

# Amy L. Rechenmacher

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## EDUCATION

- Ph.D.**, Civil Engineering, **Northwestern University**, Evanston, IL, 2000
- M.S.**, Civil Engineering, **Cornell University**, Ithaca, NY, 1994
- B.S. with distinction**, Civil Engineering, **Iowa State University**, Ames, IA, 1991

## PROFESSIONAL EXPERIENCE

- Associate Professor of Engineering Practice, University of Southern California, 2013-present
- Assistant Professor, University of Southern California, 2005-2013
- Assistant Professor, Johns Hopkins University, 2000-2004
- Faculty Intern, Northwestern University, 1999
- Staff Engineer, Woodward Clyde Consultants, Santa Ana, CA, 1995-1996
- Geotechnical Engineer, Nicholson Construction Company, Bridgeville, PA, 1993-1995
- Summer Intern, Turner Construction Company, Chicago, IL, 1988, 1989

## PROFESSIONAL SOCIETY MEMBERSHIPS

- American Society of Engineering Education (ASEE)
- American Society of Civil Engineers (ASCE), Member
- United States Universities Council on Geotechnical Education and Research (USUCGER)

**PROFESSIONAL REGISTRATION:** Civil Engineer, CA, License No. C 85799

## COURSES TAUGHT

**Undergraduate:** Engineering Freshman Academy (ENGR 102), Introduction to Civil Engineering (CE 106), Statics (CE 205), Dynamics (CE 235), Geotechnical Engineering (CE 467L), Subsurface Foundation Design (CE 482)

**Graduate:** Geotechnical Earthquake Engineering (CE 533), Design of Earth Structures (CE 534)

## TRAINING WORKSHOPS

- USC Center for Excellence in Teaching (CET) Faculty Fellow Leadership Institute (**2018-2019**)
- ASEE National Effective Teaching Institute (NETI) NETI-2 Workshop, Salt Lake City, June 2018
- ASEE National Effective Teaching Institute (NETI) NETI-1 Workshop, New Orleans, June 2016

## SERVICE ACTIVITIES

### Professional Service

- Conference Organization:
  - Organizing Committee (**2021-present**), *ASCE Geo-Congress 2023*, Los Angeles, CA. Review abstracts, coordinate paper reviews, plan session chair for the annual conference.
  - Co-chair, *ASCE Engineering Mechanics Institute (EMI) 2010 Annual Conference*, USC.
  - Session/mini-symposium co-chair or co-organizer:
    - “Granular Materials: Interconnecting Engineering and Physics Perspectives,” 2008 Engineering Mechanics Institute Conference, Minneapolis, MN, May 18-21, 2008

- “Particle-scale processes in granular systems: experiments and model validation,” *2005 Joint ASME/ASCE/SES Conference on Mechanics and Materials*, Baton Rouge, LA, Jun 1-3, 2005
- “Advances in Laboratory Methods for Soil Property Characterization,” *Geo-Frontiers, ASCE Geo-Institute 2005 Congress*, Austin, TX, Jan 24-26, 2005
- “Uncertainty and Reliability in Geomechanics,” *ASCE-EMD/SEI/GI/AD Specialty Conference on Probabilistic Mechanics and Structural Reliability*, Albuquerque, NM, Jul 26-29, 2004
- "Optical Diagnostics for Soils and Structures" *15<sup>th</sup> Engineering Mechanics Conference*, ASCE/EMD, Columbia University, New York, NY, Jun 5, 2002
- Reviewer:
  - Reviewer of the “*ASCE ExCEED Teaching Workshop (ETW)*”, Summer **2021**: Attended as observer the 2-week, summer 2021 ETW; co-wrote a 14-page assessment and review of the ETW; and orally presented the findings and recommendations to the ASCE Committee on Faculty Development (CFD)
  - Open Review Session, *National Academies Committee on Geological and Geotechnical Engineering (COGEE) Report, “State of the Art and Practice in the Assessment of Earthquake-Induced Soil Liquefaction and its Consequences,”* Costa Mesa, CA, February 2017: Attended a presentation of and provided feedback for a new state-of-the-art methodology
  - *Books*:
    - “Craig’s Soil Mechanics, 9<sup>th</sup> ed.”, Spon Press (2016)
    - “Rapid Penetration into Granular Media: Visualizing the Fundamental Physics of Rapid Earth Penetration”, Elsevier (2013)
  - *Journal Papers* (ongoing): *Acta Geotechnica*; *Granular Matter*; *J. of the Mech. & Physics of Solids*; *International J. of Solids & Struct.*; *Geotechnical Testing J.*; *J. of Geotechnical & Geoenvironmental Eng.*; *J. of Eng. Mech.*; *J. of Computing in Civil Eng.*; *J. of Materials in Civil Eng.*; *Int. J. Numer. Anal. Meth. Geomech.*; *Pure & Applied Geophysics*; *Canadian Geotechnical J.*
  - *NSF Proposal Review Panels*: CAREER (2015, 2018); CMMI-Geomechanics (2002, 2012, 2013, 2017, **2019**); NEES (2010)
  - *Grant Proposals Reviews* (ongoing): NSF, US DoE, US ARO
- Judge, *GeoWall Competition, 2013 ASCE Pacific Southwest Conference*, USC
- Editorial Board Member, *ASTM Geotechnical Testing Journal*, 2008-2013
- Study author, *National Research Council Decadal Study on Life and Physical Sciences Space Research*, Applied Physical Sciences Panel Member, 2009-2011
- Committee Chair, *Experimental Analysis and Instrumentation Committee*, ASCE Engineering Mechanics Division (Vice-Chair 2004-2006; Chair, 2007-2008)

### University Service

- Viterbi Advanced Teaching Institute (VATI): Conduct seminars and offer consultations to promote enhanced teaching in the VSoE (founding member), **2020-present**
- USC Academic Senate: Alternate (**2020**), Voting Member (**2021-2022**)
- APT/EFC Merit Review Subcommittee (Spring **2020**)
- Engineering Faculty Council (EFC), 2009-11, **2019-present** (2021 ex-officio)
- EFC Instruction Committee (**2019-present**)
- Search Committee, Science & Engineering Librarian Position #347, Fall 2018
- VSoE Baum Maker Space Project Committee (Fall 2018-Fall **2020**)
- ASCE USC Student Chapter, Faculty Advisor (**2017-present**)
- ASCE USC Student Chapter “GeoWall” team, Faculty Advisor (~**2014-present**)
- Engaged Learning Initiative, Viterbi School of Engineering, early adopter, 2013-2014
- Faculty panel member, USC Viterbi School of Engineering “Spotlight” Series Program, 2009
- Undergraduate Presidential and Trustee Scholarship candidates interviewer, 2008, 2010-13
- Faculty speaker, “Explore USC”, 2007, 2010, 2012
- USC Women in Science and Engineering (WiSE) Committee, 2005-2008

### Departmental Service:

- ASCE Student Chapter, Faculty Advisor (~2016-present)
- Committee for CEE appointment (2021-present)
- Curriculum reform committee (2016-2020)
- ABET committee (2017-2020)
- AFR/Merit Review Committee (2005-06, 2007-08, 2016-17, 2021-22); Part-time lecturers (2019)
- Ph.D. applicant review committee, 2006-12

### Other Service

- High school student summer research mentor:
  - Institute for Educational Advancement (IEA), Summer Apprenticeship Program, 2011
  - The Ingenuity Project, Baltimore Polytechnic High School, 2003
- JHU Center for Talented Youth, Academic Panel Member, Annual College Colloquium, 2001-04

### REFEREED JOURNAL PUBLICATIONS

Lakeland, D.L., **Rechenmacher, A.L.**, and Ghanem, R.G. (2014), "Towards a Complete Model of Soil Liquefaction: The Importance of Fluid Flow and Grain Movement," *Proceedings of the Royal Society A*, 470, 20130453.

Walker, D.M., Tordesillas, A., and **Rechenmacher, A.L.** (2013), "Transmission of kinematic information in granular systems: local and nonlocal network sensing," *Acta Geotechnica*, 8(5), 547-560.

Borja, R.I., Song, X., **Rechenmacher, A.L.**, Abedi, S., and Wu, W. (2013), "Shear band in sand with spatially varying density," *Journal of the Mechanics and Physics of Solids*, 61 (1), 219-234.

Walker, D.M., Tordesillas, A., Pucilowski, S., Lin, Q., **Rechenmacher, A.L.**, Abedi, S. (2012), "Analysis of grain-scale measurements of sand using kinematical complex networks," *International Journal of Bifurcation and Chaos*, 22 (12), DOI: 10.1142/S021812741230042X.

Abedi, S., **Rechenmacher, A.L.**, and Orlando, A.D. (2012), "Vortex formation and dissolution in sheared sands," *Granular Matter*, 14 (6), 695-705, DOI: 10.1007/s10035-012-0369-5.

Chupin, O., **Rechenmacher, A.L.**, Abedi, S. (2012), "Finite Strain Analysis of Non-Uniform Deformations in Shear Bands in Sand," *International Journal of Numerical and Analytical Methods in Geomechanics*, 36 (14), 1651-1666 (published online 18 Jul 2011, DOI: 10.1002/nag.1071).

**Rechenmacher, A.L.**, Abedi, S., Chupin, O., and Orlando, A.D. (2011), "Characterization of Mesoscale Instabilities in Localized Granular Shear using Digital Image Correlation," *Acta Geotechnica*, 6, 205-217.

**Rechenmacher, A.**, Abedi, S., Chupin, O. (2010) "Evolution of Force Chains in Shear Bands in Sand," *Geotechnique*, 60 (5), 343-351.

Medina-Cetina, Z. and **Rechenmacher, A.L.** (2010), "Influence of Boundary Conditions, Specimen Geometry and Material Heterogeneity on Model Calibration from Triaxial Tests," *International Journal of Numerical and Analytical Methods in Geomechanics*, 34 (6), 627-643.

**Rechenmacher, A.L.** and Medina-Cetina, Z. (2007), "Calibration of Soil Constitutive Models with Heterogeneous Parameters," *Journal of Geotechnical and Geoenvironmental Engineering*, 133 (12) 1567-1576.

**Rechenmacher, A.L.** (2006), "Grain-scale processes governing shear band initiation and evolution in sands," *Journal of the Mechanics and Physics of Solids*, 54, 22-45.

**Rechenmacher, A.L.** and Finno, R.J. (2004), "Digital Image Correlation to Evaluate Shear Banding in Dilative Sands," *Geotechnical Testing Journal*, 27 (1), 13-22.

Finno, R.J. and **Rechenmacher, A.L.** (2003), "Effects of Consolidation History on Critical State of Sand," *Journal of Geotechnical and Geoenvironmental Engineering*, 129 (4), 350-360.

## CONFERENCE PAPERS

### Refereed Conference Proceedings

Rechenmacher, A.L. (**2020**), "Emphasizing Underlying Science in Geotechnical Education through Flipped Classroom," *Proceedings, ASCE Geo-Congress 2020*, Minneapolis, MN, Feb. 25-28 (full paper and podium presentation).

Rechenmacher, A.L. and Abedi, S. (2011), "Length scales for nonaffine deformation in localized, granular shear," *Advances in Bifurcation and Degradation in Geomaterials: Proc 9<sup>th</sup> Intl Wkshp Bifurcation and Degradation Geomat*, S. Bonelli, C. Descalu, F. Nicot, eds., Porquerolles, Provence, France, May 23-26, 2011, p. 59-65.

Tordesillas, A., Walker, D.M., Rechenmacher, A., Abedi, S. (2011), "Discovering community structures and dynamical networks from grain-scale kinematics of shear bands in sand," *Advances in Bifurcation and Degradation in Geomaterials: Proc 9<sup>th</sup> Intl Wkshp Bifurcation and Degradation Geomat*, S. Bonelli, C. Descalu, F. Nicot, eds., Porquerolles, Provence, France, May 23-26, 2011, p. 67-73.

Rechenmacher, A.L., Abedi, S., Faoro, I. (2011), "Experimental Evidence of Structural Development Inside Shear Bands in Sands," *Multiscale and Multiphysics Processes in Geomechanics, Proceedings of the International Workshop on Multiscale and Multiphysics Processes in Geomechanics*, R.I. Borja, E.M. Dunham, E. Kuhl and J.A. White, eds, Stanford, CA, Jun 23-25, 2010.

Rechenmacher, A.L., Abedi, S., Chupin, O. (2009), "Force Chain Lifetimes in Shear Bands in Sands," *Powders and Grains 2009, 6th International Conference on the Micromechanics of Granular Media*, M. Nakagawa and S. Luding eds, Golden, CO, Jul 13-17, pp. 267-270.

Rechenmacher, A.L., and Abedi, S. (2008), "Imaging-based evaluation of material heterogeneity and its impact on strain localization," *Deformational Characteristics of Geomaterials, Proc. Fourth Int'l Symp. Deformation Char. Geomat.*, S.E. Burns, P.W. Mayne, J.C. Santamarina, eds, Atlanta, GA, Sep 22-24, Vol. 1, p. 383-388.

Rechenmacher, A.L. (2006), "Grain Scale Processes Associated with Shear Banding in Sands," *Geomechanics II: Testing, Modeling and Simulation, Proc 2<sup>nd</sup> Japan-US Wkshp on Testing, Modeling and Simulation in Geomechanics*, P. Lade and T. Nakai, eds., Kyoto, Japan, Sep 8-10, 2005, ASCE Geotechnical Special Pub No. 156.

Rechenmacher, A.L., Z. Medina-Cetina, and R. Ghanem (2005), "Calibration of Heterogeneous, Probabilistic Soil Models," *Geotechnology in Harmony with the Global Environment, Proc. 16<sup>th</sup> Int'l Conf. Soil Mech. Geotech. Eng.*, Osaka, Japan, Sep 12-15, Vol. 1-5, pp. 851-854.

Rechenmacher, A.L. (2005), "Imaging Based Experimental Soil Mechanics," *Geomechanics: Testing, Modeling and Simulation, Proc. 1<sup>st</sup> Japan-US Wkshp on Testing, Modeling and Simulation in Geomechanics*, J. Yamamuro, J. Koseki, eds, Boston, MA, Jun 27-29, 2003, ASCE Geotechnical Special Pub. No. 143.

Rechenmacher, A.L. and R.J. Finno (2003), "Shear Band Displacements and Void Ratio Evolution to Critical State in Dilative Sands," *Bifurcations and Instabilities in Geomechanics, Proc. Int'l Workshop on*

*Bifurcations and Instabilities in Geomechanics, IWBI 2002*, J. Labuz and A. Drescher, eds, Collegeville, MN, Jun 2-5, 2002, 193-206.

### **Non-Refereed Conference Papers**

Rechenmacher, A.L. and Orlando, A.D. (2012), "Effect of Grain Shape on Micromechanical Behavior of Sheared Granular Layers," *ICTAM 2012*, Beijing, China, Aug 19-24.

Song, A., Medina-Cetina, Z., and Rechenmacher, A.L. (2012), "Numerical Investigation on the Localized Deformation Effects of Dense Sand Specimens", *2012 ASCE Geo-Congress*, Oakland, CA, Mar 25-29 (poster presented by A. Song).

Abedi, S. and Rechenmacher, A.L. (2011), "Vortex Structures inside Shear Bands in Sands," *Geo-Frontiers 2011, Proc. ASCE Geo-Institute Annual Conference*, Dallas, TX, Mar 13-16.

Chupin, O. and Rechenmacher, A. (2007), "Kinematics of Localized Shear in Granular Materials," *Proceedings 18<sup>th</sup> ASCE Engineering Mechanics Conference*, Blacksburg, VA, Jun 3-6.

Medina-Cetina, Z. and Rechenmacher, A.L. (2006), "Image-Based Sensing of 3-D Displacements for Enhanced Soil Model Calibration," *Proceedings ASCE Geo-Congress*, Atlanta, GA, Feb 26-Mar 1.

Borja, R.I., J.E. Andrade and A.L. Rechenmacher (2005), "Meso-scale Finite Element Modeling of Strain Localization in Dense Sands," *11<sup>th</sup> International Conference of the International Association of Computer Methods and Advances in Geomechanics (IACMAG)*, Turin, Italy, Jun 19-24.

Rechenmacher, A.L. and Jones, Nathaniel. L. (2005), "Patterns of Local Displacements in Shear Bands in Sands," *Poromechanics III, Proc. 3<sup>rd</sup> Biot Conference on Poromechanics*, Y. Abousleiman, A. Cheng, F. Ulm, eds, Norman, OK, May 24-27, p. 795-800.

Rechenmacher, A.L. (2005), "Onset, Growth, Progression and Uniformity of Shear Bands in Dilative Sands," *11<sup>th</sup> International Conference on Fracture*, Turin, Italy, Mar 20-25.

Medina-Cetina Z., Rechenmacher A.L. and Ghanem, R.G. (2004), "Parameterization of Constitutive Models Using Data from 3D Displacement Fields and the Theory of the Inverse Problem", *20th National Conf. on Soil Mech.*, Mexican Soc. Soil Mech., Guadalajara, Mexico, Nov 18-20 (in Spanish, presented by Z. Medina-Cetina).

Rechenmacher, A., R. Ghanem, and Z. Medina-Cetina (2004), "Calibration of Soil Constitutive Models with Heterogeneous Parameters," *9<sup>th</sup> Joint Specialty Conference on Probabilistic Mechanics and Structural Reliability*, Albuquerque, NM, Jul 26-28.

Abi Saab, N. and A. Rechenmacher (2004), "Deformation Processes Associated with Localized Instabilities in Dense Sand," *17<sup>th</sup> ASCE Engineering Mechanics Conference*, Newark, DE, Jun 13-16.

Ghanem, R., A.L. Rechenmacher and Z. Medina-Cetina (2003), "Identification of the Probabilistic Structure of Soil Constitutive Models from Boundary Feedback," *Proceedings 5<sup>th</sup> Euromech Solid Mechanics Conference*, Thessaloniki, Greece, Aug 17-22.

Rechenmacher, A.L. and Z. Medina-Cetina (2003), "Digital Imaging-Based Measurements of Deformed Shapes of Axisymmetric Soil Specimens," *Proc 16<sup>th</sup> ASCE Engineering Mechanics Conference*, Seattle, WA, Jul 16-18.

Rechenmacher, A.L., Z. Medina-Cetina, and R. Ghanem (2003), "Predictions for Heterogeneous Soil Behavior: Towards a Probabilistic Characterization of Soil Design Parameters," *International Workshop on Limit State Design in Geotechnical Engineering Practice*, Cambridge, MA, Jun 26.

Rechenmacher, A.L. (2003), "Measurement of Full-Field Displacements and Shear Banding in Sands," *Soil and Rock America 2003, Proc. 12th Panamerican Conference on Soil Mechanics and Geotechnical Engineering/39th U.S. Rock Mechanics Symposium*, P. Culligan, H. Einstein and A. Whittle, eds, Cambridge, MA, Jun 22-26, Vol. 1, 751-756.

Rechenmacher, A.L. and N. Abi Saab (2002), "Digital Image Correlation to Evaluate Progression and Uniformity of Shear Bands in Dilative Sands," *15<sup>th</sup> ASCE Engineering Mechanics Conference*, New York, NY, Jun 2-5.

### **Abstracts, Posters, and Presentations**

Rechenmacher, A.L., Alamilla, C., and Orlando, A.D. (2012), "Experimental observations of grain shape effects on micromechanics of confined, dense granular shear," *Gordon Research Conference on Granular and Granular-Fluid Flow*, Jul 22-26, Davidson College, Davidson, NC (abstract and poster).

Rechenmacher, A.L., Orlando, A.D., Collins, R.W. (2012), "Vortex Structures and Macroscopic Response in Dense Granular Shear," *8<sup>th</sup> European Solid Mechanics Conference*, Graz, Austria, July 9-13, 2012 (abstract and presentation).

Abedi, S., and Rechenmacher, A.L. (2011), "Length Scale Characterization in Localized Granular Shear," *ASCE Engineering Mechanics Institute (EMI) Annual Conference*, Boston, MA, Jun 2-4 (abstract, presentation by S. Abedi).

Abedi, S., Rechenmacher, A.L., Faoro, I. (2010). "Structural Development Inside Shear Bands in Granular Materials," *ASCE Engineering Mechanics Institute Annual Conference*, Los Angeles, CA, Aug 8-11 (abstract, presentation by S. Abedi).

Abedi, S., Rechenmacher, A., and Chupin, O. (2009), "Experimental characterization of kinematics activities inside shear band in granular material," *10<sup>th</sup> US National Congress on Computational Mechanics*, Jul 16-19, Columbus, OH (abstract, presentation by S. Abedi).

Rechenmacher, A. (2008), "Grain-scale kinematics of localized shearing in dense sands," *Gordon Research Conference on Granular and Granular-Fluid Flow*, Jun 22-27, Waterville, ME (abstract, oral presentation and poster).

Rechenmacher, A.L., Chupin, O. and Abedi, S. (2008), "Grain column Evolution in Shear Bands in Sands," *8<sup>th</sup> International Workshop on Bifurcation, Instabilities and Degradation in Geomechanics*, Lake Louise, Alberta, Canada, May 28-31 (abstract and presentation).

Rechenmacher, A.L., Chupin, O. and Abedi, S. (2008), "Evolution of Inhomogeneous deformation in shear bands in sand." *Inaugural International Conference of the Engineering Mechanics Institute (EM08)*, Minneapolis, May 18-21 (abstract and presentation).

Rechenmacher, A., Chupin, O., Varjavand, R. (2006), "Experimental Study of Characteristic Length Scales Associated with Localized Shear in Granular Materials," *15<sup>th</sup> US National Congress on Theoretical and Applied Mechanics*, Boulder, CO, Jun 25-30 (abstract and presentation).

Rechenmacher, A.L. (2005), "Particle-scale processes associated with shear localization in granular materials," *Eos Trans. AGU, 86(52), Fall Meeting Supplement*, Abstract T14B-06, American Geophysical Union Fall meeting, San Francisco, CA, Dec 5-9 (abstract and presentation).

Rechenmacher, A.L. (2005), "Grain scale processes governing shear band initiation and evolution in sands," *7<sup>th</sup> International Workshop on Bifurcation, Instabilities and Degradation in Geomechanics*, Chania, Crete, Greece, Jun 13-16 (abstract and presentation).

Rechenmacher, A.L. and Jones, N.L. (2005), "Particle Scale processes in shear bands in sands," *2005 Joint ASME/ASCE/SES Conf. on Mechanics and Materials*, Baton Rouge, LA, Jun 1-3 (abstract and presentation).

Rechenmacher, A.L., Medina-Cetina, Z. and Abi Saab, N. (2004), "Localized Observations of Deformation Band Formation and Progression in Sands," *American Association of Petroleum Geologists Annual Meeting*, Dallas, TX, Apr 18-21 (invited poster).

Rechenmacher, A.L. and Finno, R.J. (2001), "The Influence of Consolidation History of Sands on Critical State Line Position," *2001 ASME/ASCE/SES Mechanics and Materials Summer Conference*, San Diego, CA, Jun 27-29 (abstract and presentation).

Rechenmacher, A.L. and Alarcon, M.A. (2000), "Direct Measures of Strain in Simulated Fault Gouge," *EOS Trans. AGU, Vol. 81, Spring Meeting Supplement*, American Geophysical Union Spring Meeting, Washington, DC, May 30-Jun 3, p. S408 (abstract and presentation).

Alarcon, M.A., Rudnicki, J.W., Finno, R.J., Rechenmacher, A.L. (1999), "Effects of Strain Localization on Fault Gouge Constitutive Relations," *Society of Engineering Science '99*, Austin, TX, Oct 25 (abstract, presented by M. Alarcon).

### **Other Conferences, Workshops & Meetings**

*Shaping the New Status Quo: Global Perspectives in Scholarly Publishing, Society for Scholarly Publishing, 41st Annual Meeting*, "The Great Divide: Communicating Scholarly Research to Practitioners (Panel)", San Diego, CA, May 29-31, **2019** (invited panelist).

*American Society of Civil Engineers (ASCE) Education Summit: Mapping the Future of Civil Engineering Innovation*, Dallas, TX, May 28-30, **2019** (participant).

*International Workshop on Education of Future Geotechnical Engineers in Response to Emerging Multi-scale Soil-Environment Problems*, sponsored by NSF, University of Cambridge, Sept. 5-6, 2014 (participant).

*X-Terramechanics: Integrated Simulation of Planetary Surface Missions II*, Keck Institute for Space Studies, California Institute of Technology, Jun 20-24, Jul 11-13 and Aug 1-3, 2011 (participant).

*International Workshop on Uncertainties in Nonlinear Soil Properties and their Impact on Modeling Dynamic Soil Response*, NSF and PEER Lifelines Project, Richmond, CA, Mar 18-19, 2004 (participant).

### **WORKSHOP PRESENTATIONS**

*United States Universities Council on Geotechnical Education and Research (USUCGER) Geotechnical Engineering Faculty Teaching Strategies & Resources Workshop*, "Effective & Efficient Teaching: Active Learning Strategies," Minneapolis, MN, Feb 25, **2020** (invited speaker/instructor)

*Viterbi Engineering Education Retreat*, "Plans for a Viterbi Teaching Institute" (w. M. Redekopp), USC, Aug. 20, **2019** (speaker and participant).

*Engaged Learning Retreat, VSoE Dean's Office Division of Engineering Education*, "Engaged Learning Strategies for CE 106 Introduction to Civil Engineering," August, 2014 (speaker and participant).

*X-Terramechanics: Integrated Simulation of Planetary Surface Missions I*, "Overview of Soil Mechanics: Limitations and Future Directions," Keck Institute for Space Studies, Caltech, Pasadena, CA, Jun 20-24, 2011 (speaker and participant).

*Micro-Geomechanics Across Multiple Scales* (NSF workshop), Cambridge, England, Mar 20-23, 2005 (speaker and participant).

## INVITED LECTURES

“Force Chain Kinematics in Sheared, Dense Granular Layers,” USC Earthquake Physics Seminar, Fall semester, 2009.

“Grain Scale Processes Associated with Shear Band Growth and Evolution in Sands,” California Institute of Technology, Nov 15, 2005.

“Imaging Based Analysis of Strain Localization and Material Heterogeneity and Their Impacts on the Behavior of Sand,” Naval Research Lab, Marine Geosciences Division, Stennis Space Center, MS, Jan 30, 2004.

“Impacts of Strain Localization and Specimen Heterogeneity on the Behavior of Sand,” Columbia University, Oct 23, 2003.

"Imaging Based Measurement of Shear Bands in Sand and Implications for Critical State," Stanford University, January 8, 2003; AND Massachusetts Institute of Technology, Apr 22, 2003.

"The Effects of Deposition Void Ratio and Rate of Shear on Critical State in Sands," University of Delaware, Newark, Delaware, Mar 18, 2002.

"Impact of Shear Banding on Critical State of Sands and Rate Response of Simulated Fault Gouge," Sandia National Laboratories, Aug 7, 2001.

## FUNDED RESEARCH

- *CAREER: The Kinematics of Localized Failure and Flow in Granular Materials*, National Science Foundation, \$400,000, 05/08-4/13; REU Supplement, \$6,000
- *Collaborative Research: Experimental Imaging-Finite Element Modeling of Strain Localization in Granular Soils*, National Science Foundation, \$177,587, 08/03 through 07/06 (co-P.I. with R. Borja, Stanford Univ.); REU Supplement, \$11,250
- *Enhancement of Experimental Imaging Capabilities for Advanced Study of Shear Band Growth and Evolution*, National Science Foundation, \$74,714, 7/02 - 06/04; REU Supplement, \$12,500
- *Dewatering of Sacred Lake of the Temple of Mut and the Conservation of monuments retrieved from the lake*, American Research Center in Egypt, Inc./Egyptian Antiquities Project (ARCE/EAP), \$400,000, 01/02 through 03/04 (co-PI. PI was B. Bryan, JHU Near East Studies)
- *GE Faculty of the Future Research Development Award*, GE Faculty of the Future Internship, \$15,000, 09/00 through 08/05

## STUDENTS SUPERVISED

### Ph.D.

- *Dan Lakeland* (co-advised with R. Ghanem): “Continuum Modeling Techniques and Their Application to the Physics of Soil Liquefaction and Dissipative Vibrations”, 2008-2013
- *Mehdi Mollanouri*, 2012-2013
- *Dong Wang*, 2012
- *Rodney Collins*, 2011
- *Sara Abedi*: “Meso-scale kinematics in shear bands and impact of material heterogeneity on shear band development in sand,” 2006-2011 (postdoc, MIT; currently Assistant Professor, Texas A&M University)
- *Zenon Medina-Cetina* (at JHU; co-advised with R. Ghanem): “Probabilistic Calibration of a Soil Model,” 2001-2006 (currently Associate Professor, Texas A&M University)



## **Post-Docs**

- *Andrés Orlando*, 2011-2012 (currently at Jenike & Johanson, Inc., Tyngsboro, MA)
- *Igor Faoro*, 2010
- *Olivier Chupin*, 2006-07 (currently at Université Nantes-Angers-Le Mans, France)

## **M.S.**

- *Nidal Abi Saab*, 2001-2004

## **Undergraduates**

- *Carlos Alamilla*, Summer, 2012 (M.S., USC)
- *Colleen O'Brien*, USC Merit Research Fellow, 2011-2012
- *Rafi Halajian*, NSF REU, Summer, 2011
- *Nina Arroyo*, NSF REU, 2010-2011
- *Michael Makris*, Rose Hills Foundation Scholar, Summer 2010; NSF REU, 2010-2011
- *Nan Wang*, Viterbi Summer Intern, 2009 (M.S., UC Berkeley)
- *Paloma Paredes*: NSF REU and WiSE Research Fellow, 2008-2009
- *Lisa Okamoto*: USC Merit Research Fellow, 2007-2009
- *Katie Hickey*, NSF REU, 2009
- *Robert (Reb) Burky*: NSF REU, 2007-2008
- *Matthew Elliot*: Viterbi Summer Intern, 2007 (M.S., Georgia Tech)
- *Yu-Chi (Claire) Chang*: NSF REU and WiSE Research Fellow, 2006-2008 (currently at LADWP)
- *Nathaniel Jones* (JHU): NSF REU, 2004 (M.S., Cornell University)
- *Allison Reilly* (JHU): NSF REU, 2004 (Ph.D., Cornell University)

## **Ph.D. Committee Member**

- *Thomas Gobel*: USC Dept. Earth Sciences (Ph.D. 2013)
- *Hadi Meidani*: USC Dept. of Civil and Environmental Engineering (Ph.D. 2012)
- *Whitney Behr*: USC Dept. Earth Sciences, 2009-2011 (Ph.D. 2011)
- *Fang Liu*: USC Civil and Environmental Engineering (Ph.D. 2009)
- *Yigang Liu*: Univ. of Delaware, Civil Engineering (Ph.D. 2004)

## **HONORS AND AWARDS**

- NSF (National Science Foundation) CAREER grant awardee, 2008
- NSF Fellowship, Multiscale Modeling and Simulation of Nano Mechanics and Materials, NSF Summer Institute on Nano Mechanics and Materials, Northwestern University, Evanston, IL, 2004
- NSF Travel Grant, International Wkshp on Bifurcations & Instabilities in Geomaterials (IWBI), 2002
- GE Faculty of the Future Internship Award, Northwestern University, 1999
- ARCS (Achievement Rewards for College Scientists) Foundation Scholar, 1998 & 1999
- Walter P. Murphy Fellowship, Northwestern University, 1996-1997
- NSF Undergraduate Research Fellow, Northwestern University, Summer 1990

## **CONSULTING PROJECTS**

- Texas A & M University Galveston – Wastewater Treatment Plant (WWTP) Foundation Design (2016): Analyzed geotechnical report and recommended an appropriate foundation design for a packaged WWTP.
- Round Mountain Gold Corporation – Coarse Ore Pile (COP) Tunnel (2015): Analyzed reports and provided information and developed geotechnical recommendations related to observed tunnel failure.