

Sai Wang, Ph.D.

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Section Head I/Research Engineer II, Petroleum Recovery Research Center (PRRC)
Dean's Developing Scholar, New Mexico Institute of Mining and Technology (NMT)
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Principal Areas of Expertise

Principal areas of interest and expertise include well design/drilling/completion, field operation and production, flow assurance, carbon sequestration and mineralization, geo-energy exploration (hydrogen, geothermal and critical minerals/REE), methane emission mitigation, enhanced oil recovery, conventional/unconventional reservoir management, regulation and permit, fluid flow in porous media, analytical chemistry and geochemistry.

Education

- Ph.D., Petroleum Engineering, University of North Dakota, January 2016 – May 2019
- M.S., Petroleum Engineering, New Mexico Tech, August 2013 – December 2015
- B.S., Applied Chemistry (analytical), Hainan University, China, September 2007 – July 2011

Professional Experience***2025.7 – Present: Assistant Professor/Dean's Developing Scholar, Department of Petroleum and Natural Gas Engineering - New Mexico Tech***

Teaching the core undergraduate courses: Production Engineering, Well Completion.

2025.5 – Present: Section Head I/Research Engineer II, PRRC - New Mexico Tech

Section Head for Geo-Resources Evaluation and Applied Technologies (GREAT) group. Principle Investigator on DOE funded projects. Conduct research on the CCUS, Carbon Mineralization, Critical Mineral and Rare Earth Elements, Geothermal Energy, Hydrogen Production and Storage and methane emission mitigation related projects and perform responsibilities on lab scale and pilot scale tests, field operation, regulation support and project management.

2024.1 – Present: Interim Section Head/Research Engineer II, PRRC - New Mexico Tech

Interim Section Head for Gas Flooding Processes and Flow Heterogeneities group. Principle Investigator on DOE funded projects. Conduct research on the CCUS, Carbon Mineralization, Critical Mineral and Rare Earth Elements, Geothermal Energy, Hydrogen Production and Storage and methane emission mitigation related projects and perform responsibilities on lab scale and pilot scale tests, field operation, regulation support and project management.

2024.8 – 2024.12 : Lecturer, Petroleum and Natural Gas Engineering Department – New Mexico Tech

Taught the course “PETR311-Drilling Engineering”, and supervised the lab section. 14 students enrolled.

2023.5 – 2024.1: Research Engineer II, PRRC - New Mexico Tech

Principle Investigator on DOE funded projects. Conduct research on the CCUS, REE and Hydrogen related projects and perform responsibilities on regulation support and project management.

2021.7 – 2023.5: Research Associate III, PRRC - New Mexico Tech

Lead and supervise on several DOE funded projects. Perform research on the CCUS and REE related projects and provide regulation and management support to the team.

2020.7 – 2021.7: Postdoc Research Engineer, PRRC - New Mexico Tech

Research focusing on the CO₂ EOR and storage and geochemistry of the conventional/unconventional reservoir, Class VI well permit application, well design, drilling and operation of the CO₂ monitoring/ injection wells, P&A.

2019.7 – 2020.5: Petroleum Engineer, Oilfield Operations. EERC, University Of North Dakota

- Design and execute oil and gas field activities such as preparing Class VI well-drilling permits;
- Design well completions;
- Determine appropriate logging and coring activities;
- Ensure the design meets project objectives, all regulations, and safety requirements;
- Analyze hydraulic fracturing practices to look for ways clients can optimize oil recovery.

2016.1 – 2019.5: Lab Manager and Course Instructor, Department of Petroleum Engineering, University of North Dakota.

- Provided training on equipment operation in the labs.
- Taught core course “Production Engineering, Stimulation and Intervention Techniques.”
- Tutored “Petroleum Evaluation & Property Management,” “Reservoir Engineering,” “Advanced Reservoir Engineering,” and “Well completion” courses.
- Guided students to accomplish on-site project involving the hydraulic fracture process, well completion method, decline curve analysis, production forecast (two-phase flow), etc.
- Research topics included the following: 1) Evaluation of CO₂ flooding in unconventional reservoirs; 2) Mathematic model application to partial blockage detection of the gas pipeline.

2013.8 – 2015.12: Research Assistant, Petroleum Recovery Research Center, New Mexico Tech.

Conducted research on the following projects:

- Development of a Novel CO₂ Chemical Sensor for Downhole CO₂ Monitoring in Carbon Sequestration, U.S. Department of Energy (DOE) Contract No. DE-FE0009878.
- Silica Nanoparticle-Stabilized CO₂ Foams for Enhanced Oil Recovery, DOE Contract No. DE-FE0005979.

2012.5 – 2013.8: Environmental Engineer, Department of Environment, Hainan, China.

- Monitored produced water and exhausted gas emissions in midstream and downstream.
- Developed and implemented water quality-monitoring plans and air pollution control.

- Developed produced water treatment plans and working schedule.
- Provided recommendations based on collected and recorded field data.

2011.4 – 2012.5: Territorial Sales Manager, Ecolab China.

- Established and maintained good relationships with all customers by providing high-quality services and maintaining customer satisfaction.
- Monitored district market trends, expanded potential customer list, supervised salespeople to submit a variety of management reports in a timely manner.
- Provided clean consultation to account. Trained and directed staff of accounts to use Ecolab product and equipment more efficiently and safely.

Synergistic Activities:

- **Principle Investigator**, Laboratory Evaluation of Asphaltene Deposition (LEAD) in Tubing Systems. Chevron. Total Value: \$82,000
- **Principle Investigator**, Advanced Retrofit Technologies for Methane Emission Mitigation (ART-CH4) from Compressor Stations: Multiple Field Deployments and Demonstrations. US Department of Energy. Total Value: \$ 7,487,592.00
- **Project Manager**, Methane Emission Mitigation by Field Deployment of Innovative Controlled Combustion Technology. US Department of Energy. Total Value: \$ 7,499,101.00
- **Co-Principle Investigator**, the Uinta-Piceance Basin Carbon Management and Community Engagement Partnership. Department of Energy. Total Value: \$ 4,780,568.00
- **Co-Principle Investigator**, Regional Initiative for Technical Assistance Partnerships – Permian Basin (RITAP-PB). US Department of Energy. Total Value: \$6.2M.
- **Co-Principle Investigator**, Scalable and Efficient Membrane Distillation and Adsorption Process for High-Purity Water and Lithium Recovery from Produced Water in New Mexico. US Department of Energy. Total Value: \$1,874,976.00.
- **Project Manager**, the Southwest CCUS Training and Research Partnership (CCUS-STRP). US Department of Energy. Total Value: \$1,500,000.00.
- **Co-Principle Investigator**, Geochemical and Hydromechanical stimulation for Reaction Acceleration (GeoHydRA) of serpentinization for in situ hydrogen production (DE-AR0001863). US Department of Energy. Total Value: \$1,300,000.00.
- **Co-Principle Investigator**, Four Corner CarbonSAFE III Storage Hub. US Department of Energy. Total Value: \$51,800,913.00.
- **Co-Principle Investigator**, Technical, Regulatory, and Legal Support for Class VI Rulemaking. State of New Mexico Energy, Minerals and Natural Resources Department, Oil Conservation Division. Total Value: \$1.9M.
- **Key Personnel**, Permian Regional Carbon Sequestration Hub (PRCS). US Department of Energy. Total Value: \$11,160,624.00
- **Project Manager & Co-Principle Investigator**, Subsurface Seismic Structural Characterization of the Hogback Monocline and Thermal Characterization of the San Juan Basin, New Mexico (DE-FE0032369). US Department of Energy. Total Value: \$1,180,850.00
- **Co-Principle Investigator**, Regional Initiative to Accelerate Carbon Capture, Utilization, and Storage (CCUS) Deployment: Technical Assistance for Large-Scale Storage Facilities and Regional Carbon (DE-FE0032363). US Department of Energy. Total Value: \$ 3,124,989.00

- **Principle Investigator**, Regional Resource Assessment for CO₂ Storage in New Mexico and Surrounding Areas: Identification, Characterization, and Evaluation of In-Situ Mineralization Site/Complex (DE-FE00032257). US Department of Energy. Total Value: \$1,250,000.00
- **Co-Principle Investigator**, Uinta Basin CarbonSAFE II: Storage Complex Feasibility (DE-FE0032266). US Department of Energy. Total Value: \$ 11,752,730.00
- **Principle Investigator**, Site Characterization for CO₂ storage to Support Escalante Hydrogen Power Plant Project, US Department of Energy, Carbon Utilization & Storage Partnership. US Department of Energy. Total Value: \$ 40,0000.00
- **Key Personnel**, Advancing Characterization of Faults through Deployment of Novel Geophysical, Geochemical and Geomechanical Technologies at the San Juan Basin CarbonSAFE Site, US Department of Energy (DE-FE0032064). US Department of Energy. Total Value: \$1,515,623.00
- **Task Lead**, San Juan Basin CarbonSAFE Phase III: Ensuring Safe Subsurface Storage of CO₂ in Saline Reservoirs, US Department of Energy (DE-FE-0031890). US Department of Energy. Total Value: \$21,504,098.00
- **Task Lead**, Carbon Ore, Rare Earth, and Critical Minerals (CORE-CM) Assessment of San Juan River-Raton Coal Basin (DE-FE0032051). US Department of Energy. Total Value: \$1,556,480.00
- **Program membership Chairperson** for Society of Petroleum Engineers Roswell Section since 2021.

Publications and Invited Presentations

Zhenhua Rui, Guoqing Han, He Zhang, Sai Wang, Hui Pu, Kegang Ling, A new model to evaluate two leak points in a gas pipeline, Journal of Natural Gas Science and Engineering, Volume 46, 2017, Pages 491-497.

San, Jingshan, Wang, Sai, Yu, Jianjia, Liu, Ning, and Robert Lee. "Nanoparticle-Stabilized Carbon Dioxide Foam Used In Enhanced Oil Recovery: Effect of Different Ions and Temperatures." SPE J. 22 (2017): 1416–1423.

Hao Fu, Lu Yang, Huirong Liang, Sai Wang, Kegang Ling, Diagnosis of the single leakage in the fluid pipeline through experimental study and CFD simulation, Journal of Petroleum Science and Engineering, Volume 193, 2020.

Munawar Khalil, Sai Wang, Jianjia Yu, Robert L. Lee and Ning Liu, Electrodeposition of Iridium Oxide Nanoparticles for pH Sensing Electrodes. Journal of the Electrochemical Society, Volume 163, Number 9, 2016.

Wang, S., 2019, Investigation of Properties Alteration during Super-Critical CO₂ Injection in Shale: Journal of Applied Science, 2019, 9(8), 1686.

Ling, Kegang, He, Jun, Pei, Peng, Wang, Sai, and Xiao Ni. "Comparisons of Biot's Coefficients of Bakken Core Samples Measured by Three Methods." Paper presented at the 50th U.S. Rock Mechanics/Geomechanics Symposium, Houston, Texas, June 2016.

Hao Fu, Sai Wang, Kegang Ling, Detection of two-point leakages in a pipeline based on lab investigation and numerical simulation, Journal of Petroleum Science and Engineering, Volume 204, 2021.

Yu, Jianjia , Wang, Sai , Liu, Ning , and Robert Lee. "Study of Particle Structure and Hydrophobicity Effects on the Flow Behavior of Nanoparticle-Stabilized CO₂ Foam in Porous Media." Paper presented at the SPE Improved Oil Recovery Symposium, Tulsa, Oklahoma, USA, April 2014.

Wang, Xuyu; Wang, Sai; Yin, Xueqiong; Chen, Junhua; Zhu, Li, Activated Carbon Preparation from Cassava Residue Using a Two-Step KOH Activation: Preparation, Micropore Structure and Adsorption Capacity. *Journal of Biobased Materials and Bioenergy*, Volume 8, Number 1, February 2014, pp. 35-42(8).

Anthony Morgan, William Ampomah, Reid Grigg, Zhenxue Dai, Junyu You, Sai Wang, Techno-economic life cycle assessment of CO₂-EOR operations towards net negative emissions at farnsworth field unit, *Fuel*, Volume 342, 2023.

Ling, Kegang , Wu, Xingru , Han, Guoqing , and Sai Wang. "Optimising the Multistage Fracturing Interval for Horizontal Wells in Bakken and Three Forks Formations." Paper presented at the SPE Asia Pacific Hydraulic Fracturing Conference, Beijing, China, August 2016.

Nsiah-Gyambibi, R., Sokama-Neuyam, Y.A., Boakye, P. et al. Valorization of coal fly ash (CFA): a multi-industry review. *Int. J. Environ. Sci. Technol.* 20, 12807–12822 (2023).

San, J., Wang, S., Yu, J., Lee, R., and Ning Liu, 2016, Nanoparticle stabilized CO₂ foam—effect of different ions: Presented at the 20th Society of Petroleum Engineers (SPE) Improved Oil Recovery Conference, Tulsa, Oklahoma, April 9–13, 2016, SPE-179628-MS.

Wang, S., San, J., Yu, J., Lee, R., and Liu, N., 2016, A downhole CO₂ sensor to monitor CO₂ movement in situ for geologic carbon storage: *International Journal of Greenhouse Gas Control*, v. 55, December, p. 202–208.

Wang, Yanbo , Wang, Sai , Yang, Lu , Pu, Hui , and Kegang Ling. "A New Model to Evaluate Polished Rod Load of Sucker Rod Pumping System." Paper presented at the SPE Liquids-Rich Basins Conference - North America, Midland, Texas, USA, September 2018.

Wang, Hongsheng , Rabiei, Minou , Lei, Guanglun , and Sai Wang. "A Novel Granular Profile Control Agent for Steam Flooding: Synthesis and Evaluation." Paper presented at the SPE Western Regional Meeting, Bakersfield, California, April 2017.

Jason D. Simmons, Sai Wang, Andrew J. Luhmann, Alex J. Rinehart, Jason E. Heath, Bhaskar S. Majumdar, Paragenetic controls on CO₂-fluid-rock interaction and weakening in a macroporous-dominated sandstone, *Applied Geochemistry*, Volume 156, 2023.

Fu, Hao, Long, Yifu, Wang, Sai, Wang, Yanbo, Yu, Peng, and Kegang Ling. "The Development of CO₂ Plume in CO₂ Sequestration in the Aquifer." Paper presented at the Carbon Management Technology Conference, Houston, Texas, USA, July 2019.

Wang, H., Rabiei, M., Wang, S., and G. Cui. "Fracture Quantification Method with 3D X-Ray Image - Entropy-Assisted Indicator Kriging Method." Paper presented at the SPE Western Regional Meeting, Garden Grove, California, USA, April 2018.

Ampomah, William and Wang, Sai and El-Kaseeh, George, Overview of Safe Subsurface Storage of CO₂ in Saline Reservoirs: San Juan Basin CarbonSAFE Phase III (November 24, 2022).

Proceedings of the 16th Greenhouse Gas Control Technologies Conference (GHGT-16) 23-24 Oct 2022.

Czarnota, R., Rinehart, A. J., Luhmann, A., Wang, S., and R. Grigg. "Acoustic Response During Brine-CO₂ Relative Permeability Testing of Bluff and Entrada Sandstones." Paper presented at the 56th U.S. Rock Mechanics/Geomechanics Symposium, Santa Fe, New Mexico, USA, June 2022.

Wang, Sai, Han, Juan, Wang, Yanbo, Ling, Kegang, Jia, Bao, Wang, Hongsheng, and Yifu Long. "Recovery Potential and Mechanism Investigation of the Supercritical CO₂ EOR in the Bakken Tight Formation." Paper presented at the Carbon Management Technology Conference, Houston, Texas, USA, July 2019.

Yanbo Wang, Hao Fu, Lu Yang, Sai Wang, Huirong Liang, Kegang Ling, Study the Boundary of Two-Phase Flow Regime From Bubble to Slug Flow. ASTFE Digital Library, 2019.

Morgan, A.; Ampomah, W.; Grigg, R.; Wang, S.; Czarnota, R. Mechanisms of Waterflood Inefficiency: Analysis of Geological, Petrophysical and Reservoir History, a Field Case Study of FWU (East Section). *Energies* 2024, 17, 1565.

Jia, B., Charles, B., Wang, S., Liu, D., Wang, H., *Advanced materials and sensors for energy: Petroleum and Gas Publisher: Wiley.*

Wang, Sai, Ling, Kegang, Liu, Ning, and Hongsheng Wang. "Development and Evaluation of an Iridium Oxide Based Chemical Sensor for Downhole CO₂ Monitoring." Paper presented at the Carbon Management Technology Conference, Houston, Texas, USA, July 2017.

Wang, Sai, San, Jingshan, and Ning Liu. "A Chemical CO₂ Sensor Monitoring CO₂ Movement Under Reservoir Conditions." Paper presented at the Carbon Management Technology Conference, Sugar Land, Texas, November 2015.

Morgan, A., Ampomah, W., Grigg, R., Wang, S., and R. Czarnota. "Unveiling the Enigma of Waterflood Inefficiency: A Multifaceted Analysis of Geological, Petrophysical, and Reservoir Dynamics - A Case Study in a Morrowan Clastic Reservoir." Paper presented at the SPE Improved Oil Recovery Conference, Tulsa, Oklahoma, USA, April 2024.

Morgan, A., Ampomah, W., Grigg, R., Wang, S., and R. Czarnota. "Experimental Investigation of Waterflood Performance Challenges in a Low-Permeability Morrowan Sandstone Reservoir: Implications for Mechanistic Modeling and Enhanced Oil Recovery Optimization." Paper presented at the SPE Western Regional Meeting, Palo Alto, California, USA, April 2024.

Wang, S., Liu, K., Ling, K., and Wang, H., 2018, Properties evaluation of the Middle Bakken Formation due to the CO₂ injection: the 52nd U.S. Rock Mechanics/Geomechanics Symposium, Seattle, Washington, June 17–20, 2018, ARMA-2018-641.

Ampomah, William and Bui, Dung and McCormack, Kevin and Bratton, Tom and Wang, Sai and Amosu, Adewale and Huang, Lianjie and Smith, Christopher and Smith, Michael and Hama, Anthony, Advancing Characterization of Faults through Deployment of Novel Geophysical, Geochemical and Geomechanical Technologies at the SJB CarbonSAFE Site (December 23, 2024). Proceedings of the 17th Greenhouse Gas Control Technologies Conference (GHGT-17) 20-24 October 2024.

Jiyue Wu, Sai Wang, Regional Resource Assessment for CO₂ Storage Via Mineralization Process in New Mexico and Surrounding Areas. 2024 AIChE Annual Meeting, San Diego, CA.

Jonathan Adams, Nicole C Hurtig, Alex Rinehart, Jason Simmons, Alexander P Gysi, Sai Wang, An experimental and numerical study on the sequestration of CO₂ in basaltic aquifers in New Mexico, USA. 2024 Goldschmidt Conference, Chicago, IL.

Anthony Morgan, William Ampomah, Robert Czarnota, Sai Wang, Reid Grigg, Jiawei Tu, Experimental study of brine compatibility on water-alternating-CO₂ injection in low-permeability Morrow sandstone reservoir. Carbon Capture, Utilization, and Storage Conference and Exhibition, 11–13 March 2024

Rinehart, A., Simmons, J., Simmons, J., Heath, J., Heath, J., Luhmann, A. J., Wang, S. (2024). Quantifying Microtextural Controls on Changes in Absolute Permeability during Fluid-Rock Interactions Using Lattice Boltzmann Simulations of Xrct-Measured Sandstone Pore Networks. In Geological Society of America Abstracts (Vol. 56, p. 405243).

Sai Wang, William Ampomah, George El-Kaseeh, Candace Candy, Richard Esser, Overview of the UIC Class VI Permit Application for San Juan Basin Carbonsafe Phase III Project. 2022 AIChE Annual Meeting, Phoenix, AZ.

Simmons, Jason, Wang, Sai, Luhmann, Andrew, Rinehart, Alex, Crandall, Dustin, & Moore, Johnathan E. (2022). Geochemical and Mechanical Evolution of Bluff and Entrada Sandstone Due to CO₂-Fluid-Rock Interaction.

Simmons, Jason; Wang, Sai; Luhmann, Andrew; Rinehart, Alex; Heath, Jason, Coupled Chemomechanical Feedbacks from Experimental CO₂-Rich Fluid-Rock Interaction in Uncemented Lithofacies of Morrow B Sandstone. AGU Fall Meeting 2021, held in New Orleans, LA, 13-17 December 2021.

Jason Heath, Jason Simmons, Sai Wang, Andrew Luhmann, Alex Rinehart, Coupled Chemomechanical Feedbacks from Experimental CO₂-Rich Fluid-Rock Interaction in Uncemented Lithofacies of Morrow B Sandstone. SAND2021-15499C, December 2021.

Yanbo Wang, Kegang Ling, Hao Fu, Lu Yang, Sai Wang, Huirong Liang, Study of pressure-drop in two phase flow based on experiment and CFD simulation. ASTFE Digital Library, 2019.

Wang, Hongsheng, Rabiei, Minou, and Sai Wang. "Micro-Crack Segmentation of Middle Bakken Shale Rock Sample With High-Resolution SEM – The Application of Self-Adaptive Image Enhancement Technique." Paper presented at the 52nd U.S. Rock Mechanics/Geomechanics Symposium, Seattle, Washington, June 2018.

Wang, S., Ling, K., Liu, N., and Wang, H., 2017, Development and evaluation of an iridium oxide-based chemical sensor for downhole CO₂ Monitoring—Part I: Presented at the Carbon Management Technology Conference, Houston, Texas, July 17–20, 2017.