



ILLINOIS

UNIVERSITY OF ILLINOIS AT URBANA-CHAMPAIGN

Postdoctoral position(s) at the University of Illinois at Urbana-Champaign
Experimental physical/materials chemistry/physics/mechanical/chemical/aerospace engineering
Contact: Professor Dana Dlott, dlott@illinois.edu

The Dlott laboratory at the University of Illinois (UIUC) needs talented postdoctoral researchers in experimental physical chemistry, physics, mechanical engineering or aerospace engineering. The Dlott group has pioneered new experimental methods that use a pulsed laser to launch small hypervelocity (0-6 km/s or 0-Mach 20) projectiles to study hypervelocity impacts with very high time and space resolution. The primary areas of interest are materials under extreme conditions (defined as pressures up to 50 GPa and temperatures up to 6000K), energetic materials and materials for hypersonic and space vehicles.

This is interdisciplinary interest that will appeal to, and advance the careers of researchers in several disciplines:

A. Physical chemistry and chemical engineering: develop a deeper understanding of chemical transformations of organic and inorganic materials under extreme conditions. Develop new tools to study matter in extreme states.

B. Physics: Materials in extreme conditions can undergo metallization where bonding electrons become free conduction electrons and new types of material transformations can occur. Develop new tools for remote temperature measurement and better understanding of thermal processes under extreme conditions. Develop systems using pulsed lasers to launch hypervelocity materials using nonlinear light-material interactions.

C. Mechanical engineering: Study energetic material detonations. Understand the coupling between high-velocity flow and chemical reactivity. Fundamental studies of interactions of shock waves with fuel droplets for pulsed-detonation engines that are more efficient and operate at higher velocities than typical combustion engines. Develop methods to control and focus the effects of detonation to develop microdetonation devices and improved ways of inducing high-strain rate processes in metals, especially complex high-entropy alloys and energetic composites.

D. Aero and astro engineering: A tabletop source of hypervelocity projectiles is a versatile tool to study processes relevant to high-velocity impacts. Interactions of hypervelocity projectiles with atmospheric dust and water for hypersonic missile development. Fundamental understanding of materials during orbital velocity impacts or astroidal impacts.

More information about research opportunities in the Dlott group is available at <https://dlottgroup.web.illinois.edu/>, and the link "Jobs" at the top of the page. Links are also provided to recent research publications.

Recent PhDs or those anticipating PhD degrees in the near future are encouraged to apply. This position is primarily experimental, so researchers with a primary focus on theoretical studies need not apply. Please send current CV to dlott@illinois.edu. If there is mutual interest in your application we will request 3 current letters of recommendation and a Zoom interview.