英語講演会　事前申込不要

東北大学大学院工学研究科　次世代航空機研究センターからのお知らせ

TU Next Seminar in Applied Mechanics and Computational Engineering

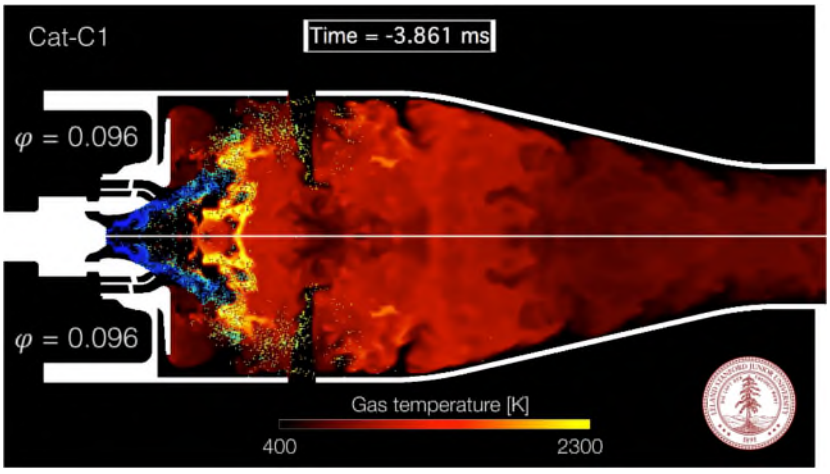
日時：2019 年 11 月 21 日（木）, November 21st　2019, 16：20-17：20

場所：東北大学大学院工学研究科　機械・知能系 2 号館 203 室 Room203 Research Building MENo2

講師：Prof. Matthias Ihme (Stanford University)

演題：Are we there yet? Requirements and challenges for the reliable prediction of turbulent combustions

Combustion in gas turbines, rockets, and other propulsion devices are often accompanied by unstable operating conditions and pollutant emissions. The accurate prediction of such combustion-dynamical processes introduces significant challenges. The selection of an appropriate combustion model and solution approach for the numerical prediction of reacting flows remains an outstanding issue. Often, expert knowledge or experimental data is required to make an informed decision in selecting a suitable model. By addressing these issues, this presentation discusses the development of a Pareto-efficient combustion (PEC) framework for application to complex chemically reacting flows under consideration of user-specific requirements about quantities of interest, desired simulation accuracy and computational cost, and a set of combustion models. PEC utilizes a Pareto efficiency, and introduces a manifold drift term as a measure for determining the adequacy of using a certain combustion-manifold model to predict selected quantities of interest. As such, this formulation represents a general description for the selection of combustion models, thereby overcoming limitations of monolithic combustion models. The capability of the PEC-framework is demonstrated in application to a series of flames of increasing complexity, including a tribrachial flame, a turbulent DME jet-diffusion flame, and the simulation of gas-turbine combustor. Results obtained from PEC-calculations are compared with benchmark simulations, and improvements in predicting flame dynamics and emissions are discussed.



Bio-sketch: Matthias Ihme is Associate Professor in the Department of Mechanical Engineering at Stanford University. He holds a BSc. degree in Mechanical Engineering and a MSc. degree in Computational Engineering. In 2008, he received his Ph.D. in Mechanical Engineering from Stanford. After being on the faculty of the Aerospace Engineering Department at the University of Michigan for five years, he returned to Stanford in 2013. He is a recipient of the NSF CAREER Award (2009), the ONR Young Investigator Award (2010), the AFOSR Young Investigator Award (2010), the NASA Early Career Faculty Award (2015), and the Hiroshi Tsuji Early Career Research Award (2017).　His research interests are broadly on the computational modeling of reacting flows, the development of numerical methods, and the investigation of advanced combustion concepts.

東北大学大学院工学研究科 次世代航空機研究センター事務局

TEL: 022-795-7998　E-mail: next@klab.mech.tohoku.ac.jp　URL: http://www.next.mech.tohoku.ac.jp