

UNIVERSITY OF RHODE ISLAND
Department of Chemistry

SEMINAR

Room 105 Beupre
3:00 p.m, Monday, Dec. 4, 2017

Prof. Timothy Swager

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Cambridge, MA

"Molecular Electronics
for Chemical Sensors"

HOST

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Molecular Electronics for Chemical Sensors

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This lecture will detail the creation of ultrasensitive sensors based on electronically active conjugated polymers (CPs) and carbon nanotubes (CNTs). A central concept is that a single nano- or molecular-wire spanning between two electrodes would create an exceptional sensor if binding of a molecule of interest to it would block all electronic transport. The use of molecular electronic circuits to give signal gain is not limited to electrical transport and CP-based fluorescent sensors can provide ultratrace detection of chemical vapors via amplification resulting from exciton migration. Nanowire networks of CNTs provide for a practical approximation to the single nanowire scheme. These methods include abrasion deposition and selectivity is generated by covalent and/or non-covalent binding selectors/receptors to the carbon nanotubes. Sensors for a variety of materials and cross-reactive sensor arrays will be described. The use of carbon nanotube based gas sensors for the detection of ethylene and other gases relevant to agricultural and food production/storage/transportation are being specifically targeted and can be used to create systems that increase production, manage inventories, and minimize losses.

