

ADVANCE PROGRAM

ASME Turbo Expo 2013

Presented by the ASME International Gas Turbine Institute

June 3-7, 2013 | San Antonio Convention Center, San Antonio, Texas, USA



ANSYS enables rapid development of efficient and reliable turbomachinery

**Visit us at Booth #113
ASME Turbo Expo 2013**

ANSYS[®]

Realize Your Product Promise[®]

Visit us at www.ansys.com

TABLE OF CONTENTS

Grand Opening	4
Networking Events	5
Pre-Conference Training Workshops	6-7
Exposition	8-9
Exhibitors List	9
Industry Participants	10-11
2013 Scholar Lecture	12
Free ASME Membership Upgrade	14
Technical Conference	16-27
Participating Organizations	28
Supporting Publications	28
Top 10 Reasons to Attend Turbo Expo	30
San Antonio Highlights	33
Local Liaison Committee	33
Travel Information & Registration	34
IGTI Is Here To Serve You	36
Guest Tours	38-39
Schedule at a Glance	40
Leadership Team	40
Sponsors	Back Cover

Career
Development

Cutting-Edge
Technology

Fundamental
Training

High ROI

Industry
Leaders

Leading
R&D

Networking

Practical
Application

Targeted
Leads



Grand Opening

Featuring IGTI Awards Program & Turbo Expo Keynote Session Monday, June 3, 2013 • 10:15 a.m. – 12:15 p.m.

Join thousands of turbomachinery professionals at the year's most commanding gathering of business leaders, technology contributors, and authorities in the field of turbines. It is an ideal occasion to gather essential marketplace insights, learn about pivotal achievements, and connect with colleagues from around the world.

The program opens with IGTI's annual awards program to honor individuals who have made significant contributions to advance turbine technology and industry. Following the awards program, prominent experts from the turbomachinery industry will address the important keynote theme *Trends in the Global Energy Supply and Implications for the Turbomachinery Industry*.

Turbomachinery plays a critical role in the global energy industry, especially in transportation, power generation, and oil & gas sectors. In recent years, the global energy supply has been undergoing momentous changes. First, increased environmental concerns have led to a significant push for renewable energy sources. Second, the renaissance of the nuclear age has been called into question due to the 2011 tsunami in Japan. Third, substantial additional oil sources have been identified worldwide; but the technical challenges to developing these reserves are significant. Furthermore, the political events in the Middle East and rising demand have added to the uncertainty regarding the global supply of oil. Fourth, the global gas supply is undergoing a "revolution" with the coming online of shale gas, especially in North America. So what does all this imply for those of us in the fields of gas turbines, steam turbines, and other turbomachinery? In the keynote session, leaders of the aviation, oil & gas, and power generation industries will examine the changes that are occurring in the global energy supply and discuss what technologies may be needed in light of such changes.



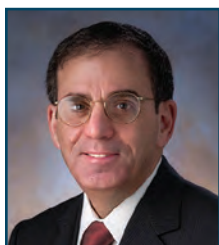
Executive Conference Chair
Bernhard Winkelmann
Solar Turbines
San Diego, CA USA



Chair of Conferences
Dr. Seung Jin Song
Seoul National University
Seoul, Korea



ASME Turbo Expo 2013 Keynote Speakers



Dr. Alan Epstein
Vice President,
Technology and
Environments
Pratt & Whitney



Stuart Jeffries
Facilities Engineering
Manager
ExxonMobil
Production Co.



Vinod Philip
Engineering Head
Siemens Gas Turbines

Opening Session

Monday, June 3, 2013 • 10:15 a.m. – 12:15 p.m.

Featuring IGTI Awards Presentations and Turbo Expo Keynote

Networking

Career
Development

High ROI

Welcome Reception

Monday, June 3, 2013 • 7:00 – 8:30 p.m.

All Turbo Expo registrants are invited to join their colleagues for complimentary light refreshments during the Monday evening event brought to you by the Turbo Expo 2013 Local Liaison Committee.

Daily Lunches

All 5-day Technical Conference registrants will be automatically ticketed for complimentary lunches on Monday - Thursday. 3-day Technical Conference registrants will receive complimentary lunches on the days they are registered for the conference.

Expo Hall Receptions

Tuesday & Wednesday, June 4 & 5, 2013 • 5:00 – 6:30 p.m.

All registered delegates are invited to the Expo Hall for complimentary refreshments and to join their colleagues in learning about the products and services of the industry's top companies.

Women Working in Turbomachinery Networking Reception & Dinner

Tuesday, June 4, 2013 • 8:00 - 11:00 p.m. • Sponsored by GE Aviation and Siemens



SIEMENS

Female registrants are invited to join their colleagues for a complimentary networking event that will feature a talk by Jeanne Rosario, Vice President of Aviation Engineering, GE Aviation and Taryn Riley, Engineering Manager, Gas Turbine Technology, Siemens Energy. This is a unique and rewarding opportunity – one you do not want to miss. Be sure to **RSVP when you receive your email invitation!**

Early Career Engineer & Student Mixer

Wednesday, June 5, 2013 • 6:45 – 8:00 p.m.

Network with fellow engineering students and early career engineers while enjoying complimentary refreshments.

Exposition Closing Ceremony

Thursday, June 6, 2013 • 1:45 p.m. • Expo Hall

Please join us as we announce the winners of booth displays, recognize outgoing Committee Chairs and announce plans for Turbo Expo 2014 in Dusseldorf, Germany.

“The Turbo Expo exhibit allows for open communication with industry experts, an opportunity for developing/cultivating new and/or existing vendor/OEM/customer relationships and most importantly is a gauge for the “health” and “face” of the gas turbine industry in a changing world.”

- Joseph.Simonetti, Chief Engineer, Vericor Power Systems

ASME International Gas Turbine Institute Pre-Conference Training Workshops

SATURDAY, JUNE 1, 2013

Gas Turbine Component Life Prediction and Life Cycle Management

This intensive one day workshop offered by Life Prediction Technologies Inc. (LPTi) is designed primarily for mechanical and industrial engineers engaged in the design, operation, maintenance and overhaul of gas turbine engines and other types of turbomachinery. The focus will be on factors affecting the deterioration of engine components and on ways of ensuring the continued safe operation of life-limited components. The modes and rates of damage accumulation, and hence life, are intimately related to operating conditions of engine speed, temperature, and gaseous environment as well as the materials used in component fabrication. The course will enable the attendees to become better acquainted with the life prediction procedures and latest developments in the life cycle management of aging engines.

Earn 7 Professional Development Hours (PDH's) and receive a certificate of completion!

Instructor: Ashok Koul, Ph.D, P.Eng., FASM, Life Prediction Technologies Inc.

Introduction to Industrial Gas Turbine Operation & Maintenance

This workshop will familiarize people from all aspects of the gas turbine academic, manufacturing and after market segments of the GT business on an introductory level. The objective of this training workshop is to improve the student's total understanding of the starting & operation of gas turbines and the lifetime effects on maintenance & parts replacement in the after-market. **Earn 7 Professional Development Hours (PDH's) and receive a certificate of completion!**

Instructor: Ron Natole, NATOLE TURBINE ENTERPRISES (NTE)

Fundamental
Training

Career
Development

High ROI

For more information about ASME-IGTI Courses, please visit:

<http://www.asmeconferences.org/TE2013/ShortCourses.cfm>

or contact Shirley Barton at +1.404.847.0072. Ext. 1647 or bartons@asme.org

For more information on IGTI training events please visit:
<http://igti.asme.org/>

SATURDAY & SUNDAY, JUNE 1 & 2, 2013

IGTI is proud to be partnering with von Karman Institute for Fluid Dynamics (VKI) to offer this workshop modeled from their week-long lecture series:

Advances in Turbines Aero-thermo-mechanical Design and Analysis

The present multidisciplinary Lecture Series addresses the current state of the art in the design and analysis of axial turbines. Both aerodynamic, heat transfer and mechanical concepts are developed by authors coming from industry, governmental and research agencies and universities. After completing the course the participants should be able to understand the aero design process of high pressure turbines; identify the relevance of unsteadiness in low pressure and high pressure turbines; list techniques to refrigerate the turbine tip; and identify the process to evaluate the force response. **Earn 14 Professional Development Hours (PDH's) and receive a certificate of completion!**

Instructors: Dr. Guillermo Paniagua, von Karman Institute for Fluid Dynamics; Dr. Ron Bunker, GE Global Research Center; Dr. John Clark, Air Force Research Laboratory; Dr. Frank Haselbach, Rolls-Royce; Dr. Eric Seinturier, Turbomeca; Raul Vazquez Diaz, ITP, and John Coull, Whittle Laboratory University of Cambridge; Dr. Roger Davis, U. of California

Introduction to Optimization Methods and Tools for Multidisciplinary Design in Turbomachinery

Modern innovative designs with higher loads and more compact configurations increasingly call for a concurrent design procedure to take into account interactions among multi-components and multi-disciplines at the same time. Innovative optimization methods are now rapidly moving from research labs to industrial real and virtual platforms and intend to provide novel and innovative design solutions in a reduced time to market. This workshop intends to provide the basic concepts and tools behind this technology. After completing the course the participants should have a global understanding of different optimization techniques; understand the adjoint method and differential evolution techniques through industrial relevant applications; understand the technical and non-technical barriers to a routine use of optimization techniques and appreciate why these techniques are important; and identify pitfalls and have notions on how to efficiently parameterize various turbomachinery components through many examples. **Earn 14 Professional Development Hours (PDH's) and receive a certificate of completion!**

Instructors: Professor L. He, Oxford University; Dr. Shahrokh Shahpar, Rolls-Royce; Dr. Tom Verstraete, Von Karman Institute for Fluid Dynamics

SATURDAY & SUNDAY, JUNE 1 & 2, 2013

Gas Turbine Aerothermodynamics and Performance Calculations

This interactive course provides review and reinforcement of relevant thermodynamic and aerodynamic concepts as applied to gas turbine engines, and introduces performance calculation methods of both aircraft engine and power generation gas turbines. The course emphasizes fundamentals which will be helpful for the practicing engineer but is not designed to review industrial practices which are usually proprietary. The acquired knowledge and problem solving opportunity will enhance the participants' ability to excel in various assignments in gas turbine design, development, and application. Participants will work out typical problems in the class during recitation sessions facilitated by the instructor. The course material has been evaluated by the Department of Mechanical and Aerospace Engineering of North Carolina State University. After completing the course the participants should be able to apply aerothermodynamic concepts to the analysis of gas turbine engines; analyze turbomachinery velocity diagrams and relate those to thermodynamic parameters; appreciate the usefulness of the degree of reaction and the radial equilibrium equation; comprehend the discipline of operability and combustor characteristics; analyze cycle analysis problems in class on integrating the component performances to get the overall engine performance. Problems include both aircraft engine and shaft power cycles; and comprehend: The method of sizing the critical flow path areas at the design point; method of satisfying conservation laws to achieve cycle balance at off-design; technique of the multivariable solver used in cycle models; and various engine cycles in the power generation field. **Earn 14 Professional Development Hours (PDH's) and receive a certificate of completion!**

Instructor: Syed J. Khalid, *Rolls-Royce North America*

SUNDAY, JUNE 2, 2013

Primer on Cogeneration/CHP Technologies

Attendees will learn the basics of Cogeneration/CHP (Combined Heat and Power) technologies including various practical considerations and rules of thumb relating to the key topics listed below on technologies currently used and also under development for enhanced performance. Cogeneration/CHP technologies are gaining renewed attention globally as a means of effective utilization of available energy resources. After completing the course the participants will have a comprehensive overview of Cogeneration/CHP technologies (matured and emerging); take away practical considerations regarding issues in design, evaluation, and operation & maintenance; and have a greater understanding of Cogeneration/CHP applications through case studies. **Earn 7 Professional Development Hours (PDH's) and receive a certificate of completion!**

Instructors: Rakesh Bhargava, Ph.D., *Hess Corporation*;
Cyrus Meher-Homji, P.E., *Bechtel Corporation*; Manfred Klein, MA
Klein & Assoc.; Steve Ingistov, P.E., *Watson Cogeneration Facility*

SUNDAY, JUNE 2, 2013

Nonisentropic Compressible Flows in Gas Turbine Design

Nonisentropic compressible flows are ubiquitous in gas turbines in their inlet systems, compressors, combustors, turbines, and the exhaust systems. They are, however, generally counter-intuitive. For example, it defies common sense that the wall friction accelerates a subsonic compressible flow in a constant-area duct with or without heating. This workshop will provide a comprehensive review and reinforcement of the key concepts of one-dimensional compressible flows with area change, friction, heat transfer, and rotation. These nonisentropic flows form the basis for the physics-based design of various gas turbine components, particularly in their preliminary/conceptual design phases. After completing the course the participants will develop a unique insight into the basic theory and concepts of isentropic and nonisentropic compressible flows, including the coupled effects of friction, heat transfer, and rotation; will develop a strong foundation in the physics-based design of various gas turbine components; will be more knowledgeable in developing physics-based compressible flow models and applying accurate boundary conditions; will be more knowledgeable in correctly interpreting results of their compressible flow design analyses; will develop skills to hand-calculate compressible flow results to perform sanity-checks of predictions by design tools as well as validate these tools during their development; and will improve their engineering productivity with reduced design cycle time. **Earn 7 Professional Development Hours (PDH's) and receive a certificate of completion!**

Instructor: Dr. Bijay (BJ) K. Sultanian, PE, MBA, *Siemens*

Wind Turbine Blade: Design, Certification and Simulation

This workshop will address Wind Turbine Blade Design: Practices, Challenges and Future Developments; Wind Turbine Blade Certification: Walk-through the IEC 61400 certification process; and Wind Turbine Blade Design and Simulation: Overview of blade design tools and introduction to aeroelastic load simulations and design loads for wind turbine certification. After completing the course, the participants should gain insight of improved knowledge about theoretical approaches employed in aerodynamic design of wind turbine blades; knowledge about current state of the art in design codes; appreciation of design & operation challenges of current wind turbine aerodynamic designs; and knowledge about the state of research in wind turbine aerodynamic design. Each registered participant will receive the Wind Turbine Technology: Fundamental Concepts in Wind Turbine Engineering, Second Edition book, a \$199 value. **Earn 7.5 Professional Development Hours (PDH's) and receive a certificate of completion!**

Instructor: Dr. George Pechlivanoglou, *SMART BLADE GmbH*

Wind Turbine Blade: Design, Certification, and Simulation must be registered separately [here](#).

The Exposition

Turbo Expo delegates represent an impressive array of segments from throughout the global turbine technology community with major influence on developing trends and products.

Maximize your marketing dollar and join your industry peers in a leading exhibition event – the 58th ASME Turbo Expo.

Companies wanting to showcase their emerging technologies will find the Turbo Expo exhibit the perfect venue to seed long-term mindshare to top tier professionals in the turbomachinery profession. The annual event includes technical sessions, tutorials, panel discussions, trade show exhibits, committee meetings, career development and abundant networking opportunities.

The 3-day Exposition will be held June 4-6 with some value added activities to promote traffic! Daily lunches in the Expo Hall are included in the registration package for delegates and exhibitors as well as afternoon networking receptions with complimentary refreshments.

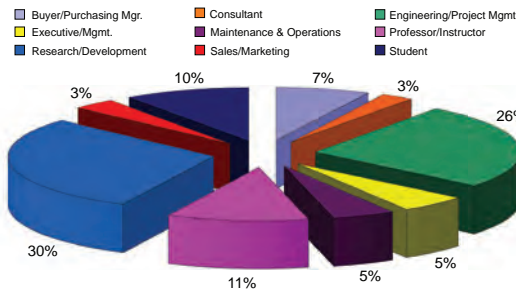
“At Turbo Expo, we have more high level engineering managers visit our booth than other Shows we attend.”

- Ken Klapper, Sales Engineering Manager, BryCoat, Inc.

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

Turbo Expo brings together the top players in the turbomachinery industry and academia - attracting a key audience from aerospace, power generation and other prime mover-related industries. Exhibitors who participated at Turbo Expo 2011 in Vancouver, Canada reported a high-level of satisfaction with the exposition:

98% rated their overall experience as satisfactory or better



97% rated the quality of traffic as satisfactory or better

Targeted Leads

High ROI

Practical Application

Exposition Information

Exhibit space is limited – Booking early will ensure the best location. Contact IGTI today!

IGTI Expositions Department | Phone: +1 404-847-0072 x1646 | Email: igtiexpo@asme.org

Pricing

Exhibit space rates for ASME Turbo Expo 2013 in San Antonio, Texas USA:

Booth Space: \$29.00 USD per square foot (For island or corner booths, add \$2.00 USD per sq. ft)

Booth Space Purchase Includes: 3 complimentary booth personnel badges* per 100sf of space, complimentary customer invitations for free admission to the exhibit, significantly discounted Technical Conference registration for company employees, pre and post-Show attendee lists, discounted advertising opportunities, exhibitor listing in the Advance and Final Programs, product category and company description in the online exhibitor directory and final printed program.

*Booth Personnel Badges include: Tuesday, Wednesday and Thursday exhibit hall lunches, Keynote and Opening Luncheon (RSVP required), entrance into the exhibit hall prior to and after exhibit hours.

Booth Details: Each exhibit space will include a black 8-foot high back drape, 3-foot high black side drapes and an exhibitor identification sign. (All other booth furnishings such as carpeting, tables and chairs can be purchased from the Show Decorator through the online Exhibitor Service Center.)

Exhibiting companies can upgrade to a hard wall booth packages purchased from the Show Decorator.

To Reserve Space at ASME TURBO EXPO 2013

View the online floor plan and secure your space by returning the online space request form at: www.asmeconferences.org/TE2013/Exposition.cfm. We look forward to hearing from you.

Exposition Hours...

Tuesday, June 4
12:30 – 6:30pm

Wednesday, June 5
12:30 – 6:30pm

Thursday, June 6
11:30am – 2:30pm

Why You Should Be on the Turbo Expo Show Floor

To Close Deals & Sell More Product/Services

To Remain "Top of Mind" for Prospects and Existing Customers

To Make High Quality Connections

When you exhibit at Turbo Expo, you will be among other key industry players. For a complete listing, visit: www.turboexpo.org. Book your booth now for prime space availability and see how Turbo Expo can generate bottom-line results for your marketing dollars.

Attendees will be looking for exhibitors in the following areas of turbomachinery:

- Aircraft gas turbines and related technology
- Ceramic technology and its application to gas turbine and other heat engines
- Technologies needed to convert and use coal, biomass and alternate fuels
- Gas turbine combustion and fuels
- Development of control, diagnostic and instrumentation systems for turbine-driven equipment
- Innovative cycles for power production
- Turbines within the electric utility industry
- Heat transfer in turbines
- Turbines within the process and cogeneration industries
- Materials, such as the repair and manufacture of coatings and base materials, in turbine power plants
- Marine turbine engines and related systems
- Turbines and small turbomachines in propulsion systems
- Turbine applications and user experience, including equipment for use on pipelines and other raw hydrocarbon processes
- Vibration, modeling, life management in turbines
- Aero/thermodynamics of turbomachines and related equipment
- Wind energy, and more

"Quite often the exhibitors will find a means of improving their products from the research knowledge that has been presented in the Technical Congress."

- David Wisler, Manager of University Programs, GE Aircraft Engines

Exhibitor List (as of 12/10/12)

Advanced Design Technology Ltd.	Capture 3D, Inc.	Gas Turbo Technology JSC	Measurement Specialties	Präwest Präzisionswerkstätten
AeroBearings	CD-adapco	GE	Mee Industries Inc.	Dr.-Ing. Heinz-Rudolf Jung
Aeroprobe Corporation	CFturbo Software	GMRC	MMP Technology	GmbH & Co.
Aikoku Alpha Corp. AP (Aero Precision) Division	& Engineering GmbH	Haynes International, Inc.	MTU Aero Engines North America	Pratt & Whitney
Air Movement and Control Association International	Cincinnati Thermal Spray, Inc.	IMI Sensors	National Aeronautics and Space Administration (NASA)	Reaction Design
Altair Engineering	Cogeneration and Onsite Power Production	INTERCEPT Technology Group, c/o COMPtrade Technologies GmbH	NORD-LOCK Inc.	Reef Industries Inc
American Institute of Aeronautics and Astronautics (AIAA)	Concepts NREC	International Thermal Spray Association	NRC Institute for Aerospace Research	S2M SKF
American Society of Mechanical Engineers (ASME)	Corac Group Plc.	Ionbond, Inc.	NUMECA International	Scanivalve
AneCom AeroTest GmbH	Data Physics Corporation	Ipsen, Inc.	Olympus	SIMULIA
ANSYS	DGA Aero-engine Testing	JSC Metallurgical Plant	OPRA Turbines BV	SoftInWay Inc.
ARI Industries Inc (Okazaki)	Diesel & Gas Turbine Worldwide	ELECTROSTAL	OROS	Southwest Research Institute
ASME International Gas Turbine Institute (IGTI)	Dresser-Rand	KARALIT srl	Oxsensis	Structural Vibration Solutions A/S
ASME Turbo Expo 2014	E+A	Korean Society of Mechanical Engineers, The	Pal-Con, Ltd.	Telemetrie Elektronik GmbH
Calnetix	ECO PHYSICS, INC.	Kulite Semiconductor Products, Inc.	Parker Hannifin	Test Devices, Inc.
Cambridge Flow Solutions Ltd	European Turbine Network	LG Tech-Link, LLC	PCA Engineers Limited	THERMOCOAX
Canadian Society for Mechanical Engineering	EXOSENT Engineering	LPP Combustion, LLC	Petrotech, Inc.	Torquemeters Ltd.
	Florida Turbine Technologies	LSP Technologies, Inc.	Philtec, Inc.	Turbines & Diesels Magazine
	Flow Systems, Inc.		Pointwise, Inc.	Turbocam International
	Flowmaster, a Mentor Graphics Company		Pollution Equipment News	Turbomachinery International
	Gas Turbine Society of Japan			Turbomachinery Laboratory
				Tyco Thermal Controls

industry participants

ASME Turbo Expo 2013 is proud to have nearly 1,000 industry participants from all over the world. Some of our participants include GE, Siemens, Pratt & Whitney, and Rolls Royce

north america

338

south america

21

europa

389

middle east

38

africa

12

asia

171

australia

12

We are Together.

“No one entity of this arena can do it alone. This is one place where it helps to bring together that collaboration of all of the various parts of the industry and see how we can team better such that we can get a better result for the public and for the users.”

Lloyd Newton, Senior Vice President for Customer Relations and Requirement and Support for the military division of Pratt & Whitney

“Gas Turbine Engine Health Management: Past, Present and Future Trends”



**By Dr. Allan Volponi
Pratt & Whitney**



Dr. Allan Volponi has been selected as IGTI's 2013 Scholar Lecturer. The focus of his paper is to review some of the methods used in the preceding decades to address the aero-thermodynamic performance of the engine. Monitoring and analysis methods have progressed in sophistication over the past 6 decades as the gas turbine evolved in form and complexity. While much of what will be presented in this paper may equally apply to both stationary power plants and aero-engines, the emphasis will be on aero propulsion. The ever increasing cost of fuel, engine prices, spare parts, maintenance and overhaul, all contribute to the cost of an engine over its entire life cycle and diagnostics can be viewed as a means to mitigate risk in decisions that impact operational integrity which can have a profound impact on safety, such as In-Flight Shut Downs (IFSD) for aero applications, (outages for land based applications) and economic impact caused by Unscheduled Engine Removals (UERs), part life, maintenance and overhaul and the overall logistics of maintaining an aircraft fleet or power generation plants.

Dr. Allan Volponi is currently a Senior Fellow at Pratt & Whitney.

Solar[®] Turbines

A Caterpillar Company

Solar is a leader in the design, manufacture, and packaging of turbomachinery products and services for the oil, gas, and power generation industries.

www.solarturbines.com





**MARGARITAS
MARIACHI
EMPANADAS**

REGISTRATION OPEN NOON - 6:00PM

NOON - 3:00PM

COME JOIN US IN THE SAN ANTONIO CONVENTION CENTER
ON SUNDAY FOR MARGARITAS, EMPANADAS, AND AN EL
MARIACHI BAND IN CELEBRATION OF OUR NEW EARLY
REGISTRATION HOURS.



Free ASME Membership Upgrade Now Available!



Select “Gas Turbine Institute” as your primary ASME interest to receive extra member benefits!

Select “Gas Turbine Institute” as your **primary** technical division/area of interest in your ASME member profile to optimize your membership. Individuals who select “Gas Turbine Institute” as their primary interest are entitled to these additional benefits:

- One free IGTI Webinar - \$298.00 value!
- A substantial subsidy on a year’s subscription to ASME’s quarterly publications, the *Journal of Turbomachinery* or the *Journal of Engineering for Gas Turbines and Power*.
[View more details here.](#)

And best of all, **there’s no additional fee**. By upgrading, you will enhance your membership and provide IGTI financial credit from ASME that allows us to continue to provide discounted services to the gas turbine community. Your status with ASME won’t change. You’ll still receive all the great ASME benefits. So essentially, it’s like belonging to two societies for the price of one.

Changing your primary interest to “Gas Turbine Institute” is easy; simply follow these steps to update your ASME member profile:

1. Go to <https://my.asme.org/> today. This is the “Members Only” section of the ASME web site.
2. Log in with your last name and ASME member ID.
3. Under “My ASME Profile”, click “Update Professional Profile”.
4. Go to the section that says: “Select your Technical Division/Interest in order of importance,” then select “Gas Turbine Institute” in the first drop-down box.
5. Edit your other technical divisions/interests in the remaining drop-down boxes, below the box where you have selected “Gas Turbine Institute”.
6. Scroll to the bottom of the form and click “Update”.

Also, you can stop by our booth to get information and sign up!

Thank you for your support of the International Gas Turbine Institute!



LAUNCH

your career...



FUEL

your thirst for knowledge...



watch your career

SOAR!

The International Gas Turbine Institute:

Serving Gas Turbine & Turbomachinery Professionals Worldwide for 57 Years

Opportunities for YOU

- ASME Turbo Expo Volunteer, Author, Exhibitor and/or Sponsor
- Publishing technical work in world renowned forums and journals
- IGTI Sponsorship
- Honors, Awards, Scholarships and Travel Assistance
- Leadership within ASME and IGTI structure
- Specialty Conferences
- Continuing Education/Professional Development

Professional Development

- Basic and intermediate training programs on a variety of platforms
- Webinars on salient industry topics
- Product store with turbomachinery resources to enhance your career

Meeting Planning

The professional IGTI staff is available to help you develop, plan and stage all types of conferences, symposiums and other forums on topics of interest to the turbomachinery community. Take advantage of the staff's expertise and global experience. For more information, contact IGTI.

Membership

- International members from Academia, Industry and Government
- 18 Technical Committees
 - ~ Organized according to the individual fields of interest within turbomachinery technology
- 8000+ ASME members involved

Vision

- IGTI is the world's foremost vehicle for the development and dissemination of all gas turbine educational and technological information
- It is THE society for all professionals involved in the turbomachinery industry

Publications and Communications

- Gas Turbine and Turbomachinery Journals
- *Global Gas Turbine Newsletter*
- Technical Papers & Proceedings
- Networking
 - ~ Online Membership Directory
 - ~ Facebook/Twitter/LinkedIn

Honors, Awards, Scholarships

- Honors and Awards
 - ~ IGTI offers a variety of awards for achievements in the turbomachinery industry
- Conference travel assistance for early career engineers
- Scholarships
 - ~ 20 annual \$2,000 student scholarships

"The IGTI has served as the gateway for my association with the ASME. This is as true today as it was 17 years ago...It has provided education, visibility to current research and most importantly, an avenue for meeting and engaging with other gas turbine professionals in Academia, Government and Industry which has yielded fruitful associations and collaborations beyond any I have experienced within other aerospace organizations."

– Allan J. Volponi, Ph.D., ASME Fellow
Discipline Chief & Senior Fellow, Diagnostics, Prognostics and Health Management, Pratt & Whitney



Find Out More About IGTI

<http://igti.asme.org/> • +1-404-847-0072 • igti@asme.org



Technical Conference

The Technical Conference features cutting edge, state-of-the-art turbine technology from around the world. For the past few years, the conference has enhanced and expanded its leadership role in turbomachinery and broadened the program scope to include related topics from wind turbine technology, steam turbine technology, fans and blowers, supercritical CO₂ power cycles and solar power plants. Also included in the 2013 Technical Conference are sessions specifically geared toward the interests of gas turbine users.

In the following pages, the Technical Conference sessions are organized according to the professional interests of IGTI's technical committees. With the broadened scope, user focused sessions and the cutting edge gas turbine technology that ASME Turbo Expo is known for, there's sure to be countless session topics that meet your professional interests.

Broadened Scope of the 2013 Technical Conference Includes...



Steam Turbine Technology

"The technical sessions are the best part of the conference. It provides far more than I can get anywhere else."

– Robert Griffith, Caterpillar, Inc.

Wind Turbine Technology



Fans and Blowers



User Sessions

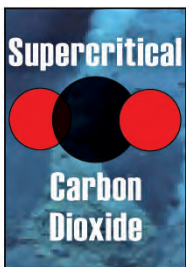
User sessions highlighted throughout the technical conference offer a great opportunity to learn about the most recent industry best practices, new technology and developments. This user focused material is arranged in a series of tutorials, panel and technical paper sessions, thus making it an ideal setting for the exchange of information with other industry practitioners. Attend these sessions to network and exchange the latest in technology and practices with other gas turbine users.



Concentrating Solar Power Plants



Supercritical CO₂ Power Cycles



Gas Turbine Users...

Look for this symbol ✨ throughout the session listings for topics of interest especially for you!

Tutorials of Basics...

ASME has always seen continuous education as an important task. At this year's Turbo Expo, industry experts from several technical committees have agreed to provide tutorials covering topics of their specific disciplines in a way that engineers from other fields find them interesting and engaging. These tutorials are ideal for engineers who want to learn about fundamentals of specific disciplines within the field of turbomachinery.

Aircraft Engine

Basics of Gas Turbine Engine Core
Jet Noise

CBAF

Gasification Tutorial

Super Critical CO₂ Power Cycles

Application of Supercritical CO₂ Power Cycles –
Fundamentals and Design Considerations Heat
Exchangers for SCO₂ Power Cycles

CFE

Basics Combustion

Fans and Blowers

The Application of Computational Methods
to Industrial Fan Design

Heat Transfer

Turbine Heat Transfer and Cooling:
An Overview Film Cooling Basics and
Reliability of RANS Based Numerical Results
for HP-Turbine Simulations

Oil and Gas Applications

Oil and Gas Applications

Turbomachinery

The Basics of Turbomachinery Design

Wind Energy Committee

Introduction to Wind Energy
Condition Monitoring of Wind Turbines





Aircraft Engine

Sessions within this track address issues of interest across a broad spectrum of aircraft engine design, development, and technology. Presenters will cover a range of topics including inlets and nozzles, modeling and simulation for steady-state and transient performance, operability, engine testing and evaluation, aircraft/engine integration, new and advanced engine concepts, "Green" (Environmentally Responsible) Technologies, Bio and Synthetic Fuels Testing and Applications, secondary flows and accessories, and near-field / far-field noise.

Additionally, two panel sessions will be conducted. One will be a session on Icing and Inclement Weather, with industry, research and regulatory agency perspectives on advancement in the understanding and management of Icing, SLD and Ice Crystal threats to propulsion systems. A second panel will be held to gain OEM Airframe and Engine manufacturers perspectives on the single aisle commercial jet business. The session, Airframe and Aircraft Engines for Single Aisle (Narrow Body) Jets, will feature industry and research experts from Airbus, Boeing, Bombardier, G.E., Pratt & Whitney and NASA. Anyone involved in aircraft engine design, development, simulation, testing, integration, current technology, and environmental issues will benefit from attending these sessions.

PANEL SESSION

- **Jet Engine Bird Ingestion - Current Issues and Ways Forward ***

TECHNICAL SESSIONS

- **Inlets and Inlet Distortion**
- **Modeling and Simulation Techniques & Cycle Analysis**
- **New Engine Concepts**
- **Nozzles & Jet Noise**
- **Oil Systems**
- **Propulsion Systems Integration**
- **Testing, Evaluation & Instrumentation**
- **Volcanic Ash & Bird Ingestion Issues**



Ceramics

Ceramics - Enabling Materials for Energy Efficient Gas Turbine Engines

Ceramics are important materials for consideration in the extreme environments found in the gas turbine engine hot sections due to their high temperature mechanical and physical properties as well as lower density than metals. The advantages of utilizing ceramic hot section components include weight reduction, improved efficiency as well as enhanced power output and lower emissions. In order to realize the potential of rotating and static ceramic components, some unique technical challenges are being overcome by the engineering community. Specific areas of research and development include: (i) Design, development and processing of monolithic ceramic and ceramic matrix composite (CMC) materials; (ii) Development, processing and characterization of Thermal and Environmental Barrier Coatings (TBCs/EBCs); (iii) Modeling and validation of material performance; (iv) Life Prediction; (v) NDE; (vi) Test methods and standards; (vii) Design and fabrication of components; (viii) Engine & laboratory testing of components. The technical and panel sessions sponsored by the ceramics committee cover breakthrough developments and demonstrations critical for the incorporation of ceramic hot section components for gas turbine engines.

TECHNICAL SESSION

- **Ceramic/CMC Component Development & Demonstration**
- **Ceramic/CMC Material Development, Assessment & Modeling**
- **CMC Development, Characterization & Modeling**
- **Thermal Barrier Coatings (TBCs)**

TUTORIAL SESSION

- **Ceramic Matrix Composites (CMCs) 101**



Coal, Biomass & Alternative Fuels

Sessions focus on high-interest topics in the area of alternative fuel systems for gas turbines, including steam turbine and other turbo-machinery technologies (e.g. Organic Rankine, Kalina etc.). Topics on current experiences and future outlook in planning, operation, problems and solutions for Integrated Gasification Combined Cycle (IGCC) and Coal/Biomass based Polygeneration Gasification plants will be covered. Another hot topic is Renewable fuels including, Biofuels, and other Wastes (RBW), usually called "biomass", which can reduce CO₂ emissions when co-used with fossil fuels. This year a specific session will be dedicated to alternative fuels for jet engines (biojet fuels). Look to this track for additional discussions on generation of hydrogen, liquid fuels, syngas and Low Calorific Value (LCV) gases. Sessions will be of interest to researchers/technologists involved in the generation and utilization of non-conventional fuels in gas turbine-based energy systems and for those wishing to start a new activity in this field. Papers are presented by academic, industrial and governmental companies/institutions from all over the world, demonstrating a significant interest not limited by geographic constraints.

PANEL SESSION

- **Current Status of Gasification Technology and IGCC with Carbon Capture**

TECHNICAL SESSIONS

- **Alternate Fuels in Gas Turbines and Power Plants**
- **Alternate Fuels for Jet Engines**
- **Alternative Fuels Combustion**
- **Clean Coal, CO₂ Abatement and IGCC**
- **Coal and Biomass Applications to Power Generation ***
- **Gasification, Pyrolysis and Syngas in Gas Turbine**
- **Modeling and Deposition of Alternate Fuels in Gas Turbines**

TUTORIAL SESSION

- **Gasification Tutorial ***



Combustion, Fuels & Emissions

The Combustion, Fuels & Emissions sessions will highlight the technology and design approaches, using both experimental and computational techniques, employed to achieve improved combustor performance including ultra-low pollutant emissions and enhanced operability such as turndown and transient response. Low specific fuel consumption and decreased CO₂ emissions require high combustor outlet temperatures, but this must be accomplished without sacrificing pollutant emissions, operability or combustor durability. Efficient operation over a broad load range and the capability to rapidly follow a given load demand is dependent on the combustor technology, and is an important challenge for combustion research. Technical sessions will include those concerning operational flexibility, the use of alternative fuels and modeling combustion instabilities. Technical presenters and session attendees will include combustion experts from government, universities, and industry.

TECHNICAL SESSIONS

- Aero Combustor Design
- Alternative Fuels I & II
- Atomization & Sprays Experimental
- Atomization & Sprays Modeling
- Chemical Kinetics
- Combustion Instabilities: Basic Research
- Combustion Instabilities: Design and Damping
- Combustion Instability: Dynamics Mechanisms I & II
- Combustion Instability: Stability Analysis I & II

TECHNICAL SESSIONS (CONTINUED)

- Combustion Instability: Transverse Modes
- Combustion Modeling: New Methods
- Combustion Modelling I & II
- Combustor CFD Application
- Combustor Design & Development I & II
- Combustor Design, Development & Diagnostics
- DLE Combustor Design
- Flashback & Blowout I & II
- Fuel Flexibility
- Fundamental Combustion
- High Hydrogen Combustion
- Ignition and Autoignition

TECHNICAL SESSIONS (CONTINUED)

- Jet-in-Crossflow Modeling & Experiments
- Novel Combustion Concepts
- Pollutant Formation - Operational Effects and Particulates
- Pollutant Emissions Formation & Control
- Pollutant Emissions: Modeling Techniques
- Premixed Flames
- Swirling Flow Modeling & Experiments

TUTORIAL SESSION

- Gas Turbine Combustion

This is the best conference for meeting a wide spectrum of people who work in the same technical field.

– John Moran, Corporate Specialist-Combustion, Rolls-Royce



Concentrating Solar Power Plants

Solar energy production has moved to the forefront of global challenges, intimately linked with global climate changes, stable economic growth, and natural resource conservation. The IGTI Concentrating Solar Power (CSP) Plant committee covers turbomachinery, energy storage, and thermodynamic cycle optimization technology for solar thermal power systems, including Brayton cycle, Rankine cycle, and hybrid power systems. Past and current CSP plants have demonstrated commercial viability but require additional research to improve efficiency and reduce costs. Papers, tutorials, and panel sessions of the CSP committee will focus on the technical, economic, and grid integration challenges surrounding the growing use of CSP plants. Key areas include:

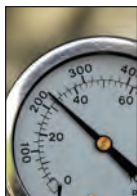
- Supercritical CO₂ and novel power cycle technologies for CSP
- Gas turbine and steam turbines for CSP
- Hybrid CSP/fossil power cycle integration
- Power management
- Life cycle and O&M
- Thermal Energy Storage

TECHNICAL SESSIONS

- Solar Combined Cycle
- Solar Gas Turbines and Gas-Turbine Hybrids

TUTORIAL SESSION

- Introduction to Concentrating Solar Power Plants ✨



Controls, Diagnostics & Instrumentation

The Controls, Diagnostics & Instrumentation track will host both technical and panel sessions that will closely examine the global challenges associated with Gas Turbine Engine Technology. These will include the latest developments in gas turbine engine control, engine prognostics, diagnostics and health management, artificial intelligence, and engine instrumentation technology, and the impact these technologies have in enabling more efficient and lower emissions engines and reducing engine operating costs.

PANEL SESSIONS

- Active Clearance Measurement in a Hot Zone
- Future of Aircraft Engine Control and the Challenges in Getting There *

TECHNICAL SESSIONS

- Aircraft Engine Distributed Controls and Energy Management (joint session with Aircraft Engine Committee)
- Controls I
- Electric Controls and Accessories
- Gas Path Diagnostics
- Modeling for Controls and Diagnostics Applications
- Pressure Probes and Pressure Measurement
- Topics in Diagnostics
- Topics in Gas Turbine Sensing, Monitoring and Control
- Topics in Instrumentation I
- Topics in Instrumentation II

“For anybody who is considering exhibiting at the very many conferences that are out there, the reason they should seriously consider Turbo Expo is that this is a unique opportunity to present to the leading scientists and parts developers and manufacturing contacts as well as the secondary industries that support the design, manufacturing and assembly of new gas turbines”

– Ron Natole, Chairman of Board of Directors for IGT1 and owner of Natole Turbine Enterprises, Inc



Cycle Innovations

Cycle Innovations sessions are focused on innovative and advanced simple or combined cycles dedicated to improve thermal efficiency, mitigate greenhouse gas emissions and enhance the operational flexibility in power generation and energy conversion systems. Cycle for new propulsion systems like pulse detonation engines and wave rotor cycles are also studied, aiming to reduce fuel consumption and environmental impacts. Thematic sessions present the audience with the latest findings about CO₂ abatement and low emission cycles, advanced gasification cycles, fuel cell driven cycles, mixed air-water-steam cycles, utilisation of unconventional working fluids in Brayton/Rankine cycles, techno-economic performance analysis, thermal cycle performance and health analysis, and optimisation. These topics are vital for people working in advanced thermodynamic cycles, propulsion systems, power production, energy conversion and environmental sustainability.

TECHNICAL SESSIONS

- CO₂ Abatement Cycles
- Cycle Performance I, II, III & IV
- Fuel Cell Driven Systems
- Low Emission and Environmental Cycles
- Novel Cycles
- Techno-economic Assessment

TUTORIAL SESSION

- Introduction to Thermodynamics for Gas Turbine Cycles & Cycle Simulation Tools *



Education

Sessions encompass gas turbine education both in the university and in industry. Specific teaching tools and techniques will be discussed, including for large scale remote education, along with industry opportunities for gas turbine engineers. Anyone interested in gas turbine engineering education is welcome, from students to PhDs. Academics will be exposed to ideas being used at other institutions. Industry will have an opportunity to interact with educators to discuss relevant topic areas. Discussions here have the potential to influence engineering education for a positive impact on future gas turbine engineers.

TECHNICAL SESSIONS

- Capstone Design
- Education I, II & III



Electric Power

The Electric Power Committee organizes panels and technical sessions that deal with the gas turbine as a major component of a power plant, its integration into the power plant and optimization of power plant components, as well as optimization of the overall plant. Paper sessions on these topics will be complemented by panel sessions to discuss the future pathway of gas turbines and combined cycle power plants. Another panel session will explore owner and operator experiences with today's gas turbines, to talk about owner/operator "wish lists" going forward and to provide further feedback to the industry. Presenters will include not only original equipment manufacturers and industry service providers, but owners and operators as well.

PANEL SESSIONS

- **Electric Utilities Strategies for Beneficial Use of CO₂ Emissions ***
- **Gas Turbine Combined Cycle Power Plant Projects - EPC Perspective ***
- **The Pathway Forward: Future Gas Turbine Products and Technologies - OEM Perspective ***
- **Voice of the Customer: Users' Voice and Experience of Gas Turbine Technology ***

TECHNICAL SESSIONS

- **GT Fuel Flexibility ***
- **GT O&M, Monitoring and Diagnostics ***
- **GT Operational Flexibility ***
- **GT Simple and Combined Cycle Design and Optimization ***

"The IGTI ASME Gas Turbine Expo is perhaps the most technically advanced assembly of users, designers and developers of gas turbine components in the world."

"Everyone who is doing groundbreaking work in the gas turbine community comes to the Gas Turbine Expo."

"If you really want to have a visibility in this arena you really have to be at the IGTI Gas Turbine Expo."

– CD adapco Group – Bill Clark, Director of Advanced Methods Development and Bill Wheeler, Vice President of Engineering



Fans & Blowers

Fans and blowers consume approximately 20% of all electricity generated, with manufacturers increasingly focusing on improving fan efficiency in response to legislative pressure that has been introduced as a part of the industry response to global climate change.

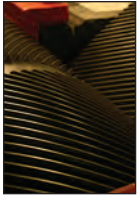
The academia-industry collaboration and the up-front use of Computational Fluid Dynamics and Experimental Fluid Dynamics are the key ingredients that facilitate the evolution from traditional empirical to computational design methodologies. In response to these challenges, the Fans and Blowers initiative focuses on current issues associated with fans and blowers intended for non-aerospace applications. The initiative considers all technical aspects associated with fans and blowers, with a special emphasis on:

- Aerodynamics design and optimization
- Fan noise, acoustic prediction and innovative noise reduction
- Structures & drive train dynamics
- Controls, diagnostics & instrumentation
- Materials & manufacturing
- Maintenance, repair & life time management

TECHNICAL SESSIONS

- **Centrifugal Fans & Blowers**
- **Fan Design, Test and Operations**
- **Fan Noise: Design, Control and Experiments**
- **Unsteady Flows and Limiting Phenomena in Fans**





Heat Transfer

Heat transfer is a pacing technology in the development of advanced high-performance gas turbines for aircraft propulsion and power generation in both simple and combined cycle operations. The heat transfer sessions offered at Turbo Expo relate to every aspect of the state-of-the-art heat transfer design of turbomachinery. Heat transfer topics are subdivided into seven tracks, each encompassing a particular heat transfer focus area. The new Conjugate Heat Transfer track with four sessions presents the latest methodology of performing conjugate heat transfer computations for the design of several critical gas turbine components. The new Internal Cooling track with ten sessions presents all aspects of internal cooling technology for the design of turbine blades and vanes and adjacent hot sections. These sessions present advanced cooling techniques with impingement and turbulators, including some innovative design concepts. Fourteen sessions in the Film Cooling track offer a wide range of information related to the developments and recent research on film cooling that contributes significantly to heat transfer advancement in cooled turbomachinery components. This track is highlighted with sessions detailing novel film cooling systems, film cooling optimization and recent advances of the numerical and computational methods suitable for advanced film cooling design and performance. The General Interest track with seven sessions covers a broad range of topics from fundamental heat transfer research to the development of advanced CFD/heat transfer tools and methods. A separate track on Internal Air Systems and Seals with six sessions is offered jointly with the Turbomachinery Committee, and represents a key area of gas turbine cooling and sealing technology. Sessions in this track are organized with papers to better understand hot gas ingestion, pressure loss, free and forced convection heat transfer on rotating surfaces and in closed cavities, leading to innovative sealing systems and cooling air delivery concepts. In addition to component-level investigations, system level studies that focus on the combustor-turbine interaction and include real engine effects such as contaminant build-up and deposition are presented in the Combustors track that is held jointly with the Combustion, Fuels and Emissions Committee. The Structures track is organized jointly with the Structures & Dynamics Committee, and presents papers on probabilistic thermal/structures analysis for robust design and predictable life of critical components. The new Tutorials track presents three “basic” tutorial sessions on internal cooling, film cooling, and RANS CFD validation for the benefit of wider audience who are not specialized in heat transfer, but would like to understand why heat transfer technology plays a critical role in design and development of advanced gas turbines.

Combustors

(with Combustion, Fuels & Emissions)

TECHNICAL SESSIONS

- Combustor Related Heat Transfer & Flow
- Computational Heat Transfer Applied to Combustor Designs

Conjugate Heat Transfer

TECHNICAL SESSION

- Conjugate Heat Transfer I, II, III & IV

Film Cooling

TECHNICAL SESSION

- 3D Flow Field Measurements in Film Cooling
- Blade Tip and Platform Film Cooling
- CFD Simulation of Film Cooling I & II
- Effusion Film Cooling
- Endwall Film Cooling I & II
- General Film Cooling I & II
- Leading Edge and Trailing Edge Film Cooling
- Mist/Air Film Cooling
- Novel Film Cooling I & II
- Unsteady Effects in Film Cooling

General Interest

TECHNICAL SESSIONS

- Computational Heat Transfer Studies
- Endwall and Blade Tip Heat Transfer
- Experimental Test Techniques I & II
- General Heat Transfer I & II
- Numerical Studies with Experimental Validation

Internal Air Systems & Seals

(with Turbomachinery)

TECHNICAL SESSIONS

- Brush and Leaf Seals
- Compliant Seals
- Fluid System Integration
- Labyrinth and Annular Seals
- Rim Seals & Rotor Stator Cavities
- Rotating Cavities

Internal Cooling

TECHNICAL SESSIONS

- General Internal Cooling I & II
- Impingement Internal Cooling I, II & III
- Innovative Internal Cooling
- Turbulated Internal Cooling I, II, III & IV

Structures

(with Structures & Dynamics)

TECHNICAL SESSION

- Probabilistic Thermal/Structural Analysis

Tutorials

TUTORIAL SESSIONS

- Film Cooling Basics and Reliability of RANS Based Numerical Results for HP-Turbine Simulations
- Turbine Heat Transfer and Cooling: An Overview ✨





Industrial & Cogeneration

Representing gas turbine applications within the cogeneration and process industries, technical sessions in this track cover a wide range of topics including thermo-economic analysis of Combined Heat and Power (CHP) Systems, applications of cogeneration in LNG plants, hybrid cogeneration systems (combined with fuel cells, Organic Rankine cycles, etc.), optimization and simulation methods, design and operation & maintenance aspects of Heat Recovery Steam Generators, operation & maintenance issues of cogeneration plants, gas turbine power augmentation technologies (inlet cooling, high pressure fogging, and wet compression or overspray), steam turbine and reciprocating engine based CHP systems, compressor fouling, inlet filtration systems, compressor washing, gas turbine upgrades and modifications, environmental and regulatory issues of cogeneration plants, and field experiences & case studies.

Panel/Tutorial sessions cover topics on cogeneration technologies, optimization and simulation of cogeneration systems, compressor washing technologies, inlet filtration systems, gas turbine power augmentation technologies, and gas turbine combustion processes and emissions standards.

PANEL SESSION

- **Executives Roundtable - Powering the Oil & Gas Shale Plays ***

TECHNICAL SESSIONS

- **GT Power Augmentation Technologies ***
- **Operational & Maintenance Aspects ***
- **Selected Topics ***
- **Techno-Economic Evaluation - CHP Systems ***
- **Wet Compression ***

TUTORIAL SESSIONS

- **Combustion and Emissions ***
- **Compressor Washing ***



Manufacturing Materials & Metallurgy

The current global challenges toward a sustainable future in energy use and environmental concerns demand higher efficiency and reliability as well as greater flexibility in fuel and mode of operation together with lower life-cycle cost of turbomachinery. Materials with higher strength, lighter weight and improved durability are required for these applications. The continuing development in metallurgy and materials science has resulted in newer materials, better surface protecting methods, and more reliable component life. Development in manufacturing technologies, including better process planning/optimization, advance machining operations, newer coating and repair methods, helps to reduce the manufacturing cost and increase overall cost of gas turbines. Condition assessment of parts after service and advanced repairs are required to further reduce life cycle cost and impact to the environment. The MMM committee is organized to disseminate the latest developments and research results in the areas of manufacturing, materials and metallurgy to gas and steam turbine designers, manufacturers, users, repair and service vendors, researchers and consultants. In addition to technical paper sessions, panel sessions are planned where highly experienced panel members will discuss their latest experiences and knowledge in manufacturing methods, repair/coating processes and component inspections. Tutorials and lectures will be given on gas turbine operations and maintenance and other topics.

PANEL SESSIONS

- **Coatings ***
- **Latest Improvements of Established Key IGT Reconditioning Processes and Emerging Technologies ***
- **Manufacturing ***
- **Material and Coating Needs for Advanced Gas Turbines of the Future ***
- **Rotor Life Assessment and Extension ***

TECHNICAL SESSIONS

- **Coatings ***
- **Manufacturing ***
- **Repair and Basic Metallurgy ***

TUTORIAL SESSION

- **Introduction to Industrial Gas Turbine Operation & Maintenance ***



Marine

Sessions showcase the latest developments and best practices for gas turbines in marine power and propulsion systems. Paper subjects cover a wide variety of gas turbine related topics ranging from installation design, testing, controls development, optimized maintenance practices and Condition Based Maintenance (CBM), in-service failures, and engine design and development in both commercial and naval applications. In addition, there will be papers on optimizing propeller design and test results from real time torque measurement integrated into engine control. A Marine Gas Turbine Intake system paper will be presented as well. Lastly, a paper with results of engine tests with an HRD 76 fuel blend will be presented.

PANEL SESSION

- **Gas Turbine Waste Heat Recovery for Marine Applications ***

TECHNICAL SESSIONS

- **Gas Turbine Applications and Operational Experience ***
- **Gas Turbine Control Systems ***
- **Gas Turbine Design & Development ***
- **Gas Turbine Testing and Performance ***



Microturbines, Turbochargers & Small Turbomachines

Microturbines and small turbomachinery continue to capture a growing sector of the energy industry, and a growing demand for lower emissions and the use of alternative biomass fuels has led to a number of innovations in the area of microturbine combustion. The efficiency benefits of microturbines for onsite cogeneration and recuperators applicable to gas turbines of all power levels continue to have increased relevance in today's energy climate. The technical advancements of microturbines and recuperators are once again highlighted in this year's sessions, along with combustion and emissions innovations and the utilization of biomass fuels. Microturbine use in combined cycles and hybrid systems will also be explored. The track also features an increasing number of papers devoted to advances in turbochargers for use in cars and trucks, covering the areas of Concepts & Systems, Design & optimization, and Unsteady & Pulsating Flow.

TECHNICAL SESSIONS

- **Alternative Cycles & Systems**
- **Combustions & Alternative Fuels**
- **Component Design, Optimization & Performance**
- **Materials Development, Selection & Testing**
- **Rotordynamics & Bearings with an Emphasis on Turbochargers**
- **Turbocharger: Aero Analysis and Optimization**
- **Turbocharger: Concepts & Systems I & II**
- **Turbocharger: Variable Geometry Turbines**



Oil & Gas Applications

The Oil & Gas industry is rapidly changing in recent years following sudden changes in energy sources availability and, consequently, of the related market. In this framework, operation and optimization of turbomachinery in a variety of Oil & Gas applications is of primary importance. Moreover, potentially extreme operation environments require the consideration of innovative design and operational attributes.

In this framework, sessions in the Oil & Gas Applications Committee address both theoretical and practical Oil & Gas industry perspectives.

The technical sessions provide the latest information on turbine equipment in pipeline and compression stations. Particular emphasis is given to design, operation and maintenance, management, dynamic behavior, diagnostics and vibration and noise, as well as to all engineering issues in Oil & Gas applications. Wet gas compression and multi-phase pumping are also addressed, due to the increasing interest in many installations.

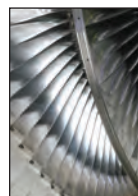
The Oil & Gas Applications Committee has also a well-established and valuable experience in panel and tutorial sessions jointly held by both academic educators and industry professionals. Both basics of Oil & Gas installations and off-design operation issues will be covered, aimed to ensure improved efficiency and safe and reliable operation. The latest information about environmental impact, product upgrade, risk assessment, standards and legislation of gas turbines and compressors in Oil & Gas applications is also provided.

TECHNICAL SESSIONS

- **CCS, Wet Gas Compression and Multi-Phase Pumping ***
- **Compression System Operation ***
- **Compression System Theory and Modeling ***
- **Engineering Issues in Oil and Gas Applications ***
- **Gas Turbine Health State Determination and Prognostics ***
- **Gas Turbine Operation and Management ***
- **Gas Turbine Performance Assessment ***

TUTORIAL SESSIONS

- **Development of a Low Varnish & Long Life Gas Turbine Oil ***
- **Modal Testing for Turbomachinery Applications: A Practical Tutorial**
- **Oil and Gas Applications ***



Steam Turbines

ASME Turbo Expo 2013 includes a track dedicated to Steam Turbines and the unique challenges associated with the design and development of the flexible and competitive products given the increased penetration of renewable energy technologies in today's power generation sector. While many of the analyses, computational methods, and experimental techniques are common for steam turbines and gas turbines, there are some unique features on steam turbines that warrant special consideration. Separate, co-located, steam turbine sessions at Turbo Expo provide a natural way of sharing many of the cutting edge technologies while giving the steam turbine community a dedicated forum for unique technical challenges associated with wet steam, large annulus last stage blades, industrial scale turbines, erosion, and more.

PANEL SESSIONS

- **Effect of Renewables on Steam Turbine Operation and Consequences on Design Requirements ***
- **Industrial Steam Turbines**

TECHNICAL SESSIONS

- **Design of Steam Turbine Components**
- **Mechanical Design of Steam Turbine Components**
- **Steam Cycle, Performance and Control**
- **Steam Turbine Blade Aeromechanics**
- **Steam Turbine Blade Path Design**
- **Steam Turbine Drum Stage Design**
- **Steam Turbine Exhaust Flow Including Last Stage Interaction I & II**
- **Steam Turbine Last Stage Blade Design**
- **Wetness Effects in Steam Turbine Stages**
- **Wetness Modelling and Measurement**



Structures & Dynamics

The expanded use of gas turbines in extreme environments introduces new demands on the structural integrity of aero- and industrial gas turbine development and operation. The program of eight Structures & Dynamics tracks, including (1) Emerging Methods in Design and Engineering, (2) Fatigue, Fracture & Life Prediction, (3) Probabilistic Methods, (4) Rotordynamics, (5) Bearing & Seal Dynamics, (6) Structural Mechanics & Vibration, (7) Damping Technologies, and (8) Aerodynamic Excitation & Damping, covers highly relevant issues concerning the mechanical integrity of gas turbine engines as well as boilers, steam and wind turbines. Papers in the Structures and Dynamics Committee deal with best-in-class structural mechanics solutions by contributing fluid, acoustic, thermodynamic, and cooling interactions, which have an impact on the reliable lifetime prediction or failure-free operation of mechanical components. Modeling and design methodologies based on analytical, numerical, probabilistic and experimental approaches are presented in 50 technical sessions organized by internationally recognized industry leaders and academic researchers. International networking is arranged among all attending engineers, designers and researchers representing industry, academia and government from different countries. All participants benefit from scientific discussions and identification of cutting edge technological news and trends in mechanical integrity for meeting today's and tomorrow's challenges in gas, steam and wind turbine industry for the best cross-product methodology synergy. The diversity of subjects covered will boost attendees' knowledge and contribute to their professional career development. The S&D panel and tutorial sessions, organized in collaboration with other Congress Committees, leverage engineers' knowledge for topics of the highest interest to the international mechanical engineering society.

Aerodynamic Excitation & Damping

(with Turbomachinery)

TECHNICAL SESSIONS

- Turbomachine Aerodynamic Interaction and Forced Response
- Turbomachine Aeroelasticity and Computational Methods I & II

Bearing & Seal Dynamics

TECHNICAL SESSIONS

- Bearings I, II & III - Modeling & Validation
- CFD Applied to Bearings and Seals
- Controllable Bearings - Theoretical & Experimental Aspects
- Gas Bearings I & II - Modeling & Experimental Validation
- Seals I - Modeling & Validation
- Squeeze Film Damper - Modeling & Experimental Testing

Damping Technologies

TECHNICAL SESSIONS

- Emerging Damping Technologies
- Friction and Nonlinear Dynamics Analysis

Emerging Methods in Design and Engineering

PANEL SESSION

- Optical Measurement Techniques and its Application to Turbomachinery

TECHNICAL SESSIONS

- Novel Approaches in Compressor & Turbine Blade Analyses
- Novel Approaches in Hybrid CFD Analyses and Creep Modelling

Fatigue, Fracture & Life Prediction

TECHNICAL SESSIONS

- Durability and Fatigue Methods for Turbomachinery
- Fatigue Crack Growth Methods for Turbomachinery
- Life Prediction of Turbomachinery Components

Probabilistic Methods

TECHNICAL SESSIONS

- Probabilistic Assessment of Manufacturing Variation in Gas Turbine Components
- Probabilistic Methods in Design and Risk Assessment of Turbine Engines
- Probabilistic Methods in Life Prediction of Turbine Engine Components

Rotordynamics

TECHNICAL SESSIONS

- Active Magnetic Bearings
- Bearings and Seals Influences I & II
- Condition Monitoring and Malfunctions
- Modeling and Experiments
- Rotordynamic Analysis I & II

Structural Mechanics & Vibration

TECHNICAL SESSIONS

- Bladed Disk Design and Rotor/Stator Interaction
- Bladed Disk Mistuning Modelling
- Coupled Dynamics
- Forced Response and Aeromechanical Coupling
- Non Linear Vibration and Damping
- Structures Design Techniques
- Vibration Advanced Measurement





Supercritical CO₂ Power Cycles

Supercritical CO₂ based power cycles have significant relevance to thermal solar, nuclear and fossil fuel power generation applications. Additionally there is considerable interest in the efficient separation, compression, transportation, and storage (geologic) of CO₂ from fossil fuel power plants. At the same time the approach to geologic storage of CO₂ will benefit greatly from the existing technology and knowledge amassed around CO₂ utilization and management in the oil & gas industry. While the end goals of the CO₂ based power cycles and the CO₂ storage applications are different the properties of the working fluid, thermodynamics, technology and machinery used for these applications are very similar. The confluence of interests related to the use and management of supercritical CO₂ has created an imperative to further the understanding of these applications. Through IGTT's continuing mission in supporting the international exchange of information related to energy, Turbo Expo is expanding its coverage of machinery systems to cover supercritical CO₂ power cycles, related equipment, compressors for CO₂ storage, and the determination of physical and chemical properties relevant to CO₂ and CO₂ mixtures

PANEL SESSIONS

- **Heat Exchangers for Supercritical CO₂ Power Cycles**
- **Overview of Developments and Status Related to Supercritical CO₂ Power Cycles**
- **Physical Properties of Supercritical CO₂**
- **Status and Characteristics of Existing Supercritical CO₂ Test Loops**

TECHNICAL SESSIONS

- **Modeling of Supercritical CO₂ Power Cycles**
- **Supercritical CO₂ Power Cycles for Concentrating Solar Applications I & II**
- **Supercritical CO₂ Turbomachinery**
- **Supercritical CO₂ Turbomachinery and Related Equipment**
- **Test Facilities for Supercritical CO₂ Power Cycles**

TUTORIAL SESSION

- **Application of Supercritical CO₂ Power Cycles Fundamentals and Design Considerations ***



Turbomachinery

The adoption of alternative energy sources and the drive to cut fossil fuel consumption is increasing the significance of gas turbine units as the reliable main stay of power generation and propulsion to compensate for the intermittent nature of renewables. Even in the exploitation of alternative energies, efficient turbomachinery is often at the heart of the energy conversion process. More than ever, sustainable energy solutions depend upon turbomachinery designs that provide the best balance of performance, reliability and flexibility in varied and extreme operating environments.

The turbomachinery technical paper sessions offer the state-of-the art in aero/thermodynamics of turbomachinery, covering compressors and turbines of axial, radial and mixed flow configurations. The technical sessions encompass both axial and radial flow compressors and turbines, and include topics such as design strategies for enhanced performance, CFD methods and optimization, real geometry influences, steam turbine aerodynamics, component interaction and integration effects, investigation of component loss mechanisms, unsteady internal flows and aeromechanics, instabilities and their control, acoustics of rotating machinery, and gas turbine engine noise.

The leading turbomachinery engineers from academia, industry and government agencies all around the world will address topics covering aerodynamics of compressors and turbines, noise, unsteady flows and internal ducts. The latest methodologies and design strategies are included such as advanced CFD methods, component interactions, real geometry influences, component loss mechanisms, integration effects, aero-structural interactions and control of instabilities. The technical content covers not just a wide range of gas turbine applications for air and marine propulsion as well as power generation, but also encompasses other important sectors such as advanced turbocharger aerodynamics and industrial gas compression.

Joint sessions are held with the Heat Transfer, Structures, and Aircraft Committees to facilitate the most effective dissemination of technology. This integrates the breadth and depth of expertise necessary to produce the optimized interdisciplinary design solutions that will meet the challenges of operating turbomachinery systems at best performance and value in the most demanding environments. The turbomachinery committee at the ASME Turbo Expo is the established forum for sharing and challenging the leading edge of turbomachinery technology and is the meeting venue for world experts in this field.

In summary, world-renowned researchers from all around the globe will share their views and technical expertise in turbomachinery aero/thermodynamics in the quest to meet the need for reliable gas turbine engines striving for efficiency improvements, reduction of weight, low cost, and environmental compatibility.



Turbomachinery (continued)

Axial Flow Fan & Compressor Aerodynamics

TECHNICAL SESSIONS

- Casing Treatment I & II
- Design, Analysis, and Test I, II, III, IV & V
- Distortion
- Fan & Compressor Operation
- Flow Control I & II
- Real Geometry Effects I & II
- Tip Clearance Flows

Axial Flow Turbine Aerodynamics

TECHNICAL SESSIONS

- Aerodynamic Design of Axial Turbines
- Ducts, Clocking & Inlet Turbulence
- Endwall Aerodynamics in Turbines
- Flow Injection and Cooling
- Hot Streaks & Real Gas Effects
- Low Pressure Turbines
- Roughness & Transition in Axial Turbines
- Shrouded Blades Squealings & Purge
- Shroudless Blades, Squealers & Winglets
- Turbine Cascade Aerodynamics

Design Methods & CFD Modeling For Turbomachinery

TECHNICAL SESSIONS

- Adjoint Methods
- Compressor Applications
- LES and DNS methods
- Methods Development I & II
- Optimization
- Radial Apps
- Throughflow and Low Order Methods
- Transition Modelling
- Treatments for Unsteady Flow
- Turbine Applications

Ducts & Component Interactions

TECHNICAL SESSIONS

- Component and Module Interactions
- Inlets, Ducts and Exhaust Systems

Multidisciplinary Design Approaches, Optimization, and Uncertainty Quantification

(with Heat Transfer and Structures & Dynamics)

TECHNICAL SESSIONS

- MDAO I, II, III & IV

Noise & Innovative Noise Reduction

(with Aircraft Engine)

TECHNICAL SESSIONS

- Noise I-II

Radial Turbomachinery Aerodynamics

TECHNICAL SESSIONS

- Centrifugal Compressors
- Centrifugal Compressors: Diffusers
- Centrifugal Compressors: Stability of Operation
- Radial Turbines
- Radial Turbomachinery: Novel Configurations
- Turbocharger Radial Turbines
- Turbochargers Centrifugal Compressors

Unsteady Flows in Turbomachinery

TECHNICAL SESSIONS

- Stall & Surge I & II
- Unsteady Flows in Centrifugal Compressors
- Unsteady Flows in Compressors I & II
- Unsteady Flows in Turbines I, II & III
- Unsteady Turbomachinery Interaction



Wind Turbine Technology

The rapid expansion of wind power and the steady decrease in the cost of technology has cemented the position of wind power as an indispensable part of the global energy mix. Thus the Wind Energy Technology Track will focus on innovations that are driving technological advances in the wind industry. The technical presentations cover aerodynamics, structures, controls and condition monitoring aspects of wind turbines, as well as the interaction of wind turbines with other energy systems. These topics are addressed for small and large wind turbines, as well as vertical and horizontal axis wind turbines. Special panel sessions highlight changes that are taking place in industry, as well as that is research being undertaken in universities and research laboratories. For experts and beginners, two tutorial sessions and a workshop will be presented to detail developments and tools that are employed in the rapidly growing wind industry.

PANEL SESSIONS

- Improved Utilization of Wind Assets ✨
- University Research

TECHNICAL SESSIONS

- Aerodynamics: Load Alleviation and Control
- Drive Trains: Reliability and Control
- Novel Concepts
- Rotor and Wake Aerodynamics
- Small Wind Turbines
- Structural Design and Materials
- Vertical Axis Wind Turbines
- Wind Farms
- Wind Turbine Blades: Aerodynamic Design and Analysis I & II

TUTORIAL SESSIONS

- Condition Monitoring of Wind Turbines ✨
- Introduction to Wind Energy ✨

Participating Organizations & Supporting Publications

Special Thanks to Our...

Participating Organizations

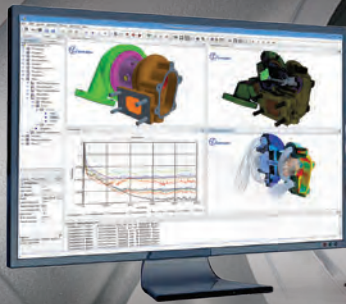


Supporting Publications



STAR-CCM+: Engineering Success

Delivering the power of **integrated fluid dynamics & heat transfer simulation technology** with the ease of **automated meshing of complex geometries.**



Vist us at

ASME Turbo Expo
2013, 03-07 July, Henry
B. Gonzalez Convention
Center, Texas,
Booth 125

“The applications of this software seem to be infinite. The user-friendly interface makes it easy to learn and a very powerful tool!”
SEAN ALEXANDER - SOLAR TURBINES INC.

**SOLUTIONS
THAT SPAN THE
TURBOMACHINERY
INDUSTRY**



For more information: info@cd-adapco.com
Follow us online www.cd-adapco.com/applications/turbomachinery

TURBOEXPO



SAN ANTONIO



Rolls-Royce. Located in every corner of the world.

Known the world over for providing advanced power solutions for the aerospace, marine and energy sectors, not everyone is aware of the full extent of our global presence. The fact is, Rolls-Royce has manufacturing and service

facilities in 50 countries and customers in well over 150 countries worldwide. And with 40% of our workforce located outside the UK our expertise, service and support are sure to be within easy reach. **Trusted to deliver excellence**

www.rolls-royce.com



Rolls-Royce

Top 10 Reasons You Should Attend Turbo Expo

Networking

Networking –

A value-packed registration package that includes access to all activities and abundant networking opportunities, including receptions and daily lunches.

Leading R&D

Leading R&D –

A five-day Technical Conference that sets the world standard for turbomachinery technology events. *Conference participants also receive the added value of earning Professional Development (PDH) credits for attending!*

Industry Leaders

Industry Leaders –

From the keynote to the technical conference and the exposition, the prominent industry leaders from around the world will be there.

Targeted Leads

Targeted Leads –

A three-day, premium exhibition of turbomachinery products and services supported by leading companies in the industry.

Fundamental Training

Fundamental Training –

Previous IGTI training course attendees have unanimously said the interactive teaching style has enhanced their learning.

Practical Application

Practical Application –

Paper presentations, panels and informal discussions with colleagues will facilitate development of practical solutions to real-time challenges.

Cutting-Edge Technology

Cutting Edge Technology –

Turbo Expo has a well earned reputation for bringing together the best and brightest experts from around the world to share the latest in turbomachinery technology, research and development, and application. Now, the IGTI community is enhancing its leadership role in turbomachinery as it broadens the program scope to include related topics from wind, steam, fans & blowers, and solar technology.

High ROI

High ROI –

Compressed into 5 days is the opportunity to gather the newest and best in technology from more than 1,000 presentations of technical papers and in panels as well as interface with exhibitors and colleagues on practical solutions.

Career Development

Career Development –

From in-depth courses, to sharing the best technology, to networking with the industry elite, it is a professionally enhancing experience.

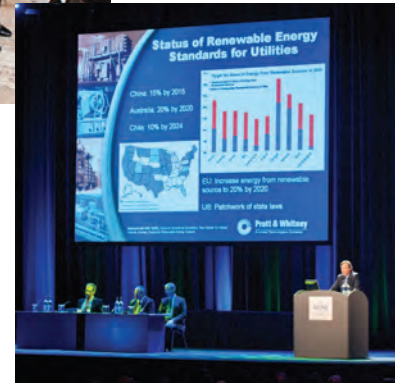
Destination San Antonio –

San Antonio is one of America's most beautiful and diverse cities. Visitors will have the opportunity to explore the unique landscape and discover the rich history that makes San Antonio unique.



Facility Tours

Facility Tours are being arranged by the ASME Turbo Expo Local Liaison Committee. Be sure to check out the ASME Turbo Expo Web page this Spring for further details.



An advertisement for SoftInWay Incorporated. The top part features the company logo and the text "DESIGNING NEW ORC TURBINES?". Below this is a 3D rendering of a blue ORC turbine. The middle part features the text "RETROFITTING STEAM OR GAS TURBINES?" and a photograph of a large turbine component. The bottom part features the text "WE CAN HELP! TURBO EXPO JUNE 3-7, 2013 BOOTH 509" and contact information for SoftInWay, Inc. A red banner at the bottom right says "LEVERAGE AXSTREAM AND OUR CONSULTING SERVICES". The text "CONCEPTUAL DESIGN & OPTIMIZATION OF TURBOMACHINERY" is written vertically on the left side of the advertisement.

Responsible energy transcends boundaries.

See how the future unfolds...

From robust industrialized nations to rapidly emerging regions, we all share a future with one thing in common: the need for responsible energy. Keeping pace with ever increasing demand will take more than a highly reliable energy source. It'll take many. That's why GE Energy offers a broad portfolio of power generation options: from proven base load designs to innovative wind, solar and heavy-duty gas turbine solutions. GE Energy has the technology, the people and the global commitment to help power the world responsibly. Which simply means anywhere you need it, any way you cut it – GE Energy is powering potential. Visit us at ge.com to learn more.



imagination at work

COMING ^S 58 YEARS ^O
2013 ^O TECHNICAL PAPERS ^F
^Z ^O ^N ^D ^V ^D ASME
turbo
expo



ASME INTERNATIONAL GAS TURBINE INSTITUTE

is proud to announce the comprehensive digital library of Turbo Expo Technical Papers on DVD from 1956 through 2012. Now it's as simple as the click of a mouse to find any of the 20,000 + technical papers presented since 1956.

Searchable database on DVD!

SEARCH BY:

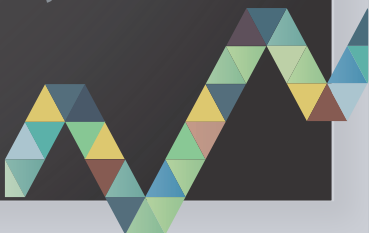
- ▶ PAPER TITLE
- ▶ AUTHOR
- ▶ PAPER NUMBER
- ▶ YEAR

An excellent reference tool for your office, school or home library!

introductory price:

CORPORATIONS : \$5,000 USD
UNIVERSITIES: \$2,500 USD
Please Visit: <http://igt.asme.org/>
for more information

onward and upward



San Antonio Highlights

San Antonio has always been a crossroads for travelers, explorers, and those on a quest for liberty. Its sights, sounds, tastes and past captivate, while friendly people, the relaxing river and a superb climate entice visitors to come back for more.

From its important role in Texas independence to its fusion of cultures, San Antonio is a truly unique and authentic destination. Explore the routes of the conquistadors, the settlements of the first missions, and the Shrine of Texas Liberty—the Alamo. San Antonio's heart is in its past—but its future is in its celebration of cultures.

Helpful Information...

Maps of San Antonio: <http://www.visitsanantonio.com/visitors/sleep/san-antonio-maps/index.aspx>

Restaurants & Dining: <http://www.visitsanantonio.com/visitors/eat/index.aspx>

Sales Tax: 8.125 percent, suburbs vary

Time Zone: Central, observes Daylight Savings Time

Weather: With 300 days of sunshine a year, San Antonio is an ideal destination year round.

Visit <http://www.weather.com> for the local forecast.

Getting Around the City...

MASS TRANSIT: San Antonio's bus system has routes that cover over 1200 square miles. Use [Google Transit](#) to plan the trip. The customer service number is [here](#).

TAXI: Two to six people can ride the taxi for the price of one. Approximate fares, not including tips, to the downtown business district from the airport range from \$24–\$26; Northwest Area (near Sea World) \$39–\$41; Westin La Cantera Resort \$33–\$35. San Antonio offers multiple [taxi services](#).

BICYCLE: San Antonio's bicycle culture is growing rapidly. As part of the international bikeshare movement, the city has installed kiosks at convenient spots around the downtown urban core. [Rent or share a bike](#) and hop on the nearly 40 miles of urban bike trails to explore the city.

STREETCAR: Downtown travel is a breeze on the streetcar, an open air, authentic reproduction of a rail streetcar which traveled the streets of San Antonio more than 50 years ago. Four streetcar routes stop at top sights like the Alamo, the Spanish Governor's Palace, La Villita, Sunset Station, the Southwest School of Art, the Institute of Texan Cultures, the King William Historic District and downtown shopping. The downtown streetcar station at Convention Plaza provides convenient access for travelers. [Order a streetcar pass online](#) or purchase one at the [Visitor Center](#). When you get in town, pick up a [streetcar brochure](#) in your hotel lobby.

SIGHTSEER BUS: (Bus 7) runs daily between the city's favorite sites. You can see them all for one price. Locations visited by the Sightseer Special include: River Walk Streetcar Station, Henry B. Gonzalez Convention Center, Alamo, San Antonio Museum of Art, Japanese Tea Garden, Brackenridge Park, San Antonio Zoo, Trinity University, University of the Incarnate Word, Witte Museum and San Antonio Botanical Garden.

RIVER TAXI: The River Taxi stops at 39 locations along the River Walk. [Purchase tickets online or from the operator](#). Look for the river cruiser with the black and yellow checkered flag.

Local Liaison Committee... Thank You, Volunteers!

Harold Simmons, Chair
Southwest Research Institute

Cyrus Meher-Homji
Bechtel Corporation

Manuel Lechuga
Student Section Chair, UTSA

Ron Natole
Natole Turbine Enterprises

Brock Ramey
Industrial Info Resources

Harry Millwater
Professor, UTSA

Henry Bernstein
Gas Turbine Materials Association

Swami Swaminathan
TurboMet International

Larry Sowle
Air Force Life Cycle Management Center
Tinker AFB

Randall Manteufel
Professor, UTSA

Don Barnett
CPS Energy

Jay Gabrelcik
Pratt & Whitney

Travel Information and Registration

Visit www.turboexpo.org to register and to make your hotel reservations for ASME Turbo Expo 2013 today! Register online or download a PDF form to complete.

Housing

Housing information is now available at:

<http://www.regonline.com/Register/Checkin.aspx?EventID=1079982>

The Grand Hyatt San Antonio is the official headquarters hotel for ASME Turbo Expo 2013.

To get the Turbo Expo hotel rate, you must register through the Turbo Expo hotel service online. Don't delay. Make your hotel reservation today!

Discounted Airfare

Delta airlines have been appointed as the Official Airline Network for ASME Turbo Expo 2013. Save up to 10% on travel when booking through the Turbo Expo 2013 website. Discounted airfare information is now available at:

<http://www.asmeconferences.org/TE2013/TravellInfo.cfm>

Event Registration...

ALL TURBO EXPO Technical Conference Registrants receive:

- Access to **EVERY session** in the TURBO EXPO Technical Conference
- **DVD Proceedings** comprised of all papers published for TURBO EXPO 2013
- Certificate of completion for **Professional Development Hours (PDH's)**
- Admission to the **Opening Session, IGTI Awards Program, Keynote Session and Welcome Reception**
- **Complimentary daily lunches (Monday - Thursday)**
- Unlimited access to the Exhibit Hall during the **3-day Exposition (June 4-6, 2013)**
- Two **Exhibit Hall receptions** with complimentary refreshments
- Opportunity to attend **Facility Tours**

Registration Type:	On or Before May 6	After May 6
TECHNICAL CONFERENCE		
Member 5-day	\$950	\$1050
Non-Member 5-day	\$1180	\$1280
Exhibiting Company Employee 5-day	\$770	\$870
Platinum Sponsor Employee 5-day	\$720	\$820
ASME Life Member 5-day	\$220	\$220
Student 5-day <small>(Student ID will be required at badge pick-up)</small>	\$220	\$220
Corporate Group Member 5-day: <small>Email igti@asme.org for group package pricing</small>		
Member 3-day	\$750	\$850
Non-Member 3-day	\$950	\$1050
Exhibiting Company Employee 3-day	\$620	\$720
EXPOSITION ONLY		
Spouse/Companion* <small>(Guest Badge, Welcome Reception, Exhibit Only)</small>	\$120	\$120
Exhibition Visitor* <small>(Visitor Badge, Exhibit Only)</small>	\$120	\$120
<small>*Does not include Conference Proceedings or Complimentary Lunches. Proceedings and lunches are available for separate purchase. Contact igti@asme.org.</small>		
EXHIBIT BOOTH PERSONNEL		
Exhibit Booth Personnel <small>(3 badges per 100sf of exhibit space; Mon RSVP Tue/Wed/Thu lunches)</small>	Free	Free
Additional Exhibit Booth Personnel <small>(includes Mon RSVP Tue/Wed/Thu lunches)</small>	\$200	\$200
Exhibit Company Technical Conference	\$1120	\$1120
Multi-use Badge <small>(Contact IGTI at igtiexpo@asme.org for details.)</small>		

Registration Type:	Member Fee	Non-Member Fee
TRAINING WORKSHOPS*		
1-Day, Saturday, June 1 "New" Life Prediction of Gas Turbine Components and Coatings	\$645	\$745
1-Day, Saturday, June 1 Gas Turbine Operation and Maintenance	\$645	\$745
2-Days, Saturday-Sunday, June 1-2 Advances in Turbines Aero-thermo-mechanical Design and Analysis	\$1175	\$1275
2-Days, Saturday-Sunday, June 1-2 Introduction to Optimization Methods and Tools for Multi-disciplinary Design in Turbomachinery	\$1175	\$1275
2-Days, Saturday-Sunday, June 1-2 Gas Turbine Aerothermodynamics & Performance Calculations	\$1175	\$1275
1-Day, Sunday, June 2 "New" Nonisentropic Compressible Flows in Gas Turbine Design	\$645	\$745
1-Day, Sunday, June 2 A Primer on CHP Technologies	\$645	\$745
*1-Day, Sunday, June 2 "New" Wind Turbine Blade: Design, Certification, and Simulation <small>All training workshop registrations include workbook, workshop CD, & lunch.</small>	\$645	\$745
<small>* Wind Turbine Blade: Design, Certification, and Simulation must be registered separately here.</small>		
ADDITIONS*		FEE
Extra Lunches*		\$30 ea.
Extra DVD Turbo Expo Technical Conference Proceedings*		\$150 ea.
*These items will be in addition to those items already included with your primary registration type. Note: All Technical Conference registrants automatically receive the conference proceedings with their registration package as well as daily complimentary lunches.		

Visit the online Turbo Expo registration site for more information on discounted member rates, qualifying for free ASME membership, cancellation/refund policies, and requesting letters of invitation for visas.

Registration inquiries? Contact us at igti@asme.org

*The Most Important Conference
for Turbomachinery Professionals*



TURBO EXPO

Turbine Technical Conference & Exposition

Presented by ASME International Gas Turbine Institute

June 16-20, 2014

CCD Congress Center Düsseldorf

Düsseldorf

G E R M A N Y

www.turboexpo.org



ASME INTERNATIONAL GAS TURBINE INSTITUTE
phone +1-404-847-0072 | fax +1-404-847-0151 | igti@asme.org



IGTI is Here to Serve YOU!

IGTI is your source for conferences, training, products, networking services, and scholarships.

Throughout the year we offer courses and webinars related to the turbomachinery industry. For detailed information on upcoming training events and webinars for the gas turbine industry, please visit the IGTI web site at <http://igti.asme.org/>. Additionally, if you have a topic you think will be of value to the turbine industry and would like to present it in a webinar format or a “face-to-face” format, please contact Shirley Barton at bartons@asme.org.

Awards and Student Scholarships Available from IGTI

IGTI will award up to **20 student scholarships of \$2,000 each** to students who submit all the required documentation and meet the qualifications. ***The deadline to submit an application is May 15, 2013.***

For application and requirements, please visit: <http://igti.asme.org/Honors/>

Young Engineer Travel Award

IGTI offers several travel awards to students and young engineers employed in industry or government to attend ASME Turbo Expo to present papers of which they are authors. Please visit the IGTI web site at <http://igti.asme.org/> for more details.

Become an IGTI Sponsor and help us provide even greater benefits to our members!

IGTI is now offering unique opportunities to sponsor our year-round activities and services. In addition to Show Sponsorship Packages, you can now sign up to become an IGTI Platinum, Gold, Silver or Bronze Sponsor. For more details visit <http://igti.asme.org>. Sponsorships will be assigned on a first-come, first-served basis.

IGTI Products Available Online

We offer a comprehensive technical paper archive from past IGTI conferences (dating back to 1947) as well as books, CDs, and courses in our online store. See what we have to offer here: <http://igti.asme.org/Publications>.

Contribute to the IGTI newsletter!

IGTI is looking for technical articles of a non-commercial nature for our **Global Gas Turbine Newsletter**. The newsletter is published quarterly inside of ME Magazine and is a great opportunity to highlight current issues in the turbomachinery industry. Articles can be approximately 800 words and include 1 or 2 graphic figures. Contact IGTI at +1-404-847-0072 x1645 today if you are interested.

Keep up with latest IGTI updates and network with your colleagues in the turbomachinery industry:

<http://www.facebook.com/ASMEIGTI>

<http://twitter.com/IGTI>

<http://www.linkedin.com/company/1801054>

Boxer 3.2.1
software released

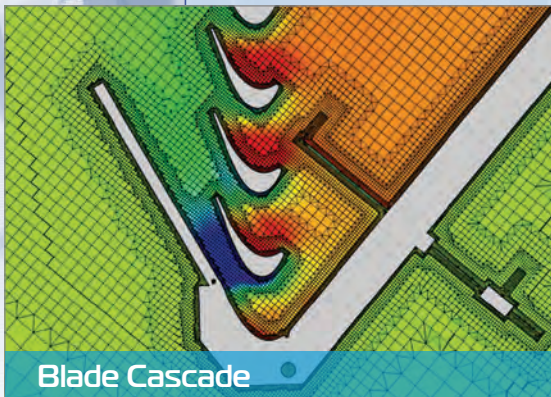
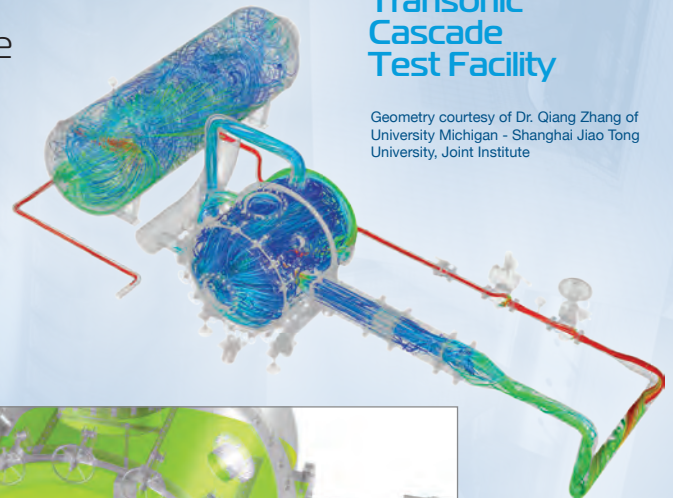
Meshes for complex CAE applications



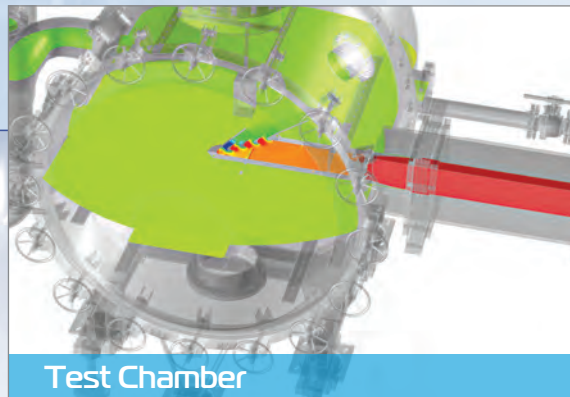
- Fully parallelised & scalable
- High speed meshing
- Highly scriptable
- Quality assured
- Robust CAD import

Transonic
Cascade
Test Facility

Geometry courtesy of Dr. Qiang Zhang of
University Michigan - Shanghai Jiao Tong
University, Joint Institute



Blade Cascade



Test Chamber



Visit us at Booth 309 | ASME Turbo Expo 2013

T: +44 (0)1223 257978

www.cambridgeflowsolutions.com

Guest Tours

Crusin' & Explorin' San Antonio

Monday, June 3, 2013 • Time: 9:30 a.m. – 1:30 p.m.

Tickets: \$52 USD



We will begin in the shops of **La Villita** located in a rustic, limestone plaza. These historically significant buildings have been moved to re-create a small village. Our tour guide will share our rich history and the significance of the buildings while allowing guests time to shop. Experience the river on a privately chartered **River Cruiser** with historical and entertaining commentary as we pass through the pages of San Antonio's history. Enjoy a stop at the **Fernando Cathedral** founded in 1731 and is the oldest standing church building in Texas. We will view the

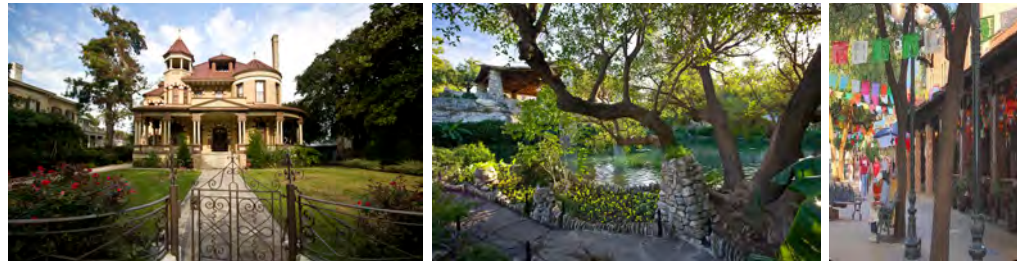
Ursuline Academy/Southwest School of Art founded in 1851 by French Ursuline nuns. It has now become a center for arts and crafts and is truly a gem in our city. We will disembark at the **Paseo del Alamo**, an architecturally interesting walkway which connects the river. Our tour guide will point out the **Alamo Centataph**, a marvelous sculpture by Pompeo Copini, the **Alamo**, and we will wrap up in the lobby of the historic **Menger Hotel**.

Celebrating San Antonio

Tuesday, June 4, 2013 • Time: 8:30 a.m. - 1:00 p.m.

Tickets: \$62 USD

Considered by many to be the most beautiful neighborhood in all of Texas, the **King William Historic District**, with its tree-lined avenues, recalls a more gracious era. Just at the end of the Street is the **Guenther House**. Built by the German immigrants who operated the first flourmill on the San Antonio River, the house is still part of the Pioneer Flour Mill and is still run by the Guenther family. We will tour the house and visit the fabulous gift shop. Then on to the **Japanese Tea Gardens**. In 1915, the city requested a



Japanese immigrant and his wife to transform an old rock quarry into a Japanese styled garden. We then continue to the **Spanish Governor's Palace**. Built to serve as the official residence for the commander of the Presidio de San Antonio, it served as the seat of the Spanish government in Texas. Our last stop will be the border-style **El Mercado** or **Mexican Market**. Serving as a hub of commerce years ago, Market Square, as it has become known, has retained much of its charm of the past. Its quaint shops offer local crafts, art, clothing and food. Two indoor markets are filled to the brim with vendors. Stay and shop awhile, enjoy lunch on your own and return on own via city trolley or return to the hotel by tour bus – your choice!

Spanish Mission Trail

Wednesday, June 5, 2013 • Time: 8:30 a.m. - 12:30 p.m.

Tickets: \$75 USD



One of the country's few National Parks within an urban setting, the missions tell the early story of San Antonio and European expansion in the New World. We will begin with the most famous of the Missions, Mission San Antonio de Valero, better known as the Alamo. Established in 1718, the **Alamo** played a pivotal role in Texas history. The shrine displays exhibits from the battle and guests will enjoy the beautifully landscaped grounds. Next we will explore the largest and most restored of the Missions, **Mission San Jose**. Established in 1720, it is known as the "Queen of the Missions" and is the

showpiece of the San Antonio Missions National Historical Park. We will tour the Indian and Spanish soldier's quarters that were located within the walls. San Jose's church is one of the most beautiful in the country with its elaborate carvings on the chapel facade. At our last stop, we will tour **Mission Concepcion**, the oldest un-restored mission church in Texas, established in 1731. Twin towers and a beautiful cupola helped make it a construction project of twenty-plus years. Rare original frescoes decorate the church side rooms.

All tours are subject to cancellation based on a minimum of 25 participants.
Tours include meals where indicated, tickets and transportation.

Not for the Weak of Art

Thursday, June 6, 2013 • Time: 9:00 a.m. – 1:00 p.m.

Tickets: \$90 USD



The diversity of San Antonio can be seen in the expressions of the visual arts. The tour will begin with a drive past some of the more notable public sculptures that grace the city streetscapes, including the “**Torch of Friendship.**” The Torch is our latest prize and is a gift from the celebrated Mexican artist, Sebastian. We will tour the impressive exhibits of the **San Antonio Museum of Art**, located within the walls of the 19th century twin foustory towers that were originally home to the Lone Star Brewery. The museum showcases Greek and Italian pottery of the Contemporary and Modern Art Collections as well as expressions from Pre- Columbian, Spanish Colonial and ancient Asian culture. It is also home to the

renowned Latin American Folk Art Collection of the late Nelson Rockefeller. Our next find is a hidden jewel, the **McNay Art Museum.** Set within the former Mediterranean-style mansion of the eccentric Marion Koogler McNay, the museum features modern, impressionist, medieval and Native American paintings, sculpture and objects d’art, Picasso, Chagal, Renoir and Monet among others.

Caverns & Cabernet

Friday, June 7, 2013 • Time: 8:30 a.m. – 1:30 p.m.

Tickets: \$115 USD



Over 30 million years ago what we know now as the picturesque Texas Hill Country was a volcanic bed of activity and violent earthquakes forming today’s rich farmland to the east and rugged ranch land to the west. Our tour today will showcase the results of this activity, from deep caverns to fertile soil. We begin with the Natural Bridge Caverns, named for the 60 foot natural limestone arch that spans the entrance. This cave is by far one of the most spectacular in the area. Trails through the Caverns cover more than a mile and the temperature is 70 degrees year round. You will be amazed by the natural formations. The sound of constantly dripping water is a reminder the cave is still alive and growing! Next we will enjoy the fruits of ancient Texas at Dry Comal Creek Vineyards, nestled in a small protected valley. Proprietor Franklin Houser has honed his passion for the grape into a quality winery. All of his vines and wines receive personal care and tending. From the picking to the bottling, every step is completed by hand. We will taste four unique styled wines with Mr. Houser who will give an explanation of each wine’s history and “character”.

Please visit the ASME tour website to register:

<http://www.regonline.com/asmeturboexpo2013guesttours>

Turbo Expo 2013 Schedule at a Glance

SUBJECT TO CHANGE

Saturday, June 1						
GT Workshops 8:30 a.m. - 5:00 p.m.						
Sunday June 2	Monday June 3	Tuesday June 4	Wednesday June 5	Thursday June 6	Friday June 7	
Registration 12:00 - 6:00 p.m.	Registration 7:00 a.m. - 5:30 p.m.	Registration 7:00 a.m. - 6:30 p.m.	Registration 7:00 a.m. - 6:30 p.m.	Registration 7:00 a.m. - 5:30 p.m.	Registration 7:00 a.m. - 12:00 p.m.	
Speaker Ready Room 12:00 - 6:00 p.m.	Speaker Ready Room 7:00 a.m. - 5:00 p.m.	Speaker Ready Room 7:00 a.m. - 5:00 p.m.	Speaker Ready Room 7:00 a.m. - 5:00 p.m.	Speaker Ready Room 7:00 a.m. - 5:00 p.m.	Speaker Ready Room 7:00 a.m. - 12:00 p.m.	
GT Workshops 8:30 a.m. - 5:00 p.m.	Session Participant Networking Coffee/Danish 7:15 - 8:00 a.m.	Session Participant Networking Coffee/Danish 7:15 - 8:00 a.m.	Session Participant Networking Coffee/Danish 7:15 - 8:00 a.m.	Session Participant Networking Coffee/Danish 7:15 - 8:00 a.m.	Session Participant Networking Coffee/Danish 7:15 - 8:00 a.m.	
IGTI Board Meeting 1:00 - 5:00 p.m.	Conference Sessions 8:00 - 10:00 a.m.	Conference Sessions 8:00 - 10:00 a.m.	Conference Sessions 8:00 - 10:00 a.m.	Conference Sessions 8:00 - 10:00 a.m.	Conference Sessions 8:00 - 10:00 a.m.	
Council of Chairs 6:00 - 7:30 p.m.	Opening Session, IGTI Awards Program & Turbo Expo Keynote 10:15 a.m. - 12:15 p.m. <i>“Over the years, I am very much impressed by the international attraction that IGTI has....it has been able to further the development of (the) gas turbine and jet engine”</i> – Sigmar Wittig, Chairman of the Board for the German Aerospace Center	Coffee Break 10:00 - 10:15 a.m.	Coffee Break 10:00 - 10:15 a.m.	Coffee Break 10:00 - 10:15 a.m.	Coffee Break 10:00 - 10:15 a.m.	
		Conference Sessions 10:15 a.m. - 12:45 p.m.	Conference Sessions 10:15 a.m. - 12:45 p.m.	Conference Sessions 10:15 a.m. - 12:15 p.m.	Conference Sessions 10:15 a.m. - 12:45 p.m.	
		Expo Open 12:30 - 6:30 p.m.	Expo Open 12:30 - 6:30 p.m.	Expo Open 11:30 a.m. - 2:30 p.m. Closing Ceremony 1:45 p.m.		
		Opening Lunch 12:30 - 2:30 p.m.	Expo Lunch 12:30 - 2:30 p.m.	Expo Lunch 12:30 - 2:30 p.m.	Expo Lunch 12:30 - 2:30 p.m.	Facility Tours Times TBA
		Conference Sessions 2:30 - 5:30 p.m.	Conference Sessions 2:30 - 5:30 p.m.	Conference Sessions 2:30 - 5:30 p.m.	Conference Sessions 2:30 - 5:30 p.m.	*Conference ends at 12:45 p.m. on Friday!
			Expo Hall Reception 5:00 - 6:30 p.m.	Expo Hall Reception 5:00 - 6:30 p.m.		
	Scholar Lecture 5:45 - 7:00 p.m.	Committee Meetings 6:00 - 7:30 p.m.	Committee Meetings 6:00 - 7:30 p.m.	Committee Meetings 6:00 - 7:30 p.m.		
	Welcome Reception 7:00 - 8:30 p.m.	Women’s Dinner 8:00 - 11:00 p.m.	ECE/Student Mixer 6:45 - 8:00 p.m.			

Turbo Expo 2013 Leadership Team... Thank You, Volunteers!

Executive Conference Chair

Bernhard Winkelmann

Solar Turbines
San Diego, CA USA

Technical Program Chair

Dr. Timothy Lieuwen

Georgia Institute of Technology
Atlanta, GA USA

Chair of Conferences

Dr. Seung Jin Song

Seoul National University
Seoul, Korea

Local Liaison Committee Chair

Dr. Harold Simmons

Southwest Research Institute
San Antonio, TX USA

Review Chair

Dr. Howard Hodson

University of Cambridge
Whittle Laboratory
Cambridge, UK

Review Co-Chair

Dr. Geoff Sheard

Flakt-Woods Group
Colchester, UK

Review Co-Chair

Dr. Philip Andrew

GE Energy
Greenville, SC USA



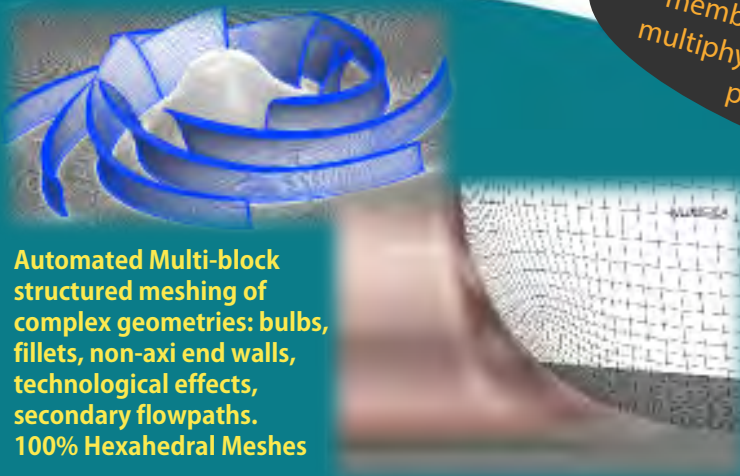
Visit us at Booth 419

Pioneering Products in the Field of Turbomachinery Analysis & Design Optimization



Researchers & Academics
Discover **OpenLabs** and its new membership program and develop your own multiphysics CFD code running on thousands of processors for 500 US\$ per year!

Innovation & Quality



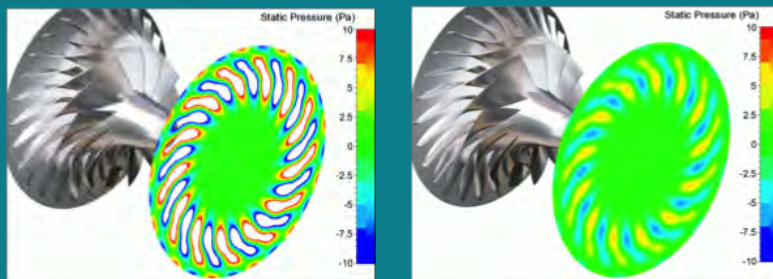
Automated Multi-block structured meshing of complex geometries: bulbs, fillets, non-axi end walls, technological effects, secondary flowpaths.
100% Hexahedral Meshes

AutoGrid5™

The most advanced automatic grid generator for turbomachinery

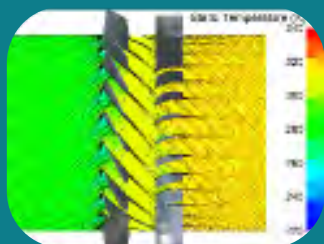
Non-Linear Harmonics module:

Multi-stage unsteady simulations at affordable CPU cost



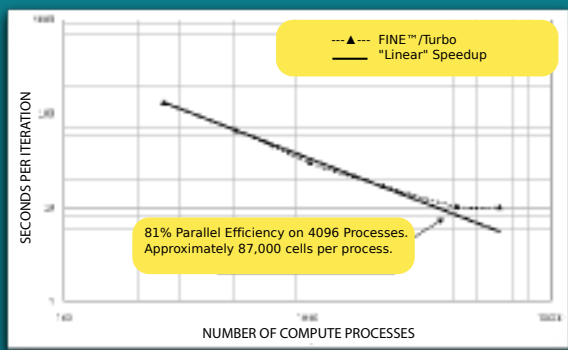
Integrated Aero Acoustic Optimization of a radial impeller with FINE/Design 3D (left) before and (right) after. Successful attenuation of impeller-induced pressure fluctuations.

Unsteady NLH simulation of the NASA 67 stage with 350 million cells (per passage)



CPU Booster:

The fastest CFD code with unprecedented speed -- even faster now with the CPU Booster



Convergence in around 30 minutes per million nodes per core. A compressor multi-stage analysis with 4 million cells runs in less than 15 minutes on 8 processors.

HPC Solver:

Near-linear scalability on thousands of cores

NUMECA software provides full multiphysics analysis, design, and optimization with combustion, multiphase, sprays, cavitation, radiation, chemistry, FEA, Aero-VibroAcoustics and FSI for flutter.

TURBO EXPO

Turbine Technical Conference & Exposition

Presented by ASME International Gas Turbine Institute

JUNE 3-7, 2013 | SAN ANTONIO, TEXAS, USA

Register today at... www.turboexpo.org

Platinum Sponsors



Rolls-Royce

Silver Sponsor



additionally an IGTI Silver Sponsor

Bronze Sponsors



additionally sponsoring
Attendee Bags



Solar Turbines
A Caterpillar Company

Additional Sponsors

Attendee Bag Insert



Women's Dinner



Conference Coffee Break



Attendee Bags



Women's Dinner



Lanyards

