



Elevating our gaze: contemplating how accelerating technological change will advance the study of extreme wind events

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The presentation will offer a forward-looking perspective that the civil (wind) engineering and atmospheric science fields are poised to reverse this trend by leveraging recent advancements in automation, data fusion and machine learning, heterogenous computing, multi-modal sensing, and other technologies reinventing modalities for scientific research and technology transfer. To build that case, we will begin by exploring the evolution of field reconnaissance efforts in landfalling Atlantic tropical cyclones to characterize the intensity and structure of damaging winds and how it is has influenced complementary research in atmospheric boundary layer wind tunnels (BLWTs). Key highlights will include activities and findings originating from the Florida Coastal Monitoring Program (which has led field experiments in 34 storms, including Harvey, Michael, and Dorian) and the Digital Hurricane Consortium, which represents the broader community of landfall experimentalists that deploy anemometry, mobile doppler radars, and storm surge/wave sensors.

The presentation will then explore cyber physical wind engineering experiments conducted in the NSF Natural Hazards Engineering Research Infrastructure (NHERI) BLWT using its computer-controlled terrain generator (the “Terraformer”) and other exciting new technologies that are reinventing the conventional design-build-test paradigm. Examples will include mechatronic building modeling to optimize the design of wind sensitive structures and the development of a new 300+ fan system to simulate non-stationary and non-neutral flows for the study of bluff-body aerodynamics in unsteady winds, flows over geomorphically complex terrain, and internal boundary layer formations. All systems are available for use by NCAR. Information will be given about how to access these resources as well as the lab/field data.

The presentation will conclude with remarks about how these research activities interrelate with the rapid transformation now taking place at engineering campuses worldwide, which is being driven by the so-called 4th Industrial Revolution (i.e., the integration of artificial intelligence, robotics, and the internet of things into industry and mainstream life), reduced barriers to adopt technology, and the emergence of student bodies that are increasingly more prepared for living and working in a “digital” world than previous generations. The perceived ripple effect on atmospheric science will then be discussed from an engineering perspective, with the goal of identifying opportunities in a future where data streams are sufficiently rich and forecasting tools are sufficiently skilled that the role of the “human in the loop” is far diminished by today’s standards.

Thursday, 23 January 2020, 3:30pm
Refreshments 3:15pm

NCAR-Foothills Laboratory, 3450 Mitchell Lane, FL2-1022-Large Auditorium

This seminar will be webcast live at:
<http://ucarconnect.ucar.edu/live>

Recorded seminar link can be viewed here:
<https://www.mmm.ucar.edu/events/seminars>

