

Lianyang Zhang, Ph.D., P.E., F.ASCE

Professor in Civil Engineering
SMART (Sustainable Materials and Recycling Technologies) Laboratory
Department of Civil and Architectural Engineering and Mechanics
The University of Arizona
Phone: (520) 626-0532; Email: lyzhang@arizona.edu

EDUCATION

Ph.D., Geotechnical Engineering, Massachusetts Institute of Technology, Cambridge, MA, 1999
M.S., Civil and Environmental Engineering, Massachusetts Institute of Technology, Cambridge, MA, 1997
M.S., Geotechnical Engineering, Tongji University, Shanghai, China, 1988
B.S., Naval Architecture and Ocean Engineering, Shanghai JiaoTong University, Shanghai, China, 1985

EMPLOYMENT

Assistant Professor, Associate Professor and Professor, University of Arizona	2007–Present
Technical Specialist, ICF International	2002–2007
Manager, Arthur D. Little Inc.	2000–2002
Post-Doctoral Research Associate, Massachusetts Institute of Technology	1999–2000
Lecturer, Department of Geotechnical Engineering, Tongji University, Shanghai	1988–1993

PROFESSIONAL REGISTRATION

- Professional Civil Engineer, Massachusetts, No. 41598 (active)

HONORS AND AWARDS

- Researcher of the Year, College of Engineering, University of Arizona, 2024
- Slag Cement in Sustainable Concrete Project of the Year Award, Slag Cement Association, 2023
- Ranked in World’s Top 2% Scientists, 2020, 2021, 2022, 2023
- Fellow, ASCE, 2019
- Recognition Award for Outstanding Contribution to GeoShanghai International Conference, GeoShanghai Organizing Committee, May 2018
- Best Paper Award, GeoShanghai International Conference 2018, May 27-30, 2018
- Featured in “Annual & Endowment Report”, The University of Arizona Foundation, 2012
- Featured in “Recycling mine tailings project could become billion-dollar industry in Arizona”, Inside Tucson Business, 2011
- American Society of Civil Engineers (ASCE) ExCEED Teaching Fellow, 2011.

PUBLICATIONS/CREATIVE ACTIVITY

□ Scholarly books and monographs

- B1. Zhao, Y., Zhang L., Wang, Y., and Lin, H. (2023). *Geofluids: Thermal-Hydraulic-Mechanical (THM) Coupling Behaviour of Fractured Rock Masses*. Special Issue, Volume 2023. Wiley & Hindawi. <https://www.hindawi.com/journals/geofluids/si/506397/>. (Editors)
- B2. Zhao, Y., Zhang L., Wang, Y., and Lin, H. (2021). *Hydro-Mechanical Coupling and Creep Behaviors of Geomaterials*. Lausanne: Frontiers Media SA. doi: 10.3389/978-2-88966-528-0. (Editors).

- B3. Zhang, L., Gonçalves da Silva, B., and Zhao, C. (2018). *Proceedings of GeoShanghai 2018 International Conference: Rock Mechanics and Rock Engineering*. Springer. 419 pages. (Edited).
- B4. Zhang, L. (2016). *Engineering Properties of Rocks*. 2nd edition. Butterworth-Heinemann, Elsevier. 378 pages. (Authored).
- B5. Ding, W., Zhang, L., Li, X., and Zhang, X. (2014). *Proceedings of GeoShanghai 2014 International Conference, GSP 236-243*. ASCE Publisher. (Edited).
- B6. Zhang, L., and Wong, L. N. Y. (2014). *Rock Mechanics and Its Applications in Civil, Mining and Petroleum Engineering, GSP237*, ASCE Publisher. (Edited).
- B7. Zhang, L. (2006). *Engineering Properties of Rocks*. Elsevier Geo-Engineering Books Series Volume 4. Elsevier. 304 pages. (Authored).
- B8. Zhang, L. (2004). *Drilled Shafts in Rock – Analysis and Design*. CRC Press. 396 pages. (Authored).

□ Chapters in scholarly books and monographs

- Ch1. Li, Z., and Zhang, L. (2016). “Chapter 9: Fly ash-based geopolymer with kappa-carrageenan biopolymer.” In: *Biopolymers and Biotech Admixtures for Eco-Efficient Construction Materials*, 173-192, Eds: F. Pacheco-Torgal, V. Ivanov, N. Karak and H. Jonkers, Woodhead Publishing.
- Ch2. Ahmari, A., and Zhang, L. (2015). “Chapter 13: The properties and durability of mine-tailings-based geopolymeric masonry blocks.” In: *Eco-efficient Masonry Bricks and Blocks: Design, Properties and Durability*, 289-310, Eds: F. Pacheco-Torgal, P. Lourenco, J. Labrincha, P. Chindaprasirt and S. Kumar, Woodhead Publishing.
- Ch3. Ahmari, A., and Zhang, L. (2015). “Chapter 24: The properties and durability of alkali-activated masonry units.” In: *Handbook of Alkali-activated Cements, Mortars and Concretes*, 643-660, Eds.: F. Pacheco-Torgal, J. Labrincha, C. Leonelli, A. Palomo and P. Chindaprasit, Woodhead Publishing.

□ Refereed Journal articles

- J1. Chen, H., Zhu, H., & Zhang, L. (2024). “Semi-analytical solution for ultimate bearing capacity of smooth and rough circular foundations on rock considering three-dimensional strength.” *International Journal for Numerical and Analytical Methods in Geomechanics*. <https://doi.org/10.1002/nag.3699>.
- J2. Nikvar-Hassani, A., Batchler, T., and Zhang, L. (2024). “Full-scale demonstration and performance evaluation of a hybrid geopolymer/biopolymer cementitious material developed for pumpable roof supports in underground mines.” *Mining, Metallurgy & Exploration*, <https://doi.org/10.1007/s42461-024-00921-7>.
- J3. Nikvar-Hassani, A., Chen, H., Motameni, S., Visnansky, C., Lovelady, M., Cutruzzola, S. E., and Zhang, L. (2024). “Using cross-linked polyethylene (XLPE) waste in production of concrete: An experimental study.” *Construction and Building Materials*, 411, 134261, <https://doi.org/10.1016/j.conbuildmat.2023.134261>.
- J4. Korouzhdeh, T., Eskandari-Naddaf, H., Shadnia, R., and Zhang, L. (2024). “A comparative study between Gray Wolf and particle swarm algorithms use for optimization of cost in composite beam.” *Soft Computing*, <https://doi.org/10.1007/s00500-023-09560-4>.
- J5. Chen, H., Zhu, H., and Zhang, L. (2024). “Semi-analytical solution for ultimate bearing capacity of smooth and rough circular foundations on rock considering three-dimensional strength.” *International Journal for Numerical and Analytical Methods in Geomechanics*, <https://doi.org/10.1002/nag.3699>.
- J6. Soltanianfard, M. A., Desai, C. S., Zhang, L., Hosseinali, M., Toufigh, V., and Ghaemian, M. (2023). “Experimental investigation and constitutive modeling of rock-like specimens’ interface with effect of roughness based on 3D printing.” *International Journal of Geomechanics*, <https://doi.org/10.1061/JGNAI.GMENG-8823>.
- J7. Chen, H., Hu, J., and Zhang, L. (2023). “Three-dimensional analyses of long-term settlements of storage tanks supported by a large piled-raft foundation system.” *Journal of Geotechnical and Geoenvironmental Engineering*, <https://doi.org/10.1061/JGGEFK.GTENG-11206>.

- J8. Zhao, Y., Liu, J., Zhang, C., Zhang H., Liao, J., Zhu, S., and Zhang L. (2023). “Mechanical behavior of sandstone during post-peak cyclic loading and unloading under hydromechanical coupling.” *International Journal of Mining Science and Technology*, 33(8), 927-947, <https://doi.org/10.1016/j.ijmst.2023.05.004>.
- J9. Xu, Q., Xie, J., Zhang, L., He, X., Lu, L., and Li, Y. (2023). “Failure analysis of progressive instability and deformation law of excavation face in sand cobble stratum under cutting disturbance by shield cutter.” *Engineering Failure Analysis*, <https://doi.org/10.1016/j.engfailanal.2023.107711>.
- J10. Zhao, Y., Wang, X., Tang, W., Li, Y., Lin, H., Wang, Y., and Zhang, L. (2023). “Creep behavior of layered salt rock under triaxial loading and unloading cycles.” *Applied Rheology*, 33, 20230103, <https://doi.org/10.1515/arh-2023-0103>.
- J11. Chen, H., Nikvar-Hassani, A., Ormsby, ST, Ramey, R., and Zhang, L. (2023). “Mechanical and microstructural investigations on the low-reactive copper mine tailing-based geopolymer activated by phosphoric acid.” *Construction and Building Materials*, 393, 132030, <https://doi.org/10.1016/j.conbuildmat.2023.132030>.
- J12. Zhao, Y., Zhang L., Wang, Y., and Lin, H. (2023). “Editorial: Thermal-hydraulic-mechanical (THM) coupling behaviour of fractured rock masses.” *Geofluids*. Special Issue, Volume 2023, Article ID 9764934, <https://doi.org/10.1155/2023/9764934>.
- J13. Chen, H., Zhu, H., and Zhang, L. (2023). “Rock slope stability analysis incorporating the effects of intermediate principal stress.” *Rock Mechanics and Rock Engineering*, 56, 4271–4289, <https://doi.org/10.1007/s00603-023-03277-4>.
- J14. Chen, H., Zhu, H., and Zhang, L. (2022). “Further modification of a generalized three-dimensional Hoek-Brown criterion – the GZZ criterion.” *Geotechnique Letters*, 12, 1-9, <https://doi.org/10.1680/jgele.21.00117>.
- J15. Chen, H., Zhu, H., and Zhang, L. (2022). “An analytical solution to the ultimate bearing capacity of smooth and rough strip foundations on rock mass considering three-dimensional (3D) strength.” *Computers and Geotechnics*, <https://doi.org/10.1016/j.compgeo.2022.104865>.
- J16. Chen, H., Zhu, H., and Zhang, L. (2022). “A three-dimensional (3D) analytical solution for the ultimate side shear resistance of rock-socketed shafts.” *International Journal of Rock Mechanics and Mining Sciences*, [10.1016/j.ijrmms.2022.105231](https://doi.org/10.1016/j.ijrmms.2022.105231).
- J17. Nikvar-Hassani, A., Hodges, R., and Zhang, L. (2022). “Production of green bricks from low-reactive copper mine tailings: Durability and environmental aspects.” *Construction and Building Materials*, 327, 127571, <https://doi.org/10.1016/j.conbuildmat.2022.127571>.
- J18. Nikvar-Hassani, A., and Zhang, L. (2022). “Development of a biopolymer modified geopolymer based cementitious material for enhancement of pumpable roof support.” *Materials and Structures*, 55:116, <https://doi.org/10.1617/s11527-022-01953-5>.
- J19. Nikvar-Hassani, A., Alnuaimi, H. N., Amjad, U., Sasmal, S., Zhang, L., and Kundu, T. (2022). “Alkali activated fly ash based concrete: Evaluation of curing process using non-linear ultrasonic approach.” *Journal of Nondestructive Evaluation, Diagnostic and Prognostics of Engineering Systems*, 5(2), 021006, <https://doi.org/10.1115/1.4052952>.
- J20. Kazemi, R., Shadnia, R., Eskandari-Naddaf, H., and Zhang, L. (2022). “The Properties of Cement-Mortar at Different Cement Strength Classes: Experimental Study and Multi-objective Modeling.” *Arabian Journal for Science and Engineering*, <https://doi.org/10.1007/s13369-022-06820-7>.
- J21. Liu, J., Zhao, Y., Tan, T., Zhang, L., Zhu, S., and Xu, F. (2022). “Evolution and modeling of mine water inflow and hazards characteristics in southern coalfields of China: a case of Meitanba mine.” *International Journal of Mining Science and Engineering*, <https://doi.org/10.1016/j.ijmst.2022.04.001>.

- J22. Nikvar-Hassani, A., Vashaghian, H., Hodges, R., and Zhang, L. (2022). "Production of green bricks from low-reactive copper mine tailings: chemical and mechanical aspects." *Construction and Building Materials*, 324, 126695, <https://doi.org/10.1016/j.conbuildmat.2022.126695>.
- J23. Nikvar-Hassani, A., and Zhang, L. (2022). "Synthesis of a CKD modified fly ash based geopolymer cementitious material for enhancing pumpable roof support." *Materials and Structures*, 55-64, <https://doi.org/10.1617/s11527-022-01899-8>.
- J24. Chen, H., and Zhang, L. (2022). "A machine learning-based method for predicting end-bearing capacity of rock-socketed shafts." *Rock Mechanics and Rock Engineering*, <https://doi.org/10.1007/s00603-021-02757-9>.
- J25. Chen, H., Zhu, H., and Zhang, L. (2022). "A three-dimensional (3D) semi-analytical solution for the ultimate end-bearing capacity of rock-socketed shafts." *Rock Mechanics and Rock Engineering*, 55(2), 611-627.
- J26. Nikvar-Hassani, A., Manjarrez, L., and Zhang, L. (2022). "Rheology, Setting Time and Compressive Strength of Class F Fly Ash-Based Geopolymer Binder Containing Ordinary Portland Cement." *Journal of Materials in Civil Engineering*, 34(1), [https://doi.org/10.1061/\(ASCE\)MT.1943-5533.0004008](https://doi.org/10.1061/(ASCE)MT.1943-5533.0004008).
- J27. Wang, X., Zhu, H., Zhu, M., Zhang, L., and Ju, J. W. (2021). "An Integrated Parameter Prediction Framework for Intelligent TBM Excavation in Hard Rock." *Tunnelling and Underground Space Technology*, 118, <https://doi.org/10.1016/j.tust.2021.104196>.
- J28. Chen, R., Ding, X., Lai, H., and Zhang, L. (2021). "Improving dust resistance of mine tailings using green biopolymer." *Environmental Geotechnics*, 8(6), 382-391.
- J29. Cai, W., Zhu, H., Liang, W., Zhang, L., and Wu W. (2021). "A New Version of the Generalized Zhang–Zhu Strength Criterion and a Discussion on Its Smoothness and Convexity." *Rock Mechanics and Rock Engineering*, 54, 4265-4281.
- J30. Alnuaimi, H. N., Sasmal, S., Amjad, U., Nikvar-Hassani, A., Zhang, L., and Kundu, T. (2021). "Monitoring concrete curing by linear and nonlinear ultrasonic methods." *ACI Materials Journal*, 118(3), 61-69, doi: 10.14359/51730412.
- J31. Chen, H., Zhu, H., and Zhang, L. (2021). "Analytical solution for deep circular tunnels in rock with consideration of disturbed zone, 3D strength, and large strain." *Rock Mechanics and Rock Engineering*, 54, 1391-1410.
- J32. Chen, H., Zhu, H., and Zhang, L. (2021). "A unified constitutive model for rock based on newly modified GZZ criterion." *Rock Mechanics and Rock Engineering*, 54, 921-935.
- J33. Zhao, Y., Zhang L., Wang, Y., and Lin, H. (2021). "Editorial: Hydro-Mechanical Coupling and Creep Behaviors of Geomaterials." *Frontiers in Earth Science*, doi: 10.3389/feart.2020.632135.
- J34. Sadat, M. R., Muralidharan, K., Frantziskonis, G., and Zhang, L. (2021). "From atomic-scale to mesoscale: A characterization of geopolymer composites using molecular dynamics and peridynamics simulations." *Computational Materials Science*, 186, 110038, <https://doi.org/10.1016/j.commatsci.2020.110038>.
- J35. Xu, Q., Zhang, L., Zhu, H., Gong, Z., and Liu, J. (2020). "Laboratory tests on conditioning the sandy cobble soil for EPB shield tunnelling and its field application." *Tunnelling and Underground Space Technology*, 105, <https://doi.org/10.1016/j.tust.2020.103512>.
- J36. Zhao, Y., Zhang, L., Wang, W., Liu, Q., Tang, L., and Cheng, G. (2020). "Experimental study on shear behavior and a revised shear strength model for infilled rock joints." *International Journal of Geomechanics*, 20(9), 04020141, 1-17.
- J37. Zhang, J., Zhang, L., Wang, W., Zhang, D., and Zhang, B. (2020). "Probabilistic analysis of three-dimensional tunnel face stability in soft rock masses using Hoek–Brown failure criterion." *International Journal for Numerical and Analytical Methods in Geomechanics*, 44(11), 1601–1616.

- J38. An, M., Zhang, F., Elsworth, D., Xu, Z., Chen, Z., and Zhang, L. (2020). "Friction of Longmaxi Shale Gouges and Implications for Seismicity during Hydraulic Fracturing." *Journal of Geophysical Research - Solid Earth*, 125(8), <https://doi.org/10.1029/2020JB019885>.
- J39. An, M., Zhang, F., Chen, Z., Elsworth, D., and Zhang, L. (2020). "Temperature and Fluid Pressurization Effects on Frictional Stability of Shale Faults Reactivated by Hydraulic Fracturing in the Changning Block, Southwest China." *Journal of Geophysical Research - Solid Earth*, 125(8), <https://doi.org/10.1029/2020JB019584>.
- J40. Zhao, Y., Zhang, L., Liao, J., Wang, W., Liu, Q., and Tang, L. (2020). "Experimental study of fracture toughness and subcritical crack growth of three rocks under different environments." *International Journal of Geomechanics*, 20(8), 04020128, 1-15.
- J41. Yin, Z, Huang, H., Zhang, F., Zhang, L., and Maxwell, S. (2020). "Three-dimensional distinct element modeling of fault reactivation and induced seismicity due to hydraulic fracturing injection and backflow." *Journal of Rock Mechanics and Geotechnical Engineering*, <https://doi.org/10.1016/j.jrmge.2019.12.009>.
- J42. Zhang, K., Wu, W., Zhu, H., Zhang, L., Li, X., and Zhang, H. (2020). "A modified method for discontinuity trace mapping using three-dimensional point clouds of rock mass surfaces." *Journal of Rock Mechanics and Geotechnical Engineering*, 12(3), 571-586.
- J43. Zhu, H., Wang, X., Chen, X., and Zhang, L. (2020). "Similarity search and performance prediction of shield tunnels in operation through time series data mining." *Automation in Construction*, 114, 10318, <https://doi.org/10.1016/j.autcon.2020.103178>.
- J44. Zhang, F., Yin, Z., Chen, Z., Maxwell, S., Zhang, L., and Wu, Y. (2020). "Fault reactivation and induced seismicity during multistage hydraulic fracturing: Microseismic analysis and geomechanical modeling." *SPE Journal*, 25(2), <https://doi.org/10.2118/199883-PA>
- J45. Zhang, F., An, M., Zhang, L., Fang, Y., and Elsworth, D. (2020). "Effect of mineralogy on friction-dilation relationships for simulated faults: Implications for permeability evolution in caprock faults." *Geoscience Frontiers*, 11(2), 439-450.
- J46. Wang, P., Tan, X., Zhang, L., Li, Y., and Liu, R. (2019). "Influence of particle diameter on the wettability of coal dust and the dust suppression efficiency via spraying." *Process Safety and Environmental Protection*, 132, 189-199.
- J47. Wang, P., Shi, Y., Zhang, L., and Li, Y. (2019). "Effect of structural parameters on atomization characteristics and dust reduction performance of internal-mixing air-assisted atomizer nozzle." *Process Safety and Environmental Protection*, 126, 316-328.
- J48. Manjarrez, L., Nikvar-Hassani, A., Shadnia, R., and Zhang, L. (2019). "Experimental Study of Geopolymer Binder Synthesized with Copper Mine Tailings and Low-Calcium Copper Slag." *Journal of Materials in Civil Engineering*, 31(8), 04019156, 1-14.
- J49. Zhang, F., An, M., Zhang, L., Yang, Y., and Elsworth, D. (2019). "The Role of Mineral Composition on the Frictional and Stability Properties of Powdered Reservoir Rocks." *Journal of Geophysical Research: Solid Earth*, 124(2), 1480-1497. DOI: 10.1029/2018JB016174.
- J50. Ren, X., and Zhang, L. (2019). "Experimental study of geopolymer concrete produced from waste concrete." *Journal of Materials in Civil Engineering*, [https://doi.org/10.1061/\(ASCE\)MT.1943-5533.0002750](https://doi.org/10.1061/(ASCE)MT.1943-5533.0002750), 31(7), 04019114, 1-14.
- J51. Lai, H., Zhang, J., Zhang, L., Chen, R., and Yang, W. (2019). "A new method based on centrifuge model test for evaluating ground settlement induced by tunneling." *KSCE Journal of Civil Engineering*, 23, 2426-2436, DOI 10.1007/s12205-019-0780-0.
- J52. Gur, S., Sadat, M. R., Frantziskonis, G., Bringuier, S., Zhang, L., and Muralidharan, K. (2019). "The effect of grain-size on fracture of polycrystalline silicon carbide: A multiscale analysis using a molecular dynamics-peridynamics framework." *Computational Materials Science*, 159, 341-348.

- J53. Manjarrez, L., and Zhang, L. (2018). "Utilization of copper mine tailings as road base construction material through geopolymerization." *Journal of Materials in Civil Engineering*, 30(9), 04018201, 1-12.
- J54. Madadi, A., Eskandari-Naddaf, H., Shadnia, R., and Zhang, L. (2018). "Digital image correlation to characterize the flexural behavior of lightweight ferrocement slab panels." *Construction and Building Materials*, 189, 967-977.
- J55. Zhao, Y., and Zhang, L. (2018). "Experimental study on the mud-water inrush characteristics through rock fractures." *Advances in Civil Engineering*, <https://doi.org/10.1155/2018/2060974>, 1-7.
- J56. Madadi, A., Eskandari-Naddaf, H., Shadnia, R., and Zhang, L. (2018). "Characterization of ferrocement slab panels containing lightweight expanded clay aggregate using digital image correlation technique." *Construction and Building Materials*, 180, 464-476.
- J57. Sadat, M. R., Muralidharan, K., and Zhang, L. (2018). "Reactive molecular dynamics simulation of the mechanical behavior of sodium aluminosilicate geopolymer and calcium silicate hydrate composites." *Computational Materials Science*, 150, 500-509.
- J58. Ren, X., and Zhang, L. (2018). "Experimental study of interfacial transition zones between geopolymer binder and recycled aggregate." *Construction and Building Materials*, 167, 749-756.
- J59. Sadat, M. R., Bringuier, S., Muralidharan, K., Frantziskonis, G., and Zhang, L. (2018). "Atomic-scale dynamics and mechanical response of geopolymer binder under nanoindentation." *Computational Materials Science*, 142, 227-236.
- J60. Zhao, Y., Ma, W., Zhang, L., Li, S., and Yang, H. (2018). "Separation of elasto-visco-plastic strains of rock and a nonlinear creep model." *International Journal of Geomechanics*, 18(1), 04017129, 1-18.
- J61. Chen, R., Ding, X., Zhang, L., Xie, Y., and Lai, H. (2017). "Discrete element simulation of mine tailings stabilized with biopolymer." *Environmental Earth Sciences*, 76, 772, 1-9.
- J62. Shadnia, R., and Zhang, L. (2017). "Experimental study of geopolymer synthesized with class F fly ash and low calcium slag." *Journal of Materials in Civil Engineering*, 29(10), 04017195, 1-10.
- J63. Zhu, H., Zhang, Q., Huang, B. and Zhang, L. (2017). "A constitutive model based on the modified generalized three-dimensional Hoek–Brown strength criterion." *International Journal of Rock Mechanics and Mining Science*, 98, 78-87.
- J64. Zhao, Y., Zhang, L., Wang, W., Wan, W., Li, S., Ma, W., and Wang, Y. (2017). "Creep behavior of intact and cracked limestone under multi-level loading and unloading cycles." *Rock Mechanics and Rock Engineering*, 50(6), 1409-1424.
- J65. Zhao, Y., Luo, S., Wang, Y., Wang, W., Zhang, L., and Wan, W. (2017). "Numerical analysis of Karst water inrush and a criterion for establishing the width of water-resistant rock pillars." *Mine Water and the Environment*, 36(4), 508-519.
- J66. Zhang, L. (2017). "Evaluation of rock mass deformability using empirical methods – A review." *Underground Space*, 2(1), 1-15.
- J67. Zhao, Y., Tang, J., Chen, Y., Zhang, L., Wang, W., Wan, W., and Liao, J. (2017). "Hydromechanical coupling tests for mechanical and permeability characteristics of fractured limestone in complete stress–strain process." *Environmental Earth Sciences*, 76, 24, 1-18.
- J68. Zhao, Y., Zhang, L., Wang, W., Tang, J., Lin, H., and Wan, W. (2017). "Transient pulse test and morphological analysis of single rock fractures." *International Journal of Rock Mechanics and Mining Sciences*, 91, 139-154.
- J69. Chen, J.-J., Zeng, F.-Y., Wang, J.-H., and Zhang, L. (2017). "Analysis of laterally loaded rock-socketed shafts considering the nonlinear behavior of both the soil/rock mass and the shaft." *Journal of Geotechnical and Geoenvironmental Engineering*, 143(3), 06016025, 1-7.
- J70. Sadat, M. R., Bringuier, S., Asaduzzaman, A., Muralidharan, K., and Zhang, L. (2016). "A molecular dynamics study of the role of molecular water on the structure and mechanics of amorphous geopolymer binders." *Journal of Chemical Physics*, 145, 134706, 1-13.

- J71. Zhang, L. (2016). "Determination and applications of rock quality designation (RQD)." *Journal of Rock Mechanics and Geotechnical Engineering*, 8(3), 389-397.
- J72. Zhu, H., Huang, X., Li, X., Zhang, L., and Liu, X. (2016). "Evaluation of urban underground space resources using digitalization technologies." *Underground Space*, 1(2), 124-136.
- J73. Chen, R., Ramey, D., Weiland, E., Lee, I., and Zhang, L. (2016). "Experimental investigation on biopolymer strengthening of mine tailings." *Journal of Geotechnical and Geoenvironmental Engineering*, 142(12), 06016017, 1-5.
- J74. Zhao, Y., Zhang, L., Wang, W., Pu, C., Wan, W., and Tang, J. (2016). "Cracking and stress-strain behavior of rock-like material containing two flaws under uniaxial compression." *Rock Mechanics and Rock Engineering*, 49(7), 2665-2687.
- J75. Zhou, S., Zhu, H., Yan, Z., Ju, J. W., and Zhang, L. (2016). "A micromechanical study of the breakage mechanism of microcapsules in concrete using PFC2D." *Construction and Building Materials*, 115, 452-463.
- J76. Cai, Y., Han, L., Tian, L., and Zhang, L. (2016). "Meshless method based on Shepard function and partition of unity for two-dimensional crack problems." *Engineering Analysis with Boundary Elements*, 65, 126-135.
- J77. Sadat, M. R., Bringuier, S., Muralidharan, K., Runge, K., and Zhang, L. (2016). "An atomistic characterization of the interplay between composition, structure and mechanical properties of amorphous geopolymer binders." *Journal of Non-Crystalline Solids*, 434, 53-61.
- J78. Chen, R., Ding, X., Ramey, D., Lee, I., and Zhang, L. (2016). "Experimental and numerical investigation into surface strength of mine tailings after biopolymer stabilization." *Acta Geotechnica*, 11, 1075-1085.
- J79. Meng, Z., Chen, J., Zhang, L., Wang, J., and Yao, J. (2015). "Field Tests to Investigate the Installation Effects of Drilled Displacement Piles with Screw-Shaped Shaft in Clay." *Journal of Geotechnical and Geoenvironmental Engineering*, 141(12), 06015010, 1-6.
- J80. Asaduzzaman, A., Runge, K., Muralidharan, K., Deymier, P. A., and Zhang, L. (2015). "Energetics of substituted polyhedral oligomeric silsesquioxanes: a DFT study." *MRS Communications*, 5(3), 519-524.
- J81. Shadnia, R., Zhang, L., and Li, P. (2015). "Experimental study of geopolymer mortar with incorporated PCM." *Construction and Building Materials*, 84, 95-102.
- J82. Ahmari, R., Parameswaran, K., and Zhang, L. (2015). "Alkali activation of copper mine tailings and low-calcium flash-furnace copper smelter slag." *Journal of Materials in Civil Engineering*, 27(6), 04014193, 1-11.
- J83. Ren, X., Zhang, L., Ramey, D., Waterman, B., and Ormsby, S. (2015). "Utilization of aluminum sludge (AS) to enhance mine tailings-based geopolymer." *Journal of Materials Science*, 50, 1370-1381.
- J84. Chen, R., Lee, I., and Zhang, L. (2015). "Biopolymer stabilization of mine tailings for dust control." *Journal of Geotechnical and Geoenvironmental Engineering*, 141(2), 04014100, 1-10.
- J85. Zhang, Q., Zhu, H., and Zhang, L. (2015). "Studying the effect of non-spherical micro-particles on Hoek-Brown strength parameter m_i using numerical true triaxial compression tests." *International Journal for Numerical and Analytical Methods in Geomechanics*, 39(1), 96-114.
- J86. Ding, X., and Zhang, L. (2014). "A new contact model to improve the simulated ratio of unconfined compressive strength to tensile strength in bonded particle model." *International Journal of Rock Mechanics and Mining Science*, 69, 111-119.
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- M2. Zhang, L. (2012). “Underground compressed air energy storage (CAES).” *Geo-Strata – Energy Geotechnics*, January/February Issue, 34-39. Invited by Editor-in-Chief.
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□ Discussions/Closures (Refereed)

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- D2. Zhang, L. (2011). Reply to the Discussion by Arioglu et al. on “Estimating the Strength of Jointed Rock Masses” by Zhang, DOI 10.1007/s00603-009-0065-x, *Rock Mechanics and Rock Engineering*, 44, 511-511.
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- P3. Chen, H., Zhu, H., and Zhang, L. (2024). “An analytical solution for deep circular tunnels in rock based on GZZ criterion.” *58th U.S. Rock Mechanics/Geomechanics Symposium*, June 23 – 26, 2024, Golden, CO., Paper No. ARMA 24-0668, 6 pages.
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- P35. Ahmari, S., Chen, R., and Zhang, L. (2012). "Utilization of mine tailings as road base material." *Geo-Congress 2012 – State of the Art and Practice in Geotechnical Engineering*, March 25-29, 2012, Oakland, CA. 8 pages.
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- P41. Zhang, L. (2008). "Predicting the end bearing capacity of rock socketed shafts." *33rd Annual Conference on Deep Foundations & 11th International Conference on Piling and Deep Foundations*, October 15-17, 2008, New York, NY. 307-316.
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- P43. Zhang L., Silva, F., and Grismala, R. (2003). "Horizontal subgrade reaction coefficient of rock." *Soil and Rock America 2003*, MIT, Cambridge, MA. 2, 1931-1936.

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- P46. Zhang L., and Einstein, H. H. (2000). “Estimating the deformation modulus of rock masses.” *4th North American Rock Mechanics Symposium, Pacific Rocks 2000: Rock around the Rim*, Seattle, Washington, 703-708.
- P47. Du, J., and Zhang, L. (1992). “Earthquake subsidence of soft soil in Shanghai.” *Proceedings of ILT’92 Symposium on Problems of Lowland Development*, Saga University, Japan. 8 pages.
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- P49. Zhang, L., Du, J., and Zhu, L. (1990). “Study on parameters influencing the results of pile wave equation analysis.” *Proceedings of the 3rd National Soil Dynamics Conference*, May 22-25, Shanghai, 633-636, in Chinese.
- P50. Chen, Z., and Zhang, L. (1990). “Calculation of p-y curves for piles in cohesive soil and under cyclic loading.” *Proceedings of the 3rd National Soil Dynamics Conference*, May 22-25, Shanghai, 655-658, in Chinese.
- P51. Zhang, L. (1990). “Horizontal vibration behavior of piles in layered soils.” *Proceedings of the 3rd National Soil Dynamics Conference*, Shanghai, May 22-25, 627-630, in Chinese.

□ **Patent/Innovation Disclosures**

- Pa1. Zhang, L., and Nikvar-Hassani, A. (2022). *Pumpable Hybrid Cementitious Material*, Application Number PCT/US22/51749, Filing Date December 3, 2022.
- Pa2. Zhang, L., and Ren, X. (2017). Complete Recycling and Utilization of Waste Concrete to Produce New Structural Concrete. Innovation Disclosure UA17-175.
- Pa3. Zhang, L., and Chen, R. (2017). Eco-Friendly Dust Control with Biopolymer. Innovation Disclosure UA17-118.
- Pa4. Zhang, L., and Ahmari, S. (2015). Production Bricks from Copper Mine Tailings through Geopolymerization. US20150251951 A1 and WO 2014055558 A1.

ADVISING AND MENTORING

- 13 PhD students (11 completed and 2 in progress). Of the 11 completed PhD students, 5 are currently working at university and 6 are working in industry
- 2 MS students (completed)
- 7 ME students (7 completed and 1 in progress)
- 4 post docs (completed)
- 8 undergraduate research students (8 completed and 2 in progress)
- 15 visiting scholars (completed)

COURSES TAUGHT

- Rock Mechanics – ASCE Short Course
- CE343 Soil Mechanics

- CE440/540 Foundation Engineering
- CE441/541 Earth Structures in Geotechnical Engineering
- CE442/542 Ground Improvement
- CE445/545 Geoenvironmental Engineering
- CE446/546 Geotechnical Earthquake Engineering

INSTRUCTIONAL PROFESSIONAL DEVELOPMENT ACTIVITIES

- **Summer Engineering Faculty Learning Community:** Engineering instructors from across the college gathered on a bi-weekly basis to discuss teaching best practices, share concerns and offer suggestions for peers, support each other in plans to implement teaching strategies, and build a network of engaged engineering educators within the College of Engineering. **2021, 2022**

UNIVERSITY ACTIVITIES (Since 2017)

- Member, CAEM Graduate Curriculum Studies Committee (2016-present)
- Member, CAEM Faculty Search Committee, 2020, 2021
- Chair, CAEM Faculty Search Committee, 2022
- Member, MGE Faculty Search Committee, 2022

PROFESIONAL/SCIENTIFIC ACTIVITIES (Since 2017)

- Technical Publication Editorship
 - ✓ Managing Editor – Underground Space, 2016-present
 - ✓ Associate Editor – J. of Geotechnical and Geoenvironmental Engineering, ASCE, 2010-Present
 - ✓ Editorial Board – Rock Mechanics and Rock Engineering, 2015-present
 - ✓ Editorial Board – International Journal of Geosciences, 2010-Present
 - ✓ Editorial Board – Frontier of Structural and Civil Engineering (FSCE), 2009-Present
- Technical Committees
 - ✓ Chair (2018-2021), Vice Chair (2015-2018), Member (2010-present), ASCE Rock Mechanics Committee
 - ✓ Member, ASCE Geoenvironmental Engineering Committee, 2010-present
 - ✓ Member, Board of International Association of Computer Methods and Advances in Geomechanics (IACMAG), 2008-present
- Conference Organization
 - ✓ Session Chair, 58th US Rock Mechanics / Geomechanics Symposium. 23-26 June 2024, Golden, Colorado
 - ✓ Member, Steering Committee, GeoShanghai 2024 International Conference, May 26-29, 2024, Shanghai, China
 - ✓ Member, Steering Committee, GeoShanghai 2018 International Conference, May 27-30, 2018, Shanghai, China
 - ✓ Member, Planning Committee, Arizona Pavement/Materials Conferences, 2014, 2015, 2016, 2017, 2018, 2019, 2020, 2021, 2022 and 2023, Tempe, AZ
 - ✓ Member, Scientific and Technical Committee, RICON17 – REMINE International Conference, October 25-27, 2017, Covilha, Portugal
 - ✓ Member, Technical Committee, International Conference on Transportation Infrastructure and Materials (ICTIM 2017), June 9-12, 2017, Qingdao, China

- ✓ Member, Technical Committee, 3rd, 4th, 5th, 6th, 7th and 8th Symposiums on Operation Safety, Energy Conservation and Environmental Protection in Tunnel and Underground Space, 2012, 2013, 2014, 2015, 2016, 2017, China
- ✓ Member, Technical Committee, Transportation Research Congress (TRC) 2017, May 23-25, 2017, Beijing, China
- ✓ Session Chair, Geo-Chicago 2016 Sustainability, Energy and the Geoenvironment, Chicago, IL, August 14-18, 2016
- ✓ Session Chair and Member, Technical Committee, Transportation Research Congress (TRC) 2016, June 6-8, 2016, Beijing, China
- ✓ Session Chair, 49th U.S. Rock Mechanics/Geomechanics Symposium, June 28-July 1, 2015, San Francisco, CA
- ✓ Co-Chair, GeoShanghai 2014 International Conference, May 26-28, 2014, Shanghai, China
- Professional Society Membership
 - ✓ Member, American Society of Civil Engineers (ASCE), 1995-present
 - ✓ Member, International Society of Soil Mechanics and Geotechnical Engineering (ISSMGE), 2007-present
 - ✓ Member, Deep Foundations Institute (DFI), 2008-present
 - ✓ Member, International Society of Rock Mechanics (ISRM), 2000-present
 - ✓ Member, American Rock Mechanics Association (ARMA), 2000-present
- NSF Panels
 - ✓ Served as panelist on 10 NSF proposal review panels since 2016
- Reviewer – Tenure and Promotion Packages
 - ✓ Served as external reviewer of 17 tenure and promotion packages since 2015
- Reviewer – Research Proposals
 - ✓ Reviewed more than 38 research proposal from various national and international funding agencies since 2013
- Ph.D. Thesis Examiner
 - ✓ Served as Examiner of Ph.D. Thesis from 8 international universities since 2014
- Reviewer – Book proposals
 - ✓ Reviewed 5 book proposal for Elsevier since 2016
- Reviewer – Journals
 - ✓ Reviewed 15 – 35 papers per year since 2007
- Reviewer – Conferences
 - ✓ Reviewed 2 – 5 papers per year since 2007