

Guoping (Gregg) Zhang, Ph.D., P.E., Associate Professor
 Dept. of Civil and Environmental Eng., Louisiana State University
 Baton Rouge, LA 70803
 225 578-6047 (phone); 225 578-4945 (fax); gzhang@lsu.edu

Research Interests

- Nano/micro mechanics of low-dimensional geomaterials (clays/shales, clay-exopolymer micro flocs, “marine snow”) for energy and marine ecosystem sustainability
- Bioinspired/bioengineered soil stabilization for coastal/wetland sustainability
- Novel geopolymers for infrastructure, environment, and energy sustainability
- Behavior of soft marine/wetland clays and residual soils

Education

M.I.T.	Geotechnical & Geoenvironmental Engineering Minor in Materials Science	Ph.D. 2002
Tsinghua University	Geotechnical Engineering	M.S. 1994
Tsinghua University	Hydraulic Engineering	B.Eng. 1991
Tsinghua University	Mechanical Engineering (Precision Instruments)	B.Eng. 1991

Professional Experience

2011 – present	Associate Professor	Louisiana State University (Baton Rouge, LA)
2005 – 2011	Assistant Professor	Louisiana State University
2004 Summer	Visiting Scholar	M.I.T. (Cambridge, MA)
2002 – 2005	Lecturer	University of Nottingham (UK)
1996 – 2002	Graduate Research Assistant	M.I.T. (Cambridge, MA)
1994 – 1996	Research Engineer	Chinese Academy of Building Research (China)
1991 – 1994	Graduate Research Assistant	Tsinghua University (China)

Honors and Awards

- Special Visiting Professor, Shanghai Jiao Tong University (China), 2012
- Overseas Collaborative Research Award, NSFC, 2012
- Chevron Innovative Research Support Award, LSU College of Eng., 2011
- Research Achievement Award, LSU Dept. of Civil & Environmental Eng., 2010
- Summer Faculty Research Fellowship, Office of Naval Research (ONR)/ASEE, 2010
- Faculty Achievement Award, LSU Dept. of Civil & Environmental Eng., 2008
- Donald W. Clayton Mentor Award, LSU College of Engineering, 2007
- Ralph E. Powe Junior Faculty Enhancement Award, Oak Ridge Associated Univ., 2006
- New Lecturer Award, University of Nottingham, 2002
- Fugro Fellowship, M.I.T., 1996
- Outstanding Contribution to Laboratories Award, Tsinghua University, 1994
- Excellent Graduate, Tsinghua University, 1991
- Fluid Mechanics Scholarship of Hong Kong Tsinghua Alumni Fund, Tsinghua Univ., 1990
- Shi Jiayang Scholarship, Tsinghua University, 1989

- Excellent Students Award, 1987-1990

Patents

1. Reed, A.H., Zhang, G., and Yin, H. Environmental cell for nano/micro mechanical testing of micro-sized materials submerged in liquid. Naval Research Lab application #101233 (pending approval).
2. Zhang, G., He, J., and Gambrell, R.P. Preparation and synthesis of a cementitious geopolymeric product using industrial wastes red mud and fly ash. LSU OIP File#: 1130 (pending approval).

Publications

Journal Articles

1. An underlined co-author is graduate advisee;
2. Corresponding author is marked by a "*" superscript;
3. 2011 Impact Factors: *J. of Materials Chemistry*, 5.97; *American Mineralogist*, 2.2; *Applied Clay Science*, 2.8; *J. of Materials Research*, 1.9; *Inter. J. of Sediment Research*, 1.7]

Submitted

1. Tan, X., Hu, L., Reed, A.H., Furukawa, Y., and Zhang, G.* (2012). Evaluation of the particle sizes of four pure clays. *Applied Clay Science* (submitted).
2. Zhang, G.*, Reed, A.H., Yin, H., Nugent, R.A., Tan, X., and Furukawa, Y. (2012). Role of clay-exopolymer interactions in controlling the strength of very soft clays. *Geotechnique Symposium in Print (SiP) on Bio- and Chemo-Mechanical Processes in Geotechnical Engineering* (full paper was invited, submitted).
3. Zhang, M., Guo, H., El-Korchi, T., Zhang, G., and Tao, M.* (2012). Evaluation of geopolymer as a soil stabilizer in pavement construction. *Construction and Building Materials* (submitted).
4. Zhang, M., El-Korchi, T., Zhang, G., and Tao, M.* (2012). Investigation of factors affecting mechanical properties of red mud-fly ash based geopolymers. *Journal of Transportation Research Board* (submitted).

Accepted or published

5. Chen, Q., Ozeren, Y., Zhang, G., Wren, D., Wu, W., Jadhav, R., Parker, K., and Pant, H. (2013). Laboratory and field investigations of marsh edge erosion. A book chapter in *Sediment Transport: Monitoring, Modeling and Management*, A. Khan and W. Wu (ed.), Nova Science Publishers (in press).
6. He, J., Jie, Y., Zhang, J., Yu, Y., and Zhang, G.* (2013). Synthesis and characterization of red mud and rice husk ash-based geopolymer composites. *Cement and Concrete Composites* (<http://dx.doi.org/10.1016/j.cemconcomp.2012.11.010>, available online).
7. Tan, X., Zhang, G.*, Reed, A.H., and Furukawa, Y. (2013). Flocculation and particle size analysis of expansive clay sediments affected by biological, chemical, and hydrodynamic factors. *Ocean Dynamics* (accepted).
8. Tan, X., Zhang, G.*, Yin, H., Reed, A.H., and Furukawa, Y. (2012). Influence of a neutral exopolymer on the flocculation and settling velocity of cohesive sediments. *International Journal of Sediment Research* **27** (4), 473-485.
9. Zhang, J., Hu, L., Pant, R., Yu, Y., Wei, Z., and Zhang, G.* (2012). Effects of interlayer

- interactions on the nanoindentation behavior and hardness of 2:1 phyllosilicates. *Applied Clay Science* (tentatively accepted).
10. He, J., Zhang, J., Yu, Y., and Zhang, G.* (2012). The strength and microstructure of two geopolymers derived from metakaolin and red mud-fly ash admixture: a comparative study. *Construction and Building Materials* **30**, 80-91.
 11. Yin, H. and Zhang, G.* (2011). Nanoindentation behavior of muscovite subjected to repeated loading. *Journal of Nanomechanics and Micromechanics*, 1 (2), 72-83.
 12. He, J., Zhang, G.*, Hou, S., and Cai, C.S. (2011). Geopolymer-based smart adhesives for infrastructure health monitoring: concept and feasibility. *ASCE Journal of Materials in Civil Engineering*, **23** (2), 100-109.
 13. Zhang, G.*, He, J., and Gambrell, R.P. (2010). Synthesis, characterization, and mechanical properties of red mud-based geopolymers. *Journal of Transportation Research Board*, **2167**, 1-9.
 14. Chen, H., Zhang, G., Wei, Z., Cooke, K.M., and Luo, J.* (2010). Layer-by-layer assembly of sol-gel oxide “glued” montmorillonite-zirconia multilayers. *Journal of Materials Chemistry*, **20**, 4925-4936.
 15. Luo, J.*, Chen, H., and Zhang, G. (2010). Layer-by-layer assembly of {nanoclay-(sol-gel oxide)}_n and {nanoclay-(oxide nanoparticle)}_n multilayers. *World Journal of Engineering*, **7** (s2), 526-527.
 16. Zhang, G.*, Wei, Z., Ferrell, R.E., Guggenheim, S., Cygan, R.T., and Luo, J. (2010). Evaluation of the elasticity normal to the basal plane of non-expandable 2:1 phyllosilicate minerals by nanoindentation. *American Mineralogist*, **95**, 863-869.
 17. Zhang, G.*, Wei, Z., and Ferrell, R.E. (2009). Reply to comment on “elastic modulus and hardness of muscovite and rectorite determined by nanoindentation”. *Applied Clay Science*, **46**, 429-432.
 18. Ye, Z.*, Hohamadian, H., Yin, H., Zhang, G., and Pang, S.-S. (2009). Advancing laboratory education in control engineering with practical implementation approaches. *WSEAS Transactions on Advances in Engineering Education*, **6** (2), 55-65.
 19. Zhang, G.*, Wei, Z., and Ferrell, R.E. (2009). Elastic modulus and hardness of muscovite and rectorite determined by nanoindentation. *Applied Clay Science*, **43**, 271-281.
 20. Nugent, R.A., Zhang, G.*, and Gambrell, R.P. (2009). Effect of exopolymers on the liquid limit of clays and its engineering implications. *Journal of Transportation Research Board*, **2101**, 34-43.
 21. Wei, Z., Zhang, G.*, Chen, H., Luo, J., Liu, R., and Guo, S. (2009). A simple method for evaluating elastic modulus of thin films by nanoindentation. *Journal of Materials Research*, **24**, 801-815.
 22. Chen, H., Zhang, G., Richardson, K., and Luo, J.* (2008). Synthesis of nanostructured nanoclay-zirconia multilayers: a feasibility study. *Journal of Nanomaterials 2008*, doi:10.1155/2008/749508.
 23. Hau, K.W., McDowell, G.R.*, Zhang, G. and Brown, S.F. (2005). The application of a three-surface kinematic hardening model to repeated loading of thinly surfaced pavements. *Granular Matter*, **7**, 145-156.
 24. Yu, H.*, Khong, C.D., Wang, J. and Zhang, G. (2005). Experimental evaluation and extension of a simple critical state model for sand. *Granular Matter*, **7**, 213-225.
 25. Zhang, G.*, Germaine, J.T. and Whittle, A.J. (2005). An evaluation of the mechanical and chemical dispersion methods for a tropical old alluvium. *ASTM Geotechnical Testing Journal*, **28** (2), 123-132.

26. Zhang, G.*, Germaine, J.T., Whittle, A.J. and Ladd, C.C. (2004). Index properties of a highly weathered old alluvium, *Géotechnique*, **54** (7), 441-451.
27. Zhang, G.*, Germaine, J.T., Whittle, A.J. and Ladd, C.C. (2004). Soil structure of a highly weathered old alluvium. *Géotechnique*, **54** (7), 453-466.
28. Zhang, G.*, Germaine, J.T., Martin, R.T., and Whittle, A.J. (2003). A simple sample mounting method for random powder X-ray diffraction. *Clays and Clay Minerals*, **51** (2), 219-226.
29. Zhang, G.*, Germaine, J.T., and Whittle, A.J. (2003). Effects of Fe-oxides cementation on the deformation characteristics of a highly weathered old alluvium in San Juan, PR. *Soils and Foundations*, **43** (4), 119-130.
30. Wang, H.*, Zhang, G. and Zhou, K. (1996). Effects of inherent and induced anisotropy on the strength and deformation characteristics of a compacted clay. *Chinese Journal of Geotechnical Engineering*, **18** (3), 1-10.

Peer Reviewed Conference Papers

1. Pant, R., Hu, L., and Zhang, G. (2013). Anisotropy of mica probed by nanoindentation. *Multiphysical Testing of Soils and Shales*. Springer Series in Geomechanics and Geoengineering, 2013, Part 4, 239-245.
2. Liu, Z., Liu, F., Bai, X., and Zhang, G. (2012). Particle characterization of collapsible loess in Xi'an, China. *Proceedings of the 4th International Conference on Problematic Soils*. 21-13 September 2012, Wuhan, China.
3. Pant, R., Wang, J., Hu, L., and Zhang, G. (2012). Nanoindentation characterization of a hybrid nano geomaterials. *Proceedings of the 20th International Conferences on Composites/Nano Engineering*, Beijing, July 2012.
4. Tan, X., Yin, H., Zhang, G., Reed, A.H., and Furukawa, Y. (2011). Influence of guar gum on the particle size and settling of cohesive sediments. *Proceedings of the River, Coastal, and Estuarine Morphodynamics (RCEM) Conference*, Beijing, China.
5. Zhang, J., Wei, Z., and Zhang, G. (2011). Nanoindentation behavior of naturally layered materials. *Proceedings of the 19th International Conferences on Composites and Nano Engineering*, Shanghai, China, July 24-31.
6. Yin, H. and Zhang, G. (2011). Cyclic nanoindentation shakedown of muscovite and its elastic modulus measurement. MEMS and Nanotechnology, Vol. 4, Conference *Proceedings of the Society for Experimental Mechanics Series, Volume 999999*, 83-92.
7. Nugent, R.A., Zhang, G., and Gambrell, R.P. (2011). The effect of exopolymers and void ratio on the erosional resistance of cohesive sediments. *Proceedings of the 2011 Geo-Frontiers Conference*, March 13-16, Texas (Geotechnical Special Publication).
8. Nugent, R.A., Zhang, G., and Gambrell, R.P. (2011). The effect of exopolymers on the compressibility of clays. *Proceedings of the 2011 Geo-Frontiers Conference*, March 13-16, Texas.
9. He, J. and Zhang, G. (2011). Geopolymerization of red mud and fly ash for civil structural applications. *Proceedings of the 2011 Geo-Frontiers Conference*, March 13-16, Texas.
10. He, J. and Zhang, G. (2011). Geopolymerization of red mud and rice husk ash and potentials of the resulting geopolymeric products for civil infrastructure applications. *35th International Conference on Advanced Ceramics & Composites*, Jan. 23-28, Daytona Beach, FL.

11. Luo, J., Chen, H., and Zhang, G. (2010). Layer-by-layer assembly of {nanoclay-(sol-gel-oxide)}_n and {nanoclay-(oxide nanoparticle)}_n multilayers. *Proceedings of the 18th International Conference on Composites/Nano Engineering (ICCE-18)*, Alaska, July 2010.
12. He, J. and Zhang, G. (2010). Geopolymerizaion of aluminum refinery waste and fly ash: an innovative means to convert industrial wastes to a resource. *Proceedings of the 2010 Global Waste Management Symposium*, Oct. 3-6, Texas.
13. Nugent, R.A., Zhang, G., and Gambrell, R.P. (2010). The effect of exopolymers on the erosional resistance of cohesive sediments. *Proceedings of the 5th International Conference on Scour and Erosion*, Nov. 7-10, San Francisco, CA (GSP No. 210).
14. Hang, Y. and Zhang, G. (2010). Soft clay erosion and its undrained shear strength measurements. *2010 Geo-Shanghai International Conference on Geotechnical Engineering*, June 4-10, China (GSP No. 205).
15. Hou, S., Cai, C.S., He, J., Zhang, G., and Ou, J. (2009). Seismic damage monitoring for steel structures using smart distributed fiber optics. *Smart Structures and Materials & Nondestructive Evaluation and Health Monitoring, SPIE - the International Society of Optical Engineering*, March 8-12, San Diego, CA.
16. Ye, Z., Mohamadian, H., Yin, H., Zhang, G., and Pang, S.-S. (2008). Practical implementations in advancing laboratory courses for control engineering education. *Proceedings of the 7th WSEAS International Conference on Education and Educational Technology (EDU'08)*, Venice, Italy, November 21-23.
17. Zhang, G., Whittle, A.J., Germaine, J.T., and Nikolinakou, M.A. (2006). Characterization and engineering properties of the old alluvium in Puerto Rico. *Characterisation and Engineering Properties of Natural Soils: Proceedings of the Second International Workshop on Characterization and Engineering Properties of Natural Soils*, Singapore, 29 November-1 December, Editors - T.S. Tan, K.K. Phoon, D.W. Hight, S. Leroueil, 2557-2590.
18. Zhang, G. (2007). Soil nanoparticles and their influences on engineering properties of soils. *Frontiers of Geotechnical Engineering*, 2317-2327.
19. Lim, B.L., Stace, R.L., and Zhang, G. (2006). Index properties of soils rich in Fe-oxides. In *Advances in Unsaturated Soil, Seepage, and Environmental Geotechnics*, GSP No. 148, N. Lu, L.R. Hoyos, and L. Reddi (eds.), 271-277.
20. Whittle, A.J. and Zhang, G. (2005). Site characteristics of a weathered old alluvium in San Juan, Puerto Rico. *Geomechanics: Testing, Modeling, and Simulation*, GSP No. 143, 617-626.
21. Zhang, G. (2005). Origin and implications of the unusual consolidation behavior of some natural deposits. *GEOPROB 2005, Proceedings of the International Conference on Problematic Soils*, Vol. 3, 1155-1166, Famagusta, May 25-27, North Cyprus.
22. Zhang, G., Germaine, J.T. and Whittle, A.J. (2005). Drying induced alteration to the microstructure of an unsaturated tropical soil. *Proceedings of the International Symposium on Advanced Experimental Unsaturated Soil Mechanics*, 443-449, June 27-29, Trento, Italy.
23. Zhang, G. (2003). Effects of drying on the index properties of a weathered deposit. *China-Japan Symposium on Geotechnical Engineering*, October 24-26, Beijing.
24. Zhang, G., Germaine, J.T. and Whittle, A.J. (2003). Site characteristics of a highly weathered old alluvium in San Juan, Puerto Rico. *Proceedings of Soil and Rock America 2003*, 1, 783-788, June 23-26, Boston, USA, Verlag Glöckauf GMBH, Essen.

25. Zhang, G., Wang, H., and Zhou, K. (1994). Development of a new torsional shear hollow cylinder with unequal inner and outer cell pressures. *Proceedings of the 7th Chinese Conference on Soil Mechanics and Geotechnical Engineering*, **1**, 1-8.

Conference Posters and Presentations

- Tan, X., Zhang, G., Reed, A.H., and Furukawa, Y. (2012). Particle size and structural arrangement of suspended cohesive sediments. AGU Fall Meeting, San Francisco, Dec. 3-7. [poster]
- Reed, A.H., Zhang, G., Yin, H., Tan, X., Furukawa, Y., and Bateman, S. (2012). Measuring relevant properties of cohesive sediment flocs for sediment transport modeling. AGU Fall Meeting, San Francisco, Dec. 3-7. [poster]
- Pant, R. and Zhang, G. (2012). Elastic and plastic anisotropy of muscovite probed by nanoindentation. 2012 Annual Meeting of the Clay Minerals Society, Golden, July 2012. [presentation]
- Chatagnier, J., Zhang, G., and Chen, Q.J. (2012). The biomechanical properties of salt marsh vegetation related to wave and storm surge attenuation. The 9th INTECOL – International Wetlands Conference, Orlando, June 3-8. [poster]
- Yin, H., Reed, A.H., Furukawa, Y., Hu, L., and Zhang, G. (2012). Nanomechanical characterization of tenuous clay flocs. 2012 Nano Measure Conference, June 19-20, Palo Alto. [poster]
- Parker, K., Chen, Q.J., Jadhav, R., Bouanchaud, J., Chatagnier, J., and Zhang, G. (2012). Field monitoring of storm impacts on marsh edge stability in South Louisiana. AGU Ocean Science Meeting, Salt Lake City, Utah, Feb. 2012 [poster]
- Yin, H., Reed, A.H., Tan, X., Furukawa, Y., and Zhang, G. (2012). Strength of cohesive sediment-biopolymer flocs under compressional loading. AGU Ocean Science Meeting, Salt Lake City, Utah, Feb. 2012 [poster]
- Reed, A.H., Yin, H., Tan, X., Furukawa, Y., and Zhang, G. (2012). Cohesive sediment particle size transformation by biopolymers in water of varied ionic strength and velocity. AGU Ocean Science Meeting, Salt Lake City, Utah, Feb. 2012 [poster]
- Zhang, G., Yin, H., Pant, R., and Wei, Z. (2011). Nano-elasticity of clay minerals and its geomechanical implications. *ASCE Engineering Mechanics Institute Conference*, June 2-4, Boston. [presentation]
- Yin, H., Tan, X., Reed, A.H., Furukawa, Y., and Zhang, G. (2010). Influence of compositional variations on floc size and strength. *2010 AGU Fall Meeting*, Dec. 12-17, San Francisco. [poster]
- Yin, H. and Zhang, G. (2011). Development of a field vane to characterize the shear strength of wetland surface sediment. NOAA Workshop on Response of Louisiana Marsh Soils and Vegetation to Diversions. February 23-24. [poster]
- Reed, A.H., Zhang, G., Yin, H., Furukawa, Y., and Tan, X. (2010). Flocculation of clay and organic matter in turbid salt water. *2010 AGU Fall Meeting*, Dec. 12-17, San Francisco. [poster]
- Chatagnier, J., Zhang, G., Chen, Q.J., and Pardue, J. (2010). Biomechanics of salt marshes applied to wave and surge attenuation. *2010 State of the Coast Conference*, June 4-7, Baton Rouge. [poster]

- Cai, C.S., Zhang, G., He, J., and Hou, S. (2010). Smart distributed fiber optic sensors for damage monitoring of steel structures. The 2010 ASCE-Engineering Mechanics Institute Conference, August 8-11, Los Angeles, CA [presentation].
- Land, L., Gambrell, R.P., and Zhang, G. (2009). Experimental design to test the impact of natural polymers on aggregation and microbial activity in three coastal Louisiana sediments. *Coastal Restoration and Enhancement Through Science and Technology (CREST) annual meeting*. [presentation]
- Land, L., Gambrell, R.P., and Zhang, G. (2009). The impact of polymers on effective aggregation and microbial activity in coastal Louisiana wetland sediments. *Coastal and Estuarine Research Federation 20th Biennial Conference*. [poster]
- Zhang, G., Wei, Z., Chen, H., and Luo, J. (2010). Nanoindentation behavior of {nanoclay-(sol-gel oxide)}_n multilayers and its implications for synthesis and design. The 2nd International Conference on Nanomechanics and Nanocomposites, Beijing, China. October 10-13. [poster]
- He, J. and Zhang, G. (2010). Geopolymerization of red mud and its influence on strength development. *The 34th International Conference and Exposition on Advanced Ceramics and Composites (ICACC)*, Jan., Daytona Beach, FL. [presentation]
- Chen, H., Luo, J., and Zhang, G. (2009). A new class of nanoclay-based inorganic multilayers. *Materials Science and Technology Conference*, Oct., Pittsburg, PA. [presentation]
- He, J., Zhang, G., Hou, S., and Cai, C.S. (2009). Geopolymer-based smart adhesives for structural health monitoring: a feasibility study. *The 33rd International Conference and Exposition on Advanced Ceramics and Composites (ICACC)*, Jan. 18-23, Daytona Beach, FL. [presentation]
- Wei, Z., Zhang, G., and Ferrell, R.E. (2009). Nanoindentation testing of layered silicates. *AIPEA Conference*, May, Italy. [presentation]
- Wei, Z., Zhang, G., Ferrell, R.E., and Guggenheim, S. (2009). Elastic moduli and nanohardness of talc and phrophyllite. *2009 CMS Annual Conference*, June, Billings, MT. [poster]
- Wei, Z., Wang, X., Zhang, G., Chen, H., and Luo, J. (2008). Nanoindentation behavior of nanoclay-zirconia multilayers and its implications for synthesis and design. *Materials Science and Technology Conference*, Oct., Pittsburg, PA. [presentation]
- Chen, H., Luo, J., Wang, X., and Zhang, G. (2008). Nanoclay-zirconia multilayers: processing optimization and layer-by-layer deposition mechanisms. *Materials Science and Technology Conference*, Oct., Pittsburg, PA. [presentation]
- Wei, Z. and Zhang, G. (2008). Nanoindentation behavior nanostructured layered minerals. *The 1st American Academy of Mechanics Conference*, April, New Orleans. [presentation]
- Liu, R., Wei, Z., Guo, S., and Zhang, G. (2008). Splat Formation and Hardness Study of Atmospheric Plasma Sprayed Alumina. *The 1st American Academy of Mechanics Conference*, April, New Orleans. [presentation]
- Wei, Z., Zhang, G., and Ferrell, R.E. (2008). Nanoindentation behavior and related mechanical properties of clay minerals. *The Clay Minerals Society Annual Conference*, April, New Orleans. [poster]
- Culligan, J. P. and Zhang, G. (1998). *Geotechnical Centrifuge Modeling of Horizontal Hydraulic Flushing for LNAPLs Contaminated Sands*. Final report submitted to NSF.

- Whittle, A. J., Germaine, J. T., and Zhang, G. (2002). *Prediction of Ground Deformations Caused by Underground Construction of the Tren Urbano in Rio Piedras*. Final report submitted to Puerto Rico Department of Transportation.
- Zhang, G., Germaine, J. T. and Whittle, A. J. (2003). Effects of Fe-oxides cementation on the deformation characteristics of a highly weathered old alluvium. *The 3rd International Symposium on the Deformation Characteristics of Geomaterials*, Sept. 22-24, IS-Lyon 03. [presentation]
- Zhang, G. and Culligan, P.J. (2000). Geotechnical centrifuge modelling of hydraulic flushing for LNAPLs contaminated sands. *MIT CEE New Millennium Conference*, January 2000, Cambridge, MA. [poster]
- Zhang, G. and Germaine, J. T. (2000). A transported residual soil in San Juan, Puerto Rico. *MIT CEE New Millennium Conference*, January, Cambridge, MA. [poster]
- Zhang, G., Germaine, J. T., and Whittle, A. J. (2001). Soil mineralogy and structure of an alluvial residual soil in San Juan, *Soil Behavior and Soft Ground Construction – The Ladd Symposium*, October, Cambridge, MA. [poster]
- Whittle, A. J., Germaine, J. T., Zhang, G., Hsieh, Y.-M. (2001). Prediction of ground movement caused by underground construction. *Soil Behavior and Soft Ground Construction – The Ladd Symposium*, October, Cambridge, MA. [poster]

Research Grants (selected)

Total funding: ~\$3,927,700 (funds to LSU only, excluding LSU matches)

Federal funding: ~\$1,929,600
 State funding: ~\$1,600,400
 Private funding: ~\$397,700

Research Track #1: Nanomechanics of low-dimensional geomaterials

- PI: The physics and mechanics of cohesive sediment flocs in littoral environments, \$190,364, *Office of Naval Research* (pending).
- PI: Nanomechanical characterization of clay-biopolymer aggregates and their interactions, \$285,000, *Office of Naval Research*, 4/2010 – 5/2013.
- PI: The nanomechanical properties of clay particles under bending, \$10,000, *Oak Ridge Associated Universities (ORAU)*, 7/2006 – 6/2007.
- PI: Elastic modulus and hardness of individual clay particles, \$10,000, *NSF EPSCoR*, 7/2006 – 6/2007.
- PI: A nano universal testing system for integrated enhancement of multidisciplinary research and education on nanomechanics, geosciences, and biomaterials, \$148,211 + \$20,000 match, *Louisiana Board of Regents*, 6/2010 – 5/2011.
- PI: Nanoscale clay-polymer interactions and novel applications, \$100,000, *Louisiana Board of Regents*, 8/2007 – 5/2011.
 Collaborators: Ferrell, Gambrell, LSU

Research Track #2: Wetland cohesive soil erosion and biostabilization

- Co-PI: A multidisciplinary analysis of linkage among wetland vegetation, rhizosphere microbial communities and soil stability in response to oiling. \$800,000, 1/2012 – 12/2013, BP Gulf Research Initiative.
Collaborators: King (PI), Hester
- Co-PI: Investigation of wave, surge, and erosion reduction by vegetation, total \$1,500,000, LSU portion \$471,091, *US Dept. of Homeland Security*, 1/2009 – 8/2012.
Collaborators: Wu (PI) and Holland, Univ. of Mississippi; Wren, USDA National Sediment Lab; and Chen, LSU
- Co-PI: An integrated computational and experimental study of driven pile setup in soft clays. \$307,781 + \$300,000 (industrial match), La Board of Regents, 6/2012 – 6/2015
- PI: Enhancing the erosion resistance of coastal sediments using biodegradable polymers, \$102,609, *Louisiana Board of Regents*, 6/2007 – 5/2010.
- PI: Bioengineered and bioinspired coastal sediment stabilization for coastal restoration, \$100,000, *Louisiana Board of Regents*, 8/2009 - 5/2013.
- Co-PI: A physical, chemical, and biological evaluation of the application of biopolymers to restoring coastal wetlands, \$114,954, *National Oceanic and Atmospheric Administration (NOAA)*, 7/2007 – 6/2010.
Collaborator: Gambrell (PI), LSU
- PI: Developing an in-situ characterization technique to assess erosion of cohesive sediments, \$30,000, *Louisiana Dept. of Transportation and Development (La DOTD)*, 11/2007 -10/2008.
- PI: Evaluation of design methods to determine scour depth for bridge structures, \$200,004, *La DOTD*, 4/2009 – 9/2011.
Collaborators: Hsu & Guo, LSU

Research Track #3: Geopolymers for sustainability

- PI: Collaborative Research: An integrated experimental and computational multiscale study of geopolymers for the next generation soil improvement. \$171,723, *NSF*, 6/13 – 5/16.
Collaborator: Tao, Worcester Polytechnic Institute, \$164,585.
- PI: Geopolymeric fusion of energy wastes for infrastructure, environment, and energy sustainability, \$30,000, Chevron Corp. (Seed Fund).
- PI: Development of geopolymer-based smart bonding materials for distributed optic fiber sensor applications to infrastructure, \$250,000 + industrial match \$45,000, *La Board of Regents*, 6/2009 – 6/2013.
Collaborator: Cai, LSU
- PI: Geopolymeric fusion of industrial wastes for energy conservation and environmental sustainability, \$100,000, *La Board of Regents*, 8/2011 – 5/2015.

Students Supervised

[All students were or are supported by research assistantships (including \$36k from startup fund. No TA support was received)]

Current Students

1. Rohit Pant, Ph.D. candidate
Dissertation: *The nanomechanical genes of clay minerals probed by nanoindentation.*
2. Hang Yin, Ph.D. candidate
Dissertation: *Nanomechanics of clay-exopolymer micro flocs and their interactions.*
3. Xiaoling Tan, Ph.D. candidate
Dissertation: *Microstructure and physics-based models of clay-exopolymer micro flocs.*
4. Zhen Liu, Ph.D. student
Dissertation: *Synthesis and characterization of ternary clay-lime-saccharide mixtures as the next generation green binder for infrastructure sustainability.*
5. Fenghong Fan, Ph.D. student (co-supervised with Dr. Cai)
Dissertation: *Waste-derived geopolymers for structural applications.*
6. James Bouanchaud, M.S. student
Thesis: *Field investigation of saltmarsh vegetation tensile strength and its effect on marsh erosion.*
7. Hem Pant, M.S. student
Thesis: *Effect of exopolymers and oil spill on marsh soil erosion.*
8. Francisco Grau, M.S. student

Past Students

1. Zhongxin Wei, Ph.D., Fall 2009
Dissertation: *Nanoindentation behavior of clay minerals and clay-based nanostructured multilayers.*
2. Rick A. Nugent, Ph.D., Fall 2010
Dissertation: *The effect of exopolymers on the compressibility and shear strength of kaolinite.*
3. Jian He, Ph.D., Summer 2012
Dissertation: *Synthesis, characterization, and engineering properties of geopolymers derived from metakaolin and industrial wastes.*
4. Hang Yin, M.S., Fall 2010
Thesis: *Nanomechanics of muscovite subjected to repeated indentation loading and the pertinent indentation size effect.*

5. Xiaonan Wang, M.S., Summer 2009
Thesis: *Preparation of dispersed individual clay nanoplatelets and clay-based inorganic multilayers on substrate for AFM nano-characterization.*
6. Xiaoyan Zhao, M.S., Fall 2011
Thesis: *Application of satellite remote sensing imagery to bridge scour evaluation.*
7. Rebecca Cavataio, M.S., Fall 2011
Thesis: *Evaluation of gypsum wastes for pavement construction.*
8. James Chatagnier, M.S., Spring 2012 (co-supervised with Dr. Q. J. Chen)
Thesis: *The biomechanics of coastal marsh vegetation related to wave and storm surge attenuation.*
9. Jacques Boudreaux, M.S., Summer 2012 (Co-supervised with Dr. J. Pardue)
Thesis: *Effects of vegetation roots on the geotechnical properties of wetland sediments.*
10. Ling Zhang, M.S., Fall 2012 (Co-supervised with Dr. F. Wang)
Thesis: *Application of GIS and NASA remote sensing data to bridge scour.*
11. Steve K.W. Hau, Ph.D., Fall 2004 (Co-supervised, University of Nottingham)
12. Sam J. Wang, Ph.D., Spring 2005 (Co-supervised, University of Nottingham)

Postdoctoral Associates

1. Dr. Jie Gu, 3/12 - present

Visiting Researchers/Professors

1. Fengyin Liu, Professor, Xi'an University of Technology (China), 6/11 – 12/11
2. Yonglai Zheng, Professor, Tongji University (China), 9/11 – 11/11
3. Zhenyu Lei, Associate Professor, Tongji University (China), 7/12 – 6/13

Other Students (paid)

Undergraduates: Rick Nugent, Yeimi Soler, Jenen Barillas, Jacques Boudeaux, James Chatagnier, Simone Guidry

High school students: Justin Yan, Stacy Yang

Courses Taught

[The teaching load is three courses per academic year; No teaching load reduction was received at initial appointment; No teaching assistants were provided for these courses; I taught 7 different courses during my initial four years; Since the 5th year, I have been the seminar coordinator and instructor (my role was the coordination with external and internal speakers, scheduling, making

announcements, and making travel arrangements) of a 1-credit graduate seminar course CE 7750, which is not counted toward the regular teaching load]

Graduate Level

- CE 7300 Advanced Geotechnical Engineering I (substantially revised, 5 semesters)
- CE 7335 Soil Improvement and Stabilization (newly developed, 2 semesters)
- CE 7315 Principles of Soil Behavior (newly developed, 4 semesters)
- CE 7701 Nanomechanical Testing of Clays (newly developed, 1 semester)
- CE 7750 CEE graduate seminar

Undergraduate Level

- CE 3300 Geotechnical Engineering I (substantially revised, 6 semesters)
- CE 3350 Geotechnical Engineering Lab (2 semesters, each semester has two 3-hour sessions per week)
- CE 4300 Geotechnical Engineering II [Shallow Foundations] (substantially revised, 4 semesters)

Other Professional Activities and Services

1. Memberships

- Clay Minerals Society (CMS)
- American Society of Civil Engineers (ASCE)
- American Society for Testing and Materials (ASTM)
- American Ceramics Society (ACerS)
- American Geophysical Union (AGU)
- TRB AFP 40, Physicochemical and Biological Processes in Soils
- ASCE Geo-Institute Technical Committee on Geotechnics of Soil Erosion
- USUCGER Lab Facilities Committee

2. LSU and community services

- Faculty Advisor, LSU Chinese Students and Scholars Association, 2007-2008
- Faculty Search Committee, 2007, 2010, 2011, 2012
- Graduate Seminar Coordinator, 2010 – 2012
- Lab Safety Committee, 2005 – present
- College Policy Committee, 2010 – 2012

- Judge, Louisiana Junior Science and Humanity Symposium, sponsored by DoD, 2010, 2011, 2012
- Dean's Representatives in multiple Ph.D. dissertation committees
- CE Undergraduate Curriculum Committee, 2011 - present
- CE Graduate Program Committee, 2011 - present
- Advisory Panel, Horizon-SERT for Louisiana Office of Coastal Protection and Restoration rapid projects (for 2010 Deepwater Horizons oil spill)
- Advisory Panel, NOAA Workshop for River Diversions
- External Examiner for PhD Defense, Nanyang Technological University, Singapore

3. Reviewer for proposals

- National Science Foundation (CMMI, Geosciences)
- NOAA (Sea Grant)
- Exact Sciences & Engineering 2012, FCT-Portugal
- Maryland Industrial Partnerships (MIPS)
- Department of Energy SBIR/STTR
- Engineering and Physical Sciences Research Council (EPSRC, UK)

4. Reviewer for journals:

Geotechnical Testing Journal (ASTM)
 Journal of Geotechnical and Geoenvironmental Engineering (ASCE)
 Canadian Geotechnical Journal (CGS)
 Geotechnical Engineering (ICE)
 Geotechnique (BGS)
 Soils and Foundations (JGS)
 Journal of Materials Research (MRS)
 Journal of Materials in Civil Engineering (ASCE)
 Water Science and Technology (IWA)
 Journal of Transportation Research Board (TRB)
 Applied Surface Science
 Applied Clay Science
 Journal of Engineering Mechanics (ASCE)
 Surface and Coatings Technology
 Journal of Waterways, Port, Coastal and Ocean Engineering (ASCE)
 Clays and Clay Minerals (CMS)
 Journal of Hydraulic Engineering (ASCE)
 Construction and Building Materials
 Transportation Research Records
 Journal of Plastic Films and Sheeting
 International Journal for Numerical and Analytical Methods in Geomechanics
 Soil and Sediment Contamination

Minerals
ASCE Journal of Aerospace Engineering
Water Science and Technology: Water Supply
Materials Research
Materials and Structures
International Journal of Molecular Sciences

5. Involvement in conferences

- Reviewer for many papers in Geo-Congress, Geo-Risk, Geo-Shanghai, TRB, and Materials (geopolymer) conferences
- 3 occasions as session co-chairs in Geo-Congress conferences
- Conference Technical Committee member
2012 4th International Conference on Problematic Soils
2014 Geo-Shanghai Conference: International Conference on Geotechnical Engineering

6. Invited seminars and presentations

- Tsinghua University (China), 2012
- Shanghai Jiao Tong University (China), 2012
- Imperial College, London, 2003
- University of Wisconsin Madison, 2004
- University of California Davis, 2004
- North Carolina State University, 2005
- University of Illinois at Chicago, 2009
- Pennsylvania State University, 2011
- University of Massachusetts Amherst, 2012