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Director, SMART (Sustainable Materials and Recycling Technologies) Laboratory
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EDUCATION

Ph.D., Geotechnical Engineering, Massachusetts Institute of Technology (MIT), 1999
M.S., Civil and Environmental Engineering, Massachusetts Institute of Technology (MIT), 1997
M.S., Geotechnical Engineering, Tongji University, 1988
B.S., Naval Architecture and Ocean Engineering, Shanghai Jiao Tong University, 1985

PROFESSIONAL EXPERIENCE

2017–Present Delbert R. Lewis Distinguished Professor, University of Arizona
2013–Present Associate Professor, University of Arizona
2007–2013 Assistant Professor, University of Arizona
2002–2007 Technical Specialist, ICF International
2000–2002 Manager, Arthur D. Little Inc.
1999–2000 Research Associate, Massachusetts Institute of Technology
1988–1993 Lecturer, Department of Geotechnical Engineering, Tongji University, Shanghai

PROFESSIONAL REGISTRATION

Licensed P.E. in Civil Engineering in Massachusetts since 2000 (License No. 41598)

HONORS AND AWARDS

- ASCE ExCEEEd Teaching Fellow, 2011
- Guest Professor, Tongji University, China, 2015-present
- Guest Professor, Central South University, China, 2009-2014
- First Runner-Up, Young Professor Paper Competition, Deep Foundations Institute, 2008
- Arthur D. Little Corporate Star Case Awards, 2001, 2002
- Science and Technology Progress Award, China Education Ministry, 1994
- Outstanding Young Faculty Member Award, Tongji University, Shanghai, 1993

RESEARCH INTERESTS

- Rock Mechanics and Rock Engineering
 - ✓ Three-dimensional (3D) multi-scale characterization and investigation of rock fractures
 - ✓ 3D strength criteria for rocks
 - ✓ Evaluation of mechanical and hydraulic properties of jointed rock masses
 - ✓ Development of Rock Expert System (RES) for evaluation of rock properties
 - ✓ Discrete element method (DEM) analysis of rock behavior
 - ✓ Enhancement of reservoir (oil, water, and thermal) production in rock
- Optimal Analysis and Design of Deep Foundations
 - ✓ Evaluation and mobilization of end bearing capacity of rock-socketed shafts
 - ✓ Nonlinear analysis of laterally loaded piles

- Sustainable Geotechnics and Geoenvironmental Engineering
 - ✓ Recycling and utilization of wastes through geopolymerization
 - ✓ Bio-enhancement of geopolymer cementitious material
 - ✓ Development of sustainable construction materials
 - ✓ Molecular dynamics (MD) study of geopolymer
 - ✓ Environmentally benign dust control
- Renewable Energy
 - ✓ Underground compressed air energy storage (CAES)
 - ✓ Geopolymer energy efficient buildings materials

SELECTED PUBLICATIONS Since 2000

Books

1. Zhang, L. (2016). *Engineering Properties of Rocks*. 2nd edition. Butterworth-Heinemann, Elsevier. p378.
2. Ding, W., Zhang, L., Li, X., and Zhang, X. (2014). *Proceedings of GeoShanghai International Conference, GSP 236-243*. May 26-28, 2014, Shanghai, China. ASCE Publisher. (General Editors)
3. Zhang, L., and Wong, L. N. Y. (2014). *Rock Mechanics and Its Applications in Civil, Mining and Petroleum Engineering, GSP237, Proceedings of GeoShanghai International Conference*. May 26-28, 2014, Shanghai, China. ASCE Publisher. (Editors)
4. Zhang, L. (2005). *Engineering Properties of Rocks*. Elsevier Geo-Engineering Books Series Volume 4. Elsevier. p304.
5. Zhang, L. (2004). *Drilled Shafts in Rock – Analysis and Design*. A. A. Balkema Publishers. p384.

Book Chapters

1. Li, Z., and Zhang, L. (2016). “Fly ash-based geopolymer with kappa-carrageenan biopolymer.” In: *Biopolymers and Biotech Admixtures for Eco-Efficient Construction Materials*, 173-192, Woodhead Publishing.
2. Ahmari, A., and Zhang, L. (2014). “The properties and durability of mine-tailings-based geopolymeric masonry blocks.” In: *Eco-efficient Masonry Bricks and Blocks: Design, Properties and Durability*, 289-310, Woodhead Publishing.
3. Ahmari, A., and Zhang, L. (2014). “The properties and durability of alkali-activated masonry units.” In: *Handbook of Alkali-activated Cements, Mortars and Concretes*, 643-660, Woodhead Publishing.

Refereed Journal Articles

1. 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*, in press.
2. 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.
3. 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 Environ.*, DOI 10.1007/s10230-017-0438-4.
4. Zhang, L. (2017). “Evaluation of rock mass deformability using empirical methods – A review.” *Underground Space*, 2(1), 1-15. <http://doi.org/10.1016/j.undsp.2017.03.003>.
5. Zhao, Y., Tang, J., Chen, Y., Zhang, L., Wang, W., Wan, W. (2017). “Hydromechanical coupling tests for mechanical and permeability characteristics of fractured limestone in complete stress-strain process.” *Environ. Earth Sci.*, 76, 24. DOI 10.1007/s12665-016-6322-x.

6. 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 & Mining Sciences*, 91, 139-154.
7. 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." *The Journal of Chemical Physics*, 145(13), 134706.
8. Chen, J.-J., Zeng, F.-Y., Wang, J.-H., and Zhang, L. (2016). "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.
9. Zhang, L. (2016). "Determination and applications of rock quality designation (RQD)." *Journal of Rock Mechanics and Geotechnical Engineering*, 8(3), 389-397.
10. 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.
11. 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*, DOI: 10.1061/(ASCE)GT.1943-5606.0001568, 142(12), 06016017/1-5.
12. 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.
13. 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.
14. 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.
15. 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.
16. Chen, R., Ding, X., Ramey, D., Lee, I., and Zhang, L. (2015). "Experimental and numerical investigation into surface strength of mine tailings after biopolymer stabilization." *Acta Geotechnica*, DOI 10.1007/s11440-015-0420-x.
17. 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*, DOI: 10.1061/(ASCE)GT.1943-5606.0001371, 06015010.
18. 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.
19. Shadnia, R., Zhang, L., and Li, P. (2015). "Experimental study of geopolymer mortar with incorporated PCM." *Construction and Building Materials*, 84, 95-102.
20. 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.
21. 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.

22. Chen, R., Lee, I., and Zhang, L., M. (2014). "Biopolymer stabilization of mine tailings for dust control." *Journal of Geotechnical and Geoenvironmental Engineering*, 141(2), 04014100.
23. 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.
24. 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.
25. Chen, R., Ahmari, S., and Zhang, L. (2014). "Utilization of sweet sorghum fiber to reinforce fly ash-based geopolymer." *Journal of Materials Science*, 49, 2548-2558.
26. Ding, X., Zhang, L., Zhu, H., and Zhang, Q. (2014). "Effect of model scale and particle size distribution on PFC3D simulation results." *Rock Mechanics and Rock Engineering*, 47, 2139-2156.
27. Zhu, H., Zhang, Q., and Zhang, L. (2013). "Review of research progresses and applications of Hoek-Brown strength criterion." *Chinese Journal of Rock Mechanics and Engineering*, 32(10), 1945-1963.
28. Zhang, L. (2013). "Production of bricks from waste materials - A review." *Construction and Building Materials*, 47, 643-655.
29. Li, Z., and Zhang, L. (2013). "Utilization of chitosan biopolymer to enhance fly ash-based geopolymer." *Journal of Materials Science*, 48, 7896-7993.
30. Zhang, Q., Zhu, H., and Zhang, L. (2013). "Modification of a generalized three-dimensional Hoek-Brown strength criterion." *International Journal of Rock Mechanics and Mining Science*, 59, 80-96.
31. Chen, R., Zhang, L., and Budhu, M. (2013). "Biopolymer stabilization of mine tailings." *Journal of Geotechnical and Geoenvironmental Engineering*, 139(1), 1802-1809.
32. Ahmari, S., and Zhang, L. (2013). "Durability and leaching behavior of mine tailings-based geopolymer bricks." *Construction and Building Materials*, 44, 743-750.
33. Ahmari, S., and Zhang, L. (2013). "Utilization of cement kiln dust (CKD) to enhance mine tailings-based geopolymer bricks." *Construction and Building Materials*, 40, 1002-1011.
34. Chen, J.-J., and Zhang, L. (2013). "The effect of spatial correlation of cone tip resistance on the bearing capacity of piles." *Journal of Geotechnical and Geoenvironmental Engineering*, 139(3), 494-500.
35. Zhang, L. (2013). "Aspects of rock permeability." *Frontiers of Structural and Civil Engineering*, 7(2), 102-116.
36. Zhang, L., and Ahmari, S. (2013). "Nonlinear analysis of laterally loaded rigid piles in cohesive soil." *International Journal for Numerical and Analytical Methods in Geomechanics*, 37(2), 201-220.
37. Chen, J.-J., Zhang, L., Zhang, J.-F., Zhu, Y.-F., and Wang, J.-H. (2013). "Field tests, modification and application of deep soil mixing (DSM) method in soft clay." *Journal of Geotechnical and Geoenvironmental Engineering*, 139(1), 24-34.
38. Ahmari, S., Ren, X., Toufigh, V., and Zhang, L. (2012). "Production of geopolymeric binder from blended waste concrete powder and fly ash." *Construction and Building Materials*, 35, 718-729.
39. Ahmari, S., Zhang, L., and Zhang, J. (2012). "Effects of activator type/concentration and curing temperature on alkali-activated binder based on copper mine tailings." *Journal of Materials Science*, 47, 5933-5945.
40. Zhang, L., Ding, X., and Budhu, M. (2012). "A rock expert system for the evaluation of rock properties." *International Journal of Rock Mechanics and Mining Science*, 50, 124-132.
41. Ahmari, S., and Zhang, L. (2012). "Production of eco-friendly bricks from copper mine tailings through geopolymerization." *Construction and Building Materials*, 29, 323-331.

42. Zhang, L., and Chen, J.-J. (2012). "Effect of spatial correlation of standard penetration test (SPT) data on bearing capacity of driven piles in sand." *Canadian Geotechnical Journal*, 49, 394-402.
43. Zhang, L., Ahmari, S., and Zhang, J. (2011). "Synthesis and characterization of fly ash modified mine tailings-based geopolymers." *Construction and Building Materials*, 25(9), 3773-3781.
44. Zhang, Q., Zhu, H., Zhang, L., and Ding, X. (2011). "Study of scale effect on intact rock strength using particle flow modeling." *Int. J. of Rock Mechanics and Mining Science*, 48(8), 1320-1328.
45. Zhang, L., Cao, P., and KC, R. (2010). "Evaluation of rock strength criteria for wellbore stability analysis." *International Journal of Rock Mechanics and Mining Science*, 47(8), 1304-1316.
46. Zhang, L. (2010). "Method for estimating the deformability of heavily jointed rock masses." *Journal of Geotechnical and Geoenvironmental Engineering*, 136(9), 1242-1250.
47. Zhang, L. (2010). "Prediction of end bearing capacity of rock-socketed shafts considering rock quality designation (RQD)." *Canadian Geotechnical Journal*, 47(10), 1071-1084.
48. Zhang, L., and Ding, X. (2010). "Variance of non-parametric rock fracture mean trace length estimator." *International Journal of Rock Mechanics and Mining Science*, 47(7), 1222-1228.
49. Zhang, L. (2010). "A simple method for evaluating liquefaction potential from shear-wave velocity." *Frontier of Architecture and Civil Engineering in China (FAC)*, 4(2), 178-195.
50. Zhang, L. (2010). "Estimating the strength of jointed rock masses." *Rock Mechanics and Rock Engineering*, 43(4), 391-402.
51. Zhang, L. (2010). "Nonlinear analysis of torsionally loaded piles in a two-layer soil profile." *International Journal of Geomechanics*, 10(2), 65-73.
52. Zhang, L., and Einstein, H. H. (2010). "The planar shape of rock joints." *Rock Mechanics and Rock Engineering*, 43(1), 55-68.
53. Zhang, L. (2009). "Nonlinear analysis of laterally loaded rigid piles in cohesionless soil." *Computers and Geotechnics*, 36(5), 718-724.
54. Zhang, L. (2008). "A generalized three-dimensional Hoek-Brown strength criterion." *Rock Mechanics and Rock Engineering*, 41(6), 893-915.
55. Zhang, L., and Zhu, H. (2007). "Three-dimensional Hoek-Brown strength criterion for rock." *Journal of Geotechnical and Geoenvironmental Engineering*, 133(9), 1128-1135.
56. Zhang, L., Silva, F., and Grismala, R. (2005). "Ultimate lateral resistance to piles in cohesionless soils." *Journal of Geotechnical and Geoenvironmental Engineering*, 131(1), 78-83.
57. Zhang, L., and Einstein, H. H. (2004). "Using RQD to estimate the deformation modulus of rock masses." *International Journal of Rock Mechanics and Mining Science*, 41(2), 337-341.
58. Zhang, L., Einstein, H. H., and Dershowitz, W. S. (2002). "Stereological relationship between trace length and size distributions of elliptical discontinuities." *Geotechnique*, 52(6), 419-433.
59. Zhang, L., and Einstein, H. H. (2000). "Nonlinear analysis of laterally loaded rock-socketed shafts." *Journal of Geotechnical and Geoenvironmental Engineering*, 126(11), 955-968.
60. Zhang, L., and Einstein, H. H. (2000). "Estimating the intensity of rock discontinuities." *International Journal of Rock Mechanics and Mining Science*, 37(5), 819-837.

Magazine Articles

1. Zhang, L. (2012). "Complete recycling and utilization of waste concrete through geopolymerization." *C&D World*, 5(3), 30-34. Invited by Editor.
2. Zhang, L. (2012). "Underground compressed air energy storage (CAES)." *Geo-Strata – Energy Geotechnics*, January/February Issue, 34-39. Invited by Editor-in-Chief.
3. Einstein, H. H., and Zhang, L. (2009). "The importance of discontinuities." *Geo-Strata – Rock Mechanics*, November/December Issue, 18-21.

Discussions/Closures

1. 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.
2. Zhang, L., Silva, F., and Grismala, R. (2006). Closure to “Ultimate lateral resistance to piles in cohesionless soils.” *Journal of Geotechnical and Geoenvironmental Engineering*, 132 (8), 1109-1110.

Peer-Reviewed Conference Proceedings

1. Ren, X, and Zhang, L. (2016). “The complete recycling of waste concrete to produce geopolymer concrete.” *Geo-Chicago 2016 Sustainability, Energy and the Geoenvironment*, Chicago, IL, August 14-18, 2016, 103-111.
2. Zhang, L. (2016). “Characterization of rock masses using rock quality designation (RQD).” *Transportation Research Congress (TRC) 2016*, June 6-8, 2016, Beijing, China, p6.
3. Ding, X., and Zhang, L. (2015). “Numerical study of cracking process using a new contact model.” *49th U.S. Rock Mechanics/Geomechanics Symposium*, June 28-July 1, 2015, San Francisco, CA. Paper No. ARMA 15-675, p8.
4. Zhang, Q., Zhu, H., and Zhang, L. (2015). “A new 3D constitutive model for rock mass tunnel.” *49th U.S. Rock Mechanics/Geomechanics Symposium*, June 28-July 1, 2015, San Francisco, CA. Paper No. ARMA 15-137, p6.
5. Zhu, F., and Zhang, L. (2014). “Experimental study on load-unload response ratio (LURR) of brittle rocks.” *GSP 237, Rock Mechanics and Its Applications in Civil, Mining and Petroleum Engineering, GeoShanghai 2014 International Conference*, May 26-28, 2014, Shanghai, China. pp 5-12.
6. Parameswaran, K., Ekholm, J., and Zhang, L. (2014). “Evaluation of Mine Tailings Dust Control.” *GSP 241, Geoenvironmental Engineering, GeoShanghai 2014 International Conference*, May 26-28, 2014, Shanghai, China. pp 80-89.
7. Ding, X., and Zhang, L. (2014). “A new contact model for DEM analysis of rock.” *48th U.S. Rock Mechanics/Geomechanics Symposium*, June 1-4, 2014, Minneapolis, MN. Paper No. ARMA 14-7161, p8.
8. Chen, R., and Zhang, L. (2014). “Mitigation of mine tailings dust with green biopolymer.” *Geo-Congress 2014 –Geo-Characterization and Modeling for Sustainability*, February 23-26, 2014, Atlanta, GA. pp 2198-2205.
9. Ding, X., and Zhang, L. (2012). “Effect of model scale on mechanical properties of rocks based on PFC3D modeling.” *46th U.S. Rock Mechanics/Geomechanics Symposium*, June 24-27, 2012, Chicago, IL. Paper No. ARMA 12-411, p7.
10. Zhang, Q., Zhu, H., Zhang, L., and Ding, X. (2012). “Effect of micro-parameters on the Hoek-Brown strength parameter m_i for intact rock using particle flow modeling.” *46th U.S. Rock Mechanics/Geomechanics Symposium*, June 24-27, 2012, Chicago, IL. Paper No. ARMA 12-672, p6.
11. Zhang, L., Ahmari, S., Sternberg, B., and Budhu, M. (2012). “Feasibility study of compressed air energy storage using steel pipe piles.” *Geo-Congress 2012 – State of the Art and Practice in Geotechnical Engineering*, March 25-29, 2012, Oakland, CA. p8.
12. 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. p8.
13. Ding, X., and Zhang, L. (2011). “Simulation of rock fracturing using particle flow modeling: Phase I – Model development and calibration.” *45th U.S. Rock Mechanics/ Geomechanics Symposium*, June 26-29, 2011, San Francisco, CA. Paper No. ARMA 11-510, p8.

14. Zhang, L., Grismala, R., and Silva, F. (2010). "Geotechnical safety program for underground storage caverns in salt." *44th U.S. Rock Mechanics Symposium*, June 27-30, 2010, Salt Lake City, UT. Paper No. ARMA 10-144, p8.
15. Zhang, L., and K C, R. (2010). "Stability analysis of vertical boreholes using a three-dimensional Hoek-Brown strength criterion." *GeoFlorida 2010 – Advances in Analysis, Modeling & Design*, February 20-24, 2010, West Palm Beach, FL. p10.
16. Zhang, L. (2009). "Considering the effect of discontinuities in prediction of end bearing capacity of rock socketed shafts." *SinoRock2009 – ISRM Int. Symp. on Rock Mechanics: Rock Characterization, Modeling and Engineering Design Methods*, May 19-22, 2009, Hong Kong, China. p5.
17. Zhang, L., and Xu, J. (2009). "Axial load transfer behavior of rock-socketed shafts." *International Foundation Congress & Equipment Expo'09*, March 15-19, 2009, Orlando, FL. p8.
18. Zhang, L. (2008). "Predicting the end bearing capacity of rock socketed shafts." *33rd Annual Conf. on Deep Foundations & 11th International Conference on Piling and Deep Foundations*, October 15-17, 2008, New York, NY. 307-316.
19. Zhang, L. (2008). "Evaluation of three-dimensional Hoek-Brown strength criteria." *42nd US Rock Mechanics Symposium and 2nd US-Canada Rock Mechanics Symposium*, June 29-July 2, 2008, San Francisco, CA. Paper No. ARMA 08-084, p6.
20. 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.
21. Silva, F., and Zhang, L. (2002). "Geoenvironmental Engineering: Application of Geotechnical Fundamentals for Sustainable Development – State of the Practice." *Proc. of the VXII Venezuelan Geotechnical Seminar*, Caracas, Venezuela. p20.
22. Zhang L., Silva, F., and Grismala, R. (2002). "Ultimate resistance of laterally loaded piles in cohesionless soils." *Deep Foundations 2002 – An International Perspective on Theory, Design, Construction, and Performance*, Geotechnical Special Publication No. 116, February 14-16, Orlando, FL, 2, 1364-1375.
23. 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.

Patents

1. Zhang, L., Ahmari, S., and Zhang, J. (2015). Production Bricks from Mine Tailings through Geopolymerization. US20150251951 A1 and WO 2014055558 A1.

Keynote and Invited Lectures/Presentations

1. Utilization of wastes in pavement construction through geopolymerization. 13th Arizona Pavement/Materials Conference, November 16-17, 2016, Tempe, AZ.
2. Enhanced characterization of rock masses based on rock quality designation (RQD). Geotechnical Special Presentation, the Arizona Chapter of the Geo-Institute, August 24, 2016, Tucson, AZ.
3. Sustainable geotechnical engineering research at the University of Arizona. School of Resources and Safety Engineering, Central South University, China, June 22, 2016.
4. Sustainable geotechnical engineering research at the University of Arizona. Department of Civil Engineering, Hunan University of Technology, China, June 21, 2016.
5. Sustainable geotechnical engineering research at the University of Arizona. School of Resource Environment and Safety Engineering, Hunan University of Science and Technology, China, June 20, 2016.
6. Characterization of rock masses using rock quality designation (RQD). Transportation Research

- Congress (TRC) 2016, June 6-8, 2016, Beijing.
7. Sustainable geotechnical engineering research at the University of Arizona. College of Civil and Transportation Engineering, HoHai University, China, November 29, 2015.
 8. Geotechnical safety of underground compressed air energy storage (CAES). The 6th Symposium on Operation Safety, Energy Conservation and Environmental Protection in Tunnel and Underground Space. July 25-26, 2015, Anhui, China.
 9. Complete recycling and utilization of waste concrete based on geopolymerization. School of Transportation, Southeast University, China, July 22, 2015.
 10. Complete recycling and utilization of waste concrete through geopolymerization. 11th Arizona Pavement/Materials Conference, November 19-20, 2014, Tempe, AZ.
 11. Geotechnical aspects of underground compressed air energy storage (CAES). Geo-San Antonio 2014 Geotechnical Topics in the Energy Sector, March 14, 2014, San Antonio, Texas.
 12. A new contact model for PFC3D to investigate rock behavior. School of Civil Engineering, Southeast University, China, June 9, 2013.
 13. A new contact model for PFC3D to investigate rock behavior. School of Highway, Chang'an University, China, June 8, 2013.
 14. A new contact model for PFC3D to investigate rock behavior. Institute of Geotechnical Engineering, Xi'an University of Technology, China, June 6, 2013.
 15. Recycling and utilization of concrete waste in infrastructure construction. The 3rd Symposium on Operation Safety, Energy Conservation and Environmental Protection in Tunnel, Underground Space and Transportation Infrastructure Construction. July 20-22, 2012, Inner Mongolia, China.
 16. Recycling and utilization of mine tailings as construction material through geopolymerization. U.S. EPA Hardrock Mining Conference 2012: Advancing Solutions for a New Legacy. April 3-5, 2012, Denver, Colorado.
 17. Utilization of mine tailings as highway construction material. 60th Annual Arizona Conference on Roads & Streets. April 20-22, 2011, Tucson, AZ.
 18. A new three-dimensional Hoek-Brown strength criterion for rocks. Department of Civil Engineering, Shanghai University, China, June 5, 2009.
 19. Investigation and repair of a failed landfill cap. School of Resources and Safety Engineering, Central South University, China, June 11, 2009.
 20. Optimum design of rock-socketed shafts. Department of Civil Engineering, Hunan University of Technology, China, June 12, 2009.
 21. A new three-dimensional Hoek-Brown strength criterion for rocks. Department of Geotechnical Engineering, Tongji University, China, June 18, 2009.
 22. Nonlinear analysis of laterally loaded rock-socketed shafts. School of Civil Engineering, Southeast University, China, June 19, 2009.
 23. A new Hoek-Brown strength criterion for rocks. School of Naval Architecture, Ocean and Civil Engineering, Shanghai Jiao Tong University, China, June 22, 2009.

PROFESSIONAL MEMBERSHIP AND ACTIVITIES

Editorial Board/Professional Committee

- Associate Editor – Journal of Geotechnical and Geoenvironmental Engineering, ASCE, 2010-Present
- Managing Editor – Underground Space, An Elsevier International Journal, 2015-present
- Editorial Board – Rock Mechanics and Rock Engineering, 2015-present
- Editorial Board – International Journal of Geosciences, 2010-present

- Editorial Board – Frontiers of Structural and Civil Engineering, 2009-present
- Editorial Advisory Board - Journal of Traffic and Transportation Engineering (English Edition), 2013 – 2016
- Member, International Society for Rock Mechanics (ISRM) Commission on Rock Engineering Design Methodology, 2012-present.
- Member, ASCE Geoenvironmental Engineering Committee, 2010-present
- Vice Chair, ASCE Rock Mechanics Committee, 2016-present
- Member, ASCE Rock Mechanics Committee, 2008-present
- Member, Board of International Association of Computer Methods and Advances in Geomechanics (IACMAG), 2008-present
- Member, Transportation Research Board NCHRP Research Project Panels, 2004-2011

Conference Chair/Committee

- Member, Steering Committee, GeoShanghai 2018 International Conference, May 27-30, 2018, Shanghai, China
- Member, Planning Committee, 11th, 12th, 13th and 14th Arizona Pavement/Materials Conferences, 2014, 2015, 2016, 2017, Tempe, AZ
- Member, Technical Committee, 2017 International Conference on Transportation Infrastructure and Materials, June 9-12, 2017, Qingdao, 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, Technical Committee and Organizing Committee, GeoShanghai 2014 International Conference, May 26-28, 2014, Shanghai, China
- Session Chair – GeoRisk 2011, Risk Assessment and Management in Geo-engineering, June 26-28, 2011, Atlanta, GA
- Member, Organizing Committee, Geotechnical Engineering Symposium, International Conference on Computational & Experimental Engineering and Sciences (ICCES 2011), April 18-21, 2011, Nanjing, China
- Member, International Academic Committee, 1st International Conference on Information Technology in Geo-Engineering (ICITG-Shanghai 2010), September 16-17, 2010, Shanghai, China
- Member, Organizing Committee, International Conference on Rock Joints and Jointed Rock Masses '09, January 4-10, 2009, Tucson, Arizona

Reviewer for Research Agencies

- National Science Foundation
- National Natural Science Foundation of China
- Swiss National Science Foundation
- Environmental Research and Education Foundation (EREF)
- American Chemical Society Petroleum Research Fund (ACS PRF)
- Transportation Research Board NCHRP
- Academic Research Fund, Ministry of Education, Singapore
- NTU, Singapore

Reviewer for Journals

- Acta Geotechnica
- Acta Mechanica Sinica
- Advances in Civil Engineering Materials
- Applied Clay Science
- Applied Mathematical Modelling
- Arabian Journal of Geosciences
- Arabian Journal for Science and Engineering
- Bulletin of Engineering Geology and the Environment
- Canadian Geotechnical Journal
- Cement and Concrete Composites
- Central European Journal of Geosciences
- Computers and Geosciences
- Computers and Geotechnics
- Construction and Building Materials
- Energy and Buildings
- Engineering Geology
- Environmental Science and Pollution Research
- Environmental Technology
- European Journal of Environmental and Civil Engineering
- European Journal of Wood and Wood Products
- Frontiers of Structural and Civil Engineering
- Fuel
- Geochemical Transactions
- Geoderma
- Geomechanics and Engineering
- Geophysical Research Letters
- Geotechnical and Geological Engineering
- Geotechnical Letters
- Geotechnical Testing Journal
- International Journal of Environmental Science and Technology
- International Journal of Geomechanics
- International Journal of Mineral Processing
- International Journal of Mining Science and Technology
- International Journal for Numerical and Analytical Methods in Geomechanics
- International Journal of Rock Mechanics and Mining Sciences
- International Journal of Sustainable Built Environment
- Journal of Aerospace Engineering, ASCE
- Journal of the American Ceramic Society
- Journal of Applied Mechanical Engineering
- Journal of Civil Engineering and Science
- Journal of Computers in Civil Engineering
- Journal of Environmental Management
- Journal of Geotechnical and Geoenvironmental Engineering, ASCE
- Journal of Hazardous Materials
- Journal of Materials in Civil Engineering
- Journal of Mountain Science
- Journal of Process Mechanical Engineering
- Journal of Testing and Evaluation

- Journal of Transportation Engineering
- Journal of Unconventional Oil and Gas Resources
- Journal of Zhejiang University – SCIENCE A
- Marine Georesources & Geotechnology
- Materials
- Materials and Design
- Materials and Structures
- Materials Research
- Natural Hazards
- Petroleum Science
- Renewable and Sustainable Energy
- Rock Mechanics and Rock Engineering
- Science and Engineering of Composite Materials
- Soils and Foundations
- Tectonophysics
- Underground Space
- Waste Management

Reviewer for Conferences

- Reviewer for more than 25 international conferences

Book Proposal Reviewer

- Reviewer for Elsevier on 2 book proposals

Reviewer on Tenure/Promotion Packages

- Tongji University
- University of Macau

Ph.D. Thesis Examiner

- Yonsei University, South Korea
- NTU, Singapore

ADVISING AND MENTORING

- 9 Ph.D. students (6 graduated and 3 in progress)
- 2 MS students (graduated)
- 1 ME student (in progress)
- 4 post docs (completed)
- 3 undergraduate research students (graduated)
- 15 visiting professors/scholars and Ph.D. students (11 completed and 4 in progress)

COURSES TAUGHT

- CE343 Geotechnical Engineering and Design
- CE440/540 Foundation Engineering
- CE441/541 Earth Structures in Geotechnical Engineering
- CE442/542 Ground Improvement
- CE445/545 Geoenvironmental Engineering