

# John W. Rudnicki

## Curriculum Vitae

**Date and Place of Birth:** August 12, 1951, Huntington, West Virginia

### Employment:

September, 1981 – present, Northwestern University, Evanston, IL  
August, 1978 – August 1981, University of Illinois at Urbana-Champaign  
February, 1977 – July, 1978, California Institute of Technology

### Positions:

September 1991 – present, Professor of Mechanical Engineering  
September 1990 – present, Professor of Theoretical and Applied Mechanics and Civil and Environmental Engineering  
September, 1981 – August, 1990, Associate Professor of Theoretical and Applied Mechanics and Civil Engineering  
August 1978 – August 1981, Assistant Professor of Theoretical and Applied Mechanics, (University of Illinois at Urbana-Champaign)  
February 1977 – July 1978, Research Fellow and Instructor in Geophysics (California Institute of Technology)

### Education:

Brown University, 1969 – 1977; Sc.B. (Engineering Mechanics), June 1973; Sc.M. (Solid Mechanics), June 1974; Ph.D. (Solid Mechanics), January 1977.

### Awards:

Fellow, American Rock Mechanics Association, 2017  
Honorary Professorship in CEE, Hong Kong Polytechnic University, 2015 - 2017  
Society of Engineering Science Medal, 2014  
Caterpillar Prize for paper co-authored with WaiChing Sun and Matthew R. Kuhn, “A multiscale DEM-LBM analysis on permeability evolutions inside a dilatant shear band,” *Acta Geotechnica*, DOI 10.1007/s1144013-0210-2, 2013.  
Citation, Excellence in Reviewing, Journal of Geophysical Research, 2013  
Fellow, Engineering Mechanics Institute (Am. Soc. Civil Eng.), 2013  
Daniel C. Drucker Medal, American Society of Mechanical Engineers, 2011  
Honor Roll for Faculty and Administrators, Associated Student Government, Northwestern University, 2010.  
Advisor of the Year, McCormick School of Engineering and Applied Science, 2009  
Brown Engineering Alumni Medal, June, 2008

Fellow, American Society of Mechanical Engineers, 2008  
Maurice A. Biot Medal 2006 from Engineering Mechanics Division of the American Society of Civil Engineers "For his fundamental contributions to the mechanics of porous media and its applications to rock mechanics and geophysics."  
Award for Outstanding Research in Rock Mechanics (June 1977) from the U.S. National Committee on Rock Mechanics, for the paper "Conditions for the localization of deformation in pressure-sensitive dilatant materials" (with J.R. Rice), *J. Mech. Phys. Solids*, 23, 371-394, 1975.

### **Professional Activities:**

#### **Societies:**

American Geophysical Union, 1975  
American Association for the Advancement of Science (1975 – 2010)  
American Rock Mechanics Association, 2016  
American Society of Civil Engineers, 2006 (Fellow, Engineering Mechanics Institute, 2013)  
American Society of Mechanical Engineers, 1987 (Fellow, 2008)  
Seismological Society of America (1978 – 2011)  
Sigma Xi (1975- 2010)

#### **Editorial:**

Advisory Board, *Mechanics of Cohesive-Frictional Material and Structures, An International Journal on Experiments, Modeling and Computation*, (Incorporated into *International Journal for Numerical and Analytical Methods in Geomechanics*, January, 2001) 1995-  
Contributing Editor in Geophysics, *Mechanics*, 1982 – 1989  
Associate Editor, *Journal of Geophysical Research*, 1986-1988  
Associate Editor, *Journal of Applied Mechanics*, 1988-1994  
Guest Editor, *International Journal of Solids and Structures*, Special volume honoring John Dundurs, 1994  
Co-editor (with T.-J. Chuang) *Multiscale Fracture and Deformation in Materials and Structures, The James R. Rice 60<sup>th</sup> Anniversary Volume*, Kluwer Academic Publishers, Dordrecht, The Netherlands, April, 2000.

#### **Committees and Panels:**

External Advisory Board, Southern California Earthquake Center (SCEC), Member 2005-2010  
U. S. Dept. of Energy, Office of Energy Sciences, Geosciences Council, 1997- 2010 (Chairman 2008 - 2010)  
IUTAM Working Party 8, Geophysical and Environmental Mechanics, Member, 2004-2009

Poroelasticity Committee, Mechanics Institute (American Society of Civil Engineers), 2003 –

N. S. F. Review Panel on San Andreas Continental Fault Zone Drilling Project, May 28-29, 1999

NAS/NRC U. S. National Committee on Rock Mechanics, 1995-1999

NAS/NRC Advisory Panel for AFOSR Research Proposals in Mechanics (Vice Chairman), 1996

ASME/AMD Committee on Geomechanics, 1982 -1990 (Chairman, 1985-88)

U.S. Geological Survey Peer Review Panel for National Earthquake Hazards Reduction Program 1986-1989, 2018

N.S.F. Panel for Review of Science and Technology Center Proposals in Earth Sciences, 1988; U.S. National Committee on Rock Mechanics, Subpanel on Awards, 1988-1991

Seismological Society of America, Nominating Committee for Board of Directors, 1990

Department of Energy External Review Panel for J. S. Szymanski Report, "Conceptual Considerations of the Yucca Mountain Groundwater System with Special Emphasis on the Adequacy of this System to Accommodate a High-Level Waste Repository" 1990-91.

### Scientific Committees:

GeoProc 2017, Multiphysical Processes and Phenomena Across Scales, July 5 -7, 2017, Paris, France.

6th Biot Conference on Poromechanics, July 9 - 13, 2017. École Nationale des Ponts et Chaussées and IFSTTAR, Paris, France.

Mechanics and Physics of Porous Solids: A tribute to Pr. Olivier Coussy, April 18 - 20, 2011. École des Ponts ParisTech and the Laboratoire Central des Ponts et Chaussées (Paris)

4<sup>th</sup> Biot Conference on Poromechanics, Columbia University, June 8-10, 2009

GeoProc 2008, 3<sup>rd</sup> International Conference on Coupled T-H-M-C Processes in Geosystems: Fundamentals, Modeling, Experiments & Applications, June 2-6, Lille, France

3<sup>rd</sup> Biot Conference on Poromechanics, June 24 - 27, 2004, Norman, Oklahoma

2<sup>nd</sup> Biot Conference on Poromechanics, Aug. 26-28, 2002, Grenoble, France

International Workshop on Bifurcation and Instabilities, June 2-5, 2002, University of Minnesota

Biot Conference on Porous Mechanics, Sept. 14-16, 1998, Louvain-la-Neuve, Belgium;

International Committee, Seventh Conference of the International Association for Computer Methods and Advances in Geomechanics, 1991.

### Reviewer:

Computers and Geosciences; Dept. of Energy, Basic Energy Sciences; Earth and Planetary Science Letters; Elsevier/Woodhead Publishing; EOS, Transactions of the American Geophysical Union; Geomechanics for Earth and Environment; Geophysical Journal International; Geophysical Research Letters; Geotechnique; Journal of Applied Mechanics; Journal of Geophysical Research; Journal of Structural Geology; Journal of the Mechanics and Physics of Solids; International Journal for Greenhouse and Gas

Control; International Journal of Numerical and Analytical Methods in Geomechanics; International Journal of Solids and Structures; International Journal of Rock Mechanics and Mining Science; International Journal of Engineering Science; Mathematical Problems in Engineering; Mechanics of Materials; Mechanics Research Communications; National Science Foundation; Petroleum Research Fund; Nature; PLOS ONE; Philosophical Transactions of the Royal Society, A; Physics of Earth and Planetary Interiors; Pure and Applied Geophysics (PAGEOPH); Science

### Short Appointments and selected lectures:

MTS Visiting Professor, Department of Civil, Environmental and Geo- Engineering, University of Minnesota, August 24 – September 4, 2015

Plenary Lecture, “Formation and Extension of Localized Compaction in Porous Sandstone”, American Association of Rock Mechanics Meeting, June 26, 2012

MTS Visiting Professor, Department of Civil Engineering, University of Minnesota, October 1 – 31, 2010.

“Geological Sequestration of CO<sub>2</sub>: ‘Not as harebrained as it sounds’”, Sigma Xi Lecture, Loyola Marymount University, Los Angeles. Friday, April 25, 2008.

“Localized Failure in Brittle Rocks” Keynote Lecture, GEOProc 2008, 3<sup>rd</sup> International Conference on coupled T-H-M-C processes in geo-systems: fundamentals, modeling experiments and applications, June 2-6, 2008, Lille, France. June 2, 2008.

“Failure of Rocks in the Laboratory and in the Earth” Sectional Lecture, ICTAM 2008, 22<sup>nd</sup> International Congress on Theoretical and Applied Mechanics, August 24-29, 2008, Adelaide, Australia. August 27, 2008.

“True Triaxial Testing and the Failure of Rocks”, Maurice Biot Lecture, Columbia University, October 30, 2007

Participant, Program on Granular Physics, Kavli Institute for Theoretical Physics, Santa Barbara, Ca April 5 – 15, 2005

Invited participant, Program on Granular and Particle Laden Flows, Isaac Newton Institute for Mathematical Sciences, Cambridge, England, September, 2003

Invited lecturer Vening Meinesz Research School of Geodynamics, TU Delft, The Netherlands, February 2003

Lecturer, Deformation in the Earth’s Continental Crust: Theory, Experiment and Modeling, Advanced Course, International Centre for Mechanical Sciences, CISM, June 17 - 21, 2002, Udine, Italy

Invited Lecture, Gordon Conference on Rock Deformation, Deformation Mechanism and Mode of Failure Transitions in Rocks, May 19-24, 2002, Il Ciocco, Italy

Visiting Professor, École Normale Supérieure, Paris, April, 2001

Southwest Mechanics Lecturer, March, 1996

Geophysicist, Office of Earthquake Studies, U. S. Geological Survey, June, 1979

**Consulting:**

IMPACT Project, Centre for Integrated Petroleum Research, Norway, 2012 - 2014  
Exxon-Mobil, 2007  
Advantek International, February, 2002  
Amoco Netherlands, Sept. - December, 1994; 1996  
Snap-On Tools, Kenosha, WI, April, 1996  
Sandia National Laboratory, 1982-1992  
Science Applications International Corporation, 1990-91  
Los Alamos Scientific Laboratory, March 17-18, 1981  
Amoco Oil Company, September 25-28, 1983

**Courses Taught:**

Graduate: Theoretical Geophysics (Caltech), Wave Motion in Continuous Media (Univ. of Illinois), Fracture Mechanics, Theory of Elasticity, Continuum Mechanics, Plasticity, Dynamics of Structures, Mechanics of Earthquakes, Inelastic Behavior of Solids.

Undergraduate: Mechanics of Materials, Mechanics (Statics and Dynamics), Continuum Mechanics, Engineering Analysis - 2, Mechanics of Sports.

## Publications

- [1] J. W. Rudnicki and J. R. Rice, "Conditions for the Localization of Deformation in Pressure-Sensitive Dilatant Materials", *Journal of the Mechanics and Physics of Solids*, Vol. 23, 371-394, 1975.
- [2] M. P. Cleary and J. W. Rudnicki, "Initiation and Propagation of Dilatant Rupture Zones in Geological Materials", in *The Effects of Voids on Material Deformation* (edited by S. C. Cowin) ASME Applied Mechanics Division, Vol. 16, [Proceedings of the Symposium on the Effects of Voids on Material Deformation, Salt Lake City, Utah, 14 June 1976], 13-30, 1976.
- [3] J. W. Rudnicki, "The Inception of Faulting in a Rock Mass with a Weakened Zone", *Journal of Geophysical Research*, Vol. 82, 84-854, 1977.
- [4] J. W. Rudnicki, "The Effect of Stress-Induced Anisotropy on a Model of Brittle Rock Failure as Localization of Deformation", in *Energy Resources and Excavation Technology* (edited by F.-D. Wang and G. B. Clark) [Proceeding of the 18th U.S. Symposium on Rock Mechanics, Keystone, Colorado, 22-24 June 1977], 3B4-1 - 34B-8, 1977.
- [5] J. R. Rice, J. W. Rudnicki and D. A. Simons, "Deformation of Spherical Cavities and Inclusions in Fluid-Infiltrated Elastic Materials", *International Journal of Solids Structures*, Vol. 14, 289-303, 1978.
- [6] J. R. Rice and J. W. Rudnicki, "Earthquake Precursory Effects Due to Pore Fluid Stabilization of a Weakening Fault Zone", *Journal of Geophysical Research*, Vol. 84, 2177-2193, 1979.
- [7] J. W. Rudnicki, "The Stabilization of Slip on a Narrow Weakening Fault Zone by Coupled Deformation -Pore Fluid Diffusion", *Bulletin of the Seismological Society of America*, Vol. 69, 1011-1026, 1979.
- [8] J. W. Rudnicki, "Rotation of Principal Stress Axes Caused by Faulting", *Geophysical Research Letters*, Vol. 6, 135-138, 1979.
- [9] J. W. Rudnicki, "Fracture Mechanics Applied to the Earth's Crust", *Annual Review of Earth and Planetary Science* (ed. F. Donath), Vol. 8, 489-525, 1980.
- [10] J. R. Rice and J. W. Rudnicki, "A Note on Some Features of the Theory of Localization of Deformation", *International Journal of Solids and Structures*, Vol. 16, 597-605, 1980.
- [11] J. W. Rudnicki, "An Inclusion Model for Processes Preparatory to Earthquake Faulting", in *Solid Earth Geophysics and Geotechnology*, (ed. S. Nemat-Nasser), Applied Mechanics Division Volume 42, American Society of Mechanical Engineers, New York, 39-52, 1980.

- [12] J. W. Rudnicki and H. Kanamori, "Effects of Fault Interaction on Moment, Stress Drop, and Strain Energy Release", *Journal of Geophysical Research*, Vol. 86, 1785-1793, 1981.
- [13] J. W. Rudnicki and L. B. Freund, "On Energy Radiation from Seismic Sources", *Bulletin of the Seismological Society of America*, Vol. 71, 583-595, 1981.
- [14] J. W. Rudnicki, "On 'Fundamental Solutions for a Fluid-Saturated Porous Solid', by M. P. Cleary", *International Journal of Solids and Structures*, Vol. 17, 855-857, 1981.
- [15] J. W. Rudnicki, "Discussion of 'On Finite Plastic Flows of Compressible Materials with Internal Friction' by S. Nemat-Nasser and A. Shokooh", *International Journal of Solids and Structures*, Vol. 18, 357-360, 1982.
- [16] J. W. Rudnicki, "Energy Radiation from a Spherically Symmetric Homogeneous Source", *Bulletin of the Seismological Society of America*, Vol. 73, 901-908, 1983.
- [17] J. W. Rudnicki, "A Formulation for Studying Coupled Deformation - Pore Fluid Diffusion Effects on Localization of Deformation", in *Geomechanics, Proceedings of The Symposium on the Mechanics of Rocks, Soils, and Ice* (ed. S. Nemat-Nasser), American Society of Mechanical Engineers, New York, Vol. 57, pp. 35-44, 1983.
- [18] J. W. Rudnicki, "A Class of Elastic-Plastic Constitutive Laws for Brittle Rocks", *Journal of Rheology*, Vol. 28, 759-778, 1984.
- [19] J. W. Rudnicki, K. Hirashima and J. D. Achenbach, "Amplification of Moment and Strain Energy Release due to Interaction between Different Size Fault Slip Zones", *Journal of Geophysical Research*, Vol. 89, 5828-5834, 1984.
- [20] J. W. Rudnicki, "Effect of Pore Fluid Diffusion on Deformation and Failure of Rock", in *Mechanics of Geomaterials*, (ed. Z. P. Bazant), Proceedings of the IUTAM William Prager Symposium on Mechanics of Geomaterials: Rocks, Concretes, Soils, September 11-15, 1983, Northwestern University Evanston, Illinois, John Wiley & Sons, Ltd., pp. 315-347, 1985.
- [21] J. W. Rudnicki, "Reply to J. Boatwright's Comments on 'Energy Radiation from a Spherically Symmetric Homogeneous Source'", *Bulletin of the Seismological Society of America*, Vol. 74, 1487-1493, 1984.
- [22] J. W. Rudnicki, "Effects of Dilatant Hardening on the Development of Concentrated Shear Deformation in Fissured Rock Masses", *Journal of Geophysical Research*, Vol. 89, 9259-9270, 1984.
- [23] E. Roeloffs and J. W. Rudnicki, "Coupled Deformation-Diffusion Effects on Water Level Changes Due to Propagating Creep Events", *Pure and Applied Geophysics*, Vol. 122, 560-582, 1984/85.

- [24] J. W. Rudnicki, "Slip on an Impermeable Fault in a Fluid-Saturated Rock Mass", in *Earthquake Source Mechanics, Geophysical Monograph Series*, Vol. 87 (Maurice Ewing Volume 6), edited by S. Das, J. Boatwright, and C. H. Scholz, pp. 81-89, American Geophysical Union, Washington, 1986.
- [25] J. W. Rudnicki, "Fluid Mass Sources and Point Forces in Linear Elastic Diffusive Solids", *Mechanics of Materials*, Vol. 5, 383-393, 1986.
- [26] J. W. Rudnicki, "Plane Strain Dislocations in Linear Elastic Diffusive Solids", *Journal of Applied Mechanics*, Vol. 54, 545-552, 1987.
- [27] J. W. Rudnicki, "Physical Models for Earthquake Instability and Precursory Processes", *Pure and Applied Geophysics*, Vol. 126, 531-552, 1988.
- [28] J. W. Rudnicki and C.-H. Chen, "Stabilization of Rapid Frictional Slip on a Weakening Fault by Dilatant Hardening", *Journal of Geophysical Research*, Vol. 93, 4745-4757, 1988.
- [29] J. W. Rudnicki and T.-C. Hsu, "Pore Pressure Changes Induced by Slip on Permeable and Impermeable Faults", *Journal of Geophysical Research*, Vol. 93, 3275-3285, 1988.
- [30] J. W. Rudnicki and E. A. Roeloffs, "Plane Strain Shear Dislocations Moving Steadily in Linear Elastic Diffusive Solids", *Journal of Applied Mechanics*, Vol. 112, 32-39, 1990.
- [31] K. T. Chau and J. W. Rudnicki, "Bifurcations of Compressible Pressure-sensitive Materials in Plane Strain Tension and Compression", *Journal of the Mechanics and Physics of Solids*, Vol. 38, 875-898, 1990.
- [32] W. R. Wawersik, J. W. Rudnicki, W. A. Olsson, D. J. Holcomb and K. T. Chau, "Localization of Deformation in Brittle Rock: Theoretical and Laboratory Investigations", *Micromechanics of Failure of Quasi-Brittle Materials* (eds. S. P. Shah, S. E. Swartz, and M. L. Wang), Elsevier Applied Science, pp. 115-124, 1990.
- [33] J. W. Rudnicki and D. A. Koutsibelas, "Steady Propagation of Plane Strain Shear Cracks on an Impermeable Plane in an Elastic Diffusive Solid", *International Journal of Solids and Structures*, Vol. 27, 205-225, 1991.
- [34] J. W. Rudnicki, "Boundary Layer Analysis of Plane Strain Shear Cracks Propagating Steadily on an Impermeable Plane in an Elastic Diffusive Solid", *Journal of the Mechanics and Physics of Solids*, Vol. 39, 201-221, 1991.
- [35] J. W. Rudnicki, "Reporter's Summary: Session Three, Theoretical Fracture Mechanics Considerations", in *Toughening Mechanisms in Quasi-Brittle Materials* (ed. S. Shah), NATO Advanced Science Institutes Series E, Vol. 195, Kluwer Academic, pp. 203-205, 1991.
- [36] J. W. Rudnicki, M. Wu, C. H. Kuo and L. M. Keer, "Surface Deformation and Energy



Release Rates for Constant Stress Drop Slip Zones in an Elastic Half-space", *Journal of Geophysical Research*, Vol. 96, 16,509-16,524, 1991.

[37] J. W. Rudnicki, M. Jeyakumaran and L. M. Keer, "Modeling Slip Zones with Triangular Dislocation Elements", *Bulletin of the Seismological Society of America*, Vol. 82, 2153-2169, 1992.

[38] J. W. Rudnicki, J. Yin and E. A. Roeloffs, "Analysis of Water Level Changes Induced by Fault Creep at Parkfield, California", *Journal of Geophysical Research*, Vol. 98, 8143-8152, 1993.

[39] J. W. Rudnicki, "Effects of Faulting Mode on Pore Fluid Stabilization of Slip", in *Proceedings of Workshop LXIII, The Mechanical Involvement of Fluids in Faulting*, U. S. Geological Survey Open File Report 94-228, edited by S. Hickman, R. Sibson and R. Bruhn, pp. 390-398, 1994.

[40] J. W. Rudnicki and M. Wu, "Use of Stress Drop Models to Interpret Geodolite/Global Positioning System and Leveling Measurements at Loma Prieta", in *The Loma Prieta, California, Earthquake of October 17, 1989-Main Shock Characteristics: U.S. Geological Survey Professional Paper 1550-A*, edited by P. Spudich, pp. A289-A297, 1995.

[41] J. W. Rudnicki and M. Wu, "Mechanics of Dip-slip Faulting in an Elastic Half-space", *Journal of Geophysical Research*, Vol. 100, 22,173-22186, 1995.

[42] M. Jeyakumaran and J. W. Rudnicki, "The Sliding Wing Crack - Again!", *Geophysical Research Letters*, Vol. 22, 2901-2904, 1995.

[43] J. W. Rudnicki, "Moving and Stationary Dislocations in Poroelastic Solids and Applications to Aseismic Slip in the Earth's Crust", in *Mechanics of Poroelastic Media*, (Ed. A. P. S. Selvadurai), Vol. 35, Solid Mechanics and Its Applications, Kluwer Academic Publishers, Dordrecht, pp. 3-22, 1996.

[44] J. W. Rudnicki, "Development of Localization in Undrained Deformation", in *Engineering Mechanics, Proceedings of 11th Conference*, Fort Lauderdale, FL, May 19-22, 1996 (edited by Y.K. Lin and T. C. Su), pp. 939-942, American Society of Civil Engineers, New York, 1996.

[45] J. W. Rudnicki and K. T. Chau, "Multiaxial Response of a Microcrack Constitutive Model for Brittle Rock", in *Tools and Techniques in Rock Mechanics*, Proceedings of NARMS'96, 2nd North American Rock Mechanics Symposium, ISRM Regional Conference, June 19-21, 1996 (edited by M. Aubertin, F. Hassani and H. Mitri), pp. 1707-1714. A. A. Balkema, Rotterdam, 1996.

[46] J. W. Rudnicki, M. A. Alarcon, R. J. Finno, G. Viggiani and M. A. Mooney, "Coupled deformation-Pore Fluid Diffusion Effects on the Development of Localized Deformation in Fault Gouge", Proceedings of ISRM International Symposium on Prediction and Performance in Rock

Mechanics and Rock Engineering, EUROCK'96, September 2-5, 1996, Torino, Italy (edited by G. Barla), pp. 1261-1268. A. A. Balkema, Rotterdam, 1996.

[47] J. W. Rudnicki and W. A. Olsson, "Reexamination of Fault Angles Predicted by Shear Localization Theory", *International Journal of Rock Mechanics and Mining Science*, Vol. 35: 4-5, pp. 512-513, Paper No. 88. (Extended abstract, full paper on CD Rom), 1998.

[48] J. W. Rudnicki, W. R. Wawersik and D. J. Holcomb, "Microcrack Damage Model for Brittle Rock", in *Inelasticity and Damage in Solids Subject to Microstructural Change* (Lazar M. Kachanov Symposium, Sept. 25-27, 1996, St. John's Newfoundland, Canada), edited by I. J. Jordaan, R. Seshardir and I. L. Meglis, pp. 301-310, Memorial University of Newfoundland, 1997.

[49] J. W. Rudnicki and W. R. Wawersik, "Report Looks at Sequestering CO<sub>2</sub> beneath Earth's Surface", *EOS, Trans. American Geophysical Union*, Vol. 80, pp. 607-608, 1999. (Excerpt appeared in *Earth in Space*, AGU's publication for high school teachers and students).

[50] J. W. Rudnicki, "Geomechanics", *International Journal of Solids and Structures*, Vol. 37, pp. 349-358, 2000. (Also appeared as a chapter in the volume *Research Trends in Solid Mechanics*, Report from the U. S. National Committee on Theoretical and Applied Mechanics, editor George J. Dvorak, Elsevier, 1999.)

[51] J. W. Rudnicki, "Coupled Deformation-Diffusion Effects in the Mechanics of Faulting and Failure of Geomaterials", *Applied Mechanics Reviews*, Vol. 54, No. 6, pp. 483-502, November, 2001.

[52] D. J. Holcomb and J. W. Rudnicki, "Inelastic Constitutive Properties and Shear Localization in Tennessee Marble", *International Journal for Numerical and Analytical Methods in Geomechanics*, Vol. 25, pp. 109-129, 2001.

[53] J. W. Rudnicki, "Alteration of Regional Stress by Reservoirs and Other Inhomogeneities: Stabilizing or Destabilizing?", *Proceedings of the Ninth International Congress on Rock Mechanics*, Paris, France, August 25-28, edited by G. Vouille and P. Berest, Vol. 3, pp. 1629-1637, 1999.

[54] W. R. Wawersik, J. W. Rudnicki, P. Dove, J. Harris, J. M. Logan, L. Pyrak-Nolte, F. M. Orr Jr., P. J. Ortoleva, F. Richter, N. R. Warpinski, J. L. Wilson and T.-F. Wong, "Terrestrial Sequestration of CO<sub>2</sub>: An Assessment of Research Needs", in *Advances in Geophysics*, Vol. 43, pp. 97-177, 2001.

[55] J. W. Rudnicki, "Linear Poroelasticity", *Handbook of Materials Behavior, Models and Properties*, edited by J. Lemaitre, Chapter 11.5, Academic Press, 2000.

[56] K. A. Issen and J. W. Rudnicki, "Conditions for Compaction Bands in Porous Rock", *Journal of Geophysical Research*, Vol. 105, pp. 21,529 - 21,536, 2000.

[57] J. F. Shao and J. W. Rudnicki, “A Microcrack-based Continuous Damage Model for Brittle Geomaterials”, *Mechanics of Materials*, Vol. 32, pp. 607-619, 2000.

[58] R. A. Albert and J. W. Rudnicki, “Non-uniformity of Stress and Deformation in Axisymmetric Finite Element Models of Tennessee Marble”, in *Pacific Rocks 2000* [Proceedings of the Fourth North American Rock Mechanics Symposium, NARMS 2000, July 31- August 2, 2000, Seattle, Washington.], edited by Jami Girard, Mark Liebman, Christopher Breeds and Thomas Doe, A. A. Balkema, Rotterdam, 2000.

[59] G. Chambon and J. W. Rudnicki, “Effects of normal stress variations on frictional stability of a fluid-infiltrated fault”, *Journal of Geophysical Research*, Vol. 106 (B6), pp. 11,353-11,372, 2001.

[60] R. A. Albert and J. W. Rudnicki, “Finite Element Simulations of Tennessee Marble under Plane Strain Laboratory Testing: Effects of Sample-platen Friction on Shear Band Onset”, *Mechanics of Materials*, Vol. 33, pp. 47-60, 2001.

[61] J. W. Rudnicki, “Diffusive Instabilities in Dilating and Compacting Geomaterials,” in *Multiscale Fracture and Deformation in Materials and Structures – The James R. Rice 60<sup>th</sup> Anniversary Volume*, Edited by T.-J. Chuang and J. W. Rudnicki, pp. 159-182, Kluwer Academic Publishers, Dordrecht, The Netherlands, 2000.

[62] K. A. Issen and J. W. Rudnicki, “Theory of Compaction Bands in Porous Rock”, *Physics and Chemistry of the Earth* (Special issue on “Compaction, Subsidence and Mechanics of Granular Materials”), Vol. 26, pp. 95-100, 2001.

[63] W. A. Olsson, D. J. Holcomb and J. W. Rudnicki, “Compaction Localization in Porous Sandstone: Implications for Reservoir Mechanics”, *Revue de l’Institut Français du Pétrole, Oil and Gas Science and Technology*, Vol. 57 (5), 591-599, 2002. [Special issue devoted to the Workshop on Geomechanics in Reservoir Simulation, Dec. 4-7, 2001, Rueil-Malmaison, France. Also, published as a book *Geomechanics in Reservoir Simulation* edited by P. Longuemare and published by Editions TECHNIP, Paris, France.]

[64] J. W. Rudnicki, “Conditions For Compaction and Shear Bands in a Transversely Isotropic Material”, *International Journal of Solids and Structures*, Vol. 39, pp. 3741-3756, 2002.

[65] J. W. Rudnicki, “Eshelby Transformations, Pore pressure and Fluid Mass Changes, and Subsidence”, in *Poromechanics II*, Proceedings of the Second Biot Conference on Poromechanics, Grenoble, France, August 26-28, 2002, edited by J. – L. Auriault et al., pp. 307-312, A. A. Balkema, 2002.

[66] J. F. Shao and J. W. Rudnicki, “Un Modèle D’endommagement Anisotrope Pour Roches

Fragiles: Application Au Granite”, *Revue Française de Genie Civil*, Vol. 6 (1), 49-58, 2002.

[67] D. I. Garagash and J. W. Rudnicki, “Stability of undrained deformation of fluid-saturated geomaterials.” In *Plasticity, Damage and Fracture at Macro, Micro and Nano Scales*, Proceedings of the 9<sup>th</sup> International Symposium on Plasticity, (edited by A. Khan and O. Lopez-Pamies), pp. 492-494, NEAT Press, 2002.

[68] E. Grueschow, O. Kwon, I. G. Main and J. W. Rudnicki, “Observation and Modeling of the Suction Pump Effect During Rapid Dilatant Slip”, *Geophysical Research Letters*, Vol. 30 (5), 1226, doi:10.1029/2002GL15905, 2003.

[69] J. W. Rudnicki, “Compaction Bands in Porous Rock”, in *Bifurcations and Instabilities in Geomechanics* (Editors: J. F. Labuz and A. Drescher), [Proceedings of the International Workshop on Bifurcation and Instability, 2002, St. John’s College, Minnesota, June 3-5, 2002], pp. 29-39, Swets & Zeitlinger (formerly Balkema) Publishers, 2003.

[70] D. I. Garagash and J. W. Rudnicki, “Shear Heating of a Fluid-saturated Slip-weakening Dilatant Fault Zone 1. Limiting Regimes”, *Journal of Geophysical Research*, Vol. 108 (B2), 2121, doi:10.1029/2001JB001653, 2003.

[71] D. I. Garagash and J. W. Rudnicki, “Shear Heating of a Fluid-saturated Slip-weakening Dilatant Fault Zone 2. Quasi-drained Regime”, *Journal of Geophysical Research*, Vol. 108 (B10), 2472, doi:10.1029/2002JB002218, 2003.

[72] J. W. Rudnicki, “Shear and Compaction Band Formation on an Elliptic Yield Cap”, *Journal of Geophysical Research*, Vol. 109, B03402, doi:10.1029/2003JB002633, 2004.

[73] P. Bésuelle and J. W. Rudnicki, “Localization: Shear Bands and Compaction Bands”, Chapter V in *Mechanics of Fluid-Saturated Rock* (Editors: Y. Guéguen and M. Boutéca), pp. 219-321, Vol. 89, International Geophysics Series, Academic Press, London, 2004.

[74] D. I. Garagash and D. G. Schaeffer and J. W. Rudnicki, “Effect of Rate Dependence in Shear Heating of a Fluid-Saturated Fault Zone”, in *Poromechanics III-Biot Centennial (1905-2005)*, Proceedings, 3rd Biot Conference on Poromechanics (Editors: Y. Abousleiman and A.H.-D, Cheng and F.-J. Ulm), pp. 789-794, A.A. Balkema, Leiden/London/New York/Philadelphia/Singapore, 2005.

[75] E. Grueschow and J. W. Rudnicki, “Elliptic yield cap constitutive modeling for high porosity sandstone,” *International Journal of Solids and Structures*, Vol. 42, pp. 4574-4587, 2005.

[76] J. W. Rudnicki and K. R. Sternlof, “Energy release model of compaction band propagation,” *Geophysical Research Letters*, Vol. 32, L16303, doi:10.1029/2005GL023602, 2005.

- [77] K. R. Sternlof, J. W. Rudnicki and D. D. Pollard, “Anti-crack inclusion model for compaction bands in sandstone,” *Journal of Geophysical Research*, Vol. 110, B11403, doi:10.1029/2005JB003764, 2005.
- [78] Tao Huang and J. W. Rudnicki, “A mathematical model for seepage of deeply buried groundwater under higher temperature and pressure,” *Journal of Hydrology*, Vol. 327, 42-54, 2006.
- [79] J. W. Rudnicki and J. R. Rice, “Effective normal stress alteration due to pore pressure changes induced by dynamic slip propagation on a plane between dissimilar materials”, *Journal of Geophysical Research*, Vol. 111, B10308, doi:10.1029/2006JB004396, 2006.
- [80] J. W. Rudnicki, “Models for compaction band propagation,” Chapter 8 in *Rock Physics and Geomechanics in the Study of Reservoirs and Repositories* (eds. C. David and M. Le Ravelec-Dupin), Geological Society, London, Special Publications, **284**, pp. 107-125, doi: 10.1144/SP284.8, 2007.
- [81] D. J. Holcomb, J. W. Rudnicki, K. A. Issen and K. Sternlof, Compaction localization in the Earth and the laboratory: State of the research and research directions, in *Acta Geotechnica*, Vol. 2 (1), doi: 10.1007/S11440-007-0027-y, April, 2007.
- [82] J. W. Rudnicki, Localized Failure in Brittle Rock, in *Thermo-Hydromechanical and Chemical Coupling in Geomaterials and Applications* (ed. Jian-Fu Shao and Nicolas Burlion), Proceedings of the 3<sup>rd</sup> International Symposium GeoProc’2008, pp. 25 -40, Wiley, London, 2008.
- [83] J. W. Rudnicki, Failure of Rocks in the Laboratory and in the Earth, in Proceedings of 22<sup>nd</sup> International Congress on Theoretical and Applied Mechanics, Adelaide, Australia 24 – 29 August, 2008. Editors: James P. Denier and Matthew D. Finn. pp. 199-215. Springer, 2013.
- [84] B. C. Haimson and J. W. Rudnicki, The effect of the intermediate principal stress on fault formation and fault angle in siltstone, *Journal of Structural Geology*, doi:10.1016/j.jsg.2009.08.017, 2010.
- [85] J. W. Rudnicki, Localization in undrained deformation, Poromechanics IV, Proceedings, Fourth Biot Conference on Poromechanics, including the Second Frank L. DiMaggio Symposium (edited by Hoe I. Ling, Andrew Smyth, and Raimondo Betti), June 8 – 10, 2009, Columbia University, pp. 1134 – 1139, 2009.
- [86] N. Lenoir, J.E. Andrade, W.C. Sun, J.W. Rudnicki, In situ permeability measurements inside compaction bands using X-ray CT and lattice Boltzmann calculations, in *Proceedings of GeoX2010: Advances in Computed Tomography for Geomaterials*.

- [87] Sun, W., J. Andrade, J. W. Rudnicki, and P. Eichhubl, Connecting microstructural attributes and permeability from 3D tomographic images of in situ shear-enhanced compaction bands using multiscale computations, *Geophys. Res. Lett.*, 38, L 10302, doi:10.1029/2011GL047683, 2011.
- [88] Sun, W., J. Andrade, and J. W. Rudnicki, Multiscale method for characterization of porous microstructures and their impact on macroscopic effective permeability, *International Journal for Numerical Methods in Engineering*, DOI: 10.1002/nme.3220, 2011.
- [89] J. W. Rudnicki, Eshelby's Technique for Analyzing Inhomogeneities in *Geomechanics, in Mechanics of Crustal Rocks*, edited by Yves M. Leroy and Florian K. Lehner Courses and Lectures No. 533, International Centre for Mechanical Sciences (CISM), pp. 43 – 72, SpringerWienNewYork, 2011.
- [90] W. Sun, M. R. Kuhn, and J. W. Rudnicki, A multiscale DEM-LBM analysis on permeability evolutions inside a dilatant shear band, *Acta Geotechnica*, DOI 10.1007/s1144013-0210-2, 2013.
- [91] J. W. Rudnicki, 2011 Drucker Medal Paper: Localized Compaction in Porous Sandstones, *J. Appl. Mech.* 80(6), doi:10.1115/1.4025176, 2013.
- [92] J. R. Rice, J. W. Rudnicki, and J. D. Platt, Stability and Localization of Rapid Shear in Fluid-Saturated Fault Gouge, 1. Linearized Stability Analysis, *J. Geophys. Res. Solid Earth*, 119, 4311-4333, doi:10.1002/2013JB010710, 2014.
- [93] J. D. Platt, J. W. Rudnicki, and J. R. Rice, Stability and Localization of Rapid Shear in Fluid-Saturated Fault Gouge, 2. Localized Zone Width and Strength Evolution, *J. Geophys. Res. Solid Earth*, 119, 4334-4359, doi:10.1002/2013JB010711, 2014.
- [94] X. Ma, J. W. Rudnicki, and B. C. Haimson, True triaxial tests in two porous sandstones: experimental failure characteristics and theoretical prediction, Proceedings 48<sup>th</sup> US Rock Mechanics / Geomechanics Symposium, ARMA 14-7286, Minneapolis MN, 1 – 4 June, 2014.
- [95] John W. Rudnicki, *Fundamentals of Continuum Mechanics*, 199 pages, John Wiley & Sons, Ltd., ISBN 978-1-118-47991-9, 2015.
- [100] Y. Song, H. Hu, and J. W. Rudnicki, Shear properties of heterogeneous fluid-filled porous media with spherical inclusions, *Int. J. Solids Structures*, 83, 154-168, 2016.  
<http://dx.doi.org/10.1016/j.ijsolstr.2016.01.009>
- [101] Y. Song, H. Hu, J. W. Rudnicki, and Y. Duan, Dynamic transverse shear modulus for a heterogeneous fluid-filled porous solid containing cylindrical inclusions, *Geophys. J. Int.*, 206, 1677-1694, 2016. doi: 10.1093/gji/ggw245
- [102] Y. Song, H. Hu, and J. W. Rudnicki, Dynamic bulk and shear moduli due to grain-scale local

fluid flow in fluid-saturated cracked poroelastic rocks: theoretical model, *J. Mech. Phys. Solids*, 92, 28-54, 2016. DOI: <http://dx.doi.org/10.1016/j.jmps.2016.03.019>

[103] Y. Song, H. Hu, and J. W. Rudnicki, Deriving Biot-Gassmann relationship by inclusion-based method. *Geophysics*, 81(6), D657-D667, 2016. DOI: 10.1190/geo2015-0432.1

[104] L. Huet, J. W. Rudnicki, and M. Hartmann, Tactile sensing with whiskers of various shapes: Determining the three-dimensional location of object contact based on mechanical signals at the whisker base, *Soft Robotics*, Vol. 4, No. 2, 88-102, June, 2017. DOI: 10.1089/soro.2016.0028

[105] Y. Song and J. W. Rudnicki, Plane-strain shear dislocation on a leaky plane in a poroelastic solid, *J. Applied Mechanics*, 84, 2017. DOI: 10.1115/1.4035179

[106] Y. Song, H. Hu, and J. W. Rudnicki, Dynamic stress intensity factor (Mode I) of a permeable penny-shaped crack in a fluid-saturated poroelastic solid, *International Journal of Solids and Structures*, 127-136, 2017. <http://dx.doi.org/10.1016/j.ijsolstr.2017.01.034>

[107] Y. Song, H. Hu, and J. W. Rudnicki, Normal compression wave scattering by a permeable crack in a fluid-saturated poroelastic solid, *Acta Mechanica Sinica*, 33 (2), 356-367, 2017. DOI: 10.1007/s10409-016-0633-8.

[108] X. Ma, J. W. Rudnicki, and B. C. Haimson, The application of a Matsuoka-Nakai-Lade-Duncan failure criterion to two porous sandstones, *International Journal of Rock Mechanics and Mining Sciences*, 92, 9-18, 2017. <http://doi.org/10.1016/j.ijrmms.2016.12.004>

[109] X. Ma, J. W. Rudnicki, and B. C. Haimson, Failure characteristics of two porous sandstones subjected to true triaxial stresses: applied through a novel loading path, *Journal of Geophysical Research – Solid Earth*, 122, 2017. doi: 10.1002/2016JB013637

[110] J. W. Rudnicki, A three invariant model of failure in true triaxial tests on Castlegate sandstone, *International Journal of Rock Mechanics & Mining Sciences*, 97, 46-51, 2017. <http://doi.org/10.1016/j.ijrmms.2017.06.007>

[111] X. Ma, B. C. Haimson and J. W. Rudnicki, True triaxial failure stress and failure plane of two porous sandstones subjected to two distinct loading paths, Chapter 13, in *Porous Rock Failure Mechanics*, Eds. Amir K. Shojaei and Jianfu Shao, Elsevier Ltd., pp. 285-307, 2017. <http://dx.doi.org/10.1016/B978-0-08-100781-5.00013-0>

November 8, 2018.