

The Department of Mechanical Engineering
College of Engineering and Applied Sciences State University of New
York at Stony Brook

Mechanical Engineering Distinguished Lecture Series



Prof. Rodney Clifton

Lecture Title: Mechanics of Materials at Nanosecond Time Scales

2:00PM, Friday, February 21, 2003, room 301 Engineering

Dr. Rodney J. Clifton is the Hawkins University Professor and Dean of the School of Engineering of Brown University. He is the author or co-author of more than 150 papers in solid mechanics and the mechanical behavior of materials. He has been awarded the Prager Medal of the Society of Engineering Science, the Melville Medal (with K.-S. Kim) of the American Society of Mechanical Engineering, the Murray Medal of the Society for Experimental Mechanics, and the Distinguished Alumnus Award of Carnegie Mellon University. **He is a member of the National Academy of Engineering.**

Abstract

Much attention has been given recently to improving the understanding of the mechanical response of materials at submicron length scales. Much less attention has been given to the time dependence of mechanisms that are operative at these length scales. Examples of these mechanisms include high-speed dislocation motion, martensitic phase transformations, dynamic crack propagation, and dynamic friction. Because effects of inertia are inherent in the investigation of such mechanisms, the most attractive experimental approaches involve stress waves in relatively simple geometries so that the stress wave propagation problem can be analyzed with as few approximations as possible. The simplest stress wave propagation problem is that of plane waves in an unbounded medium. For this reason our lab has made extensive use of pressure-shear plate impact configurations to produce plane waves with nanosecond risetimes, and laser interferometry to monitor the rear surface motions of the impacted plates with comparable time resolution. The results of several of these experiments will be described along with the modeling efforts that have been used to interpret the results.

Previous Distinguished Lectures: The Taguchi Method and Quality Engineering by Genichi Taguchi, October 11, 2002

By Car

From New York City, take the Long Island Expressway (LIE, I-495) eastbound from the Queens Midtown Tunnel in Manhattan or the Throgs Neck Bridge or Whitestone Bridge in Queens to exit 62, and follow Nicolls Road (Route 97) north for 9 miles. The main entrance to the University is on the left.

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