



TEXAS TECH UNIVERSITY
Department of Mechanical Engineering

ON NONLOCAL AND STRAIN GRADIENT EFFECTS IN CONTINUUM THEORIES OF STRUCTURES

Dr. J.N. Reddy

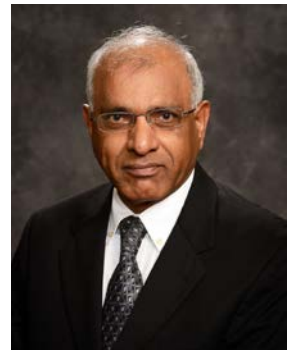
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Abstract: The lecture deals with the authors' recent research on nonlocal elasticity and modified couple stress/strain gradient theories in formulating the governing equations of functionally graded material beams and plates [1, 2]. Two different nonlinear gradient elasticity theories that account for geometric nonlinearity and microstructure-dependent size effects are revisited to establish the connection between the modified couple stress theory of Mindlin and the strain gradient theory of Srinivasa-Reddy. In addition, Eringen's nonlocal models and discrete peridynamics ideas will also be discussed.

References:

1. Parisa Khodabakhshi and J.N. Reddy, "A Unified Integro-Differential Nonlocal Model," *International Journal of Engineering Science*, Vol. 95, pp. 60-75, 2015.
2. C.W. Lim, G. Zhang, and J.N. Reddy, "A higher-order nonlocal elasticity and strain gradient theory and its applications in wave propagation," *Journal of the Mechanics and Physics of Solids*, Vol. 78, pp. 298-313, 2015.

Bio: Dr. Reddy is a Distinguished Professor, Regents' Professor, and inaugural holder of the Oscar S. Wyatt Endowed Chair in Mechanical Engineering at Texas A&M University, College Station, Texas. Dr. Reddy earned a Ph.D. in Engineering Mechanics in 1974 from University of Alabama in Huntsville and worked as a Post-Doctoral Fellow in Texas Institute for Computational Mechanics at the University of Texas at Austin, Research Scientist for Lockheed Missiles and Space Company, Huntsville, during 1974-75, and taught at the University of Oklahoma from 1975 to 1980, Virginia Tech from 1980 to 1992, and Texas A&M University from 1992 till now.



Dr. Reddy is the author of numerous journal papers and several well-received textbooks in the area of composite materials and structures, variational methods, plates and shells, and linear and nonlinear finite elements. He has delivered over 138 plenary, keynote, or general invited lectures at international conferences and institutions; taught over 99 short courses on finite elements, composite materials, and nonlocal structural theories. Professor Reddy advised 33 postdoctoral fellows and research visitors and about 105 graduate theses.

Dr. Reddy's research is concerned with the development of higher-order theories of plates and shells and extensions and applications of the finite element method to a broad range encompassing composite structures, numerical heat transfer, computational fluid dynamics, and more recently to biology and medicine. His shear deformation plate and shell theories and their finite element models and penalty finite element models of fluid flows have been implemented into commercial finite element computer programs like ABAQUS, NISA, and HyperXtrude. Dr. Reddy is one of the original top 100 ISI Highly Cited Researchers in Engineering around world with over 17,300 citations (average citations of over 35 per paper) with h-index of over 63 as per Web of Science; as per Google Scholar the number of citations of nearly 40,000 with h-index of 83 and i10-index of 369

(i.e., 369 papers are cited at least 10 times). Recently, Dr. Reddy was elected as a Member of the prestigious US National Academy of Engineering for “contributions to composite structures and to engineering education and practice” and a Foreign Fellow of the Indian National Academy of Engineering; he was also inducted into the Hall of Fame of the College of Engineering, Architecture, and Technology at Oklahoma State University. A more complete resume with links to journal papers can be found at <http://isihighlycited.com/> and <http://www.tamu.edu/acml>.

Monday, November 9, 2015
Livermore Center 101 | 2:00 – 3:00 pm
Coordinator: Dr. Beibei Ren (beibei.ren@ttu.edu)