

# UNIVERSITY of HOUSTON

## CULLEN COLLEGE of ENGINEERING

Department of Civil & Environmental Engineering

### CIVE 6111 Graduate Seminar

#### **Dr. Daniel Giammar**

Walter E. Browne Professor of Environmental Engineering  
Department of Energy, Environmental and Chemical Engineering  
Washington University in St. Louis

#### **Lead in drinking water: The role of water chemistry and reactions at the pipe scale-water interface**

**Friday, November 10, 2017**

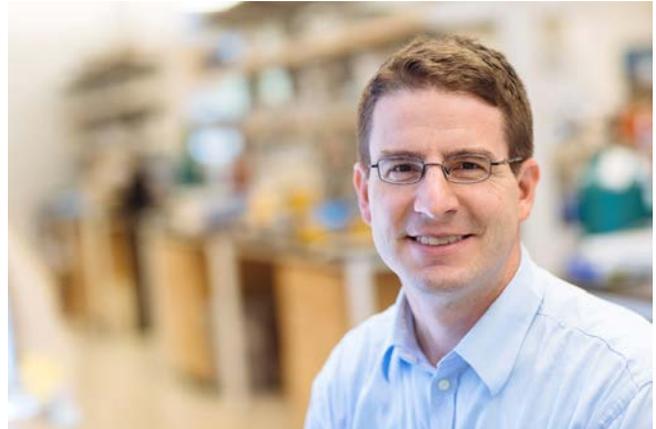
2:45PM-3:45PM

Classroom Business Building (CBB) Room 122

#### **Abstract**

Lead concentrations in tap water are influenced by reactions between lead pipes and the water in the distribution system. Of particular interest are oxidation-reduction reactions and reactions with phosphate added as a corrosion inhibitor. The formation and stability of lead(IV) oxide ( $\text{PbO}_2$ ), a low solubility solid that is only stable in the presence of free chlorine, is an example of the importance of oxidation-reduction reactions. Redox reactions are also relevant to the galvanic corrosion that can occur during partial lead service replacements. Addition of orthophosphate can control lead concentrations in tap water by promoting the formation of low-solubility lead phosphate solids. The ultimate effectiveness of orthophosphate addition for control of lead concentrations can depend on the composition, rates, and mechanisms of lead phosphate formation. The presentation will include data from laboratory-scale precipitation experiments and bench-scale pipe loop tests.

#### **About the Speaker:**



**Dr. Daniel Giammar** is the Walter E. Browne Professor of Environmental Engineering in the Department of Energy, Environmental and Chemical Engineering at Washington University in St. Louis. Professor Giammar's research focuses on chemical reactions that affect the fate and transport of heavy metals, radionuclides, and other inorganic constituents in natural and engineered aquatic systems. His recent work investigated the removal of arsenic and chromium from drinking water, control of the corrosion of lead pipes, geologic carbon sequestration, and biogeochemical processes for remediation of uranium-contaminated sites. His research has been sponsored by the National Science Foundation, Department of Energy, and Water Research Foundation. Professor Giammar is currently an Associate Editor of *Environmental Science & Technology*. Professor Giammar completed his B.S. at Carnegie Mellon University, M.S. and Ph.D. at Caltech, and postdoctoral training at Princeton University before joining Washington University in St. Louis in 2002. He is a registered professional engineer in the State of Missouri.