# S7 – Steam and Gas Turbines

Organizers: Tetsuya Sato & Jae Su Kwak

Gas and steam turbines are complex and comprehensive systems composed of many elements. In the near future, gas turbines for power generation will play a role to compensate for output fluctuations of renewable energy sources. It is necessary to solve technical problems such as high efficiency over a wide load range and reduction of the start-up time. Technological innovations on gas turbines for aviation are also required to develop electric aircrafts as well as supersonic aircrafts. Steam turbines, which are external combustion engines, can use a variety of primary energies such as fossil fuels, biomass, solar, geothermal and nuclear energy, and thus play a major role in the power generation systems. Therefore, improving the performance, safety and controllability of gas and steam turbines is an urgent issue directly linked to $CO_2$ reduction, transportation safety, measures in emergency. In addition, many interesting and complex phenomena related with aerodynamics, multiphase flow dynamics, thermodynamics, rotor dynamics, heat transfer, control, etc. are observed in gas and steam turbines. The scope of this session covers all scientific and engineering topics related with gas and steam turbines.

## Non-exhaustive list of suggested topics

- Design
- Control
- Performance analysis
- Thermal-fluid dynamics
- Combustion
- Heat transfer and cooling
- Performance analysis
- Rotor dynamics

## Organizers

**Tetsuya Sato** is a Professor at Department of Applied Mechanics and Aerospace Engineering of WASEDA University in Japan. After receiving a Ph.D. degree from the University of Tokyo in 1992, he developed hypersonic aerospace propulsion systems such as an air turbo ramjet engine (ATREX) and precooled turbojet engine (PCTJ) in the Japan Aerospace Exploration Agency (JAXA). Presently, his field of research is the thermal-fluid dynamics of aerospace propulsion systems.

**Prof. Jae Su Kwak** received his B.S. and M.S. degrees in Mechanical Engineering from Korea University in 1996 and 1998, respectively. He then received his Ph.D. degree from Texas A&M University in 2002 and joined the Aeropropulsion department in Korea Aerospace Research Institute (KARI). Professor Kwak is currently a Professor at the School of Aerospace and Mechanical Engineering at Korea Aerospace University in Goyang-City, Korea. His main research interests include gas turbine heat transfer and cooling, heat transfer in propulsion system, and enhancement of heat transfer.

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