



## Dr. Judy Wood Engineering Mechanics

### Assistant Professor

PhD, Virginia Tech, 1992  
MS, Virginia Tech, 1983  
BS, Virginia Tech, 1981

### Teaching Interests:

statics, structures and solid mechanics, experimental stress analysis

### Research Interests:

Experimental stress analysis, optical methods of deformation analysis, moiré interferometry, biomaterials, composite materials, micromechanics, bimaterial interfaces.

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*Judy D. Wood* joined the Department in 1999 after 3 years of post-doctoral research at Virginia Tech. She is a member of the Society for Experimental Mechanics (SEM), IADR (International Association for Dental Research), and the Academy of Dental Materials. She currently serves on the SEM Composite Materials Technical Division Committee and has organized a symposium on Biocomposites for the 2001 Annual SEM Conference.

Dr. Wood and her students are investigating the deformation behavior of materials with complex geometries and complex material properties, such as fiber-reinforced composite materials and biological materials. Dr. Wood's area of expertise is moiré interferometry, a full-field optical method that produces contour maps of in-plane displacements. Experimental measurements are used to complement numerical and analytical solutions.

### Research Topics:

**Structure-Property Relationship of Biological Materials:** Experimental measurements and development of numerical models of biological structures. Investigating the structure-property relationship of biological materials and material interfaces. Improved understanding of these complex and optimized material systems will help to improve the design of man-made structures and interfaces.

**Finite Element Models of Bimaterial interfaces:** I am interested in modeling non-linear and/or non-homogeneous properties near interfaces in biological materials. Natural interfaces in biological materials are optimized designs. Developing models of these interfaces will enhance understanding for improving the design of man-made interfaces.

**Deformation Analysis of Structures:** Full-field displacement measurements are obtained by optical methods to study the surface deformations of a material or the relative displacement of two points. The deformations may be caused by residual stresses, thermal stresses, fatigue cycling or manufacturing defects.

**Composite Materials:** Optical methods can be used to analyze slippage between fiber and matrix, delamination detection, residual stresses, thermal stresses, long-term effects of aging and moisture as well as characterization of overall laminate performance.

### Selected Publications:

Wood, J. D., R. Z. Wang, S. Weiner and D. H. Pashley, "Mapping of deformation caused by moisture change using moiré interferometry," *Dental Materials* (submitted for review, Feb. 2001).

Vergheese, K. N. E., M. D. Hayes, K. Garcia, C. Carrier, J. Wood, J. R. Riffle and J. J. Lesko, "Influence of Matrix Chemistry on the Short Term, Hydrothermal Aging of Vinyl Ester Matrix and Composites Under Both Isothermal and Thermal Spiking Conditions," *Journal of Composite Materials (USA) Vol. 33. (no.20)*, pp.1918-1938 (July 1999).

Post, D., J. D. Wood, B. Han, V. J. Parks, and F. P. Gerstle, Jr., "Thermal Stresses in a Bimaterial Joint: An Experimental Analysis," *ASME J. of Applied Mechanics*, Vol. 61, (no. 1), pp. 192-198 (March 1994).

Wood, J. D., "Detection of Delamination Onset in a Composite Laminate Using Moiré Interferometry," *Composites Technology and Research*, Vol. 7, no. 4, pp. 121-128 (Winter 1985).