



Workshop on Advances in Radial Compressor Aerodynamic Design and Turbomachinery Aeroelasticity

Date: Tuesday, November 4th, 2014

Location: Aerospace Faculty Auditorium

Time: 08:30-16:30

The training activities will be open for all students, industry and academic staff. There is no cost for registration; however it is mandatory for all participants. Please reserve your spot until 26/10/2014 by contacting Kamila Barshtak < kamila@ae.technion.ac.il >.

Program

- ❖ 08:30 - 08:45 Registration and Introduction
- ❖ 08:45 - 09:30 Introduction to Flow in Centrifugal Compressors (Prof. Casey)
 - Velocity Triangles and Euler Equation
 - Non-dimensional Parameters
 - Loss Mechanisms
- ❖ 09:30 - 11:00 Key aspects of Centrifugal Compressor Design (Prof. Casey)
 - Impeller Inlet
 - Impeller Exit
 - Diffuser
 - Volute
- ❖ 11:00 - 11:20 Coffee Break
- ❖ 11:20 - 11:50 Centrifugal Compressor Performance Characteristics (Prof. Casey)
 - Range, Surge, and Choke
 - Performance Map
 - Stage Characteristics
- ❖ 11:50 - 12:30 Modern Centrifugal Compressor Design Tools (Prof. Casey)
- ❖ 12:30 - 13:30 Break (Light Lunch will be served)
- ❖ 13:30 - 14:45 Introduction to turbomachinery aeroelasticity (Prof. Vogt)
 - General Aspects
 - Flutter
 - Forced Response
 - Rotating Instabilities
- ❖ 14:45 - 15:00 Coffee Break
- ❖ 15:00 - 16:30 Methods in Turbomachinery Aero-elasticity (Prof. Vogt)
 - Experimental Methods
 - Numerical Methods

Dr. Beni Cukurel
Turbo & Jet Engine Laboratory
Technion City, Haifa 32000, Israel
Tel. +972-4-8293807
e-mail: bcukurel@technion.ac.il



**DEPARTMENT OF
AEROSPACE ENGINEERING**

TECHNION
Israel Institute
of Technology

Bio:

Michael Casey graduated in Engineering Science at Oxford University in 1970, and continued in Oxford to complete his doctoral thesis on "Cavitation inception on hydrofoils" in 1974. He subsequently held post-doctoral positions in Durham and Cambridge Universities in the UK, before taking up engineering and management roles for nearly 30 years in various international companies (WS Atkins, Sulzer Turbo, Rolls Royce, and Sulzer Innotec). Over this period his technical work included the development, design and analysis of all aerodynamic components of centrifugal compressors, and he carried out research on compressors and turbines, turbomachinery design methods, CFD and experimental methods. From 2003 until his retirement in 2011 he was Professor of Thermal Turbomachinery in Stuttgart University, Germany where he worked mainly on steam turbines. During this period he became a director of PCA Engineers Limited in the UK where he still consults, mainly on design methods and performance of centrifugal compressors. He has authored or co-authored well over 100 technical papers, and has received many awards for his publications. In addition to his university teaching, he has given courses and workshops on radial turbomachinery in various industrial companies and universities, notably at the prestigious Cambridge Turbomachinery Course. He is a Fellow of the Institution of Mechanical Engineers and of the American Society of Mechanical Engineers.

Dr. Damian Vogt graduated in Mechanical Engineering at the Swiss Federal Institute of Technology (ETH) in Zurich in 1998 and continued at the Royal Institute of Technology (KTH) in Stockholm, Sweden, to complete his doctoral thesis on turbine aeroelasticity. He has over 15 years of experience in experimental and numerical research on turbomachines with a main focal point on turbomachinery aeroelasticity and was leading the EU FP7 collaborative project "FUTURE" within which 25 partners from academia, industry and research institutes from Europe and South Africa were researching on turbomachinery flutter. He has published over 60 journal and conference articles as well as book chapters. Dr. Vogt is currently Professor of Thermal Turbomachinery and Director of the Institute of Thermal Turbomachinery and Machinery Laboratory at the University of Stuttgart (Germany). After having chaired the Structures & Dynamics Committee of ASME IGTI, he is presently serving as the Technical Program Chair of the 2015 Turbo Expo conference.