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# Department of Chemistry Bryce L. Crawford Lectureship

## Professor Dana Dlott

Department of Chemistry  
University of Illinois at Urbana-Champaign

Website:

[http://www.chemistry.illinois.edu/faculty/Dana\\_Dlott.html](http://www.chemistry.illinois.edu/faculty/Dana_Dlott.html)

Faculty Host: Professor Aaron Massari

Professor Dana Dlott was born in Los Angeles, CA, but grew up in the Midwest in Ohio and Indiana. He majored in chemistry at Columbia University and did undergraduate research with the late Professor Richard Bersohn in the field of protein dynamics. In 1974, he entered Stanford University, and he received his doctorate under the direction of Professor Michael D. Fayer. At Stanford, he was exposed to the latest in ultrafast laser technology in the laboratory of Professor Anthony Siegman and used picosecond lasers to measure the rates of electronic energy transfer in molecular crystals. After graduation in 1979, he took a faculty position at the University of Illinois and he is currently the William H. and Janet G. Lycan Professor of Chemistry.



His diverse research interests revolve around the uses of advanced forms of vibrational spectroscopy applied to problems that include shock waves and energetic materials, spectroelectrochemistry and single-molecule spectroscopy.

## *Materials Chemistry Under Extreme Conditions*

**9:45 a.m.**

**Thursday, April 2, 2015**

**331 Smith Hall**

Chemistry under extreme conditions of high temperature and pressure represents a forefront of chemical reactivity investigations and has many applications, such as understanding energetic materials (explosives), violent processes involving high speed impacts, oil and fracking chemistry deep underground, biochemistry of extreme life forms, catalysis, etc. We have developed a unique method for this field of study where a Nd:YAG laser propels a tiny plate of metal foil at a sample while other lasers probe its state. For instance, a 2 km/s impact with this mini flyer plate would produce a shock wave with 10 GPa (100,000 bar) pressure and 600K temperature jump within one nanosecond. The laser flyer technique has been highly developed and it is routine now. There is unlimited potential with this technique to study chemical processes for the next several decades.

In this talk, I will describe our recent investigations of single molecules under high pressure, and the use of fluorescent probes of shock-compressed materials to monitor spatially-varying pressures, temperatures and compositions with high time and space resolution.

**Bryce L. Crawford Jr.** was a renowned Department of Chemistry professor and scientist. He died in September 2011, at the age of 96. He joined the department in 1940, and became a full professor of physical chemistry in 1946. He was chair of the department from 1955 to 1960, and was dean of the graduate school from 1960 to 1972. He retired in 1985. He loved studying molecular vibrations and force constants, and the experimental side of molecular spectroscopy and molecular structure. During World War II, Crawford worked in research on rocket propellants, making significant contributions to rocketry, and the development of solid propellants for the much larger rockets that evolved after the war. Crawford received many honors during his career, including the prestigious American Chemical Society Priestley Medal; and being named a Fellow of the Society for Applied Spectroscopy, a Guggenheim Fellow at the California Institute of Technology, and a Fulbright Fellow at Oxford University. He held the distinction of membership in three honorary science academies, and was actively involved in many professional associations.

