

Ebrahim Fathi, PhD

Professor - Full Professor and Holder of the Ross B. Matthews Professorship in Petroleum Engineering, Texas Christian University

CAREER SUMMARY



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Experienced engineer, author, and educator with extensive expertise in reservoir engineering, Hydraulic Fracturing, AI/deep Learning technologies, algorithms, engineered geothermal systems and Carbon Capture Utilization and Storage (CCUS). Experienced in developing, managing, and leading large multidisciplinary projects. Continuous record of driving end-to-end complex data-driven projects.

EDUCATION

Postdoctoral Research Fellow, University of Oklahoma, 2010-2012

Ph D, University of Oklahoma, 2010. Major: Petroleum Engineering

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

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

PROFESSIONAL EXPERIENCES

- **Professor** - Full Professor and Holder of the Ross B. Matthews Professorship in Petroleum Engineering, Texas Christian University. (2026-Present).
- **Professor** -Petroleum and Natural Gas Engineering, West Virginia University. (2025-2026).
- **Associate Professor** -Petroleum and Natural Gas Engineering, West Virginia University. (2018-2025).

Funded Projects:

- 1- Tri-State CO₂ Storage Hub; Tri-State Project intends to characterize four stacked geologic reservoir and caprock carbon storage systems in the West Virginia, Ohio, and Pennsylvania region to better understand suitability for CO₂ storage and caprock competence. Total: \$3,348,742, Task **\$650,773** (2024—2027)
 - 2- SMART Phase 2 Validation P010220883 Task 47. Leidos Total **\$67,929**, Task 56,141
 - 3- Feasibility Analysis of Geothermal Deep Direct-Use Combined with Reservoir Thermal Energy Storage on the West Virginia University Campus- Morgantown, WV - Phase II. US DOE Department of Energy. Total: \$11,872,757.00, Task: **\$299,729.24** (2022-2025)
 - 4- Develop automated ML recognition of subseismic faults and fractures (healed and open) using image logs and/or drilling data. SMART PHASE 2. Leidos, Total: \$86,034.00, Task **\$45,681**(2023-2024)
 - 5- SMART Decisions in Subsurface Applications Phase 2 Development and Field Validation Task 46. Leidos Total: \$9,035, Task **\$4,500** (2024)
 - 6- SMART Phase 2 Work Package 2C.2 - WVU Task Release 35, Leidos Total: \$140,000, Task **\$43,895** (2022-2024)
 - 7- Subsurface Data-to-Knowledge in a Fractured Reservoir – Leidos, Total: \$158,500.00, Task **\$63,741** (2021-2022)
 - 8- Marcellus Shale Energy and Environment Laboratory (MSEEL), US DOE-National Energy Technology Laboratory, Total: \$16,608,355 Task: **\$20,484** (2019-2021)
 - 9- Developed an integrated data-driven models for completion design optimization to enhance overall NPV of Marcellus shale”. Sponsored by EQT production company, Total \$88,557.0, Task **\$44,358** (2017-2018)
- **Assistant Professor** -Petroleum and Natural Gas Engineering, West Virginia University. (2012 -2018).

- 10- Managed and lead a team to develop an integrated hydraulic fracturing software for prediction of fault reactivation in hydraulic fracturing of horizontal wells in shale gas reservoirs," Sponsored by RPSEA, Federal, **\$1,098,628.00** (2012-2015)
- 11- Developed a fine and reduced order reservoir models for science-based prediction to characterize reservoir behavior as a function of CO₂ injection characteristics, geological variables, and time. Sponsored by US DOE/URS Corporation, **\$74,000.00** (2015-2016)
- 12- Developed and validated new knowledge and technology to improve recovery efficiency and minimize environmental implications of unconventional resource development. Sponsored by US Department of State, Federal, **\$168,000.0** (2017-2018)
- 13- Developed advanced completion and operational optimization procedure for the International Forum on Unconventional Gas Sustainability and the Environment (INFUSE)," Sponsored by US Department of State, Federal, **\$121,046.00** (2015-2018)
- **Lecturer:** North Eastern University, Arlington Data Analytics (2024-2026)
- **Postdoctoral Research Fellow**, University of Oklahoma.
 - 1- Developed experimental and numerical techniques for conventional and unconventional oil and gas reservoirs
- **Reservoir engineer intern**, Chevron Corporation, Houston Texas Summer 2009
 - 1- Water flooding and coning studies of Lucapa oil field in block 14 Angola

HONORS AND AWARDS

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

Synergistic Activities

- Associate Editor of Frontiers in Earth Science
- Guest Editor for a special issue on Recent Advances in Subsurface Sequestration of Anthropogenic Carbon Dioxide in the Journal of Energies
- Guest Editor in Geofluids special edition on Petrophysics and Fluid Transport in Shales and Tight Reservoirs.
- Department of energy 2020 technology commercialization fund (TCF) reviewer
- Oak Ridge Associated Universities (ORAU)/Oak Ridge Institute for Science and Education (ORISE) Nazarbayev University FDCRGP and AI Review 2023
- Oak Ridge Associated Universities (ORAU)/Oak Ridge Institute for Science and Education (ORISE) Nazarbayev University CRP Research Review 2023
- Oak Ridge Associated Universities (ORAU)/Oak Ridge Institute for Science and Education (ORISE) Nazarbayev University Research Council's Faculty-Development Competitive Research Grants Program (FDCRGP).
- Oak Ridge Institute for Science and Education (ORISE) 2024 National Science Bowl® Middle School Regional Competitions
- Oak Ridge Institute for Science and Education (ORISE) 2024, 2025 National Science Bowl® High school Regional Competitions

SHORT COURSES

- 1- Enhanced Oil Recovery (rpsgroup)
- 2- CO₂ Enhanced Oil recovery (Nautilus Training Alliance)

PUBLICATIONS Books

- 1. Belyadi Fatemeh, Fathi Ebrahim (2026) Subsurface CO₂ Sequestration- A Thorough Analysis of Sustainable Emission Solutions and Regulatory Frameworks. Springer Nature

2. Belyadi, H., **Fathi, E.**, Belyadi, F. (2019). Hydraulic Fracturing in Unconventional Reservoirs: Theories, Operations, and Economic Analysis (2st ed.). Gulf Professional Publishing.
3. 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

29 peer reviewed publications and more than 30 conference proceedings with more than 3500 citations based on google scholar. <https://tinyurl.com/58w6wtu6>

1. E Fathi , G B L Dongho*, B Heidari*, T R. Carr, F Belyadi and I Bilgesu. (2024) Optimizing Deep Geothermal Drilling for Energy Sustainability in the Appalachian, Sustainability Journal, Sustainability 16 (18), 8053 <https://doi.org/10.3390/su16188053>
2. I Iyegbekedo *, E Fathi, T R. Carr, and F Belyadi (2024), Machine Learning-Driven Quantification of CO2 Plume Dynamics at IBDP Sites using Microseismic Data, , Energies 2024, 17(17), 4421; <https://doi.org/10.3390/en17174421>
3. E Fathi, F Belyadi, MF Adenan*, C Pacheco* (2024). Application of Fiber Optics for Completion Design Optimization: A Methodological Approach and Key Findings; Fuels 5 (1), 33-52; <https://doi.org/10.3390/fuels5010003>
4. M Faiq Adenan*, E Fathi, TR Carr, B Panetta (2024) Advancing Subsurface Analysis: Integrating Computer Vision and Deep Learning for Near Real-Time Interpretation of Borehole Image Logs in the Illinois Basin Decatur Project; Interpretation 12 (2), 1-41; <https://doi.org/10.1190/int-2023-0078.1>
5. E Fathi, A. Takbiri-Borujeni, F Belyadi, MF Adenan* (2024). Simultaneous well spacing and completion optimization using an automated machine learning approach. A case study of the Marcellus Shale reservoir, northeastern United States, Petroleum Geoscience 30 (1), petgeo2023-077 <https://doi.org/10.1144/petgeo2023-077>
6. E Fathi, MF Adenan*, N Moryan*, F Belyadi, H Belyadi (2024). High-Precision Single-Leak Detection and Localization in Single-Phase Liquid Pipelines Using the Negative Pressure Wave Technique: An Application in a Real-Field Case Study. SPEJ (SPE-217455-PA) <https://doi.org/10.2118/217455-PA>
7. E Fathi, D Arcentales, F Belyadi (2023), Impacts of Different Operation Conditions and Geological Formation Characteristics on CO2 Sequestration in Citronelle Dome, Alabama. Energies 16 (7), <https://doi.org/10.3390/en16073191>
8. E Fathi, TR Carr, MF Adenan*, B Panetta, A Kumar, BJ Carney., (2022), High-quality fracture network mapping using high frequency logging while drilling (LWD) data: MSEEL case study. Machine Learning with Applications, 100421, <https://doi.org/10.1016/j.mlwa.2022.100421>
9. V Van Pham*, E Fathi, F Belyadi (2021), New hybrid approach for developing automated machine learning workflows: a real case application in evaluation of marcellus shale gas production Fuels 2 (3), 286-303
10. E Fathi, F Belyadi, B Jabbar* (2021), Shale Poroelastic Effects on Well Performance Analysis of Shale Gas Reservoirs, Fuels 2, 130-143
11. SZ Lashari*, A Takbiri-Borujeni, E Fathi, T Sun, R Rahmani, M Khazaeli (2019), "Drilling Performance Monitoring and Optimization Using Artificial Intelligence Algorithms", Journal of Petroleum Exploration and Production Technology, 24 April 2019, 9 (4), 2747-2756
12. 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
13. 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>
14. 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
15. A Jenkins*, E Fathi, F Belyadi (2017). 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
16. B Hoss, F Ebrahim, B Fatemeh (2017). Drawdown Key To Well Performance. The American Oil & Gas Reporter 60 (5), 69-73

17. JQ Bao*, E Fathi, S Ameri (2016). A Unified Finite Element Method for the Simulation of Hydraulic Fracturing With or Without Fluid Lag. *Engineering Fracture Mechanics*, 162, 164-178 -.
18. Q Gao*, Y Cheng, E Fathi, S Ameri (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
19. Mehdi Mokhtari, David Wood, Amin Ghanizadeh, Pandurang Kulkarni, Vamegh Rasouli, Ebrahim Fathi, Milad Saidian, Reza Barati (2016). Advances in the Petrophysical and Geomechanical Characterization of organic- Rich Shales. *Journal of Natural Gas Science and Engineering*, 38, 638-641.
20. B Kong*, E Fathi, S Ameri (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 -<http://dx.doi.org/10.1016/j.coal.2015.06.006>
10.1016/j.coal.2015.06.006
21. JQ Bao*, E Fathi, S Ameri (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
22. JQ Bao*, E Fathi, S Ameri (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
23. E Fathi, IY Akkutlu (2014). Multi-component Gas Transport and Adsorption Effects During CO₂ Injectin and Enhanced Shale Gas Recovery. *International Journal of Coal Geology*, 123, 52-
24. Fathi, E., Akkutlu, I. Y. (2013). Lattice Boltzmann Method for Simulation of Shale Gas Transport in Kerogen. *SPE Journal*, 18(1),
25. Fathi, E., Akkutlu, I. Y. (2012). Correction to Klinkenberg Slip Theory for Gas Dynamics in Nanocapillaries. *International Journal Coal Geol*, 103, 51-59 -
26. 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
27. Akkutlu, I. Y., Fathi, E. (2012). Multiscale Gas Transport in Shales with Local Kerogen Heterogeneities. *SPE Journal*, 17(4), 1002-1011 –
28. SM Kang*, E Fathi, RJ Ambrose, IY Akkutlu, RF Sigal (2011). Carbon Dioxide Storage Capacity of Organic-rich Shales. *SPEJournal*, 16(4), 842-855
29. 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 -