Environmental and Water Resources Engineering Seminar Series Presents:

Thursday, February 15th 2024, 3:30-4:30pm, CPE 2.218

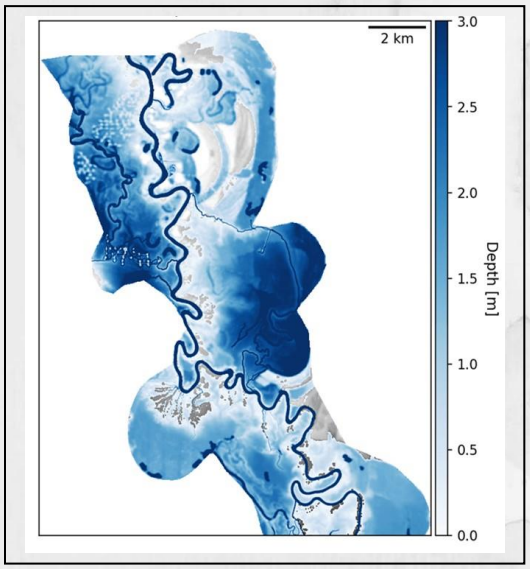
TEXAS

Topographic Controls on River-Floodplain Exchange and Residence Times

Nelson Tull

M.S. Civil Engineering North Carolina State University, 2018

Advisor: Dr. Paola Passalacqua



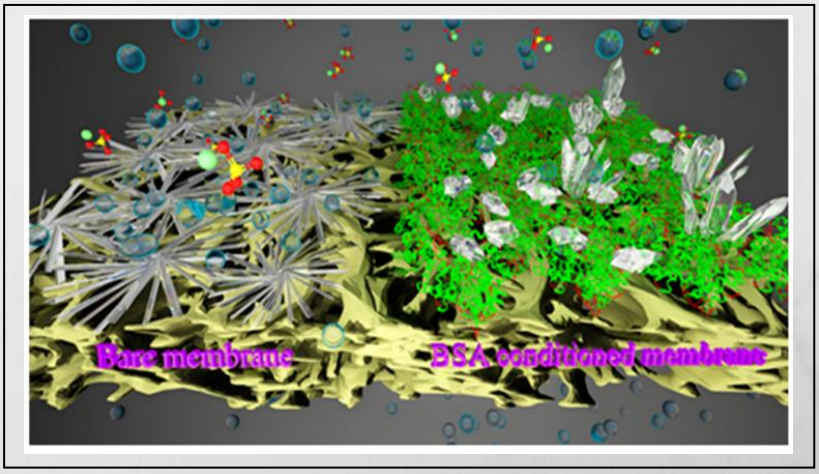
The topography of river floodplains is an important control on mass flux in and out of river channels, which impacts ecosystem services, flood attenuation, and sediment transport. We developed a numerical model for the Lower Trinity River in Texas to quantify how floodplain inundation and water residence times change as the river approaches the coast. We used a Lagrangian particle routing model to identify flow sources and pathways through the floodplain. Inundation volumes and particle fluxes across the river bank are controlled by topographic bluffs that constrict the floodplain. Residence times can be orders of magnitude longer for particles entering the floodplain far upstream of bluffs. Our results characterize the relationship between floodplain topography and flood hydraulics in coastal river systems.

Mechanistic Study of Polymer Coatings to Control Mineral Scaling During Desalination

Dr. Meng Wang

Ph.D. Environmental Engineering, University of Houston 2023

Advisor: Dr. Lynn Katz



Surface modifications are widely adopted to control interfacial scale formation. However, the underlying mechanisms for sulfate mineral scaling (i.e., gypsum) on surfaces containing biomolecules remain unclear. Our studies focused on gypsum scaling tests on bare and BSA-conditioned membranes. Mass, crystal growth orientation, and crystallinity of mineral precipitates on membranes, as well as their effects on membrane permeability, have been investigated. Different permeability decay behaviors of bare and BSA-conditioned membranes were attributed to differences in crystal growth orientations rather than amounts of gypsum precipitates. BSA-conditioned layers with high carboxylic density stabilize bassanite, hindering needle-like gypsum crystal formation observed on bare membranes and slowing down membrane flux decline.

EWRE Seminar Committee Members: Claire Baldus, Priyanshu Gupta, Elle Henson, Mila Otegui, Zijie Zheng
Supervising Faculty: Dr. Ben Hodges