Rice University

George R. Brown School of Engineering
Department of Chemical and
Biomolecular Engineering

Presents

Eilaf Egap, PhD

Assistant Professor

Department of Chemistry at Emory University and
the Wallace H. Coulter Department of Biomedical Engineering at
Georgia Institute of Technology and Emory University

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Molecular and Nanostructure Engineering of Polymer Semiconductors for Electronic and Optoelectronic Applications

Solution-processable conjugated polymer semiconductors are of significant fundamental and technological interest in flexible and printed electronics. The ability to engineer the electronic, photonic and magnetic properties and elucidate structure–property relationships is essential for developing novel materials, functions and device applications. Also of significant interest is the synthesis of zero–dimensional (0–D) and one–dimensional (1–D) nanostructures of organic semiconductors for exploration of the effects of carrier and exciton confinements as well as applications in electronic devices. In this seminar, I will present recent progress in materials design of organic and nanomaterials, factors that determine their self-assembly, elucidation of structure–property relationships that govern their electronic and optoelectronic properties. An extremely simple and an effective strategy to generate well-aligned arrays of 1-D polymer semiconductor nanowires that exhibit remarkable enhancement in charge transport and would enable high-performance, large-area, flexible electronic devices for a wide range of applications will be presented. I will also discuss our recent efforts in developing multicomponent photonic polymer nanoparticles (0D) and the engineering of excited states and spin-polarization of soft materials to understand and control the role of electron spin dynamics for potential application in magneto-optic and optoelectronic devices.

About the Speaker

Eilaf Egap is an Assistant Professor at the Department of Chemistry at Emory University and the Wallace H. Coulter Department of Biomedical Engineering at Georgia Institute of Technology and Emory University. She received her PhD degree from the University of Washington in 2011, where her worked focused on macromolecules for electronics and optoelectronics. She then moved to MIT as a postdoctoral fellow where she developed a new platform of multicomponent nanomaterials for diagnostics and imaging. Broadly, her group is interested in the molecular-engineering and self-assembly of functional soft materials with the goal of controlling and creating novel photonic, electronic, and magnetic properties to enable new forms of technologies.