

**UNIVERSITY OF RHODE ISLAND**  
**Department of Chemistry**  
**SEMINAR**

**Room 105 Beupre Center**  
**2:00pm p.m., Friday, December 6, 2019**

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**URI**

***“Ultrasensitive Detection of Nitrite and Nitrate  
Through Implementation of N-(1-  
Naphthyl)ethylenediamine-Grafted Cellulose into  
a Paper-Based Microfluidic Device”***

**HOST**

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## **Ultrasensitive Detection of Nitrite and Nitrate Through Implementation of *N*-(1-Naphthyl)ethylenediamine-Grafted Cellulose into a Paper-Based Microfluidic Device**

There is high demand for affordable, robust, sensitive, selective, and user-friendly detection methods for nitrite and nitrate, nutrients which are harmful at high concentrations in both marine environments and physiological systems. A paper-based microfluidic device to meet these demands has been constructed, using *N*-(1-naphthyl)ethylenediamine-functionalized cellulose, and has resulted in nitrite detection limits in synthetic freshwater and real seawater of 0.26  $\mu\text{M}$  and 0.22  $\mu\text{M}$ , respectively. The incorporation of a solid-state nitrate reduction system into the device has allowed for a subtraction-free method for nitrate. Additionally, the sensor is efficient in a wide range of temperature, humidity, turbidity, and salinity conditions and was successfully used to detect nitrite in real water samples.