
Advanced Design Concepts and Practice

ADCP2016 Spring Workshop

As a Session of TMCE2016 (<http://tmce.io.tudelft.nl/>)

Aix-en-Provence, France, 9th May, 2016

adcp2012.com

Chair

Professor Yongsheng Ma

Department of Mechanical Engineering

Faculty of Engineering, University of Alberta, Canada

Introduction to the workshop

ADCP workshops offer a forum for presentation and discussion to bring advanced theories and technologies to the design and simulation of complex equipment and products, with a focus on computational design and evaluation methods and tools. ADCP2016 is taken as one session of TMCE2016, jointly organized by TU Delft and Tsinghua University based on a large MOE project, NSFC (National Natural Science Foundation Committee of China) projects, the Oversea Innovation Team Project of Tsinghua University, and MOE Joint Laboratory of Innovative Design and Manufacturing of Advanced Mechanical Systems. The theme of ADCP2016 Spring Workshop is *practice-based modelling and simulation of products*.

Keynote speaker



Professor Yongsheng Ma

Department of Mechanical Engineering

Faculty of Engineering, University of Alberta, Canada

Professor Ma is full professor with the Dept. of Mechanical Engineering of the University of Alberta (UA) since 2013. Dr. Ma has also been a registered Professional Engineer with APEGA, Canada since 2009. Currently he is also a senator of UA. Dr. Ma teaches capstone design projects, engineering economics and manufacturing processes. His research areas include interdisciplinary heavy oil recovery production tooling engineering, feature-based product and process modeling, plastic molding simulation and mold design optimization, CAD/CAE integration, CAD/CAM, ERP informatics modeling, and product lifecycle management. Dr. Ma received B.Eng. degree from Tsinghua University, Beijing in 1986; and both M.Sc. and Ph.D. degrees from UMIST, UK in 1990

and 1994 respectively. From 2000 to 2007, he had been an Associate Professor with Nanyang Technological University, Singapore; and from 2007 to 2013, with UA. From 2009 to 2013, Dr. Ma served as an associate editor of IEEE Transaction of Automation Science and Engineering; and since 2012, has been an editor of Advanced Engineering Informatics. Dr. Ma won ASTech award sponsored by Alberta Science and Technology Leadership Foundation jointly with Drader Custom Manufacturing Ltd (Canada) in 2012. Dr. Ma had been a visiting professor (2009-2013) of NUAA, and currently is also a visiting professor at Tsinghua University (Pengchen Scholar). He started his career as a Lecturer from Ngee Ann Polytechnic, Singapore in 1993, and then from 1996 to 2000, he was a senior research fellow and a group manager at Singapore Institute of Manufacturing Technology (SIMTech).

Lecture topic: Interdisciplinary physics phenomenon modeling via features

—An engineering informatics methodology for industrial projects

Abstract: Success of energy development projects requires close collaboration among engineers from different disciplines. However, till now, there is still lack of systematic information sharing support for such multi-disciplinary collaboration, such as between geo-mechanical and chemical process engineering and mechanical engineering. From engineering informatics point of view, in this workshop, a unified interdisciplinary methodology is proposed based on associative feature to have a generic data representation and multi-physics modelling schema. With the systematically organized and indexed constraints embedded in the feature models, and a supporting change propagation method, an informatics engineering methodology is proposed to find good fit for collaborative engineering of sizable projects. As a case study, this workshop presents an integrated and coherent research program for oil extraction innovation in steam-assisted gravity drainage (SAGD) production. The research aspects include phenomena discovery and investigation, product design, performance evaluation, failure mode analysis, interfacial and surface interaction enhancement, tooling product development and manufacturing technologies. The focused area is semantics integration for SAGD tooling system design and manufacturing. This study covers sand control liners and inflow and outflow control devices for in-situ heavy oil extraction. In order to provide solid scientific engineering input and analysis support, multi-disciplinary experts with a unique combination of strengths are suggested to form a team; hence the collective expertise covers a broad range of required scientific challenges. This proposed program leverages on knowledge-based and sustainable solutions with synergic, industry-oriented, and multidisciplinary collaboration approach.

Presentation

Topic: Modeling and Simulation of Flapping Wings

Abstract: This presentation presents an introduction to model and simulate flapping wings and a new approach for the designing of complicated flapping wing. A bio-inspired conceptual design of flapping wing is presented to validate this new designing approach. The bioinspired design has been simulated by the flexible multibody dynamic

tool, and the results show that the designed flapping wing has the similar flapping motion as that of a real bird.

Speakers:

Dr. Wang Jielong
Beijing Aeronautical Science & Technology Research Institute
Commercial Aircraft Corporation of China, Ltd. (COMAC)



Dr Jielong Wang (JW), obtained his Ph. D from Georgia Institute of Technology in 2007. He current works in Beijing Aeronautical Science & Technology Research Institute (BASTRI) of Commercial Aircraft Corporation of China, Ltd. (COMAC), as Oversea Advanced Technical Staff and senior engineer. He has over 10 years of experience in developing and using structural dynamic and CFD codes for aeroelastic analysis. Current activities: developing flutter analysis tool based on fluid-structure coupling; prediction of buffeting response of new type of aircraft; aerodynamic inverse design of composite wing taking into account the deformation of wings; and developing new type of structural dynamic elements based on motion interpolation.

Dr. Hou Yuemin
Design Institute, Mechanical Engineering Department
Tsinghua University



Dr. Hou Yuemin obtained her Ph. D from Tsinghua University in 2005. She works in the Design Institute of Mechanical Engineering Department at Tsinghua University as senior researcher and in the Mechatronic Engineering School of Beijing Information Science and Technology University as associate professor. Her current research include: biology inspired design theory and algorithms, gene transcription and translation in design, 4D design, neural networks, and design of intelligent systems.

Call for participants

Participants are welcome to present 1-3 slides at the workshop. Participant and presentation intention please send to yongshen@ualberta.ca or hym01@mails.tsinghua.edu.cn with subject “ADCP2016 Spring”.

Contact:

Prof. Yongsheng Ma
Department of Mechanical Engineering
Faculty of Engineering
University of Alberta, Canada
Email: yongshen@ualberta.ca

Dr. Hou Yuemin
Lab room 1043, Lee Shao Kee S&T Building
Design Institute, Mechanical Engineering
Department. Tsinghua University
Tel: +86 (10) 62773470
Email: hym01ATmails.tsinghua.edu.cn