

Ahmad Ghassemi
McCasland Chair Professor
Mewbourne School of Petroleum & Geological Engineering
The University of Oklahoma

Ahmad Ghassemi is a Rock Mechanics Professor and McCasland Chair in the Mewbourne School of Petroleum & Geological Engineering, OU. He has Ph.D. in Geological Engineering and specializes in geomechanics for development of unconventional petroleum and geothermal reservoir. He has been working on high-temperature reservoir rock mechanics and hydraulic fracturing research for the past 25 years with emphasis on numerical modeling of thermo-poroelastic effects, induced seismicity, and the impact of rock heterogeneity on stimulated volume. Currently, he is involved in geomechanics studies of stimulation using experimental and numerical analysis. The experimental works deal with hydraulic stimulation and measuring rock properties under in-situ stress conditions, and are part of an overall geomechanics characterization program. The numerical work consists of finite element and boundary element modeling of THM processes in heterogeneous rocks with emphasis on hydraulic stimulation. Other research interests and activity include reactive fluid flow in fractures, and constitutive modeling for chemically-active rocks, geologic-scale rock mechanics e.g., mechanics of magma intrusion and caldera collapse.

For the past two decades, he has been leading one of the largest academic reservoir rock mechanics group in the U.S., with up to twenty graduate students and two post-docs all supported by research funds from federal agencies and industry. He was the Chief-Editor for Geothermics, an International Journal for geothermal research in 2010-2014. He has served on several national and international panels dealing with challenges of hydraulic fracturing, CO₂ sequestration, and enhanced geothermal systems development. In 2012 he received the Geothermal Resources Council Special Achievement Award for outstanding contributions to the modeling of coupled chemical-thermal-mechanical processes and rock-fluid interactions in geothermal reservoirs. He has also served as a Panel Leader for the Geomechanics and Geochemistry working group in the Carbon Sequestration-Geothermal Energy Systems Geosciences Workshop, U.S. Department of Energy; June 15-16, 2010, Washington, DC; (ii) Team Leader for EPA Hydraulic Fracturing Technical Workshop, Impacts of HF on Natural Transport Systems Washington DC., March, 27, 2011; (iii) Discussion Leader for the Theory/Modeling Theme, DOE workshop on induced seismicity, Stanford University; (iv) the technical organizing committee of ARMA Hydraulic Fracturing Workshop. He published more than 200 technical article and conference papers in the study of numerical modeling and laboratory testing in geomechanics. He also serves on the Scientific Advisory Committee for LabEx Geothermal Project in France.

Academic Preparation

Ph.D., 1996. Geological Engineering, The University of Oklahoma
Dissertation: 3D Poroelastic Hydraulic Fracture Simulator Using the Displacement Discontinuity Method

M.S., Geomechanics, University of Minnesota, 1990

M.S., Engineering Geology, South Dakota School of Mines, 1988

B.Sc., Geological Engineering, University of Oklahoma

Academic Appointments

2013-Present: McCasland Chair Professor, Mewbourne School of Petroleum & Geological Engineering, The University of Oklahoma

2007-1013: Associate Professor, and Holder of George & Joan Voneiff Development Professorship. Department of Petroleum Engineering, Texas A & M. University, TX- Tenured (2010) and Recommended for Full Professor 2012

2002-2007: Associate Professor, Department of Geology & Geological Engineering, UND

1996-2002: Assistant Professor, Department of Geology & Geological Engineering, UND

1990-1996: Research Assistant- Petroleum Rock Mechanics Research Center, OU

Course Taught

- Reservoir Rock Mechanics
- Petrophysics
- Statics & Dynamics
- Advanced Rock Mechanics
- Petrology
- Petroleum Reservoir Development (drilling, well logging, completions)
- Reservoir Stimulation
- Science & Engineering of Shales
- Applied Thermo-poroelasticity
- Natural Hazards

Research: Rock Mechanics Applied to Petroleum & Geothermal Reservoir Development

- Hydraulic fracture propagation and reservoir seismicity modeling
- Experimental determination of reservoir rock properties
- Wellbore stability analysis, shale instability
- Enhanced geothermal system development
- Petrophysics and poro-thermoelasticity
- Coupled reactive flow in fractures

Journal Publications (31 since coming to OU)

1. Hu, L., Ghassemi, A., Pritchett, J. and Garg, S. 2019. Characterization of laboratory-scale hydraulic fracturing for EGS. *Geothermics*. Doi.org/10.1016/j.geothermics.2019.07.004
2. Hu, L., Ghassemi, A., Pritchett, J. and Garg, S. 2019. Self-Potential response in lab-scale EGS simulation. *Rock Mechanics & Rock Engineering*. Doi.org/10.1007/s00603-019-01937-y
3. Huang, K., Cheng, Q., Ghassemi, A., Bauer, A., 2019. Evaluation of shear slip in fractured rock using a 3D coupled thermo-poromechanical FEM. *Int. J. Rock Mech.* 120, 68-81.
4. Cheng, Q., Ghassemi, A. 2019. Numerical simulation of reservoir stimulation with reference to the Newberry EGS. *Geothermics*, 77, 327-343

5. Ye, Z., Ghassemi, A. 2019. Injection-Induced Propagation and Coalescence of Preexisting Fractures in Granite Under Triaxial Stress. *J. Geoph. Res, Solid Earth*, 124, 16 p.
6. Ye, Z., Ghassemi, A. 2018. Injection-induced shear slip and permeability enhancement in granite fractures. *J. Geoph. Res, Solid Earth*, 123, 24 p.
7. Ye, Z., Sesetty, V., and Ghassemi, A. 2018. Experimental and numerical analysis of shear stimulation and permeability evolution in shales. *Hydraulic Fracturing Journal*, 5(3): 28-41.
8. Simakin, A.G., Ghassemi, A., 2018. Mechanics of magma chamber with the implication of the effect of CO₂ fluxing. arXiv preprint arXiv:1803.03631, 2018. To Appear in *Intechopen*.
9. Kamali, A., Ghassemi, A., 2018. Analysis of injection-induced shear slip and fracture propagation in geothermal reservoir stimulation. *Geothermics*, 76, 93-105.
10. Sesetty, V. K., Ghassemi, A. 2018. Effect of rock anisotropy on wellbore stresses and hydraulic fracture propagation. *Int. J. Rock Mech.*, 11, 369-384.
11. Lu, J., Ghassemi, A., 2018. Estimating fracture orientations using geomechanics based stochastic analysis of microseismicity related to reservoir stimulation. *Geothermics*. 79, 129-139.
12. Gao, Q., Ghassemi, A., 2017. Pore pressure and stress distributions around a hydraulic Fracture in heterogeneous rock. *Rock Mech. Rock Eng.* 50(12), 3157–3173.
13. Kumar, D., and Ghassemi, A. 2018. Three-dimensional poroelastic modeling of multiple hydraulic fracture propagation form horizontal wells. *Int. J. Rock Mech.* 105, 192-209.
14. Vachaparampil, A., and Ghassemi, A. 2017. Failure characteristics of three shales under true-triaxial compression. *Int. J. Rock Mech.* 100, 151-159.
15. Xia, Y., Plummer, M., Mattson, E., Podgorney, R., Ghassemi, A. 2017. Design, modeling, and evaluation of a doublet heat extraction model in enhanced geothermal systems. *Renewable Energy*, 105, 232-247.
16. Wang, J., Ghassemi, A., Valko, P. 2018. Laboratory scale characterization of brittleness and permeability enhancement due to rock failure. *International Journal of Oil, Gas and Coal Technology* (In Press).
17. Huang, J., Ghassemi, A. 2017. Poro-viscoelastic modeling of production from shale gas reservoir: An adaptive dual permeability model. *J. Pet. Sci. Eng.* 158, 336-350.
18. Farmahini-Farahani, M., Ghassemi, A. 2016. Simulation of micro-seismicity in response to injection/production in large-scale fracture networks using the fast multipole displacement discontinuity method (FMDDM). *Engineering Analysis with Boundary Elements*. 71, 179-189.
19. Safari, R., Ma, X., Mutlu, O., Ghassemi, A. 2016. Infill well fracturing optimization in tightly spaced horizontal wells. *SPE Journal*. SPE-178513-PA.
20. Kumar, D., and Ghassemi, A. 2016. Three-Dimensional modeling and analysis of sequential and simultaneous hydraulic fracturing of horizontal wells. *J. Petroleum Science and Engineering*, 46, 1006-1025.
21. Safari, R., Ghassemi, A. 2016. Three-Dimensional poroelastic modeling of injection induced permeability enhancement and micro-seismicity. *Int. J. Rock Mechanics*. 84, 47–58.
22. Huang, K., and Ghassemi, A. 2016. Modeling 3D thermal fracture propagation by transient cooling using virtual multidimensional internal bonds. *Int. J. Num. and Anal. Methods in Geomech.* doi: 10.1002/nag.2526.
23. Wang, J., Woodong, J., Li, Y., and Ghassemi, A. 2016. Geomechanical characterization of Newberry Tuff. *Geothermics Special Issue on EGS.* doi:10.1016/j.geothermics.2016.01.016.

24. Ghassemi, A., and Tao, Q. 2016. Thermo-poroelastic effects on reservoir seismicity and permeability change. *Geothermics Special Issue on EGS*. doi:10.1016/j.geothermics.2016.02.006.
25. Zhang, Z. Peng, S., Ghassemi, A., Ge, X. 2016. Simulation of complex hydraulic fracture generation in reservoir stimulation. *J. Petroleum Science and Engineering*, 146, 272–285.
26. Huang, J., and Ghassemi, A. 2015. A poroelastic model for evolution of fractured reservoirs during gas production. *J. Pet. Sci. & Engng.* 10.1016/j.petrol.2015.10.007.
27. Zhang, Z. Ding, J., Ghassemi, A., Ge, X. 2015. A hyperelastic-bilinear potential for lattice model with fracture energy conservation. *Engineering Fracture Mechanics*. 142, 220–235.
28. Safari, R., Ghassemi, A. 2015. Three-dimensional thermo-poroelastic analysis of fracture network deformation and induced micro-seismicity in enhanced geothermal systems. *Geothermics*, 58, 1-14.
29. Verde, A., Ghassemi, A. 2015. Fast multipole displacement discontinuity method (FM-DDM) for geomechanics reservoir simulations. *Int. J. Num. and Anal. Methods in Geomech.*, 39, 1953-1974.
30. Rahimzade Kivi, I., Ameri, M.J., Ghassemi, A. 2015. Chemoporoelastic characterization of Ghom shale. *Int. J. Petroleum Sci. and Eng.*, 127, 115–123.
31. Verde, A., Ghassemi, A. 2015. Modeling injection/extraction in a fracture network with mechanically interacting fractures using an efficient displacement discontinuity method. *Int. J. Rock Mech.*, 77, 278-286.
32. Sesetty, V. K., Ghassemi, A. 2015. Modeling and analysis of sequential and simultaneous hydraulic fracturing in single and multi-lateral horizontal wells. *Int. J. Petroleum Sci. and Eng.*, 132, 65-76.
33. Tarasovs, S. and Ghassemi, A. 2014. Self-similarity and scaling of thermal shock fractures. *Physical Review E* 90 (1), 012403-1-6.
34. Huang, K., Zhang, Z., Ghassemi, A. 2013. Modeling three-dimensional hydraulic fracture propagation using virtual multidimensional internal bonds. *Int. J. Numer. Anal. Meth. Geomech.* 37:2021–2038.
35. Sesetty, V., and Ghassemi, A. 2013. Numerical simulation of sequential and simultaneous hydraulic fracturing. In: *Effective and Sustainable Hydraulic Fracturing*. Edited by Andrew P. Bungler, John McLennan and Rob Jeffrey, ISBN 978-953-51-1137-5, Hard cover, 1000 pages, Publisher: InTech. Pp. 680-691.
36. Ghassemi, A., and Rawal, A., Zhou, X. 2013. Rock failure and micro-seismicity around hydraulic fractures. *J. Pet. Sci. and Engrg.* (108), 118-127. DOI information: 10.1016/j.petrol.2013.06.005.
37. Rawal, A., and Ghassemi, A. 2014. A Reactive poro-thermoelastic analysis of cold water injection in enhanced geothermal reservoir. *Geothermics*, 50, 10-23. (online 2013)
38. Tarasov, S., and Ghassemi, A. 2012. Radial Cracking of a Borehole By Pressure And Thermal Shock. 46th U.S. Rock Mechanics/Geomechanics Symposium, 24-27.
39. Ghassemi, A. 2012. A review of some rock mechanics issues in geothermal reservoir development. *Geotechnical and Geological Engineering J.*, 10706, Article No. 9508.
40. Ghassemi, A., and Zhou, X. 2011. A three-dimensional thermo-poroelastic model for fracture response to injection/extraction in enhanced geothermal systems. *Geothermics*, 40 (1), 39-49.
41. Zhou, X., Ghassemi, A. 2011. Three-dimensional poroelastic analysis of a pressurized natural fracture. *Int. J. Rock Mech.*, 48(4), 527–534.
42. Tao, Q., Ghassemi, A., and Ehlig-Economides, C.E. 2011. A fully coupled method to model fracture permeability change in naturally fractured reservoirs. *Int. J. Rock Mech. & Min. Sci.*, 48(2), 259-268.

43. Zhang, Z., and Ghassemi, A. 2011. Simulation of hydraulic fracture propagation near a natural fracture using virtual multidimensional internal bonds. *Int. J. Num. Anal. Methods. Geomech.* 35 (4), 480–495.
44. Tao, Q., and Ghassemi, A. 2010. Poro-thermoelastic borehole stress analysis for determination of the in-situ stress and rock strength. *Geothermics*, 39(3), 250-259.
45. Rawal, C., and Ghassemi, A. 2010. 3D Analysis of rock failure around a hydraulic fracture with reference to induced seismicity. *GRC Transactions V.* 34.
46. Tarasovs, S., and Ghassemi, A. 2010. A Study of propagation of cooled cracks. *GRC Transactions V.* 34. 463-466.
47. Simakin, A., and Ghassemi, A. 2009. The Role of magma chamber-fault interaction in caldera forming eruptions. *Bull. Volcanology* , DOI10.1007/s00445-009-0306-6.
48. Ghassemi, A., Tao, Q., and Diek, A. 2009. Influence of coupled chemo-poro-thermoelastic processes on pore pressure and stress distributions around a wellbore in swelling shale. *J. Pet. Science & Engrg.* 67, 57-64.
49. Tao, Q., and Ghassemi, A. 2009. Poro-thermoelastic borehole stress analysis for determination of the in-situ stress and rock strength. *Geothermics* 39 (30), 250-259.
50. Zhou, X., and Ghassemi, A. 2009. Finite element analysis of coupled chemo-poro-thermo-mechanical effects around a wellbore in swelling shale. *Int. J. Rock Mech.* 46, 769-778. doi:10.1016/j.ijrmms.2008.11.009.
51. Zhou, X., Ghassemi, A., and Cheng, A.H.-D. 2009. A Three-dimensional integral equation model for calculating poro- and thermoelastic stresses induced by cold water Injection into a Geothermal Reservoir. *Int. J. Num. Anal. Methods Geomech.* DOI:10.1002/nag.
52. Ghassemi, A., Nygren, A., and Cheng, A.D.-H. 2008. Effects of heat extraction on fracture aperture: A poro-thermoelastic analysis. *Geothermics*, 37 (5), 525-539.
53. Koshelev, V., and Ghassemi, A. 2008. Wedge boundary elements for 2D problems with corner points. *J. Engineering Analysis with Boundary Elements.* 32, 168-175.
54. Ghassemi, A., Tarasovs, S., and Cheng, A. H.-D. 2007. A three-dimensional study of the effects of thermo-mechanical loads on fracture slip in enhanced geothermal reservoir. *Int. J. Rock Mechanics & Min Sci.*, Vol. 44 , pp. 1132–1148.
55. Simakin, A., and Ghassemi, A. 2007. The mechanics of a magma chamber-fault system in trans-tension with application to Coso. *Journal of Structural Geology.* 29(12), 1971-1983.
56. Ge, J., and Ghassemi, A. 2007. Pore pressure and stress distributions around an injection-induced fracture. *Geothermal Resources Council Transaction.*
57. Ghassemi, A., Suresh Kumar, G. 2007. Variation of fracture aperture and pressure due to combined heat extraction-induced thermal stress and silica dissolution/precipitation, *Geothermics.* 36, 115–140
58. Suresh Kumar, G. and Ghassemi, A. 2006. Spatial moment analysis for non-isothermal quartz transport and dissolution/precipitation in a fracture-matrix system. *J. Hydrologic Engineering*, 11(4), 338-346.
59. Ghassemi, A., Tarasovs, A. and Cheng, A.D.-H. 2005. Integral equation solution of heat extraction induced thermal stress in enhanced geothermal reservoirs. *Int. J. Num. & Anal. Methods in Geomechanics*, 29, 829-844.
60. Dobroskok, A. A., Ghassemi, A., and Linkov, A.M. 2005. Novozhilov structural criterion: an extension for numerical simulation of mode I and II crack growth and coalescence. *Int. J. of Fracture.* 133, 223-246.
61. Dobroskok, A. A., Ghassemi, A., and Linkov, A.M. 2005. Numerical simulation of crack propagation influenced by thermal and porous liquid stresses. *Int. J. of Fracture.* 134, L29-L34.

62. Suresh Kumar, G. and Ghassemi, A. 2005. Numerical modeling of non-isothermal quartz dissolution and precipitation in a coupled fracture-matrix system. *Geothermics*, 34, 411-439.
63. Simakin, A. & Ghassemi, A. 2005. Modeling deformation of partially melted rock using a poro-viscoelastic rheology with dynamic power law viscosity, *Tectonophysics*. **397**, 195-209.
64. Ghassemi, A., Zhang, Q. 2006. Poro-thermoelastic response of a stationary crack using the displacement discontinuity method. *ASCE J. Engineering Mechanics*, 132(1), 26-33.
65. Ghassemi, A. & Zhang, Q. 2004. A transient fictitious stress boundary element method for poro-thermoelastic media. *J. Eng. Anal. Boundary Elements*, 28/11, 1363-1373.
66. Koshelev, V., and Ghassemi, A. 2004. Complex variable BEM for stationary thermoelasticity & poroelasticity. *J. Eng. Anal. Boundary Elements*, 28/7, 825-832.
67. Ghassemi, A., Tarasovs, A. and Cheng, A.D.-H. 2003. An Integral equation method for modeling three-dimensional heat extraction from a fracture in hot dry rock. *Int. J. Num. & Anal. Methods in Geomech.* 27, No. 12, 989-1004.
68. Ghassemi, A., and Diek, A., 20003. Linear chemo-poroelasticity for swelling shales: theory & application. *J. Pet. Sci. & Eng.*, 38/3-4, 199 – 212.
69. Simakin, A. & Ghassemi, A. 2002. Salt loaded heat pipes: steady-state operation and related heat and mass transport. *J. Earth & Planetary Sci. Letters*, 215/3-4, 411-424.
70. Ghassemi, A., Diek, A. 2002. Poro-thermoelasticity for swelling shales. *J. Petroleum Sci. & Eng.* 34, 123-135.
71. Ghassemi, A., Cheng, A. H.-D., Diek, A., and Roegiers, J.-C. 2001. A complete plane-strain fictitious stress boundary element method for poroelastic media. *J. Eng. Anal. Boundary Elements*, 25/1, 41-48.
72. Cheng, A. H.-D., Ghassemi, A., and Detournay, E. 2001. A two-dimensional solution for heat extraction from a fracture in hot dry rock. *Int. J. Numerical & Analytical Methods in Geomech.*, 25, 1327-1338.
73. Ghassemi, A. Diek, A., and Roegiers, J.-C. 1998. A solution for stress distribution around an inclined borehole in shale. *Int. J. Rock Mech. & Mining Sci.*, 35: 4-5, paper No. 43.

Book Chapters

Ghassemi, A. (2017). Application of rock failure simulation in design optimization of the hydraulic fracturing. *Porous Rock Fracture Mechanics* (pp. 3-23). Elsevier. 10.1016/b978-0-08-100781-5.00001-4. <http://dx.doi.org/10.1016/b978-0-08-100781-5.00001-4>.

Conference Papers (50+ since coming to OU)

1. Kumar, D., Feizi Masouleh, S., Ghassemi, A., Riley, S., and Elliott, B. 2018. A 3D Geomechanical Analysis of Horizontal Well Refracturing and “Frac-hits”. 52nd US Rock Mechanics/Geomechanics Symposium, Seattle, Washington, USA, June 17-20: pp.1-11.
2. Kumar, D., Ghassemi, A., Riley, S., and Elliott, B. 2018. Geomechanical Analysis of “Frac-hits” Using a 3D Poroelastic Hydraulic Fracture Model. SPE-191491-MS, accepted for Publication in the SPE Annual Technical Conference and Exhibition to be held 24-26 Sept., Dallas, USA: pp.1-19.
3. Kumar, D. and Ghassemi A. (2017). 3D geomechanical analysis of refracturing of horizontal wells. Unconventional Resources Technology Conference, URTeC: 2697487, held in Austin, Texas, USA, pp.1-13.
4. Khosravi, E., Ghassemi, A. 2017. Influence of temperature and anisotropy on creep behavior of Mancos shale. Proc. 51st US Rock Mechanics / Geomechanics Symposium held in San Francisco, California, USA.

5. Ye, Z., Janis, M., Ghassemi, A. 2017. Injection-driven Shear Slip and The Coupled Permeability Evolution of Granite Fractures for EGS Stimulation. Proc. 51st US Rock Mechanics / Geomechanics Symposium held in San Francisco, California, USA.
6. Vachaparampil, A., Ghassemi, A. 2017. Strength Criteria for Shale under True-Triaxial Stresses. Proc. 51st US Rock Mechanics / Geomechanics Symposium held in San Francisco, California, USA.
7. Sesetty, V., Ghassemi, A. 2017. Complex Fracture Network Model for Stimulation of Unconventional Reservoirs. Proc. 51st US Rock Mechanics / Geomechanics Symposium held in San Francisco, California, USA.
8. Sesetty, V., Ghassemi, A. 2017. Simulation of Hydraulic Fracture Clusters Considering Viscosity and Toughness Dominated Propagation. Proc. 51st US Rock Mechanics / Geomechanics Symposium held in San Francisco, California, USA.
9. Zhou, X., Ghassemi, A. 2017. Biot's Effective Stress Coefficient of Mudstone Source Rocks. Proc. 51st US Rock Mechanics / Geomechanics Symposium held in San Francisco, California, USA.
10. Yu, W., & Ghassemi, A. 2017. Laboratory Geomechanical Characterization of the Arbuckle Group in Oklahoma. 51st US Rock Mechanics/Geomechanics Symposium. American Rock Mechanics Association.
11. Hu, L., Ghassemi, A., Pritchett, J., Garg, S. 2016. Experimental simulation of enhanced geothermal reservoir stimulation. GRC Transactions.
12. Ghassemi, A. 2016. Impact of fracture interactions, rock anisotropy and heterogeneity on hydraulic fracturing: some insights from numerical simulations. Proc. 50th US Rock Mechanics / Geomechanics Symposium held in Houston, TX.
13. Ghassemi, A., Tao, Q. 2016. Thermo-poroelastic effects on reservoir seismicity. Proc. 41st Workshop on Geothermal Reservoir Engineering. Stanford University, Stanford, California
14. Sesetty, V., Ghassemi, A. 2015. Numerical modeling of hydraulic fracture propagation from horizontal wells in anisotropic shale. Proc. 50th US Rock Mechanics / Geomechanics Symposium held in Houston, TX.
15. Kumar, D., Ghassemi, A. 2016. 3D poroelastic simulation and analysis of multiple fracture propagation and re-fracturing of closely-spaced horizontal wells. Proc. 50th US Rock Mechanics / Geomechanics Symposium held in Houston, TX.
16. Kumar, D., Ghassemi, A. 2015. 3D Simulation of Mixed-Mode Poroelastic Fracture Propagation for Reservoir Stimulation. GRC Transactions, 39, 100.
17. Safari, R., Ghassemi, A. 2016. 3D Analysis of thermo-poroelastic processes on fracture network deformation and induced micro-seismicity potential in EGS. Proc. 50th US Rock Mechanics / Geomechanics Symposium held in Houston, TX.
18. Cheng, Q., Ghassemi, A., 2016. Numerical modeling of Newberry EGS stimulation. Proc. 50th US Rock Mechanics / Geomechanics Symposium held in Houston, TX.
19. Hu, L., Ghassemi, A., Pritchett, J., Gard, S. 2016. Laboratory Scale Investigation of Enhanced Geothermal Reservoir Stimulation. Proc. 50th US Rock Mechanics / Geomechanics Symposium held in Houston, TX.
20. Gao, A., Ghassemi, A. 2016. 3D Thermo-poromechanical analysis of reservoir stimulation using damage mechanics with application to the Fenton Hill HDR experiment. Proc. 50th US Rock Mechanics / Geomechanics Symposium held in Houston, TX.
21. Vachaparampil, A., Hu, L., Zhou, X., Ghassemi, A., Gill, I., Chitralla, Y. 2016. Geomechanical anisotropy of Utica Shale from static and dynamic measurements. Proc. 50th US Rock Mechanics / Geomechanics Symposium held in Houston, TX.

22. Kamali, A., Ghassemi, A. 2016. On the reservoir stimulation mechanisms in fractured reservoirs. Proc. 50th US Rock Mechanics / Geomechanics Symposium held in Houston, TX.
23. Kamali, A., Ghassemi, A. 2016 Analysis of Natural Fracture Shear Slip and Propagation in Response to Injection. Proc. 41st Stanford Geothermal Workshop.
24. Bakshi, R., Ghassemi, A., 2016. Injection Experiments on Basaltic Tuffs under Triaxial and Heated Conditions with Acoustic Emissions Monitoring. 50th U.S. Rock Mechanics/Geomechanics Symp.
25. Safari, R., Lewis, R., Ma, X., Mutlu, U., Ghassemi, A. 2015. Fracture curving between tightly spaced horizontal wells. URTEC 2149893. DOI 10.15530/urtec-2015-2149893.
26. Sesetty, V., Ghassemi, A. 2015. Simulation of Simultaneous and Zipper Fractures in Shale Formations. 49th US Rock Mechanics/Geomechanics Symp., San Francisco, CA, USA.
27. Gao Q., and Ghassemi, A. 2015. Hydraulic Fracture Design in Heterogeneous Formations. The 5th International Conference on Coupled Thermo-Hydro-Mechanical-Chemical (THMC) Processes in Geosystems: Petroleum and Geothermal Reservoir Geomechanics and Energy Resource Extraction. Salt Lake City, Utah
28. Kumar D. and Ghassemi A. 2015. 3D Simulation of Multiple Fracture Propagation from Horizontal Wells. 49th U.S. Rock Mechanics/Geomechanics Symp., San Francisco, USA.
29. Kumar D. and Ghassemi A. 2015. 3D Simulation of Mixed-Mode Poroelastic Fracture Propagation for Reservoir Stimulation. 39th GRC Annual Meeting and GEA Geothermal Expo, Reno, Nevada, USA, Sept. 20-23, pp. 1-11.
30. Farmahini-Farahani, M., Ghassemi, A. 2015. Analysis of Fracture Network Response to Fluid Injection. Proc. 40th Workshop on Geothermal Reservoir Engineering, Stanford University, Stanford, CA.
31. Zhou, X, Vachaparampil, A., Ghassemi, A. 2015. A combined method to measure Biot's coefficient. Proc. 47th US Rock Mechanics / Geomechanics Symposium held in San Francisco, CA.
32. Ghassemi, A., Kelkar, S., McClure, M. 2015. Geothermal Code Comparison Study: Problems 2, 3, and 6. Proc. 40th Workshop on Geothermal Reservoir Engineering, Stanford University, Stanford, CA.
33. Zhang, Z., Peng, S., Ghassemi, A., Ge, X. 2015. Lattice bond cell modeling of dynamic hydraulic fracture. 49th U.S. Rock Mechanics/Geomechanics Symp. 28 June-1 July, San Francisco, USA.
34. Safari, R., & Ghassemi, A., 2014. 3D Coupled Poroelastic Analysis of Multiple Hydraulic Fractures. Pro. American Rock Mechanics Association Symp.
35. Ghassemi, A., 2013. Fracture conductivity in shale: role of rock rheology. ARMA forum: "Rheology, Creep and Viscoplasticity: It's About Time, Salt Lake City, Utah.
36. Wang, X., Ghassemi, A., 2013. A three-dimensional poroelastic model for naturally fractured geothermal reservoir stimulation. GRC Annual Meeting. Las Vegas, Nevada.
37. Verde, A., Ghassemi, A. 2013. Efficient solution of large-scale displacement discontinuity problems using the fast multipole method. Proc. 47th US Rock Mechanics/Geomechanics Symposium, San Francisco, USA.
38. Suarez-Rivera, R. and A. Ghassemi, 2013. Sustaining fracture area and conductivity of gas shale reservoirs for enhancing long-term production and recovery, monograph in preparation.
39. Verde, A., Ghassemi, A. 2013. Fracture network response to injection using an efficient displacement discontinuity method. GRC Annual Meeting, Las Vegas.

40. Verde, A., Ghassemi, A., 2013. Efficient solution of large-scale displacement discontinuity problems using the fast multipole method. Proc. 47th US Rock Mechanics/Geomechanics Symposium, San Francisco, USA.
41. Huang, J., Ghassemi, A. 2013. Simulating geomechanical evolution of fractured shale reservoir using a poro-viscoelastic constitutive model. Proc. 47th US Rock Mechanics/Geomechanics Symposium, San Francisco, USA.
42. Safari, M. R., & Ghassemi, A., 2012. 3D Modeling of Natural Fracture Stimulation Using a Poroelastic Displacement Discontinuity Method With Slip Weakening. Proc. American Rock Mechanics Association Symp.
43. Li, Y., Jung, W., Ghassemi, A. 2012. Mechanical properties of intact & jointed welded tuff From Newberry Volcano, 37th Stanford Geothermal Workshop.
44. Tarasovs, S., Ghassemi, A. 2012. Radial cracking of a borehole by pressure and thermal shock. 46th U.S. Rock Mechanics/Geomechanics Symposium. 24-27 June, 2012, Chicago, Illinois.
45. Li, Y., and Ghassemi, A. 2012. Creep Behavior of Barnett, Haynesville, and Marcellus shale, ARMA 12-330, Chicago, Ill.
46. Wang, X., Ghassemi, A. 2012. A three-dimensional poroelastic model for naturally fractured geothermal reservoir stimulation. GRC Transactions, Vol. 36, GRC 2012 Annual Meeting.
47. Wang, X., Ghassemi, A. 2012. A 3D thermal-poroelastic model for naturally fractured geothermal reservoir stimulation. Proc. 46th US Rock Mechanics and Geomechanics Symposium, Chicago, Illinois, June 24 – June 27, 2012.
48. Wang, X., Ghassemi, A. 2012. A 3D thermal-poroelastic model for geothermal reservoir stimulation. Proc. 37th Workshop on Geothermal Reservoir Engineering, Stanford University, Stanford, California, January 30 – February 1, 2012.
49. Sesetty, V., Ghassemi, A. 2012. Simulation of Hydraulic Fractures and their Interaction with Natural Fractures. Proc. 46th U.S. Rock Mechanics/Geomechanics Symposium, Chicago, IL, USA.
50. Sesetty, V., Ghassemi, A. 2012. Modeling and analysis of stimulation for fracture network generation, Proc. 37th Stanford Geothermal Workshop on Geothermal Reservoir Engineering, Stanford University, California.
51. Huang J., and Ghassemi, A. 2012. Geomechanical evolution of fractured reservoirs during gas production. 46th ARMA Conf., Chicago, Illinois, USA.
52. Min K.S., Ghassemi, A. 2012. Simulation of fracture clusters in unconventional reservoir using fully coupled Thermo-Hydro-Mechanical FEM analysis. 46th ARMA Conf., Chicago, Illinois, USA.
53. Badakhshan, S., Ghassemi, A. 2012. A study of hydrate formation in open space under high subcoolings. Proc. 1st International Conference on Upstream Engineering and Flow Assurance, AIChE, Houston, TX.
54. Huang, K. and Ghassemi, A. 2012. Modeling 3D hydraulic fracture propagation and thermal fracturing using virtual multidimensional internal bonds. Proc., 37th Workshop on Geothermal Reservoir Engineering, Stanford University, CA.
55. Tarasovs, S., and Ghassemi, A. 2011. Propagation of a System of cracks under thermal stress. 45th U.S. Rock Mechanics / Geomechanics Symp., San Francisco, CA.
56. Safari, M. R., & Ghassemi, A., 2011. A 3D Analysis of Enhanced Geothermal Reservoir: Shear Slip and Micro-Seismicity. Proc. American Rock Mechanics Association Symp.
57. Wang, X., Ghassemi, A. 2011. A three-dimensional stochastic fracture network model for geothermal reservoir stimulation. Thirty-Sixth Workshop on Geothermal Reservoir Engineering, Stanford University, Stanford, California, January 31 – February 2, 2011.

58. Min K.S., Huang K., Ghassemi A. 2011. A Study of numerical simulations of mixed-mode fracture propagation in rock. Proc, 36th Workshop on Geothermal Reservoir Engineering, Stanford University.
59. Lee, B.T., Ghassemi A. 2011. Shear slip and permeability change caused by injection/extraction in a fractured reservoir. Proc. 45th U.S. Rock Mechanics / Geomechanics Symp., San Francisco, California.
60. Rawal, C., Ghassemi, A. 2011. Poroelastic rock failure analysis around multiple hydraulic fractures using a BEM/FEM model. 45th US Rock Mechanics/Geomechanics Symposium, San Francisco, USA
61. Huang, J., and Ghassemi, A. 2011. Poroelastic analysis of gas production from shale. 45th ARMA Conf., San Francisco, California, USA.
62. Min K.S., Ghassemi A. 2011. Three-dimensional numerical analysis of thermal fracturing in rock. 45th ARMA Conf., San Francisco, California, USA
63. Wang X, Ghassemi, A. 2011. A three-dimensional stochastic fracture network model for geothermal reservoir stimulation. Proc., 36th Workshop on Geothermal Reservoir Engineering, Stanford University.
64. Lee S.H., Ghassemi A., 2011. Three-dimensional thermo-poro-mechanical modeling of reservoir stimulation and induced microseismicity in geothermal reservoir. 36th Stanford Geothermal Workshop, Stanford, CA.
65. Tarasovs, S., and Ghassemi, A. 2010. A Study of propagation of cooled cracks. GRC Trans. (34), 463-466.
66. Zhang, Z.Z., and Ghassemi, A. 2010. Three-dimensional fracture simulation using the virtual multidimensional internal bond. Proc. 44th US Rock Mechanics Symp., Salt Lake City, UT.
67. Rawal C., and Ghassemi A. 2010. Reactive transport in a planar fracture in hot- and poroelastic rock. Proc. 44th U.S. Rock Mechanics Symp., Salt Lake City, UT.
68. Lee, S. H. and Ghassemi, A., 2010. A Three-Dimensional thermo-poro-mechanical finite Element analysis of a wellbore on damage evolution. Proc. 44th US Rock Mechanics Symp., Salt Lake City, UT.
69. Safari, M.R. and Ghassemi , A., 2010. 3D Poroelastic analysis of natural fracture response to variable injection/extraction rates. Proc. 44th US Rock Mechanics Symp., Salt Lake City, UT.
70. Tao, Q., Ghassemi, A. 2010. Numerical modeling of non-isothermal compressible fluid flow in naturally fractured reservoirs. Proc. 44th US Rock Mech. Symposium, Salt Lake City.
71. Huang, J., Ghassemi, A. 2010. Chemo-poroelasticity solution for pore pressure transmission test considering salt diffusion. Proc. 44th US Rock Mech. Symposium, Salt Lake City.
72. Zhennan, Z., Ghassemi, A. 2010. Three-dimensional fracture simulation using virtual multidimensional internal bond. Proc. 44th US Rock Mech. Symposium, Salt Lake City.
73. Rawal, C., Ghassemi, A. 2010. A 3-D analysis of solute transport in a fracture in hot- and poro-elastic rock. Proc. 44th US Rock Mech. Symposium, Salt Lake City.
74. Lee, A.H., and Ghassemi, A. 2010. A Three-dimensional thermo-poro-mechanical finite element analysis of a wellbore on damage evolution. Proc. 44th US Rock Mech. Symposium, Salt Lake City.
75. Ghassemi, A., Xiaoxian, Z., Rawal, C. 2010. Numerical predictions of rock failure around major hydraulic fractures. Proc. 44th US Rock Mech. Symposium, Salt Lake City.
76. Lee, S.H., and Ghassemi, A. 2010. Thermo-poroelastic finite element analysis of rock deformation and damage evolution in geothermal reservoir. Proc. 35th Workshop on Geothermal Res. Engrg. Stanford University, Ca.

77. Rawal, C., and Ghassemi, A. 2010. Reactive flow in a natural fracture in poro-thermo-elastic rock. Proc. 35th Workshop on Geothermal Res. Engrg. Stanford University, CA.
78. Tao, Q. and Ghassemi, A. 2010. Simulation of fluid flow in fractured poro-thermoelastic reservoirs. Proc. 35th Workshop on Geothermal Res. Engrg. Stanford University, CA.
79. Min, K.S., Zhennan Z., and Ghassemi, A. 2010. Hydraulic fracturing propagation in heterogeneous rock using the VMIB method. Proc. 35th Workshop on Geothermal Res. Engrg. Stanford University, Ca.
80. Min, K.S., Zhennan Z., and Ghassemi, A. 2010. Numerical Analysis of Multiple Fracture Propagation in Heterogeneous Rock. 44th US Rock Mechanics Symposium and 5th U.S.-Canada Rock Mechanics Symposium, held in Salt Lake City, UT June 27–30, 2010.
81. Ghassemi, A. 2009. Wellbore stress analysis, is linear elasticity enough? SPE/AAPG/SEG Pore Pressure Prediction, Monitoring, and Wellbore Stability. Feb., 16-17th, San Antonio (Invited).
82. Tao, Q. Ehlig-Economides, C. and Ghassemi, E. 2009. Investigation of stress-dependent permeability in naturally fractured reservoirs using a fully coupled poroelastic displacement discontinuity model. SPE-124745, 2009 SPE ATCS, New Orleans, LA.
83. Akbarnejad-Nesheli, B., and Ghassemi, A. 2009. Undrained poroelastic response of Berea sandstone and Indiana limestone to confining and deviatoric stress change. 43rd US Rock Mech. Symp., Asheville, NC.
84. Xue, W., Ghassemi, A., 2009. Poroelastic analysis of hydraulic fracture propagation. 43rd US Rock Mech. Symp., Asheville, NC.
85. Lee S. H. and Ghassemi, A., 2009. Thermo-poroelastic Finite Element Analysis of Rock Deformation and Damage. 43rd US Rock Mech. Symp., Asheville, NC.
86. Tao, Q. Ehlig-Economides, C. and Ghassemi, E. 2009. Modeling Variation of Stress and Permeability in Naturally fractured reservoirs using displacement discontinuity method. 43rd US Rock Mechanics Symp., Asheville, NC.
87. Zhou, A., Ghassemi, A. 2009. Three-dimensional poroelastic simulation of hydraulic and natural fractures using the displacement discontinuity method. 34th Stanford Geothermal Workshop, Stanford, CA..
88. Ge, J., Ghassemi, A. 2008. Analysis of failure potential around a hydraulic fracture in jointed rock. Proc. 42nd U.S. Rock Mechanics Symp., San Francisco. CA.
89. Tao, Q., Birchwood, R., Ghassemi, A. 2008. Poro-elasto-plastic analysis of factors controlling sand production from a hemispherical cavity. Proc. 42nd U.S. Rock Mech. Symp., San Francisco, CA.
90. Simakin, A., Ghassemi, A. 2008. Numerical modeling of subsidence above a solidifying magma chamber. Proc. 42nd U.S. Rock Mechanics Symp., San Francisco, CA.
91. Rawal, C., Ghassemi, A. 2008. Fracture aperture change in response to reactive transport of silica and thermoelastic effects. Proc. 42nd U.S. Rock Mech. Symp., June 29 – July 2, San Francisco, CA.
92. Zhou, X., Ghassemi, A. 2008. A three-dimensional model for calculating poro- and thermoelastic Stresses Induced by Cold Water Injection into a Geothermal Reservoir. Proc. 42nd U.S. Rock Mech. Symp., San Francisco, CA.
93. Zhou, X., Ghassemi, A. 2008. Finite element analysis of chemo-poro-thermomechanic effects around a wellbore in shale. Proc. 42nd U.S. Rock Mech. Symp., San Francisco, CA.
94. Zhou, X., Ghassemi, A. 2008. A three-dimensional poroelastic model for water injection into a geothermal reservoir. 33rd Stanford Geothermal Workshop of Reservoir Engineering, Stanford, CA.

95. Ge, J., Ghassemi, A. 2007. Pore pressure and stress distributions around an injection-induced fracture. Transactions, GRC.
96. Tao, Q., Ghassemi, A. 2006. Optimization of mud properties for drilling in shale using coupled chemo-poro-thermoelasticity. 40th U.S. Rock Mech. Symp., Golden, CO.
97. Nygren, A. and Ghassemi, A. 2006. Coupled poroelastic and thermoelastic effects of injection into a geothermal reservoir. 40th U.S. Rock Mech. Symp., Golden, CO.
98. Tao, Q., Ghassemi, A., and Diek, A. 2005. A chemo-poro-thermoelastic model for stress/pore pressure analysis around a wellbore in shale. 40th U.S. Rock Mech. Symp., Anchorage, Alaska.
99. Nygren, A. and Ghassemi, A. 2005. Influence of cold water injection on critically-stressed fractures in Coso Geothermal Field, CA. 40th U.S. Rock Mech. Symp., Anchorage, Alaska.
100. Nygren, A. and Ghassemi, A., Cheng A.H.-D. 2005. Effects of cold-water injection on fracture aperture and injection pressure. GRC Annual Conf., Reno, Nevada.
101. Suresh Kumar, G., and Ghassemi, A. 2005. Evolution of fracture permeability and pressure with rock cooling and silica dissolution in a coupled fracture-matrix system: a numerical investigation. GRC Annual Conf., Reno, Nevada.
102. Dobroskok A., and Ghassemi, A. 2004. Crack propagation, coalescence and re-initiation in naturally fractured rocks. In *GRC Trans.* 28, 285-288.
103. Dobroskok, A., Ghassemi, A., Linkov, A. 2005. Crack propagation under thermal influence of a wellbore. Stanford Geothermal Workshop, Stanford, CA.
104. Dobroskok, A., and Ghassemi, A. 2005. Deformation and stability of a discontinuity in a Geothermal System. *GRC Trans.*
105. Ghassemi, A. and Tarasovs, S. 2004. Three-dimensional modeling of injection induced thermal stress. 6th North American Rock Mechanics Symp. Houston, TX.
106. Nygren, A., and Ghassemi, A. 2004. An Estimate of the maximum horizontal in-situ stress in Coso Geothermal Reservoir from drilling-induced Tensile Fractures. Ann. Geothermal Resources Council Conf. (GRC) Palm Springs, CA.
107. Ghassemi, A. and Zhang, Q. 2004. Poro-thermoelastic mechanisms in wellbore stability & reservoir stimulation. 29th Stanford Geothermal Workshop, Stanford, 2004.
108. Ghassemi, A., and Diek, A. 2002. A chemo-poroelastic solution for stress and pore pressure around a wellbore in transversely isotropic shale. SPE/ISRM Rock Mechanics Conference, Dallas.
109. Diek, A., and Ghassemi, A. 2002. Anisotropic Chemo-poroelasticity with ion transfer, ASCE Engineering Mechanics Conf., Columbia University, New York City. Cheng, A. H.-D. &
110. Ghassemi, A. 2001. Effect of fluid leak-off on heat extraction from a fracture in hot dry rock. Resources Council Conf., San Diego, CA.
111. Ghassemi, A., and Diek, A., 2001. Effects of Ion diffusion and thermal osmosis on shale deterioration and borehole instability. AADE National Drilling Technical Conference: Drilling Technology- The Next 100 years, March 27-29, Dallas, TX.
112. Ghassemi, A., Cheng, A.-H.D. 2001. Poroelastic analyses near underground excavations and underneath a dam, BETECH 2001, 14th International Conference on Boundary Element Technology.
113. Ghassemi, A., and Diek, A., 2000. Effects of thermal osmosis on shale instability. Proc. 4th North American Rock Mech. Symp., J. Girard, M. Liebman, C. Breeds, and T. Doe (eds.), 2000, 231-239.
114. Ghassemi, A., Diek, A., C., Wolfe, and Roegiers, J.-C. 1999. A Chemo-mechanical model for borehole stability analyses. Proc. 37th US Rock Mech. Symp., Vail, Colorado.

115. Ghassemi, A. and Roegiers, J.-C. 1996. A three-dimensional poroelastic hydraulic fracture simulator using the displacement discontinuity method. Proc. 2nd North American Rock Mech. Symp., Montreal, Quebec, Canada.
116. Ghassemi, A. & Zhang, Q. 2003. A transient displacement discontinuity method for poro-thermoelasticity. BEM Technology 2003. Detroit, MI.
117. Koshelev, V. and Ghassemi, A. 2003. Numerical modeling of stress distribution and crack trajectory near a fault or a natural fracture. Soil-Rock America Symp., Boston, MA.

Grants Selected for Award (About \$12,000, 000; over \$6,000,000 since coming to OU)

1. Reservoir Geomechanics JIP. 2013-current, \$1,500,000
2. Rock mechanics research in support of reservoir development: geomechanical characterization of reservoir rock systems. Devon Energy, 2017-2018. \$475,000
3. Rock mechanics research in support of reservoir development: geomechanical characterization of reservoir rock systems. Devon Energy, 2016-2017. \$475,000
4. Laboratory-Scale Characterization of EGS Reservoirs, 2015-2017, \$880,000
5. Evaluation of Laboratory Shear Test, Sandia/DOE. 2015-2016, \$256,000
6. Geothermal Code Intercomparison Study-DOE, 2014-2016, 100,000
7. Rock mechanics research in support of reservoir development: geomechanical characterization of reservoir rock systems. Devon Energy, 2013-2016. \$1,685,000.
8. Integrated study using geology, reservoir modeling and rock mechanics for induced seismicity (RPSEA), 1478,000 (12%).
9. Fracture Permeability caused by shear slip in gas shale reservoirs (2012-2014), RPSEA; \$777,000.
10. A Geomechanical analysis of gas shale fracturing and its containment (2011-13), RPSEA. \$651,000
11. Development of a geological and geomechanical framework for the analysis of MEQ in EGS experiments, DOE, \$1,400,000, Co-PIs: AltaRock Energy, Temple U, NER (PI: Ghassemi \$700,000)
12. Sustaining fracture area and conductivity of gas shale reservoirs for enhancing long-term production and recovery (\$1,950,000), co-PIs : Ghassemi & Roberto Suarez-Rivera, Schlumberger.
13. Predicting enhanced geothermal reservoir stimulation using geomechanics-based stochastic analysis of injection-induced seismicity, DOE Geothermal Program, \$1,100,000.
14. Three-dimensional modeling of fracture clusters in geothermal reservoirs, DOE Geothermal Program, \$825,000.
15. Fracture propagation and permeability change under poro-thermoelastic loads & silica reactivity in Enhanced Geothermal System, DOE Geothermal Program. \$370,000.
16. Fluid flow characterization & fracture propagation modeling in New Albany Shale. RPSEA. Subcontract through Gas Technology Institute. (\$500,000)
17. Three-dimensional fracture modeling (Schlumberger); with Peter Valko (\$300,000).
18. Reservoir compaction & deep-well casing integrity. Crisman Institute for Petroleum Research (\$150,000) 2009-2001.
19. Modeling hydraulic fracturing of shales. Crisman Institute for Petroleum Research (\$300,000), 2010-2013.
20. Characterization of shale geomechanical and transport properties. Crisman Institute for Petroleum Research (255,000). 2011-2013
21. Rock mechanics characterization of Newberry reservoir. AltaRock Energy (\$50,000)
22. Modeling & Analysis of EGS Stimulation. AltaRock. \$145,000
23. A Geomechanics model for geothermal reservoir development, PI. DOE/INL, \$280,000 (2003-2006).

24. Estimating injection-induced joint slip & permeability variation (2005), Energy & Geoscience Institute (Utah). \$40,000
25. Fracture propagation & reactive fluid flow for geothermal reservoir development, PI. DOD (2002-2004), \$295,000.
26. Thermoelastic hydraulic fracture modeling for geothermal reservoir development, PI. DOE, \$381,000.
27. Coupled thermo-poroelastic modeling of magma intrusion into saturated rocks, NSF EPSCoR Infrastructure Implementation Program Award (2000), \$30,000.
28. UND Faculty Seed Money Award 2000. \$40,000.
29. UND Faculty Seed Money Award 2002. \$40,000
30. University of North Dakota Summer Research Scholarship Award (2000). \$5400.
31. NSF EPSCoR Equipment Award (1999). Acquisition of a Rock Strength Device. \$2000.
32. Office of Research & Program Development (1999). Acquisition of a Rock Strength Device. \$2500.
33. University of North Dakota Summer Research Scholarship Award (1998), \$5000.
34. NSF EPSCoR Infrastructure Implementation Program Award (1997). A boundary element method for modeling borehole stability in chemically-active poroelastic media. \$18,000.
35. New Faculty Scholar Award, (1996). Modeling chemo-mechanical coupling and borehole stability in shale. \$5000.

Selected Presentations

1. Reservoir Stimulation: Hydraulic Fracturing and Mixed-Mode Fracture Propagation. 2nd ARMA Workshop on Hydraulic Fracturing. San Fran., CA, 2017.
2. HF Simulation Results from “GeoFrac”. 2nd ARMA Workshop on Hydraulic Fracturing. San Fran., CA, 2017.
3. Experimental Rock Mechanics Testing of Shale, Devon Energy, 2015, 2016.
4. Experimental simulation of enhanced geothermal reservoir stimulation. GRC Annual Meeting, Sacramento, CA, 2016.
5. Impact of Fracture Interactions, Rock Anisotropy and Heterogeneity on Hydraulic Fracturing: Some Insights from Numerical Simulations. 50th US Rock Mechanics / Geomechanics Symposium held in Houston, TX. 2016.
6. Thermo-poroelastic Effects on Reservoir Seismicity. 41st Workshop on Geothermal Reservoir Engineering. Stanford University, Stanford, CA, 2016.
7. Geomechanics of Unconventional Reservoirs. University of Southern California, Mork Family Department of Chemical Engineering and Materials Science. 2015.
8. Reservoir Geomechanics, Saud Aramco, Houston. 2015.
9. Fundamentals of Reservoir Geomechanics, Conoco-Phillips, Houston. 2013.
10. Optimum fracture spacing: Geomechanics Aspects. Niobrara completions and well spacing conf. Denver, CO, American Business Conference, 2014.
11. Some Geomechanics Aspects of Unconventional Reservoir Stimulation. Department of Petroleum and Geosystems Engineering, The University of Texas at Austin, 2014.
12. Rock Failure, Stimulated Volume & Permeability Enhancement in Gas Shale HF. EPA Hydraulic Fracturing Technical Workshop, Washington DC., 2011.
13. Wellbore Stress Analysis, Is Linear Elasticity Enough? SPE/AAPG/SEG Pore Pressure Prediction, Monitoring, and Wellbore Stability. Feb., 16-17th, San Antonio (Invited).
14. Numerical Modeling of Subsidence above a Solidifying Magma Chamber. 42nd U.S. Rock Mechanics Symp., June 29 – July 2, 2008, San Francisco.
15. A Three-dimensional Poroelastic Model for Water Injection into a Geothermal Reservoir. 33th Stanford Geothermal Workshop, Stanford, 2008.
16. Fracture Slip and Opening in Response to Fluid Injection into a Geothermal Reservoir. 31th Stanford Geothermal Workshop, Stanford, 2006.

17. Poro-thermoelastic Mechanisms in Wellbore Stability & Reservoir Stimulation. 29th *Stanford Geothermal Workshop*, Stanford, 2004.
18. Hydraulic Fracture Propagation near a Natural Discontinuity. 28th Annual Stanford Geothermal Workshop, Stanford, 2003.
19. A transient Displacement Discontinuity Method for Poro-thermoelasticity. BEM Technology 2003, Detroit.
20. Anisotropic Chemo-poroelasticity with ion Transfer, ASCE Engineering Mechanics Conf., Columbia University, New York City, 2002.
21. A Chemo-poroelastic Solution for Stress and Pore Pressure Around a Wellbore in Transversely Isotropic Shale. SPE/ISRM Rock Mechanics Conference, Dallas, 2002.
22. Modeling Fracture Initiation & Propagation Using an Indirect Poro-thermoelastic boundary element method. GRC Annual Conf. Reno, 2002.
23. Poroelastic Analyses near Underground Excavations and Underneath a Dam. BETECH 2001, 14th Int. Conf. on Boundary Element Tech., 2001.
24. Effects of Ion Transfer on Shale Instability. 38th US Rock Mech. Symp. Washington D.C., 2001.
25. Hydraulic Fracturing for Geothermal Reservoir Development. DOE Peer-Review Conference, Albuquerque, NM, 2001.
26. Effect of Fluid leak-off on Heat Extraction from a Fracture in Hot Dry Rock. Geothermal Research Council Annual Meeting, San Diego, CA, 2001.
27. Effects of Thermal Osmosis on Shale Instability. 4th North American Rock Mech. Symposium, Seattle, Washington. 2000.
28. A Chemo-mechanical Model for Borehole Stability Analyses. 37th US Rock Mechanics Symposium, Vail, Colorado, 1999.
29. Borehole Stability Analyses in Chemically-active Rocks. Dept. of Civil Engineering, University of Minnesota, April 1999.
30. Borehole Stability in Shale, Rock Mechanics Institute, The University of Oklahoma, May 1998.
31. Boundary Element Modeling of a Borehole in Chemically-active Poroelastic Media. Rock Mechanics Institute, University of Oklahoma, 1997.
32. Ghassemi, A. and Roegiers, J.-C. 1996. A three-dimensional poroelastic hydraulic fracture simulator using the displacement discontinuity method. Proc. 2nd North American Rock Mech. Symp., Montreal, Quebec, Canada.

Invited Lectures

2013-2014: UT Austin; South Dakota School of Mines, Rapid City, SD; 4. Devon Energy, OKC; U of Tulsa; Conoco-Phillips, Houston, TX

2015-2016: ARMA HF Conference; GRC Stimulation Workshop; Devon Energy (3)

2016-2019: SedHeat: Unlocking the Energy Elephant (NSF Workshop), Salt Lake City; International Continental Scientific Drilling Program (ICDP) Newberry Deep Drilling Project Workshop, Bend, OR; Houston Geological Society Mudrocks Conf., Houston; American Rock Mechanics Association (ARMA) HF Workshop, San Francisco; Devon Energy (3), Chesapeake Energy, OKC; Anadarko Petroleum, Houston; Von Gonten Laboratories, Houston; Gulf Coast SPE Geomechanics Congress; ARMA HF Workshop.

Professional Activities & Service

- Chair, American Rock Mechanics Association Award's Committee (2018-current)
- Executive Committee Member, DOE EGS Collaboration Project (Sigma-V) 2018-2019
- American Rock Mechanics Association (ARMA) Awards Committee (2009-2017)

- Scientific Advisory Committee for LabEx Geothermal Project in France (2017-current)
- Organized a booth in OKS SPE meeting highlighting Geomechanics research at OU
- Organized a booth at UrTec in Austin highlighting Geomechanics research at OU
- Organizing Committee, ARMA Hydraulic Fracturing Workshop (2017; 2018)
- Reviewer for 6-10 Journals, Swiss National Science Foundation, ACS, NSF, DOE
- ARMA Technical Committee on Hydraulic Fracturing, Executive Committee Member
- Member Organizing Committee, American Rock Mechanics Symposium, 2016
- Scientific Advisory Board, AltaRock Energy (2008-2017)
- ARMA Symposium Organizing Committee (2017)
- 58th SPWLA Symp. Workshop on Geomechanics
- South Dakota School of Mines and Technology GGE Advisory Board
- Editor-in-Chief, Geothermics, 2010-2014
- **Panel Leader** for the Geomechanics and Geochemistry working group in the Carbon Sequestration-Geothermal Energy Systems Geosciences Workshop, U.S. Department of Energy; June 15-16, 2010, Washington, DC.
- **EPA Hydraulic Fracturing Technical Workshop Team Leader**, Impacts of HF on Natural Transport Systems Washington DC., March, 27,2011.
- **Discussion Leader** for the Theory/Modeling Theme, DOE workshop on induced seismicity, Stanford University. Identify the critical issues for understanding and mitigation of induced seismicity, 2010.
- Session Organizer and Chair, American Rock Mechanics Association Symp., 2011
- Associated Editor in Chief, Journal of Natural Gas Science & Engineering (2009-2010)
- Advisory Board of International Conference on Rock Joints and Jointed Rock Masses, Tucson AZ, 2009.
- NSF Geomechanics Panel
- PETE Undergraduate Curriculum Committee
- PETE Research Committee
- Member, $\pi\epsilon\tau$: Petroleum Engineering Honor Society
- Member, American Rock Mechanics Association
- Co-Chair, Reservoir Engineering Session, Geothermal Res. Council, Annual Meeting, Palm Springs, 2004.
- Co-Chair, Reservoir Engineering Session, Geothermal Res. Council, Annual Meeting, Reno, 2003
- Chair, Session on Wellbore Stability, 4th North American Rock Mech. Symp., Seattle, WA, 2000.
- Co-Chair, Session on Shale Properties, 38th US Rock Mech. Symp., 2001, Washington D.C.
- Co-Chair, Poromechanics Session: ASCE Engineering Mechanics Conference, New York, 2002.
- Co-organizer, 2001 Hydraulic Fracturing Workshop in 38th US Rock Mech. Symp., Washington DC.
- Journal Reviewer: Eng. Analysis Boundary Elements, Int. J. Num. Anal. Methods in Geomechanics, Int. J. Rock Mechanics, and Geophysics, Natural resources, Geothermics, J. Pet. Sci. & engineering, Pure & Applied Geophysics.
- Proposal Review: DOE, American Chemical Society: Petroleum Research Fund
- Developed MS Program in Geological Engineering at UND
- Co-Chair Geological Engineering Curriculum Committee, UND
- Co-Director, Engineering Ph.D. Program
- Director, Geological Engineering Graduate Program

- Member, University Research Council
- Co-Director, Energy Engineering Ph.D. Program Committee

Awards & Honors

- American Rock Mechanics Association Dr. N.G.W. Cook Ph.D. Dissertation Award to Student Chakra Rawal, 2015
- American Rock Mechanics Association M.S. Thesis of the Year Awarded to M.S. Student Byungtark. Lee, 2014
- Geothermal Resources Council Special Achievement Award for outstanding contributions to the modeling of coupled chemical-thermal-mechanical processes and rock-fluid interactions in geothermal reservoirs
- William Keeler Faculty Fellow, Texas A&M University College of Engineering (2008-09)
- American Rock Mechanics Association M.S. Thesis of the Year Awarded to M.S. Student Andrew Nygren, 2006
- George & Joan Voneiff Development Professorship
- School of Engineering & Mines Olson Professors, 2003-2004
- University of North Dakota Graduate School Summer Professorship Award, 2000
- University of North Dakota Graduate School Summer Professorship Award, 1998
- New Faculty Scholar Award, 1997
- Oak Ridge Junior Faculty Enhancement Award 1996 (Runner-up)
- SPE Student Paper Contest, Ph.D. Division: 2nd Place, 1994
- University of Oklahoma, Petroleum & Geological Engineering: Guy M. Steele Fellow, 1993
- University of Oklahoma, Petroleum & Geological Engineering: Guy M. Steele Fellow, 1991

Collaborators

Dr. Gillian Foulger, Durham University
 Dr. Sabodh Garg, Leidos Inc. (Now Geologica Inc.)
 Dr. Francois Cornet
 John Pritchett, Leidos Inc. (Now Geologica Inc.)
 Collab (Sigma) Research Group
 Dr. Alexander Cheng; University of Mississippi
 Dr. McLennan, University of Utah
 Dr. Zhennan Zhang, Shanghai Jiao Tong University
 Dr. Joe Moore, University of Utah
 Sandia National Laboratories
 Idaho National Lab.
 Dr. Jean-Claude Roegiers; University of Oklahoma
 Dr. Michal Nimcok; EGS, University of Utah
 Dr. Sofia Mogilevskaya, University of Minnesota

Postdoctoral Associates

Dharmendra Kumar, Moein Farmahini Farahani; John Zhou, Kai Huang, Sergej Tarasovs;
 Vadim Koshelev; Alexander Simakin; Anastasia Dobroskok; Suresh Kumar, Woodong Jung,
 Zhennan Zhang John Zhou

Current and Former Graduate Students

MS (26): Ruben Gonzales, Laura Gonzales, Lei Han, Mostafa Eskandari, Rohit Bakshi, Jiman Lu, Michael Janis, Weiqi Yu, Elahe Khosravi, Alex Vachaparampil, Jing Xiang, Byungtark, Lee, Chanpreet Singh-Kang, Vahid Serajian, Sadegh Badakhshan, Jun Ge, Wexue Xue, Clotilde Chen,

Jihui Ding, Hachan Jeong, Qiang Zhang; Christopher Wolf; Santosh Satyan; Jing Wang; Andrew Nygren, Qingfeng Tao

Ph.D. (22) Will Kibikis, Chakra Rawal, Sang Hoon Lee, Shahla Masouleh, Reza Safari, Chun Kwang He, Jian Huang, Kyoung Min, Qingfeng Tao, Alexander Verde, Kai Huang, Sonia Wang, Qian Gao, Qinglu Cheng, Naresh Sesetty, Yawei Li, Lianbo Hu, Alex Vachaparampil, Behzad Hemami, Amir Kamali, Zhi Ye, Jinarong Lu