

The Department of Civil and Environmental Engineering at the University of Houston presents...

CIVE 6111 Graduate Seminar

Revolutionizing Storm Surge Hazard Estimation: Surrogate

Models at our service



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Department of Civil & Environmental Science at
University of Oklahoma

Friday, April 28, 2023

2:45pm-3:45pm

Classroom Business Building (CBB) - Room 104

Zoom: <https://uh-edu-cougarnet.zoom.us/j/94589160391>

Abstract

Protection of coastal communities is emerging as a critical challenge for civil engineering especially if someone considers the increasing exposure to natural hazards, intensified by climate change, and the increasingly interconnected infrastructure of modern urban areas. Towards these efforts of reinforcing coastal resilience, the availability of state-of-the-art scientific tools should be leveraged, since current modeling advancements allow for the simulation of complex hydrodynamic processes with extreme accuracy. Unfortunately, they require both expert knowledge and large computational resources for their execution, prohibiting their use in real-time risk assessments or in forecasting by emergency response managers. Acknowledging that this integration of high-accuracy models is necessary in the decision-making process, tools from statistical computing can be integrated, substituting the expensive simulator, while maintaining its high accuracy at a reduced computational cost. Such data-driven (surrogate) models are able to offer a more comprehensive risk assessment estimation, that can inform a range of actions: from real time evacuation efforts to the generation of localized highly detailed hazard maps, to even serving as input to numerical models that would quantify infrastructure response against such phenomena. Dr. Kyprioti will talk about her ongoing research involving storm surge time series predictions, the challenges, and problems that she has tackled tailoring and comparing machine learning approaches to be able to provide robust and accurate results for large domains of interest.

Bio

Dr. Aikaterini (Katerina) Kyprioti received her Bachelor degree (2014) in Civil Engineering with a minor on civil infrastructure, and her Master's (2016) in Earthquake Engineering from Aristotle University of Thessaloniki in Greece. She then moved to the States, and graduated in 2022 with a PhD in Civil Engineering and a Master's in Applied Mathematics and Statistics from the University of Notre Dame. She is currently an Assistant Professor in the School of Civil Engineering at the University of Oklahoma, leading her Natural Hazards Infrastructure Resilience Lab. She is the winner of the EMI student paper competition in both the Dynamics committee (2021) and the Probabilistic Methods committee (2020) and of the IASSAR Student Paper competition (2022) for her research projects. Her work focuses on integrating and adapting computational statistics in civil engineering applications with a particular interest on natural hazard risk mitigation and infrastructure resiliency. She has worked with numerous key agencies (NOAA, FEMA and USACE) on storm surge coastal hazard estimation, for both real-time forecasting and regional planning, using surrogate modeling to expedite the surge estimation.