

Ebrahim Fathi
West Virginia University
Petroleum and Natural Gas Engineering
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Education

Ph D, University of Oklahoma, 2010.
Major: Petroleum Engineering
Dissertation Title: Matrix Heterogeneity Effects on Fluid Transport in Porous Medium Using Perturbation Theory

MS, Tehran University, 2003.
Major: Exploration of Petroleum Engineering

BS, Tehran University, 2001.
Major: Exploration of Mining Engineering

Professional Positions

Academic - Post-Secondary

Associate Professor -Petroleum and Natural Gas Engineering, West Virginia University. (2018 - Present).

Assistant Professor -Petroleum and Natural Gas Engineering, West Virginia University. (2012 - 2018).

Postdoctoral Research Fellow, University of Oklahoma. (2010 - 2012).

Chevron Internship, Reservoir engineer, summer 2009

Professional Memberships

Society of Petroleum Engineering. (2012 - Present).

American Petroleum Professionals of Iranian Heritage (APPIH) (2013-present)

American Society for Engineering Education. (2012 - 2015).

RESEARCH

Contracts, Grants and Sponsored Research

Sponsored Research

Funded

1. Fathi, Ebrahim (Principal), "Prediction of Fault Reactivation in Hydraulic Fracturing of Horizontal Wells in Shale Gas Reservoirs," Sponsored by RPSEA, Federal, \$1,098,628.00. (January 19, 2013 - August 15, 2015).

2. Fathi, Ebrahim (Principal), "Develop Third-Generation ROMs for Reservoir Behavior (Activity No. 4000.2.651.072.002.242.000.005)," Sponsored by US DOE/URS Corporation, Federal, \$74,000.00. (February 1, 2014 - November 14, 2014).
3. Fathi, Ebrahim (Principal), "“Developing Data-Driven Models for Completion Design Optimization to Enhance Overall NPV of Marcellus Shale” Sponsored by EQT Production Company, \$88,557.0 (Oct, 2017 -Dec 2018).
4. Fathi, Ebrahim (Principal), "Development of Smart Proxy Drag Models for Non-Spherical Particles in Assembly (11.524023113.71202269)," Sponsored by WVU Research Corporation, West Virginia University, \$19,126.00. (August 15, 2017 - August 1, 2018).
5. Fathi, Ebrahim (Co-Principal), "Marcellus Shale Energy and Environment Laboratory (MSEEL)," Sponsored by US Department of State, Federal, \$9,100,000.00. (2014 - 2019).
6. Fathi, Ebrahim (Co-Principal), "West Virginia University - Support for the International Forum on Unconventional Gas Sustainability and the Environment (INFUSE)," Sponsored by US Department of State, Federal, \$121,046.00. (September 23, 2015 – Jun 30, 2018).

Grant:

1. NVIDIA Quadro P6000 GPU Grant. \$1260.0 (October 2018)

Awards and Honors

1. Outstanding Technical Editor Award, SPE Journal. (2018).
2. Outstanding Contribution in Reviewing Award, JFUEL (2018).
3. AIME Rossiter W. Raymond Memorial Award, The American Institute of Mining, Metallurgical and Petroleum Engineers. (2015).
4. Outstanding Technical Editor Award, SPE Journal. (2013).

Published Intellectual Contributions

Books

- 1- Belyadi, H., Fathi, E., Belyadi, F. (2019). Hydraulic Fracturing in Unconventional Reservoirs: Theories, Operations, and Economic Analysis (2st ed.). Gulf Professional Publishing.
- 2- Belyadi, H., Fathi, E., Belyadi, F. (2016). *Hydraulic Fracturing in Unconventional Reservoirs: Theories, Operations, and Economic Analysis* (1st ed.). Gulf Professional Publishing.

Refereed Journal Articles

- 3- A. Takbiri-Borujeni, E. Fathi, M. Kazemi, F. Belyadi. (2018). An Integrated Multiscale Model for Gas Storage and Transport in Shale Reservoirs. *Journal of Fuel*, Volume 237, 1 February 2019, Pages 1228-1243
- 4- Y Feng, D Xiaohu, AH Alexandra, F Ebrahim, E Derek. (2018). Petrophysics and Fluid Transport in Shales and Tight Reservoirs. *Geofluids*, Volume 2018, Article ID 5691953, 3 page, <https://doi.org/10.1155/2018/5691953>
- 5- G Nupur, F Ebrahim, B Fatemeh. (2018). Effects of nano-pore wall confinements on rarefied gas dynamics in organic rich shale reservoirs. *Fuel*, Volume 220, 15 May 2018, Pages 120-129
- 6- Mokhtari, M., Wood, D., Ghanizadeh, A., Kulkarni, P., Rasouli, V., Fathi, E., Saidian, M., Barati,

R. (2016). Advances in the Petrophysical and Geomechanical Characterization of organic-Rich Shales. *Journal of Natural Gas Science and Engineering*, 38, 638-641.

- 7- Jenkins, A., Fathi, E., Belyadi, F. (2016). Stress Field Behavior Induced by Hydraulic Fracture in Shale Reservoirs: A Practical View on Cluster Spacing. *Journal of Natural Gas Science and Engineering*, Volume 48, December 2017, Pages 186-196
- 8- Bao, J. Q., Fathi, E., Ameri, S. (2016). A Unified Finite Element Method for the Simulation of Hydraulic Fracturing With or Without Fluid Lag. *Engineering Fracture Mechanics*, 162, 164-178 - Cited by 4.
- 9- Gao, Q., Cheng, Y., Fathi, E., Ameri, S. (2016). Analysis of Stress-Field Variations Expected on Subsurface Faults and Discontinuities in the Vicinity of Hydraulic Fracturing. *SPE-16871 SPE Reservoir Evaluation & Engineering-Formation Evaluation*, 19(01), 16 pages. 10.2118/168761-PA
- 10- Kong, B., Fathi, E., Ameri, S. (2015). Coupled 3-D Numerical Simulation of Proppant Distribution and Hydraulic Fracturing Performance Optimization in Marcellus Shale Reservoirs. *International Journal of Coal Geology*, 147-148, 35-45 - Cited by 4.
<http://dx.doi.org/10.1016/j.coal.2015.06.006> 10.1016/j.coal.2015.06.006
- 11- Bao, J. Q., Fathi, E., Ameri, S. (2015). Uniform Investigation of Hydraulic Fracturing Propagation Regimes in Plane Strain Model. *International Journal for Numerical Analytical Methods in Geomechanics*, 9(5), 507-523 - Cited by 13. 10.1002/nag.2320
- 12- Bao, J. Q., Fathi, E., Ameri, S. (2014). A Coupled Finite Element Method for the Numerical Simulation of Hydraulic Fracturing with a Condensation Technique. *Engineering Fracture Mechanics*, 131, 269-281 - Cited by 12. 10.1016/j.engfracmech.2014.08.002
- 13- Fathi, E., Akkutlu, I. Y. (2014). Multi-component Gas Transport and Adsorption Effects During CO₂ Injectin and Enhanced Shale Gas Recovery. *International Journal of Coal Geology*, 123, 52-61 - Cited by 38.
- 14- Fathi, E., Akkutlu, I. Y. (2013). Lattice Boltzmann Method for Simulation of Shale Gas Transport in Kerogen. *SPE Journal*, 18(1), Cited by 77.
- 15- Fathi, E., Akkutlu, I. Y. (2012). Correction to Klinkenberg Slip Theory for Gas Dynamics in Nanocapillaries. *International Journal Coal Geol*, 103, 51-59 - Cited by 70. 10/1016/j.coal.2012.06.008
- 16- Fathi, E., Akkutlu, I. Y. (2012). Mass Transport of Adsorbed-phase in Stochastic Porous Medium with Fluctuating Porosity Field and Nonlinear Gas Adsorption Kinetics. *Journal of Transport in Porous Media*, 91(1), 5-33 - Cited by 30.
- 17- Akkutlu, I. Y., Fathi, E. (2012). Multiscale Gas Transport in Shales with Local Kerogen Heterogeneities. *SPE Journal*, 17(4), 1002-1011 - Cited by 176.
- 18- Kang, S. M., Fathi, E., Ambrose, R. J., Akkutlu, I. Y., Sigal, R. F. (2011). CO₂ Applications: Carbon Dioxide Storage Capacity of Organic-rich Shales. *SPE Journal*, 16(4), 842-855 - Cited by 239.
- 19- Fathi, E., Akkutlu, I. Y. (2009). Matrix Heterogeneity Effects on Gas Transport and Adsorption in Coalbed and Shale Gas Reservoirs. *Journal of Transport in Porous Media*, 80, 281-304 - cited by 65.

Conference Proceedings

- 20- Amir Ansari (graduate student), Ebrahim Fathi*, Fatemeh Belyadi, Ali Takbiri-Boroujeni Hoss Belyadi, Kirby Walker (2017). *Data-Based Smart Model for Real Time Liquid Loading Diagnostics in Marcellus Shale via Machine Learning*. SPE Unconventional Resources Conference to be held 13 - 14 March 2018 in Calgary, Alberta, Canada
- 21- Belyadi, H., Fathi, E., Belyadi, F. (2016). *Managed Pressure Drawdown in Utica/Point Pleasant with Case Studies*. Canton, Ohio: Proceedings of SPE Eastern Regional Meeting - Cited by
- 22- Reddy, L., Jenkins, A., Fathi, E. (2015). *Dynamic Assessment of Induced Stresses and In-situ Stress Reorientation During Multi-Stage Hydraulic Fracturing in Unconventional Reservoirs*. Morgantown, WV: SPE-177301-MS SPE Eastern Regional Meeting - Cited by 1.
- 23- Jenkins, A., Reddy, L., Fathi, E. (2015). *Dynamic Assessment of Stress Field Behavior Induced by Fracture Tip Propagation in Quasi-Brittle/Ductile shale Reservoirs: A New Approach Based on Modified theory of Critical Distances*. San Diego, CA: 13th USA National Congress on Computational Mechanics.
- 24- Zamirian, M., Aminian, K., Fathi, E., Ameri, S. (2014). *A Fast and Robust Technique for Accurate Measurement of the Organic-rich Shales Characteristics under Steady-State Conditions*. Charleston, WV: SPE 171018, SPE Eastern Regional Meeting - Cited by 19.
- 25- Zhong, R., Bao, J., Fathi, E. (2014). *Fully Coupled Finite Element Model to Study Fault Reactivation During Multiple Hydraulic Fracturing in Heterogeneous Tight Formations*. Charleston, WV: SPE-171035-MS, SPE Eastern Regional Meeting - Cited by 7.
- 26- Zamirian, M., Aminian, K., Ameri, S., Fathi, E. (2014). *New Steady-State Technique for Measuring Shale Core Plug Permeability*. Calgary, Canada: SPE-171613-MS, SPE/CSUR Unconventional Resources Conference - Cited by 12.
- 27- Gao, Q., Cheng, Y., Fathi, E., Ameri, S. (2013). *Characterization of Stress-field Variation on Subsurface Faults in Surrounding Areas of Hydraulic Fracturing*. Denver, CO: SPE 168761 / URTEC 1579798 Unconventional Resources Technology Conference.
- 28- Elamin, A., Fathi, E., Ameri, S. (2013). *Simulation of Multicomponent Gas Flow and Condensation in Marcellus Shale Reservoir*. The Woodlands, TX: SPE-164538-MS SPE Unconventional Resources Conference - Cited by 11.
- 29- Tinni, A., Fathi, E., Agrawal, R., Sondergeld, C., Akkutlu, Y., Rai, C. (2012). *Shale Permeability Measurements on Plugs and Crushed Samples*. Calgary, Alberta, Canada: SPE Canadian Resources Conference - Cited by 77.
- 30- Fathi, E., Tinni, A., Akkutlu, I. Y. (2012). *Shale Gas Correction to Klinkenberg Slip Theory*. Pittsburgh, PA: Americas Unconventional Resources Conference - Cited by 46.
- 31- Tinni, A. O., Fathi, E., Sondergeld, C. H., Rai, C. S., Akkutlu, Y. (2011). *Crushed Rocks Permeability Measurements*. Shales Moving Forward, Oklahoma Geological Survey.
- 32- Fathi, E., Akkutlu, I. Y. (2011). *Gas Transport in Shales with Local Kerogen Heterogeneities*. Denver, CO: 2011 SPE Annual Technical Conference and Exhibition (ATCE).
- 33- Fathi, E., Akkutlu, I. Y. (2011). *Lattice Boltzmann Method for Simulation of Shale Gas Transport in Kerogen*. Denver, CO: 2011 SPE Annual Technical Conference and Exhibition (ATCE).
- 34- Kang, S. M., Fathi, E., Akkutlu, I. Y., Sigal, R. F. (2010). *CO₂ Storage Capacity of Organic-rich Shales*. Florence, Tuscany, Italy: SPE Annual Technical Conference.

- 35- Fathi, E., Akkutlu, I. Y. (2009). *Nonlinear Sorption Kinetics and Surface Diffusion Effects on Gas Transport in Low Permeability Formation*. New Orleans, LA: SPE Annual Technical Conference - Cited by 22.
- 36- Fathi, E., Akkutlu, I. Y. (2009). *Macrokinetics of Matrix Gas Release and Its Influence on Coalbed Methane Flow and Production*. SPE Latin American and Caribbean Petroleum Engineering Conference - Cited by 3.
- 37- Fathi, E., Akkutlu, I. Y. (2008). *Counter-Diffusion and Competitive Adsorption Effects During CO₂ Injection and Coalbed Methane Production*. Denver, CO: SPE Annual Technical Conference - Cited by 11.
- 38- Fathi, E., Akkutlu, I. Y., Dunha, L. (2007). *Effects of Material and Porosity Fluctuations on Gas Transport Phenomena and Adsorption Kinetics in Coalbeds*. Calgary: Canadian International Petroleum Conference - Cited by 2.
- 39- Fathi, E., Akkutlu, I. Y. (2006). *Effect of Heterogeneity on Advection-Reaction Problem in Porous Media Using Stochastic Eulerian Flow Model*. Calgary: Canadian International Petroleum Conference.

Other

- 40- Belyadi, H., Fathi, E., Belyadi, F. (2017). *Drawdown Key to Well Performance* (5th ed., vol. 60, pp. 69-73). The American Oil & Gas Reporter.
- 41- Fathi, E. (2010). *Matrix Heterogeneity Effects on Fluid Transport in Porous Medium Using Perturbation Theory*. University of Oklahoma. mpge.ou.edu - Cited by 2

Presentations Given

- Fathi, E., 7th Reserves Estimation Unconventional, "Innovative Ways of Indexing and Ranking Wells Through Rate Transient Analysis (RTA) and Type Curve analogies," Houston, TX. (2017).
- Mohaghegh, S. D., Ansari, A., Shahnam, M., Dietiker, J.-F., Fathi, E., Takbiri Borujeni, A., 2017 Multiphase Flow Science Workshop, "Data-Driven Smart CFD Proxy: Applications of Big Data Analytics and Machine Learning in Computational Fluid Dynamics," US DOE/NETL, Morgantown, WV. (August 2017).
- Fathi, E., Graduate Seminar Texas A&M University, "Prediction of Fault Reactivation in Hydraulic Fracturing of Horizontal Wells in Shale Gas Reservoirs," Texas A&M University, College Station, TX. (March 7, 2017).
- Mohaghegh, S. D., Shahnam, M., Ansari, A., Takbiri, A., Fathi, E., Dietiker, J.-F., 2016 Multiphase Flow Science Workshop, "Data-Driven Smart CFD Proxy: Fast and Accurate Proxy of Multiphase CFD with Big Data Analytics." (2016).
- Fathi, E., Consol Energy, "Enhanced Shale Oil Recovery," Pittsburgh, PA. (December 2015).
- Fathi, E., Texas Training Center, "Enhanced Oil Recovery Using CO₂: Techniques, Practices and Simulation," Houston, TX. (November 2015).
- Fathi, E., Statoil, "Enhanced Shale Oil/Gas Recovery." (September 2015).
- Jenkins, A., Reddy, L., Fathi, E., 13th US National Congress on Computational Mechanics,

- "Dynamic Assessment of Stress Field Behavior Induced by Fracture Tip Propagation in Quasi-Brittle/Ductile Shale Reservoirs: A New Approach Based on Modified Theory of Critical Distances," San Diego, CA. (July 2015).
- Fathi, E., Graduate Seminar, "A Fast and Robust Technique for Accurate Measurement of the Organic-rich Shales Characteristics under Steady-State Conditions," University of Oklahoma, Norman, OK. (November 26, 2014).
- Fathi, E., Short Course Texas Training Center, "Enhanced Oil Recovery Using CO₂: Techniques, Practices and Simulation," Houston, TX. (November 20, 2014).
- Fathi, E., SPE/CSUR Unconventional Resources Conference, "New Steady-State Technique for Measuring Shale Core Plug Permeability," Calgary, Canada. (October 2, 2014).
- Fathi, E., Graduate Seminar, "Unconventional Natural Gas Reservoirs," University of Kansas, Lawrence, KS. (2012).
- Fathi, E., Graduate Seminar, "Gas Transport and Storage in Organic Rich Shales," University of Texas Tech, Lubbock, TX. (2011).
- Fathi, E., Devon Energy Corporation, "Pressure Pulse Decay Tests: Permeability and Adsorption Measurements," Oklahoma City, OK. (2010).
- Fathi, E., Chevron, "Water Coning and Fingering Studies of the Lucapa Oil Field, Angola," Houston, TX. (2009).
- Fathi, E., University of Oklahoma, "Design of Laboratory Investigation on Gas Transport Mechanisms and Permeability in Coal and Shale Gas Reservoirs." (2009).
- Fathi, E., SPE-OKC Young Professionals, "Numerical Modeling and Reservoir Simulation of Coalbed Resources and CO₂-ECBM." (2008).
- Fathi, E., Alberta Research Council (ARC), "Effects of Coal Matrix Heterogeneities on Gas Transport and Sorption Kinetics." (2007).

Media Contributions

Magazine

Engineering WV. (2014).

Other

"Research Description Published in WVU's Linking Innovation, Industry and Commercialization (LIINC)," LIINC Program Booklet. (October 2013).

SERVICE

Professional Service

Guest Editor for the special edition, Geofluids. (2016).

Editorial Review Board Member, Journal of Natural Gas Science and Engineering/Special Issue. (2016).

Reviewer, Conference Paper, Abu Dhabi International Petroleum Exhibition and Conference--30 Reviewed. (2012 - 2016).

Reviewer, Grant Proposal, Canada Foundation for Innovation Leaders Opportunity Fund. (2012 - 2016).

Reviewer, Journal Article, International Journal of Coal Geology-- 9 Reviewed. (2012 - 2016).

Reviewer, Journal Article, International Journal of Computational Fluid Dynamics--2 Reviewed. (2012 - 2016).

Reviewer, Journal Article, International Journal of Oil, Gas and Coal Technology (IJOGCT)--4 Reviewed. (2012 - 2016).

Reviewer, Journal Article, Journal of Fuel--1 Reviewed. (2012 - 2016).

Reviewer, Journal Article, Journal of Natural Gas Science & Engineering --3 Reviewed. (2012 - 2016).

Reviewer, Journal Article, Journal of Transport in Porous Media -- 3 Reviewed. (2012 - 2016).

Reviewer, Grant Proposal, National Sciences and Engineering Research Council of Canada. (2012 - 2016).

Reviewer, Journal Article, Society of Petroleum Engineering Journal--43 Reviewed. (2012 - 2016).

Reviewer, Journal Article, SPE Reservoir Evaluation & Engineering Journal --8 Reviewed. (2012 - 2016).

Ph.D. Division Judge - Eastern North America, 2015 Regional Student Paper Contest. (2015).

Editorial Technical Subcommittee Member, Abu Dhabi International Petroleum Exhibition and Conference. (2015).

Guest Editor for the special edition, Journal of Natural Gas Science and Engineering. (2015).

Reviewer, Journal Article, 2014 Unconventional Resources--1 Reviewed, Alberta. (2014).