

Bo Zhang, Ph.D., P.Eng.
Assistant Professor
Civil and Environmental Engineering, University of Alberta
Email: bzhang7@ualberta.ca

BIOGRAPHY

Dr. Zhang is an assistant professor in the Department of Civil and Environmental Engineering at the University of Alberta and a registered professional engineer (P.Eng) in Canada. He is the founder and principal investigator (PI) of the GeoCloud Research Group at the University of Alberta. Currently, Dr. Zhang is supervising 2 post-doc fellows, 11 PhD students, 2 master students, 6 undergraduate students and 1 assistant researcher from geotechnical engineering, mining engineering, petroleum engineering, software engineering and computer science at University of Alberta.

EDUCATION

Ph.D., Geotechnical Engineering, University of Alberta, Canada, 2019. Supervisor: Rick Chalaturnyk and Jeff Boisvert

M.Sc., Petroleum Engineering, University of Alberta, Canada, 2014. Supervisor: Ryosuke Okuno

B.E., Petroleum Engineering, China University of Petroleum–Beijing, China, 2011

PROFESSIONAL EXPERIENCE

- **Assistant Professor, University of Alberta** (January 2022 to now)

Teaching: Engineering mechanics, Solid mechanics, Mining enterprise economics

Research: Multiscale study of reservoir-geomechanical behavior from pore to reservoir scale, Coupled Thermal-hydro-mechanical-chemical modeling and simulation, CCUS, oil sands, geothermal, hydrates

- **Geotechnical/Geological Engineer, WSP Global Inc.** (January 2020 to December 2021)
- **Postdoctoral Research Fellow, University of Alberta** (January 2020 to December 2021)

CURRENT RESEARCH PROJECTS

- **NSERC Discovery Program.** Multi-physical and Data-driven Modelling for Subsurface Energy Geotechnics. (2023-2029). **PI.**
- **NSERC-Alberta Innovates Advance program.** Development of a cloud-based data-driven modelling, optimization, and decision-making system for subsurface energy development (GeoCloud). (2023-2025). **PI.**
- **Future Energy System (Canada First Research Excellence Fund).** Project title: Uncertainty Quantification and Optimization for the Scale-Up of Geological Carbon Storage. (2022-2025). **PI.**
- **NSERC Alliance International Program.** Optimization of the Large-Scale Geological Carbon Storage. (2023-2024). **PI.**
- **Research Exploration Program at University of Alberta.** Regional-scale Mechanical Earth Modelling for West Canadian Sedimentary Basin. (2023-2025). **PI.**
- **Canada Foundation for Innovation (CFI) John R. Evans Leaders Fund.** Integrated Quadruped Robotic Sensing System (IQRSS) for Efficient Monitoring and Management of Critical Infrastructure.
- **Future Energy System Accelerator Fund.** Scale-up of geological carbon storage through CO₂ plume geothermal and real-time data-driven decision makings. (2023-2026). **PI.**

INDUSTRIAL PARTNERS

Albert Energy Regulator, Alberta Geological Survey, Alberta Innovates, DEEP Geothermal, Enverus, Natural Resource Canada, , Suncor Energy

PROFESSIONAL REGISTRATION

Registered Professional Engineer in the province of Alberta, Canada (PEng)

Member of Society of Petroleum Engineer (SPE), American Rock Mechanics Association (ARMA), American Association of Petroleum Geologists (AAPG), Canadian Energy Geoscience Association (CEGA),

RELEVANT RECENT PUBLICATIONS (* REPRESENTS CORRESPONDING AUTHOR)

1. **Zhang, B.***, Deisman N., Chalaturnyk, R. and Boisvert, J., (2023). Numerical Upscaling of anisotropic failure criteria in heterogeneous reservoirs. Engineering Geology, 107455.
2. **Zhang, B.***, Chalaturnyk, R. and Boisvert, J., (2023). Sequentially Coupled Thermal-Hydraulic-Mechanical Simulation for Geomechanical Assessments of Caprock Integrity in SAGD. Canadian Geotechnical Journal, in press.
3. **Zhang, B.**, Ma, Z.*, Zheng, D., et al. (2023). Upscaling Shear Strength of Heterogeneous Oil Sands with Interbedded Shales Using Artificial Neural Network. SPE Journal 28 (02): 737-753.
4. **Zhang, B.***, Chalaturnyk R. and Boisvert J. (2021). A Numerical Characterization Workflow for Assessing the Strength and Failure Modes of Heterogeneous Oil Sands. Canadian Geotechnical Journal 58(6): 763-781.
5. **Zhang, B.***, Deisman N., Khajeh M., et al. (2020). Numerical Local Upscaling of Elastic Geomechanical Properties in Heterogeneous Continua. Petroleum Geoscience 26: 400–416.
6. **Zhang, B.**, and Okuno. R.* (2015). Modeling of Capacitance Flow Behavior in EOS Compositional Simulation. Journal of Petroleum Science and Engineering, 131, 96–113.
7. Du, H., Zhang, Y.*, **Zhang, B.***, Tian, S., Li, G., and Zhang, P. (2023). Study of CO₂ injection to enhance gas hydrate production in multilateral wells. Energy, 129078.
8. Chen, Z., Shi, H.*, Zhao, H., Huang, Z., He, W., Li, X., Yu, C. and **Zhang, B.***, (2023). Hydraulic parameters optimization of two-stage PDC bit in deep formation applications. Geoenergy Science and Engineering, 230, 212248.
9. Yu, C., Zhang, Y.*, Tan, Y., Song, X., Wang, G., Huang, H. and **Zhang, B.***, (2023). Simulation study of novel methods for water reinjection efficiency improvement of a doublet system in Guantao sandstone geothermal reservoir. Geothermics, 111, p.102709.
10. Xiong, C.*, Huang, Z.*, Shi, H., Chen, H., Chen, Z., He, W., and **Zhang, B.** (2023). Investigations on the Stinger PDC cutter breaking granitoid under in-situ stress and hydrostatic pressure conditions. International Journal of Rock Mechanics and Mining Sciences, 164, 105312.
11. Yang R.*, Wen H., Huang Z.*, **Zhang B.**, Wang H., Wang B. and Dubinya N. (2023). Experimental Investigation on Fracture Characteristics by Liquid Nitrogen Compound Fracturing in Coal. Fuel, 340 127434 (2023).
12. Zhang Y*, Zhang P., Hui C., Tian S. and **Zhang B***. (2023). Numerical Analysis of the Geomechanical Responses during Natural Gas Hydrate Production by Multilateral Wells. Energy, 269, 126810 (2023). doi.org/10.1016/j.energy.2023.126810
13. Zhang Y*, Wu, X., Zhao, S., Hui, C., Li, G., Li, J., Lu, J. and **Zhang B***. (2022). Numerical Simulation of the Straight-Swirling Integrated Jet and Its Application in Natural Gas Hydrate Drilling. SPE Journal 27(6).
14. Wu, X., Zhang Y*, Tan, Y., Li, G., Li, J., Peng K. and **Zhang B***. (2022). Flow-visualization and numerical investigation on the optimum design of cavitating jet nozzle. Petroleum Science 19(5).
15. Zhang Y*, Wu X., Hu X., **Zhang, B.***, et al. (2022). Visualization and investigation of the erosion process for natural gas hydrate using water jet through experiments and simulation. Energy Reports 8.
16. Zhang, Y.*, Wang, W., Zhang, P., Li, G., Tian, S., Lu, J., **Zhang, B*** (2022). A Solution to Sand Production from Natural Gas Hydrate Deposits with Radial Wells: Combined Gravel Packing and Sand Screen. Journal of Marine Science and Engineering, 2022, 10, 71.
17. Zheng, D., **Zhang B.*** and Chalaturnyk R. (2022). Uncertainty Quantification of in-situ horizontal stress with pressuremeter using a statistical inverse analysis method. Canadian Geotechnical Journal 59(3): 397-409.