

Peter Eichhubl

Professional Summary

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Business address: The University of Texas at Austin
Bureau of Economic Geology
University Station, Box X
Austin, TX 78713-8924
Telephone: (512) 475-8829
E-mail address: peter.eichhubl@beg.utexas.edu

Professional Preparation

Academic Background

Ph.D. Geology, University of California, Santa Barbara, September 1997

M.S. Geology, University of Vienna, Austria, June 1989

Areas of Expertise

Areas of Expertise

Diagenesis and low-temperature geochemistry

Fault and fracture mechanics

Fluid flow and transfer processes in sedimentary basins

Awards

Awards and Honorary Societies

AAPG Energy Minerals Division President's Certificate for Excellence in Presentation Award (co-author), 2012

SEPM Recognition for an Excellent Technical Presentation, SEPM Annual Meeting (co-author), 2011

Postdoctoral Fellowship, Monterey Bay Aquarium Research Institute, 1998 - 2001

G. K. Gilbert Award, Department of Geological Sciences, University of California, Santa Barbara, 1996 - 1997

Outstanding Student Research Award, Geological Society of America, 1992

Department Regents Fellowship, University of California, Santa Barbara, 1991

Recognition of Achievement, Amoco Production Corporation, 1991

University of Vienna student grant, 1990

University of Vienna student grant, 1988

University of Vienna student grant, 1987

University of Vienna Faculty of Sciences Merit Scholarship, 1985

Service

University Committees

Member, Graduate Studies Committee, Jackson School of Geosciences, UT Austin, Austin, Tex., September 2016-May 2017

Member, Strategic Planning Committee, Jackson School of Geosciences, The University of Texas at Austin, June 2015-Present

Proposal Review Panels Participation

U.S. Department of Energy (DOE) (Energy Frontier Research Centers), 2018

Teaching and Advising

Student Committee Supervision

Supervisor, M.S. Thesis Committee, Adenike Tokan-Laval, Understanding fluid flow in rough-walled fractures using x-ray microtomography images, The University of Texas at Austin, completed, 2015

Supervisor, M.S. Thesis Committee, Canalp Ozkul, Fracture abundance and strain in folded Cardium sandstone, Alberta fold-and-thrust belt, The University of Texas at Austin, completed, 2014

Supervisor, M.S. Thesis Committee, Yaser Al Zayer, Fracture opening kinematics in tight sandstone reservoirs, The University of Texas at Austin, completed, 2014

Co-Supervisor, M.S. Thesis Committee, Celia Xu, The University of Texas at Austin, Department of Geological Sciences, completed, 2012

Supervisor, Ph.D. Dissertation Committee, Jonathan Major, The University of Texas at Austin, in progress, 2012

Supervisor, Ph.D. Dissertation Committee, Owen Callahan, The University of Texas at Austin, in progress, 2012

Supervisor, M.S. Thesis Committee, Alex Urquhart, The University of Texas at Austin, completed, 2011

Co-Supervisor, M.S. Thesis Committee, Magdalena Ellis, The University of Texas at Austin, 2009

Co-Supervisor, M.S. Thesis Committee, Peter Hargrove, The University of Texas at Austin, Department of Geological Sciences, completed, 2009

Co-Supervisor, Ph.D. Dissertation Committee, Nick Davatzes, University of California, Stanford, 2003

Student Committee Participation

Examining member, Ph.D. Dissertation Committee, Russell Wirkus Carter, Fluid characterization at the Cranfield CO₂ injection site: Quantitative seismic interpretation from rock-physics modelling and seismic inversion, The University of Texas at Austin, Austin, TX, 2014

External Examiner, Ph.D. Dr. rer. nat. Committee, Christopher Tuitz, University of Vienna, Austria, completed, 2012

Member, M.S. Reading Committee Committee, Karen Black, The University of Texas at Austin, completed, 2012

Member, Ph.D. Dissertation Committee, John Hooker, The University of Texas at Austin, reading committee, 2012

Member, Ph.D. Oral Exam Committee Committee, Harpeeth Singh, The University of Texas at Austin, Austin, Texas, 2012

Member, Ph.D. Reading Committee Committee, Margaret Dalthorp, Texas A&M University, Corpus Christi, completed, 2012

Member, Ph.D. Dissertation Committee, Lindsay Olinde, The University of Texas at Austin, orals committee, 2011

Member, Ph.D. Dissertation Committee, William Burnett, Department of Geological Sciences: The University of Texas at Austin, completed, 2011

Member, Ph.D. Dissertation Committee, Ran Chen, The University of Texas at Austin, Department of Civil Engineering, completed, 2010

Member, Ph.D. Dissertation Committee, Aysen Ozkan, Opening History of Fractures in Sandstone: The University of Texas at Austin, Department of Geological Sciences, completed, 2009

Member, M.S. Thesis Committee, Natalia Kalitynska, The University of Texas at Austin, 2006

Member, Advancement Dissertation Committee, Christie Rowe, University of California, Santa Cruz, 2005

Presentations

Invited Presentations

Geomechanics of CO₂ Reservoir Seals: presented to National Energy Technology Laboratory, presented at Mastering the Subsurface through Technology, Innovation and Collaboration: Carbon Storage and Oil and Natural Gas Technologies Review Meeting, Pittsburgh, Pa., August 1-3, 2017.

Digital rocks portal data management, visualization, and simulation: presented to Royal Microscopical Society Tomography for Scientific Advancement (ToScA), Austin, Tex., June 8, 2017.

Geomechanics of induced seismicity: presented to Department of Geology and Geophysics, University of Utah, Salt Lake City, Utah, March 24, 2017.

Natural fracture growth in unconventional hydrocarbon reservoirs: Rates, mechanisms, and implications for flow: presented to Energy and Geoscience Institute, University of Utah, Salt Lake City, Utah, March 23, 2017.

Activities of a Professional Nature

Activities of a Professional Nature

Session convenor, chair, GSA Annual Meeting, Seattle, Wash., Session T217. Challenges in Tectonics: Synergies between Meeting Societal Needs and Advancing Interdisciplinary Research in Tectonics and Structural Geology (October 22, 2017)

Publications

Peer Reviewed Journal Articles

Callahan, O., Eichhubl, P., Olson, J. E., and Davatzes, N. C., 2019, Fracture mechanical properties of damaged and hydrothermally altered rocks, Dixie Valley-Stillwater Fault Zone, Nevada, USA: *Journal of Geophysical Research: Solid Earth*, v. 124, p. 4069-4090, <http://doi.org/10.1029/2018JB016708>.

Chen, X., Eichhubl, P., Olson, J. E., and Dewers, T. A., 2019, Effect of water on fracture mechanical properties of shales: *Journal of Geophysical Research: Solid Earth*, v. 124, p. 2428-2444, <http://doi.org/10.1029/2018JB016479>.

Fan, Z., Eichhubl, P., and Newell, P., 2019, Basement fault reactivation by fluid injection into sedimentary reservoirs: poroelastic effects: *Journal of Geophysical Research-Solid Earth*, v. 124, p. 7354-7369, <http://doi.org/10.1029/2018JB017062>.

Aman, M., Espinoza, D. N., Ilgen, A. G., Major, J. R., Eichhubl, P., and Dewers, T. A., 2018, CO₂-induced chemo-mechanical alteration in reservoir rocks assessed via batch reaction experiments and scratch testing: *Greenhouse Gases: Science and Technology*, v. 8, p. 133-149, <http://doi.org/10.1002/ghg.1726>.

- Dewers, T., Eichhubl, P., Ganis, B., Gomez, S., Heath, J., Jammoul, M., Kobos, P., Liu, R., Major, J., Matteo, E., Newell, P., Rinehart, A., Sobolik, S., Stormont, J., Reda Taha, M., Wheeler, M., and White, D., 2018, Heterogeneity, pore pressure, and injectate chemistry: control measures for geologic carbon storage: *International Journal of Greenhouse Gas Control*, v. 68, p. 203-215, <http://doi.org/10.1016/j.ijggc.2017.11.014>.
- Espinoza, D. N., Jung, H., Major, J. R., Sun, Z., Ramos, M. J., Eichhubl, P., Balhoff, M. T., Choens, R. C., and Dewers, T. A., 2018, CO₂ charged brines changed rock strength and stiffness at Crystal Geyser, Utah: implications for leaking subsurface CO₂ storage reservoirs: *International Journal of Greenhouse Gas Control*, v. 73, no. 6, p. 16-28, <http://doi.org/10.1016/j.ijggc.2018.03.017>.
- Major, J. R., Eichhubl, P., Dewers, T. A., and Olson, J. E., 2018, Effect of CO₂-brine-rock interaction on fracture mechanical properties of CO₂ reservoirs and seals: *Earth and Planetary Science Letters*, v. 499, p. 37-47, <http://doi.org/10.1016/j.epsl.2018.07.013>.
- Chen, X., Eichhubl, P., and Olson, J. E., 2017, Effect of water on critical and subcritical fracture properties of Woodford shale: *Journal of Geophysical Research: Solid Earth*, v. 122, no. 4, p. 2736-2750, <http://doi.org/10.1002/2016JB013708>.
- Landry, C. J., Prodanovic, M., and Eichhubl, P., 2017, Comment on Xu et al., 2017: *AIChE Journal*, v. 63, no. 10, p. 4717-4718, <http://doi.org/10.1002/aic.15823>.
- Newell, P., Martinez, M. J., and Eichhubl, P., 2017, Impact of layer thickness and well orientation on caprock integrity for geologic carbon storage: *Journal of Petroleum Science and Engineering*, v. 155, p. 100-108, <http://doi.org/10.1016/j.petrol.2016.07.032>.
- Tokan-Lawal, A., Prodanovic, M., Landry, C. J., and Eichhubl, P., 2017, Influence of numerical cementation on multiphase displacement in rough fractures: *Transport in Porous Media*, v. 116, no. 1, p. 275-293, <http://doi.org/10.1007/s11242-016-0773-0>.
- Yoon, H., Major, J., Dewers, T., and Eichhubl, P., 2017, Application of a pore-scale reactive transport model to a natural analog for reaction-induced pore alterations: *Journal of Petroleum Science and Engineering*, v. 155, p. 11-20, <http://doi.org/10.1016/j.petrol.2017.01.002>.
- Fan, Z., Eichhubl, P., and Gale, J. F. W., 2016, Geomechanical analysis of fluid injection and seismic fault slip for the Mw4.8 Timpson, Texas, earthquake sequence: *Journal of Geophysical Research: Solid Earth*, v. 121, p. 2798-2812, <http://doi.org/10.1002/2016JB012821>.
- Landry, C. J., Eichhubl, P., Prodanovic, M., and Wilkins, S., 2016, Nanoscale grain boundary channels in fracture cement enhance flow in mudrocks: *Journal of Geophysical Research: Solid Earth*, v. 121, p. 3366-3376, <http://doi.org/10.1002/2016JB012810>.
- Landry, C. J., Prodanovic, M., and Eichhubl, P., 2016, Direct simulation of supercritical gas flow in complex nanoporous media and prediction of apparent permeability: *International Journal of Coal Geology*, v. 159, p. 120-134, <http://doi.org/10.1016/j.coal.2016.03.015>.
- Rinehart, A. J., Dewers, T. A., Broome, S. T., and Eichhubl, P., 2016, Effects of CO₂ on mechanical variability and constitutive behavior of the Lower Tuscaloosa Formation, Cranfield Injection Site, USA: *International Journal of Greenhouse Gas Control*, v. 53, p. 305-318, <http://doi.org/10.1016/j.ijggc.2016.08.013>.
- Ukar, E., Ozkul, C., and Eichhubl, P., 2016, Fracture abundance and strain in folded Cardium Formation, Red Deer River anticline, Alberta Foothills, Canada: *Marine and Petroleum Geology*, v. 76, p. 210-230, <http://doi.org/10.1016/j.marpetgeo.2016.05.016>.
- Alzayer, Y., Eichhubl, P., and Laubach, S. E., 2015, Non-linear growth kinematics of opening-mode fractures: *Journal of Structural Geology*, v. 74, p. 31-44, <http://doi.org/10.1016/j.jsg.2015.02.003>.
- Fall, A., Eichhubl, P., Bodnar, R. J., Laubach, S. E., and Davis, J. S., 2015, Natural hydraulic fracturing of tight-gas sandstone reservoirs, Piceance Basin, Colorado: *Geological Society of*

America Bulletin, v. 127, no. 1-2, p. 61-75, <http://doi.org/10.1130/B31021.1>.

Hooker, J.N., Larson, T., Eakin, A., Laubach, S. E., Eichhubl, P., Fall, A., and Marrett, R., 2015, Fracturing and fluid flow in a sub-décollement sandstone; or, a leak in the basement: *Journal of the Geological Society*, v. 172, p. 428-442, <http://doi.org/10.1144/jgs2014-128>, <http://jgs.lyellcollection.org/content/172/4/428.full.pdf+html>.

Tokan-Lawal, A., Prodanovic, M., and Eichhubl, P., 2015, Investigating flow properties of partially cemented fractures in Travis Peak Formation using image-based pore scale modeling: *Journal of Geophysical Research: Solid Earth*, v. 120, no. 8, p. 5453-5466, <http://doi.org/10.1002/2015JB012045>.

Altman, S. J., Aminzadeh, B., Balhoff, M. T., Bennett, P. C., Bryant, S. L., Cardenas, M. B., Chaudhary, K., Cygan, R. T., Deng, W., Dewers, T., DiCarlo, D. A., Eichhubl, P., Hesse, M. A., Huh, C., Matteo, E. N., Mehmani, Y., Tenney, C. M., and Yoon, H., 2014, Chemical and hydrodynamic mechanisms for long-term geological carbon storage: *The Journal of Physical Chemistry C*, v. 118, no. 28, p. 15103-15113, <http://doi.org/10.1021/jp5006764>.

Gale, J. F. W., Laubach, S. E., Olson, J. E., Eichhubl, P., and Fall, A., 2014, Natural fractures in shale: a review and new observations: *AAPG Bulletin*, v. 98, no. 11, p. 2165-2216, <http://doi.org/10.1306/08121413151>.

Laubach, S. E., Eichhubl, P., Hargrove, P., Ellis, M. A., and Hooker, J. N., 2014, Fault core and damage zone fracture attributes vary along strike owing to interaction of fracture growth, quartz accumulation, and differing sandstone composition: *Journal of Structural Geology*, v. 68, Part A, p. 207-226, <http://doi.org/10.1016/j.jsg.2014.08.007>.

Ellis, Magdalena, Laubach, S. E., Eichhubl, P., Olson, J., and Hargrove, Peter, 2012, Fracture development and diagenesis of Torridon Group Applecross Formation, near An Teallach, NW Scotland: millennia of brittle deformation resilience: *Journal of the Geological Society, London*, v. 169, p. 297-310, <http://doi.org/10.1144/0016-76492011-086>, 2012 Top 10 'Most Read' (downloads) for journal, according to publisher.

Fall, A., Eichhubl, P., Cumella, S. P., Bodnar, R. J., Laubach, S. E., and Becker, S. P., 2012, Testing the basin-centered gas accumulation model using fluid inclusion observations: Southern Piceance Basin, Colorado: *AAPG Bulletin*, v. 96, no. 12, p. 2297-2318.

Mehmani, Y., Sun, T., Balhoff, M., Eichhubl, P., and Bryant, S., 2012, Multiblock pore-scale modeling and upscaling of reactive transport: application to carbon sequestration: *Transport in Porous Media*, v. 95, p. 305-326.

Hooker, J. N., Laubach, S. E., Gomez, L. A., Marrett, R. A., Eichhubl, P., Diaz Tushman, K., and Pinzon, E. A., 2011, Fracture size, frequency, and strain in the Cambrian Eriboll Formation sandstones, NW Scotland: *Scottish Journal of Geology*, v. 47, p. 45-56.

Sun, W., Andrade, J. E., Rudnicki, J. W., and Eichhubl, P., 2011, Connecting microstructural attributes and permeability from 3D tomographic images of in situ shear-enhanced compaction bands using multiscale computations: *Geophysical Research Letters*, v. 38, L10302, [doi:10.1029/2011GL047683](http://doi.org/10.1029/2011GL047683).

Becker, S. P., Eichhubl, P., Laubach, S. E., Reed, R. M., Lander, R. H., and Bodnar, R. J., 2010, A 48 m.y. history of fracture opening, temperature, and fluid pressure: Cretaceous Travis Peak Formation, East Texas Basin: *Geological Society of America Bulletin*, v. 122, no. 7/8, p. 1081-1093.

Eichhubl, P., Hooker, J. N., and Laubach, S. E., 2010, Pure and shear-enhanced compaction bands in Aztec Sandstone: *Journal of Structural Geology*, v. 32, p. 1873-1886.

Laubach, S. E., Eichhubl, P., Hilgers, C., and Lander, R. H., 2010, Structural diagenesis: *Journal of Structural Geology*, v. 32, no. 4, p. 1866-1872.

Eichhubl, P., Davatzes, N. C., and Becker, S. P., 2009, Structural and diagenetic control of fluid

- migration and cementation along the Moab fault, Utah: AAPG Bulletin, v. 93, no. 5, p. 653-681.
- Appold, M. S., Garven, G., Boles, J. R., and Eichhubl, P., 2007, Numerical modeling of the origin of calcite mineralization in the Refugio-Carneros fault, Santa Barbara Basin, California: *Geofluids*, v. 7, p. 79-95.
- Naehr, T. H., Eichhubl, P., Orphan, V. J., Hovland, M., Paull, C. K., Ussler, W. III, Lorenson, T. D., and Greene, H. G., 2007, Authigenic carbonate formation at hydrocarbon seeps in continental margin sediments: a comparative study: *Deep-Sea Research Part II: Topical Studies in Oceanography*, v. 54, no. 11-13, p. 1268-1291.
- Aydin, A., Borja, R. I., and Eichhubl, Peter, 2006, Geological and mathematical framework for failure modes in granular rock. *Journal of Structural Geology*, vol. 28, no. 1, p. 83-98. [most cited paper in *Journal of Structural Geology*, 1/2005-6/2012]
- Greene, H. G., Murai, L. Y., Watts, P., Maher, N. A., Fisher, M. A., Paull, C. E., and Eichhubl, P., 2006, Submarine landslides in the Santa Barbara Channel as potential tsunami sources, in *Tsunami hazard from slope instability: Natural Hazards and Earth System Sciences*, v. 6, p. 63-88.
- Davatzes, N. C., Eichhubl, Peter, and Aydin, A., 2005, Structural evolution of fault zones in sandstone by multiple deformation mechanisms: Moab fault, SE Utah: *Geological Society of America Bulletin*, v. 117, no. 1/2, p. 135-148.
- Eichhubl, Peter, D'Onfro, P., Aydin, A., Waters, J., and McCarty, D. K., 2005, Structure, petrophysics, and diagenesis of shale entrained along a normal fault, Black Diamond Mines, California--implications for fault seal: *AAPG Bulletin*, v. 89, no. 9, p. 1113-1137.
- Boles, J. R., Eichhubl, Peter, Garven, G., and Chen, J., 2004, Evolution of a hydrocarbon migration pathway along basin-bounding faults: evidence from fault cement: *AAPG Bulletin*, v. 88, no. 7, p. 947-970.
- Eichhubl, Peter, 2004, Growth of ductile opening-mode fractures in geomaterials, in Cosgrove, J. W., and Engelder, T., eds., *The initiation, propagation, and arrest of joints and other fractures: interpretations based on field observations: Geological Society of London Special Publication*, v. 231, p. 11-24.
- Eichhubl, Peter, Taylor, W. L., Pollard, D. D., and Aydin, A., 2004, Paleo-fluid flow and deformation in the Aztec Sandstone at the Valley of Fire, Nevada--evidence for the coupling of hydrogeologic, diagenetic, and tectonic processes: *Geological Society of America Bulletin*, v. 116, no. 9, p. 1120-1136.
- Davatzes, N. C., Aydin, A., and Eichhubl, Peter, 2003, Overprinting faulting mechanisms during the development of multiple fault sets in sandstone, Chimney Rock fault array, Utah, USA: *Tectonophysics*, v. 363, no. 1-2, p. 1-18.
- Eichhubl, Peter, and Aydin, A., 2003, Ductile opening-mode fracture by pore growth and coalescence during combustion alteration of siliceous mudstone: *Journal of Structural Geology*, v. 25, no. 1, p. 121-134.
- Du Bernard, X., Eichhubl, Peter, and Aydin, A., 2002, Dilation bands: a new form of localized failure in granular media: *Geophysical Research Letters*, v. 29, no. 24, 10.1029/2002GL015966.
- Eichhubl, Peter, Greene, H. G., and Maher, N., 2002, Physiography of an active transpressive margin basin: high-resolution bathymetry of the Santa Barbara basin, Southern California continental borderland: *Marine Geology*, v. 184, no. 1/2, p. 95-120.
- Lore, J., Eichhubl, Peter, and Aydin, A., 2002, Alteration and fracturing of siliceous mudstone during in situ combustion, Orcutt field, California: *Journal of Petroleum Science and Engineering*, v. 36, no. 3-4, p. 169-182.
- Eichhubl, Peter, Aydin, A., and Lore, J., 2001, Opening-mode fracture in siliceous mudstone at

high homologous temperature-effect of surface forces: *Geophysical Research Letters*, v. 28, no. 7, p. 1299-1302.

Eichhubl, Peter, and Boles, J. R., 2000, Focused fluid flow along faults in the Monterey Formation, coastal California: *Geological Society of America Bulletin*, v. 112, no. 11, p. 1667-1679.

Eichhubl, Peter, and Boles, J. R., 2000, Rates of fluid flow in fault systems--evidence for episodic fluid flow in the Miocene Monterey Formation, coastal California: *American Journal of Science*, v. 300, no. 7, p. 571-600.

Eichhubl, Peter, Greene, H. G., Naehr, T., and Maher, N., 2000, Structural control of fluid flow: offshore fluid seepage in the Santa Barbara basin, California: *Journal of Geochemical Exploration*, v. 69-70, p. 545-549.

Eichhubl, Peter, and Behl, R. J., 1998, Diagenesis, deformation, and fluid flow in the Miocene Monterey Formation of coastal California, in Eichhubl, P., ed., *Diagenesis, deformation, and fluid flow in the Miocene Monterey Formation of coastal California: SEPM Pacific Section Special Publication*, v. 83, p. 5-13.

Non Peer Reviewed Authored Books

Eichhubl, Peter, ed., 1998, *Diagenesis, deformation, and fluid flow in the Miocene Monterey Formation of coastal California: SEPM Pacific Section Special Publication*, v. 83, 98 p.

Non Peer Reviewed Journal Articles

Fall, A., Eichhubl, P., and Laubach, S. E., 2013, Timing and processes of fracture formation in tight-gas sandstone reservoirs using fluid inclusions: *Proceedings of the Unconventional Resources Technology Conference (URTeC)*, Denver, Colorado, USA, no. SPE-168833-MS, 6 p., <http://doi.org/10.1190/URTEC2013-173>.

Fall, A., Eichhubl, Peter, and Laubach, S. E., 2013, Timing and Processes of Fracture Formation in Tight-Gas Sandstone Reservoirs Using Fluid Inclusions: *Proceedings of the Unconventional Resources Technology Conference (URTeC)* Denver, Colorado, USA, 12-14 August, URTeC Control ID Number: 1582124, 6 p.

Fall, A., Eichhubl, Peter, and Laubach, S. E., 2013, Timing and processes of fracture formation in tight-gas sandstone reservoirs using fluid inclusions: *Unconventional Resources Technology Conference (URTeC)*, Denver, Colorado, USA, 12-14 August 2013, URTeC Control ID 1582124.

Fall, A., Eichhubl, Peter, and Laubach, S. E., 2013, Timing and processes of fracture formation in tight-gas sandstone reservoirs using fluid inclusions: *Unconventional Resources Technology Conference*, Denver, Colorado, USA, 12-14 August 2013, URTeC Control ID 1582124.

Pommer, L., Gale, J. F. W., Eichhubl, P., Fall, A., and Laubach, S. E., 2013, Using structural diagenesis to infer the timing of natural fractures in the Marcellus Shale: *Proceedings of the Unconventional Resources Technology Conference (URTeC)*, Denver, Colorado, USA, no. SPE-168770-MS, 6 p., <http://doi.org/10.1190/URTEC2013-167>.

Pommer, L., Gale, Julia F. W., Eichhubl, Peter, Fall, A., and Laubach, S. E., 2013, Using structural diagenesis to infer the timing of natural fractures in the Marcellus Shale: *Proceedings of the Unconventional Resources Technology Conference (URTeC)* Denver, Colorado, USA, 12-14 August, URTeC Control ID Number: 1580135, 6 p.

Tokan-Lawal, A., Prodanovic, M., and Eichhubl, Peter, 2013, Image-based modeling of flow in natural partially cemented fractures: *Unconventional Resources Technology Conference (URTeC)*, Denver, Colorado, 12-14 August 2013, URTeC Control ID 158163.

Eichhubl, P., and Gale, J. F. W., 2011, Fractured mudrock reservoirs of the Monterey and Sisquoc formations of southern California: *FRAC Research Meeting Santa Barbara, California*, November 8-10, 134 p.

Hooker, J. N., Laubach, S. E., Kaylor, A., Eichhubl, P., and Fall, A., 2011, Size, spacing, and opening history of natural fractures: preliminary results from the El Alamar Formation, northeastern Mexico: Gulf Coast Association of Geological Societies Transactions, v. 61, p. 233-243.

Laubach, S. E., Olson, J. E., Eichhubl, P., Fomel, S. B., and Marrett, R. A., 2010, Natural fractures from the perspective of diagenesis: CSEG Recorder, September, p. 26-31.

Olson, J. E., Laubach, S. E., and Eichhubl, P., 2010, Estimating natural fracture producibility in tight gas sandstones: The Leading Edge, v. 29, no. 12, p. 1494-1499.

Eichhubl, Peter, 2009, Valley of Fire, Nevada, in Laubach, S. E., and Tinker, S. W., eds., 2009, Earth's art: celebrating the Centennial of the Bureau of Economic Geology, 1909-2009: The University of Texas at Austin, Bureau of Economic Geology, p. 34-35.

Laubach, S. E., Olson, J., and Eichhubl, Peter, 2009, Fracture diagenesis and producibility in tight gas sandstones, in Carr, T., D'agostino, T., Ambrose, W., Pashin, J., and Rosen, N. C., eds. Unconventional energy resources: making the unconventional conventional: 29th Annual GCSSEPM Foundation Bob F. Perkins Research Conference, December 6-8, Houston, p. 483-499.

Eichhubl, P., 2008, Diagenesis, deformation, and fluid flow in the Miocene Monterey Formation fo California: Santa Barbara-Lompoc-Jalama Beach: FRAC Research Meeting Santa Barbara, California, November 10-13, 115 p.

Laubach, S. E., Olson, J. E., Eichhubl, P., and Lander, R. H., 2006, Accurate and verifiable interwellbore fracture attribute predictions, in Proceedings, European Association of Geoscientists & Engineers, 68th EAGE Conference & Exhibition, June 12-15, Vienna, Austria, CD-ROM [4 p.].

Eichhubl, Peter, and Flodin, E., 2005, Brittle deformation, fluid flow, and diagenesis in sandstone at Valley of Fire State Park, Nevada, in Pederson, J., and Dehler, C. M., eds., Interior Western United States: Geological Society of America Field Guides, v. 6, p. 151-167, doi: 10.1130/2005.fld006(07).

Eichhubl, Peter, and Boles, J. R., 1998, Vein formation in relation to burial diagenesis in the Miocene Monterey Formation, Arroyo Burro Beach, Santa Barbara, California, in Eichhubl, P., ed., Diagenesis, deformation, and fluid flow in the Miocene Monterey Formation of coastal California: SEPM Pacific Section Special Publication, v. 83, p. 15-36.

Eichhubl, Peter, and Boles, J. R., 1997, Scale and dynamics of fracture-related fluid flow in the Miocene Monterey Formation, coastal California, in Hendry, J., Carey, P., Parnell, J., Ruffell, A., and Worden, R., eds., Proceedings, Geofluids II, Belfast, Queen's University, p. 81-84.

Guidebooks

Eichhubl, P., and Elliott, S., 2014, Structural diagenesis field trip--Las Vegas, Valley of Fire, San Rafael Desert, Green River, Moab, and Grand Junction, The University of Texas at Austin, Bureau of Economic Geology, 95 p.

Ukar, E., Fermor, P., and Eichhubl, P., 2013, Fractured unconventional reservoirs in the Alberta Foothills, Canada: Guidebook for the FRAC IA Consortium Annual Meeting September 12-14, 2013 Field Trip, with contributions by D. Meloche and R. Marrett 59 p.

Eichhubl, P., and Flodin, E., 2007, Brittle deformation, fluid flow, and diagenesis in an exhumed analog of a sandstone reservoir, Valley of Fire State park, Nevada: FRAC Research Meeting, Las Vegas, Nevada, October 15-17, 2007,; FRAC Research Meeting, Las Vegas, Nevada, October 15-17 37 p.

Eichhubl, P., and Flodin, E., 2005, Brittle deformation, fluid flow, and diagenesis in sandstone at Valley of Fire State Park, Nevada, in Pederson, J., and Dehler, C. M., eds., Interior western United States: Geological Society of America Field Guides, p. 151-167.

Eichhubl, Peter, 2004, Field trip to the San Andreas fault and related structures at Point Reyes Peninsula, California, in Proceedings of the 2004 Stanford Rock Fracture Project: Stanford University California, 23 p.

Eichhubl, P., Muller, J., and Aydin, A., 2003, Deformation structures in poorly consolidated sediments in a compressional setting, northern California, in Proceedings of the 2003 Stanford Rock Fracture Project: Stanford University 35 p.

Aydin, A., Muller, J., Bergbauer, S., Eichhubl, P., and Du Bernard Rochy, X., 2002, Fractures and faults in basaltic volcanic and granitic intrusive rocks, Donner Pass, Sierra Nevada: Proceedings of the 2002 Stanford Rock Fracture Project: 35 p.

Aydin, A., Davatzes, N., and Eichhubl, P., 2001, Fractures and faults in sandstone--Moab revisited: proceedings, Stanford Rock Fracture Project: Stanford University 70 p.

Aydin, A., Eichhubl, P., Girbacea, R., Jacobs, J., Pollard, D., and Taylor, W. L., 1998, Recently active segments of the San Andreas Fault and structural heterogeneities and fluid flow in outcrops of Laguna and Pescadero Beach: Proceedings, Stanford Rock Fracture Project: Stanford University 60 p.

Eichhubl, Peter, and Behl, R. J., 1998, Field guide to "Diagenesis, deformation, and fluid flow in the Miocene Monterey Formation": Ventura--Santa Barbara--Jalama Beach--Grefco Quarry/Lompoc, in in Eichhubl, P., ed., Diagenesis, deformation, and fluid flow in the Miocene Monterey Formation of coastal California: SEPM Pacific Section Special Publication, p. 85-98.

Conference Proceedings

Landry, C. J., Prodanovi, M., Reed, R. M., Eichhubl, P., and Mohanty, K., 2017, Estimating mudrock oil-water relative permeability curves using digital rock physics, Unconventional Resources Technology Conference, No. 2691701, Austin, Tex., 21 p.

Zhu, C., Fan, Z. Q., and Eichhubl, P., 2017, The Effect of Variable Fluid Injection Rate on the Stability of Seismogenic Faults, American Rock Mechanics Association (ARMA), 51st U.S. Rock Mechanics/Geomechanics Symposium, San Francisco, Calif., 7 p.

Landry, C. J., Prodanovic, M., and Eichhubl, P., 2015, Slip-flow in complex porous media as determined by Lattice Boltzmann modeling, Unconventional Resources Technology Conference (URTeC), San Antonio, Texas, 19 p.

Landry, C. J., Eichhubl, P., Prodanovic, M., and Tokan-Lawal, A., 2014, Matrix-fracture connectivity in Eagle Ford Shale, URTeC, ePaper, no. 1922708.

Tokan-Lawal, A., Prodanovic, M., Landry, C. J., and Eichhubl, P., 2014, Understanding tortuosity and permeability variations in naturally fractured reservoirs: Niobara formation, URTeC, ePaper, no. 1922870.

Contract Reports

Newell, P., and Eichhubl, P., 2017, Geomechanics of Induced Seismicity in CO2 Reservoirs, Sandia Report SAND2017-10472: Sandia National Laboratories, Final report prepared for Sandia National Laboratories, 20 p.

Eichhubl, P., 2015, Density of cataclastic deformation bands in Cedar Mesa, Wingate, and Navajo Formations, San Rafael Monocline, and Comb Ridge, Utah: prepared for industry, 4 p.

Elliott, S., and Eichhubl, P., 2015, Flow properties of deformation bands in sandstone reservoir outcrop analogs: Final Report prepared for Shell, 28 p.

Frohlich, C., Gale, J. F. W., and Eichhubl, P., 2015, Relationships between Induced seismicity and fluid Injection development of strategies to manage fluid disposal in shale hydrocarbon plays: Final Report prepared for Research Partnership to Secure Energy for America (RPSEA), under contract no. 11122427, 146 p.

Elliott, S., Eichhubl, P., and Landry, C. J., 2014, Flow properties of deformation bands in sandstone reservoir outcrop analogs: Annual Report prepared for Shell, 29 p.

Fall, A., and Eichhubl, P., 2014, SHELL-FRAC collaboration: Fracture cement petrography and fluid inclusion assessment, Niobrara Formation: final report prepared for Royal Dutch Shell, 22 p.

Fall, A., and Eichhubl, P., 2014, SHELL-FRAC collaboration: Fracture cement petrography and fluid inclusion assessment, Vaca Muerta Formation, Argentina: final report prepared for Royal Dutch Shell, 10 p.

Black, K., Eichhubl, Peter, and Fall, A., 2013, Natural fracture petrography Grosmont Formation: The University of Texas at Austin, Bureau of Economic Geology, contract report prepared for Shell International Exploration and Production, Inc., 59 p., 59 p.

Eichhubl, Peter, Black, K., and Fall, A., 2013, Fracture cement petrography and fluid inclusion analysis, Niobrara Formation: The University of Texas at Austin, Bureau of Economic Geology, contract report prepared for Anadarko, 49 p.

Ukar, E., Eichhubl, Peter, and Laubach, S. E., 2013, Distribution and characteristics of natural fractures in outcrop and core, Nikanassin Formation, Alberta Foothills, Canada: Implications for natural and hydraulic fracture interaction: Shell / UT Unconventional Research, Interim Report, SUTUR Task 5, 91 p + figures and tables.

Eichhubl, P., Black, K., and Fall, A., 2012, Anadarko-FRAC collaboration: Fracture cement petrography and fluid inclusion analysis, Niobrara Formation: final report prepared for Anadarko Petroleum, 49 p.

Laubach, S. E., Olson, J. E., Lander, R. H., Eichhubl, P., and Bonnell, L. M., 2012, Predicting fracture porosity evolution in sandstone: The University of Texas at Austin, Bureau of Economic Geology, final report prepared for the U.S. Department of Energy, under contract no. DE-FG02-03ER15430, 95 p.

Fall, A., and Eichhubl, P., 2011, ExxonMobil--BEG Collaborative on Unconventional Reservoirs, Task 3: fracture petrography and fluid inclusion analyses: The University of Texas at Austin, Bureau of Economic Geology, final report prepared for ExxonMobil, 7 p.

Eichhubl, Peter, Fall, Andras, Davis, J. S., and Laubach, S. E., 2010, ExxonMobil--BEG Collaborative on Unconventional Reservoirs, Task 3: Fracture petrography and fluid inclusion analyses: The University of Texas at Austin, Bureau of Economic Geology, Project Year 2, Report 23 prepared for ExxonMobil, 30 p.

Laubach, S. E., Lander, R. H., Olson, J. E., Eichhubl, P., Bonnell, L. M., and Marrett, R. A., 2010, Predicting fracture porosity evolution in sandstone: The University of Texas at Austin, Bureau of Economic Geology, annual report prepared for U.S. DOE, Office of Science Program Office: Chemical Sciences, Geosciences, and Bioscience Division, Office of Basic Energy Sciences, under Grant No. DE-FG02-03ER15430, 21 p.

Laubach, S. E., Eichhubl, Peter, Fall, Andras, Hooker, J. N., and Davis, J. S., 2009, ExxonMobil--BEG Collaborative on Unconventional Reservoirs, Task 3: Understanding the importance of natural fractures, stress sensitivity, and hydraulic/natural fracture interaction, Project Year 1: The University of Texas at Austin, Bureau of Economic Geology, Project Year 1, Report 13 prepared for ExxonMobil, 25 p.

Hooker, J. N., Eichhubl, Peter, Reed, R. M., and Laubach, S. E., 2006, Wind River Basin study: initial analysis of Tensleep Formation: The University of Texas at Austin, Bureau of Economic Geology, topical report prepared for FRAC Industrial Associates, 13 p.

Laubach, S. E., Lander, R. H., Olson, J. E., Eichhubl, P., Bonnell, L. M., and Marrett, R., 2006, Predicting fracture porosity evolution in sandstone: The University of Texas at Austin, Bureau of Economic Geology, final report prepared for the U.S. Department of Energy, under contract no.

DE-FG02-03ER15430, 73 p.