] Davide Biliotti[2] Lorenzo Toni[2] Andrea Arnone[1] *1. University of Florence, Italy; 2. Baker Hughes, Italy*
8:30	**GT2022:81204** **Low Reynolds Number Effects on the Endwall Flow Field in A High-Lift Turbine Passage** Molly Donovan[1] Markus Rumpfkeil[1] Christopher Marks[2] Zachary Robison[3] Andreas Gross[3] *1. University of Dayton, USA; 2. U.S. Air Force Research Laboratory, USA; 3. New Mexico State University, USA*	**GT2022:80876** **Machine Learning-Based Multi-Disciplinary Optimization of Transonic Axial Compressor Blade Considering Aeroelasticity** Hyun-Su Kang, Youn-Jea Kim *Sungkyunkwan University, Korea*	**GT2022:82279** **Analysis of the Condensation Phenomena Within the Radial Turbine of a Fuel Cell Turbocharger** Tim Wittmann[1] Piotr Wiśniewski[2] Sebastian Lück[1] Jens Friedrichs[1] Sławomir Dykas[2] *1. Technische Universitaet Braunschweig - IFAS, Germany; 2. Silesian University of Technology, Poland*
9:00	**GT2022:82460** **Improving the Aerodynamic Performance of a High-Loading Turbine Blade by End-Wall Surface Structures** Yueyun Xi, Shaopeng Lu, Qiang Zhang, Hongmei Jiang *Shanghai Jiao Tong University, China (Mainland)*		**GT2022:82452** **Assessment of Low Engine Order Excitation of a Contaminated Turbocharger Radial Turbine Stage Using a Nozzle Ring Only Computational Model** Michaela Rita Beierl[1] Damian Vogt[1] Magnus Fischer[2] Tobias Müller[2] Kwok Kai So[2] *1. Institute of Thermal Turbomachinery and Machinery Laboratory, Germany; 2. ABB Turbo Systems AG, Switzerland*
9:30	**GT2022:81945** **A Review of High-Speed Rotating HP Turbine Heat Transfer and Cooling Studies Over the Last Decade in the Oxford Turbine Research Facility** Chiara Falsetti[1] Paul F. Beard[1] David N. Cardwell[2] Kam Chana[1] *1. University of Oxford, United Kingdom; 2. Oxford Thermofluids Institute, United Kingdom*		**GT2022:83309** **On the Influence of Stator-Rotor Radial Gap Size on the Fluid-Dynamic Performance of Mini-ORC Supersonic Turbines** Alessandro Cappiello[1] Matteo Majer[2] Raffaele Tuccillo[1] Matteo Pini[2] *1. University of Naples, Federico II, Italy; 2. Delft University of Technology, Netherlands*

FRIDAY JUNE 17 — 08:00 AM - 10:00 AM

	TURBOMACHINERY: UNSTEADY FLOWS IN TURBOMACHINERY	WIND ENERGY	
	Unsteady Flows in Compressors I	**Wind Farms**	
	Technical • Port 1 C • 43-06	**Technical • Dock 9 • 44-06**	
	Session Organizer: **Tianyu Pan**, Beihang University	Session Organizer: **Juan Jauregui**, University of Queretaro Session Co-Chairs: **Giacomo Bruno Azzurro Persico**, Politecnico di Milano; **Lorenzo Ferrari**, University of Pisa – DESTEC, Italy	
8:00	**GT2022:81673** **Highly Resolved Large-Eddy Simulations of a Transonic Compressor Stage Midspan Section Part I: Effect of Inflow Disturbances** Christoph Bode[1] Pawel Przytarski[2] John Leggett[2] Richard Sandberg[2] *1. Technische Universitaet Braunschweig, Germany; 2. University of Melbourne, Australia*	**GT2022:81983** **A Novel Wake Control Approach for Power Generation Improvement of Three Wind Turbines in a Wind Farm** Mahdi Erfanian Nakhchi Toosi, Mohammad Rahmati *Northumbria University, United Kingdom*	
8:30	**GT2022:82474** **Highly Resolved Large-Eddy Simulations of a Transonic Compressor Stage Midspan Section - Part II: Effect of Rotor-Stator Gap** Pawel Przytarski[1] Christoph Bode[2] John Leggett[1] Richard Sandberg[1] *1. University of Melbourne, Australia; 2. Technische Universitaet Braunschweig, Germany*	**GT2022:83444** **Wake Structure in Yawed Approaching Flows for an Axial-Flow Wind Turbine** Mohammad Ahmadi, Zhiyin Yang *University of Derby, United Kingdom*	
9:00	**GT2022:84386** **Investigation of Unsteady Rotor-Stator Interaction and Deterministic Correlation Analysis in a Transonic Compressor Stage** Yangwei Liu, Xindi Wei, Yumeng Tang *Beihang University, China (Mainland)*	**GT2022:83454** **Optimization of the Traveling Time of Construction Crews to Minimize the Time to Operation of a Wind Farm** Lorenzo Ferrari[1] Guido Francesco Frate[1] Francesca Leanza[2] Gian Lorenzo Giuliattini Burbui[2] *1. University of Pisa, Italy; 2. ENEL Green Power, Italy*	
9:30	**GT2022:78007** **Unsteady Flow Simulations of an Axial Compressor Cascade Subjected to Free Stream Wakes** Benjamin Duda[1] Gregory Laskowski[2] *1. Dassault Systemes, Germany; 2. Dassault Systemes, USA*		

FRIDAY JUNE 17 — 10:30 AM - 12:00 PM

	CYCLE INNOVATIONS	CYCLE INNOVATIONS	FANS AND BLOWERS
	Innovative Propulsion	**Organic Rankine Cycles**	**Design and optimization**
	Technical • Dock 12 • 06-04	**Technical • Dock 10 A • 06-05**	**Technical • Dock 2 • 10-03**
	Session Organizer: **Ioannis Templalexis**, Hellenic Air Force Academy Session Co-Chairs: **Alessandro Sorce**, University of Genoa; **Christina Salpingidou**, MTU Aero Engines AG; **Ward De Paepe**, University of Mons	Session Organizer: **Alessandro Sorce**, University of Genoa Session Co-Organizer: **Ward De Paepe**, University of Mons	Session Organizer: **Massimo Masi**, University of Padova - DTG Session Co-Chairs: **Zhiping Wang**, Morrison Products Inc; **Giovanni Delibra**, Sapienza University of Rome
10:30	**GT2022:80455** **Performance Assessment of a Recuperated Turboshaft Engine: A Multifuel Case** Jody Anfossi, Jafar Al-Zaili, Tala El Samad, Abdulnaser Sayma *City, University of London, United Kingdom*	**GT2022:80844** **LNG Regasification Plants Integrated with Low- and High-Temperature Organic Rankine Cycles** Vittorio Tola[1] Eliana Delogu[1] Matthias Finkenrath[2] *1. University of Cagliari, Italy; 2. Kempten University of Applied Sciences, Germany*	**GT2022:82245** **Effect of Solidity and Aspect Ratio on the Aerodynamic Performance of Axial-Flow Fans with 0.2 Hub-to-Tip Ratio** Massimo Masi, Piero Danieli, Andrea Lazzaretto *University of Padova, Italy*
11:00	**GT2022:81939** **Performance and Economic Assessment of Mechanically Integrated Parallel Hybrid Aircraft** Thibault Carpentier, Jinning Zhang, Ioannis Roumeliotis, Albert van Heerden *Cranfield University, United Kingdom*	**GT2022:80944** **Optimisation of an ORC Radial Turbine Using a Reduced-Order Model Coupled with CFD** Eva Alvarez-Regueiro[1] Esperanza Barrera-Medrano[1] Bijie Yang[1] Srithar Rajoo[2] Ricardo Martinez-Botas[1] *1. Imperial College London, United Kingdom; 2. Universiti Teknologi Malaysia, Malaysia*	**GT2022:80256** **Design of an Axial Flow Fan for a Unique Cooling Application** Francois D. Boshoff, Sybrand J. Van Der Spuy, Johannes P. Pretorius, Christiaan J. Meyer *University of Stellenbosch, South Africa*
11:30	**GT2022:82744** **Using Blade Surface Heat Transfer for Partial Intercooling and Thrust Augmentation** Anthony Gannon, Thomas Morgan, Walter Smith, Garth Hobson *Naval Postgraduate School, USA*		**GT2022:80190** **A Comprehensive Analytical Model for Vortex Shedding From Low-Speed Axial Fan Blades** Gabor Daku, Janos Vad *Budapest University of Technology and Economics, Hungary*
12:00			**GT2022:82294** **Development of Oil Free Centrifugal Blower As Enabling Technology for Solid Oxide Fuel Cell Anode Gas Recycling** Rochelle Wooding, Hannah Lea, Jose Luis Cordova *Mohawk Innovative Technology, Inc., USA*

FRIDAY JUNE 17 — 10:30 AM - 12:00 PM

	FANS AND BLOWERS	HEAT TRANSFER: INTERNAL AIR SYSTEMS	INDUSTRIAL & COGENERATION
	Design Challenges	**Turbine Rim Seals II**	**Session II**
	Technical • Dock 4 • 10-07	**Technical • Port 1 B • 14-03**	**Technical • Dock 15 • 17-02**
	Session Organizer: **Giovanni Delibra**, Sapienza University of Rome Session Co-Organizer: **Lorenzo Tieghi**, Sapienza University of Rome	Session Organizer: **Arnd Reichert**, Siemens Limited China Session Co-Chairs: **Carl M. Sangan**, University of Bath; **Jens Fridh**, KTH - Royal Institute of Technology; **Axel Glahn**, Pratt & Whitney; **James L. Rutledge**, Air Force Institute of Technology	Session Organizer: **Vladimir Lupandin**, LVDM Consulting Ltd Session Co-Organizer: **Clement Joly**, Softinway, Inc
10:30	**GT2022:82966** **Experimental Study on the Surface Geometry of Foam-Metal Casing Treatment** Yuqing Wang[1] Dakun Sun[1] Jia Li[1] Jinming Zhang[2] Xu Dong[1] Xiaofeng Sun[1] *1. Beihang University, China (Mainland); 2. School of Energy and Power Engineering, Beihang University, China (Mainland)*	**GT2022:81947** **Model Setup for the Investigation of Flow Phenomena in a 1.5-Stage Gas Turbine Regarding Hot Gas Ingestion** Lukas Pehle, Sven Schwertner, Manfred Wirsum *RWTH Aachen University, Germany*	**GT2022:80828** **Modelling and Optimization of a Hospital Gas Turbine-Based Cogeneration System** Marco Zini[1] Carlo Carcasci[1] Roberto Sodini[2] *1. University of Florence, Italy; 2. SOF S.p.A., Italy*
11:00	**GT2022:82962** **Inverse Design of a Centrifugal Fan for High Flow Rate Operating at Low Noise Level** Vijender Singh, Nikhil A. Baraiya, Jyotirmay Banerjee *Sardar Vallabhbhai National Institute of Technology, India*	**GT2022:82846** **Measurement of Inertial and Acoustic Waves in a Turbine Chute Rim Seal Cavity** Anna Bru Revert[1] Paul Beard[2] John Chew[3] *1. Rolls-Royce plc, United Kingdom; 2. Univeristy of Oxford, United Kingdom; 3. University of Surrey, United Kingdom*	**GT2022:83427** **Optimizing Internal Energy Streams in Micro Gas Turbines in Cogeneration Towards Flexible Heat-to-Power Ratio – Global Thermodynamic Performance Assessment and Specific Case Studies** Ward De Paepe[1] Tom Clymans[2] *1. University of Mons, Belgium; 2. Clayton of Belgium NV, Belgium*
11:30	**GT2022:82116** **Machine-Learning Clustering Methods Applied to Detection of Noise Sources in Low-Speed Axial Fan** Lorenzo Tieghi[1] Stefan Becker[2] Alessandro Corsini[1] Giovanni Delibra[1] Stefan Schoder[3] Felix Czwielong[2] *1. Sapienza University of Rome, Italy; 2. Friedrich-Alexander-Universität Erlangen-Nürnberg, Germany; 3. TU Graz, Austria*	**GT2022:82869** **Local Heat/Mass Transfer Measurements in a Shrouded Rotor-Stator Cavity** Seungyeong Choi, Hee Jae Lee, Jeonghun Heo, Hee Seung Park, Hee-Koo Moon, Hyung Hee Cho *Yonsei University, Korea*	

FRIDAY JUNE 17

10:30 AM - 12:00 PM

	STRUCTURES AND DYNAMICS: EMERGING METHODS IN DESIGN & ENGINEERING	STRUCTURES AND DYNAMICS: FATIGUE, FRACTURE & LIFE PREDICTION	STRUCTURES AND DYNAMICS: ROTORDYNAMICS
	Emerging Methods on Additive Manufacturing II	**Creep and Thermo-Mechanical Fatigue**	**Rotordynamic Design and Applications**
	Technical • Port 3 • 26-03	**Technical • Dock 1A • 27-02**	**Technical • Dock 5 • 29-02**
	Session Organizer: **Partha Das**, Honeywell International, Inc.	Session Organizer: **Karl Michael Kraemer**, TU Darmstadt - Mpa/Ifw Session Co-Chairs: **Alessandro Ramaglia**, Ansaldo Energia; **Dipankar Dua**, Siemens Energy Inc.; **Amrita Basak**, Pennsylvania State University	Session Organizer: **Theodore Brockett**, Honeywell Aerospace Session Co-Chairs: **Athanasios Chasalevris**, National Technical University of Athens; **Philip Bonello**, University of Manchester; **Steven Chatterton**, Politecnico di Milano - Department of Mech. Engineering
10:30	**GT2022:81207** **Analyses of Damping Sustainability of Additively Manufactured Nickel Alloy Components Subjected to High Strain Loading Cycles** John Hollkamp, Onome Scott-Emuakpor, Dino Celli *U.S. Air Force Research Laboratory, USA*	**GT2022:81676** **Short-Time Creep Deformation of the Coarse-Grained Nickel-Base Alloy 247 and Its Implications on the High-Cycle Fatigue Behavior** Oliver Jordan, Philipp Lion, Tilmann Beck *TU Kaiserslautern, Germany*	**GT2022:84058** **Forced Response System Identification of Full Aero-Engine Rotordynamic Systems for Prognostics and Diagnostics** In Young Hur, Zoltan Spakovszky *Massachusetts Institute of Technology, USA*
11:00	**GT2022:83889** **Increasing of Damping in the Turbine Blade Through Multi-Functional Design and Advantages of Additive Manufacturing Technology** Grzegorz Moneta, Michal Fedasz, Michal Szmidt, Slawomir Cieslak, Wieslaw Krzymien *Lukasiewicz Research Network - Institute of Aviation, Poland*	**GT2022:83443** **Investigation of Self-Heating During Ultrasonic Fatigue Testing and Effect on Very High Cycle Fatigue Behavior of Titanium 6Al-4V** Dino Celli[1] Onome Scott-Emuakpor[2] Justin Warner[3] Tommy George[2] *1. Aerospace Systems Directorate | AFRL, USA;* *2. Air Force Research Laboratory, USA;* *3. ARCTOS Technology Solutions, USA*	**GT2022:79563** **Rotordynamic Design and Experimental Validation of a sCO2 Centrifugal Compressor Equipped with a Pocket Damper Seal** Giuseppe Vannini[1] Matteo Dozzini[2] Filippo Cangioli[3] *1. GE Oil & Gas, Italy; 2. Baker Hughes, Italy;* *3. Waukesha Bearings, United Kingdom*
11:30		**GT2022:79829** **Turbine Blade Crack Detection Using Blade Vibration Monitoring: Field Study From an Operating Steam Turbine** Laszlo Techy[1] Brynn De Gooyer[2] Andy Von Flotow[1] Peter Tappert[1] Shaju John[1] David Losh[1] Benjamin Lewit[1] *1. Hood Tech, USA; 2. Millmerran Operating Company, Australia*	**GT2022:82632** **Semi-Analytical Model for High-Speed Rotor Whirl Prediction: An Assumed Modes Formulation for an Axisymmetric Rotor with Non-Uniform Properties** Riju Chatterjee[1] Ashutosh Patel[2] Nirmal Kumar[1] Pramod Kumar[2] *1. Birla Institute of Technology, Mesra, Ranchi, India; 2. Indian Institute of Science, Bangalore, India*

FRIDAY JUNE 17 — 10:30 AM - 12:00 PM

	SUPERCRITICAL CO2	TURBOMACHINERY: DESIGN METHODS & CFD MODELING FOR TURBOMACHINERY	TURBOMACHINERY: DESIGN METHODS & CFD MODELING FOR TURBOMACHINERY
	sCO2 Mixture Effects	**Computational Methods for Compression System Stall and Surge**	**Physics Informed Neural Networks (PINNs)**
	Technical • Dock 16 • 33-08	**Technical • Dock 11 • 37-09**	**Technical • Port 2 • 37-16**
	Session Organizer: **Ladislav Vesely**, Czech Technical University In Prague Session Co-Chairs: **Nathan Weiland**, National Energy Technology Laboratory; **Jayanta Kapat**, University of Central Florida	Session Organizer: **Sunil Patil**, ANSYS Inc Session Co-Organizer: **Mahmoud Mansour**, Honeywell International Inc	Session Organizer: **Jason Bourgeois**, Rolls-Royce Deutschland Session Co-Chairs: **Ezra Mcnichols**, NGRC; **Mahmoud Mansour**, Honeywell International Inc
10:30	**GT2022:83576** **Life Cycle Assessment of Innovative Concentrated Solar Power Plants Using Supercritical Carbon Dioxide Mixtures** Xun Liao[1] Sophie Chalumeau[1] Francesco Crespi[2] Cristia Prieto-Ríos[3] Antón López-Román[3] Pablo Rodríguez De Arriba[2] Noelia Martínez-Sanz[3] David Sanchez[2] Andrea Paggini[4] Pierre-Luc David[5] *1. Quantis, Switzerland; 2. University of Seville, Spain; 3. Abengoa, Spain; 4. Baker-Hughes, Italy; 5. Kelvion Thermal Solutions, France*	**GT2022:82548** **Evaluation of Surge Prediction Capabilities of Body-Force Model on a High-Speed Multi-Stage Axial-Radial Compressor** Hanxuan Zeng, Tengbo Fan, Zhenzhong Sun, Baotong Wang, Xinqian Zheng *Tsinghua University, China (Mainland)*	**GT2022:80960** **Investigation of Physics-Informed Neural Networks Based Solution Techniques for Internal Flows** Pascal Post, Benjamin Winhart, Francesca Di Mare *Ruhr-Universität Bochum, Germany*
11:00	**GT2022:84197** **Preliminary Analysis of High-Temperature Corrosion of Metallic Alloys with CO2 and CO2-Based Working Mixtures for Power Plants Applications** Lorenza Putelli[1] Gioele Di Marcoberardino[1] Marcello Gelfi[1] Costante Mario Invernizzi[1] Paolo Giulio Iora[1] Giampaolo Manzolini[2] *1. UniBS, Italy; 2. PoliMI, Italy*	**GT2022:83478** **Comparison of Stall Point Predictions in a Transonic Axial Compressor Rotor Using Single Passage and Three Passage CFD Geometries** Benjamin Meinster, Walter Smith, Garth Hobson, Anthony Gannon *Naval Postgraduate School, USA*	**GT2022:81768** **Modelling of Inviscid Flow Shock Formation in a Wedge-Shaped Domain Using a Physics-Informed Neural Network-Based Partial DIfferential Equation Solver** Ryno Laubscher[1] Pieter Rousseau[2] Chris Meyer[1] *1. Stellenbosch University, South Africa; 2. University of Cape Town, South Africa*
11:30	**GT2022:81223** **Integrated Aerodynamic and Structural Blade Shape Optimisation of Axial Turbines Operating With Supercritical Carbon Dioxide Blended with Dopants** Abdelrahman Abdeldayem[1] Martin White[1] Andrea Paggini[2] Marco Ruggiero[2] Abdulnaser Sayma[1] *1. City, University of London, United Kingdom; 2. Baker Hughes Company, Italy*	**GT2022:78911** **Numerical Observations of a Stall Phenomenon in the NASA CC3 Compressor** Michael Ni[1] Gregorio Robles Vega[1] Ron Ho Ni[1] John Clark[2] Michael List[3] *1. ADS CFD Inc, USA; 2. AFRL / RQTT, USA; 3. AFRL, USA*	

	TURBOMACHINERY: MULTIDISCIPLINARY DESIGN APPROACHES, OPTIMIZATION, AND UNCERTAINTY QUANTIFICATION	TURBOMACHINERY: MULTIDISCIPLINARY DESIGN APPROACHES, OPTIMIZATION, AND UNCERTAINTY QUANTIFICATION	TURBOMACHINERY: MULTIDISCIPLINARY DESIGN APPROACHES, OPTIMIZATION, AND UNCERTAINTY QUANTIFICATION
	Parametric and Topological Optimization Applications	**Preliminary Design Methods, Digital Twins and Holistic Approaches**	**UQ and Robust Design Optimization - Manufacturing Uncertainties, Operating Conditions and Engine Wear**
	Technical • Rotterdam C • 39-05	**Technical • Port 1 C • 39-06**	**Technical • Port 1 A • 39-08**
	Session Organizer: **Lieven Baert**, Cenaero Session Co-Chairs: **Francesco Montomoli**, ToffeeAM; **Adam Siegel**, Pratt & Whitney	Session Organizer: **Christian Voss**, German Aerospace Center Session Co-Organizer: **Lieven Baert**, Cenaero	Session Organizer: **Marcus Meyer**, Rolls Royce Session Co-Organizer: **Marc Nagel**, MTU Aero Engines
10:30	**GT2022:83005** **Optimal Blade Design of Stator Based on Adjoint Fluid Topology Optimization Method in a Torque Converter** Tianlang Tao[1] Zhifang Ke[1] Wei Wei[2] Cheng Liu[3] Qingdong Yan[3] *1. School of Mechanical Engineering, Beijing Institute of Technology, China (Mainland); 2. Beijing Institute of Technology, China (Mainland); 3. National Key Laboratory of Vehicular Transmission, Beijing Institute of Technology, China (Mainland)*	**GT2022:82688** **Mean-Line Design and Optimization of Axial-Flow Turbines Based on Mixed Integer Nonlinear Programming** Vincenzo Dipierro, Matteo Martinelli, Giacomo Bruno Azzurro Persico, Emanuele Martelli *Politecnico di Milano, Italy*	**GT2022:78309** **The Validation of a Parametric Leading Edge Model for Probabilistic CFD Analyses of Post-Service Compressor Airfoils** Lukas Schlueter[1] Paul Voigt[1] Matthias Voigt[1] Ronald Mailach[1] Robin Schmidt[2] Mirco Rostamian[2] Bernd Becker[2] *1. TU Dresden, Germany; 2. Rolls-Royce Deutschland Ltd & Co KG, Germany*
11:00	**GT2022:83322** **Evolution of Turbine Rear Frame Design for Aero Derivative Engine** Srinidhi Katti[1] Vishnu Vardhan Reddy[1] Babu Santhana Gopalakrishnan[1] Anil Chippa[1] Federico Casadio[2] *1. Baker Hughes, India; 2. Baker Hughes, Italy*	**GT2022:84296** **The Road to a Digital Twin for Fan-Blade Off and Thermally Enabled Structural Analyses of Aero Engines** Akin Keskin, Rob Fox *Rolls-Royce plc, United Kingdom*	**GT2022:82579** **Impact of Epistemic Uncertainty on Performance Parameters of Compressor Blades** Andriy Prots[1] Lukas Schlüter[1] Matthias Voigt[1] Ronald Mailach[1] Marcus Meyer[2] *1. Technische Universität Dresden, Germany; 2. Rolls-Royce Deutschland Ltd & Co KG, Germany*
11:30	**GT2022:82144** **Turbine Endwall Contouring Through Advanced Optimization Techniques** Matteo Burigana, Tom Verstraete, Sergio Lavagnoli *von Karman Institute for Fluid Dynamics, Belgium*		**GT2022:81779** **Digital Shadow and Robust Optimization of in Service Squealer Tip Turbine Blades** Irene Virdis[1] Tiziano Ghisu[1] Shahrokh Shahpar[2] Inaki De La Puerta[3] Haidong Li[3] *1. University of Cagliari, Italy; 2. Future Methods Rolls-Royce plc, United Kingdom; 3. Turbine Systems Rolls-Royce Bristol, United Kingdom*

FRIDAY JUNE 17 — 10:30 AM - 12:00 PM

	TURBOMACHINERY: RADIAL TURBOMACHINERY AERODYNAMICS	TURBOMACHINERY: UNSTEADY FLOWS IN TURBOMACHINERY	WIND ENERGY
	Radial and Mixed Flow Turbines II	**Stall & Surge in Radial Machines III**	**Simulation**
	Technical • Dock 10 B • 40-02	**Technical • Rotterdam A • 43-12**	**Technical • Dock 9 • 44-02**
	Session Organizer: **Bob Mischo**, MAN Energy Solutions Schweiz AG Session Co-Organizer: **Nicolas Lachenmaier**, Rolls-Royce Power Systems	Session Organizer: **Michael Barton**, Honeywell Aerospace	Session Organizer: **Juan Jauregui**, University of Queretaro Session Co-Chairs: **Giacomo Bruno Azzurro Persico**, Politecnico di Milano; **Ryo Amano**, University of Wisconsin-Milwaukee
10:30	**GT2022:80186** **Using Machine Learning for Loss Prediction in a Hybrid Meanline Modeling Method to Deliver Improved Radial Turbine Performance Prediction** Pangbo Ren[1] Charles Stuart[1] Stephen Spence[1] Ryosuke Inomata[2] Takayuki Kobayashi[3] Isao Morita[3] *1. Trinity College Dublin, Ireland; 2. IHI Charging Systems International GmbH, Germany; 3. IHI Corporation, Japan*	**GT2022:82682** **Investigation of Surge in a Transonic Centrifugal Compressor with Vaned Diffuser: Part 1 – Surge Signature** Fangyuan Lou[1] Herbert Harrison[2] Nicole Key[1] *1. Purdue University, USA; 2. NASA Glenn Research Center, USA*	**GT2022:81910** **Effect of Surface Corrugations on Laminar and Transitional Flows** Subrata Sarkar, Ishita Jain *Indian Institute of Technology Kanpur, India*
11:00	**GT2022:82255** **Unsteady Gas Dynamics of Radial Turbine Volutes Under Pressure Pulsations** Bijie Yang[1] Yingxian Xue[2] Ricardo Martinez-Botas[1] Mingyang Yang[2] *1. Imperial College London, United Kingdom; 2. Shanghai Jiao Tong University, China (Mainland)*	**GT2022:82686** **Investigation of Surge in a Transonic Centrifugal Compressor with Vaned Diffuser: Part 2 – Correlation With Subcomponent Characteristics** Fangyuan Lou[1] Herbert Harrison[2] William Brown[3] Nicole Key[3] *1. Tsinghua University, China (Mainland); 2. NASA Glenn Research Center, USA; 3. Purdue University, USA*	**GT2022:81988** **Direct Numerical Simulations of Aerodynamic Performance of Wind Turbine Airfoil by Considering Flap-Wise Blade Oscillations** Mahdi Erfanian Nakhchi Toosi, Mohammad Rahmati *Northumbria University, United Kingdom*
11:30	**GT2022:83879** **Improvement of the Semi-Analytical Model of a Tesla Disc Turbine by the Correction of the Velocity Profile** Krzysztof Rusin, Emad Hasani Malekshah, Włodzimierz Wróblewski, Sebastian Rulik *Silesian University of Technology, Poland*	**GT2022:80383** **Numerical Investigation of Unsteady Flow Phenomena in a Centrifugal Compressor Operating Near Surge with a Geometrically Reduced Model** Dominik Paul, Werner Eißler *Hochschule Rheinmain, Germany*	**GT2022:82096** **Large Eddy Simulations of Wind Turbine Flows** Jérôme Dabas, Laurent Gicquel, Nicolas Odier, Florent Duchaine *CERFACS, France*

Turbo Session Participant Index

A

B

C

D

E

F

G

H

I

J

K

L

M

N

O

P

Q

R

S

T

U

V

W

X

Y

Z

MEMBERSHIP INFORMATION SESSION

JUNE 15, 2022 | 12:30 PM UTC

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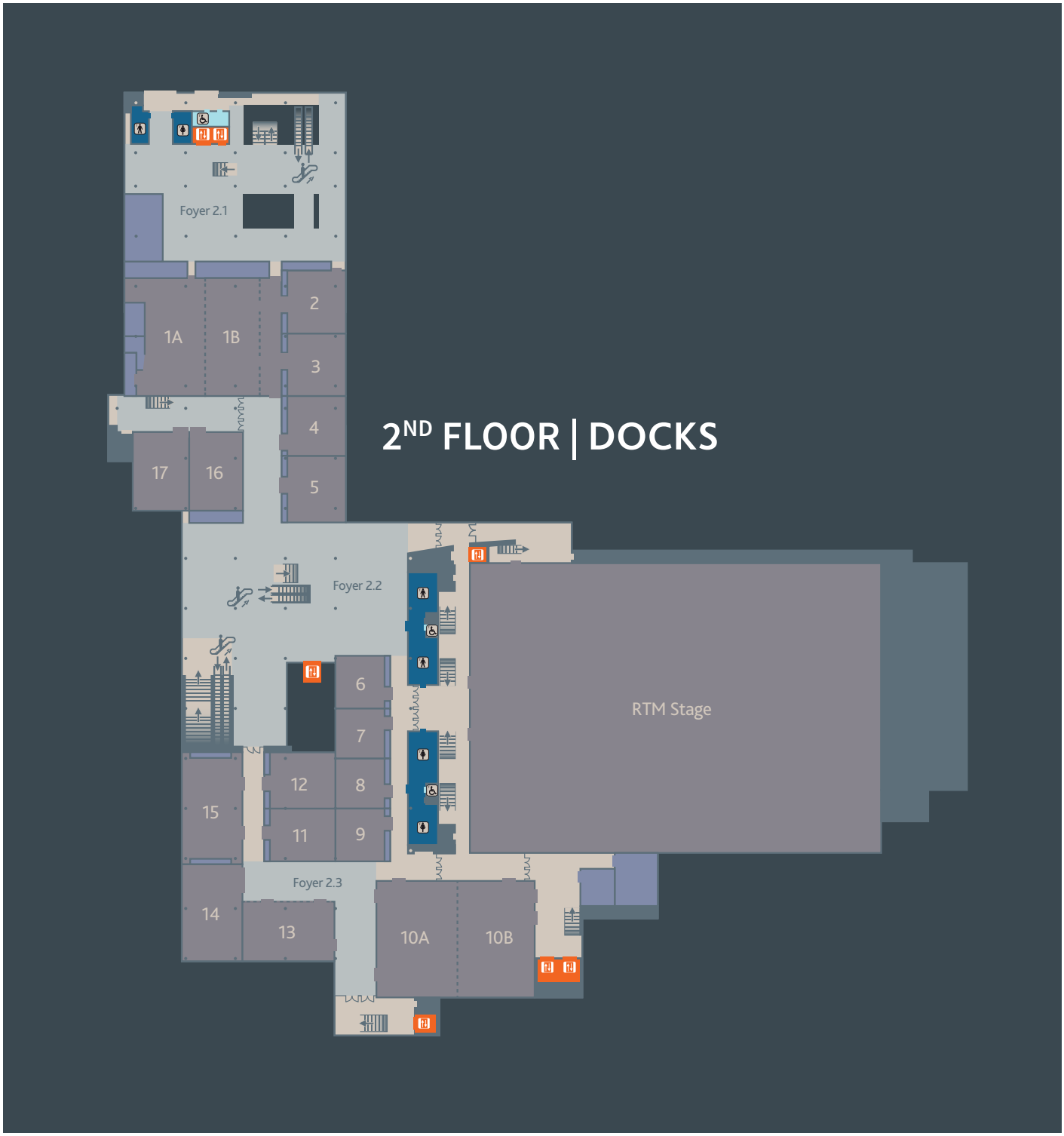
Step 4: Get your questions answered by an ASME Membership Representative

Conference Center Map

First Floor

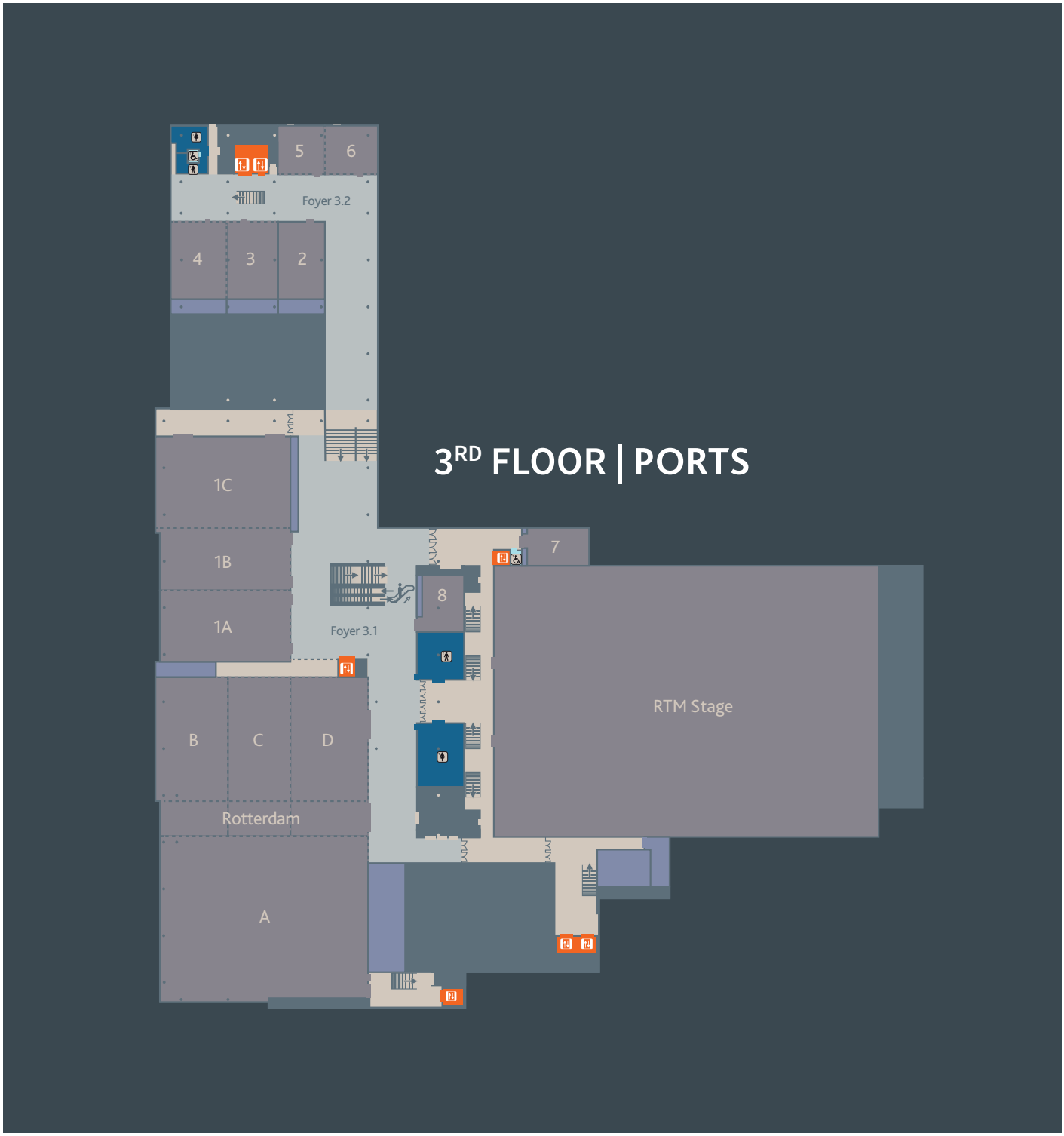
Conference Center Map

Second Floor



Conference Center Map

Third Floor



Schedule at a Glance

SUNDAY June 12	MONDAY June 13	TUESDAY June 14	Hydrogen & Energy Storage Day WEDNESDAY June 15	THURSDAY June 16	FRIDAY June 17
	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 - 12:00 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 - 12:00 pm
	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
	Coffee/Tea Break 10:00 am - 10:30 am	**Coffee/Tea Break** 10:00 am - 10:30 am	**Coffee/Tea Break** 10:00 am - 10:30 am	**Coffee/Tea Break** 10:00 am - 10:30 am	**Coffee/Tea Break** 10:00 am - 10:30 am
	Keynote & Awards Program 10:30 am - 12:10 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
Gas Turbine Technology Group Meeting 1:00 pm - 5:00 pm (Dock 6, AHOY)	**Opening Lunch** 12:00 pm – 1:30 pm	**Exhibit Open** 12:30 pm – 6:30 pm **Conference Lunch** 12:30 pm – 1:30 pm **Poster Session** 12:30 pm – 1:30 pm (Exhibit Hall)	**Exhibit Open** 12:30 pm – 6:30 pm **Conference Lunch** 12:30 pm – 1:30 pm	**Exhibit Open** 11:30 am – 2:30 pm **Conference Lunch** 12:00 pm – 1:30 pm **Closing Ceremony** 1:00 pm	**Closing Lunch** 12:00 pm – 1:30 pm **Conference Close** 1:00 pm **IGTI Executive Committee Meeting** 1:00 pm – 5:30 pm (Dock 15, AHOY)
Speaker Ready Room 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	
Registration 3:00 pm - 6:00 pm	**Coffee/Tea Break** 3:30 pm - 4:00 pm	**Coffee/Tea Break** 3:30 pm - 4:00 pm (Exhibit Hall)	**Coffee/Tea Break** 3:30 pm - 4:00 pm (Exhibit Hall)	**Coffee/Tea Break** 3:30 pm - 4:00 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	
		Exhibit Hall Reception 5:00 pm - 6:30 pm	**Exhibit Hall Reception** 5:00 pm - 6:30 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	
Council of Chairs Meeting 6:00 pm - 7:30 pm (Port 2)	**Welcome Reception** 6:00 pm - 7:30 pm (Rotterdam A)	**Celebrating Women in Engineering Event** 7:45 pm - 10:00 pm (Nhow Hotel)	**Early Career Engineer/Student Mixer** 6:45 pm – 8:00 pm Rotterdam A		

Conference Sessions | Coffee Break | Keynote and Plenary Sessions | Exhibit Activities and Lunch | Committee Meetings | Events

SCHEDULE SUBJECT TO CHANGE