Department of Civil Engineering

**FALL 2021 SEMINAR SERIES**


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**Monday, December 6, 1:00 – 1:55 PM, Frey Hall 309**

**ZOOM LINK:** Meeting ID: 950 8981 9867; Passcode: 860265
https://stonybrook.zoom.us/j/95089819867?pwd=NzdKQUJXU3J3NFN4VlpBUlp4bDFhUT09

# An efficient global sensitivity analysis method for a water-shale interaction model... or any model


## Abstract

In the past years I have been studying chemical reactions in shale during hydraulic fracturing. The experimental findings show that along the water flow pathways, there will be mineral reactions such as calcite dissolution, pyrite oxidation, iron oxide precipitation, and barite formation. A reactive transport model was constructed to simulate the intertwining contributions from flow and reactions, where tens of input parameters were adjusted to allow modeling calibration with experimental data. Like in many models, it has been questioned how would the uncertainty in each of the input parameters affect the uncertainty in the final modeling results. Here I will present a new method, the distance-based generalized sensitivity analysis (DGSA) method, for analyzing parameter sensitivities over the entire parameter space. This method can be adapted to sensitivity analyses of any model that requires multiple input parameters, with applications in both geosciences and engineering.


**About the Speaker:**

Dr. Qingyun Li joined the department of Geosciences at Stony Brook University in the Fall of 2021. She holds a bachelor's degree in environmental sciences from Peking University in 2011, and completed her PhD in Energy, Environmental and Chemical Engineering at Washington University in St. Louis in 2016. She applied her expertise to her postdoc study at Stanford University and SLAC National Accelerator Laboratory. At Stony Brook University, she will use experimental approaches, geochemical modeling, and synchrotron X-ray techniques to study water-rock interactions in energy and environmental applications, including geologic carbon sequestration to fight climate change and hydraulic fracturing to promote transition to cleaner energy. She is also exploring new research directions to serve local environmental remediation efforts.