UNIVERSITY of HOUSTON

CULLEN COLLEGE of ENGINEERING

Department of Civil & Environmental Engineering

CIVE 6111 Graduate Seminar

Paola Passalacqua
Assistant Professor
University of Texas at Austin

The Analysis of Geomorphic Features in the Digital Terrain Era

Friday, February 10, 2017
2:45 pm - 3:45 pm
CBB 120

Abstract: With the advent of high-resolution digital terrain data, detailed information on terrain characteristics and on scale and location of geomorphic features such as channel networks is available over extended areas. Our ability to observe landscapes and quantify topographic patterns has greatly improved, but challenges remain in the analysis of high-resolution topographic data; the presence of features such as roads, for example, challenges classic methods for feature extraction and large data volumes require computationally efficient extraction and analysis methods. Moreover, opportunities exist to define new robust metrics of landscape characterization for landscape comparison and model validation.

In this presentation, I will cover recent research in multi-resolution and objective analysis of high-resolution topographic data. I will present how the powerful combination of new data and new methods can be exploited to deepen our understanding of hillslope-channel process and form, and to evaluate the dynamic interactions with climate, vegetation, soil properties, and other environmental factors. I will also show how the analysis of the probability density functions of topographic attributes such as slope, curvature, and topographic index contains useful information for feature localization and extraction. The analysis of how the distributions change across scales, quantified by the behavior of modal values and interquartile range, allows the identification of landscape characteristic scales, such as terrain roughness. Finally, I will show how the use of high-resolution topographic data can greatly improve the prediction of inundated areas during flood events.

About the speaker:

Dr. Paola Passalacqua is an Assistant Professor in Environmental and Water Resources Engineering, in the Civil, Architectural and Environmental Engineering Department at the University of Texas at Austin. She received a MS and a PhD in Civil Engineering from the University of Minnesota. Her research interests include quantitative analysis and modeling of landscape forming processes, geomorphic transport laws, multi-scale analysis of hydrologic processes and dynamics of environmental transport in river networks and deltaic systems. She joined the University of Texas at Austin in 2011 where she continues her research program at the boundary between hydrology and geomorphology. Dr. Passalacqua has been honored with the National Science Foundation CAREER award (2014), the Association of Environmental Engineering and Science Professors (AEESP) Award for Outstanding Teaching in Environmental Engineering and Science (2016), and other teaching awards including the Dean's Outstanding Teaching by an Assistant Professor (2015).