Professor Rakesh Kapania

See:
http://www.aoe.vt.edu/people/faculty/rkapania.html
http://www.unmanned.vt.edu/people/affiliate/kapania.html
http://www.mii.vt.edu/Personnel/Kapania.html
http://m.esm.vt.edu/people/affiliate/rkapania/rkapania-bio.html

http://www.worldcat.org/identities/np-kapania,%20rakesh%20k
http://journalogy.net/Author/12817772/rakesh-k-kapania
http://www.zoominfo.com/#!search/profile/person?personId=216294887&targetid=profile
http://www.esm.vt.edu/news/articles/2009/news-article-2009-03-02-226.html

Department of Aerospace Engineering
Virginia Tech College of Engineering
Norris and Laura Mitchell Professor of Aerospace Engineering

Education:
Ph.D., 1985, School of Aeronautics and Astronautics, Purdue University
M.S., 1979, Department of Aeronautical Engineering, Indian Institute of Science, Bangalore, India
B.S., 1977, Department of Aeronautical Engineering, Punjab Engineering College, Chandigarh, India

Research Expertise: Structures and Materials

Professional History:
2008-Present Norris and Laura Mitchell Professor of Aerospace Engineering, Aerospace and Ocean Engineering, Virginia Polytechnic Institute and State University
1994-2008, Professor, Department of Aerospace and Ocean Engineering, Virginia Polytechnic Institute and State University;
1996, Boeing Welliver Faculty Fellow;
1990-1994, Associate Professor,
1985-1990, Assistant Professor: Department of Aerospace and Ocean Engineering, Virginia Polytechnic Institute and State University.

Awards and Honors:
2007- Associate Editor, AIAA Journal;
2000 Dean's Award for excellence in Research;
1994-1997 Associate Editor, the AIAA Journal;
1996 Boeing Welliver Fellow

Professional Leadership:
AOE Undergraduate Curriculum Review Committee, AOE Computer Committee, 1996-1997 President of Executive Committee of Engineering Faculty Organization, Judicial Panel of Graduate Honor System, Virginia Polytechnic Institute and State University; Editor of MADFLYER; 1985 NASA-ASEE Summer Faculty Fellow; Technical Committee on Stability, Technical Committee on Metallic and Composite Structure, & Technical Committee on Computational Mechanics, ASCE; Technical Committee on Structures, (1995-1997) Associate Editor of AIAA Journal, AIAA; Editorial Board, Composites Engineering--An International Journal; Committee on Composites in Infrastructure, ICCE; Technical Editor, AOE Library Representative, Applied Mechanics Reviews.
Research Interests

Finite Element Analysis of Nonlinear Analysis of Plates and Shells:
While there are many shell finite element available for shell structural analysis there are problems with using these elements for nonlinear analysis. The research is concerned with the development and application of high

accuracy shell finite element geometrically nonlinear (large displacement, large rotation) analysis of plates and shells including buckling, postbuckling and nonlinear vibrations. Research also involves panel flutter and aerolastic tailoring of laminated beams and plates, and nonlinear transient analysis (including wave propagation) of laminated plates and shells, equivalent plate models for efficiently analyzing wing structures, and continuum models of built-up structures using neural networks.

Shape Sensitivity Analysis of Aerolastic Response:
Research is concerned with determining the sensitivity of various aerolastic responses such as divergence, flutter, aerolastic lift distribution and control effectiveness to small perturbations in the shape parameters of the wing. The wing parameters of interest are sweep, aspect ratio, taper ratio, wing surface area, and the root angle of attack. Emphasis is on determining these sensitivities using analytical methods as opposed to the finite difference method. Research also involves developing CFD/CSD interaction methodology.

Statistical Analysis of Structures:
Deterministic analysis and design structures based on safety factors to allow for statistical variation is increasingly inadequate for modern structural design. The research effort is concerned with structures subject to random loadings such as wind or wave load and the calculation of the statistical properties of the nonlinear structural response.

Neural Networks and Genetic algorithm:
This research involves using neural networks and genetic algorithms to solve inverse problems in structural health monitoring. Wavelets are being used to represent the signal.