

UNIVERSITY OF TEXAS AT DALLAS  
**OFFICE OF VICE-PRESIDENT FOR RESEARCH AND GRADUATE EDUCATION**  
**SCHOOL OF NATURAL SCIENCES AND MATHEMATICS**  
**DEPARTMENT OF PHYSICS**  
**COLLOQUIUM**

<http://www.utdallas.edu/dept/physics/colloquia1.htm>

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Wednesday, November 9, 2005; TI Auditorium, ECSS 2.102  
Reception: 6:00-6:30, Presentation: 6:30-7:30 PM

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**MULTIFUNCTIONAL CARBON NANOTUBE YARNS  
AND TEXTILES FOR FUN AND PROFIT**

*ARTIFICIAL MUSCLE, ELECTRONIC TEXTILE, ENERGY STORAGE AND HARVESTING,  
DISPLAY, ELECTRON EMISSION, AND OTHER APPLICATIONS*

**Professor Ray Baughman**

*NanoTech Institute, University of Texas at Dallas*

We describe novel methods for producing polymer-free carbon nanotube yarns and sheets (self-assembled textiles), and describe their application as multifunctional materials. These fabrication methods are conducted at room temperature in the solid state for multi-walled carbon nanotubes, which are much cheaper to produce than our previously used single-walled carbon nanotube fibers. The yarns have a maximum failure strength of above 460 MPa (850 MPa after polymer infiltration), they are highly resistant to creep and to knot or abrasion-induced failure, and they provide a giant Poisson's ratio for stretch in the fiber direction. The nanotube textiles have higher gravimetric strength than the strongest steel sheet or the polymers used for ultralight air vehicles and proposed for solar sails. Applications evaluations are described for artificial muscles, thermal and light harvesting, energy storage, field-emission electron sources, electrically conducting appliqués, three types of lamps and displays, and sensors.

**About the speaker:** Dr. Baughman is the Robert A. Welch Professor of Chemistry and Director of the NanoTech Institute of UTD. He received Ph.D. in the Materials Science area from Harvard University. Before joining UTD in 2001 he was a Corporate Fellow of Honeywell/AlliedSignal. Dr. Baughman's interests cover various aspects of science, technology and applications of materials with novel mechanical, electrical, optical, and magnetic properties. He is a Fellow of the American Physical Society and the American Institute of Chemists.