

# Reaction Chemistry Meets Lithography

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This talk will focus on using reaction chemistry and self-assembly as a means to construct nanoscale electrical devices. Through these studies we are developing molecular-based materials that forge a connection (both literally and figuratively) between the ultra-fine lithographic tools of the semiconductor industry and reaction chemistry that has largely driven the chemical and pharmaceutical industries. The meeting of these seemingly disparate fields is the nanometer length-scale, which holds the future for molecular electronics. At these length-scales the interfacial properties dominate. The chemistry at the interfaces pertinent to electrical devices is poorly understood. The concepts outlined in this presentation reveal how informationally rich molecules may be programmed for placement, assembly, and functionality in electrical circuits. The studies draw from a combination of device fabrication, self-assembly, and programmed reactivity to allow the study of individual molecules, isolated nanostructures, and chemical reactions. Three main topics will be: 1) Interfacial self-assembly of  $\pi$ -systems; 2) designing functional metal-molecule interfaces; 3) synthesizing single-molecule devices.