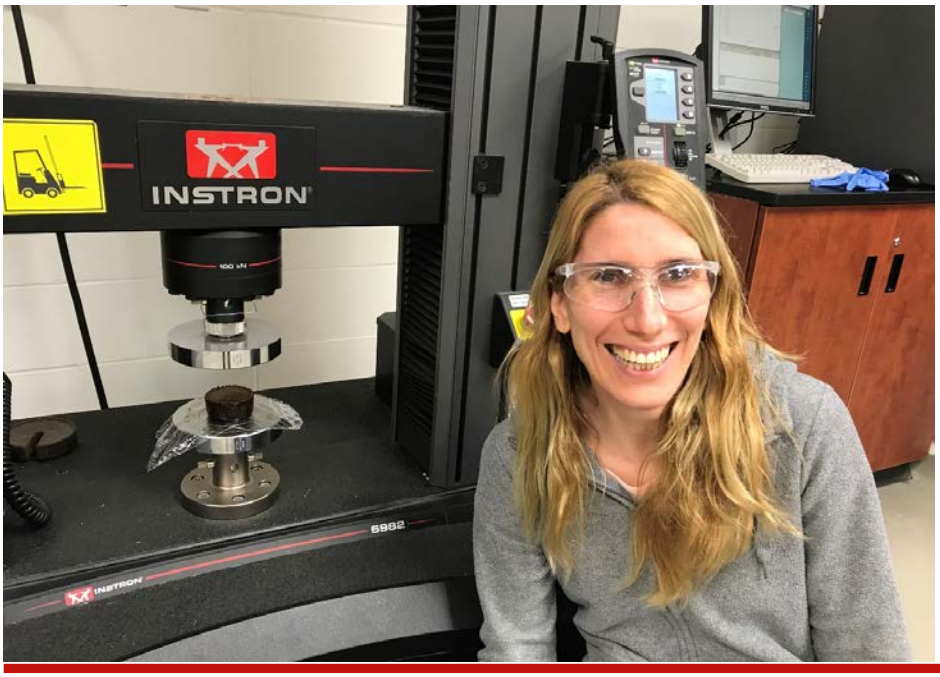

The UNIVERSITY CONSORTIUM

Dr. Erica Pensini

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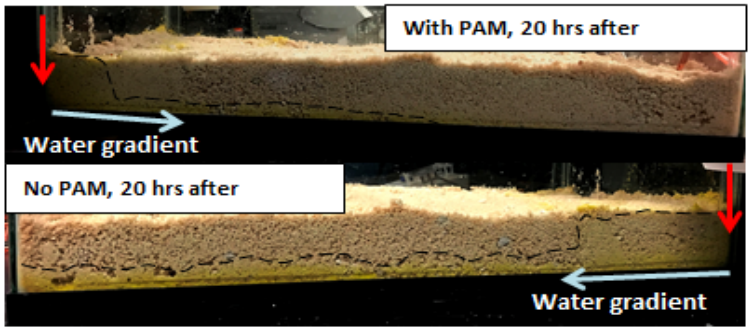
Dr. Pensini received her PhD in Philosophy, Chemical/Environmental Engineering from the University of Toronto. Her research interests are at the crossroads between the oil & gas, environmental and chemical engineering sectors. They encompass green process engineering, soil remediation, water treatment, colloid, polymer, emulsion and interface science. Dr. Pensini's research projects include:

Reactive Gels for Soil /Groundwater Remediation

The majority of the existing remediation technologies for soil and groundwater contamination do not allow simultaneously treating and immobilizing the contaminants, thus preventing their migration during the treatment. Our goal is to fill this gap by simultaneously immobilizing and treating subsurface contaminants. We are currently working on the development of reactive polymeric gels with tunable viscosity. The low viscosity of the gel in the clean zones facilitates its transport, while their high viscosity around the contaminated areas impedes contaminant migration. Reactive species embedded in the gel favour the degradation of the immobilized contaminants, allowing their remediation in situ.



Precision in Soil Remediation: Emulsions and Capsules for the Targeted Delivery of Reactive Species

Many in situ soil remediation technologies rely on adequate delivery of reactive species to the polluted zones and on the fact that the functionality of the reagents remains intact when they migrate in the subsurface. However, reactive species may undergo undesired reactions before the polluted zones are reached, losing their ability to degrade the contaminants. The scope of the project is to emulsify or encapsulate the reactive species to promote their migration in the clean zones and allow them to be released on demand in the contaminated areas.

Extraction of Perfluorooctane Sulfonate (PFOS) and Perfluorooctanesulfonic Acid (PFOA) from Groundwater

PFOS and PFOA are global contaminants listed in the EPA priority list of hazardous substances, and conventional, oxidative, reductive, and thermal methods are ineffective for their treatment. The goal of the project is to scavenge PFOS/PFOA from water by concentrating them onto liquid interfaces, and subsequently treat them using radiation or other technologies that cannot be utilized in situ.

Natural adsorbents for the removal of phosphorus from water

Fresh water bodies such as Lake Erie are threatened by high levels of phosphorus from agricultural fields. This project investigates the effectiveness of calcium-rich rocks in adsorbing phosphorus from agricultural drainage water collected in the ditches. The phosphorus adsorbed can be released from the rocks by adjusting the pH. Phosphorus desorption from the rocks allows to reuse the rocks as adsorbents and the phosphorus as fertilizer.

Selected Papers and Theses

Selected Publications

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