

Mark Zoback

Education

- 1975 | Ph.D. Geophysics Stanford University
- 1973 | M.S. Geophysics Stanford University
- 1969 | B.S. Geophysics University of Arizona

Professional Experience

- 2012- Present | Senior Fellow, Precourt Institute for Energy, Stanford University
- 1991 - 1997 | Chairman, Department of Geophysics Stanford University
- 1984 - Present | Professor of Geophysics Stanford University
- 1981 - 1984 | Chief Branch of Tectonophysics, U.S. Geological Survey
- 1980 - 1981 | Deputy Chief Office of Earthquake Studies, U.S. Geological Survey
- 1976 - 1984 | Geophysicist U.S. Geological Survey
- 1976 - 1980 | Chief In-Situ Stress Measurement Project, U.S. Geological Survey
- 1975 - 1976 | Research Associate National Research Council Postdoctoral Fellowship
- 1975 | Visiting Scientist Ruhr University, Bochum, Germany
- 1973 - 1975 | Geophysicist U.S. Geological Survey
- 1971 - 1973 | Research Assistant Stanford University
- 1969 - 1971 | Geophysicist Amoco Production Company

Honors & Awards

- 2013 | Einstein Chair Professor, Chinese Academy of Sciences
- 2013 | Louis Neel Medal, European Geosciences Union
- 2012 | Honorary Member, Society of Exploration Geophysics
- 2011 | Elected Member, National Academy of Engineering
- 2011 | Elected Fellow, American Rock Mechanics Association
- 2008 | Walter H. Bucher Medal, American Geophysical Union
- 2006 | New Zealand Geophysics Prize for 2006 (with John Townend)
- 2006 | Emil Wiechert Medal, German Geophysical Society
- 2005 | Named Benjamin M. Page Professor of Earth Sciences, Stanford University
- 2004 | Best of What's New 2004, Popular Science (EarthScope's San Andreas Fault Observatory at Depth)

2004 | School of Earth Sciences Excellence in Teaching Award
1999 | Outstanding Alumni Award, University of Arizona Department of Geosciences
1999 | Elected Honorary Fellow, European Union of Geosciences
1998 | University Fellow, Stanford University
1998 | Kenneth Cuthbertson Award for Exceptional Contributions to Stanford University
1998 | Elected Fellow, American Geophysical Union
1989 | Senior Research Scientist Award, Alexander Von Humboldt Stiftung
1985 | Elected Fellow, American Association for the Advancement of Science
1984 | Elected Fellow, Geological Society of America
1975 | National Research Council Post-Doctoral Fellowship

University Service

2010 - 2012 | SUES Breadth Requirement Review Committee
2010 - 2011 | Faculty Senate Steering Committee
2009 - 2011 | Faculty Senate
2009 - 2010 | University Fact Finder, Reappointment Appeal
2004 - 2008 | University Capital Planning Group
2003 - 2004 | Member University Advisory Board
2002 - 2003 | Chair, Subcommittee on University Awards
2002 - 2004 | Chair, Planning and Policy Board
2001 - 2004 | Provost's Committee on Recreational use of the Dish
2001 - 2002 | Earth Systems Review Committee
2001 | Provost's Task Force on College Rankings
2000 | Provost Search Committee
2000 | General Counsel Evaluation Panel
1999 - 2000 | Member, Stanford Communications Council
1999 - 2000 | Chair, Faculty Senate
1997 - 1998 | Committee on Committees
1996 - 1998 | Chair, Committee of 15
1996 - 2000 | Coordinator, SME, Earth Sciences Track
1995 - 2008 | Member, Earth Systems Steering Committee
1991 - 1997 | Chair, Geophysics Department

Professional Activities

2012-2013 | Member Canadian Academy of Science Committee on Shale Gas Development
2013 | Invited Speaker, British Geophysical Association
2013 | Invited Speaker, National Agency Hydrocarbons, Bogota Colombia
2012 | Invited speaker USC, Lyman Handy Lecture
2012 | Invited Speaker Lawrence Berkeley National Laboratory
2012 | Invited Speaker SPE/SEG Workshop on Induced and Triggered Seismicity
2012 | Invited Speaker American Geophysical Union Meeting
2012 | Invited Speaker Lawrence Livermore National Laboratory
2011-2012 | Member, Secretary of Energy Committee on Shale Gas Development
2010-2011 | Member, NAE Committee Investigating Deepwater Horizon Accident
2011-Present | President, American Rock Mechanics Association
2010-Present | Member of Board, RPSEA
2007-2011 | Chair, Scientific Earthquake Studies Advisory Group of USGS
2008 | Advisory Board, Department of Geosciences, University of Arizona
1999-2000 | Chair, Stanford Faculty Senate
1991-1997 | Chair, Department of Geophysics
1999-2006 | Chair, Science Advisory Group, ICDP
1988-1989 | President, Tectonophysics Section, AGU
2011 | SEG Shale Gas Forum, Chengdu, China
2011 | Lawrence Livermore National Laboratory
2011 | U.S. Geological Survey
2011 | University of California, Santa Cruz
2011 | Lawrence Berkeley National Laboratory
2010 | University of Texas
2010 | Invited Lecture, Univ. S. Carolina
2010 | Invited Speaker, American Geophysical Union
2010 | Holmes Lecture, Syracuse University
2010 | Netherlands Earth Science Review Committee
2010 | Invited Speaker, Unconventional Gas Conference
2010 | Invited Speaker, USGS/GCEP Conference on CO2 Seals
2010 | EUG, Invited Speaker 2010 | Invited Speaker, University of Munich
2010 | Invited Speaker, University of Wisconsin

2010 - Present | Earth Science Chair, Program Advisory Committee, DUSEL Program
2010 - Present | Member, NAE Committee on Deepwater Horizon Accident
2010 | Cuyler Memorial Lecture, University of Texas
2010 | Distinguished Scientist Lecture, Lawrence Berkeley National Lab
2009 - Present | Board of Directors and Vice President, American Rock Mechanics Association
2009 - Present | Board of Directors, Research Partnership for Secure Energy for America
2009 | Invited Speaker, Sed. Basin Workshop, Abu Dhabi
2009 | Invited Speaker, ILP Symposium, Clarmont-Ferrand, France
2009 | Invited Speaker, ConocoPhillips Workshop on Geomechanics
2009 | Invited Speaker, SPE Shale Forum
2009 | Invited Speaker, GCEP Annual Meeting
2009 | Invited Speaker, COGA Meeting
2008 | Invited Speaker, GeoForschung Potsdam, Germany
2008 | Invited Speaker, GEO2008, Bahrain
2008 | Invited Speaker, MIT
2008 | Invited Speaker, Hedberg Conference 2008 Keynote Speaker, ARMA Symposium
2008 | Invited Speaker, World Stress Map Conference
2007 | Invited Speaker, University of Oregon
2007 | Invited Speaker, Geological Survey of Canada
2007 | Invited Speaker, University of Toronto
2007 - Present | Chair, Science of Earthquake Studies Advisory Committee (USGS)
2007 - Present | University of Arizona Geoscience Department Advisory Board
2007 | Invited Speaker, Geological Society of London Bicentennial
2007 | Invited Speaker, SPE Forum, Kananaskis, Canada
2007 | Invited Speaker, Geological Society of America Pardee Symposium
2007 | Invited Speaker, New Zealand Geological Survey
2006 | Invited Speaker, Annual Milton Dobrin Memorial Lecture, Houston Geophysical Society
2006 | Invited Speaker, GeoForschungZentrum, Potsdam, Germany
2006 | Invited Speaker, National Institute for Geophysical Volcanology, Rome
2006 | Invited Speaker, Seismological Society of America
2006 | Invited Speaker, German Geophysical Society
2006 | Invited Speaker, American Association for the Advancement of Science
2006 - 2007 | IODP Review Committee

2005 | Invited Speaker, Sandia National Laboratory, Distinguished Speaker
2005 | Invited Speaker, Scripps Institute of Oceanography
2005 | Invited Speaker, University of Kansas
2005 | Invited Speaker, University of Southern California
2005 | Invited Speaker, American Geophysical Union
2005 | Invited Speaker, Society of Exploration Geophysicists
2002 - 2008 | EarthScope Facilities Executive Committee/EarthScope Management Team
2001 - 2005 | Science Director, Western Resources Project
2000 - 2006 | Member, DOSECC Board of Directors
2000 - 2007 | Member, Begleitende Kommission, Heidelberg Academy of Science, World Stress Map Project
1999 - 2006 | Chair, Science Advisory Group, International Continental Drilling Program
1998 - Present | Member, Society of Petroleum Engineers
1998 - Present | Member, American Association of Petroleum Geologists
1984 - Present | Member, American Association for the Advancement of Science
1983 - Present | Member, Geological Society of America
1982 - Present | Member, Seismological Society of America
1973 - Present | Member, American Geophysical Union

Courses Taught

2012 (Winter) 202 Reservoir Geomechanics (Enrolled 38)
2012 (Winter) 385K Crustal Mechanics [Enrolled 4]
2012 (Winter) 385L Quake Seismology & Stress [Enrolled 6]
2011 (Fall) 385K Crustal Mechanics [Enrolled 6]
2011 (Fall) 385L Quake Seismology & Stress [Enrolled 10]
2011 (Winter) 385K Crustal Mechanics [Enrolled 6]
2011 (Winter) 385L Quake Seismology & Stress [Enrolled 10]
2011 (Winter) 400 Geophysics Research [Enrolled 6]
2011 (Winter) 801 TGR Project [Enrolled 1]
2011 (Winter) 802 TGR Dissertation [Enrolled 1]
2011 (Winter) 290 Tectonophysics [Enrolled 11]
2010 (Fall) IHUM 71 Sustainability and Collapse [Enrolled 210]
2010 (Fall) 802 TGR Dissertation [Enrolled 1]

2010 (Fall) 801 TGR Project [Enrolled 1]
2010 (Fall) 400 Geophysics Research [Enrolled 5]
2010 (Fall) 385L Quake Seismology & Stress [Enrolled 9]
2010 (Fall) 385K Crustal Mechanics [Enrolled 6]
2010 (Summer) 255 RPT on Energy Industry Training [Enrolled 3]
2010 (Summer) 802 TGR Dissertation [Enrolled 1]
2010 (Summer) 400 Geophysics Research [1]
2010 (Spring) 802 TGR Dissertation [Enrolled 1]
2010 (Spring) 400 Geophysics Research [Enrolled 7]
2010 (Spring) 385L Quake Seismology & Stress [Enrolled 8]
2010 (Spring) 385K Crustal Mechanics [Enrolled 6]
2010 (Winter) Reservoir Geomechanics [Enrolled 30]
2010 (Winter) TGR Research [Enrolled 1]
2010 (Winter) 400 Geophysics Research]Enrolled 6]
2010 (Winter) 385L Quake Seismology & Stress [Enrolled 8]
2010 (Winter) 385K Crustal Mechanics [Enrolled 5]
2010 (Winter) 185K Crustal Mechanics [Enrolled 1]
2009 (Fall) | 385K Crustal Mechanics [Enrolled 3]
2009 (Spring) | 802 TGR Dissertation [Enrolled 1]
2009 (Fall) | 385L Quake Seismology & Stress [Enrolled 7]
2009 (Fall) | 400 Geophysics Research [Enrolled 7]
2009 (Winter) | 185K Crustal Mechanics [Enrolled 1]
2009 (Winter) | 202 Reservoir Geomechanics [Enrolled 30]
2009 (Winter) | 385K Crustal Mechanics [Enrolled 5]
2009 (Winter) | 385L Quake Seismology & Stress [Enrolled 8]
2009 (Winter) | 400 Geophysics Research [Enrolled 6]
2009 (Winter) | 802 TGR Dissertation [Enrolled 1]
2009 (Spring) | 385K Crustal Mechanics [Enrolled 3]
2009 (Spring) | 385L Quake Seismology & Stress [Enrolled 4]
2009 (Spring) | 400 Geophysics Research [Enrolled 5]
2008 (Winter) | 399 Teaching Experience in Geophysics [Enrolled 1]
2008 (Winter) | 400 Geophysics Research [Enrolled 4]
2008 (Winter) | 385K Crustal Mechanics Mark Zoback on sabbatical [Enrolled 1]

2008 (Spring) | 385K Crustal Mechanics Mark Zoback on sabbatical [Enrolled 2]
2008 (Winter) | 290 Tectonophysics Mark Zoback on sabbatical taught by Paul Hagin [Enrolled 10]
2008 (Fall) | 385L Earthquake Seismology, Deformation & Stress Mark Zoback on sabbatical [Enrolled 9]
2008 (Fall) | 385K Crustal Mechanics Mark Zoback on sabbatical [Enrolled 2]
2008 (Spring) | 385L Quake Seismology & Stress Mark Zoback on sabbatical [Enrolled 6]
2008 (Winter) | 385L Quake Seismology & Stress Mark Zoback on sabbatical [Enrolled 9]
2008 (Winter) | 185K Geophysics Research Mark Zoback on sabbatical [Enrolled 1]
2008 (Spring) | 400 Geophysics Research Mark Zoback on sabbatical [Enrolled 5]
2008 (Fall) | 400 Geophysics Research Mark Zoback on sabbatical [Enrolled 6]
2008 (Fall) | 802 TGR Dissertation Mark Zoback on sabbatical [Enrolled 1]
2007 (Winter) | 802 TGR Dissertation [Enrolled 1]
2007 (Winter) | 400 Geophysics Research [Enrolled 4]
2007 (Winter) | 399 Teaching Experience in Geophysics [Enrolled 1]
2007 (Winter) | 385K Crustal Mechanics [Enrolled 1]
2007 (Spring) | 255 Report on Energy Industry Training [Enrolled 3]
2007 (Winter) | 385L Quake Seismology & Stress [Enrolled 5]
2007 (Fall) | 400 Geophysics Research [Enrolled 3]
2007 (Winter) | 202 Reservoir Geomechanics [Enrolled 16]
2007 (Summer) | 802 TGR Dissertation [Enrolled 1]
2007 (Summer) | 400 Geophysics Research [Enrolled 1]
2007 (Spring) | 385L Quake Seismology & Stress [Enrolled 4]
2007 (Spring) | 185L Quake Seismology & Stress [Enrolled 1]
2007 (Spring) | 802 TGR Dissertation [Enrolled 1]
2007 (Spring) | 400 Geophysics Research [Enrolled 4]
2007 (Fall) | 385L Quake, Seismology & Stress [Enrolled 5]
2007 (Fall) | 385K Crustal Mechanics [Enrolled 2]
2007 (Fall) | 802 TGR Dissertation [Enrolled 2]
2007 (Fall) | 801 TGR Project [Enrolled 1]
2006 (Winter) | GP 202 Reservoir Geomechanics [Enrolled 9]
2006 (Fall) | 385K Crustal Mechanics [Enrolled 2]
2006 (Fall) | 385L Quake Seismology & Stress [Enrolled 4]
2006 (Fall) | 110 Geosphere [Enrolled 35]

2006 (Fall) | 400 Geophysics Research [Enrolled 2]
2006 (Fall) | 802 TGR Dissertation [Enrolled 4]
2005 (Fall) | GP102 Geosphere [Enrolled 1]
2005 | GP202 Reservoir Geomechanics [Enrolled 16]
2004 (Fall) | GP385L Quake Seismology & Stress (with Beroza, Segall) [Enrolled 5]
2004 | GP185L Quake Seismology & Stress (with Beroza, Segall) [Enrolled 1]
2004 | GP 400 Geophysics Research [Enrolled 5]
2004 | GP 802 TGR Dissertation [Enrolled 2]
2004 | GP202 Reservoir Geomechanics [Enrolled 23]
2004 | GP385K Crustal Mechanics [Enrolled 4]
2004 | GP802 TGR Dissertation [Enrolled 1]
2004 | GP399 Teaching Experience [Enrolled 1]
2004 | GP400 Geophysics [Enrolled 7]
2004 | GP 385K Crustal Mechanics [Enrolled 4]
2003 | GP110/ESP110 Geosphere (with Arrigo) [Enrolled 66]
2003 | GP385K Crustal Mechanics (with Arrigo) [Enrolled 9]
2003 | GP385L Quake Seismology & Stress (with Beroza, Segall) [Enrolled 6]
2003 | GP399 Teaching Experience [Enrolled 3]
2003 | GP400 Geophysics Research [Enrolled 26]
2003 | GP202 Reservoir Geomechanics [Enrolled 13]
2003 | GP290 Tectonophysics [Enrolled 13]
2003 | GP802 TGR Dissertation [Enrolled 3]
2003 | GP385K Crustal Mechanics [Enrolled 4]
2003 | GP802 TGR Dissertation [Enrolled 1]
2003 | GP400 Geophysics Research [Enrolled 7]
2002 | GP102 Earth, Oceans and Atmospheres (with Arrigo) [Enrolled 9]
2002 | GP202 Reservoir Geomechanics [Enrolled 11]
2002 | GP385L Earthquake Seismology (with Beroza, Segall) [Enrolled 16]
2002 | GP185L Quake Seismology and Stress (with Beroza, Segall) [Enrolled 3]
2002 | GP385K Crustal Mechanics [Enrolled 6]
2002 | GP399 Teaching Experience [Enrolled 2]
2002 | GP400 Geophysics Research [Enrolled 24]
2001 | GP385 Earthquake Seismology, Deformation and Stress (with Beroza, Segall) [Enrolled 2]

2001 | GP/PE202 Reservoir Geomechanics [Enrolled 14]

2001 | GP185 Earthquake Seismology, Deformation and Stress (with Beroza, Segall) [Enrolled 1]

2001 | GP400 Research [Enrolled 5]

2001 | GP385 Earthquake Seismology (w/Beroza and Segall) [Enrolled 5]

2001 | SME4 Earth, Oceans, and Atmospheres (with Arrigo) [Enrolled 22]

2001 | GP399 Teaching Experience [Enrolled 1]

2001 | GP385 Crustal Mechanics [Enrolled 1]

2001 | GP399 Teaching Experience [Enrolled 1]

2001 | GP400 Research [Enrolled 5]

2001 | GP185 Earthquake Seismology, Deformation and Stress (Beroza, Segall) [Enrolled 1]

2001 | GP385 Earthquake Seismology, Deformation and Stress (with Beroza, Segall) [Enrolled 4]

2001 | GP290 Tectonophysics [Enrolled 21]

2001 | GP385 Crustal Mechanics [Enrolled 1]

2001 | GP400 Research 6 2001 GP400 Research 6 2000 GP202 Reservoir Geomechanics [Enrolled 8]

2000 | GP385 Earthquake Seismology (w/Beroza and Segall) 8 2000 GP385 Borehole Geophysics [Enrolled 3]

2000 | GP400 Research [Enrolled 22]

1999 | SME101 Earth Resources and Sustainability of life (with three others) [Enrolled 122]

1999 | GP385 Earthquake Seismology (w/Beroza and Segall) 17 1999 GP400 Research [Enrolled 16]

1999 | GP385 Borehole Geophysics [Enrolled 2]

1998 | GP400 Research [Enrolled 18]

1998 | GP385 Earthquake Seismology [Enrolled 5]

1998 | GP385 Borehole Geophysics [Enrolled 3]

1998 | GP202 Reservoir Geomechanics [Enrolled 10]

1998 | SME001 Earth Resources and Sustainability of life (McWilliams and others) [Enrolled 149]

Publications

2013| Heller, R., J. Vermilyen and M.D. Zoback, Experimental Investigation of Matrix Permeability of Gas Shales, submitted to AAPG Bull.

2013| Sone, H. and M.D. Zoback, Mechanical Properties of Shale Gas Reservoir Rocks-Part 2: Ductile Creep, Brittle Strength, and Their Relation to the Elastic Modulus, submitted to

Geophysics.

2013| Sone, H. and M.D. Zoback, Mechanical Properties of Shale Gas Reservoir Rocks-Part 1: Static and Dynamic Elastic Properties and Anisotropy, submitted to Geophysics.

2013| Chang, C., E. Mallman and M.D. Zoback, Time-Dependent Subsidence Associated with Drainage-Induced Compaction in Gulf of Mexico Shales Bounding a Severely Depleted Gas Reservoir, submitted to AAPG Bull.

2013| Zoback, M.D. and S.M. Gorelick, Response to Juanes et al.: Evidence that earthquake triggering could render long-term carbon storage unsuccessful in many regions, Proc. Nat. Acad. Sci., v.109, no. 52, E3624, www.pnas.org/cgi/doi/10.1073/pnas.1217264109

2012| Hurd, O. and M.D. Zoback, Regional stress orientations and slip compatibility of earthquake focal planes in the New Madrid seismic zone, Seismological Res. Letters, v. 83, no. 4, July/August 2012. doi:10.1785/0220 110122

2012| Popov, A.A., S.V. Sobolev and M.D. Zoback, Modeling evolution of the San Andreas Fault system in northern and central California, G3, 13, (8) doi:10.1029, 2012GC004086

2012| Zoback, M.D. and S.M. Gorelick, Earthquake triggering and large-scale geologic storage of carbon dioxide, Proc. Nat. Acad. Sci., v. 109, no. 26, 10164-10168. www.pnas.org/cgi/doi/10.1073/pnas.1202473109

2012| Zoback, M.D., A. Kohli, I. Das and M. McClure, The importance of slow slip on faults during hydraulic fracturing of a shale gas reservoirs, SPE 155476, SPE Americas Unconventional Resources Conference held in Pittsburgh, PA, USA 5-7 June, 2012.

2012| Zoback, M.D., Managing the seismic risk of wastewater disposal, EARTH, April, 2012, 38-43.

2012| Hurd, O. and M.D. Zoback, Intraplate Earthquakes, Regional Stress and Fault Mechanics in the Central and Eastern U.S. and Southeastern Canada, *Tectonophysics*, 581, Dec.18, 2012, 182-192 <http://dx.doi.org/10.1016/j.tecto.2012.04.002>

2011| Das, I. and M.D. Zoback, Long-period, long-duration seismic events during hydraulic fracture stimulation of a shale gas reservoir, The Leading Edge, July 2011, 778-786.

2011| Goodarzi, S., A. Settari, M. Zoback and D.W. Keith, A coupled geomechanical reservoir simulation analysis of carbon dioxide storage in a saline aquifer in the Ohio River Valley, *Environmental Geosciences*, v. 18, no. 3, (Sept. 2011) 189-207.

2011| Yang, Y. and M.D. Zoback, The Effects of Gas Adsorption on Swelling, Visco-plastic Creep and Permeability of Sub-bituminous Coal, ARMA 11-433, in 45th US Rock Mechanics/Geomechanics Symposium held in San Francisco, CA, June 26-29, 2011.

2011| Sone, H. and M.D. Zoback, Visco-plastic properties of shale gas reservoir rocks, ARMA 11-417, in 45th US Rock Mechanics/ Geomechanics Symposium held in San Francisco, CA, June 26-29, 2011.

2011| Vermilyen, J. and M.D. Zoback, Hydraulic fracturing, microseismic magnitudes and stress evolution in the Barnett Shale, Texas, USA, SPE 140507, SPE Hydraulic Fracturing Technology Conference and Exhibition, held in The Woodlands, Texas, USA 24-26, January 2011.

2011 | Zoback, M.D., S. Hickman and W. Ellsworth, Scientific Drilling into the San Andreas Fault - An Overview of SAFOD's First Five Years, Scientific Drilling, no. 11, 14-28.

2011 | Paul, P., M.D. Zoback and P. Hennings, A method to implement permeability anisotropy associated with fault damage zones in reservoir simulation, SPE Reservoir Evaluation and

Engineering, Feb. 2011, 138-152.

2011 | Vermylen, J. and M.D. Zoback, Hydraulic fracturing, microseismic magnitudes and stress evolution in the Barnett Shale, Texas, USA, SPE 140507, SPE Hydraulic Fracturing Technology Conference and Exhibition, held in The Woodlands, Texas, USA 24-26, January 2011.

2010 | Zoback, M.D., S. Hickman and W. Ellsworth, Scientific Drilling into the San Andreas Fault - An Overview of SAFOD's First Five Years, *Scientific Drilling*, no. 11, 14-28.

2010 | Goodarzi, S., A. Settari, M. Zoback and D.W. Keith, Thermal aspects of geomechanics and induced fracturing in CO₂ injection with application to CO₂ sequestration in the Ohio River Valley, SPE 139706, paper presented at SPE International Conf. on CO₂ capture, Storage and Utilization, New Orleans, LA, 10-12 November 2010.


2010 | Day-Lewis, A., M.D. Zoback and S.H. Hickman, Scale-invariant stress orientation and seismicity rates near the San Andreas Fault, *Geophys. Res. Lett.*, doi:10.1029/2010GL045025.

2010 * | Chang, C. and M.D. Zoback, Viscous creep in room-dried unconsolidated Gulf of Mexico shale (II): Development of a viscoplasticity model, *Journal of Petroleum Science and Engineering*, v.72, 50-55.

2010 | Natural gas can lead the way, *Earth*, February issue, p. 86-87. February Issue.
<http://www.earthmagazine.com/earth/article/2fb-7da-2-1>

2010 * | Bohnhoff, M., M.D. Zoback, L. Chiamonte, J.L Gerst and N. Gupta, Seismic Detection of CO₂ Leakage along Monitoring Wellbores, *International Journal of Greenhouse Gas Controls*, v.4, pp.687-697.

2010 | Zoback, M.D., S. Hickman and W. Ellsworth, Scientific Drilling into the San Andreas Fault, *EOS*, v. 91, no. 22, June 1, 2010, 197-198.

2010 | Zoback, M.D., S. Kitasei and B. Copithorne, Addressing the environmental risks from shale gas development, Worldwatch Institute, 19 pp, <http://www.worldwatch.org/files/pdf/Hydraulic%20Fracturing%20Paper.pdf> .

2010 | Zoback, M.D., Climate and intraplate shocks, *Nature*, v. 466, 568-569.

2010 | Sone, H. and M.D. Zoback, Strength, creep and frictional properties of gas shale reservoir rocks, paper presented at 44th US Rock Mechanics Symposium and 5th US-Canada Rock Mechanics Symposium, Salt Lake City, Utah, June 27-30, 2010, paper ARMA 10-463.

2010 | Hagin, P.N. and M.D. Zoback, Laboratory studies of the compressibility and permeability of low-rank coal samples from the Powder River Basin, Wyoming, USA, paper presented at 44th US Rock Mechanics Symposium and 5th US-Canada Rock Mechanics Symposium, Salt Lake City, Utah, June 27-30, 2010, paper ARMA 10-170.

2010 | Hagin, P.N. and M.D. Zoback, Inverting for creep strain parameters of uncemented reservoir sands using arbitrary stress-strain data, paper presented at 44th US Rock Mechanics Symposium and 5th US-Canada Rock Mechanics Symposium, Salt Lake City, Utah, June 27-30, 2010, paper ARMA 10-171.

2010 * | Bohnhoff, M., M.D. Zoback, Oscillation of fluid-filled cracks triggered by degassing of CO₂ due to leakage along wellbores, *Journal of Geophysical Research*, 115, B11305,doi:10.1029/2010JB000848

2009 * | Ross, H.E., P. Hagin, and M.D. Zoback, CO₂ storage and enhanced coalbed methane recovery in unmineable coalbeds of the Powder River Basin, Wyoming: Reservoir characterization and fluid flow simulations, *International Journal of Greenhouse Gas Controls*,

v.3, p. 773-786, doi:10.1016/j_ijggc.2009.06.002

2009 * | Lucier, A., M.D. Zoback, V. Heesackers, Z. Reches and S. Murphy, Constraining the far-field stress state near a deep South African Gold Mine, *International Journal of Rock Mechanics and Mining Sciences*, 46 (2009), pp. 555-567.

2009 * | Paul, P., M.D. Zoback and P. Hennings, Fluid Flow in a Fractured Reservoir Using Geomechanically Constrained Fracture Model for Reservoir Simulation - SPE Reservoir Evaluation & Engineering - Formation Evaluation, Aug. 2009, page 562-575.

2010 * | Chang, C. and M.D. Zoback, Viscous creep in room-dried unconsolidated Gulf of Mexico shale (II): Development of a viscoplasticity model, *Journal of Petroleum Science and Engineering*, v.72, 50-55.

2009 * | Chang, C. and M.D. Zoback, Viscous creep in room-dried unconsolidated Gulf of Mexico shale (I): Experimental results, *Journal of Petroleum Science and Engineering*, v. 69, 239-246.

2008 * | Lucier, A. and M.D. Zoback, Assessing economic feasibility of regional deep saline aquifer CO₂ injection and sequestration: A geomechanics-based workflow applied to the Rose Run Sandstone in Eastern Ohio, USA, *International Journal of Greenhouse Gas Controls*, DOI:10.1016/j.ijggc.2007.12.002.

2008 * | Ross, H. E. and M.D. Zoback, Sub-hydrostatic pore pressure in coalbed and sand aquifers of the Powder River Basin, WY and MT, and implications for disposal of coalbed-methane -produced water through injection, *Rocky Mountain Geology*, v.43, p. 155-169.

2008 | Lucier, A., M.D. Zoback, V. Heesackers and Z. Reches, Constraining the far-field stress state near a deep South African Gold Mine, ARMA 08-141, in 42nd US Rock Mechanics Symposium, San Francisco, CA.

2008 * | Paul, P. and M.D. Zoback, Wellbore stability study for the SAFOD borehole through the San Andreas Fault, SPE 102781, SPE Drilling and Completion, Dec., 2008, p. 394-408.

2007 * | Colmenares, Lourdes B. and M.D. Zoback, Hydraulic fracturing and wellbore completion of coalbed methane (CBM) wells in the Powder River Basin, Wyoming: Implications for water and gas production, *American Association of Petroleum Geologists Bulletin*, 91,51-67.

2007 * | Chan, A.W. and M.D. Zoback, The Role of Hydrocarbon Production on Land Subsidence and Fault Reactivation in the Louisiana Coastal Zone, *Journal of Coastal Research*, DOI: 10.2112/05-0553,771-786.

2007 * | Hagin, P., Sleep, N.H. and M.D. Zoback, Application of rate-and-state friction laws to creep compaction of unconsolidated sand under hydrostatic loading conditions, *Jour. Geophys. Res.*, 112, DOI:10.1029/2006JB004286.

2007 * | Hagin, P. and M.D. Zoback, A dual power law model for prediction and monitoring of long-term compaction in unconsolidated reservoir sands, *Geophysics*,72(5),E165-E173.

2007 | Zoback, M.D., *Reservoir Geomechanics: Earth Stress and Rock Mechanics Applied to Exploration, Production and Wellbore Stability*, Cambridge Press, Cambridge Press, 449 pp.

2007 | Sleep, N.H. and M.D. Zoback, Did Earthquakes Keep the Early Crust Habitable?, *Astrobiology*,7 (6), DOI:10.1089/ast.2006.0091.

2007 * | Wu, H-Y, K-F Ma, M.D. Zoback, N. Boness, H. Ito, J-H Hung and S. Hickman, Stress orientations of Taiwan Chelungpu-Fault Drilling Project (TCDP) hole-A as observed from geophysical logs, *Geophys. Res. Lett.*, 34 (L01303).

- 2007 * | Fernandez-Ibanez, F., J.I. Soto, M.D. Zoback and J. Morales, Present-day stress field in the Gibraltar Arc (Western Mediterranean), *Jour. Geophys. Res.*, 112, B08404 DOI 10.1029/2006JB004683.
- 2007 | Harms, U., C. Koeberl and M.D. Zoback (eds), *Continental Scientific Drilling*, (Springer-Verlag, Heidelberg, 366 pp.
- 2007 | Zoback, M.D., S. Hickman and W. Ellsworth, The role of fault zone drilling, in *Earthquake Seismology - Treatise on Geophysics Vol. 4*, ed. H. Kanamori and G. Schubert, Elsevier Ltd., Amsterdam, 649-674.
- 2007 | Zoback, M.L. and Zoback, M.D., Lithosphere Stress and Deformation, in *Earthquake Seismology - Treatise on Geophysics Vol. 6*, ed. A. Watts and G. Schubert, Elsevier Ltd., Amsterdam, 253-274.
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1996 * | See a list of Mark's prior Publications

Advisee Degrees

2012 | Hiroki Sone: Mechanical Properties of Shale Gas Reservoir Rocks and Its Relation to the In-Situ Stress Variation Observed in Shale Gas Reservoirs, Ph.D. (GeoForschungsZentrum)

2011 | John Vermilyen: Geomechanical Studies of the Barnett Shale, Texas, USA, Ph.D. (McKinsey & Co.)

2008 | Laura Chiaramonte: Geomechanical Characterization and Reservoir Simulation of a CO2 Sequestration Project in a Mature Oil Field, Teapot Dome, WY, Ph.D. (Lawrence Berkeley National Laboratory)

2007 | Pijush Paul: A methodology for incorporating geomechanically-based fault damage zone models into reservoir simulation, Ph.D. (ConocoPhillips)

2007 | Hannah Ross: Carbon Dioxide Sequestration and Enhanced Coalbed Methane Recovery in unmineable coalbeds of the powder river basin, Wyoming, Ph.D. (BP)

2007 | Amy Day-Lewis: Characterization and modeling of in situ stress heterogeneity, Ph.D. (GMI)

2007 | Ellen Mallman: Stress triggering of earthquakes and subsidence in the Louisiana coastal zone due to hydrocarbon production, Ph.D. (BP)

2007 | Amie Lucier: Geomechanical Analysis applied to geological carbon dioxide sequestration, induced seismicity in deep mines, and detection of stress-induced seismicity in deep mines, and detection of stress-induced velocity anisotropy in sub-salt environments, Ph.D. (Shell)

2007 | John Vermilyen, M.S. (PhD student Stanford)

2005 | Naomi Boness: Physical properties and multi-scale seismic anisotropy in the crust surrounding the San Andreas fault near Parkfield, CA., Ph.D. (ChevronTexaco)

2004 | Lourdes Colmenares: Geomechanics and the Effectiveness of Wellbore Completion Methods of Coalbed Methane Wells in the Powder River Basin, Ph.D. (Language School, Switzerland)

2004 | Sang-Min Kim, M.S. (PhD Student, Univ. of California, Berkeley)

2004 | Alvin Wing-Ka Chan: Louisiana Coastal Wetland Loss: The role of Hydrocarbon Production, Ph.D. (Shell Oil Co., Houston, TX)

2003 | John Townend: Mechanical constraints on the strength of the lithosphere and plate-bounding faults, Ph.D. (Victoria University of Wellington, Wellington, New Zealand)

2003 | Paul Hagin: Application of viscoelastic models and rate-and-state friction laws to the mechanics of unconsolidated sands, Ph.D. (Stanford University Crustal Mechanics Laboratory)

2002 | Stephanie Prejean: The interaction between tectonic and magmatic processes in Long Valley Caldera, California, Ph.D. (U.S. Geological Survey, Menlo Park, CA 94025)

2001 | David Wiprut: Stress, Borehole Stability, and Hydrocarbon Leakage in the Northern

North Sea, Ph.D. (GeoMechanics International, Houston, TX)

2000 | Balz Grollmund: Impact of deglaciation on stress and implications for seismicity and hydrocarbon exploration, Ph.D. (Swiss Reinsurance, Zurich, Switzerland)

1999 | Thomas Finkbeiner: In-situ stress, pore pressure, and hydrocarbon migration and accumulation in sedimentary basins, Ph.D. (Geomechanics Int., Abu Dhabi)

1998 | Sneha Dholakia (with Pollard) (GES), M.S. (BP, Houston, TX)

1998 | Stacy Kerkela, M.S. (Vestek Systems, San Francisco, CA)

1998 | Carl Chang: Time-dependent deformation of unconsolidated reservoir rocks, Ph.D. (Agilent Technology Palo Alto, CA)

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