

MECHANICAL AND AEROSPACE ENGINEERING SEMINAR  
UNIVERSITY OF VIRGINIA, CHARLOTTESVILLE, VA

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**G. Paul Neitzel**

**George W. Woodruff School of Mechanical Engineering, Georgia Tech**

**Time:** Thursday May 3, 2007, 2PM

**Place:** MEC 339, Mechanical Engineering Building

Refreshments at 1:30 PM in MAE Faculty Lounge, MEC 305

**Permanent Noncoalescence and Nonwetting:  
Science and Applications**

Under the proper conditions it is possible to press together two drops of the same liquid without experiencing coalescence or to press a liquid droplet against a surface normally wetted by the liquid without wetting occurring. By permanent noncoalescence and nonwetting we distinguish cases in which the phenomena may be observed for unlimited time from transient examples such as two drops of liquid bouncing off one another or a liquid droplet bouncing off a solid wall. To achieve permanent noncoalescence or nonwetting, a mechanism is needed for establishing a lubricating film of surrounding fluid (usually air) and sustaining this film as the liquid/liquid or solid/liquid surfaces are moved toward each other.

This talk will address means for the establishment of such lubricating films and discuss measurements and theory conducted to understand the behavior of such systems. Finally, possible applications of permanent noncoalescence and nonwetting will be described, including a demonstration of levitation of a droplet above a solid surface using non-contact, optical methods.

**G. Paul Neitzel** has been a Professor in The George W. Woodruff School of Mechanical Engineering at the Georgia Institute of Technology since 1990. Prior to that, he served for eleven years on the faculty of the Department of Mechanical and Aerospace Engineering at Arizona State University and worked ten years at the U.S. Army Ballistic Research Laboratory, during which time he received his Ph.D. in fluid mechanics from The Johns Hopkins University. He has conducted research on the hydrodynamic stability of unsteady swirling flows and flows associated with materials processing, vortex breakdown, suppression of coalescence/wetting and bioreactor fluid dynamics. He is a Fellow of the American Physical Society and the American Society of Mechanical Engineers, an Associate Fellow of the American Institute of Aeronautics and Astronautics and the recipient of a National Science Foundation Presidential Young Investigator Award and an Alexander von Humboldt Fellowship. He has served as a visiting professor at the *Universität Karlsruhe* (Germany), Imperial College of Science and Technology (London) and the *Université d'Aix-Marseille II* and a visiting scientist at *Forschungszentrum Karlsruhe* (Germany).