# High-resolution Inkjet and 3D Printing

**Speaker**: **Yang Gou** - University of CT, Storrs, CT

E-Mail: yangguo0603@gmail.com

## Abstract

Inkjet printing and 3D printing are common additive manufacturing methods for rapid prototyping and flexible electronics fabrication. Inkjet printing is capable of depositing a wide range of materials, such as metallic and carbon particles, polymers, and ceramics, to fabricate flexible electronics and 3-D objects. Inkjet printing is typically characterized by high shear rate (> 104 s-1), short residence time (5 – 250 μs), and high actuation frequencies (~ 20 kHz) that are orders of magnitude larger than what is accessible using conventional rheometers (~15 Hz). In this poster, we will present the development of a stroboscopic imaging platform coupled with a custom-built print chamber. We have combined the imaging platform with digital imaging to investigate the drop formation of fluids containing carbon nanotubes (CNTs) - rolled graphene cylinders with a diameter of ca. 150 nm and an aspect ratio exceeding 40. Of particular interest is how the inclusion of CNTs with different states of aggregation affects the classical Plateau-Rayleigh instability, which further influences the jet breakup and drop size distribution. CNT/polylactic acid composites were fabricated using fused deposition modeling (FDM). We studied the structure-property relationship of the 3D-printed nano-composites using digital image correlation (DIC). The findings of the research may have broader impact in understanding the resolution and printing high-aspect ratio nanoparticles, such as CNTs.