INTERNATIONAL GAS TURBINE CONGRESS 2015 Tokyo
NOVEMBER 15-20, 2015

Sponsoring Society
Gas Turbine Society of Japan (GTSJ)

Collaborating Societies
Overseas
ASME International Gas Turbine Institute (ASME/IGTI)
European Turbine Network (ETN)
Korean Society for Fluid Machinery (KSFM)
The Korean Society of Mechanical Engineers (KSME)
Verein Deutscher Ingenieure (VDI)
Unione Italiana Termofluidodinamica (UIT)
The Chinese Academy of Sciences, Institute of Engineering Thermophysics (CAS/IET)
The Chinese Academy of Sciences, Shanghai Advanced Research Institute (CAS/SARI)

Domestic
Japan Society of Energy and Resources (JSER)
The Visualization Society of Japan (VSJ)
Thermal and Nuclear Power Engineering Society (TENPES)
Japan Society for the Promotion of Machine Industry (JSPMI)
The Society of Instrument and Control Engineers (SICE)
Advanced Cogeneration and Energy Utilization Center Japan (ACEJ)
Society of Automotive Engineers of Japan (JSAE)
Smart Processing Society for Materials, Environment & Energy (SPS)
Turbomachinery Society of Japan (TSJ)
The Institute of Electrical Engineers of Japan (IEEE)
International Electric Research Exchange (IERE)
The Federation of Electric Power Companies of Japan (FEPC)
Institute for Liquid Atomization and Spray Systems (ILASS-Japan)
The Japan Institute of Energy (JIE)
The Japan Gas Association (JGA)
The Japan Society of Mechanical Engineers (JSME)
The Japan Institute of Metals (JIM)
The Society of Japanese Aerospace Companies (SIAC)
The Japan Society for Aeronautical and Space Science (JSASS)
Japanese Aero Engines Corporation (JAEC)
Japan Aeronautocal Engineers' Association (JAEA)
The Society of Materials Science, Japan (JSMS)
The Ceramic Society of Japan (CerSJ)
The Iron and Steel Institute of Japan (ISIJ)
The Japan Electrical Manufacturers’ Association (JEMA)
Heat Transfer Society of Japan (HTSJ)
Japanese Society of Tribologists (JAST)
Japan Internal Combustion Engine Federation (JICEF)
Nippon (Japan) Engine Generator Association (NEGA)
Combustion Society of Japan (CSJ)
The Japanese Society for Non-Destructive Inspection (JSNDI)
The Japanese society for Quality Control (JSQC)
Japan Fine Ceramics Association (JFCA)
Japan Wind Energy Association (JWEA)
Japan Institute of Marine Engineering (JIME)
Japan Land Engine Manufacturers Association (LEMA)
The Japan Society of Fluid Mechanics (JSFM)
Japan Society of Corrosion Engineering (JSCE)
Japan Welding Society (JWS)

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Research Foundation for the Electrotechnology of Chubu
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Welcome to IGTC2015 Tokyo

On behalf of the Gas Turbine Society of Japan (GTSJ), I wish to thank you for attending the International Gas Turbine Congress 2015 Tokyo (IGTC2015 Tokyo) held from the 15th to the 20th of November 2015 at TORANOMON HILLS FORUM, Minato-ku, Tokyo. The IGTC2015 is supported by collaborating societies around the world. This is the 11th international congress organized by GTSJ, which would succeed the last congress taken place in 2011 in Osaka with great success.

The International Gas Turbine Congress (IGTC) is an international congress held in Japan to exchange information on the latest research and technical achievements in gas turbine related technology. The IGTC was first held in 1971 in Tokyo. The first congress was co-hosted by the American Society of Mechanical Engineers (ASME) and the Japan Society of Mechanical Engineers (JSME). The Gas Turbine Society of Japan took over this IGTC and has continued to organize this international conference to continue the creative discussion initiated in the first congress. Now the congress is the most important international activity of GTSJ providing a leading platform for information exchange in the field of energy technology.

Gas turbines with the characteristics of high efficiency, high reliability and low NOx emissions have been expected to serve as one of the best technologies for CO2 reduction which leads to the inhibition of global warming. IGTC2015 is being organized to exchange the latest research progress, fundamental and applied technologies, product developments, maintenance and service technologies for gas turbines, propulsion engines, steam turbines and related energy systems. It is my great pleasure that the IGTC2015 would contribute to enhance constructive communications among engineers, researchers and users of gas turbines, propulsion engines, steam turbines and related energy systems from all over the world.

On behalf of GTSJ, I would like to thank our worldwide collaborating societies, sponsors and the corporation members of GTSJ who have ensured the success of IGTC 2015. I wish to thank the all authors, reviewers, session organizers, invited lecturers, panelists and exhibitors who contributed so much to make the IGTC2015 valuable conference for gas turbine related technology. I also wish to thank the members of the Executive Committee and our GTSJ staff. IGTC2015 would not be possible without their hearty efforts.

I wish all attendees will have rewarding experience form IGTC2015 and enjoy your stay in Tokyo.

Tadashi Tanuma
President
Gas Turbine Society of Japan
Dear IGTC2015 Attendees,

On behalf of the GTSJ Board and the Executive Committee, I would like to welcome you to the International Gas Turbine Congress 2015 Tokyo (IGTC2015), the 11th international congress organized by GTSJ. IGTC is held every four years for exchanging the latest technical information in gas turbines, propulsion, and energy systems. We are happy to have the IGTC2015 in Tokyo together with the experts from all over the world in the sectors of academia, government, and industries.

The program of IGTC2015 includes four Invited Lectures, three Panel Discussions, and three Forum Sessions. A total of 220 papers are to be presented in the technical sessions widely ranged over the gas turbines, steam turbines, jet propulsion, and other energy related fields. The exhibition will present the newest products and technologies at the congress site with 38 exhibitors related to gas turbines, turbomachines, power systems, accessories, parts, materials, instrumentation, application software, etc.

The Invited Lectures present the latest topics for future gas turbines and energy technology. We are honored to have Mr. James Free from NASA GRC, Dr. Shailesh Patal from Special Metals Corporation, Professor Konrad Vogeler from TU Dresden, and Mr. Yoshiaki Tsukuda from MHI as the lecturers. The Panel Discussions feature the trends and perspectives of energy network, aircraft propulsion, and Asian energy strategy. After the Great East Japan Earthquake, there have been intense discussions in Japan concerning energy supply strategy. We expect to have discussion with the participants on the reliable energy system and role of gas turbine in the future energy network. The Forum Sessions are pre-organized sessions of several technical presentations and free discussions, including a new joint session with ASME/IGTI concerning additive manufacturing. The Asian gas turbine market is rapidly growing and the technology is accordingly progressing now. IGTC is expected to provide opportunity to introduce the technical activities in this area, leading an organization of a mutual community.

The congress is made possible based on the contribution and dedication of many individuals and organizations. I extend my sincere gratitude to the sponsors and collaborating societies for their generous support. The invited lecturers, panelists, authors, session chairs, exhibitors, all did tremendous work, and I greatly appreciate their efforts. Finally, I thank the members of the Executive Committee and GTSJ staff who devoted so much effort to ensure the success of IGTC2015.

Thank you all for attending IGTC2015. I hope that you will enjoy your time in Tokyo for fruitful experience of technical exchange and networking.

Toshinori Watanabe
Chair
The Executive Committee of IGTC2015 Tokyo
The University of Tokyo
### 1. WHOLE CONGRESS TIME TABLE

<table>
<thead>
<tr>
<th>Nov.15 (Sun)</th>
<th>Morning</th>
<th>Afternoon</th>
<th>Evening</th>
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<tbody>
<tr>
<td></td>
<td>Registration (Foyer, 5F) 16:30-20:00</td>
<td>Welcome Reception (Room B, 5F) 17:45-20:00</td>
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<tr>
<th>Nov.16 (Mon)</th>
<th>Morning</th>
<th>Afternoon</th>
<th>Evening</th>
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<tbody>
<tr>
<td></td>
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<td>Exhibition 12:00-17:00 (Foyer &amp; Main Hall, 5F)(Foyer, 4F)</td>
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<tr>
<td></td>
<td>Opening Address 9:00-9:10 (Room A, 5F)</td>
<td>Lunch Break 11:45-13:15</td>
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<tr>
<td></td>
<td>Invited Lecture 1 9:10-10:10 (Room A, 5F)</td>
<td>Technical Sessions 13:15-14:30 (7 Rooms, 4 &amp; 5F)</td>
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<tr>
<td></td>
<td>Break 10:10-10:30</td>
<td>Break 14:30-14:50</td>
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<tr>
<td></td>
<td>Technical Sessions 10:30-11:45 (6 Rooms, 4 &amp; 5F)</td>
<td>Technical Sessions 14:50-16:05 (6 Rooms, 4 &amp; 5F)</td>
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<tr>
<td></td>
<td>Break 16:05-16:15</td>
<td>Panel Discussion 1 16:15-18:15 (Room A, 5F)</td>
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<td>Backyard Tour</td>
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<tr>
<td></td>
<td>Forum 1 10:20-11:35 (Room A, 5F)</td>
<td>Panel Discussion 2 13:05-14:55 (Room A, 5F)</td>
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<td>Exhibition 10:00-17:00 (Foyer &amp; Main Hall, 5F)(Foyer, 4F)</td>
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<tr>
<td></td>
<td>Invited Lecture 3 9:00-10:00 (Room A, 5F)</td>
<td>Lunch Break 12:25-13:55</td>
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<td>Break 10:00-10:20</td>
<td>Backyard Tour</td>
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<td></td>
<td>Technical Sessions 10:20-12:25 (7 Rooms, 4 &amp; 5F)</td>
<td>Forum 2 13:55-15:00 (Room A, 5F)</td>
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<td></td>
<td>Technical Sessions 10:20-12:25 (7 Rooms, 4 &amp; 5F)</td>
<td>Technical Sessions 15:55-17:35 (6 Rooms, 4 &amp; 5F)</td>
<td>Banquet 17:45-20:30 (Room A, 5F)</td>
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<th>Morning</th>
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<td>Exhibition 10:00-14:00 (Foyer &amp; Main Hall, 5F)(Foyer, 4F)</td>
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<tr>
<td></td>
<td>Invited Lecture 4 9:00-10:00 (Room A, 5F)</td>
<td>Lunch Break 11:35-13:05</td>
<td></td>
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<tr>
<td></td>
<td>Break 10:00-10:20</td>
<td>Backyard Tour</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Technical Sessions 10:20-11:35 (Room E, 4F)</td>
<td>Technical Sessions 13:05-14:45 (6 Rooms, 4 &amp; 5F)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Technical Sessions 10:20-11:35 (5 Rooms, 4 &amp; 5F)</td>
<td>Break 14:45-15:05</td>
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</tr>
<tr>
<td></td>
<td>Forum 3 10:20-11:35 (Room E, 4F)</td>
<td>Panel Discussion 3 15:05-17:05 (Room A, 5F)</td>
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</tr>
<tr>
<td></td>
<td>Technical Sessions 10:20-11:35 (5 Rooms, 4 &amp; 5F)</td>
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</table>

| Nov.20 (Fri) | Optional Facility Tours |         |         |
2. GENERAL INFORMATION

2.1 Language
The official language of the Congress is English.

2.2 Registration Desk
Congress Registration Desk will be open at the times and place indicated below:

<table>
<thead>
<tr>
<th>Date</th>
<th>Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nov. 15 (Sun)</td>
<td>16:30-20:00</td>
</tr>
<tr>
<td>Nov. 16 (Mon)</td>
<td>8:00-17:30</td>
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<tr>
<td>Nov. 17 (Tue)</td>
<td>8:30-17:30</td>
</tr>
<tr>
<td>Nov. 18 (Wed)</td>
<td>8:30-18:00</td>
</tr>
<tr>
<td>Nov. 19 (Thu)</td>
<td>8:30-15:00</td>
</tr>
</tbody>
</table>

in the foyer of 5F.

2.3 Information for Speakers and Chairpersons

Speaker's Meeting
There will be a short meeting among the chairpersons and speakers just before each session. The speakers and chairpersons are requested to arrive the session room 10 minutes before the session start.

Timing of Presentations
Each presentation will be allotted 25 minutes including discussion.

Speakers' Practice
A room (Guest Room 4, 4F) will be reserved for speakers those who wish to check their slides and to practice. Projector, and power supply will be available there.

Audio Visual Equipment
Each session room is equipped with a projector, a screen, a laser pointer, and microphones. Speakers are advised to bring their own PC for presentation and to check their materials in advance of their session.

2.4 Congress Venue
The congress venue is TORANOMON HILLS FORUM located in Toranomon, Minato-ku, Tokyo. For more information on the venue, please visit web site at http://toranomonhills.com/en/.

2.5 Recording Policy
During the plenary and technical sessions, taking photos and recording is prohibited in general. Only congress staffs with an armband is permitted to taking photos.

2.6 Information for Tourism
Information for tourism is available at the web site of Toranomon Hills Forum & Tourism Bureau, and other organizations. Brochures, maps and other materials for tourism will be available at the Congress Registration Desk, as well as the bureau's web site in some foreign Languages. (http://www.gotokyo.org/en/index.html)

2.7 Official Agents
The official agents of IGTC2105 are e-side, inc. (http://en.e-side.co.jp/) in charge of collecting papers, administering registration. For further information on registration and payment, please contact the e-side, inc. (c/o Mr. Scott Macdonald).
E-mail: igtc2015-office@e-side.co.jp
Tel: 81-3-6435-8789
Fax: 81-3-6435-8790

3. REGISTRATION & FEE

3.1 Registration Fee
All participants are required to register and pay registration fees according to the categories in Table 1. The registration fee includes a badge to access all sessions of the congress, the welcome reception, coffee breaks, and electronic proceedings CD.

Those who wish to participate in the congress banquet on Wednesday and an optional tour on Friday are requested to register and pay an additional fee(s) for participation. The additional fees for banquet and tour are shown in Table 2.

Early-registration before August 31, 2015 is requested for at least one speaker for each technical paper. Papers will be excluded from the proceedings and the final program unless the executive committee of IGTC2015 confirms the speaker's early-registration.

Table 1 Registration Fee (Tax (8%) not included)

<table>
<thead>
<tr>
<th>Category</th>
<th>Early-registration before Aug. 31, 2015</th>
</tr>
</thead>
<tbody>
<tr>
<td>Speaker</td>
<td>55,000 JPY</td>
</tr>
<tr>
<td>Member *1</td>
<td>55,000 JPY Early-registration compulsory</td>
</tr>
<tr>
<td>Non-member</td>
<td>65,000 JPY</td>
</tr>
<tr>
<td>Student</td>
<td>15,000 JPY</td>
</tr>
</tbody>
</table>

*1 Members of GTSJ, the collaborating or the cooperative societies listed on the back cover.
Table 2 Additional Fee *(Tax (8%) not included)*

<table>
<thead>
<tr>
<th>Item</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>Banquet</td>
<td>10,000 JPY/person</td>
</tr>
<tr>
<td>Optional Tour</td>
<td>7,000 JPY/person</td>
</tr>
</tbody>
</table>

* Participants of the banquet and the plant tours must be registered participants or accompanying persons.

3.2 Online Registration (in advance)

Online registration is accepted at the Congress Registration Desk (online) at

Payment should be made by a major credit card (VISA, MASTER, AMEX, Diners, or JCB).

Online registration will be accepted until 19:00 of October 31, 2015 (JST).

3.3 On-site Registration

On-site registration will be accepted at the Congress Registration Desk shown in subsection 2.2.

Major credit cards (VISA, MASTER, AMEX, Diners, or JCB) or cash (JPY) will be accepted for payment.

3.4 Congress Kit

All participants including those who have registered in advance are requested to come to the desk to receive a badge, a copy of program and a proceeding on a CD with ISBN number.

4. PLENARY SESSIONS

4.1 Invited Lecture

**Place: Room A**

**Lecture 1**

November 16 (Mon) 9:10-10:10

“NASA Glenn: 75 Years & Beyond Propelling 21st Century Aviation to New Heights”

*Mr. James M. Free (Director, NASA Glenn Research Center)*

Chair: Dr. Toshio Nishizawa (JAXA)

**Lecture 2**

November 17 (Tue) 9:00-10:00

“Nickel-Base Superalloys Enabling Future Generations of Power Turbines”

*Dr. Shailesh Patel (Vice President, Special Metals Corporation)*

Chair: Prof. Yomei Yoshioka (Ehime Univ.)

**Lecture 3**

November 18 (Wed) 9:00-10:00

“Probabilistic Analysis of Complex System Behaviour in Turbomachinery Design”

*Prof. Dr.-Ing. Konrad Vogeler (Technische Universität Dresden)*

Chair: Prof. Joerg R. Seume (Leibniz Univ. Hannover)

**Lecture 4**

November 19 (Thu) 9:00-10:00

“Challenge for Low BTU Blast Furnace Gas Firing GTCC in Steel Works”

*Mr. Yoshiaki Tsukuda (Executive Corporate Adviser, Mitsubishi Heavy Industries, Former president of GTSJ)*

Chair: Prof. Yutaka Ohta (Waseda Univ.)

4.2 Panel Discussion

**Place: Room A**

**Panel Discussion 1**

November 16 (Mon) 16:15-18:15

“Challenges in Propulsion Technology for Next Generation Air Transport”

Chair: Prof. Keiichi Okai (Univ. Tokyo)

*Mr. James M. Free (NASA Glenn Research Center)*

*Mr. Hisao Futamura (Japan Aerospace Exploration Agency)*

*Dr. Alan Epstein (Pratt & Whitney Technology and Environment)*

*Mr. Daisuke Koyama (Rolls-Royce Japan)*

*Dr. Shinji Hiratsuka (Japanese Aero Engines Corporation)*

*Mr. Hiroki Haraikawa (JAL Engineering)*

*Mr. Satoru Yasuraoka (Ministry of Economy, Trade and Industry)*

**Panel Discussion 2**

November 17 (Tue) 13:05-14:55

“Current Status and Future Strategy of Electricity and Energy Supply in Asian Countries”

Chair: Prof. Shozo Kaneko (Univ. Tokyo)

*Mr. Yuji Matsuo (The Institute of Energy Economics, Japan)*

*Prof. Feng Lin (Chinese Academy of Sciences)*

*Dr. Jeong Lak Sohn (Korea Institute of Machinery & Materials)*

*Prof. Souvik Bhattacharyya (Indian Institute of Technology Kharagpur)*
Panel Discussion 3
November 19 (Thu) 15:05-17:05
“Energy Strategy: Role of Gas Turbines in the Future Energy Network”
Chair: Prof. Toshihiko Nakata (Tohoku Univ.)
Dr. Robert Steele (Electric Power Research Institute)
Mr. Christer Björkvist (European Turbine Network)
Mr. Wataru Horie (GE Power & Water)
Mr. Yasushi Fukuizumi (Mitsubishi Heavy Industries)

5. FORUMS

Forum 1
November 17 (Tue) 10:20-11:35 Room A
“Perspective on Electric Propulsion Technologies for Aircraft Applications”
Chair: Prof. Keiichi Okai (Univ. Tokyo)
Dr. Nateri Madavan (NASA Ames Research Center)
Mr. Daisuke Koyama (Rolls-Royce Japan)
Dr. Hideyuki Taguchi (Japan Aerospace Exploration Agency)

Forum 2
November 18 (Wed) 13:55-15:00 Room A
“CFRP in Aircraft Engine Technology”
Chair: Prof. Takahira Aoki (Univ. Tokyo)
Mr. Katuyoshi Moriya (IHI Corp.)
Dr. Tomo Takeda (Japan Aerospace Exploration Agency)
Mr. Kotaro Akakabe (The Univ. of Tokyo)
Dr. Yoshinori Shihiara (Inst. of Industrial Science, the Univ. of Tokyo)

Forum 3
November 19 (Thu) 10:20-11:35 Room E
“GTSJ-IGTI Joint Forum on Additive Manufacturing”
Chair: Prof. Seung Jin Song (Seoul National University)
Prof. Hideki Kyogoku (Kinki University)
Mr. Toshihiko Maeda (NTT Data Engineering Systems)
Mr. Wei Bin (GE Global Research in Shanghai)

6. EXHIBITIONS
Following total of 38 industries and research organizations exhibit their products and activities related to gas turbines, turbomachines, power systems and their accessories, parts, materials, instrumentation, and application software in the exhibition hall (Foyer and Main Hall (5F), Foyer (4F)).
- American Society of Mechanical Engineers
- AIKOKU ALPHA CORPORATION AP DIVISION
- AIST (National Institute of Advanced Industrial Science and Technology)
- B&B-AGEMA GmbH
- Camfil / Tominaga & Co., Ltd.
- CD-adapco Co., Ltd.
- Concurrent Nippon Corporation
- Daiichi System Engineering Co., LTD.
- DANTEC DYNAMICS K. K.
- EthosEnergy / Tominaga & Co., Ltd.
- Fuji Technical Research Inc.
- Fuji Techno Industries Corporation
- GE Power & Water
- HAYNES INTERNATIONAL KK
- HODEN SEIMITSU KAKO KENKYUSHO CO., LTD.
- Honda R&D Co., Ltd. Aircraft Engine R&D Center
- IHI Corporation
- Japan Aerospace Exploration Agency
- Japanese Aero Engines Corporation
- Kawasaki Heavy Industries, Ltd.
- KIGUCHI TECHNICS INC.
- Maruwa Electronic Inc.
- MARUYAMA EXCELL CO., LTD.
- Metal Technology Co. Ltd.
- Mitsubishi Heavy Industries Aero Engines, Ltd.
- MITSUBISHI HITACHI POWER SYSTEMS, LTD.
- NewtonWorks Corporation
- NIPPON MUKI CO., LTD.
- NUMECA Japan Co., Ltd.
- OHTÉ GIKEN, INC.
- SANKYO INTERNATIONAL CORPORATION
- SHINWA CORPORATION
- SINTOKOGIO, LTD.
- Spraying Systems Co., Japan
- SUMITOMO PRECISION PRODUCTS CO., LTD.
- Tasco Corporation / Rochem Technical Services
Exhibitions by university and technical college laboratories will be held also in pathway of 5th floor. A brochure in both English and Japanese including a list of the exhibitors will be handed to visitors at the entrance of the hall. Neither admission fee nor registration will be required to have access to this part.

7. SOCIAL PROGRAMS & TOURS

7.1 Welcome Reception
All participants and accompanying persons registered will be invited to attend the Welcome Reception to be held in the Room B (5F) from 17:45 to 20:00 on November 15, Sunday (free of charge).

7.2 Banquet
The banquet will be held in Room A (5F) from 17:45 to 20:30, November 18, Wednesday. Those who wish to participate in the banquet are required to register and pay an additional fee in advance. Dinner will be served in buffet style. A variety of kinds of meals and drinks are offered, including "Sushi chef demonstration". Sake -Japanese rice wine- produced from different sake brewing are served in special tasting area. Entertainment is also offered including the Japanese traditional dance, called "NIHON BUYO".

7.3 Optional Facility Tours
The following two Optional tours are planned on November 20 on Friday. Those who wish to attend are asked to complete the advance registration and pay an additional fee. Because space is limited for all tours, on site registrations are not accepted.

(1) Course A
This tour will be headed for J-POWER, Isogo Thermal Power Plant and Toshiba Corporation Power System Company. The tour bus will depart from the congress venue (Toranomon Hills) on 8:30, and come back to the congress venue at 18:45.

(2) Course B
This tour will be headed for Japan Aerospace Exploration Agency (JAXA) in Chofu and IHI AEROSPACE MUSEUM in Akishima. The tour bus will depart from the congress venue (Toranomon Hills) on 8:30, and come back to the congress venue at 18:45.

7.4 Backyard Tour
Backyard Tour is also planned at TORANOMON HILLS Main Tower during lunch time from November 17, Tuesday to November 19, Thursday.

8. CONGRESS OFFICE
The Congress Office will be set in the GTSJ Secretariat on 5F (Meeting Room 3).
# 9. SESSION PROGRAMS

## 9.1 Session Program at a Glance

### Monday November 16, 2015

<table>
<thead>
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<th>Room A</th>
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<tr>
<td>09:00-09:10</td>
<td>Opening Address</td>
<td>Invited Lecture 1 09:10-10:10</td>
<td>Room A</td>
<td>NASA Glenn: 75 Years &amp; Beyond Propelling 21st Century Aviation to New Heights (Mr. James M. Free, Director, NASA Glenn Research Center)</td>
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<tr>
<td>10:30-11:45</td>
<td>Combustor Development I</td>
<td>Blade Tip Cooling</td>
<td>A-USC Technology</td>
<td>10:30-11:45</td>
<td>Frontier CFD in Gas Turbine I</td>
<td>10:30-11:45</td>
</tr>
<tr>
<td>16:15-18:15</td>
<td>Panel Discussion 1</td>
<td>Challenges in Propulsion Technology for Next Generation Air Transport</td>
<td>Room A</td>
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### Tuesday November 17, 2015

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<tr>
<td>1:05-1:15</td>
<td>Panel Discussion 2 13:05-14:55 Room A</td>
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<tr>
<td>1:05-1:15</td>
<td>Current Status and Future Strategy of Electricity and Energy Supply in Asian Countries</td>
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### Wednesday November 18, 2015

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<tr>
<td>17:45-20:30</td>
<td>Banquet</td>
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<tr>
<td>09:00-10:00</td>
<td>Invited Lecture 4</td>
<td>Challenge for Low BTU Blast Furnace Gas Firing GTCC in Steel Works</td>
<td>(Mr.Yoshiaki Tsukuda, Executive Corporate Adviser, Mitsubishi Heavy Industries, Former President of GTSJ)</td>
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<tr>
<td>15:05-17:05</td>
<td>Panel Discussion 3</td>
<td>Energy Strategy: Role of Gas Turbines in the Future Energy Network</td>
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<tr>
<td>17:05-17:30</td>
<td>Closing Address</td>
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</table>
9.2 Technical Sessions

Monday November 16, 2015

MoLPL Room A
NASA Glenn: 75 Years & Beyond Propelling 21st Century Aviation to New Heights (Invited Lecture)
Chair: Nishizawa, Toshio Japan Aerospace Exploration Agency

Monday November 16, 2015

MoAMC Room C
A-USC Technology (General Session)
Chair: Imano, Shinya Mitsubishi Hitachi Power Systems, Ltd.
Co-Chair: Saito, Daizo Toshiba Corp.

10:55-11:20 MoAMC.2
Feasibility Study of Austenite Steel for A-USC Castings
Kamoshida, Hiroshi Mitsubishi Hitachi Power Systems, Ltd.
Imano, Shinya Mitsubishi Hitachi Power Systems, Ltd.
Takeyama, Masao Tokyo Inst. of Tech.

11:20-11:45 MoAMC.3
Development of High Temperature Inlet Valves for A-USC Steam Turbines
Takano, Tetsu Fuji Electric Co., Ltd.
Izumi, Sakae Fuji Electric Co., Ltd.
Takahashi, Yoichi Fuji Electric Co., Ltd.

MoAME Room E
Frontier CFD in Gas Turbine I (General Session)
Chair: Yamamoto, Satoru Tohoku Univ.
Co-Chair: Inoue, Chihiro The Univ. of Tokyo

10:55-11:20 MoAME.2
Numerical Simulation of Supercritical CO2 Flows in Transonic Turbine and Compressor
Furusawa, Takashi Tohoku Univ.
Miyazawa, Hironori Tohoku Univ.
Yamamoto, Satoru Tohoku Univ.
Numerical Simulation of Sand Erosion Phenomena on Coated Vane of Low Pressure Turbine

Iwashita, Hiroaki
Tokyo Univ. of Science

Yamamoto, Makoto
Tokyo Univ. of Science

Okita, Yoji
IHI Corp.

MoAMF Room F
Centrifugal Compressor Aerodynamics (General Session)

Chair: Sakaguchi, Daisaku
Nagasaki Univ.

Co-Chair: Tamaki, Hideaki
IHI Corp.

Influence of Root Fillet on the Aerodynamic and Structural Performance of a Centrifugal Impeller

Liu, Haiqing
Shanghai Advanced Res. Inst.

Chi, Zhongran
Shanghai Jiao Tong Univ.

Zhang, Jingxuan
Shanghai Advanced Res. Inst.

MoAMG Room G
Cycle Innovation I (General Session)

Chair: Moritaka, Noriko
IHI Corp.

Co-Chair: Cao, Yunpeng
Harbin Engineering Univ.

Design of Micro Gas Turbine System Using Commercial Turbocharger

Rajoo, Sritar
Univ. Teknologi Malaysia

Tan, Feng Xian
Univ. Teknologi Malaysia

Chiong, Meng Soon
Univ. Teknologi Malaysia

Chong, Cheng Tung
Univ. Teknologi Malaysia

Romagnoli, Alessandro
Nanyang Tech. Univ.

Ochiai, Masayuki
Tokai Univ.

MoPM1A Room A
Combustor Development II (General Session)

Chair: Fujimoto, Toshiro
IHI Corp.

Co-Chair: Yamamoto, Takeshi
Japan Aerospace Exploration Agency

Influence of the Pressure Dependence of NOx Emissions of an Industrial Gas Turbine Compressor with High Hydrogen Content Fuels

Kroniger, Daniel
Inst. for Power Plant Tech.

Wirsum, Manfred
Inst. for Power Plant Tech.

Horikawa, Atsushi
Kawasaki Heavy Industries, Ltd.

Okada, Kunio
Kawasaki Heavy Industries, Ltd.

Kazari, Masahide
Kawasaki Heavy Industries, Ltd.

MoPM1B Room B
Seals and Cavities (General Session)

Chair: Takeishi, Kenichiro
Tokushima Bunri Univ.

Co-Chair: Li, Jun
Inst. of Turbomachinery, Xi’an Jiaotong Univ.

A Summary of Computations of Ingestion at the University of Bath

Wilson, Michael
Univ. of Bath

Lock, Gary
Univ. of Bath

Time Resolved Velocity and Pressure Measurements in a Turbine Rotor-Stator Disc Cavity

Kim, You I
Seoul National Univ.

Song, Seung Jin
Seoul National Univ.

Effect of Fin Overlap and Eccentricity on Rim Seal Performance

Ishida, Katsuhiko
Kawasaki Heavy Industries, Ltd.

Kato, Hiroshi
Kawasaki Heavy Industries, Ltd.

Hagari, Tomoko
Kawasaki Heavy Industries, Ltd.
### MoPM1C  
**Room C**  
**Materials and Coatings I (General Session)**  
Chair: Kubo, Takahiro  
Co-Chair: Yoshimi, Kyosuke  

<table>
<thead>
<tr>
<th>Time</th>
<th>Session</th>
<th>Title</th>
<th>Speaker(s)</th>
<th>Affiliation</th>
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</thead>
<tbody>
<tr>
<td>13:40-14:05</td>
<td>MoPM1C.2</td>
<td>Development of Ni-Base Single-Crystal Superalloy and Casting Technology for High Efficiency Gas Turbine Blade</td>
<td>Oguma, Hidetaka</td>
<td>Mitsubishi Heavy Industries, Ltd.</td>
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<td>Okada, Ikuo</td>
<td>Mitsubishi Heavy Industries, Ltd.</td>
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<td>Taneike, Masaki</td>
<td>Mitsubishi Heavy Industries, Ltd.</td>
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<td>Ito, Eisaku</td>
<td>Mitsubishi Heavy Industries, Ltd.</td>
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<td>Harada, Hiroshi</td>
<td>National Inst. for Materials Science</td>
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<td>Yokokawa, Tadaharu</td>
<td>National Inst. for Materials Science</td>
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<td>Kawagishi, Kyoko</td>
<td>National Inst. for Materials Science</td>
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<td>Fujiwara, Kosuke</td>
<td>Mitsubishi Heavy Industries, Ltd.</td>
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<tr>
<td>14:05-14:30</td>
<td>MoPM1C.3</td>
<td>Development of the Advanced Thermal Barrier Coating for High Efficiency Gas Turbine</td>
<td>Okajima, Yoshifumi</td>
<td>Mitsubishi Heavy Industries, Ltd.</td>
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<td>Torigoe, Taii</td>
<td>Mitsubishi Heavy Industries, Ltd.</td>
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<td>Okada, Ikuo</td>
<td>Mitsubishi Heavy Industries, Ltd.</td>
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### MoPM1D  
**Room D**  
**Control and Simulation (General Session)**  
Chair: Koh, Masaharu  
Co-Chair: Savenkov, Mark  

<table>
<thead>
<tr>
<th>Time</th>
<th>Session</th>
<th>Title</th>
<th>Speaker(s)</th>
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<tbody>
<tr>
<td>13:15-13:40</td>
<td>MoPM1D.1</td>
<td>Automated Control for Electric-Thermal Load Following Operation in Nuclear Gas Turbine Cogeneration System</td>
<td>Sato, Hiroyuki</td>
<td>Japan Atomic Energy Agency</td>
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<td>Yan, Xing</td>
<td>Japan Atomic Energy Agency</td>
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<td>Sumita, Junya</td>
<td>Japan Atomic Energy Agency</td>
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<td>Terada, Aatsuho</td>
<td>Japan Atomic Energy Agency</td>
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<td>Nishihara, Tetsuo</td>
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<td>Zhang, Bing</td>
<td>Harbin Engineering Univ.</td>
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<td>Li, Shuying</td>
<td>Harbin Engineering Univ.</td>
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<tr>
<td>14:05-14:30</td>
<td>MoPM1D.3</td>
<td>Simulation Study Investigating the Effects of Modeling Errors on Model Based State Estimations of Jet Engines</td>
<td>Kimura, Mai</td>
<td>IHI Corp.</td>
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<td>Koguma, Yuji</td>
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<td>Nakamura, Keiko</td>
<td>IHI Corp.</td>
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<td>Kinoshita, Moe</td>
<td>IHI Corp.</td>
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<td>Kakiuchi, Daiki</td>
<td>IHI Corp.</td>
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### MoPM1E  
**Room E**  
**Frontier CFD in Gas Turbine II (General Session)**  
Chair: Niehuis, Reinhard  
Co-Chair: Yamada, Kazutoyo  

<table>
<thead>
<tr>
<th>Time</th>
<th>Session</th>
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<tbody>
<tr>
<td>13:15-13:40</td>
<td>MoPM1E.1</td>
<td>Application of a High Order LES Model to Study Flow Transition under Simulated Low Pressure Turbine Conditions</td>
<td>Biswas, Debashish</td>
<td>Toshiba Corp.</td>
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<td>Jimbo, Tomohiko</td>
<td>Toshiba Corp.</td>
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<tr>
<td>13:40-14:05</td>
<td>MoPM1E.2</td>
<td>Fully Resolved Large-Eddy Simulation of a Compressor Cascade Clearance Flow</td>
<td>Ouchi, Takuya</td>
<td>IHI Corp.</td>
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<td>Teramoto, Susumu</td>
<td>The Univ. of Tokyo</td>
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<td>Okamato, Koji</td>
<td>The Univ. of Tokyo</td>
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<tr>
<td>14:05-14:30</td>
<td>MoPM1E.3</td>
<td>Numerical Procedure for Hot Gas Ingestion through Rim Seal of High Pressure Turbine</td>
<td>Suzuki, Masaya</td>
<td>Japan Aerospace Exploration Agency</td>
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<td>Hayashi, Ryosuke</td>
<td>Tokyo Univ. of Science</td>
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<td>Yamamoto, Makoto</td>
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<td>Manabe, Takashi</td>
<td>IHI Corp.</td>
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### MoPM1F  
**Room F**  
**Application of Optimization to Axial Compressor (General Session)**  
Chair: Petsch, Dieter  
Co-Chair: Kato, Hiromasa  

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<th>Speaker(s)</th>
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<tbody>
<tr>
<td>13:15-13:40</td>
<td>MoPM1F.1</td>
<td>Unsteady Aerodynamic Optimization of Compressor with Discrete Adjoint Method</td>
<td>Ma, Can</td>
<td>Tsinghua Univ.</td>
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<td>Su, Xirong</td>
<td>Tsinghua Univ.</td>
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<td>Yuan, Xin</td>
<td>Tsinghua Univ.</td>
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<td>13:40-14:05</td>
<td>MoPM1F.2</td>
<td>Optimized Multidisciplinary Design of a Small Transonic Compressor for Active High-Lift Systems</td>
<td>Teichelt, Sönke</td>
<td>Inst. of Turbomachinery and Fluid Dynamics, Leibniz Univ.</td>
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<td>Verstraete, Tom</td>
<td>Von Karman Inst.</td>
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<td>Seume, Joerg R.</td>
<td>Inst. of Turbomachinery and Fluid Dynamics, Leibniz Univ.</td>
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<tr>
<td>14:05-14:30</td>
<td>MoPM1F.3</td>
<td>Axial Flow Compressor of MGT-70 Gas Turbine Blade Shape Optimization Based on Operating Condition</td>
<td>Pakatchian, Mohammad Reza</td>
<td>MAPNA Turbine Engineering and Manufacturing Company (TUGA)</td>
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<td>Saeidi, Hossein</td>
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<td>Rafiei Sefid Dashti, Ali</td>
<td>MAPNA Turbine Engineering and Manufacturing Company (TUGA)</td>
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MoPM1G
Steam Turbine Long Blade Development Technology
Steam Loss Reduction I (General Session)
Chair: Vogt, Damian
Co-Chair: Sasao, Yasuhiro
Univ. of Stuttgart
Mitsubishi Hitachi Power Systems, Ltd.
13:15-13:40 MoPM1G.1
Unsteady Wet Steam Flow Field and Droplet Measurements at the Last Stage of Low-Pressure Steam Turbine
Bosdas, Ilias
ETH Zurich
Mansour, Michel
Lab. for Energy Conversion, ETH Zurich
Kalfas, Anestis
Aristotle Univ. of Thessaloniki
Abhari, Reza S.
ETH Zurich
Senoo, Shigeki
Mitsubishi Hitachi Power Systems, Ltd.
13:40-14:05 MoPM1G.2
A Novel Probe for Measuring Fine and Coarse Droplets of Wet Steam in a 330 MW Steam Turbine
Cai, Xiaoshu
Univ. of Shanghai for Science & Tech.
14:05-14:30 MoPM1G.3
Studies of Condensate Steam Flow and Wetness Loss in Low Pressure Steam Turbine
Tsukuda, Tomohiko
Toshiba Corp.
Nomura, Daisuke
Toshiba Corp.
Kawasaki, Sakae
Toshiba Corp.
Tominaga, Junichi
Toshiba Corp.
Sasaki, Takashi
Toshiba Corp.
MoPM2A
Emissions (General Session)
Chair: Itoh, Masao
Co-Chair: Inoue, Hiroshi
Mitsubishi Hitachi Power Systems, Ltd.
14:50-15:15 MoPM2A.1
Effects of Hydrogen Addition to Partially Premixed Spray Flame on Combustion and Emission Characteristics
Matsumoto, Takashi
Yamaguchi Univ.
Seo, Takehiko
Yamaguchi Univ.
Mikami, Masato
Yamaguchi Univ.
15:15-15:40 MoPM2A.2
Soot Concentration Distributions of Swirl-Stabilized Non-Premixed Flames in a Model Gas Turbine Combustor
Gulder, Omer L.
Inst. for Aerospace Studies, Univ. of Toronto
Chatterjee, Sandipan
Inst. for Aerospace Studies, Univ. of Toronto
15:40-16:05 MoPM2A.3
The Development of Hydrogen Content Gas Combustion Technology for Kawasaki DLE Combustor
Oda, Takeo
Kawasaki Heavy Industries, Ltd.
MoPM2B
Innovation in Wind Turbine Technology (General Session)
Chair: Abhari, Reza S.
Lab. for Energy Conversion, Inst. for Energy Tech. ETH Zurich
Co-Chair: Matsuda, Hisashi
Toshiba Corp.
14:50-15:15 MoPM2B.1
Plasma Actuation Effect on a MW Class Wind Turbine
Matsuda, Hisashi
Toshiba Corp.
Tanaka, Motofumi
Toshiba Corp.
Osako, Toshiki
Toshiba Corp.
Yamazaki, Kenichi
Toshiba Corp.
Shimura, Naohiko
Toshiba Corp.
Asayama, Masahiro
Toshiba Corp.
Oryu, Yukihiro
Hokutaku Co., Ltd.
15:15-15:40 MoPM2B.2
Impact of Forest-Elevated Turbulence Levels on Wind Farm Performance
Zendehbad, Mohsen
ETH Zurich
Kazda, Jonas
ETH Zurich
Chokani, Ndaona
ETH Zurich
Abhari, Reza S.
Lab. for Energy Conversion, Inst. for Energy Tech.
15:40-16:05 MoPM2B.3
Numerical Investigation on Effect of Upstream Turbine Wake to Flow Field and Performance of Downstream Wind Turbine
Uemura, Yuta
Tokyo Univ. of Science
Yamamoto, Makoto
Tokyo Univ. of Science
Sugawara, Hideaki
Ryoyu Systems Co., Ltd.
Aoyama, Takashi
Japan Aerospace Exploration Agency
Tanabe, Takashi
Japan Aerospace Exploration Agency
MoPM2C
Materials and Coatings II (General Session)
Chair: Kawagishi, Kyoko
National Inst. for Materials Science
Co-Chair: Taneike, Masaki
Mitsubishi Heavy Industries, Ltd.
14:50-15:15 MoPM2C.1
Phase Stability, Microstructure and Ultrahigh-Temperature Strength of Mo-Si-B-Based Alloys for the Application in Uncooling Turbine Systems
Yoshimi, Kyosuke
Tohoku Univ.
Yamamoto, Shioh
Tohoku Univ.
Nakamura, Junya
Tohoku Univ.
Maruyama, Kouichi
Tohoku Univ.
Katou, Hiroyasu
Tohoku Univ.
Goto, Takashi
Tohoku Univ.
15:15-15:40 MoPM2C.2
Development of Ni-Based Superalloy for Large Size Gas Turbine Disks
Shibayama, Takashi
Mitsubishi Hitachi Power Systems, Ltd.
Imano, Shinya
Mitsubishi Hitachi Power Systems, Ltd.
Development of Ni-Co-Base Superalloys Based on New Concept for High Temperature Turbine Disk Applications

Fujioka, Junzo  
National Inst. for Materials Science

Gu, Yuefeng  
National Inst. for Materials Science

Osada, Toshio  
National Inst. for Materials Science

Cui, Chuanyong  
National Inst. for Materials Science

Yokokawa, Tadaharu  
National Inst. for Materials Science

Kobayashi, Toshiharu  
National Inst. for Materials Science

Harada, Hiroshi  
National Inst. for Materials Science

Fukuda, Tadashi  
Hitachi Metals MMC Superalloy, Ltd.

Mitsuhashi, Akira  
Mitsubishi Materials Corp.

MoPM2E  
Room E

Unsteady Flow and Stability Enhancement in Fans and Compressors I (General Session)

Chair: Kim, Sung In  
Queen’s Univ. Belfast

Co-Chair: Hirano, Toshiyuki  
Kokushikan Univ.

14:50-15:15  
MoPM2E.1

Geometrical Effects and Inception of Rotating Stall in Vaneless Diffuser of an Industrial Centrifugal Compressor

Engeda, Abraham  
Michigan State Univ.

15:15-15:40  
MoPM2E.2

Surge Characteristics and Control Using Microsteam Injection of a Centrifugal Compressor with Vaned Diffuser

Gao, Chuang  
Shanghai Advanced Res. Inst.

Chinese Acad. of Science

15:40-16:05  
MoPM2E.3

Suppression of Rotating Stall in a Low Speed Centrifugal Compressor by Fluid Injection from Variable Heights and Yaw Angles

Otani, Kiyoshi  
National Defense Acad. of Japan

Aoki, Yasuhiro  
National Defense Acad. of Japan

MoPM2F  
Room F

Axial Turbine Aerodynamics (General Session)

Chair: Funazaki, Ken-ichi  
Iwate Univ.

Co-Chair: Hamabe, Masaaki  
IHI Corp.

14:50-15:15  
MoPM2F.1

Parameter Study for an Improved Prediction of Wake-Induced Transition in Low-Pressure Turbines

Müller, Christoph  
Leibniz Univ. Hannover

Herbst, Florian  
Leibniz Univ. Hannover

Fiala, Andreas  
MTU Aero Engines AG

Zschep, Carsten  
MTU Aero Engines AG

Kügler, Edmund  
Inst. of Propulsion Tech. German Aerospace Center

Seume, Joerg R.  
Inst. of Turbomachinery and Fluid Dynamics, Leibniz Univ.

MoPM2G  
Room G

Steam Turbine Long Blade Development Technology Wet Steam Loss Reduction II (General Session)

Chair: Kalfas, Anestis  
Aristotele Univ. of Thessaloniki

Co-Chair: Senoo, Shigeki  
Mitsubishi Hitachi Power Systems, Ltd.

14:50-15:15  
MoPM2G.1

Unsteady Force of Wet-Steam Flow on Multi-Stage Turbine Long Blade Rows

Miyazawa, Hironori  
Tohoku Univ.

Iwasaki, Toshiki  
Tohoku Univ.

Miyake, Satoshi  
Tohoku Univ.

Furusawa, Takashi  
Tohoku Univ.

Yamamoto, Satoru  
Tohoku Univ.

15:15-15:40  
MoPM2G.2

The Eulerian-Lagrangian Approach for the Prediction of Large Droplet Behavior in Low-Pressure Steam Turbine

Ooyama, Hiroharu  
Mitsubishi Hitachi Power Systems, Ltd.

Momma, Kazuhiro  
Mitsubishi Hitachi Power Systems, Ltd.

Sasao, Yosaiho  
Mitsubishi Hitachi Power Systems, Ltd.

15:40-16:05  
MoPM2G.3

Experimental Investigation of Liquid Film Instability & Droplet Distribution Aft the Trailing Edge of Cascade Blade

Javed, Baber  
The Univ. of Tokyo

Watanabe, Toshinori  
The Univ. of Tokyo

Himeno, Takehiro  
The Univ. of Tokyo

Uzawa, Seiji  
The Univ. of Tokyo
<table>
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<tbody>
<tr>
<td>16:15-18:15</td>
<td>MoPDPL.1</td>
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</tbody>
</table>

**Challenges in Propulsion Technology for Next Generation Air Transport**

**Chair:** Okai, Keiichi  
**Japan Aerospace Exploration Agency**

**Free, James M.**  
NASA Glenn Res. Center

**Futamura, Hisao**  
Japan Aerospace Exploration Agency

**Epstein, Alan**  
Pratt & Whitney Technology and Environment

**Koyama, Daisuke**  
Rolls-Royce Japan

**Hiratsuka, Shinji**  
Japanese Aero Engines Corp.

**Haraiakawa, Hiroki**  
JAL Engineering

**Yasuraoka, Satoru**  
Ministry of Ec. Trade and Industry
## Nickel-Base Superalloys – Enabling Future Generations of Power Turbines

**Chair:** Yoshioka, Yomei  
**Ehime Univ.**

9:10-10:10  
**TuILPL.1**

**Nickel-Base Superalloys – Enabling Future Generations of Power Turbines**

- **Patel, Shailesh**  
  Special Metals Corp.
- **deBarbadillo, J.J.**  
  Special Metals Corp.

---

## Perspective on Electric Propulsion Technologies for Aircraft Applications

**Chair:** Okai, Keiichi  
**The Univ. of Tokyo**

10:20-11:35  
**TuAMA.1**

**Perspective on Electric Propulsion Technologies for Aircraft Applications**

- **Madavan, Nateri**  
  NASA Ames Res. Center
- **Koyama, Daisuke**  
  Rolls-Royce Japan
- **Taguchi, Hideyuki**  
  Japan Aerospace Exploration Agency

---

## Novel Cooling Technologies I (General Session)

**Chair:** Fujimoto, Shuu  
**IHI Corp.**

10:20-10:45  
**TuAMB.1**

**Improvement of the NEKOMMI Film Cooling Technology by Application of an Automated Optimization Algorithm**

- **Kusterer, Karsten**  
  B&B-AGEMA GmbH
- **Dickhoff, Jens**  
  B&B-AGEMA GmbH
- **Sugimoto, Takao**  
  B&B-AGEMA GmbH
- **Tanaka, Ryozo**  
  Kawasaki Heavy Industries, Ltd.
- **Kazari, Masahide**  
  Kawasaki Heavy Industries, Ltd.
- **Custer, Chad**  
  CD-Adapco Computational Dynamics Ltd.
- **Dewan, Yuvraj**  
  CD-Adapco Computational Dynamics Ltd.
- **Wolfgang, Schroeder**  
  RWTH Aachen Univ.
- **Bohn, Dieter**  
  RWTH Aachen Univ.

10:45-11:10  
**TuAMB.2**

**Semi-Inverse Design Optimization of Film Cooling Arrangement and Its Prediction of Coolant Amount of HPT Vanes**

- **Chi, Zhongran**  
  Shanghai Jiao Tong Univ.
- **Liu, Haiqing**  
  Shanghai Advanced Res. Inst.
- **Zang, Shusheng**  
  Shanghai Jiao Tong Univ.

11:10-11:35  
**TuAMB.3**

**Improvement of Cooling Performance by the Combination of Internal and Film Cooling**

- **Matsumita, Tadayuki**  
  Osaka Inst. of Tech.
- **Shimizu, Nozomi**  
  Osaka Inst. of Tech.
- **Kawata, Yutaka**  
  Osaka Inst. of Tech.

---

## Component Damage, Failure & Life Assessment I (General Session)

**Chair:** Purdy, Daniel  
**Electric Power Res. Inst.**

**Co-Chair:** Yaguchi, Masatsugu  
**Central Res. Inst. of Electric Power Industry**

10:20-10:45  
**TuAMC.1**

**Interaction between Small Crack Propagation and Crystallographic Microstructure in Ni-Base Superalloy under Thermo-Mechanical Loading**

- **Yamazaki, Yasuhiro**  
  Niigata Inst. of Tech.

10:45-11:10  
**TuAMC.2**

**Creep Small Crack Propagation of Ni-Based Superalloy under a Graded Temperature Condition**

- **Subramanian, Rajivgandhi**  
  Nagaoka Univ. of Tech.
- **Metoki, Ayaka**  
  Nagaoka Univ. of Tech.
- **Yamagishi, Satoshi**  
  Nagaoka Univ. of Tech.
- **Okazaki, Masakazu**  
  Nagaoka Univ. of Tech.

11:10-11:35  
**TuAMC.3**

**Effect of Crystallographic Arrangement on Fatigue Crack Initiation for Ni-Based Directionally Solidified Superalloy**

- **Yokoyama, Takashi**  
  Mitsubishi Hitachi Power Systems, Ltd.
- **Sekihara, Masaru**  
  Mitsubishi Hitachi Power Systems, Ltd.

---

## Small Gas Turbines (General Session)

**Chair:** Rajoo, Srithar  
**Univ. Teknologi Malaysia**

**Co-Chair:** Tamaki, Hideaki  
**IHI Corp.**

10:20-10:45  
**TuAMD.1**

**Re-Compression System for SOFC Hybrid Plants: Tests with an Emulator Rig**

- **Ferrari, Mario Luigi**  
  Univ. of Genoa
- **Pascenti, Matteo**  
  Univ. of Genoa
- **Massardo, Aristide Fausto**  
  Univ. of Genoa
- **Traverso, Alberto**  
  Univ. of Genoa

10:45-11:10  
**TuAMD.2**

**Development of Micro Gas Turbine Test Facility and Secondary Flow Stabilization**

- **Lim, Hyung-soo**  
  Korea Inst. of Machinery & Materials
- **Choi, Bum-seog**  
  Korea Inst. of Machinery & Materials
- **Sohn, Jeong Lak**  
  Korea Inst. of Machinery & Materials
- **Park, Moo-ryong**  
  Korea Inst. of Machinery & Materials
- **Park, Jun-Young**  
  Korea Inst. of Machinery & Materials
- **Seo, JeongMin**  
  Korea Inst. of Machinery & Materials
- **Bang, Je-Sung**  
  Korea Inst. of Machinery & Materials
- **Hwang, Soon-Chan**  
  Korea Inst. of Machinery & Materials
- **Lim, Young-Chul**  
  Korea Inst. of Machinery & Materials
- **Oh, In-Kyun**  
  Korea Inst. of Machinery & Materials
- **Kim, Byung Ok**  
  Korea Inst. of Machinery & Materials
**TuAME**  
**Room E**  
**Aerodynamic Design of Centrifugal Compressor (General Session)**  
Chair: Engeda, Abraham  
Co-Chair: Watanabe, Hiroyoshi  
Michigan State Univ.  
EBARA Corp.  

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<tr>
<th>Time</th>
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<th>Authors</th>
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</table>
| 10:20-10:45| TuAME.1  | 1-D Vaneless Diffuser Model Accounting for the Effects of Spanwise Flow Stratification | Stuart, Charles  
Spence, Stephen  
Kim, Sung in  
Filsinger, Dietmar  
Starke, Andre  
Harley, Peter  
Queen's Univ. Belfast  
Queen's Univ. Belfast  
Queen's Univ. Belfast  
IHI Charging Systems International GmbH  
IHI Charging Systems International GmbH  |
| 10:45-11:10| TuAME.2  | Automatic Optimisation of a Centrifugal Compressor for Improved Performance at Near Surge Operation | Starke, Andre  
Bamba, Takahiro  
Filsinger, Dietmar  
Harley, Peter  
IHI Charging Systems International GmbH  
IHI Charging Systems International GmbH  
IHI Charging Systems International GmbH  |

**TuAMG**  
**Room G**  
**Steam Turbine Aerodynamic Efficiency Enhancement**  
(General Session)  
Chair: Shibukawa, Naoki  
Co-Chair: Kroniger, Daniel  
Toshiba Corp.  
RWTH Aachen Univ.  

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| 10:20-10:45| TuAMG.1  | Global Aerodynamic Design Optimization and Knowledge \  
Dis-Coverys Method of an Exhaust Hood  
Multi-Objective Design Optimization of a Steam Turbine Exhaust Hood Using Open-Source Optimization Tool | Zhu, Peiyan  
Guo, Zhengdong  
Song, Liming  
Li, Jun  
Ooyama, Hiroharu  
Xi'an Jiaotong Univ.  
Xi'an Jiaotong Univ.  
Xi'an Jiaotong Univ.  
Xi'an Jiaotong Univ.  
Mitsubishi Hitachi Power Systems, Ltd.  |
| 11:10-11:35| TuAMG.3  | PIV Visualization of the Flow Field Inside a Low Pressure Turbine Exhaust Hood for a Large Power Steam Turbine | Mizumi, Shunsuke  
Segawa, Kiyoishi  
Mitsubishi Hitachi Power Systems, Ltd.  
Mitsubishi Hitachi Power Systems, Ltd.  |

**TuPDPL**  
**Room A**  
**Current Status and Future Strategy of Electricity and Energy Supply in Asian Countries (Panel Discussion)**  
Chair: Kaneko, Shozo  
Inst. of Industrial Science, the Univ. of Tokyo  

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<th>Time</th>
<th>Session</th>
<th>Title</th>
<th>Authors</th>
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</table>
| 13:05-14:55| TuPDPL.1 | Current Status and Future Strategy of Electricity and Energy Supply in Asian Countries | Matsuo, Yuji  
Lin, Feng  
Sohn, Jeong Lark  
Bhattacharyya, Souvik  
Srisuping, Komphat  
The Inst. of Energy Ee  
Chinese Acad. of Sciences  
Korea Inst. of Machinery & Materials  
Indian Inst. of Tech. Kharagpur  
Electricity Generating Authority of Thailand  |

**TuPMA**  
**Room A**  
**Fuels (General Session)**  
Chair: Fujiwara, Hitoshi  
Japan Aerospace Exploration Agency  
Co-Chair: Iki, Norihiko  
AIST  

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<tr>
<th>Time</th>
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<th>Title</th>
<th>Authors</th>
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</table>
| 15:15-15:40| TuPMA.1  | Degradation Analysis of SOFC for Various Syngas Compositions in IGFC Systems | Harun, Nor Farida  
Zaccaria, Valentina  
Traverso, Alberto  
Adams II, Thomas A.  
McMaster Univ.  
U.S. Department of Energy  
Univ. of Genoa  
McMaster Univ.  
NETL  
NETL  |

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**TuAME**  
**Room F**  
**Unsteady Flow and Stability Enhancement in Fans and Compressors II (General Session)**  
Chair: Gao, Chuang  
Co-Chair: Goto, Takashi  
Shanghai Advanced Res. Inst. Chinese Acad. of Sciences  
IHI Corp.  

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<th>Time</th>
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<th>Title</th>
<th>Authors</th>
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</table>
| 10:20-10:45| TuAMF.1  | Modeling of Non-Uniform Flow Fields in Labyrinth Eye Seals in Shrouded Centrifugal Compressors | Song, Jieun  
Song, Seung Jin  
Seoul National Univ.  
Seoul National Univ.  |
| 10:45-11:10| TuAMG.2  | Characteristics of Diffuser Stall and Diffuser Leading-Edge Vortex in a Centrifugal Compressor | Fujisawa, Nobumichi  
Haru, Shotaro  
Ohta, Yutaka  
Waseda Univ.  
Waseda Univ.  
Waseda Univ.  |
| 11:10-11:35| TuAMG.3  | Numerical Simulation of a Mixed Flow Compressor under Off-Design Conditions | Moriyama, Masayuki  
Ichimura, Jun  
Sato, Tetsuya  
Taguchi, Hideyuki  
Waseda Univ.  
Waseda Univ.  
Waseda Univ.  
Japan Aerospace Exploration Agency  |
TuPMA.2  
Cogeneration Plant Using Wood Chips Gasification Technology  
Sudarev, Anatoly  
Avraune, Patrick, Gilles Bohor  
Rogaume, Yann, Nicolas  
«Res. «Ceramic Engines» Center Named after A.M.Boyko»  
Engineer Group Leader, ENISE  

TuPMA.3  
GE`s Aeroderivative Gas Turbines Fuel Flexibility for Japan  
Knapczyk, Michal  
GE Power&Water

TuPMA.4  
Recent Advancements in Gas Turbine Fuel Flexibility  
Goldmeer, Jeffrey  
Kihara, Ken  
Fujimoto, Haruki  
GE Power & Water  

TuPMB  
Novel Cooling Technologies II (General Session)  
Chair: Okita, Yoji  
IHI Corp.

TuPMB.1  
Effects of Dimpled-Cutback-Surface Rotation Angle on Film Cooling Performance at Airfoil Trailing Edge  
Yano, Kohda  
Tokyo Univ. of Agriculture and Tech.  
Murata, Akira  
Tokyo Univ. of Agriculture and Tech.  
Sekijima, Minehide  
Tokyo Univ. of Agriculture and Tech.  
Saito, Hiroshi  
Tokyo Univ. of Agriculture and Tech.  
Iwamoto, Kaoru  
Tokyo Univ. of Agriculture and Tech.

TuPMB.2  
Three-Component PTV Measurements of Film Cooling Flow in Multiple Planes Over Cutback Surface with Inclined Teardrop-Shaped Dimples at Airfoil Trailing Edge  
Murata, Akira  
Tokyo Univ. of Agriculture and Tech.  
Hanai, Masaki  
Tokyo Univ. of Agriculture and Tech.  
Tokutake, Taro  
Tokyo Univ. of Agriculture and Tech.  
Saito, Hiroshi  
Tokyo Univ. of Agriculture and Tech.  
Iwamoto, Kaoru  
Tokyo Univ. of Agriculture and Tech.

TuPMB.3  
High-Resolution Heat Transfer Measurements and Crossflow Regulation in Narrow Impingement Cooling Channels with Divergent Geometries  
Bonitsopoulos, Stavros  
Aristotle Univ. of Thessaloniki  
Terzis, Alexandros  
Swiss Federal Inst. of Tech. (EPFL)  
Ott, Peter  
Swiss Federal Inst. of Tech. (EPFL)  
Kalfas, Anestis  
Aristotle Univ. of Thessaloniki

TuPMB.4  
Flow and Heat Transfer Characteristics for Array of Impinging Jets with Mounting Some Baffles on Impingement Surface  
Nuntadusit, Chayut  
Prince of Songkla Univ.
Low Inertia Centrifugal Compressor Wheels: Back Disk Geometry Optimization

Fischer, Tore
Inst. of Turbomachinery and Fluid Dynamics, Leibniz Univ.

Peters, Melf
Inst. of Turbomachinery and Fluid Dynamics, Leibniz Univ.

Seume, Joerg R.
Inst. of Turbomachinery and Fluid Dynamics, Leibniz Univ.

Effects of Suction Flow Characteristics on the Performance of Automotive Turbocharger Compressor

Ohuchida, Satoshi
IHI Corp.

Numerical and Experimental Investigation on the Effect of Tip Clearance of a Multi-Stage Axial Compressor

Gao, Xuelin
Mitsubishi Heavy Industries, Ltd.

Mito, Ryosuke
Mitsubishi Heavy Industries, Ltd.

Okuzono, Masamitsu
Mitsubishi Heavy Industries, Ltd.

Walker, Thomas
Mitsubishi Heavy Industries, Ltd.

Seki, Ryosuke
Mitsubishi Heavy Industries, Ltd.

Ito, Eisaku
Mitsubishi Heavy Industries, Ltd.

Effects of Inflow Distortions in a Transonic Axial Compressor Stage

Haug, Jakob
Philipp Univ. Der Bundeswehr München

Barthmes, Sebastian
Univ. Der Bundeswehr München

Niehuis, Reinhard
Univ. Der Bundeswehr München

Influence of Tip Seal Configurations on Flow and Efficiency for Shrouded Turbine Blades

Zimmermann, Tobias
RWTH Aachen Univ.

Winfried

Cukovic, Oliver
RWTH Aachen Univ.

Wirsum, Manfred
RWTH Aachen Univ.
Numerical Simulation of Steam Seal Force and Its Effects on Rotordynamic Stability of Steam Turbine Rotor Shaft

Mimura, Yuki
Tominaga, Junichi
Hirano, Toshio
Shibukawa, Naoki
Yuan, Xin
Lin, Zhirong

Toshiba Corp.
Toshiba Corp.
Toshiba Corp.
Toshiba Corp.
Tsinghua Univ.
Tsinghua Univ.
Wednesday November 18, 2015

**Proabilistic Analysis of Complex System Behaviour in Turbomachinery Design (Invited Lecture)**

Chair: Seume, Joerg R. Inst. of Turbomachinery and Fluid Dynamics, Leibniz Univ. Hannover

09:00-10:00 WeILPL.1

**Numerical Simulation for Combustor Design (General Session)**

Chair: Watanabe, Hiroaki Kyushu Univ.
Co-Chair: Makida, Mitsumasa Japan Aerospace Exploration Agency

10:20-10:45 WeAMA.1

**Direct Numerical Simulation of Combustion Noise in Open Hydrogen Diffusion Jet Flames**

Pillai, Abhishek Kyoto Univ.
Kitano, Tomoaki Kyoto Univ.
Kurose, Ryooichi Kyoto Univ.
Komori, Satoru Kyoto Univ.

10:45-11:10 WeAMA.2

**Large-Eddy Simulation of Turbulent Spray Combustion Field of Full Annular Combustor for Aircraft Engine**

Nishiie, Takayuki Numerical Flow Designing Co., Ltd.
Makida, Mitsumasa Japan Aerospace Exploration Agency
Nakamura, Naoki Advanced Science & Intelligence Res. Inst.
Kurose, Ryoichi Kyoto Univ.

11:10-11:35 WeAMA.3

**Large-Eddy Simulation of Turbulent Spray Combustion Field in a Gas Turbine Combustor**

Itoh, Masao Toshiba Corp.
Iwai, Yasunori Toshiba Corp.
Nishiie, Takayuki Numerical Flow Designing Co., Ltd.
Zhang, Huilai Numerical Flow Designing Co., Ltd.
Kurose, Ryoichi Kyoto Univ.

11:35-12:00 WeAMA.4

**Numerical and Experimental Study on Spray Flux Distribution Produced by Liquid Sheet Atomization**

Inoue, Chihiro The Univ. of Tokyo
Shimizu, Atsushi The Univ. of Tokyo
Watanabe, Toshinori The Univ. of Tokyo
Himeno, Takehiro The Univ. of Tokyo
Uzawa, Seiji The Univ. of Tokyo

**Heat Transfer Measurement (General Session)**

Chair: Kawata, Yutaka Osaka Inst. of Tech.
Co-Chair: Song, Seung Jin Seoul National Univ.

10:20-10:45 WeAMB.1

**Measurement of Film-Cooling Effectiveness on a Turbine Endwall Using a Liquid Crystal Image Method**

Baggetta, Luca Univ. of Genoa
Satta, Francesca Univ. of Genoa
Tanda, Giovanni Univ. of Genoa

10:45-11:10 WeAMB.2

**A New Hot Gas Test Stand for Gas Turbine Cooling Investigations**

Franze, Roman Tech. Univ. Kaiserslautern
Bihlmaier, Cornelius Tech. Univ. Kaiserslautern
Boehle, Martin Tech. Univ. Kaiserslautern
Krewinkel, Robert MAN Diesel & Turbo SE
Takeishi, Kenichiro Tokushima Bunri Univ.

11:10-11:35 WeAMB.3

**Film Cooling Performance at Combustor Wavy Liner-Wall Measured by Steady-State Infrared Thermography Method Using Two Different Thermal-Conductivity Materials**

Murata, Akira Tokyo Univ. of Agriculture and Tech.
Ogiwara, Yuta Tokyo Univ. of Agriculture and Tech.
Kondo, Ryoosuke Tokyo Univ. of Agriculture and Tech.
Saito, Hiroshi Tokyo Univ. of Agriculture and Tech.
Iwamoto, Kaoru Tokyo Univ. of Agriculture and Tech.
Takahashi, Katsuyoshi IHI Corp.

11:35-12:00 WeAMB.4

**Investigation of Heat Transfer of Vane Endwall at Equivalent Condition of Real Gas Turbine Using Measurement and Analysis**

Mizukami, Satoshi Mitsubishi Heavy Industries, Ltd.
Hase, Takaaki Mitsubishi Heavy Industries Aero Engines, Ltd.
Yamaguchi, Yoshiaki Mitsubishi Heavy Industries, Ltd.
Ito, Eisaku Mitsubishi Heavy Industries, Ltd.

12:00-12:25 WeAMB.5

**Realistic Velocity, Turbulence and Temperature Profiles at the Combustor-Turbine Interaction Plane in a Rig**

Cresci, Irene Univ. of Oxford
Bacic, Marko Univ. of Oxford
Ireland, Peter Univ. of Oxford
Tibbett, Ian Rolls-Royce PLC
Rawlinson, Anton Rolls-Royce PLC

**Component Damage, Failure & Life Assessment III (General Session)**

Chair: Yamazaki, Yasuhiro Niigata Inst. of Tech.
Co-Chair: Ito, Akihiro Chubu Electric Power Co., Inc.

10:20-10:45 WeAMC.1

**Evaluation of Low Cycle Fatigue Strength on Directionally Solidified Ni-Base Superalloys for High Efficiency Gas Turbine**

Karato, Takanori Mitsubishi Heavy Industries, Ltd.
Keneko, Hideaki Mitsubishi Heavy Industries, Ltd.
Ohara, Toshinobu Mitsubishi Heavy Industries, Ltd.
Ito, Eisaku Mitsubishi Heavy Industries, Ltd.
Crystallographic Orientation Dependence on Friction and Fretting Behavior of Single Crystal Ni-Base Superalloys

Rengaraj, Balavenkatesh Nagaoka Univ. of Tech.
Baba, Sotaro Nagaoka Univ. of Tech.
Okazaki, Masakazu Nagaoka Univ. of Tech.

Role of Graded Microstructure and Residual Stresses in the Fatigue Behavior of a Friction Stir Welded Ti-6Al-4V

Muzvidziwa, Milton Nagaoka Univ. of Tech.
Okazaki, Masakazu Nagaoka Univ. of Tech.
Suzuki, Kenji Niigata Univ.
Hirano, Satoshi Hitachi Ltd.
Sekihara, Masaru Mitsubishi Hitachi Power Systems, Ltd.

Influence of Shot Peening on Low Cycle Fatigue Property of Ti-6Al-4V

Nakamura, Hiroshi IHI Corp.
Honda, Tatsuhito IHI Corp.
Prou, Joris IHI Corp.
Tsunori, Mitsuyoshi, IHI Corp.

Temperature Gradients in a Radial Turbine in Steady State and Transient Operation

Diefenthal, Mathias Inst. for Power Plant Tech. Steam and Gas Turbines
Rakut, Christian Inst. for Power Plant Tech. Steam and Gas Turbines
Tadesse, Haiu Inst. for Power Plant Tech. Steam and Gas Turbines
Wirsum, Manfred Inst. for Power Plant Tech. Steam and Gas Turbines
Heuer, Tom BorgWarner Turbo Systems Engineering GmbH

Evaluation of Scaled Turbine Matching Method for Steady and Transient Performance Prediction of Turbocharged Passenger Car Engines

Bin Ismail, Muhammad Imperial Coll. London
Costall, Aaron William Imperial Coll. London
Martinez-Botas, Ricardo Imperial Coll. London

Experimental Investigation of Vaneless Asymmetric Double Entry Turbine for Turbochargers under Steady Flow

Gununathan, Balamurugan A Imperial Coll. London
Martinez-Botas, Ricardo Imperial Coll. London
Sakai, Masa Imperial Coll. London
Rajoo, Srijith Univ. Teknologi Malaysia

Effect of Variable Nozzle Vane Profile on Radial Turbine Performance for Automotive Turbochargers

Yamagata, Akihiro IHI Corp.

Entropy Generation Rate in a Mixed Flow Turbine Passage

Newton, Peter Imperial Coll. London
Seiler, Martin ABB Turbo Systems
Martinez-Botas, Ricardo Imperial Coll. London
Palenschat, Torsten Imperial Coll. London

A Quick Method for Full Flange-To-Flange Industrial Gas Turbine Analysis Based on Through-Flow Modelling

Petrovic, Milan V. Univ. of Belgrade
Abdel-Rahman, Ahmed MAN Diesel & Turbo SE
Wiedermann, Alexander MAN Diesel & Turbo SE

Geometric Parametrization, an Important but Often Overlooked Prerequisite for the Probabilistic Analysis of Turbomachinery Blades

Voigt, Matthias Tech. Univ. Dresden
Vogeler, Konrad Tech. Univ. Dresden
Hoegner, Lars Tech. Univ. Dresden
Backhaus, Thomas Tech. Univ. Dresden
Meyer, Marcus Rolls Royce Deutschland
Jens, Scharfenstein Tech. Univ. Dresden

Trailing Edge Design to Reduce the Wake Mixing Loss of Low Pressure Turbine Airfoil

Furukawa, Jun IHI Corp.
Hamabe, Masaaki IHI Corp.
Okamura, Yasuhiro IHI Corp.
Funazaki, Ken-ichi Iwate Univ.

Experimental and Numerical Studies on Aerodynamic Performance of a Single-Stage Low-Pressure Axial Turbine with Purge Air Ejection

Funazaki, Ken-ichi Iwate Univ.
Kudo, Koki Iwate Univ.
Kawakatsu, Mitsuhito Iwate Univ.
Kikuchi, Mamoru Iwate Univ.

On the Numerical Prediction of the Influence of Tip Flow on Diffuser Stability

Drechsel, Bastian Inst. of Turbomachinery and Fluid Dynamics, Leibniz Univ. Hannover
Seume, Joerg R. Inst. of Turbomachinery and Fluid Dynamics, Leibniz Hannover
Herbst, Florian Inst. of Turbomachinery, Leibniz Univ. Hannover

A Study of the Unsteady Flow Field and Turbine Vibration Characteristic of the Supersonic Partial Admission Turbine for a Rocket Engine

Tokuyama, Yuki
Iwate Univ.

Funazaki, Ken-ichi
Iwate Univ.

Kato, Hiromasa
Iwate Univ.

Shimiya, Noriyuki
Japan Aerospace Exploration Agency

Shimagaki, Mitsuru
Japan Aerospace Exploration Agency

Uchiumi, Masaharu
Japan Aerospace Exploration Agency

Multi-Electrode Plasma Actuator to Improve Performance of Flow Separation Control

Asaumi, Norio
IHI Corp.

Matsumoto, Shinshuke
IHI Corp.

Matsumoto, Takashi
Tottori Univ.

Sugahara, Masataka
Tottori Univ.

Kawazoe, Hiromitsu
Tottori Univ.

Comparing the Effect of Unsteady Wakes on Parallel and Divergent Endwalls in a LP Turbine Cascade (T106A-EiZ and T106D-EiZ)

Kirik, Ilker
Univ. of the German Federal Armed Forces Munich

Niehuis, Reinhard
Univ. of the German Federal Armed Forces Munich

An Automated Process to Create Start Values for Gas Turbine Performance Simulations Using Neural Networks and Evolutionary Algorithms

Becker, Richard-Gregor
German Aerospace Center - DLR

Bolemant, Martin
Tech. Univ. of Berlin

Peitsch, Dieter
Tech. Univ. of Berlin

Flexibilization of Compressor and Turbine Characteristics for Optimized Specification in Off-Design Condition

Sauer, Tim
Tech. Univ. of Berlin

Peitsch, Dieter
Tech. Univ. of Berlin

Design and Performance Analysis of Partial Mixed Flow Turbopfan Engine

Akiyama, Naoki
Tokyo Univ. of Agriculture and Tech.

Fukuyama, Yoshitaka
Japan Aerospace Exploration Agency

WeAMEG.4
Room A
CFRP in Aircraft Engine Technology (Forum)
Chair: Aoki, Takahira
The Univ. of Tokyo
13:55-15:00

WePM1A.1
CFRP in Aircraft Engine Technology
Chair: Moriya, Katsuyoshi
IHI Corp.

Takeda, Tomo
Japan Aerospace Exploration Agency

Akakabe, Koki
The Univ. of Tokyo

WePM1B
Reliability and Maintenance (General Session)
Chair: Kaplan, Burak
Mitsubishi Hitachi Power Systems Europe

Co-Chair: Fukunaga, Yuya
Mitsubishi Hitachi Power Systems

13:55-14:20

WePM1B.1
GT Blade Inside Crack Inspection Using Ultrasonic Matrix Phased Array Technique

Kirihigashi, Akihiro
Mitsubishi Heavy Industries, Ltd.

Kimura, Tadashi
Mitsubishi Heavy Industries, Ltd.

Kurokawa, Masaaki
Mitsubishi Heavy Industries, Ltd.

14:20-14:45

WePM1B.2
Emergency Restoration of Damaged 25MW Industrial Gas Turbine through Bearing Retrofit Design and Test Run Result

Lee, An Sung
KIMM (Korea Inst. of Machinery & Materials)

Byung Ok, Kim
KIMM (Korea Inst. of Machinery & Materials)

Kyungho, Sun
KIMM (Korea Inst. of Machinery & Materials)

14:45-15:10

WePM1B.3
Does Filtration Efficiency Matter for Compressor Health?

Burch, Dan
CLARCOR Industrial Air

Hiner, Steve
CLARCOR Industrial Air

Lenox, Jim
CLARCOR Industrial Air

Nicholas, Tim
CLARCOR Industrial Air

Propp, Sarah
CLARCOR Industrial Air

WePM1C
Manufacturing Technologies I (General Session)
Chair: Takahashi, Satoshi
IHI Corp.

Co-Chair: Imano, Shinya
Mitsubishi Hitachi Power Systems, Ltd.

13:55-14:20

WePM1C.1
Close Partnership with Design Technology for Manufacturing of Investment Castings in Aero Engine Industry

Arai, Mikiya
IHI Castings

Toyama, Hiroki
IHI Castings

14:20-14:45

WePM1C.2
Microstructure and Mechanical Properties of Superalloy Built up by Additive Manufacturing Process

Kuo, Yen Ling
Tokyo Metropolitan Univ.

Kakehi, Koji
Tokyo Metropolitan Univ.
14:45-15:10 WePM1C.3  
**Development and Application of Repair Material for Land-Base Gas Turbine Transition Pieces**  
Saito, Daizo  
Kitayama, Kazuhiro  
Ishikawa, Yosuke  
Sakai, Yoshiaki  
Toshiba Corp.  

15:10-15:35 WePM1C.4  
**Direct Recycle of Used Single Crystal Superalloy Turbine Blades**  
Utada, Satoshi  
Joh, Yuichiro  
Osawa, Makoto  
Kobayashi, Toshiharu  
Yokokawa, Tadaharu  
Kawagishi, Kyoko  
Suzuki, Shinsuke  
Harada, Hiroshi  
Waseda Univ.  
National Inst. for Materials Science  

13:55-14:20 WePM1D.1  
**Preliminary Test of Turbofan Engine for Noise Research**  
Ishii, Tatsuya  
Nagai, Kenichiro  
Enomoto, Shunji  
Kazawa, Junichi  
Oishi, Tsutomu  
Japan Aerospace Exploration Agency  
IHI Corp.  

14:20-14:45 WePM1D.2  
**Effects of Aperture Geometry on Impedance of Active Acoustic Liners**  
Tanaka, Yuki  
Yamasaki, Nobuhiko  
Inoue, Chihiro  
Ishii, Tatsuya  
Kyushu Univ.  
Kyushu Univ.  
Japan Aerospace Exploration Agency  

14:45-15:10 WePM1D.3  
**Flow Field Analysis on Acoustic Panel of Fan Duct in Jet Engine**  
Kudo, Genki  
Hayashi, Ryosuke  
Yamamoto, Makoto  
Kagaya, Ryu  
Ooba, Yoshinori  
Oishi, Tsutomu  
Tokyo Univ. of Science  
IHI Corp.  
IHI Corp.  

15:10-15:35 WePM1D.4  
**Acoustic Excitation for Jet Noise Reduction**  
Sawada, Kyohei  
Enomoto, Shunji  
Oinuma, Hideshi  
Nagai, Kenichiro  
Ishii, Tatsuya  
The Univ. of Tokyo  
Japan Aerospace Exploration Agency  
Japan Aerospace Exploration Agency  
Japan Aerospace Exploration Agency  
Japan Aerospace Exploration Agency  
Japan Aerospace Exploration Agency  

14:20-14:45 WePM1E.1  
**Investigation of the Unsteady Flow Field of a Low Speed Single-Stage Axial Compressor**  
Pallot, Guillaume  
Kato, Dai  
Ohta, Yutaka  
Kanameda, Wataru  
IHI Corp.  
Waseda Univ.  
Waseda Univ.  

14:45-15:10 WePM1E.2  
**Feasibility Study on a Single-Stage Tandem Axial Compressor for an Active High-Lift-System**  
Vorreiter, Arne  
Mitsubishi Heavy Industries, Ltd.  

15:10-15:35 WePM1E.3  
**Development of a Stage Stacking Procedure for Evaluation of Axial Compressor Off-Design Performance**  
Walker, Thomas  
Mito, Ryosuke  
Ito, Eisaku  
Mitsubishi Heavy Industries, Ltd.  
Mitsubishi Heavy Industries, Ltd.  

14:20-14:45 WePM1E.4  
**Uncertainty Quantification of Simultaneous Operational and Geometrical Uncertainties in Turbomachinery Design Practice**  
Wunsch, Dirk  
Nigo, Rémy  
Coussement, Gregory  
Hirsch, Charles  
Takekoshi, Yoshihisa  
NUMECA International  
Univ. of Mons  
Univ. of Mons  
NUMECA International  
NUMECA Japan  

13:55-14:20 WePM1F.1  
**Flow Structure Interaction Analysis on Internal Flow Field of Impedance Pump**  
Okamoto, Ryoma  
Watanabe, Toshinori  
Himeno, Takehiro  
Inoue, Chihiro  
The Univ. of Tokyo  
The Univ. of Tokyo  
The Univ. of Tokyo  
The Univ. of Tokyo  

13:55-14:20 WePM1F.2  
**Fluid Structure Interaction (General Session)**  
Chair: Hah, Chunil  
Co-Chair: Yamamoto, Makoto  
NASA Glenn Res. Center  
Tokyo Univ. of Science  

14:20-14:45 WePM1F.3  
**Fluid Structure Interaction (General Session)**  
Chair: Hah, Chunil  
Co-Chair: Yamamoto, Makoto  
NASA Glenn Res. Center  
Tokyo Univ. of Science  

13:55-15:35 WePM1F.4  
**Fluid Structure Interaction Analysis on Internal Flow Field of Impedance Pump**  
Okamoto, Ryoma  
Watanabe, Toshinori  
Himeno, Takehiro  
Inoue, Chihiro  
The Univ. of Tokyo  
The Univ. of Tokyo  
The Univ. of Tokyo  
The Univ. of Tokyo  

26
14:20-14:45 WePM1F.2
**Forced Response Excitation Due to Variances in a Multi-Stage Axial Turbine**
Hauptmann, Thomas
Inst. of Turbomachinery and Fluid Dynamics
Aschenbruck, Jens
Formerly at Inst. of Turbomachinery and Fluid Dynamics
Seume, Joerg R.
Inst. of Turbomachinery and Fluid Dynamics

14:45-15:10 WePM1F.3
**Verification and Application of FSI and Modal Identification Technique to Cascade Flutter Simulations**
Tateishi, Atsushi
The Univ. of Tokyo
Watanabe, Toshinori
The Univ. of Tokyo
Himeno, Takehiro
The Univ. of Tokyo
Aotsuka, Mizuho
IHI Corp.
Murooka, Takeshi
IHI Corp.

15:10-15:35 WePM1F.4
**Design Process of a 1.5-Stage Axial Compressor for Experimental Flutter Investigations**
Keller, Christian
Gottfried Wilhelm Leibniz Univ. Hannover
Willeke, Tobias
Gottfried Wilhelm Leibniz Univ. Hannover
Burrafato, Salvatore
Pol. Di Milano
Seume, Joerg R.
Inst. of Turbomachinery and Fluid Dynamics, Leibniz Univ.

**WePM1G Room G**
Cycle Innovation III (General Session)
Chair: Kojima, Takayuki
Japan Aerospace Exploration Agency
Co-Chair: Becker, Richard-Gregor
German Aerospace Center - DLR

13:55-14:20 WePM1G.1
**Exergetic and Sustainability Analysis of 320 MW Reheat Gas Turbine Engine**
Almutairi, Abdulrahman
Cranfield Univ.
Pericles, Pilidis
Cranfield Univ.
Al-Mutawa, Nawaf
Kuwait Univ.

14:20-14:45 WePM1G.2
**Thermodynamic Evaluation of Constant Volume Combustion for Gas Turbine Power Cycles**
Stathopoulos, Panagiotis
Tech. Univ. of Berlin
Paschereit, Christian Oliver
Tech. Univ. of Berlin
Vinkoloe, Johann
Tech. Univ. of Berlin

14:45-15:10 WePM1G.3
**Novel Gas Turbine Cycle Concepts for Future Generations**
Sane, Shrikrishna
Indian Inst. of Tech. Bombay (Mumbai)

**WePM2B Room B**
Heat Transfer Evaluation by CFD (General Session)
Chair: Wilson, Michael
Univ. of Bath
Co-Chair: Ishida, Katsuhiro
Gas Turbine Div. Kawasaki Heavy Industries, Ltd.

15:55-16:20 WePM2B.1
**Assessment of Different CFD Modeling Techniques for Film Cooling**
Alameldin, Ahmad
American Univ. of the Middle East
El-Gabry, Lamya
American Univ. in Cairo

16:20-16:45 WePM2B.2
**Comparative Study between Hole Shapes of Flat Plate Film Cooling Using Numerical Model**
Alshehaby, Mohammad
American Univ. in Cairo
El-Gabry, Lamya
American Univ. in Cairo

16:45-17:10 WePM2B.3
**Numerical Study on Film Cooling Effect of Gap Leakage Flow on First-Stage Stationary Vane**
Maehara, Tomohiro
Kansai Univ.
Oda, Yutaka
Kansai Univ.
Takeishi, Kenichiro
Tokushima Bunri Univ.

17:10-17:35 WePM2B.4
**Numerical Study on Heat Exchange Characteristics of Surface Air Cooled Oil Cooler Focused on Flow Field Around Cooling Fin**
Sekoguchi, Naoya
The Univ. of Tokyo
Watanabe, Toshinori
The Univ. of Tokyo
Himeno, Takehiro
The Univ. of Tokyo
Inoue, Chihiro
The Univ. of Tokyo
Uzawa, Seiji
The Univ. of Tokyo
Sakuma, Yasunori
The Univ. of Tokyo
Tomida, Susumu
Sumitomo Precision Products
Watanabe, Kazushi
Sumitomo Precision Products

**WePM2C Room C**
Manufacturing Technologies II (General Session)
Chair: Sato, Akihiro
IHI Corp.
Co-Chair: Kakehi, Koji
Tokyo Metropolitan Univ.

15:55-16:20 WePM2C.1
**Present Status and Future Prospect of Forging Material Industry for Aero-Engine Component in Japan**
Matsui, Takanori
Hitachi Metals MMC Superalloy Ltd

16:20-16:45 WePM2C.2
**Effect of Alloy Modifications on Hot Deformability of a Precipitation-Hardened A-286 Superalloy**
Kuo, Shih-Ming
China Steel Corp.
Li, Ming-Yen
China Steel Corp.
Pan, Yeong-Tsuen
China Steel Corp.

16:45-17:10 WePM2C.3
**Optimization of Additive Manufacturing (AM) Parameters and Selection of the Heat Treatment Conditions Regarding the Gas Turbine Combustor Swirler Production**
Sone, Hiroyuki
Uemura Giken Co., Ltd.
Hori, Takusei
Uemura Corp.
Kajihara, Manabu
Uemura Giken Co., Ltd.
Hasegawa, Masaya
Uemura Giken Co., Ltd.
Mechanical Properties of Cast and Wrought Ni-Co Base Superalloy TMW-4M3 Disk
Kobayashi, Shinichi Hitachi Metals Ltd.
Ueno, Tomonori Hitachi Metals Ltd.
Ohno, Takehiro Hitachi Metals Ltd.
Harada, Hiroshi National Inst. for Materials Science

Application of an Algebraic Reconstruction Algorithm to Tomographic BOS Measurements
Hartmann, Ulrich Inst. of Turbomachinery and Fluid Dynamics, Leibniz Univ.
Seume, Joerg R. Inst. of Turbomachinery and Fluid Dynamics, Leibniz Univ.

Temperature Measurement Using Particle-Seeded Two Color Optical Pyrometry in an Afterburner for a Pre-Cooled Turbo Jet Engine
Yoshiyama, Tomoyuki The Univ. of Tokyo
Kita, Shonosuke The Univ. of Tokyo
Nishida, Shunsuke Japan Aerospace Exploration Agency
Taguchi, Hideyuki Japan Aerospace Exploration Agency
Nakaya, Shinji The Univ. of Tokyo
Tsu, Mitsuhiro The Univ. of Tokyo

A Concept Study of Engine/Aircraft Integrated Thermal Management System
Seki, Naoki IHI Corp.

Development and Validation of Vibration Analysis for Friction Dampers Considering Contact Conditions
Umehara, Ryuichi Mitsubishi Heavy Industries, Ltd.
Akaki, Tomohiro Mitsubishi Heavy Industries, Ltd.
Onozato, Naoki Mitsubishi Heavy Industries, Ltd.

Effect of Supply Oil Flow Rate on the Dynamic Characteristics of Oil Lubricated Journal Bearings
Taura, Hiroo Nagaoka Univ. of Tech.

Development of Low Loss Direct Lubricated Two Pads Journal Bearing
Yokoyama, Shimpei Mitsubishi Heavy Industries, Ltd.
Sano, Takeshi Mitsubishi Heavy Industries, Ltd.
Yoshimine, Chihiro Mitsubishi Heavy Industries, Ltd.
Hirokawa, Kazuharu Mitsubishi Hitachi Power Systems, Ltd.
Hashimoto, Shinya Mitsubishi Hitachi Power Systems, Ltd.
Iijima, Takayoshi Mitsubishi Hitachi Power Systems, Ltd.
Kondo, Takahiro Mitsubishi Hitachi Power Systems, Ltd.

Development of Model for Axial Vibration of a Rotor Observed in Turbo Pump Considering Compressibility of Fluid
Ohnishi, Itsuki The Univ. of Tokyo
Kaneko, Shigehiko The Univ. of Tokyo
Development of DAIHATSU Two Shaft Gas Turbine DF/DFL-Series for Pump Drive

15:55-16:20 WePM2G.1

Nohara, Hiroyasu Daihatsu Diesel Mfg. Co., Ltd.
Tori, Yoshio Daihatsu Diesel Mfg. Co., Ltd.
Watanabe, Kosuke Daihatsu Diesel Mfg. Co., Ltd.
Miya, Daizuke Daihatsu Diesel Mfg. Co., Ltd.
Horisaki, Takashi Daihatsu Diesel Mfg. Co., Ltd.
Okamoto, Takuya Daihatsu Diesel Mfg. Co., Ltd.
Saitoh, Takahiro Daihatsu Diesel Mfg. Co., Ltd.

F Class Gas Turbine Upgrading Verification Result

16:20-16:45 WePM2G.2

Sakagami, Naoki Mitsubishi Hitachi Power Systems, Ltd.
Fujii, Keita Mitsubishi Hitachi Power Systems, Ltd.
Ueda, Osamu Mitsubishi Hitachi Power Systems, Ltd.

Verification and Operation Result of M501GAC (Air Cooled G Class Gas Turbine)

16:45-17:10 WePM2G.3

Yamamoto, Tomohiko Mitsubishi Hitachi Power Systems, Ltd.
Masada, Junichiro Mitsubishi Hitachi Power Systems, Ltd.
Ai, Toshishige Mitsubishi Hitachi Power Systems, Ltd.
Takahashi, Tatsuji Mitsubishi Hitachi Power Systems, Ltd.
Akizuki, Wataru Mitsubishi Hitachi Power Systems, Ltd.
Thursday November 19, 2015

ThILPL Room A
Challenge for Low BTU Blast Furnace Gas Firing GTCC in Steel Works (Invited Lecture)
Chair: Ohta, Yutaka Waseda Univ.
09:00-10:00 ThILPL.1

Challenge for Low BTU Blast Furnace Gas Firing GTCC in Steel Works
Tsukuda, Yoshiaki Mitsubishi Heavy Industries, Ltd.

ThAMA Room A
Combustion Instability I (General Session)
Chair: Tachibana, Shigeru Japan Aerospace Exploration Agency
Co-Chair: Uemichi, Akane The Univ. of Tokyo
10:20-10:45 ThAMA.1

Study on Premixed Flame Behavior in a Cylindrical Combustor with Variable Swirl Vanes
Ichikawa, Yuichi Osaka Univ.
Komiyama, Masaharu Osaka Univ.
Koyama, Atsushi Osaka Univ.
10:45-11:10 ThAMA.2

An Investigation of Flashback Phenomenon into the Vortex Core of Swirling Premixed Gas Flow
Nagai, Naonori Mitsubishi Heavy Industries, Ltd.
Saitoh, Keijiro Mitsubishi Heavy Industries, Ltd.
Kimura, Yuichi Mitsubishi Heavy Industries, Ltd.
11:10-11:35 ThAMA.3

Unsteady Characteristics of a Lean Premixed Turbulent Flame in a Low-Swirl Combustor under Combustion Instability
Moriyama, Kotaro Keio Univ.
Tachibana, Shigeru Japan Aerospace Exploration Agency
Yokomori, Takeshi Keio Univ.
10:20-10:45 ThAMC.1

Laser Welding Repair for Single Crystal Blades
Tsukimoto, Koji Mitsubishi Heavy Industries, Ltd.
Tanigawa, Shuji Mitsubishi Heavy Industries, Ltd.
Kitamura, Masahiko Mitsubishi Heavy Industries, Ltd.
Shimohata, Sachio Mitsubishi Heavy Industries, Ltd.
Mega, Masahiko Mitsubishi Heavy Industries, Ltd.
10:45-11:10 ThAMC.2

Laser Drilling for Cooling Holes of Blade with TBC
Goya, Saneyuki Mitsubishi Heavy Industries, Ltd.
11:10-11:35 ThAMC.3

ThAME Room C
Manufacturing Technologies III (General Session)
Chair: Takahashi, Satoshi IHI Corp.
Co-Chair: Yoshioka, Yomei Ehime Univ.
10:20-10:45 ThAME.1

GTSJ-IGTI Joint Forum on Additive Manufacturing (Forum)
Chair: Song, Seung Jin Seoul National Univ.
Co-Chair: Watanabe, Toshinori The Univ. of Tokyo
10:20-11:35 GTSJ-IGTI Joint Forum on Additive Manufacturing

ThAMD Room D
Health Monitoring and Diagnostics (General Session)
Chair: Kakiuchi, Daiki IHI Corp.
Co-Chair: Mansour, Michel Lab. for Energy Conversion, ETH Zurich
10:20-10:45 ThAMD.1

Use of Robotic Inspection Technology to Provide a Flexible Solution to Generator Maintenance: A Case Study of an Inspection Performed on a Gas Turbine Generator of Japanese Origin
Savenkov, Mark Alstom Power
Turner, Michael Alstom Power
Price, Lloyd Alstom Power
Aronpitoon, Somkuan Alstom Power
10:45-11:10 ThAMD.2

Study on Blade Vibration of Radial Compressor — Experimental Evaluation of Crack Detection by NSMS—
Shimohara, Naoto IHI Corp.
Hattori, Hiroaki IHI Corp.
Murae, Shota IHI Corp.
11:10-11:35 ThAMD.3

Advanced Gas Turbine Monitoring & Diagnostic Service
Tomita, Yasuoiki Mitsubishi Hitachi Power Systems, Ltd.
Kumano, Shintaro Mitsubishi Hitachi Power Systems, Ltd.
Mikami, Naotaka Mitsubishi Hitachi Power Systems, Ltd.
10:20-10:45 ThAME.1

GTSJ-IGTI Joint Forum on Additive Manufacturing

Kyogoku, Hideki Kinki Univ.
Maeda, Tosihiko NTT Data Engineering Systems
Bin, Wei GE Global Research in Shanghai

ThAMF Room F
Blade Mistuning (General Session)
Chair: Taura, Hiroo Nagaoka Univ. of Tech.
Co-Chair: Hattori, Hiroaki IHI Corp.
10:20-10:45 ThAMF.1

Modification of Mistuning Process in a Low Pressure Turbine Blade
Torabideh, Reza Mapna Turbine Blade Engineering & Manufacturing Co.
Motamedi Zoka, Hamid Mapna Turbine Blade Engineering & Manufacturing Co.
Savadkouhi, Payam Mapna Turbine Blade Engineering & Manufacturing Co.
Asadi, Saeed Mapna Turbine Blade Engineering & Manufacturing Co.

Relationship between Axial Shortening and Integrity of Linear Friction Welded Dissimilar Titanium Joint
Shinohara, Takahiko IHI Corp.
Watanabe, Kosuke IHI Corp.
Monta, Ichiro IHI Corp.
Wakabayashi, Tsukasa IHI Corp.
Nakamura, Kenji IHI Corp.
Nezaki, Koji IHI Corp.
Kuroki, Hiroshi IHI Corp.
10:20-10:45 ThAMF.1

Torabideh, Reza Mapna Turbine Blade Engineering & Manufacturing Co.
Motamedi Zoka, Hamid Mapna Turbine Blade Engineering & Manufacturing Co.
Savadkouhi, Payam Mapna Turbine Blade Engineering & Manufacturing Co.
Asadi, Saeed Mapna Turbine Blade Engineering & Manufacturing Co.
10:45-11:10  ThAMF.2  Stability Analysis of Mistuned Bladed Disk of Steam Turbine
Kaneko, Yasutomo  Ryukoku Univ.
Takemura, Masato  Ryukoku Univ.
Mori, Kazushi  Mitsubishi Heavy Industries, Ltd.
Ooyama, Hiroharu  Mitsubishi Hitachi Power Systems, Ltd.

10:20-10:45  ThAMG.1  Model of a Generic 300 MW F Class Gas Turbine for IGCC
Cerri, Giovanni  Roma Tre Univ.
Chennaoui, Leila  Roma Tre Univ.
Giovannelli, Ambra  Roma Tre Univ.
Mazzoni, Stefano  Roma Tre Univ.

10:45-11:10  ThAMG.2  CCGT Upgrades Focusing on Flexibility Improvements
Kaplan, Burak  Mitsubishi Hitachi Power Systems Europe
Ojiro, Yasuhiro  Mitsubishi Hitachi Power Systems Europe
Miyasaka, Toji  Mitsubishi Hitachi Power Systems Europe
Bratowski, Michal  Mitsubishi Hitachi Power Systems Europe
Myrisidis, Tilemachos  Mitsubishi Hitachi Power Systems Europe
Abe, Katsuhiko  Mitsubishi Hitachi Power Systems

11:10-11:35  ThAMG.3  GE Rapid Response Plant and Operation
Smith, Gordon  GE Power & Water
Smith, Raub  GE Power & Water
Karaca, Erhan  GE Power & Water

13:55-14:20  ThPMA.3  Numerical and Experimental Studies on Self-Sustained Thermoacoustic Combustion Instability of an Experimental Rig for Full Scale Industrial Burners
Laera, Davide  Pol. Di Di Bari
Camporeale, Sergio Mario  Pol. Di Di Bari

14:20-14:45  ThPMA.4  Proposal of a Criterion for Combustion Oscillation Considering Fuel Flexibility
Uemichi, Akane  The Univ. of Tokyo
Machida, Riku  The Univ. of Tokyo
Kaneko, Shigehiko  The Univ. of Tokyo

13:05-13:30  ThPMB.1  Conjugate Heat Transfer Simulation (General Session)
Chair: Kusterer, Karsten  B&B-AGEMA GmbH
Co-Chair: Takahashi, Toshihiko  CRIEPI

13:30-13:55  ThPMB.2  Temperature Calculation in an Uncooled Low-Pressure Stage of a Heavy-Duty Gas Turbine Using Conjugate Heat Transfer Analysis
Salemkar, Hossein  MAPNA Turbine Engineering and Manufacturing Co. (TUGA)
Poursamad, Amir  MAPNA Turbine Engineering and Manufacturing Co. (TUGA)
Torabideh, Reza  MAPNA Turbine Blade Engineering and Manufacturing Co.
Savadkouhi, Payam  MAPNA Turbine Blade Engineering and Manufacturing Co.

Yamane, Takashi  Japan Aerospace Exploration Agency

14:20-14:45  ThPMB.4  Conjugate Heat Transfer CFD Predictions of Metal Walls with Arrays of Short Holes As Used in Impingement and Diffusion Cooling
El-Jummah, Abubakar M.  School of Chemical and Process Engineering, Univ. of Leeds
Andrews, Gordon Edward  School of Chemical and Process Engineering, Univ. of Leeds
Stagg, John E. J.  School of Chemical and Process Engineering, Univ. of Leeds
### ThPMD
**Room D**

**Measurement (General Session)**

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<th>Time</th>
<th>Session</th>
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| 13:05-13:30     | ThPMD.1 Development of a Miniaturized Pneumatic Multi-Hole Probe for 3D Turbomachinery Measurements  

Hoenen, Herwart  
RWTH Aachen Univ.

<table>
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<tr>
<th>Time</th>
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</table>
| 13:30-13:55     | ThPMD.2 Development of TBC Film Thickness Measuring System by Non-Contact Measurement  

Iio, Satoshi  
Mitsubishi Heavy Industries, Ltd.

Yasui, Jun  
Mitsubishi Heavy Industries, Ltd.

Shiotani, Shigetoshi  
Mitsubishi Heavy Industries, Ltd.

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<th>Time</th>
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Mansour, Michel  
Lab. for Energy Conversion, ETH Zurich

Rebholz, Patrick  
Lab. for Energy Conversion, ETH Zurich

Kalfas, Anestis  
Aristotle Univ. of Thessaloniki

Abhari, Reza S.  
Lab. for Energy Conversion, ETH Zurich

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<tr>
<th>Time</th>
<th>Session</th>
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</table>
| 14:20-14:45     | ThPMD.4 Measurement Uncertainty Analysis for Multi-Hole Pressure Probes Combined with a Temperature Sensor  

Hölle, Magnus  
RWTH Aachen Univ.

Bartsch, Christian  
RWTH Aachen Univ.

Hon, Herwart  
MTU Aero Engines AG

Metzler, Timo  
MTU Aero Engines AG

Jeschke, Peter  
RWTH Aachen Univ.

### ThPME
**Room E**

**Aerodynamic Design of Axial Compressor III (General Session)**

<table>
<thead>
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<th>Time</th>
<th>Session</th>
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</table>
| 13:05-13:30     | ThPME.1 Unsteady Pressure Measurement on Oscillating Blade with Pressure-Sensitive Paint  

Azuma, Toshihiko  
The Univ. of Tokyo

Watanabe, Toshinori  
The Univ. of Tokyo

Himeno, Takehiro  
The Univ. of Tokyo

Uzawa, Seiji  
The Univ. of Tokyo

Inoue, Chihiro  
The Univ. of Tokyo

Takahashi, Yasuo  
Mitsubishi Hitachi Power Systems, Ltd.

Shibata, Takanori  
Mitsubishi Hitachi Power Systems, Ltd.

Takeda, Hiroki  
Mitsubishi Hitachi Power Systems, Ltd.

<table>
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<th>Time</th>
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Chair: Sun, Xiaofeng  
Beihang Univ.

Co-Chair: Sakuma, Yasunori  
The Univ. of Tokyo

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<th>Time</th>
<th>Session</th>
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Brehm, Sebastian  
Univ. of the German Federal Armed Forces Munich

Niehuis, Reinhard  
Univ. of the German Federal Armed Forces Munich

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<th>Time</th>
<th>Session</th>
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Dejone Toge, Tegegn  
Indian Inst. of Tech. Bombay

Amboor Madathil, Pradeep  
Indian Inst. of Tech. Bombay

### ThPMF
**Room F**

**Unsteady Flow and Stability Enhancement in Axial Compressor III (General Session)**

<table>
<thead>
<tr>
<th>Time</th>
<th>Session</th>
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Brehm, Sebastian  
Univ. of the German Federal Armed Forces Munich

Niehuis, Reinhard  
Univ. of the German Federal Armed Forces Munich

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<th>Time</th>
<th>Session</th>
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</table>
| 13:30-13:55     | ThPMF.2 Low Speed Study on Extending Axial Compressor Capability by Using Variable Geometry Inlet Guide Vane  

Roy, Bhaskar  
Indian Inst. of Tech. Bombay

Emandi, Rajesh  
National Aeronautical Lab. Bangalore

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| 13:55-14:20     | ThPMF.3 Numerical Investigation on the Bleeding Effects of Real Bleeding Geometry in the Compressor Stage  

Gou, Jinlan  
Univ. of Tsinghua

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Yuan, Xin  
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### ThPMG
**Room G**

**Industrial Gas Turbine and Power Systems III (General Session)**

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| 13:05-13:30     | ThPMG.1 Operating Experience with MAN’s MGT6200 Gas Turbine  

Wiedermann, Alexander  
MAN Diesel & Turbo SE

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MAN Diesel & Turbo SE

Cagna, Michele  
MAN Diesel & Turbo SE

Orth, Ulrich  
MAN Diesel & Turbo SE

Spiegel, Andreas  
MAN Diesel & Turbo SE

Wiers, Sven-Hendrik  
MAN Diesel & Turbo SE

Mueller, Ralf  
MAN Diesel & Turbo SE
13:30-13:55 ThPMG.2
Development and Operating Experience of the 1600deg.C J Class Gas Turbine

- Torii, Shunsuke
- Hada, Satoshi
- Yuri, Masanori
- Masada, Junichiro
- Tsukagoshi, Keizo

Mitsubishi Hitachi Power Systems, Ltd.

13:55-14:20 ThPMG.3
The Role of Large, Dual-Fuel Gas Turbine Combined Cycle in Achieving Cost-Effective, High-Efficiency, Reliable Power Generation in Asia-Pacific

- Vandervort, Christian
- Leach, David
- Kihara, Ken
- Fujimoto, Haruki

GE Power & Water

14:20-14:45 ThPMG.4
Development of M701F5 Gas Turbine

- Masada, Junichiro
- Ai, Toshishige
- Fukunaga, Yuya

Mitsubishi Hitachi Power Systems, Ltd.

15:05-17:05 ThPDPL.1
Energy Strategy: Role of Gas Turbines in the Future Energy Network (Panel Discussion)

- Steele, Robert
- Björkqvist, Christer
- Horie, Wataru
- Fukuizumi, Yasushi

Electric Power Res. Inst. Inc.
European Turbine Network-ETN a.i.s.b.l
GE Power & Water
Mitsubishi Heavy Industries, Ltd.
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11. INFORMATION OF GAS TURBINE SOCIETY OF JAPAN (GTSJ)

ABOUT GTSJ
Gas Turbine Society of Japan (GTSJ), the sponsor of IGTC2015 Tokyo, was founded in 1976, based on Gas Turbine Committee of Japan established in 1972.

GTSJ aims to promote science, technology and social development through information exchange, publication, technology research and other activities in the fields of all types of gas turbines, turbomachinery and energy conversion.

GTSJ members come from a wide variety of organizations; gas turbine manufacturing companies, users, universities, national laboratories, and other corporations. Currently more than 2,000 individuals join GTSJ and more than 100 corporate members support the activities of GTSJ.

MEMBERSHIP
Member: an individual who agrees to the objective of GTSJ.
Student Member: a student in university (master or bachelor course), technical college, or equivalent organization, who agrees to the objective of GTSJ.
   (A PhD candidate is classified into "Member").
Corporate Member: an organization which agrees to the objective of GTSJ and supports its activity.

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<td>2,500yen</td>
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PUBLISHING ACTIVITIES

The Journal provides information on a variety of gas turbine and turbomachinery and energy technologies with original technical papers, reports, and introductions of new products.

International Journal of Gas Turbine, Propulsion and Power Systems (JGPP) (Web journal, published online in English)
JGPP covers a wide range of engineering information concerning gas turbines and related power systems.
URL: http://www.gtsj.org/english/jgpp/index.html

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Please contact GTSJ office for detail.

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Address: 7-5-13-402, Nishi-Shinjuku, Shinjuku-ku, Tokyo 160-0023 JAPAN
Fax: +81-3-3365-0387
Email: gtsj-office@gtsj.org
http://www.gtsj.org/english/index.html
12. ACCESS TO CONGRESS VENUE & FLOOR GUIDE

ACCESS TO CONGRESS VENUE

- Ginza Line 5-minute walk from No. 1 Exit of Toranomon Stn.
- Hibiya Line 6-minute walk from Exit 3 of Kamiyacho Stn.

- Chiyoda Line
- Marunouchi Line
- Hibiya Line
  8-minute walk from Exit A12 of Kasumigaseki Stn.

- Ginza Line
- Asakusa Line
- Yurikamome
- JR Yamanote Line, KeihinTohoku Line, Tokaido Line, Yokosuka Line
  11-minute walk from the Karasumoriguchi Exit of Shimbashi Stn.

- Tokyo Station Approx 10 minutes
- Haneda Airport Approx 30 minutes
- Narita Airport Approx 90 minutes

Access to Toranomon Hills Forum on Foot

Toranomon Hills Mori Tower 5th Floor, 1-23-3 Toranomon, Minato-ku, Tokyo 105-6305

FLOOR GUIDE

Toranomon Hills Mori Tower 4th and 5th Floor

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5th Floor
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Saito, Hiroshi ........................................................ TuPMB.1
Saitoh, Keihiro ....................................................... ThAMA.2
Saitoh, Takahiro ..................................................... WePM2CG.
Sakagami, Naoki ..................................................... WePM2G.2
Sakaguchi, Daisaku ................................................ MoAMF
Sakai, Masa ............................................................ WeAMD.3
Sakai, Yoshiaki ...................................................... TuPMC.4
Sakai, Yoshihiro ..................................................... TuPMG3
Sakuma, Yasunori ................................................... TuPMF3
Sakurai, Takashi ..................................................... MoAMC.1
Salemkar, Hossein ................................................ ThPMB.2
Sane, Shrikrishna ................................................... WePM1G.3
Sano, Takeshi ........................................................ WePM2F.3
Sasaki, Takashi ....................................................... MoAMC.3
Sasaio, Yasuhiro ..................................................... MoPM1G.3
Sato, Akihiro ........................................................ WePM2C
Sato, Hiroki ........................................................... WePM1D.1
Sato, Sota ............................................................. WePM2D.2
Sato, Tetsuya ........................................................ TuAMF.3

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Takaki, Hiroshi ........................................................ MoAMC.2
Takeda, Hiroshi ........................................................ ThAMG.3
Takeda, Koichi ........................................................ TuPMD.1
Takeda, Kojun ........................................................ TuAME.2
Takagishi, Koichi .................................................... ThAMC.3
Takagi, Yuta ........................................................... MoAMC.4
Takeda, Koichi ........................................................ ThAMC.3
Takahashi, Masa ..................................................... MoAMC.5
Takahiro, Masa ........................................................ MoAMC.6
Takahiro, Tadayoshi ............................................... WePM2D.
Takahiro, Yutaka .................................................... WePM2D.
Takahiko, Tatsuya ................................................ MoAMC.1
Takahito, Masa ........................................................ WeAMC.1
Takaichi, Koichi ...................................................... WeAMC.2
Takaichi, Koichi ..................................................... WeAMC.3
Takagi, Koichi ......................................................... WeAMC.4
Takeda, Kojun ........................................................ ThAMC.3
Takeda, Tatsuya ...................................................... ThAMC.3
Takeda, Koichi ....................................................... ThAMC.3
Takahiro, Masa ....................................................... MoAMC.6
Takahiro, Tadayoshi ............................................... WePM2D.
Takahiro, Yutaka .................................................... WePM2D.
Takahiro, Yutaka .................................................... WePM2D.
Takahiro, Yutaka .................................................... WePM2D.
Takahiro, Yutaka .................................................... WePM2D.
Takahiro, Yutaka .................................................... WePM2D.
Takashima, Masa ................................................... MoAMC.5
Takahashi, Masa ..................................................... MoAMC.2
Takeda, Koichi ....................................................... ThAMC.3
Takahiro, Masa ....................................................... MoAMC.6
Takahiro, Tadayoshi ............................................... WePM2D.
Takahiro, Yutaka .................................................... WePM2D.
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Takahiro, Yutaka .................................................... WePM2D.