Department of Engineering
Seminar Program
Wednesday, Feb 8, 2017
Shanahan Teaching and Learning Center
Lecture Hall 1430, 4:15pm

"Experiments in Environmental Turbulence: Understanding the Impact of Heterogeneities"

Ali Hamed

Summary:

Fluid mechanics has an influential role in the environment and in energy systems. This talk will begin with an overview of flow control in energy systems with recent experimental results demonstrating the potential of increasing the efficiency of energy production from wind turbines through flow manipulation. The remainder of the talk will focus on the impact of surface heterogeneities on the flow field in two environmental systems: (i) flow over large-scale topography and (ii) flow above and within aquatic vegetation. These systems provide critical ecological services. For example, the ecosystem services provided by aquatic vegetation in rivers and coastal regions include providing habitat, protection against erosion, and sequestration of pollutants. These services are strongly dependent on the flow field and have been valued at trillions of dollars annually. The flow measurements over simple models of these environmental systems were made using particle image velocimetry in a flow channel. The results quantify the significant impact of surface heterogeneities on the mean flow field and turbulence quantities.

Bio:

Ali M. Hamed is a doctoral candidate in mechanical engineering at the University of Illinois at Urbana-Champaign. He received his Bachelor of Science in Engineering and Bachelor of Arts in Economics at Washington and Lee University. Ali's research utilizes unique experimental techniques to study turbulent flows for environmental and energy applications. His work on wind energy, confined shear layers, and turbulent boundary layers over large-scale topography has been published in journals such as *Energies*, *Physics of Fluids*, *Boundary Layer Meteorology*, and *Journal of Fluid Mechanics*. Ali has mentored undergraduate researchers throughout his PhD and has been part of the Illinois Scholar Undergraduate Research program for three years. He has received the Distinguished Student Seminar Award from the American Physical Society (APS) and has been recognized on the List of Teachers Ranked as Excellent at the University of Illinois.

After the seminar there will be an informal dinner and conversation with the speaker in the Rose Hills PDR at Hoch-Shanahan Dining Hall. If you are not on the meal plan, we will have a signup sheet. If you are interested in attending, please RSVP with Sydney Torrey at storrey@hmc.edu.