S12 - Experimental Techniques applied to Turbomachines

Organizers: Dr. Shigeyuki Tomimatsu, Prof. Teiichi Tanaka & Dr. Arthur Favrel

The continuous development of more advanced and sophisticated experimental techniques over the past decades has enabled a better understanding and control of the complex flow phenomena occurring in turbomachines, leading to the improvement of their reliability and efficiency. However, the new challenges faced by turbomachines manufacturers and designers, notably in terms of efficiency improvement, noise reduction, low-carbon power generation, operating range extension and flexibility, still require continuous improvements and developments of advanced experimental techniques. The session **Experimental Techniques applied to Turbomachines** of ISROMAC 18 is the opportunity for academic and industrial researchers and engineers to exchange and share their knowledge and experience about new advancements in terms of experimental techniques, original experiments on turbomachines on both the reduced scale model and real machines and new insights on complex flow phenomena occurring in turbomachines.

This session welcomes presentations covering advanced experimental techniques applied to turbomachines especially on (but not limited to) "Optical approach for flow visualization and velocity measurements", "Unsteady pressure, velocity and flow rate measurement", "Multi-point pressure and temperature measurement", "Radial and axial force measurement for turbomachinery", "flow control and flow instabilities mitigation" etc. Presentations about experiments on fundamental flow dynamics are also welcome.

Non-exhaustive list of suggested topics

- Advanced and novel experimental techniques
- Optical approach for flow visualization and velocity measurements
- Particle Image Velocimetry (PIV) and Laser Doppler Velocimetry (LDV) in complex geometries
- Pressure determination based on PIV measurements
- High-speed visualization of cavitation flows
- Unsteady pressure, velocity and flow rate measurement
- Multi-point pressure and temperature measurement
- Experimental techniques applied to full-scale machines
- Radial and axial force measurement on turbomachines
- Advanced monitoring of turbomachines
- Flow and boundary layers control, flow instability mitigation
- Experiments on fundamental flow dynamics

Organizers

Shigeyuki Tomimatsu is working as a Manager of the R&D Center in DMW Corporation. He received his M.S. degree from Kansai University and Dr. Eng. from Niigata University. His research interests are CFD and quantitative flow visualization for turbomachinery.

Teiichi Tanaka is working as a Professor at National Institute of Technology, Kumamoto College, Japan. He received his B.S., M.S. degrees and Dr. Eng. from Kyushu Institute of Technology, Japan. His research interests include unsteady characteristics of turbomachinery, cavitation in cryogenic pump based on understanding of internal flow using experimental and CFD results.

Arthur Favrel is working as a Researcher and Assistant Professor at Waseda Research Institute for Science and Engineering of Waseda University, Japan. After his M.Sc. degree obtained at UCBL (Lyon, France) in Mechanical Engineering, he got his PhD degree at Ecole Polytechnique Fédérale de Lausanne in Switzerland in 2016. His research interests include the investigation of cavitation flows and instabilities occurring in turbomachines by means of experiments, CFD simulation and 1D modelling.

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