

## WaiChing Sun, PhD

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### Professional Preparation

- **B.S.** Civil Engineering, University of California, Davis, 2002-2005
  - **M.S.** Civil Engineering (Geomechanics), Stanford University, 2005-2007
  - **M.A.** Civil Engineering, Princeton University, 2007-2008
  - **PhD.** Theoretical and Applied Mechanics, Northwestern University, 2008-2011
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### Appointments

- Since 2014, Assistant Professor, Columbia University
  - 2013-2014, Senior Member of Technical Staff, Sandia National Laboratories
  - 2011-2012, Postdoctoral Fellow, Sandia National Laboratories
  - 2010-2011, Visiting Scholar, California Institute of Technology
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### Five Related Publications

- **W.C. Sun**, A. Mota, A multiscale overlapped coupling formulation for large deformation strain localization, , *Computational Mechanics*, 54(3):803-820, 2014.
  - **W.C. Sun**, M.R. Kuhn and J.W. Rudnicki, A multiscale DEM-LBM analysis on permeability evolution inside a dilatant shear band, *Acta Geotechnica*, 8(5):465-480, 2013. (Selected by the editorial board as the best paper in 2013. Authors received **the 2013 Caterpillar Best Paper Prize.**)
  - **W.C. Sun**, J.T. Ostien and A.G. Salinger, A stabilized assumed deformation gradient finite element formulation for strongly coupled poromechanical simulations at finite strain, *International Journal for Numerical and Analytical Methods in Geomechanics*, 37(16), 2755-2788, 2013.
  - **W.C. Sun**, Q. Chen and J.T. Ostien, Modeling hydro-mechanical responses of strip and circular footings on saturated collapsible geomaterials, *Acta Geotechnica*, 9(5):903-934, 2013.
  - **W.C. Sun**, J.E. Andrade, J.W. Rudnicki, A multiscale method for characterization of porous microstructures and their impact on macroscopic effective permeability, *International Journal for Numerical Methods in Engineering*, 88(12), 1260-1279, 2011.
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### Five Other Significant Publications

- **W.C. Sun**, An unified method to predict diffuse and localized instabilities in sands, *Geomechanics and Geoengineering*, 8(22):65-75, 2013.
- A. Mota, **W.C. Sun**, J.T. Ostien, J.W. Foulk III and K.N. Long, Lie-Group interpolation and variational recovery for internal variables, *Computational Mechanics*, 52:1281-1299, 2013.
- **W.C. Sun**, J.E. Andrade, J.W. Rudnicki and P. Eichhubl, Connecting microstructural attributes and permeability from 3-D tomographic images of in situ compaction bands using multi-scale computation, *Geophysical Research Letter*, doi : 10.1029/2011GL047683, 2011.

- R.I. Borja and **W.C. Sun**, Co-seismic sediment deformation during the 1989 Loma Prieta Earthquake, *Journal of Geophysical Research*, Vol.113, B08314, doi : 10.1029/2007JB005265, 2008.
  - R.I. Borja and **W.C. Sun**, Estimating inelastic sediment deformation from local site response simulations, *Acta Geotechnica*, 2(3):183-195, 2007.
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## Synergistic Activities

- Recipient of **Caterpillar Best Paper Prize** (2014), International Union of Theoretical and Applied Mechanics Young Investigator Travel Fellowship (2014), 16th US National Congress of Theoretical & Applied Mechanics (2010), USACM Travel Fellowship, 9th World Congress of Computational Mechanics, (2010), NSF Travel Fellowship, International Workshop on Multiscale and Multiphysics Processes in Geomechanics (2010), Tuition Scholarship, Summer School on Accelerators for Science and Engineering, National Science Foundation, (2008), John W. and Ernestine L. Heinrich Scholarship, University of California, Davis (2004), American Public Works Associations Scholarship, American Public Works Associations (2004).
  - Invited speaker, Geotechnical Engineering Seminar at UC Davis (2013), Mechanical Engineering Department Seminar at Brown University (2014), Civil and Material Engineering Department Seminar at University of Illinois, Chicago (2014), the IUTAM Symposium on connecting multiscale mechanics to complex material design at Evanston, IL (2014), the John Rudnicki Symposium at the 51st Annual Technical Meeting of SES, at Purdue University (2014) and Northeast Granular Material Workshop at Brown University (2014). Discussion leader of the iMechanica Journal Club, (September 2014).
  - Reviewer for ASCE Journal of Geotechnical and Geoenvironmental Engineering, Computer Methods in Applied Mechanics and Engineering, International Journal for Numerical and Analytical Methods in Geomechanics, International Journal for Numerical Methods in Engineering, the Geological Society of America Bulletin, Acta Geotechnica, Finite Element Analysis and Design, Soil Dynamics and Earthquake Engineering, International Journal of Fracture, International Journal of Plasticity, Journal of Engineering Mechanics and International Journal of Solids and Structure; Member of review panel for Army Corps of Engineers, Army Research Office and National Science Foundation.
  - Organizer of the Computational Geomechanics Symposium at United States National Congress of Theoretical and Applied Mechanics at Michigan State University (2014); Co-organizer of AGU Fall Meeting Session: Digital Rock Physics, 3D printing and More; Discussion Leader on Computational Poromechanics at imechanica.org (2014); International scientific committee member of the Engineering Mechanics Institute International Conference at Hong Kong Polytechnic University (2015). Member of ASCE, ASME and AGU, EMI and International Society for Porous Media.
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## Collaborators and other affiliations

- **Collaborators and Co-editors:** Jose E. Andrade (Caltech), Joe E. Bishop (Sandia National Laboratories), Ronaldo I. Borja (Stanford), Qiushi Chen (Clemson University), George Deodatis (Columbia University), Thomas Dewers (Sandia National Laboratories), Peter Eichhubl (UT Austin), James W. Foulk (Sandia National Laboratories), Jacob Fish (Columbia University), Craig Foster (University of Illinois at Chicago), Boris Jeremic (UC Davis), Peter Kelemen (Columbia University), Matthew Kuhn (University of Portland), Hoe I. Ling (Columbia), Moo Lee (Sandia National Laboratories), Nicolas Lenoir (Université Paris-Est, France), Kevin N.

Long (Sandia National Laboratories), Kincho Law (Stanford), Mario J. Martinez (Sandia National Laboratories), Alejandro Mota (Sandia National Laboratories), Jakob T. Ostien (Sandia National Laboratories), Roger Buck (Columbia University), John W. Rudnicki (Northwestern), Simon Salager (Université de Joseph Fourier), Andrew G. Salinger (Sandia National Laboratories), Marcelo Sanchez (Texas A&M University), Heather Savage (Columbia), Marc Spiegelman (Columbia), Claudio Tamagnini (University of Perugia, Italy), Cian Wilson (Columbia), Teng-fong Wong (Chinese University of Hong Kong, Hong Kong), Honghku, Yoon (Sandia National Laboratories), Huiming Yin (Columbia University), Yin Lu Young (University of Michigan, Ann Arbor). Jidong Zhao (Hong Kong University of Science & Technology).

- **Graduate Advisors and Postdoctoral Sponsors:** James W. Foulk (Sandia National Laboratories), Alejandro Mota (Sandia National Laboratories), John W. Rudnicki (Northwestern), Jakob T. Ostien (Sandia National Laboratories), Jose E. Andrade (Caltech), Ronaldo I. Borja (Stanford), Yin Lu Young (University of Michigan, Ann Arbor).
- **Thesis and Postdoctoral Advisees:** Yang Liu (GRA, Columbia University), Senghong Na (GRA, Columbia University, Fulbright Scholar), Zhijun Cai (GRA, Columbia University, Presidential Fellow), Kun Wang (GRA, Columbia University). Total number of graduate students sponsored = 4. No postdoctoral scholar sponsored by the PI as of December 23, 2014.