

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

**SEMINAR**

**Room 105 Beaupre**  
**3:00 p.m, Monday, Jan. 29, 2018**

***Prof. Malika Jeffres-EL***

***Department of Chemistry***  
***Boston University***  
***Cambridge, MA***

***"Design and Synthesis of  
Organic Semiconductors for  
Advanced Applications"***

**HOST**

***Robert Chevalier, Matthew Kieswetter***  
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***401-874-2619***

## ***Design and synthesis of organic semiconductors for advanced applications.***

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Since their discovery over 40 years ago conjugated polymers have been of tremendous scientific and technological interest. These materials possess many exceptional electronic, optical and thermal properties and thus are well suited for organic semiconducting applications, such as solar cells and light emitting diodes. Unfortunately, there are several issues that have to be addressed before real-life products can be developed. Our group focuses on the design and synthesis of both polymeric and molecular organic semiconductors based from low cost and/or easily prepared starting materials. Since the properties of these materials can be readily modified through chemical synthesis, we have turned our attention towards the design and synthesis of novel building blocks. Our system of choice, benzobisazoles have many exceptional electronic, optical and thermal properties and thus are ideally suited for diverse organic semiconducting applications. However, these materials have found limited utility due their lack of solubility in organic solvents and the harsh conditions required for their synthesis. Our group developed a mild approach for the synthesis of benzobisoxazoles resulting in several building blocks suitable for designing new materials. As a result, we have been able to prepare wide band gap materials for use in organic light-emitting diodes and narrow band gap materials for use in photovoltaic cells. We have also developed a versatile synthesis of benzodifuran, the oxygen analog of the popular electron rich building block benzodithiophene and are developing narrow band gap conjugated polymers based on it. Our work on the synthesis and properties and utility of these materials will be presented.

