

UNIVERSITY OF RHODE ISLAND

Department of Chemistry

Ph.D. Seminar

Room 105 Beupre

2:00 P.M., Friday, April 1, 2022

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***“Development of Selective SERS
Sensors and Signal Processing
Techniques for Nitrite Detection”***

HOST

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Development of Selective SERS Sensors and Signal Processing Techniques for Nitrite Detection

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Natural and anthropogenic activities in and around seawater can lead to changes in nitrogen levels that can be monitored to help assess the coastal ecosystem. Nitrogen in seawater is an important nutrient that supports algae and aquatic plant growth, which provides food for fish and other aquatic organisms. Excess levels of nitrogen from human-made processes like wastewater treatment, agricultural runoffs and industrial processes can cause algae to grow much faster than normal, disrupting the coastal ecosystem. Living and working in the Ocean State, developing detection and monitoring processes of nitrites has become a main goal of our lab group. Currently, nitrite assay kits are available commercially and utilize the colorimetric Griess reaction to determine the concentration of nitrite in a sample, mostly for field testing. We are exploring the use of Surface Enhanced Raman Spectroscopy (SERS) as a real-time nitrite monitoring system that can be used on a deployable buoy in Narragansett Bay. SERS is well known for its high sensitivity capabilities, and technological advances have made portable instrumentation possible for the use of SERS in the field. In this talk I hope to present advances we have made in the signal processing of SERS spectra and pre-treatment of SERS substrates to improve its detection capabilities. I will also touch upon the use of surface functionalization to improve the selectivity of SERS substrates for nitrite.