

Romesh C. Batra

Romesh C. Batra earned his doctoral degree from the Johns Hopkins University in 1972 under the tutelage of Professor J. L. Ericksen for his dissertation “On Non-classical Boundary Conditions”. He worked as a Post-doctoral Fellow at Hopkins for a year, and also at the McMaster University, Canada for a year before joining the University of Missouri-Rolla as a Visiting Assistant Professor in Fall 1974. He was promoted to Associate Professor in 1977 and to full Professor in 1982. In 1994, he joined Virginia Tech (Virginia Polytechnic Institute and State University) as the Clifton C. Garvin Professor of Engineering Science and Mechanics. His visiting appointments include Professor at the Univ. of Minnesota from January 1985 till June 1985, and a Senior Research Fellow at the Army Research Laboratory in Aberdeen Proving Ground, MD during the period September 1983 through August 1984. He has spent smaller periods at the University College, Ireland, the Sandia National Laboratories, Albuquerque, the Technical University of Berlin and the University of Pisa.

He served as the President of the Society of Engineering Science (SES) in 1996, its Vice President in 1995, and on its Board of Directors during the period 1991-96. Among his services to the Professional Community include the successful organization of the 19th Annual Technical Meeting of the Society of Engineering Science in 1982, the 22nd Midwestern Mechanics Conference in 1991, the ASME Mechanics and Materials Conference in June 1999 and the 14th US National Congress of Theoretical and Applied Mechanics in June 2002. The last two conferences probably had the largest participation ever. He served as the chair of the Elasticity Committee of the Applied Mechanics Division of the American Society of Mechanical Engineers (ASME) for the five year period 1996-2000.

His excellent achievements in research and teaching earned him the very prestigious Alexander von Humboldt Award for senior scientists in 1992, the Eric Reissner Medal from the Int. Society of Computational Engineering Science for contributions to the Mechanics of Penetration in 2000, membership (1996-'99) on the National Research Council's (NRC) panel on Armor & Armaments to review the performance of the Weapon's Directorate of the Army Research Laboratory in Aberdeen Proving Ground, MD, membership on the NRC's panel on Survivability and Lethality Directorate (2002-'05), the 2000 lectureship in the Southwest Mechanics Series, the 2000 Michael A. Sadowski Mechanics Lecture at the Rensselaer Polytechnic Institute, and the grade of Fellow in the ASME, SES (in recognition of his many contributions in continuum mechanics and nonlinear elasticity, particularly in the dissipative phenomenon in solids), the American Academy of Mechanics and the American Society of Engineering Education. In 1988, he was honored with the Jai Krishna Award from the Indian Society of Earthquake Engineering for the paper “Seismic Response of a Multistory Building Supported on Piles and a Nonlinear Soil” coauthored with one of his former doctoral students. He is listed in Who's Who in America, and serves on the editorial boards of the International Journal of Plasticity, Computational Mechanics, Continuum Mechanics & Thermodynamics, and the Polish Journal of Theoretical and Applied Mechanics. He served for six years as an Associate Technical Editor of the ASME's Journal of Engineering Materials and Technology from 1995 to 2000. Professors Batra, Beatty, Horgan and Wheeler co-founded the journal “Mathematics and Mechanics of Solids” in 1995 and they co-edit it. The journal subscriptions and the number of pages published have steadily increased every year since 1995.

Dr. Batra has successfully advised 16 Doctoral, 12 Masters and 25 Postdoctoral students and published over 220 papers in widely read and reputed refereed journals. He has edited or co-edited 14 volumes. His notes ``Introduction to Continuum Mechanics'' available free on the internet have been adopted by several Professors at other Universities. His research work has been continuously funded by the ARO for the last twenty three years, and since 1987 also by the NSF and the ONR. Four of his former doctoral students (Vel at the Univ. of Maine at Orono, Liu and Lin at Taiwanese Univ. and Hwang at the Korean Air Force Academy) and three former postdoctoral fellows (Yang at the Univ. of Nebraska, Ru at the Univ. of Alberta, and Spector at the Johns Hopkins Univ.) are employed as faculty members either in the US or abroad, and several other former students and postdoctoral fellows hold responsible positions in the industry.

Besides the work in penetration mechanics for which he was recognized by the membership in the NRC panels and the Eric Reissner Medal, his research work on adiabatic shear bands in thermoviscoplastic solids, Saint-Venant's Principle, second-order solutions of the Saint-Venant Problem, linear elastic fracture mechanics concepts in functionally graded materials, smart structures and the analytical solution of laminated plates subjected to arbitrary boundary conditions has received immense attention. His work on adiabatic shear bands earned him the privilege of teaching 25% of a week-long course on Localization and Fracture Phenomenon in Inelastic Solids; the lecture notes have been published in a Book by the same title and edited by P. Perzyna.

Some of his publications (one/year for the last twenty years) are listed below; these will shed light on the breadth and depth of fields covered by his research.

1. R. C. Batra and S. Vidoli, Higher Order Piezoelectric Plate Theory Derived from a Three-Dimensional Variational Principle, *AIAA, J.*, **40**, 91-104, 2002.
2. R. C. Batra and N. A. Jaber, Failure Mode Transition Speeds in an Impact Loaded Prenotched Plate with Four Thermoviscoplastic Relations, *Int. J. Fracture*, **110**, 47-71, 2001.
3. S. S. Vel and R. C. Batra, Three-Dimensional Analytical Solutions for Hybrid Multilayered Piezoelectric Plates, *J. Applied Mechanics*, **67**, 558-567, 2000.
4. L. Chen and R. C. Batra, The Asymptotic Structure of a Shear Band in Mode-II Deformations, *Int. J. Engng. Sci.*, **37**, 859-919, 1999.
5. R. C. Batra and J. B. Stevens, Adiabatic Shear Bands in Axisymmetric Impact and Penetration Problems, *Computer Methods in Applied Mechanics and Engineering*, **151**, 111-119, 1998.
6. R. C. Batra and X. Q. Liang, Finite Dynamic Deformations of Smart Structures, *Computational Mechanics*, **20**, 427-438, 1997.
7. Z.-H. Jin and R. C. Batra, Some Basic Fracture Mechanics Concepts in Functionally Graded Materials, *J. Mech. Phys. Solids*, **44**, 1221-1235, 1996.
8. J. S. Yang and R. C. Batra, A Second-Order Theory of Piezoelectric Materials, *J. Acoustic Soc. America*, **97**, 280-288, 1995.
9. R. C. Batra and Z. Zhang, On the Propagation of a Shear Band in a Steel Tube, *J. Eng'g Materials & Technology*, **116**, 155-161, 1994.

10. R. C. Batra and K. I. Ko, Analysis of Shear Bands in Dynamic Axisymmetric Compression of a Thermoviscoplastic Cylinder, *Int. J. Engng. Sci.*, **31**, 529-547, 1993.
11. R. C. Batra and K. I. Ko, An Adaptive Mesh Refinement Technique for the Analysis of Shear Bands in Plane Strain Compression of a Thermoviscoplastic Solid, *Computational Mechs.*, **10**, 369-379, 1992.
12. R. C. Batra and T. Gobinath, Steady State Axisymmetric Deformations of a Thermoviscoplastic Rod Striking a Thick Thermoviscoplastic Target, *Int. J. Impact Engng.*, **11**, 1-31, 1991.
13. R. C. Batra and C. H. Kim, Effect of Viscoplastic Flow Rules on the Initiation and Growth of Shear Bands at High Strain Rates, *J. Mechs. Phys. Solids*, **38**, 859-874, 1990.
14. R. C. Batra and Pei-Rong Lin, Steady State Axisymmetric Deformations of a Thermoviscoplastic Rod Striking a Rigid Cavity, *Int. J. Impact Engng.*, **8**, 99-113, 1989.
15. R. C. Batra, Steady State Penetration of Thermoviscoplastic Targets, *Computational Mechs.*, **3**, 1-12, 1988.
16. R. C. Batra, The Initiation and Growth of, and the Interaction Among Adiabatic Shear Bands in Simple and Dipolar Materials, *Int. J. Plasticity*, **3**, 75-89, 1987.
17. T. W. Wright and R. C. Batra, The Initiation and Growth of Adiabatic Shear Bands, *Int. J. Plasticity*, **1**, 205-212, 1985.
18. S. L. Passman and R. C. Batra, A Thermomechanical Theory for a Porous Anisotropic Elastic Solid with Inclusions, *Arch. Rat'l Mechs. Anal.*, **87**, 11-33, 1984.
19. R. C. Batra, Saint-Venant's Principle in Linear Elasticity with Microstructures, *J. Elasticity*, **13**, 165-173, 1983.
20. R. C. Batra, Saint-Venant's Principle for a Micropolar Helical Body, *Acta Mechanica*, **42**, 99-109, 1982.