The Rise of Organic Photonics and Electronics

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Printed organic electronics, a technology based on carbon-based semiconductors that can be processed into thin films using conventional coating and printing techniques, has been the subject of active research over the past decades. Due to their ability to be processed at low temperature, over large areas, at low cost, carbon-based semiconductors can lead to a new generation of energy-efficient products using energy-efficient manufacturing approaches. While the organic semiconductor layer plays a central role, the interfaces that are formed between the organic semiconducting layer and adjacent oxide layers or electrodes are also very critical and often determine the overall electrical performance of the device.

In this talk, we will discuss recent progress in a range of solid-state devices, including organic light-emitting diodes (OLEDs), organic field-effect transistors (OFETs), sensors, organic solar cells, and photodetectors. We will present strategies to modify and stabilize the electronic properties of interfaces that can yield devices with improved performance and longer lifetime. Examples of recent studies to reduce the environmental footprint of this emerging technology will be provided. We will show that these advances can lead to disruptive innovations to address some of the world’s greatest challenges.

Biography:
Bernard Kippelen is the Joseph M. Pettit Professor at the School of Electrical and Computer Engineering at the Georgia Institute of Technology, located in Atlanta, GA, USA. His research interests range from the investigation of fundamental physical processes (nonlinear optical activity, charge transport, light harvesting and emission) in organic-based nanostructured thin films, to the design, fabrication and testing of light-weight flexible optoelectronic devices based on hybrid printable materials. He serves as co-President of the Institut Lafayette (Metz, France), and as Director of the Center for Organic Photonics and Electronics (Atlanta, USA). He is a Fellow of the Optical Society of America (2006), and a Fellow of SPIE (2007).