

Raphaël Gottardi

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PROFESSIONAL EXPERIENCE

- 2013 - present Assistant Professor
University of Louisiana at Lafayette
- 2012 - 2013 Assistant Professor
University of Alaska, Anchorage

EDUCATION

- 2008 - 2012 Ph.D., Geology
University of Minnesota
Dissertation Title: *Thermomechanics and Hydrology of a Detachment Shear Zone*
- 2006 - 2008 M.S., “Alpine and Structural Geology”
Université de Lausanne (Lausanne, Switzerland)
Dissertation Title: *Rheology and Permeability of Detachment Shear Zones, Raft River metamorphic core complex, NW Utah, USA*
- 2003 – 2006 B.S. “Earth, Universe, Environment”
Université Joseph Fourier (Grenoble, France)

RESEARCH INTERESTS

Structural Geology, Tectonics, Geodynamics, Rheology, Microstructures, Stable Isotope Geochemistry

RESEARCH SUMMARY

My research focuses on post-collisional processes, in active or exhumed systems, especially the processes related to the exhumation of high-pressure lower-crustal rocks- and the recycling of orogenic crust. I combine detailed microstructural analysis with stable isotopes thermometry to study the evolution of the different parameters that control the deformation and exhumation (temperature, stress, strain rate, role of fluids).

RESEARCH GRANTS

- Active:** Louisiana Board of Regent, Research Competitiveness Subprogram: “*Investigating fluid-rock interaction during continental tectonics*”, R. Gottardi (PI), 06/01/2015 – 12/31/2018, \$127,633
- Halliburton Foundation: “*Increasing the number of female geoscientists working in the oil and gas industry*”, R. Gottardi (PI) and D. Borrok (PI), \$28,000
- Pending:** NSF-EAR-Tectonics: “*Fluid flow metamorphism and strain localization in mid-crustal shear zones*”. Submitted 08/07/2018.

PROFESSIONAL SERVICES

- 2018 - present President of the Lafayette Geological Society
- 2017 - 2018 President-Elect of the Lafayette Geological Society
- 2015 - present Graduate coordinator for the School of Geosciences
- 2014 - present Faculty advisor for the Ragin' Cajun chapter of the Association for Women Geoscientists

TEACHING EXPERIENCE

- GEOL 105 – Geology and Man
- GEOL 106 – Historical Geology
- GEOL 314 – Structural Geology
- GEOL 315 – Structural Geology Geology for non-majors
- GEOL 400 – Summer Field Camp
- GEOL 505 – Geotectonics
- GEOL 506 – Petroleum Geology Practicum
- GEOL 540 – Advanced Structural Geology

GRADUATE STUDENTS

Current

Abigail Breaux "*Facies Characterization of the Upper and Middle Smackover encountered in Palmer #1 Caraland 26-9, Manila Embayment, southwest Alabama*".

Joshua Cecil "*Characterization of paleoshoreline and baymouth bar based on core and well log analysis of the Smackover Formation in the northeast Brooklyn oil unit of Brooklyn Field, Alabama (Conecuh County)*".

Victoria Chevrot "*Finding Sweet Spots: An Outcrop Based Investigation (Eagle Ford Formation, Val Verde County, Texas)*".

Mary Fearn "*A Petrographic Analysis of Upper Cretaceous Tuscaloosa Marine Shale Core, Eads Poitevent et al.*".

John Hardin "*Understanding carbonate pay parameters in well logs in order to discriminate porosity and hydrocarbons using stacked seismic data: a short cut to carbonate rock properties in the Jurassic Smackover in Grayson Field, Columbia Co. Arkansas.*"

Ross Ledoux "*Fracture Characterization of the Buda Formation, Val Verde County, Texas.*"

Landon Neumann "*Reservoir Characterization for Water-flood Recovery in the Clear Fork Formation, Brooklaw Field, Permian Basin, Texas*".

Christian Spano "*Facies Characterization and Petrographic Analysis of a Mid-Ramp Microbiolite Reef Trend within the Conecuh Embayment, Southwestern Alabama*".

Conner Spano "*The Effect of Dolomitization on Smackover Reservoir Quality in Brooklyn Field, Alabama.*"

Grace Stone "*Geochemical analysis of Tuscaloosa Marine Shale (Upper Cretaceous) core recovered from Eads poitevent et al # 1*".

Graduated

- David Teter** (M.S., Spring 2019) “*Understanding Potential Controls on Production in the Louisiana Austin Chalk Formation*”.
- Nicholas Jarrett** (M.S., Fall 2018) “*Thermal Maturation of the Tuscaloosa Marine Shale: Associations for Hydrocarbon Generation*”.
- Madison Miller** (M.S., Fall 2018) “*Fluid migration in the Austin Chalk and Eagle Ford Formation*”.
- Matthew O’Leary** (M.S., Fall 2018) “*Relationship between Growth Fault and Subsidence: Impact on Coastal Erosion, an Example from Cameron Prairie, Southwestern Louisiana*”.
- Megan Borel** (M.S., Spring 2018) “*A microstructural and geochronological investigation of the Coyote Mountain metamorphic core complex (AZ)*”.
- Cameron Clark** (M.S., Spring 2018) “*Investigation into the Niobrara Formation and missing section associated with pre-lithification faults, Wattenberg Field (CO)*”.
- Wil Gaiennie** (M.S., Spring 2018) “*An investigation into secondary migration of hydrocarbons in the San Joaquin Basin (near Fresno, CA)*”.
- Kohl Koppens** (M.S., Spring 2018) “*Petrologic constraints on the exhumation of the Sierra Blanca metamorphic core complex, AZ*”.
- Sam Yun** (M.S., Spring 2018) “*Mechanical analysis of a detachment shear zone, Picacho Mountains metamorphic core complex (AZ)*”.
- Eric Wang** (M.S., Fall 2017) “*Anisotropy of Magnetic Susceptibility Investigation of the Coyote Mountain Shear Zone*”.
- Logan Adams** (M.S., Spring 2017) “*New Plays in an Old Field: Depositional History and Source Rock Characterization at Teapot Dome, Wyoming*”.
- Ansley Robinson** (M.S., Spring 2017) “*A Geophysical and Geological Characterization of the Bonanza 3D Survey; Claiborne Group; Saint Landry and Evangeline Parishes, Louisiana*”.
- Ashley Filkins** (M.S., Spring 2017) “*Stratigraphic and basin analysis of the lower Mississippi Lime (OK)*”.
- Daniel Conlin** (M.S., Fall 2016) “*Numerical investigation of heat flux and fluid flow in detachment system*”.
- Shanna Mason** (M.S., Fall 2016) “*Structural Characterization of the Eagle Ford Formation, Texas*”.
- Max Shaper** (M.S., Fall 2016) “*Investigating fluid-rock interaction in a detachment shear zone, Picacho Mountains, AZ*”.
- Michael T. Berkland** (M.S., Fall 2015) “*Strain Analysis of a Detachment Shear Zone, Picacho Mountains, AZ*”.
- Kyle Spezia** (M.S., Fall 2015) “*Numerical modeling of fluid flow and heat transfers in porous media*”.
- Daniel Sutton** (M.S., Fall 2015) “*Geophysical and structural analysis of Roatan Island Honduras, Western Caribbean*”.
- Scott Hamilton** (M.S., Fall 2015) “*Determining Mass Balance of Oil and Gas Produced Versus Estimated Reserves Remaining within the A.W.P. Field, McMullen County, Texas.*”

UNDERGRADUATE STUDENTS

- Michael Mahley** (Spring 2017) “*Structural Characterization of the Boquillas Formation, Big Bend National Park, TX*”
- Byron C. Ebner** (2015) “*Investigating fluid-rock interaction using multi-proxy stable isotope geochemistry*”

Sakrin Dahal (2015) “Microstructural 2D strain analysis of the Bitterroot detachment shear zone”

PUBLICATIONS

- **Gottardi, Raphaël**, Logan M. Adams, David Borrok, and Bernardo Teixeira. “Hydrocarbon source rock characterization, burial history, and thermal maturity of the Steele, Niobrara and Mowry Formations at Teapot Dome, Wyoming.” *Marine and Petroleum Geology* 100 (2019): 326-340.
- **Gottardi, Raphaël**, Maxwell C. Schaper, Jaime D. Barnes, and Matthew T. Heizler. “Fluid–Rock Interaction and Strain Localization in the Picacho Mountains Detachment Shear Zone, Arizona, USA.” *Tectonics* 37, no. 9 (2018): 3244-3260
- **Gottardi, Raphaël**, and Shanna L. Mason. “Characterization of the natural fracture system of the Eagle Ford Formation (Val Verde County, Texas).” *AAPG Bulletin* 102.10 (2018): 1963-1984.
- Hamilton, Scott, and **Raphaël Gottardi**. “A Re-Evaluation of the Northern AWP Field, McMullen County, Texas.” *Gulf Coast Association of Geological Societies Journal*, v. 6 (2017), p. 150-160.
- Methner, Katharina, Andreas Mulch, Christian Teyssier, Michael L. Wells, Michael A. Cosca, **Raphaël Gottardi**, Aude Gévelin, and C. Page Chamberlain. “Eocene and Miocene extension, meteoric fluid infiltration, and core complex formation in the Great Basin (Raft River Mountains, Utah).” *Tectonics* 34, no. 4 (2015): 680-693.
- **Gottardi, Raphaël**, Christian Teyssier, Andreas Mulch, J. W. Valley, M. J. Spicuzza, T. W. Vennemann, A. Quilichini, and M. Heizler. “Strain and permeability gradients traced by stable isotope exchange in the Raft River detachment shear zone, Utah.” *Journal of Structural Geology* 71 (2015): 41-57.
- **Gottardi, Raphaël**, and Christian Teyssier. “Thermomechanics of an extensional shear zone, Raft River metamorphic core complex, NW Utah.” *Journal of Structural Geology* 53 (2013): 54-69.
- **Gottardi, Raphaël**, Po-Hao Kao, Martin O. Saar, and Christian Teyssier. “Effects of permeability fields on fluid, heat, and oxygen isotope transport in extensional detachment systems.” *Geochemistry, Geophysics, Geosystems* 14, no. 5 (2013): 1493-1522.
- **R. Gottardi**, C. Teyssier, A. Mulch, T.W. Vennemann, and M.L. Wells (2011). Preservation of an extreme transient geotherm in the Raft River detachment shear zone, *Geology*, July 2011, doi:10.1130/G31834.1

ABSTRACTS

- **R. Gottardi**, M. O'Leary, Relationship between growth fault and subsidence: impact on coastal erosion, an example from Cameron Prairie, southwestern Louisiana, *2018 GSA Fall Meeting, Indianapolis*.
- G. Stone, R. Gottardi, “A geochemical analysis of the Tuscaloosa Marine Shale (Upper Cretaceous) core recovered from Eads Poitevent et al. #1”, *2018 GSA Fall Meeting, Indianapolis*.
- **R. Gottardi**, Tectonic evolution of the Coyote Mountains Metamorphic Core Complex (AZ), *2018 GSA Structural Geology and Tectonics Forum, Tempe (AZ)*.
- A. Johnston, R. Zhang, **R. Gottardi**, N.H. Dawers, Investigating the relationship between tectonics and land loss near Golden Meadow, Louisiana by utilizing 3D seismic and well log data, *2017 GSA Annual Fall Meeting, Seattle*.
- K. Koppens, **R. Gottardi**, Petrologic constraints on the exhumation of the Sierra Blanca metamorphic core complex (AZ), *2017 GSA Annual Fall Meeting, Seattle*.

- M. Borel, **R. Gottardi**, G. Casale, A geothermochronologic investigation of the Coyote Mountains metamorphic core complex (AZ), *2017 GSA Annual Fall Meeting, Seattle*.
- **R. Gottardi**, S. Mason, Characterizing the natural fracture system of the Eagle Ford Formation (TX), *GSA South-Central Section - 51st Annual Meeting – San Antonio 2017*.
- A. Filkins, **R. Gottardi**, Impact of stratigraphy on reservoir quality and hydrocarbon production: analysis if the lower Mississippi lime sediments in northern Oklahoma, *GSA South-Central Section - 51st Annual Meeting – San Antonio 2017*.
- **R. Gottardi**, Thermomechanics of a detachment shear zone, Picacho Peak, AZ, *2016 GSA Structural Geology and Tectonics Forum, Sonoma*.
- D. Conlin, **R. Gottardi**, G. Morra, Numerical modeling of fluid flow and heat transfers in porous media: Implications for the hydrology of mid-crustal shear zones, *2016 Denver GSA Fall Meeting*.
- M. Schaper, **R. Gottardi**, J.D. Barnes, Fluid-rock interaction in the Picacho Peak detachment shear zone (AZ), *2016 Denver GSA Fall Meeting*.
- S. L. Mason, **R. Gottardi**, Structural Characterization of the Eagle Ford Formation, Val Verde County, Texas, *2015 GCAGS, Houston, Texas*
- S. M. Hamilton, **R. Gottardi**, An investigation of the mass balance of Oil and Gas produced versus estimated reserves remaining within the A.W.P. Field, McMullen County, Texas, *2015 AAPG West Coast Student Expo*.
- S. L. Mason, **R. Gottardi**, Structural Characterization of the Eagle Ford Formation, Val Verde County, Texas, *2015 LAGCOE, Lafayette, LA*.
- S. M. Hamilton, R. Gottardi, An investigation of the mass balance of Oil and Gas produced versus estimated reserves remaining within the A.W.P. Field, McMullen County, Texas, *2015 LAGCOE, Lafayette, LA*.
- M. T. Berkland, **R. Gottardi**, Strain analysis across a detachment shear zone, Picacho Peak, AZ, *2015 Baltimore GSA Fall Meeting*.
- K. Spezia, **R. Gottardi**, G. Morra, Numerical modeling of fluid flow and heat transfers in porous media: Implications for the hydrology of mid-crustal shear zones, *2015 GSA Baltimore Fall Meeting*.
- D. Sutton, **R. Gottardi**, G. Kinsland, Structural and Geophysical analysis of Roatan Island Honduras, Western Caribbean, *2015 Baltimore GSA Fall Meeting*.
- S. L. Mason, **R. Gottardi**, Structural Characterization of the Eagle Ford Formation, Val Verde County, Texas, *2015 GCAGS, Houston, Texas*.
- S. M. Hamilton, **R. Gottardi**, An investigation of the mass balance of Oil and Gas produced versus estimated reserves remaining within the A.W.P. Field, McMullen County, Texas, *2015 AAPG West Coast Student Expo*
- S. L. Mason, **R. Gottardi**, Structural Characterization of the Eagle Ford Formation, Val Verde County, Texas, *2015 LAGCOE, Lafayette, LA*
- S. M. Hamilton, **R. Gottardi**, An investigation of the mass balance of Oil and Gas produced versus estimated reserves remaining within the A.W.P. Field, McMullen County, Texas, *2015 LAGCOE, Lafayette, LA*
- **R. Gottardi**, C. Teyssier, Thermomechanics of a metamorphic core complex: Raft River Mountains (MW Utah), *2013 Denver GSA Annual meeting*

- **R. Gottardi**, C. Teyssier, J. W. Valley, M. Spicuzza, W. O. Nachlas, A. Quilichini, T. W. Vennemann. Isotope exchange, fluid-rock interaction and thermomechanics of detachments: Raft River, NW Utah. *2011 AGU fall meeting*.
- **R. Gottardi**, C. Teyssier, N. Seaton. Thermomechanics of a metamorphic core complex: Raft River Mountains (NW Utah). *2011 Minneapolis GSA Annual meeting*.
- **R. Gottardi**, P.-H. Kao, C. Teyssier, M. O. Saar. Fluid flow, heat transfer, and oxygen isotope exchange within metamorphic core complexes: Implications for interpreting oxygen isotope data. *2011 Minneapolis GSA Annual meeting*.
- **R. Gottardi**, C. Teyssier, N. Seaton. Flow stress history of a detachment system: combining recrystallized grain size, quartz CPO and deformation lamellae, Raft River (NW Utah). *18th Deformation Mechanisms, Rheology and Tectonics 2011, Oviedo (Spain)*
- **R. Gottardi**, C. Teyssier, A. Quilichini, T. W. Vennemann, A. Mulch. Fluid-rock interaction and thermomechanics of detachments: Raft River, NW Utah. *2011 Cordilleran Section and Rocky Mountain Section Joint Meeting, Logan*.
- N. Ryan, D. L. Whithney, C. Teyssier, **R. Gottardi**, and N. Seaton. Deformed kyanite: origin and significance in the Raft River core complex, Utah. *2009 Portland GSA Annual Meeting*
- **R. Gottardi**, C. Teyssier, N. Seaton, T. W. Vennemann, A. Mulch. Fluid-rock interaction, kinematic vorticity, and thermomechanics of detachments: Raft River, NW Utah. *17th Deformation Mechanisms, Rheology and Tectonics 2009, Liverpool*.
- **R. Gottardi**, C. Teyssier, N. Seaton, T. W. Vennemann, A. Mulch. Fluid-rock interaction, kinematic vorticity, and thermomechanics of detachments: Raft River, NW Utah. *EarthScope National meeting, Boise (Idaho), May 2009*.
- **R. Gottardi**, C. Teyssier, A. Mulch, N. Seaton. Crustal Thinning, Fluid Flow, and the Preservation of a High Transient Geotherm in the Raft River Detachment, NW Utah. *2008 Houston GSA Annual Meeting*.
- **R. Gottardi**, C. Teyssier, A. Mulch, R. Heilbronner, B. Putlitz. Deformation and fluid flow in the Raft River ductile detachment, NW Utah. *2008 Cordilleran Section and Rocky Mountain Section Joint Meeting, Las Vegas*.

PROFESSIONAL SOCIETIES

Member: Geological Society of America, Mineralogical Society of America, American Association of Petroleum Geologists, Lafayette Geological Society.

INVITED PRESENTATIONS

- Southern Illinois University (September 2018) - *Tectonic evolution of the Coyote Mountains Metamorphic Core Complex (AZ): Implication for orogenic collapse of the North American Cordillera*.
- Lafayette Chapter of the Leukemia and Lymphoma Society (May 2018) - *Geology and Wine of France*.
- Lafayette Geological Society (April 2018) - *Geology and Wine of France*.
- 2018 Structure and Tectonics Forum (January 2018) - *Tectonic evolution of the Coyote Mountains Metamorphic Core Complex (AZ)*.
- Appalachian State University (April 2017) - *Thermomechanics and Hydrology of Detachment shear zones*.
- Tulane University (September 2016) - *Thermomechanics and Hydrology of Detachment shear zones*.