Title：DIRECT NUMERICAL SIMULATIONS OF MULTI-PHYSICS PROBLEMS TOWARDS CLEAN AND EFFICIENT COMBUSTION

Date：27th May, 2014

Time：from 14:00

Place：Lecture hall in the Dep. of Thermal Engineering

Lecturer: Hong G. Im
Professor of Mechanical Engineering
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Abstract:
Direct numerical simulations (DNS) provide insights into many fundamental characteristics of laminar and turbulent combustion by rendering high fidelity solutions that are free from turbulence modeling errors and numerical dissipation. Recent progress in DNS has expanded its applicability by realizing larger physical parameter conditions towards laboratory scale, by incorporating physics submodels to describe the essential physical and chemical processes, such as radiative heat transfer, spray dynamics, and soot formation. This presentation will highlight some recent developments at KAUST in such efforts, such as soot formation in nonpremixed flames; representation of solid body within the structured grid domain to study flame stabilization and blow-off; Eulerian-Lagrangian hybrid model to describe the flame propagation through an array of liquid droplets; and high Reynolds number turbulent premixed flame propagation. The presentation will also provide a brief overview of ongoing activities and research opportunities at KAUST Clean Combustion Research Center.

Biosketch:
Hong G. Im received his B.S. and M.S. in Mechanical Engineering from Seoul National University, and Ph.D. in Mechanical and Aerospace Engineering from Princeton University. He spent two years as a Research Fellow at the Center for Turbulence Research, Stanford University, followed by a post-doctoral tenure at the Combustion Research Facility, Sandia National Laboratories. He was appointed as Assistant/Associate/Full Professor at University of Michigan in the Mechanical Engineering Department from 2000 to 2014. In 2013, he joined KAUST as a Professor of Mechanical Engineering and Clean Combustion Research Center.
Hong Im's research and teaching interests are primarily fundamental and practical aspects of combustion and power generation devices using high-fidelity computational modeling. Recent research topics include modeling of combustion in low temperature combustion engines, advanced models for turbulent sooting flames, and combustion characteristics of high hydrogen content fuels for advanced gas turbine applications. He is a recipient of the NSF CAREER Award and SAE Ralph R. Teetor Educational Award. He is an Associate Fellow of American Institute of Aeronautics and Astronautics (AIAA) and a Fellow of

American Society of Mechanical Engineers (ASME). He has also served as an Associate Editor for the Proceedings of the Combustion Institute.