

Research Associate - Chemistry, School of Arts &
Sciences
Tufts University

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Posted Apr. 28, 2022, set to expire Sep. 10, 2022

Job Title	Research Associate - Chemistry, School of Arts & Sciences
Department	Chemistry, School of Arts & Sciences
Institution	Tufts University Medford, Massachusetts
Date Posted	Apr. 28, 2022
Application Deadline	Open until filled
Position Start Date	Available immediately
Job Categories	Research Scientist/Associate
Academic Field(s)	Chemistry - General Chemistry - Organic
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Job Description

Overview

Organic Materials Chemistry Our group applies the philosophy of physical organic chemistry to organic materials, in the forms of polymers, crystals and surfaces. Specifically, we investigate new materials that show macroscopic changes in properties upon exposure to external stimuli. Our main focus has been new materials that respond to light, which has a unique combination of characteristics: i) easy control over where light goes and when it goes there (spatiotemporal control), ii) easy control over intensity and energy, and iii) the ability to pass through many solid materials that traditional chemical reagents cannot. Our research has focused in three separate areas. 1. Photochemical control of charge. As interactions between charges dictate much of molecular behavior, controlling charge can yield control over matter. We have developed a series of materials in which light switches the charge-based interactions between polymer chains from attractive. By combining this top-down fabrication

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approach of with the bottom-up fabrication method of layer-by-layer assembly, we have developed thin films in which photochemical lability is confined to individual nanoscale compartments, yielding photo-delaminated free-standing films and multi-height photolithography. 2. Using functional side chains to control conjugated materials. Conjugated materials hold great promise for applications including solar cells and displays. We have focused on expanding the role of the side-chains of these materials, which occupy up to half of their mass but are typically reserved only for solubility. Earlier work in our group focused on integrating photolabile side chains for negative conjugated photoresists. This has evolved to using the non-covalent interactions of aromatic side-chains for controlling interactions between molecules, and therefore their material properties, including the use of mechanical force to control luminescence—mechanofluorochromism. 3. Singlet-oxygen responsive materials. Singlet oxygen is a critical reactive oxygen species in photodynamic therapy for cancer as well as in damage to plants upon overexposure to light. Its photochemical production is also chemically amplified through a photochemical reaction, which is the lynchpin of several commercial bioanalytical technologies. Through a combination of fundamental physical organic chemistry and materials chemistry, we have luminescent conjugated polymer nanoparticles as probes for singlet oxygen in water that shows improved limit of detection over the commercially available luminescent probe.

What You'll Do

Work in collaboration with the senior investigator in the host laboratory. S/he works independently to participate in or lead a portion of a research project or projects. The research associate contributes ideas and suggestions to the research effort, operates independently and publishes papers in collaboration with the senior investigator. This individual may have other responsibilities in the laboratory such as supervision of staff, training of graduate students or postdoctoral fellows, grant proposal writing, writing papers, etc.

What We're Looking For

Basic Requirements:

Knowledge and skills as typically acquired by 3 years’ experience in postdoctoral research position     

PhD, MD, DVM, DDS, DMD or equivalent Doctoral degree    

An employee in this position must complete all appropriate background checks at the time of hire, promotion, or transfer.

Contact Information



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