Seminar Announcement

Wednesday, March 8, 2017
10:00 am – 11:00 am
CHTM

Tooling and Ink Design for High Speed Gravure Printing of Nanomaterials

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Abstract:

Printed electronics is a growing field of research that uses scalable, additive processing to pattern functional materials on a variety of substrates (plastic, glass, paper, etc.). The exciting advantages of this approach include the ability to integrate various thin film devices and materials over large areas, and onto flexible substrates. Among many techniques, gravure printing offers superior resolution (< 5 μm) and high throughput (> 1 m/s) –advantages that make it an industrially proven, high-volume manufacturing technology used in the graphic arts. The scope of gravure printed electronics has largely been dominated by materials whose lower performance severely limited applications. However, printed electronics need not be limited to cheap or disposable systems. With high-resolution printing and high-performance materials, we can imagine devices such as low-power sensors or flexible displays, which are distinguished by their exceptional functionality and form-factor. In the Printed Electronics Group at UC Berkeley, we have worked to understand the governing fluid mechanics of gravure printing, design 0D and 1D nanomaterial inks to enable printing of high-quality devices, and develop new tools and processes for high-speed patterning. This seminar will also discuss our recent work in which we applied that knowledge about the physics of gravure printing to design and construct a laboratory scale sheet-fed gravure printer for high speed nanomaterial printing with high registration accuracy. By decoupling each of the subprocesses of gravure in this new tool, we are then able to develop a greater understanding of the ink transfer, doctoring, and filling of nanomaterial inks.