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2009 : May 2009 - New Hot Papers : Jian Wu

## NEW HOT PAPERS - 2009

May 2009



Jian Wu talks with *ScienceWatch.com* and answers a few questions about this month's New Hot Paper in the field of Engineering.



**Article Title: An atomistic-based finite-deformation shell theory for single-wall carbon nanotubes**

Authors: Wu, J;Hwang, KC;Huang, Y

Journal: J MECH PHYS SOLIDS

Volume: 56

Issue: 1

Page: 279-292

Year: JAN 2008

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### SW: Why do you think your paper is highly cited?

The paper is highly cited because it establishes, for the first time, a finite-deformation continuum shell theory for single-walled carbon nanotubes directly from the interatomic potential and carbon nanotube structure. The method is efficient and robust, and can also be applied to other nano-structured materials such as nanowires.

### SW: Does it describe a new discovery, methodology, or synthesis of knowledge?

It describes a new theory for carbon nanotubes as well as a new method linking atomistic and continuum analyses of nano-structured materials.

### SW: Would you summarize the significance of your paper in layman's terms?

Carbon nanotubes possess superior properties, such as high thermal conductivity, elastic stiffness, mechanical strength, and low mass density. They have a wide range of potential applications in engineering, but this requires a continuum theory to bridge the gap between carbon nanotubes and technology development. We have developed a continuum shell theory for carbon nanotubes in order to bridge this gap.

### SW: How did you become involved in this research, and were there any problems along the way?

**Nanotechnology** has been an important research topic since early 2000. I was determined to contribute to this important field, particularly using carbon nanotubes in engineering applications. I soon realized that widely used atomistic simulations have many limitations, and decided to develop a continuum theory for carbon nanotubes. The main challenge was to establish the continuum theory directly from the interatomic potential so that it has the same accuracy as atomistic simulations but overcomes their limitations.

### SW: Where do you see your research leading in the future?

It will help to boost the use of carbon nanotubes and other nano-structured materials in the field of engineering.

**SW: Do you foresee any social or political implications for your research?**

It provides an efficient and robust method to apply nanotechnology to our daily lives.

**Dr. Jian Wu**

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KEYWORDS: CARBON NANOTUBE; INTERATOMIC POTENTIAL; CONSTITUTIVE MODEL; BENDING; CURVATURE.

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