



FINAL PROGRAM

August 18 - 20, 2014

Seoul National University, Seoul, Korea



Wherever light is lacking, our technology is delivering

Building your tomorrow today



Welcome to ACGT 2014

On behalf of the Local Organizing Committee and the International Organizing Committee, I would like to welcome you to the Asian Congress on Gas Turbines 2014 (ACGT2014).

ACGT has quickly become the premier event that brings together Asian (and other) researchers in industry, academia, and government to hear the latest developments in turbomachinery technology. Initially begun as a collaborative effort between the Gas Turbine Society of Japan (GTSJ) and Korean Society for Fluid Machinery (KSFJ), the first ACGT was held in 2005 at Seoul National University, and the second ACGT took place in 2009 at the University of Tokyo. The Institute of Thermophysics of the Chinese Academy of Sciences (IET/CAS) joined as a co-organizer since ACGT2009, and ACGT2012 was held at Shanghai Jiao Tong University. This year, we are happy to welcome our Indian colleagues as co-organizers.



During ACGT2014, over 200 participants are expected to attend 30 sessions featuring 112 technical papers from 7 countries. As in the past, we will have Keynote and Forum Sessions. This year, we are honored to have Xiaofeng Sun, Shinji Honami, BVSSS Prasad, and Jehyun Baek as Keynote speakers; and Zhenping Feng, Toru Hattori, Ajit Kolar, and Namsung Ahn as National Energy Strategy Forum speakers.

In addition, ACGT2014 will newly feature OEM Sessions and a Tutorial Session. General Electric Power & Water and Mitsubishi Hitachi Power Systems will outline their technical strategies on Monday and Tuesday, respectively. A Tutorial Session on gas turbine instrumentation will be offered by General Electric Aviation on Tuesday.

Most importantly, ACGT2014 will provide numerous opportunities for networking. Please make sure to attend the complimentary coffee breaks and lunches every day and the Banquet on Tuesday.

On behalf of the Local Organizing Committee, I graciously thank all of our sponsors who have ensured the success of ACGT2014 through their generous sponsorship. Furthermore, much appreciation goes to the student volunteers for their outstanding help in organizing ACGT2014. Finally, this event would not have been possible without the volunteers who served as authors, session chairs, and organizers. I would especially like to recognize Weiguang Huang, Makoto Yamamoto, Bhaskar Roy, Tong Seop Kim, Jae Hwan Kim, and Jae Su Kwak for their contributions.

Thank you for attending ACGT2014. I trust that your time in Seoul will be an enjoyable and rewarding experience.

ACGT2014 Chair

Seung Jin Song

Seoul National University

Sponsors

PLATINUM SPONSORS



GOLD SPONSORS



SILVER SPONSORS



BRONZE SPONSORS



CONFERENCE BAG



ADDITIONAL SPONSORS

- The Korean Federation of Science and Technology Societies
- Seoul National University
- College of Engineering, Seoul National University
- Institute of Advanced Machinery and Design, Seoul National University
- BK21+ Transformative Training Program for Creative Mechanical and Aerospace Engineers

International Organizing Committee

CHEN, Jingyi (Institute of Engineering Thermophysics / Chinese Academy of Sciences, China)

CHO, Hyung-Hee (Yonsei University, Korea)

HUANG, Weiguang (Shanghai Advanced Research Institute / Chinese Academy of Sciences, China)

KAWAGUCHI, Osamu (Keio University, Japan)

NAKAMURA, Yoshiya (INC Engineering, Japan)

SONG, Seung Jin (Seoul National University, Korea)

SUN, Xiaofeng (Beijing University of Aeronautics and Astronautics, China)

WATANABE, Toshinori (University of Tokyo, Japan)

YANG, Soo-Seok (Korea Aerospace Research Institute, Korea)

Local Organizing Committee

Chair

SONG, Seung Jin (Seoul National University)

KIM, Jae Hwan (Korea Aerospace Research Institute)

KIM, Tong Seop (Inha University)

KWAK, Jae Su (Korea Aerospace University)

Table of Contents

Welcome to ACGT2014	1
Sponsors	2
Committee	3
Networking, Registration & Shuttle Service	5
Transportation	6
Campus Map	7
Conference Center Map	8
Featured Sessions	11
Technical Congress	12
Schedule at a Glance	24



Printed with permission from Lexington Home Brands.

Lexington Fontaine Round Mirror design has been inspired by a jet engine, and the mirror features a polished stainless frame and a mirrored center.

Homepage: www.lexington.com

Contact address: Arthur Negrin, anegrin@lexington.com

Networking, Registration & Shuttle Service

Networking Events

Daily Lunches

Engineer House, Monday to Wednesday, August 18 – 20, 12:10 – 13:30

Banquet

Engineer House, Tuesday, August 19, 18:30 – 20:15

Registration

Registration Hours

08:30 – 17:00 Monday & Tuesday

08:30 – 12:00 Wednesday

Registration Desk (★ on Conference Center Map, page 8)

1st floor of Bldg. 301.

Registrants for ACGT 2014 will be provided:

- Access to EVERY session in the technical conference
- CD for all of the final papers of ACGT 2014
- Daily lunches
- Banquet

Badges / Tickets

The tickets for banquets, daily lunches, etc. will be printed on the badges. You should present those tickets.

Shuttle Service between Palace Hotel and Seoul National Univ.

	Leave Palace Hotel	Leave Bldg. 301
Aug 18	07:45	18:30
Aug 19	08:15	20:30 (from Engineer House)
Aug 20	08:15	16:00

Shuttle Service between Hoam Faculty House and Seoul National Univ.

	Leave Hoam	Leave Bldg. 301
Aug 18	08:00, 08:15	18:30, 18:45
Aug 19	08:30, 08:45	20:30, 20:45 (from Engineer House)
Aug 20	08:30, 08:45	16:00, 16:15

Transportation

Subway Line No.2 (Green Line), Seoul National University Entrance Station (Exit No.3)

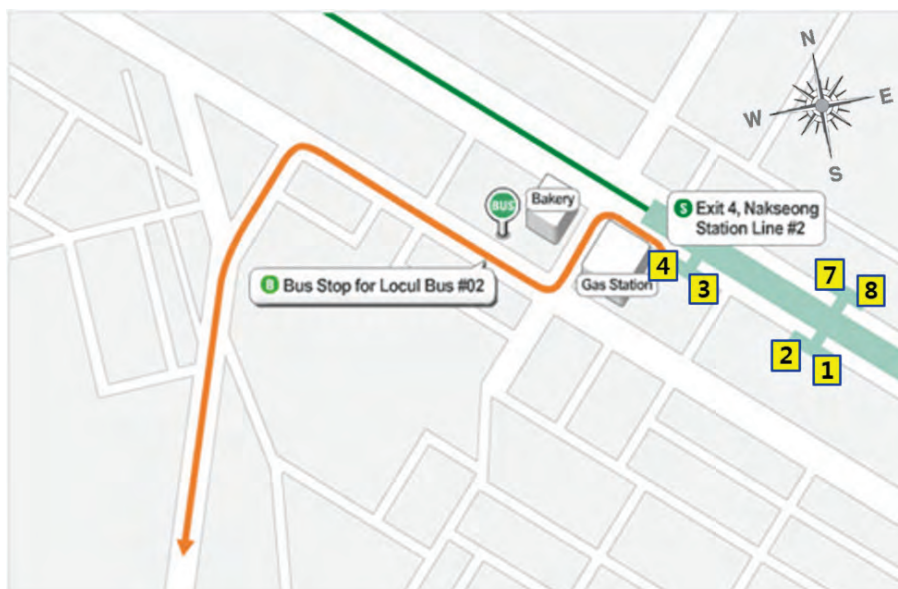
You will need to take a bus or a taxi to get the university. Be sure not to confuse the *Seoul National University Entrance Station* with the Seoul National University of Education/Court or Prosecutor's Office Station.

After exiting Exit No. 3, walk towards the Gwanak-Gu Office. You can take buses number 5511 and 5513 to the Engineering Building 301 (*Last stop*). The bus ride takes 20~30 minutes.

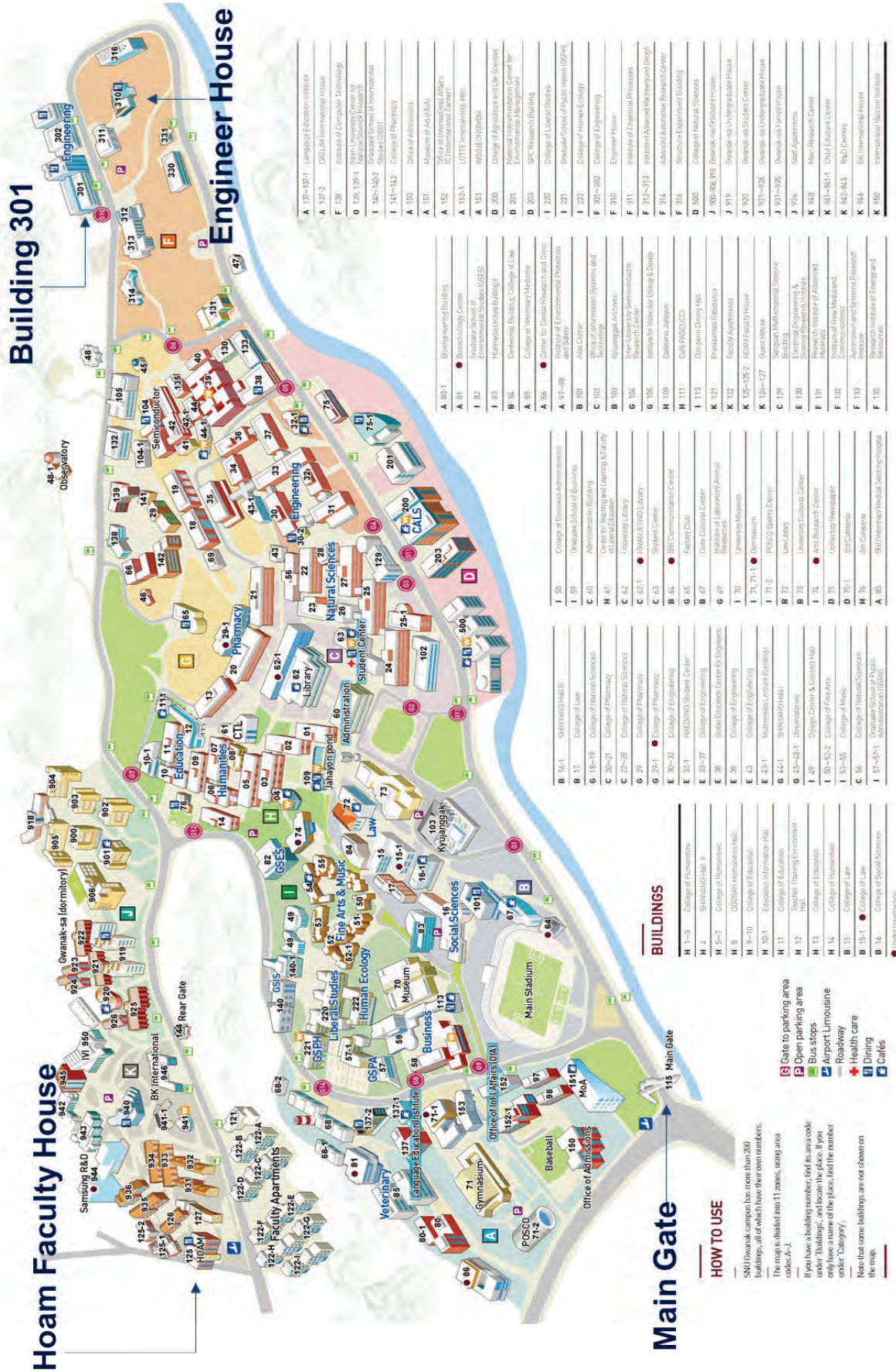


Subway Line No.2 (Green Line), Naksungdae Station (Exit No.4)

You will need to take additional public transportation when you get off the train at the *Naksungdae Station*. After exiting through the Exit No. 4, walk straight and make a left turn at the gas station. There will be a bus stop in front of the bakery (Jean Boulangerie). Take the small green bus No. 02. Building 301 is the *last stop* of this bus. The bus ride takes 20~30 minutes.

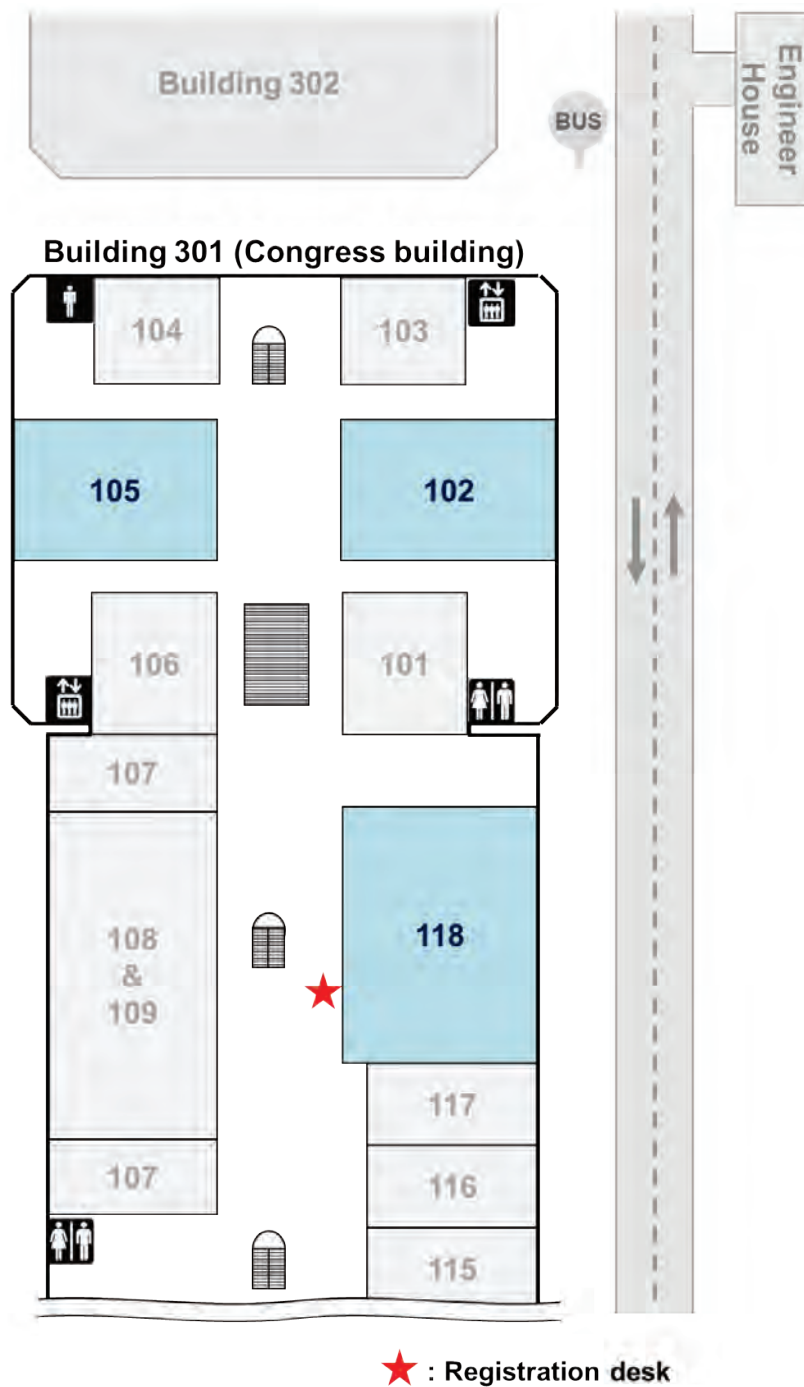


Campus Map



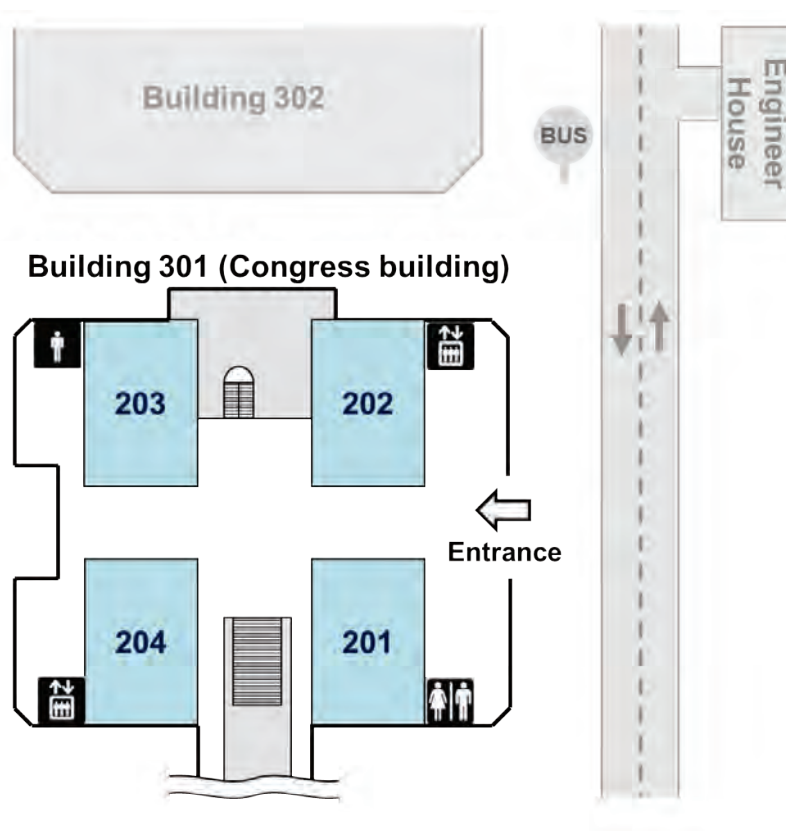
Conference Center Map

1st floor



Conference Center Map

2nd floor



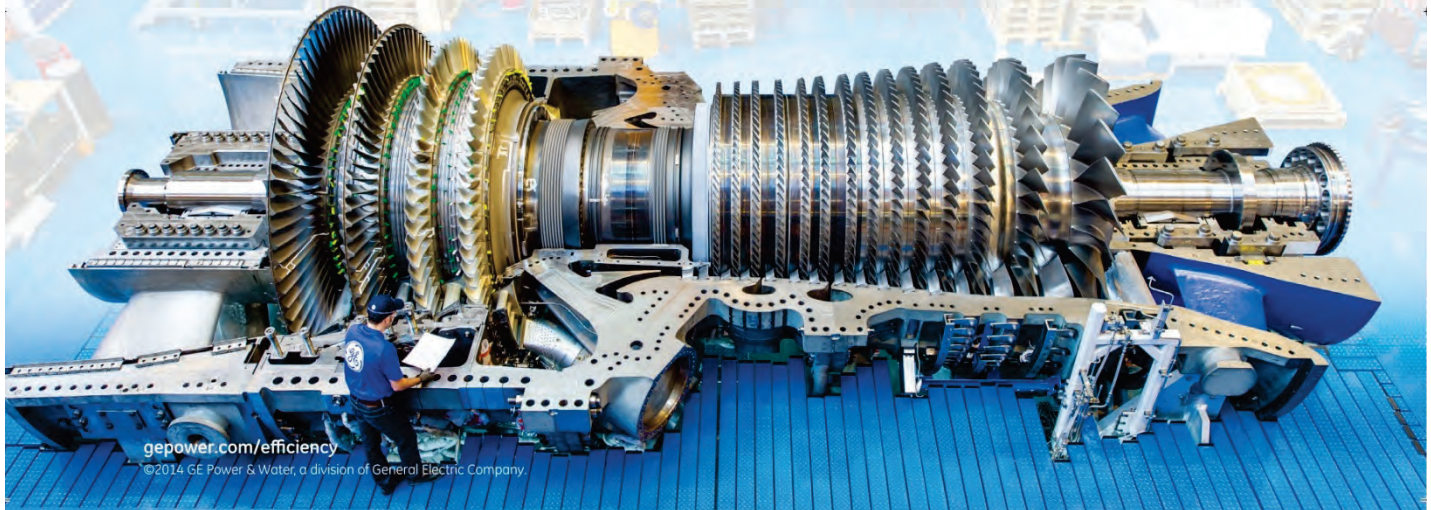
We introduced H-class. So it's only natural that we take it to the next level.

A decade ago, GE built the industry's first H-class gas turbine. Since then, our H-class gas turbines have logged more than 200,000 hours of operation and data monitoring. This experience, and data-driven insights, have led to performance improvements and smart innovation. Today, our 7HA and 9HA gas turbines lead the industry in total lifecycle value through strategic service solutions that enable our customers to adapt their operations and assets for cleaner, more reliable and cost-effective conversion of fuel to electricity.

To learn more, go to gepower.com/efficiency.



imagination at work



gepower.com/efficiency

©2014 GE Power & Water, a division of General Electric Company.

KOREA LOST-WAX

한국로스트왁스를 알게되는 순간,
대한민국 부품소재산업의 미래를 만나시게 됩니다.



자동차 부품에서 항공기 부품에 이르기까지 부품 소재산업의 선두에는 한국로스트왁스가 있습니다. 1979년 이래, 34년간 세계와 겨루고 있는 한국로스트왁스! 부품소재산업의 미래를 이끌어 나갈 것입니다.



대표이사: 장세풍
<관계사>
풍림금속 - 정밀주조품 가공
한국소리마치 - SW 개발



뿌리기술 전문기업 지정

이노비즈 인증

본사 경기도 안산시 단원구 시화로 220

연구소 경기도 시흥시 공단1대로 363-74

소리마치 서울시 구로구 디지털로 272 한신타워 701호

TEL : (031) 319 - 4680 ~ 1

TEL : (031) 499 - 8485 ~ 8

TEL : (031) 499 - 8485 ~ 8

Featured Sessions

Keynote, Forum, OEM, Tutorial Sessions are held in Room 118.

Keynote Speeches

August 18 (Mon) 09:20 - 10:10

Some New Phenomena of Unsteady Flow in Turbomachinery

Professor Xiaofeng Sun, Beihang University

August 19 (Tue) 09:20 - 10:10

Gas Turbine Secondary Air System – Some Developments

Professor B V S S Prasad, India Institute of Technology Madras

August 19 (Tue) 13:30 - 14:20

Endwall Treatment in Turbomachinery

Professor Jehyun Baek, Pohang University of Science and Technology

August 20 (Wed) 09:20 - 10:10

Recent Development of Flow Control Technology in Gas Turbine Application

Professor Shinji Honami, Tokyo University of Science

National Energy Strategy Forum

August 18 (Mon) 13:30 - 15:00

Professor Zhenping Feng, Xian Jiaotong University, China

Professor Ajit Kolar, IIT Madras, India

Dr. Toru Hattori, CRIEPI, Japan

Dr. Namsung Ahn, KETEP, Korea

OEM Sessions

August 18 (Mon) 15:00 - 15:50

GE H Class gas Turbine Leadership- 20 years of technology development

Mr. David Leach, General Electric Power & Water

August 19 (Tue) 14:20 - 15:10

Development of MHPs Advanced Large Scale Gas Turbines

Dr. Katsunori Tanaka, Mitsubishi Hitachi Power Systems

Tutorial Session

August 19 (Tue) 15:30 – 17:30

Unsteady Flow Field Measurements and Analyses for the Next Generation Turbomachinery

Dr. Hyoun-Woo Shin, General Electric Aviation

August 18 (Mon)

Room 118

09:10 09:20	Opening Address (Prof. Seung Jin Song)
	Keynote Speech 1
09:20	Session chair : Prof. Makato Yamamoto Title : Some New Phenomena of Unsteady Flow in Turbomachinery
10:10	Speaker : Professor Xiaofeng Sun, BUAA, China

	Room 102	Room 105	Room 201	Room 202	Room 203	Room 204
	[M-1] Film Cooling	[M-2] Combustor Development	[M-3] Compressor Cascade Aerodynamics	[M-4] Fan Aerodynamics and Performance	[M-5] Aerodynamics and Performance of Turbines	[M-6] Aerodynamics of Gas Turbine Components
	Session chair : Prof. Hongwu Zhang	Session chair : Prof. Huisheng Zhang	Session chair : Prof. Yutaka Ohta	Session chair : Prof. Xiaofeng Sun	Session chair : Prof. Feng Lin	Session chair : Dr. Chuang Gao
10:30	ACGT2014-0055 Effect of Satellite Cooling Hole Configuration on the Thermal-Flow Characteristics of Gas Turbine Blade <i>M. Cho, Y. Kim</i> <i>(Sungkyunkwan Univ., Korea)</i>	ACGT2014-0148 Development of DLE Combustion System for Kawasaki M1A-17D Gas Turbine <i>M. Nishi, Y. Hosokawa, Y. Douura, Y. Yamasaki</i> <i>(Kawasaki Heavy Industries, Ltd., Japan)</i>	ACGT2014-0074 Numerical Simulation of Leading-Edge Separation in Thin-Airfoil Cascade <i>A. Tateishi, T. Watanabe, T. Himeno, C. Inoue</i> <i>(University of Tokyo, Japan)</i>	ACGT2014-0086 Effect of Hub-Tip Ratio on the Characteristics of Contra Rotating Axial Flow Fans <i>M. V. Harish Babu, M. Govardhan</i> <i>(I.I.T. Madras, India)</i>	ACGT2014-0090 Evaluation of Pressure Fluctuation on Turbine Blades with Upstream Vanes Interaction <i>H. Kitagawa, T. Nakamura, D. Fujimura, Y. Sakamoto, E. Ito</i> <i>(Mitsubishi Heavy Industries, Ltd., Japan)</i>	ACGT2014-0022 Study of Variation of Discharge Coefficient and Flow Features in a Stepped Labyrinth Seal <i>S. Guddeti, A. M. Pradeep</i> <i>(I.I.T. Bombay, India)</i>

10:55	ACGT2014-0051 Numerical Investigation of Conjugate Heat Transfer for a Flat Plate with Combined Film and Impingement Cooling <i>P. Zhang, J. Fu, B. An, J. Liu (Chinese Academy of Sciences, China)</i>	ACGT2014-0153 Development of Low Emission Gas Turbine Combustors <i>S. Jung, S. Yang, S. Kim, I. Kim, S. Ahn, S. Yoon, S. Ryu (Samsung Techwin, Korea)</i>	ACGT2014-0023 Secondary Flows Analysis in an Axial Compressor Cascade <i>A. Khadse, A. M. Pradeep (I.I.T. Bombay, India)</i>	ACGT2014-0075 Investigation of Resonance-like Phenomenon Generated by Interaction between Rotor Wakes and Stator <i>H. Kodama (IHI Corporation, Japan), M. Namba (Kyusyu University, Japan)</i>	ACGT2014-0103 Unsteady Simulation of the Effects of Axial Spacing on the Secondary Flow Losses of a 2 Stage Axial Turbine <i>A. F. Mustafa, D. H. Kim, J. T. Chung (Korea University, Korea)</i>	ACGT2014-0054 The Influence of Orifice Angle of Orientation on Discharge Coefficient for Rotating Radial Orifices <i>W. Jiao, P. Hao, Z. Xuyang (Shanghai Electric Power Generation R & D Center, China), J. Guangyun (Shanghai Electric Power Generation Equipment Co., Ltd., China)</i>
11:20	ACGT2014-0114 Improvement of Flat-Plate Film Cooling Performance by Double Flow Control Devices: Effects of Flow Angle Against the Devices <i>K. Funazaki, R. Nakata, H. Kawabata (Iwate University, Japan), H. Tagawa, Y. Horiuchi (Mitsubishi-Hitachi power systems, Ltd., Japan)</i>	ACGT2014-0133 Development of Gas DLE with Liquid Stand-by Combustion System for Kawasaki L20A Gas Turbine <i>K. Matsumoto, Y. Matsuno, M. Ogata (Kawasaki Heavy Industries, Ltd., Japan)</i>	ACGT2014-0063 Numerical Study of Surface Roughness Effects on Compressor Cascade Performance <i>L. Gao, S. Geng, H. Zhang, C. Nie (Chinese Academy of Sciences, China)</i>	ACGT2014-0036 Numerical Simulation of Fan Rotor Performance Loss by Icing <i>M. Yamamoto, M. Yamamoto (Tokyo University of Science, Japan), J. Kazawa (JAXA, Japan)</i>	ACGT2014-0052 Design and Performance Analysis of a 3-D Supersonic Impulse Turbine with Optimization of Rotor Blade <i>K. S. Ravichandran, R. Krupakaran, S. Abhilash, A. P. Doss (PESIT, India)</i>	ACGT2014-0056 CFD and Experimental Analysis of Junction Flows in Gas Turbine Exhaust Diffuser <i>M. Kumar, A. M. Pradeep (I.I.T. Bombay, India)</i>
11:45	ACGT2014-0099 Effect of Turbulence Intensity on the Film Cooling Effectiveness on a Flat Plate with Anti-Vortex Holes <i>S. S. Park, J. S. Park, J. S. Kwak (Korea Aerospace University, Korea)</i>	ACGT2014-0068 An On-Line Monitoring Method for Gas Turbine Combustion Faults Based on the Law of Cosines <i>D. Chen (KARAMAY Power Plant of XinJiang Oil Field Company), A. He (Tsinghua Univ., China)</i>	ACGT2014-0092 Unsteady Aerodynamic Characteristics of Transonic Compressor Cascade in Pitching Oscillation Mode in case of Transonic Flow Region <i>T. Hirano, I. Fujimoto (Takushoku University, Japan)</i>	ACGT2014-0134 Effect of Gurney Flap on Performance of a Radial Fan <i>M. J. Kim, S. M. Jang, S. H. Son, S. J. Song (Seoul National Univ., Korea)</i>	ACGT2014-0007 Analysis and Optimization of Partial Admission Stages <i>L. Moroz, B. Frolov, O. Guriev (Softinway, USA)</i>	ACGT2014-0060 Fundamental Experiment on Jet Defrosting of Cryogenic Heat Exchanger <i>N. Sonobe, K. Fukiba, S. Sato (Shizuoka University, Japan)</i>

August 18 (Mon)

Room 118

Forum Session

13:30 National Energy Strategy Forum
15:00 Session chair : Prof. Seung Jin Song

OEM Session 1

15:00 Session chair : Dr. Soo-Seok Yang
 Title : GE H Class gas Turbine Leadership- 20 years of technology development
15:50 Speaker : Mr. David Leach, General Electric Power & Water

Room 102

Room 105

Room 201

Room 202

Room 203

Room 204

[M-7] Film and Novel Cooling

[M-8] Combustion Characteristics

[M-9] Centrifugal Turbomachinery

[M-10] Separation and Wake Issues in Compressors

[M-11] Advanced Cycles

[M-12] Fundamental Flow Phenomena

Session chair :
Dr. Jeong Min Seo

Session chair :
Prof. Seong Man Choi

Session chair :
Prof. BVSSS Prasad

Session chair :
Prof. Bhaskar Roy

Session chair :
Dr. Oksuck Sung

Session chair :
Prof. Ken-ichi Funazaki

16:10 **ACGT2014-0095**
 Total Cooling Effectiveness on Thin Perforated Plate for Inline and Staggered Array

S. H. Kim, S. M. Choi, H. Y. Chung, H. H. Cho (Yonsei Univ., Korea), K. Y. Hwang (Agency for Defense Development)

ACGT2014-0066
 Experimental and Numerical Investigation of Flame Structure in a Dual-Swirl Combustor

Y. Yuan, B. Ge, Y. Tian, W. Liu, S. Zang (Shanghai Jiao Tong Univ., China)

ACGT2014-0109
 Numerical Analysis of Flow Characteristics on the Centrifugal Compressor with Various Splitter Blades

D. H. Kim, J. H. Park, S. Y. Lee, B. J. Lee, J. T. Chung (Korea University, Korea)

ACGT2014-0003
 Predicting Compressor Corner Separation with Nonlinear Eddy-Viscosity Model

X. Su, X. Yuan (Tsinghua Univ., China)

ACGT2014-0105
 A Novel Waste Heat Recovery System Combined with Organic Rankine Cycle and Adsorption Refrigeration Cycle

H. Lei, J. Yang, C. Tang (Chinese Academy of Sciences, China)

ACGT2014-0031
 Predicting Transition in Turbomachinery Using an Intermittency Transport Equation

S. Jiang, S. Fu (Tsinghua Univ., China)

16:35	ACGT2014-0078 Influence of Blowing Ratio on Cooling Effectiveness and Aerodynamic Loss of Different Film Cooling Configurations <i>Y. Gao, B. An, J. Liu (Chinese Academy of Sciences, China)</i>	ACGT2014-0070 Investigations on Low-Swirl Multi-Nozzle Combustion in a Gas Turbine Model Combustor <i>B. Ge, W. Liu, Y. Tian, S. Zang (Shanghai Jiao Tong Univ., China)</i>	ACGT2014-0042 Experimental Investigation of Three-Dimensional Structure of Rotating Instability Vortex in a Centrifugal Blower <i>Y. Fukuda, Y. Itagaki, F. Nobumichi, Y. Ohta (Waseda University, Japan)</i>	ACGT2014-0049 Experimental Investigation of the End Wall Flows at Rotor Outlet in an Axial Compressor <i>C. Yu, N. Ma, W. Zhang, K. Wang, F. Lin (Chinese Academy of Sciences, China)</i>	ACGT2014-0155 Water and Steam Injection in Compressed Air Energy Storage <i>M. J. Kim, J. H. Choi, D. W. Kang, T. S. Kim (Inha University, Korea)</i>	ACGT2014-0143 Round-Jet Impingement on a Circular Pin-fin <i>D. Barratt, J. Lee, S. J. Song (Seoul National Univ., Korea) T. Kim (Univ. of the Witwatersrand)</i>
17:00	ACGT2014-0151 Thermal Performance of Transonic Cooled Tips in a Turbine Cascade <i>C. Zhou (Peking University, China)</i>	ACGT2014-0141 Aerodynamic Mixing Performance Investigation and Validation of Novel Fuel-Air Premixing Devices <i>G. Stefopoulos, S. Rigas, P. Tsirikoglou, A. Kalfas (Aristotle University of Thessaloniki, Greece)</i>	ACGT2014-0009 Surge Characteristics and Its Variation with Steam Injection of a Centrifugal Compressor with Vaned Diffuser <i>C. Gao, W. Huang (Shanghai Advanced Research Institute, China)</i>	ACGT2014-0088 The Influence of Stator Design on the Rotor Wakes Recovery Process <i>G. Pallot, D. Kato, W. Hoshino, Y. Ohta (IHI Corporation, Japan)</i>	ACGT2014-0129 The Design of Helium Closed Brayton Cycle Test Loop <i>J. Zhang, T. Ke, Y. Zhu, W. Huang (Chinese Academy of Sciences, China)</i>	ACGT2014-0082 Numerical Simulation of Sand Erosion Using Unified Platform for Aerospace Computational Simulation <i>T. Hataya, M. Suzuki, M. Yamamoto (Tokyo University of Science, Japan)</i>
17:25		ACGT2014-0044 Experimental Investigation on the Effect of Operating Conditions on Dynamic and Emission Characteristics of a DLN Combustor <i>S. Xing, A. Fang, Y. Cui, C. Nie (Chinese Academy of Sciences, China)</i>	ACGT2014-0132 System Damping Stability Analysis in Turbo Heat Pumps <i>J. Song, S. J. Song (Seoul National Univ. Korea)</i>			ACGT2014-0152 The Effect of Pipeline Dynamics on the Stability of Compression System <i>S. Yi, Y. Lee, W. Heo, S. Kang (Seoul National Univ., Korea)</i>

August 19 (Tue)

Room 118

Keynote Speech 2

09:20 Session chair : Prof. Weiguang Huang
Title : Gas Turbine Secondary Air System – Some Developments
10:10 Speaker : Professor B V S S S Prasad, IIT Madras, India

Room 102

Room 105

Room 201

Room 202

Room 203

Room 204

	[T-1] Internal Cooling-1	[T-2] Combustion Stability	[T-3] Compressor Design and Optimization	[T-4] Gas Turbine Development and Maintenance	[T-5] Leakage Flows in Turbines	[T-6] Superalloys
	Session chair : Dr. Jungho Lee	Session chair : Dr. Kiyoshi Matsumoto	Session chair : Dr. Guillaume Pallot	Session chair : Prof. Ajit Kolar	Session chair : Prof. Zhenping Feng	Session chair : Dr. Takashi Yamane
10:30	ACGT2014-0029 Numerical Heat Transfer Study of Broken Ribs Effect on Concave Surface with Effusion Holes <i>Q. Zhao, H. Chung, E. Y. Jung, H. H. Cho (Yonsei Univ., Korea)</i>	ACGT2014-0043 Modal Analysis with Heat Release to Study the Influence of Inlet Temperature and Equivalence Ratio on Thermo-acoustic Combustion Instability <i>K. Wang, A. Fang, S. Xing, Y. Cui, C. Nie (Chinese Academy of Sciences, China), Y. Xie (Shanghai Electric Power Technology Research and Development Center)</i>	ACGT2014-0019 Aerodynamic Design and Optimization of a Transonic Axial Compressor <i>Z. Fang, R. Ping, Z. L. Hui, Z. Ji (Shanghai Electric Power Generation Research and Development Center, China)</i>	ACGT2014-0124 Development of the 1600°C J Class Gas Turbines - Operating Experience of M501J Gas Turbine (60Hz) <i>T. Hiyama, S. Hada, J. Masada, E. Ito (Mitsubishi Hitachi Power Systems, Ltd., Japan)</i>	ACGT2014-0005 Aerodynamics of Tip Leakage Flows near Squealer Rims in an Axial Flow Turbine <i>M. V. Harish Babu, M. Govardhan (I.I.T Madras, India)</i>	ACGT2014-0062 Structure Change of Single Crystal Superalloy under Cyclic Thermal Stress with Mechanical Stress <i>T. Yamane, Y. Fukuyama (Japan Aerospace Exploration Agency, Japan), R. Aoki (Tokyo Univ.)</i>

10:55	ACGT2014-0089 Design Optimization of Internal Cooling Passage with Various Types of Rib Turbulator for High Pressure Turbine Nozzle <i>S. Lee, K. Kim (Seoul National Univ., Korea) D. Rhee, Y. Kang (Korea Aerospace Research Institute)</i>	ACGT2014-0046 Investigation on Impact of the Combustion Expansion on Transfer Function Relating the Response of Heat-Release Rate to Acoustic Perturbation <i>A. Fang, K. Wang, S. Xing, M. Chen, Y. Cui, C. Nie (Chinese Academy of Sciences, China), M. Chen (Shanghai Electric Power Technology Research and Development Center)</i>	ACGT2014-0142 Design and Development of Low Speed 4-Stage Axial Contra-Rotating Demonstrator Compressor <i>R. Patel, A. Panchal, M. Sharma, N. Khanduja, B. Roy (I.I.T. Bombay, India)</i>	ACGT2014-0125 Development of the 1600°C J Class Gas Turbines - the World Largest and Most Efficient M701J Gas Turbine (50Hz) <i>Y. Tsuji, S. Torii, M. Yuri, J. Masada (Mitsubishi Hitachi Power Systems, Ltd., Japan), E. Ito (Mitsubishi Heavy Industries, LTD)</i>	ACGT2014-0112 Influences of Tip Leakage Flow Velocity on Active Control Using a Two-Dimensional Model of Ring-Type Plasma Actuator <i>T. Matsunuma, T. Segawa (National Institute of Advanced Industrial Science and Technology, Japan)</i>	ACGT2014-0145 Microstructure and Mechanical Properties of Ni Based Single Crystal Superalloys (Present Without Publication) <i>C. Y. Jo, B. G. Choi, H. U. Hong, I. S. Kim (Korea Institute of Materials Science, Korea)</i>
11:20	ACGT2014-0027 Effect of Manufacturing Tolerances on Internal Rib Turbulated Cooling <i>S. Park, H. Chung, Y. Lee, H. H. Cho (Yonsei Univ., Korea), B. M. Chang (Korea Lost Wax Co., Korea)</i>	ACGT2014-0144 Emission Analysis of an Annular Combustor with Multiple Swirl Injectors <i>W. Jeong, J. Choi, J. Hong, H. Sung (Korea Aerospace University, Korea)</i>	ACGT2014-0039 Optimal Design of Diffuser Blade for High-Power Centrifugal Compressor Using the Response Surface Method <i>H. Kang, C. Hong, Y. Kim (Sungkyunkwan Univ., Korea)</i>	ACGT2014-0115 Development of T700/701K Engine for Korean Utility Helicopter 'SURION' <i>J. Kim, O. S. Sung (Korea Aerospace Research Institute, Korea)</i>	ACGT2014-0033 Impact of Large Tip Clearance on Aerodynamic Performance in a Linear Turbine Cascade <i>Y. G. Sohn, J. H. Lee, S. J. Song (Seoul National Univ., Korea), H. S. Lee (Hyundai Heavy Industries, Korea), E. H. Jung, J. H. Kim (KARI, Korea)</i>	ACGT2014-0146 Effects of Alloying Elements on Microstructure and Properties of Ni-Cr-W-Mo Wrought Superalloys (Present Without Publication) <i>B. G. Choi, I. S. Kim, J. H. Do, H. U. Hong, H. W. Jeong, C. Y. Jo (Korea Institute of Materials Science, Korea)</i>
11:45	ACGT2014-0072 Flow and Heat Transfer Characteristics for Steam Cooling in Rib-Roughened Channels with Various Rib Angles <i>C. Ma, J. Wang, S. Zang, Y. Ji (Shanghai Jiao Tong Univ., China)</i>	ACGT2014-0093 Measurement of Flame Dynamics of a Gas Turbine Combustor by Using Optical Method <i>T. Saito, Y. Kimura, Y. Sasano, K. Saitoh, E. Ito (Mitsubishi Heavy Industries, Ltd., Japan)</i>	ACGT2014-0136 A Study on the Design Optimization of Centrifugal Compressor Considering the Efficiency and the Size <i>Y. Lee, B. Y. Kang, S. Yi, W. Heo, S. Kang (Seoul National Univ., Korea), K. K. Ha (Hyundai Motor Group, Korea)</i>	ACGT2014-0001 New Lifting Tool Technology can Reduce Hot Gas Path Inspections by up to 3.5 Days <i>John W. Herbold (Ge Power & Water, Gas Turbine Division, USA)</i>	ACGT2014-0032 Effects of Large Tip Clearance and Turbulence Intensity on Aerodynamic Performance in a Turbine Cascade <i>Y. M. An, W. J. Jang, S. J. Song (Seoul National Univ., Korea)</i>	ACGT2014-0147 Computational Alloy Design of Superalloys for Gas Turbine Application (Present Without Publication) <i>Y. S. Yoo, S. M. Seo, H. W. Jeong, D. W. Yun, C. Y. Jo (Korea Institute of Materials Science, Korea)</i>

August 19 (Tue)

Room 118

Keynote Speech 3

- 13:30** Session chair : Prof. Bhaskar Roy
Title : Endwall Treatment in Turbomachinery
- 14:20** Speaker : Prof. Jehyun Baek, POSTECH, Korea

OEM Session 2

- 14:20** Session Chair : Dr. Jeong Lak Sohn
Title : Development of MHPS Advanced Large Scale Gas Turbines
- 15:10** Speaker : Dr. Katsunori Tanaka, Mitsubishi Hitachi Power Systems, Japan

Tutorial Session

- 15:30** Session Chair : Prof. Jae Su Kwak
Title : Unsteady Flow Field Measurements and Analyses for the Next Generation Turbomachinery
- 17:30** Speaker : Dr. Hyoun-Woo Shin, GE aviation, USA

Aug. 20 (Wed)

Room 118

Keynote Speech 4

09:20	Session chair : Prof. Tong Seop Kim Title : Recent Development of Flow Control Technology in Gas Turbine Application
10:10	Speaker : Prof. Shinji Honami, Tokyo University of Science, Japan

Room 102

Room 105

Room 201

Room 202

Room 203

Room 204

	[W-1] Internal Cooling-2	[W-2] Fuel Diversity and Emission	[W-3] Compressor Leakage Flows	[W-4] Blade Vibration and Structure/Fluid Interaction	[W-5] Test and Simulation of Gas Turbine Systems	[W-6] Small and Micro Gas Turbines
	Session chair : Dr. Byuong Moon Chang	Session chair : Dr. Aibing Fang	Session chair : Dr. Jeong-Seek Kang	Session chair : Prof. Toshinori Watanabe	Session chair : Dr. Dongho Rhee	Session chair : Dr. Donh-hyun Lee
10:30	ACGT2014-0025 Effect of Half Guide Vane on 180° Turning Channel in Numerical Simulation Analysis <i>S. M. Choi, H. Sohn, E. Y. Jung, H. H. Cho (Yonsei Univ, Korea), T. Woo (Sung-il Turbine, Korea)</i>	ACGT2014-0006 The Effect of the Fuel Change from Petroleum Diesel to a Bio Diesel Fuel on the Emission of a 20MW Gas Turbine Combustor <i>H. Fujiwara, K. Shimodaira, H. Yamada (JAXA, Japan), K. Yamaguchi (KHI, Japan)</i>	ACGT2014-0045 A Numerical Investigation of the Influence of Axial Slot Casing Treatment on Tip Leakage Vortex in an Axial Compressor <i>N. Ma, X. Nan, K. Wang, J. Du, F. Lin, J. Chen (Chinese Academy of Sciences, China)</i>	ACGT2014-0040 A New Reliable FE Modeling for Blade Frequency Calculation in Compressor Preliminary Design Procedure <i>J. Qian, Y. Shen, H. Miu, L. Tan (Shanghai Electric Power Generation Research and Development Center, China)</i>	ACGT2014-0150 Results of the 40MW-Class Advanced Humid Air Turbine Test and Development of Elemental Technologies <i>T. Morisaki, H. Araki, Y. Iwai, Y. Horiuchi, K. Koyama, T. Koganezawa (Mitsubishi Hitachi Power Systems, Ltd., Japan)</i>	ACGT2014-0113 Aerodynamic Design of a Centrifugal Compressor Stage with a Pressure Ratio 5.7:1 for a Small Turbocharger <i>T. Kawakubo, H. Tamaki (IHI Corporation, Japan), H. Mori (Turbo System United Co., Ltd., Japan)</i>

	Room 102	Room 105	Room 201	Room 202	Room 203	Room 204
	[W-1] Internal Cooling-2	[W-2] Fuel Diversity and Emission	[W-3] Compressor Leakage Flows	[W-4] Blade Vibration and Structure/Fluid Interaction	[W-5] Test and Simulation of Gas Turbine Systems	[W-6] Small and Micro Gas Turbines
10:55	ACGT2014-0104 Heat Transfer Enhancement with Intersecting Rib in Rotating Large Aspect Ratio Channel <i>H. Chung, S. Kim, Y. Lee, H. H. Cho (Yonsei University, Korea), D. Rhee (Korea Aerospace Research Institute, Korea)</i>	ACGT2014-0030 Adaptation of Swirl-Premixed Burner for Natural Gas to Hydrogen Fuel <i>X. Tian, Y. Cui, S. Xing, A. Fang, C. Nie (Chinese Academy of Sciences, China) P. Zang, M. Chen (Shanghai Electric Power Generation R & D Center, China)</i>	ACGT2014-0004 Numerical Investigation of Mechanisms Affecting the Tip Leakage Flow in a Transonic Axial Compressor Stage <i>J. Gou, C. Ma, X. Su, X. Yuan (Tsinghua Univ., China)</i>	ACGT2014-0118 Studies on the Variation in the Natural Frequency of Axial Compressor Blades According to Root Boundary Conditions <i>J. Bang, A. S. Lee, K. H. Sun, B. O. Kim (Korea Institute of Machinery and Materials, Korea), S. S. Byun (Turbo Power Tech Co. Ltd., Korea)</i>	ACGT2014-0077 Dynamic Modeling and Simulation on Gas Turbine Engine with a State Space Model <i>H. Zhang, M. Chen, J. Chen, S. Weng, D. Zhang (Shanghai Jiao Tong Univ., China) Y. Cui (Shanghai Electric Power Generation Group)</i>	ACGT2014-0131 Development of Micro Gas Turbine Test Facility <i>H. Lim, B. Choi, M. Park, S. Hwang, J. Park, J. Seo, J. Bang, B. O. Kim, A. S. Lee, J. H. Cho, H. S. Kim (Korea Institute of Machinery and Materials, Korea)</i>
11:20	ACGT2014-0015 Conjugate Heat Transfer Study in Internal Region of Nozzle Guide Vane in a Cascade <i>A. K. Puhari, B. V. S. S. S. Prasad, N. Sitaram (I.I.T. Madras, India)</i>	ACGT2014-0149 Combustion Characteristics of Multiple-Injection Dry Low-NOx Combustors for Hydrogen-Rich Syngas Fuel in an IGCC Pilot Plant <i>Y. Akiyama, T. Asai, S. Dodo, M. Karishuku, N. Yagi, A. Hayashi (Mitsubishi Hitachi Power Systems, Japan)</i>	ACGT2014-0014 Numerical Investigation on Interaction between Hub Clearance Flow and Corner Separation in a Planar Compressor Cascade <i>Z. Wang, S. Geng, H. Zhang (Chinese Academy of Sciences, China)</i>	ACGT2014-0021 Plasma Actuation Effect on Flow Around 2-D Wind Turbine Blade (Effect on Lift Increase and Drag Reduction) <i>H. Matsuda, M. Tanaka, N. Shimura, F. Otomo, T. Osako (Toshiba, Japan)</i>	ACGT2014-0076 Study on the Variation of the Tip Clearance of Gas Turbine During Earthquake <i>W. Wu, S. Zang, C. Gao (Shanghai Jiao Tong Univ., China)</i>	ACGT2014-0081 Development Status of Performance Evaluation Systems for 500W Ultra-Micro Gas Turbine Generator <i>J. Seo, H. Lim, B. S. Choi, J. Park, M. R. Park (Korea Institute of Machinery & Materials, Korea)</i>
11:45	ACGT2014-0107 Measurement of Static Pressure Distribution in Two-Pass Channel with Tip Bleed Holes on Tip Surface <i>H. Sohn, E. Y. Jung, J. S. Park, H. H. Cho (Yonsei University, Korea) B. M. Chang (Korea Lost Wax Co Ltd.)</i>	ACGT2014-0119 Effect of Swirl Types on NOx Emission of a Lean-Premixed Swirl-Stabilized Burner <i>J. M. Park (Korea University of Science and Technology), M. K. Kim, K. Y. Ahn (Korea Institute of Machinery and Materials, Korea)</i>	ACGT2014-0018 Study of the Effect of Stator Hub Clearance on Performance of a 1.5 Stage Axial Compressor and CFD Analysis of the Stator Flow Field <i>M. Joseph, B. Roy, A M Pradeep (I.I.T. Bombay, India)</i>	ACGT2014-0079 Aeroelastic Effect of a Small Wind Turbine Airfoil with a Locally Flexible Structure on Its Performance <i>W. Kang, Y. Tang, M. Xu, J. Zhang (Xi'an Jiaotong University, China)</i>		ACGT2014-0156 Feasibility Study of Instability Control of a Floating Ring Bearing for Turbocharger <i>D. Tamunodukobipi (Korea University of Sci. & Tech., Korea), B. S. Choe, Y. B. Lee (Korea Institute of Science and Technology, Korea)</i>

Aug. 20 (Wed)

	Room 102	Room 105	Room 201	Room 202	Room 203	Room 204
	[W-7] Heat Transfer Measurement	[W-8] Spray and Atomization of Fuel	[W-9] Flow Instability in Compressors and Fans	[W-10] Topics in Compressors	[W-11] Topics in Turbines	[W-12] Numerical Analysis of Novel Fluidmachinery
	Session chair : Dr. Hyungsoo Lim	Session chair : Dr. Ju Hyeong Cho	Session chair : Prof. A M Pradeep	Session chair : Prof. Takanori Hirano	Session chair : Dr. Eisaku Ito	Session chair : Prof. Weiguang Huang
13:30	ACGT2014-0096 Rotating Effect on Heat Transfer of a Concave Surface by a staggered array impingement /Effusion Cooling <i>E. Y. Jung, J. S. Park, S. J. Park, H. H. Cho (Yonsei Univ, Korea), T. K. Woo (SUNG-IL Co. Ltd.)</i>	ACGT2014-0017 Multi-scale Simulation and Validation for Predicting Liquid Sheet Atomization <i>C. Inoue, A. Shimizu, T. Watanabe, T. Himeno, S. Uzawa (Tokyo Univ., Japan)</i>	ACGT2014-0087 Instabilities Inception in a Single-Stage Transonic Axial Compressor with Axial Skewed Slot <i>B. J. Lim, T. C. Park, Y. S. Kang, B. J. Cha (Korea Aerospace Research Institute, Korea)</i>	ACGT2014-0128 A New Loss and Deviation Angle Model for the Controlled Diffusion Airfoils <i>T. Ke, J. Zhang, W. Huang (Chinese Academy of Sciences, China)</i>	ACGT2014-0091 Experimental and Numerical Investigation of Leakage Flows Injection from the Endwall Slot in Linear Cascade of High-Pressure Turbine <i>W. A. W. Ghopa (National University of Malaysia, Malaysia), K. Funazaki, T. Miura (University of Iwate, Japan)</i>	ACGT2014-0102 Internal Flow Field of the Impedance Pump <i>R. Okamoto, T. Watanabe, T. Himeno, C. Inoue (The University of Tokyo, Japan)</i>
13:55	ACGT2014-0098 Practical Use of the Heat Transfer Coefficient Measurement Technique Using a Heater Mesh and the Infrared Camera— Development of Element Technologies for CC Efficiency 57% Gas-Turbine— <i>S. Mizukami, T. Hase, E. Ito (Mitsubishi Heavy Industries, Ltd., Japan)</i>	ACGT2014-0140 Spray Characterization Using PDA for a Single Hole Spray in Cross Flow <i>T. Okada, H. Shimakata, H. Kawashima, T. Ishima (Gunma University, Japan), S. Tanaka, N. Hiromitsu (IHI Corporation, Japan)</i>	ACGT2014-0047 Effects of Rotating Inlet Distortion on Compressor Stability and Stall Inception <i>D. Xu, S. Dakun, S. Xiaofeng (Beihang Univ., China)</i>	ACGT2014-0101 An Integrated Approach to Predict the Performance of an Axial Compressor with Variable Inlet Guide Vane <i>S. Kim, D. Kim, C. Son, K. Kim, (Pusan National University, Korea), M. Kim, S. Min (Agency for Defense Development, Korea)</i>	ACGT2014-0154 A Numerical Analysis on the Influence of Hub Seal Leakage on the Efficiency of High Pressure Steam Turbine Stages <i>H. J. Jang, S. Y. Kang, T. S. Kim (Inha University, Korea)</i>	ACGT2014-0069 Numerical Simulation of Flow Field in a Mixed Flow Compressor at Windmill Condition <i>M. Moriyama, J. Ichimura, T. Sato (Waseda University, Japan), D. Masaki, H. Taguchi (JAXA, Japan)</i>

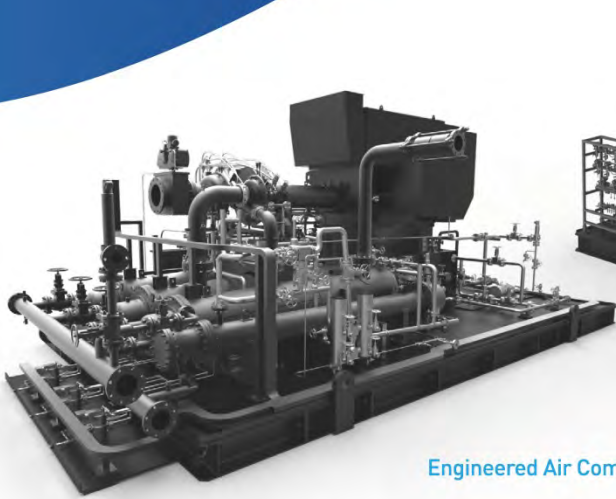
	Room 102	Room 105	Room 201	Room 202	Room 203	Room 204
	[W-7] Heat Transfer Measurement	[W-8] Spray and Atomization of Fuel	[W-9] Flow Instability in Compressors and Fans	[W-10] Topics in Compressors	[W-11] Topics in Turbines	[W-12] Numerical Analysis of Novel Fluidmachinery
14:20	ACGT2014-0053 Discussion the Problem of Environment Reflection in Radiation Thermometry for Gas Turbine Blades <i>S. Gao ,L. Wang, C. Feng (Harbin Institute of Technology, China)</i>	ACGT2014-0137 Effect of Liquid Film Width on Wetting Characteristics in a Prefilming Type Air-blast Atomizer <i>M. Itoh, S. Matsuno (IHI Corporation, Japan)</i>	ACGT2014-0013 Initial Selection of Groove Location Combination for Multi-Groove Casing Treatments <i>J. Du, L. Gao, J. Li, F. Lin, J. Chen (Chinese Academy of Sciences, China)</i>	ACGT2014-0038 Parametric Study of Casing Groove Combined with Blade Tip Injection and Ejection in a Transonic Axial Compressor <i>C. T. Dinh, K. Y. Kim (Inha Univ., Korea)</i>	ACGT2014-0121 Hot to Cold Conversion of High Pressure Turbine with Conjugate Heat Transfer Method <i>Y. S. Kang, D. H. Rhee, J. S. Huh, B. J. Cha (Korea Aerospace Research Institute, Korea)</i>	ACGT2014-0067 Numerical Analysis of Tandem Airfoils for Sub-Sonic Axial Flow Compressor Blades <i>A. K. Tiwari, V. R. Kalamkar (Visvesvaraya National Institute of Technology, India)</i>
14:45			ACGT2014-0034 Flow Features and Stall Characteristics of a Transonic Fan with a Single Circumferential Groove <i>Y. Sakuma, T. Watanabe, T. Himeno (University of Tokyo, Japan), D. Kato, T. Murooka, Y. Shuto (IHI Corporation, Japan)</i>	ACGT2014-0120 Numerical Study on the Effect of a Forward Swept Rotor on the Stall Point for a Subsonic Multi-Stage Axial Compressor <i>R. Mito, D. Morita, T. Walker, E. Ito (Mitsubishi Heavy Industries, Japan)</i>	ACGT2014-0123 Analysis of the Effects on the Structural Integrity of the First Stage High Pressure Nozzle Caused by the Different Slot Designs <i>J. S. Huh, D. H. Rhee, S. S. Yang (Korea Aerospace Research Institute, Korea), J. C. Seo (Pusan National University, Korea)</i>	

Schedule at a Glance

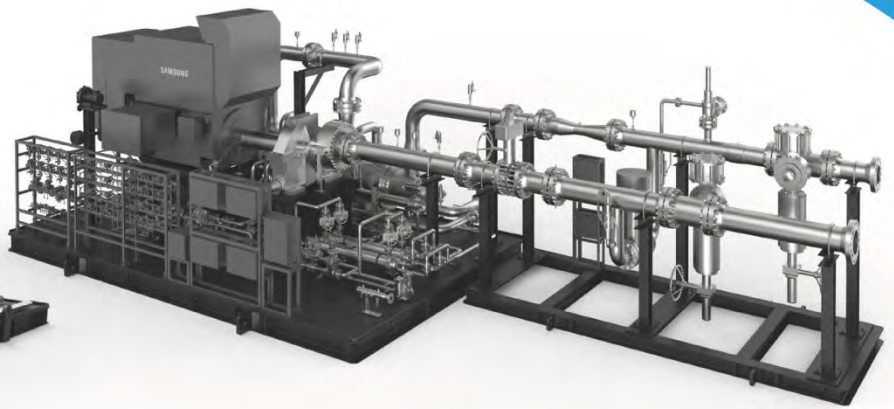
Monday August 18	Tuesday August 19	Wednesday August 20
Registration 8:30 - 17:00	Registration 8:30 - 17:00	Registration 8:30 - 12:00
Opening Address 09:10-09:20 (Room 118)		
Keynote Speech 1 09:20-10:10 (Room 118)	Keynote Speech 2 09:20-10:10 (Room 118)	Keynote Speech 4 09:20-10:10 (Room 118)
Break 10:10-10:30	Break 10:10-10:30	Break 10:10-10:30
Technical Sessions 10:30-12:10 (6 Rooms)	Technical Sessions 10:30-12:10 (6 Rooms)	Technical Sessions 10:30-12:10 (6 Rooms)
Lunch 12:10-13:30 (Engineer House)	Lunch 12:10-13:30 (Engineer House)	Lunch 12:10-13:30 (Engineer House)
	International Organizing Committee Meeting 12:10-13:30 (Engineer House)	
Forum Session 13:30-15:00 (Room 118)	Keynote Speech 3 13:30-14:20 (Room 118)	Technical Sessions 13:30-15:10 (6 Rooms)
OEM Session 1 15:00-15:50 (Room 118)	OEM Session 2 14:20-15:10 (Room 118)	
Break 15:50-16:10	Break 15:10-15:30	Closing Address 15:10-15:20 (Room 118)
Technical Sessions 16:10-17:50 (6 Rooms)	Tutorial Session 15:30-17:30 (Room 118)	
	Banquet 18:30-20:15 (Engineer House)	

Total Energy Solution Provider

Samsung Techwin is specialized in designing and manufacturing of integrally geared air and gas compressors. More than 3,000 industrial compressors are being operated around the world for plant air, process air and gas applications.



Engineered Air Compressor



Fuel Gas Booster Compressor

- API672 and API617 standard applicable
- Completely designed, built and tested by client's requirements
- Optimized solutions in extreme environments
- Wide scope of supply & Complete package available
- Proven core compressor design for guaranteed performance and reliability
- Vendor approval from a wide range of Oil & Gas, FEED companies



Gas Oil Separation Plant and NGL Recovery Plant



Oil & Gas Production Plant



Combined Cycle Power Plant

SAMSUNG TECHWIN CO., LTD.

Samsungtechwin R&D Center, 6, Pangyo-ro 319beon-gil, Bundang-gu,
Seongnam-si, Gyeonggi-do 463-400, Korea T +82-70-7147-4012 F +82-31-8018-3729
To learn more about Samsung Compressors, please visit www.samsungcomp.com

SAMSUNG TECHWIN



Graphics Courtesy of Kulite and No Other Use is Permitted



 **kulite**[®] *LEADER IN PRESSURE
TRANSDUCER TECHNOLOGY*