

**Janet A. Blume**  
Deputy Provost for Strategic Initiatives  
Deputy Dean of the Faculty  
Associate Professor of Engineering  
Brown University

Education:

BSE, Civil Engineering, Magna Cum Laude, Princeton University, June 1982  
MS, Civil Engineering, California Institute of Technology, June 1983  
PhD, Applied Mechanics, California Institute of Technology, June 1986  
Dissertation: Some Issues in the Kinematics of Finite Deformations.  
Advisor: Professor Eli Sternberg

Positions held:

7/1/2022-present: Deputy Provost for Strategic Initiatives  
7/1/2019-present: Deputy Dean of the Faculty

- 7/1/14-6/30/19: Senior Associate Dean of the Faculty
- 7/15/11-6/30/14: Associate Dean of the Faculty

7/1/21-6/30/22: Interim Chair, Department of Theatre Arts and Performance Studies  
7/1/20-6/30/21: Interim Chair, Sociology Department  
7/1/19-6/30/20: Interim co-Chair Sociology Department  
7/1/19-12/31/19: Interim Chair, Modern Culture and Media,  
7/1/18-12/31/18: Interim Chair, Literary Arts,  
7/1/17-6/30/18, 1/1/19-6/30/19: Interim Chair, French Studies  
7/1/17-6/30/18: Interim Chair, Portuguese and Brazilian Studies  
7/1/16-6/30/17: Interim Chair, Hispanic Studies,  
9/1/13-6/30/14: Interim Vice Chair, Education Department,  
7/1/12-6/30/13: Interim Director, Center for Environmental Studies,  
7/15/11-6/30/12: Interim Chair, Department of Hispanic Studies,  
7/15/11-6/30/12: Interim Director, Center for the Study of Race and Ethnicity in America  
7/1/14-6/30/19: Senior Associate Dean of the Faculty  
7/15/11-6/30/14: Associate Dean of the Faculty  
7/1/91 – present: Associate Professor, School of Engineering, Brown University  
8/1/86 - 6/30/91: Assistant Professor, Division of Engineering, Brown University

Publications:

- Zhang, Q, and Blume, JA, Surface wrinkling in generalized Blatz–Ko materials, *Extreme Mechanics Letters*, Volume 11, February, 2017.
- Rizza, G, and Blume J. Twinned Finite Plane Deformations Generated by Prescribed Rotation Fields. *Journal of Elasticity*, June 2014, Volume 116, Issue 1, pp 1-126. DOI 10.1007/s10659-013-9455-0, 2013.
- Rizza, G, and Blume J. Plane Deformations Generated by a Prescribed Finite Rotation Field. *Journal of Elasticity*, February 2013, Volume 110, Issue 2, pp 141-158
- Blume, J. An Undergraduate Teacher Education Program For Engineering Students. *Proceedings, PTEC Annual Conference series, American Physical Society, Boulder CO: March, 2007.*

- Pedersen, L, Blume, J, and Bordac, S. Using Patents Databases to Teach Information Finding Skills to Engineering Undergraduates. Proceedings ASEE Annual meeting in June of 2007.
- Crisco, J, Blume, J, Teeple, E, Fleming, B, and Jay, G. Assuming Exponential Decay by incorporating viscous damping improves the prediction of the coefficient of friction in pendulum tests of whole articular joints. *Journal of Engineering in Medicine*, Volume 221, Number 3 / 2007.
- Freund, L. B., Blume, J, Kim, K. S, and Puzniak, J. Mechanics in an engineering core program ASME Symposium, "Restructuring the undergraduate mechanics curriculum: how much?" Atlanta, GA, 1996.
- Lei, Hin-Chi and Blume, J.A. "Lie group and invariant solutions of the plane-strain equations of motion of a neo-Hookean solid", *International Journal of Non-Linear Mechanics*, PP. 465-483, Vol. 31, No.4, 1996. DOI:10.1016/0020-7462(95)00067-4.
- Blume, J. Elastic materials with coincident principal stress and strain axes, *Journal of Elasticity*, 35, 275-280, 1994.
- Xu, Y, Blume, J. and C. F. Shih. An interface crack between an orthotropic thin film and substrate *International Journal of Fracture*, 63 369-381, 1993.
- Lubarda, V, Blume J., and Needleman, A. An analysis of equilibrium dislocations distributions. *Acta Metall. Mater.* 41 625-642, 1993.
- Reynolds, D, and Blume, J. Incompressibility and materials with complementary strain energy density, *Journal of Elasticity* **33**:89-105, 1993.
- Blume, J. Reference configurations for homogeneous and inhomogeneous elastic materials, *Journal of Elasticity* 27, 247-266, 1992.
- Xu, Y, and Blume, J. Crack propagation-stability and interaction in a thin film/substrate system, *International Journal of Solids and Structures*, 30, 2587-2596, 1993.
- Blume, J. Inverted Stress-strain relations for hyperelastic materials, *International Journal of Nonlinear Mechanics* 27, 413-421, 1992. . DOI:10.1016/0020-7462(92)90009-V
- Blume, J. Finite, Dynamic motions of thin, rate-dependent sheets. *Journal of Applied Mechanics*, 57, 821-827, 1990. DOI: 10.1115/1.2897647.
- Blume, J.A. and Shih, C.F., The singular behavior of a bimaterial strip, Proceedings. 1988 ASCE Engineering Mechanics Specialty Conf. R.A. Heller, ed, held at Virginia Polytechnic Inst., p.72, May 23-25, 1988.
- Shih, C.F., Ortiz, M., and Blume, J, and Ortiz. The singular behavior of an elastic-plastic bimaterial strip: infinitesimal and finite deformation analysis, The 17th IUTAM Conference *Proceedings*, Grenoble, France, August, 1988.

- Ortiz, M, and Blume, JA. Effect of interface decohesion and sliding on bimaterial crack-tip fields *International Journal of Fracture* 42:117-128, 1990.
- Blume, J. 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.
- Blume, J. Compatibility conditions for a left Cauchy-Green strain field, *Journal of Elasticity* 21:271-308, 1989.

#### Papers Read:

- First-year Project-Based Engineering Education. (With K. Haberstroh) Society for Engineering Science 50<sup>th</sup> Annual Technical Meeting. Providence, RI, July 2013.
- Project Based Engineering Education. Caltech, March 2012.
- Development of a Multiscale Brain Injury Model for Traumatic Brain Injury, Institute for High Performance Computing, Singapore, 16 Aug 2011.
- *An Undergraduate Teacher Education Program For Engineering Students. Proceedings*, PTEC Annual Conference series, American Physical Society, Boulder CO: March, 2007
- MRS Teacher Training Workshop, Boston Museum of Science, November 2004.
- Finite deformations surrounding void clusters in nonlinearly elastic and rate-dependent solids, 3rd Finite Elasticity Workshop, Woodstock, VT, August 1993.
- Reference configurations for homogeneous elastic materials, invited lecture, Caltech, Pasadena, CA, January, 1992.
- On the existence of the undetermined pressure field in incompressible, hyperelastic solids, J. K. Knowles 60th birthday symposium, Pasadena, CA, April, 1991.
- Inverted constitutive laws for isotropic, hyperelastic solids. Second Annual Finite Elasticity Workshop, Woodstock, VT, August, 1990.
- Inverted stress-strain relations for isotropic, hyperelastic materials, 11th U.S. National Congress of Applied Mechanics, Tucson, AZ, May, 1990.
- On the homogeneity of elastic solids, 34th meeting, Society for Natural Philosophy, Lincoln, Nebraska, April, 1990.
- Reference configurations for one- and two-dimensional nonlinear elastic solids, 26th Annual Meeting, Society of Engineering Science, Ann Arbor, MI, September, 1989.
- Extending one- and two-dimensional constitutive laws for isotropic, hyperelastic materials. Finite elasticity workshop, Woodstock, VT, August, 1989.
- The singular behavior of a bimaterial strip, 17th IUTAM Conference, Grenoble, France, August, 1988.
- Interfacial yielding and debonding near bimaterial cracks, *Symposium on Interfacial Phenomena in Composites: Processing, Characterization, and Mechanical Properties*, Newport, RI, June 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.
- The singular behavior of a bimaterial strip, ASCE/EMD Specialty Conference, Blacksburg, VA, May 1988.
- Effects of interface decohesion and sliding on bimaterial crack-tip fields, IUTAM Symposium on Recent Advances in Nonlinear Fracture Mechanics, Pasadena, CA, March 1988.

- Finite element analysis of cranial injuries, Symposium for Computer Applications in Medical Care, Washington, DC, 1983.

#### Selected Recent University Service:

Faculty Advising Fellow, 2011-present (organizes and holds events for students at all levels)  
 TEAM Advising member, 2012-present (Advises at-risk first, second year, and transfer students)  
 Committee to form a gap program for underprepared STEM students 2014-present  
 Deputy Dean of the College Search Committee, 2013  
 Committee on Academic Standing, 2010-2014  
 Civil Engineering Concentration Advisor 2012-present  
 Environmental Studies Concentration Advisor 2012-present  
 Director of Undergraduate Programs in Engineering, 2010-2011  
 Director of Graduate Programs in Engineering, Semester II 2010  
 Director of Outreach, MRSEC, 1997-2010.  
 Director of the Research Experiences for Teachers program.  
 Developed and advises the Engineering Undergraduate Teacher Education Program  
 Concentration Advisor for the AB Engineering program, 2008-2011  
 PhD Thesis committees and oral exams (typically 3-5 per year)  
 Senior thesis advisor (typically 1-2 per year)  
 Advisor to the Brown University Fencing Team, 2009-2011  
 UTRA selection committee, 2010, 2011.  
 Liaison with the Office of Admissions, reviewer of Engineering applications, attended Students of Color Open house.  
 Reviewer of Fulbright Proposals, 2011.  
 Karen T. Romer Excellence in Advising Award committee, 2012, 2013.  
 Advisor to students facing academic code violations, 2012-2013.  
 Advisor to the Tau Beta Pi Engineering Honor Society.

#### Recent Professional Service

Session organizer, Society of Engineering Science 50<sup>th</sup> Annual Technical Meeting, 2013  
 Panel and Proposal Reviewer for the National Science Foundation  
 Reviewer for numerous journals

#### Awards and Honors

[Alumni Profile in ENGenious Magazine, California Institute of Technology, Issue 9 2012.](#)

Karen T. Romer Prize for Excellence in Advising, 2011  
 Tau Beta Pi Dedicated Faculty Award in the School of Engineering, 2010  
 Philip J. Bray award for Excellence in teaching in the physical sciences, 1997  
 Presidential Young Investigator Award, National Science Foundation, 1989 to 1995  
 Member, Tau Beta Pi Engineering Honor Society, 1989  
 Member, Society of Sigma Xi, 1982

### 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, 1989-1994.
- “Analytical Studies of Nonlinear Crack-Tip Fields,” funded by the AT&T Foundation, 1989.
- “Computational Modeling of Metal-Matrix Composites” (with C. F. Shih) Ford Foundation, 1990.
- NSF DMR-9302997 “Micro-- and Nano--Mechanics of Failure Resistant Materials, (R. Clifton, P.I.), 7/1/93/--8/30/96.
- NSF DMR-9632534 “Micro-- and Nano--Mechanics of Materials, (W. Curtin, P.I.), 9/1/00/--8/30/05.
- NSF DMR-9632534 “Micro-- and Nano--Mechanics of Materials, (Outreach Director, with W. Curtin, director), 9/1/05/--8/30/11, in phase-out period to 2013
- “Measurement of stress-strain response of the cervix,” Salomon Award from Brown University, with Professor Pradeep Guduru and Dr. Edward Chien (Women and Infants Hospital) 2006
- RI STAC grant: “Development of Multiscale Brain Injury Models for Concussion and Traumatic Brain Injuries” with Profs Christian Franck, Trey Crisco, and Subham Sett (Simulia.) 2011
- A Proposal for Clare Boothe Luce Graduate Fellowships for Women in the Physical Sciences, Engineering, Computer Science, Applied Mathematics and Mathematics at Brown University. (Pending)

### Recent Teaching:

#### **Undergraduate Courses, with typical enrollments.**

- ENGN0003 Introduction to Engineering (freshman course, ~15x, enrollment 160-210)
- ENGN0040 Introduction to Dynamics and Vibrations (freshman course, ~8x enrollment 150-180)
- ENGN0310 Mechanics of Solids (Junior course, enrollment 70)
- ENGN1370 Advanced Dynamics (Junior/Senior course, enrollment 30)
- ENGN1310 Operations Research Projects (Senior course, enrollment 20)
- ENGN1300 Structural Analysis (Junior course, enrollment 15)

- ENGN1750 Advanced Solid Mechanics (Senior course, enrollment 25)
- ENGN0230 Surveying (Senior noncredit course, enrollment 5)
- ENGN1970 Independent studies (multiple – honors theses or independent design projects)

### **Graduate Courses**

- ENGN2020 Mathematical Methods in Physics and Engineering (Required of first year engineering graduate students, enrollment 30)
- ENGN2240 Elasticity (Advanced grad course, enrollment 13)
- ENGN2210 Continuum Mechanics (Intro grad course, Enrollment 21)
- ENGN2220 Mechanics of solids (Intro grad course, enrollment 15)
- ENGN2270 Advanced Elasticity (advanced grad course, enrollment 15)

### **Recent undergraduate thesis advising:**

- Ed Backlund, ScB, 2013. (Engineer at Hatch Mott MacDonald)
- Sam Lee, ScB, 2015

### **Recent PhD thesis advising:**

- Greg Rizza, PhD, 2013. (Research Engineer at Alcoa)
- Qi Zhang, PhD anticipated 2016.

### Outreach

- Developed and presented numerous engineering-based class materials and presentations for K-12 students. (1990-2011)
- Ran an engineering-based Research opportunities for Teachers program, and spent part of a sabbatical (Spring 2007) working with students and teachers at Hope High School, Providence Rhode Island, developing and running challenging long-term Engineering projects in their Physics classes. 1990-2011
- Participate regularly in programs for students promoting and supporting women and underrepresented minority students in science and engineering. 1986-present.
- Teach math classes within the Rhode Island Department of Corrections at the Men's Maximum Security Prison. September, 2014-present.