

The main focus of my research is the development of novel patterning methods, which are compatible with a large variety of materials (i.e. materials useful as electrodes, photolithography masks, etc.) and substrates of variable topography (i.e. curved surfaces). Currently, I am interested in a few different patterning schemes, the most exciting of which involve:

- manipulation of grey-scale effects achieved by using patterned PDMS (polydimethylsiloxane) as a flexible photomask
- integration of non-traditional soft lithographic materials (materials other than PDMS) into a system which achieves high fidelity patterns

I am also currently involved in a project focusing on quantitative and theoretical understanding of rate-dependent delamination. Rate dependent delamination controls switching between adhesion and release of solid objects to and from an elastomeric (PDMS) stamp; this is useful for transfer printing applications (so called “pick-up and place” technology). By understanding relevant parameters (such as critical velocity and stamp modulus), it should be possible to achieve more precise control of the switching between adhesion and release of patterned metal films to and from an elastomeric stamp. This project focuses on experimental and theoretical studies for more complete understanding of this kinetic control.