



College of Engineering  
Department of  
Mechanical & Industrial Engineering

## The Robert W. Courter Seminar Series

3:00-4:00pm, Friday, October 4, 2019  
1263 Patrick F Taylor Hall



### The simulation and modeling of turbulent flows

by **Krishnan Mahesh\***

University of Minnesota

Our group at the University of Minnesota focuses on fundamental advances in numerical algorithms, and understanding of flow physics that allow the prediction of engineering turbulent flows. This presentation will discuss key aspects of such simulation alongside illustrative examples. We will discuss a recently developed unstructured overset grid methodology and its application to particle-resolved DNS of several thousands of particles in turbulent flow. We will discuss global stability and adjoint analyses for three-dimensional complex baseflows, and illustrate its application to jets in crossflow. Finally we will present an integral analysis for axisymmetric boundary boundary layers in the presence of pressure gradients, and illustrate its application to interpret LES results.

\* Krishnan Mahesh is Professor in the Department of Aerospace Engineering and Mechanics at the University of Minnesota. His research focuses on algorithm development, theoretical analysis and modeling of multi-physics turbulent flows. Mahesh is a 2018 Fulbright-Nehru Specialist, Fellow of the American Physical Society, Associate Fellow of the American Institute of Aeronautics and Astronautics, and Fellow of the Minnesota Supercomputing Institute. He is a recipient of the CAREER Award from the National Science Foundation and the Francois N. Frenkiel award from the American Physical Society. He has received the Taylor award for Distinguished Research, McKnight Presidential Fellowship, Guillermo E. Borja award and McKnight Land-Grant Professorship from the University of Minnesota. Mahesh has over 150 publications in journals and refereed conferences, and has advised 20 PhD students.