

José E. Andrade

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EDUCATION

- Ph.D., Civil Engineering: Geomechanics, Stanford University, Stanford, CA, June 2006
- M.S., Civil Engineering: Geomechanics, Stanford University, Stanford, CA, March 2003
- B.S. (summa cum laude): Civil Engineering, Florida Tech, Melbourne, FL, July 2001

HONORS AND AWARDS

- U.S. National Academy of Engineering Fronteers of Engineering Symposium, participant, Albuquerque, NM (2008)
- USNC/TAM Fellowship, International Congress in Theoretical & Applied Mechanics, Adelaide, Australia (2008)
- USACM Fellowship, 8th World Congress in Computational Mechanics, Venice, Italy (2008)
- Zienkiewicz Medal 2006, best paper in numerical methods by a researcher under 35 years old by the Institution of Civil Engineers of London (2008)
- Searle Center for Teaching Excellence Fellow (2007)
- Young Researcher Fellowship, 7th World Congress in Computational Mechanics, Los Angeles, CA (2006)
- Young Researcher Fellowship, 3rd MIT Conference on Computational Fluid & Solid Mechanics (2005)
- Shah Family Full Graduate Fellowship: Awarded to two students each year and provides funding for 4 quarters (\$13,000/quarter), Stanford University (2001-2003)
- Florida Tech Distinguished Scholar award, Department of Civil Engineering (2002)
- Outstanding Senior, Junior, and Sophomore of the Year, Florida Tech (1999-2001)
- All American Scholar (2000, 2004)
- Tau Beta Pi, National Engineering Honor Society (2000)
- Chi Epsilon, Civil Engineering Honor Society (2000)
- Florida Tech Scholarship (1998-2001)

RESEARCH INTERESTS

We are interested in problems at the interface of physics and mechanics to develop predictive analytical and numerical models for geomaterials such as concrete, rocks, and soils. Our research spans areas of defense, sustainable energy and infrastructure.

PROFESSIONAL ACTIVITIES

- Reviewer for more than 10 leading technical journals including: Int. J. Numer. Meth. Eng.; Int. J. Numer. Anal. Meth. Geomech.; Comput. Meth. Appl. Mech. Eng.; ASCE J. Geotech. Geoenv. Eng.; ASCE J. Appl. Mech.; Comp. Struct.
- Faculty advisor for undergraduate students in the Summer Research Opportunity Program at Northwestern
- Establishing 'bridges to the PhD' with Hispanic communities in Puerto Rico (University of Mayaguez) and Ecuador (Polytechnic University). Program involves mentoring at the MS level and eventual enrollment into our graduate program
- Faculty advisor to talented Senior H.S. students: direct them in research in Science & Engineering at Northwestern
- Tau Beta Pi Engineering Futures Seminar Facilitator: traveled around the country to facilitate workshops for engineering students' interpersonal, leadership, and organizational skills
- Stanford University Partners for Academic Excellence Graduate Mentor: provided guidance and counseling to underrepresented freshmen students
- Member of the American Society of Civil Engineers, American Geophysical Union, and US Computational Mechanics Association

INVITED TALKS

University of Illinois, Urbana-Champaign, IL, October 2008; **Purdue University**, Lafayette, IN, October 2008; **University of Newcastle**, Newcastle, Australia, September 2008; **University of Cambridge**, Cambridge, UK, October, 2007; **Laboratoire Sols, Solides, Structures & Risk**, Grenoble, France, September, 2007; **ESPOL**, Guayaquil, Ecuador, June 2007, 2008, **AFOSR Workshop on Particle Mechanics**, Shalimar, FL, February 2007 and March 2008; **University of Michigan**, Ann Arbor, MI, November, 2006; **GA Tech**, Atlanta, GA, April, 2006; **Princeton University**, Princeton, NJ, April, 2006; **Rice University**, Houston, TX, February, 2006; **Duke University**, Durham, NC, February, 2006; **Florida Tech**, Melbourne, FL, December, 2005

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JOURNAL PUBLICATIONS

- [1] X. Tu, **J. E. Andrade**, and Q. Chen. Return mapping for nonsmooth and multiscale elastoplasticity. *Computer Methods in Applied Mechanics and Engineering*. In review, 2008.
- [2] **J. E. Andrade** and X. Tu. Multiscale framework for behavior prediction in granular media. *Mechanics of Materials*. In press, 2009.
- [3] H. M. Jennings, J. W. Bullard, J. J. Thomas, **J. E. Andrade**, J. J. Chen, and G. W. Sherer. Characterization and modeling of pores and surfaces in cement paste: correlations to processing and properties. *Advanced Concrete Technology*, 6:5-29, 2008.
- [4] K. C. Ellison and **J. E. Andrade**. Liquefaction mapping in finite element simulations. *Journal of Geotechnical and Geoenvironmental Engineering*. In review, 2008.
- [5] **J. E. Andrade** and K. C. Ellison. Evaluation of a predictive constitutive model for sands. *Journal of Geotechnical and Geoenvironmental Engineering*. In press, 2008.
- [6] X. Tu and **J. E. Andrade**. Criteria for static equilibrium in particulate mechanics computations. *International Journal for Numerical Methods in Engineering*. 75:1581-1606, 2008.
- [7] **J. E. Andrade**. A predictive model for static liquefaction. *Géotechnique*. In press, 2009
- [8] **J. E. Andrade**, J. W. Baker, and K. C. Ellison. Random porosity fields and their influence on the stability of granular media. *International Journal for Numerical and Analytical Methods in Geomechanics*, 32:1147-1172, 2008.
- [9] **J. E. Andrade** and R. I. Borja. Modeling deformation banding in dense and loose fluid-saturated sands. *Finite Elements in Analysis and Design* 43:361-383, 2007.
- [10] **J. E. Andrade** and R. I. Borja. Capturing strain localization in dense sands with random density. *International Journal for Numerical Methods in Engineering* 67:1531-1564, 2006.
- [11] R. I. Borja and **J. E. Andrade**. Critical state plasticity, Part VI: Meso-scale finite element simulation of strain localization in discrete granular materials. *Computer Methods in Applied Mechanics and Engineering* 195:5115-5140, 2006.
- [12] **J. E. Andrade** and R. I. Borja. Quantifying sensitivity of local site response models to statistical variations in soil properties. *Acta Geotechnica* 1:3-14, 2006.

TEACHING EXPERIENCE

- Course Instructor, Northwestern University, Evanston, IL (January 2007- present)
 - GEN ENG 205-2 Engineering Analysis II: Statics and Dynamics (Undergraduate)
 - CEE 250 Introduction to Soil Mechanics (Undergraduate)
 - CEE 495 Computational Inelasticity (Graduate)
- Student Liaison and Teaching Assistant Coordinator, Center for Teaching and Learning, Stanford, CA (June 2005-June 2006)
- Teaching Assistant, Stanford University, Undergraduate and Graduate courses (Spring 2002- Fall 2003)

RESEARCH PROJECTS

- Characterization of random fields and their impact on the mechanics of geosystems at multiple scales. **National Science Foundation**. September 2007-August 2009. \$150,000
- Multi-scale prediction and simulation of localization banding in granular media. **Air Force Office of Scientific Research**. October 2007-September 2010. \$320,000
- Multiscale framework for predicting the coupling between deformation and fluid diffusion in porous rocks. **Department of Energy**. September 2008-August 2011. \$525,000