

CURRICULUM VITAE 12/2007

1. Janet A. Blume
Associate Professor
Division of Engineering
2. 49 Taber Avenue
Providence, RI 02906
3. (a) BSE, Princeton University, Princeton, NJ; June 1982
(b) MS, California Institute of Technology, Pasadena, CA; June 1983
(c) Ph.D., California Institute of Technology, Pasadena, CA; June 1986
Dissertation: Some Issues in the Kinematics of Finite Deformations
4. Assistant Professor, Division of Engineering, Brown University 8/1/86 - 6/30/91
Associate Professor, Division of Engineering, Brown University 7/1/91 - present
5. Publications:
 - Compatibility conditions for a left Cauchy-Green strain field, *Journal of Elasticity* 21:271-308, 1989.
 - The finite deformation and stress fields near a pair of spherical cavities in a nonlinearly elastic solid, in *Proceedings, Symposium on Three-Dimensional Fracture Processes*, Berkeley, CA, June 1988.
 - Effects of interface decohesion and sliding on bimaterial crack-tip fields (with M. Ortiz), *International Journal of Fracture* 42:117-128, 1990.
 - The singular behavior of an elastic-plastic bimaterial strip: infinitesimal and finite deformation analysis (with C. F. Shih and M. Ortiz), The 17th IUTAM Conference *Proceedings*, Grenoble, France, August, 1988.
 - Dynamic and quasistatic motions of thin, rate-dependent sheets, *Journal of Applied Mechanics*, 57, 821-827, 1990.
 - Inverted Stress-strain relations for hyperelastic materials, *International Journal of Nonlinear Mechanics* 27, 413-421, 1992.
 - Crack propagation-stability and interaction in a thin film/substrate system (with Y. Xu), *International Journal of Solids and Structures*, 30, 2587-2596, 1993.
 - Elastic materials with coincident principal stress and strain axes, *Journal of Elasticity*, 35, 275-280, 1994.
 - Reference configurations for homogeneous and inhomogeneous elastic materials, *Journal of Elasticity* 27, 247-266, 1992.
 - Incompressibility and materials with complementary strain energy density (with D. Reynolds), *Journal of Elasticity* 33:89-105, 1993.
 - An analysis of dislocation distributions (with V. Lubarda and A. Needleman) *Acta Metall. Mater.* 41 625-642, 1993.

- An interface crack between an orthotropic thin film and substrate (with Y. Xu and C. F. Shih) *International Journal of Fracture*, 63 369-381, 1993.
- Fracture toughness of niobium/alumina interfaces: An analysis based on a micromechanical model (with Y. Xu and C. F. Shih) *Acta Metall Mater.* 43 4301-4307, 1995.
- Lie group representation of equilibrium Neo-Hookean states (with H. C. Lei) *Journal of Nonlinear Mechanics*, 31 465-482, 1996.
- Mechanics in an engineering core program (with L. B. Freund, K. S. Kim and J. Puzniak) ASME Symposium, "Restructuring the undergraduate mechanics curriculum: how much?" Atlanta, GA, 1996.
- Assuming Exponential Decay by incorporating viscous damping improves the prediction of the coefficient of friction in pendulum tests of whole articular joints. Crisco, J, Blume J, Teeple, E, Fleming, B, and Jay, G. *Journal of Engineering in Medicine*, Volume 221, Number 3 / 2007.
- *Using Patents Databases to Teach Information Finding Skills to Engineering Undergraduates*" Janet Blume, Sarah Bordac, and Lee Pedersen. Proceedings ASEE Annual meeting in June of 2007.
- *An Undergraduate Teacher Education Program For Engineering Students. Proceedings*, PTEC Annual Conference series, American Physical Society, Boulder CO: March, 2007

Papers Read:

- Finite element analysis of cranial injuries, Symposium for Computer Applications in Medical Care, Washington, DC, 1983.
- Effects of interface decohesion and sliding on bimaterial crack-tip fields, IUTAM Symposium on Recent Advances in Nonlinear Fracture Mechanics, Pasadena, CA, March 1988.
- The singular behavior of a bimaterial strip, ASCE/EMD Specialty Conference, Blacksburg, VA, May 1988.
- The finite deformation and stress fields near a pair of spherical cavities in a nonlinearly elastic solid, read at the Symposium on Three-Dimensional Fracture Processes, Berkeley, CA, June 1988.
- Interfacial yielding and debonding near bimaterial cracks, Symposium on Interfacial Phenomena in Composites: Processing, Characterization, and Mechanical Properties, Newport, RI, June 1988.
- The singular behavior of a bimaterial strip, 17th IUTAM Conference, Grenoble, France, August, 1988.
- Extending one- and two-dimensional constitutive laws for isotropic, hyperelastic materials (invited talk) Finite elasticity workshop, Woodstock, VT, August, 1989.
- Reference configurations for one- and two-dimensional nonlinear elastic solids, 26th Annual Meeting, Society of Engineering Science, Ann Arbor, MI, September, 1989.
- On the homogeneity of elastic solids, 34th meeting, Society for Natural Philosophy, Lincoln, Nebraska, April, 1990.

- Inverted stress-strain relations for isotropic, hyperelastic materials, 11th U.S. National Congress of Applied Mechanics, Tucson, AZ, May, 1990.
- Inverted constitutive laws for isotropic, hyperelastic solids. Second Annual Finite Elasticity Workshop, Woodstock, VT, August, 1990.
- On the existence of the undetermined pressure field in incompressible, hyperelastic solids, J. K. Knowles 60th birthday symposium, Pasadena, CA, April, 1991.
- Reference configurations for homogeneous elastic materials, invited lecture, Caltech, Pasadena, CA, January, 1992.
- Finite deformations surrounding void clusters in nonlinearly elastic and rate-dependent solids, 3rd Finite Elasticity Workshop, Woodstock, VT, August 1993.
- MRS Teacher Training Workshop, Boston Museum of Science, November 2004.
- *An Undergraduate Teacher Education Program For Engineering Students. Proceedings*, PTEC Annual Conference series, American Physical Society, Boulder CO: March, 2007

Selected Invited Lectures:

State University of New York at Stony Brook (1988)
 University of Connecticut (1988)
 Michigan State University (1988)
 California Institute for Technology (1988)
 The Johns Hopkins University (1988)
 Army Materials Research Lab (1989)
 Cornell University (1989)
 University of Pennsylvania (1989)
 Massachusetts Institute of Technology (1989)
 Harvard University (1989)
 Princeton University (1989)
 California Institute of Technology (1991)

6. University Service:

Director of Outreach, MRSEC, 1997-present
 Freshman and sophomore advisor
 Concentration Advisor for the AB Engineering program
 Initiated Engineering Undergraduate Teacher Preparation Program
 Committee to reevaluate and restructure the math courses for engineering graduate students
 Faculty advisor to the ASCE student section, SWE student section
 Freshman advisor
 Secretary, Division of Engineering Staff Luncheons, 1987
 Member, Faculty Committee on Student Support Services, 1987-1988
 Solid Mechanics Seminar Series Chairperson, 1986-1987
 Sophomore advisor
 Member, faculty committee on Admissions and Financial Aid 1990-1992
 Member, faculty committee on the Status of Women 1991-present, Chair, 1993-1995
 Graduate representative to the Solid Mechanics Group 1990-1991
 Engineering undergraduate admissions representative 1991-1992
 Member, WISE Advisory Committee, 1990-present
 Solid Mechanics Search Committee, 1992-1993
 Civil Engineering Concentration advisor, 1993-1996
 Member, Wriston Fellowship Selection Committee, 1993-1995

Member, Engineering Executive Committee, 1995-1997
Member, Lectureships Committee, 1993-1995
Affirmative Action Officer for the Division of Engineering, 1994-1998
Member, Ad Hoc Committee on Sexual Assault, 1996-1997
Member, Honorary Degree Committee, 1997-1998
Member, Affirmative Action Monitoring Committee, 2001-2004

Professional Service:

Past Member of the following:

ASME elasticity committee
ASCE elasticity committee
MSS Advisory Committee of the National Science Foundation 1989-1990
PYI Selection Committee of the National Science Foundation 1990-1991

7. Awards, Honors and Research Grants:

Member, Society of Sigma Xi, 1982
Student Paper award, Symposium for Computer Applications in Medical Care, 1983
Presidential Young Investigator Award, National Science Foundation, 1989 to 1995
Philip J. Bray award for Excellence in teaching in the physical sciences, 1997

Research Grants:

- “Compatibility Conditions for Finite Strain Fields: Related Issues and Applications,” research grant funded by the National Science Foundation
- “Microstructural Mechanisms of Dynamic Ductile Fracture and Implications for Structural Failure” (with R. J. Clifton, P.I.; J. Duffy; L. B. Freund and S. Nutt) Research grant funded by the Army Research Office, 1987 to 1991.
- Presidential Young Investigator Award, National Science Foundation, 1989-present.
- “Analytical Studies of Nonlinear Crack-Tip Fields,” funded by the AT&T Foundation, 1989.
- “Computational Modelling of Metal-Matrix Composites” (with C. F. Shih) Ford Foundation, 1990 to present.
- “Micro-mechanics of Failure-resistant Materials,” Materials Research Group funded by the National Science Foundation, March 1990-1996.
- “The Materials Research Science and Engineering Center on Micro- and Nano-Mechanics of Materials at Brown University” National Science Foundation. (Outreach director)
- “Measurement of stress-strain response of the cervix,” \$30,000 Salomon Award from Brown University, with Professor Pradeep Guduru and Dr. Edward Chien (Women and Infants Hospital)
- “RET: Arming K-12 Teachers and Community College Faculty with Hands-on, Research-Driven Learning Modules in Engineering” Submitted to NSF, October, 2006.

8. Research In Progress:

- Studies in the kinematics of finite deformations
- Studies of the mechanical properties of the cervix

- Studies of Muscle mechanics (with Thomas Roberts)
- Studies of biomechanics of sport injuries and sport (with Trey Crisco)

9. Teaching (last three years):

Fall 2002	EN 31; Solid Mechanics
Spring 2003	EN 4: Dynamics
Fall 2003	EN229 Advanced Elasticity
Spring 2004	EN4: Dynamics
Fall 2004	EN3: Introduction to Engineering
Spring 2005	EN130, Structural Analysis
Fall 2005	EN3: Introduction to Engineering
Spring 2006	EN202: Mathematical Methods in Engineering and Physics
Fall 2006	EN3: Introduction to Engineering
Fall 2007	EN3: Introduction to Engineering

K-12 Outreach

Director of the MRSEC Research Experience for Teachers Program and BrownOut Programs since 1999. Have developed and given countless engineering-based presentations to K-12 students. Spend sabbatical (Spring 2007) working with students and teachers at Hope High School, Providence Rhode Island, running some challenging Engineering projects in Physics classes

Recent Honors Theses directed:

Aimee Duquete, 2002
 Dan Tuhos, 2002
 Marshall Stark, 2002
 Graham Seiner, 2002
 David Rothschild 2002
 Chesley Austin 2003
 Noa Kay 2003
 Chesley Austin, 2004
 Shawn Kitchner 2006

Doctoral Thesis directed:

Hin-Chi Lei, Ph.D., 1991
 David J. Reynolds, Ph.D., 1993
 Yanjiang Xu, Ph.D., 1994
 Kuang Hui, Ph.D., 1998