

Environmental and Water Resources Engineering Seminar Series Presents:

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

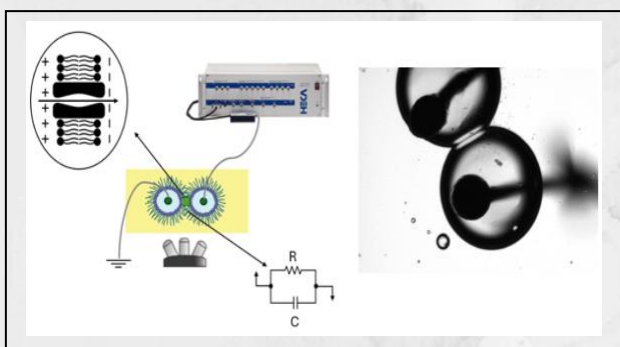


Sustainable Rare Earth Element Recovery Utilizing Bio-Inspired Materials

Claire Baldus

Bachelor of Science in Civil Engineering, Marquette University, 2022

Advisor: Dr. Manish Kumar and Dr. Charles Werth



The rare earth elements (REEs) consist of 17 transition metals, the lanthanide group, scandium, and yttrium. These elements possess unique chemical properties that make REEs useful in many technological applications. As a result, REEs have become critical materials in modern technology and renewable energy products. However, current extraction and separation methods of REEs are energy intensive and environmentally harmful. We aim to use droplet interface bilayer (DIB) model membranes to study lanthanide selectivity of a bacterial ion channel, gramicidin A. A single DIB resembles the structure of cellular membranes, whereas a network of DIBs resembles a tissue-like material. Using electrophysiological techniques, we characterize capacitive behavior and lanthanide ion transport through a ‘DIB tissue’.

Navigating the Waters in Remote Alaska: Current State and Challenges of Water Service

Rebecca Cantrell

Bachelor of Science in Civil Engineering, Purdue University, 2021

Advisor: Dr. Lina Sela

The Norton Sound region is home to 16 remote communities facing unique challenges and conditions that have negatively impacted drinking water services. Faced with (i) workforce challenges, such as untrained personnel and high turnover, (ii) economic challenges due to limited cash economy, (iii) environmental challenges of extreme weather conditions, and (iv) technical challenges such as limited power and telemetry communication, advanced monitoring technologies that facilitate operating water systems are unsuitable for these communities. This work aims to improve water service through a three-phase approach: (i) archival – digitizing technical information and documenting institutional knowledge; (ii) informational – developing a hydraulic model that can provide guidance on performance; (iii) operational – creating a decision-making tool coupling data and the hydraulic model to make operational decisions.

