Sai Sandeep Chitta

Assistant Professor
Department of Civil, Environmental, and Geospatial Engineering
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Research Areas

Granular mechanics across multiple spatial scales, bio-mediation techniques for soil improvement, bio-inspired geotechnics, surface interferometry, digital image analysis, and material models for discrete element method (DEM) simulations

Certifications

Engineering Intern License Oregon - 102513EI

Work Experience

- Postdoctoral Researcher — October 2023 - Present
  University of Arkansas
  Supervisor: Professor Michelle Barry
- Postdoctoral Researcher — December 2020 – September 2023
  Oregon State University
  Supervisor: Professor Matt Evans
- Developer — January 2023 – April 2023
  Learning Outcomes, Criteria and Rationale (LOCR) for general education at Oregon State University
- Instructor — December 2021 – April 2022
  Oregon State University
- Postdoctoral Researcher — November 2019 – November 2020
  University of Oklahoma
  Supervisor: Professor Ze'ev Reches
- Field Engineer (supervising construction of diaphragm wall and metro slabs) — June 2013 – December 2013
  Larsen & Toubro – CC27 Delhi Metro Railway

Education

- Ph.D. in Civil Engineering — 2019
  City University of Hong Kong
  Supervisor: Dr. Kostas Senetakis
- M. Tech in Geotechnical Engineering — 2016
  Indian Institute of Technology Guwahati, India

Department of Civil Engineering
Supervisor: Dr. Murali Krishna

- B. Tech in Civil Engineering — 2013
  Jawaharlal Nehru Technological University Kakinada, India

Awards & Honors

- First author of Editor's Choice Selection paper, *Canadian Geotechnical Journal* — April 2020
- Ringo Yu Prize for Best Ph.D. Thesis in Geotechnical Studies — May 2020
- Outstanding academic performance award — August 2018
- City University Research Tuition Scholarship — August 2018
- Outstanding academic performance award — August 2017
- City University Research Tuition Scholarship — August 2017
- Hong Kong Ph.D. Scholarship — 2016 – 2019

Teaching Experience

INSTRUCTOR

- CE 570 — Soil Mechanics — December 2021 – March 2022
  Overall Student Learning Evaluation: 5.8/6.0

TEACHING ASSISTANT

- CA2560 — Geology for Engineers — January – April 2017, 2018
- CA3687 — Soil Mechanics — September – December 2018
- CA3664 — Advanced Geotechnical and Foundation Engineering — January – April 2018
- CA4682 — Soil Mechanics Laboratory — September – December 2018

Students Supervised

• Mr. Sam Luft	Co-supervised with Professor Matt Evans	Crushing characteristics of pumiceous soils & biomediation techniques for reducing erosion
• Mr. Keller Evans	Co-supervised with Professor Matt Evans	Shape analysis of particles & biocementation techniques
• Ms. LAU Tsz Ying Abby	Co-supervised with Professor Kostas Senetakis	Crushing behavior of recycled concrete aggregate
• Ms. CHAU Ka Ki	Co-supervised with Professor Kostas Senetakis	Exploring the influence of physical properties on the coefficient of restitution (COR) of granular materials
• Mr. Man Fai CHIU	Co-supervised with Professor Kostas Senetakis	Grain scale behavior of completely decomposed granite

• Ms. Siyue Li	Co-supervised with Professor Kostas Senetakis	Normal contact behavior of natural proppant simulants

Distinctions of Students Supervised

- Co-supervisor of Ms. LAU Tsz Ying Abby (City University), receiving "*Best Final Year Project Award 2018*" by ASCE Hong Kong Section.
- Co-supervisor of Ms. CHAU Ka Ki (City University), receiving "*Best Final Year Project Award 2019*" by ASCE Hong Kong Section.

Projects Worked

- Fundamental Research to Advance Understanding and Prediction of Coastal Processes for the US West Coast (with Professor Matt Evans) 2022 – 2023
- Crushing characteristics of pumiceous soils (with Professor Matt Evans) 2021 – 2022
- Site-specific calibration of DEM material models (with Professor Matt Evans) 2020 – Present
- Investigating earthquake source processes in the laboratory (with Professor Ze'ev Reches) 2019 – 2020
- Micro- and Macroscale behavior of sand-granulated rubber mixtures (Collaboration with Professor Fiona Kwok, HKU) 2019 – 2020
- Mechanical behavior of DNA-1A lunar regolith simulant in comparison to Ottawa sand (Collaboration with Technical University Bari and Universität Erlangen-Nürnberg) 2018 – 2020
- Mechanical behavior of polymer-coated sand (with Professor Sérgio Lourenço, HKU) 2018 – 2019
- Understanding debris flow mechanisms and mitigating risks for a sustainable Hong Kong (Collaboration with Professor Charles W. W. Ng and Professor Matthew Coop) 2016 – 2019

Research Funding & Grants

- Site-specific calibration of DEM material models $120,000 2022
  Sponsor: Oregon Metals Initiative & ESCO Group LLC
  Role: Co-PI
- Geomechanical factors influencing bucket tooth wear response. $120,000 2024-2025
  Sponsor: Oregon Metals Initiative & ESCO Group LLC
  Role: Co-PI

Professional Memberships

- Associate Member of American Society of Civil Engineers 2019 – Present
- ASCE Geo-Institute 2019 – Present

Professional Service

- Industry Exploration Program Coordinator, OSU Postdoctoral Association June 2022 – July 2023

- Developer for Learning Outcomes, Criteria, and Rationale (LOCR) for general education at Oregon State University — January 2023 – April 2023

RESEARCH PROPOSAL REVIEWER

- National Science Centre, Poland

JOURNAL REVIEWER

- ASCE Geotechnical and Geoenvironmental Engineering
- ASME Journal of Tribology
- ASTM Journal of Testing and Evaluation
- ASTM Advances in Civil Engineering Materials
- Bioinspiration and Biomimetics
- Bulletin of Engineering Geology and the Environment
- Computers and Geotechnics
- Construction and Building Materials
- Geomechanics and Geoengineering: An International Journal
- Geomechanics and Geophysics for Geo-energy and Geo-resources
- Geomechanics for Energy and the Environment
- Geosynthetics International
- Géotechnique
- Granular Matter
- International Journal for Numerical and Analytical Methods in Geomechanics
- Mathematical Problems in Engineering
- Scientific Reports
- Remote Sensing Letters
- Soils and Foundations
- Tribology International

Publications

REFEREED JOURNAL PUBLICATIONS

- Watters, M., **Sandeep, C.S.,** Thorappady, A., Barry, M.B. Additive Manufacturing of Granular Analog Soils: Feasibility Studies and Mechanical Characterization. (Submitted)
- **Sandeep, C. S.,** & Evans, T. M. (2023). Biomimetic intruder tip design for horizontal penetration into a granular pile. Bioinspiration & Biomimetics. DOI 10.1088/1748-3190/acfa50
- **Sandeep, C. S.,** Hernandez, A., Stangeland, K., & Evans, T. M. (2023). Shape characteristics of granular materials through realistic particle avatars. *Computers and Geotechnics*, 157, 105352.
- **Sandeep, C. S.,** He, H., & Senetakis, K. (2022). Experimental and analytical studies on the influence of weathering degree and ground-environment analog conditions on the tribological behavior of granite. *Engineering Geology*, 106644.
- **Sandeep, C. S.,** Senetakis, K., Cheung, D., Choi, C. E., Wang, Y., Coop, M. R., & Ng, C. W. W. (2021). Experimental study on the coefficient of restitution of grain against block interfaces for natural and engineered materials. *Canadian Geotechnical Journal*, 58(1), 35-48.
- Chen, X., **Sandeep, C. S.,** Zu, X., & Reches, Z. E. (2021). Dynamic fault weakening during earthquakes: Rupture or friction? *Earth and Planetary Science Letters*, 575, 117165.
- **Sandeep, C. S.,** Li, S., & Senetakis, K. (2021). Experimental and analytical investigation on the normal contact behavior of natural proppant simulants. *Geomechanics and Geophysics for Geo-Energy and Geo-Resources*, 7(4), 1-15.

- **Sandeep, C. S.,** Li, S., & Senetakis, K. (2021). Scale and surface morphology effects on the micromechanical contact behavior of granular materials. *Tribology International*, 159, 106929
- Marzulli, V., **Sandeep, C. S.,** Senetakis, K., Cafaro, F., & Pöschel, T. (2020). Scale and water effects on the friction angles of two granular soils with different roughness. *Powder Technology*, 377, 813-826.
- **Sandeep, C.S**., Luo, L., Senetakis, K. (2020). Effect of grain size and surface roughness on the normal coefficient of restitution of single grains. *Materials*, 13, 814.
- **Sandeep, C. S.**, Marzulli, V., Cafaro, F., Senetakis, K., Poschel, T. (2019) Micromechanical behavior of DNA-1A lunar regolith simulant in comparison to Ottawa sand. *Journal of Geophysical Research: Solid Earth*. Doi.org/10.1029/2019JB017589
- **Sandeep, C. S.,** & Senetakis, K. (2019). An experimental investigation of the microslip displacement of geological materials. *Computers and Geotechnics*, 107, 55-67.
- Liu, D., **Sandeep, C. S.,** Senetakis, K., Nardelli, V., Sergio, S.D.N. (2019). Micromechanical behaviour of a polymer-coated sand. *Powder Technology*, 347, 76-84.
- **Sandeep, C. S.,** & Senetakis, K. (2019). Influence of morphology on the micro-mechanical behavior of soil grain contacts. *Geomechanics and Geophysics for Geo-Energy and Geo-Resources*, 5(2), 103-119.
- He, H., **Sandeep, C.S.,** Senetakis, K. (2019). Interface behavior of recycled concrete aggregate: A micromechanical grain-scale experimental study. *Construction and Building Materials*, 210, 627-638.
- **Sandeep, C. S.**, & Senetakis, K. (2019). Micromechanical experiments using a new inter-granule loading apparatus for gravel-to-ballast sized materials. *Friction*. doi.org/10.1007/s40544-018-0243-5.
- Li, W., Kwok, C. Y., **Sandeep, C. S.**, & Senetakis, K. (2019). Sand type effect on the behaviour of sand-granulated rubber mixtures: Integrated study from micro- to macro-scales. *Powder Technology*, 342, 907-916.
- **Sandeep, C. S.**, Todisco, M. C., Nardelli, V., Senetakis, K., Coop, M. R., & Lourenco, S. D. N. (2018). A micromechanical experimental study of highly/completely decomposed tuff granules. *Acta Geotechnica*, 13(6), 1355–1367.
- **Sandeep, C. S.**, He, H., & Senetakis, K. (2018). An experimental micromechanical study of sand grain contacts behavior from different geological environments. *Engineering Geology*, 246, 176-186.
- **Sandeep, C. S.**, & Senetakis, K. (2018). Effect of Young's modulus and surface roughness on the inter-particle friction of granular materials. *Materials*, 11(2), [217].
- **Sandeep, C. S.**, & Senetakis, K. (2018). Grain-scale mechanics of quartz sand under normal and tangential loading. *Tribology International*, 117, 261-271.
- **Sandeep, C. S.**, & Senetakis, K. (2018). The tribological behavior of two potential-landslide saprolitic rocks. *Pure and Applied Geophysics*, 175(12), 4483-4499.
- Senetakis, K., **Sandeep, C. S.**, & Todisco, M. C. (2017). Dynamic inter-particle friction of crushed limestone surfaces. *Tribology International*, 111, 1-8.
- Senetakis, K., & **Sandeep, C. S.** (2017). Experimental study of sand grains behavior at their contacts with force- and displacement-controlled sliding tests. *Underground Space*, 38-44.

- **Sandeep, C. S.**, & Senetakis, K. (2017). Exploring the micromechanical sliding behavior of typical quartz grains and completely decomposed volcanic granules subjected to repeating shearing. *Energies*, 10(3), 1-16. [370].
- **Sandeep, C. S.**, Todisco, M. C., & Senetakis, K. (2017). Tangential contact behaviour of a weathered volcanic landslide material from Hong Kong. *Soils and Foundations*, 57(6), 1096-1102.

BOOK CHAPTERS & CONFERENCES

- **Sandeep, C. S.,** & Evans, T. M. Particle Shape Effects in 3D DEM Simulations of Angle of Repose. In Geo-Congress 2023 (pp. 557-564).
- **Sandeep, C. S.**, Chen, X., Reches, Z. E., & Carpenter, B. M. (2020, December). Dynamic Bilateral Rupture Along a Circular Bimaterial Fault. In AGU Fall Meeting Abstracts (Vol. 2020, pp. MR030-06).
- Reches, Z. E., Chen, X., **Sandeep, C. S.**, & Zu, X. (2020, December). Earthquake nucleation by stick-slip ruptures. In AGU Fall Meeting Abstracts (Vol. 2020, pp. S029-0004).
- Chen, X., **Sandeep, C. S**., Reches, Z. E., & Carpenter, B. M. (2020, December). Supershear Ruptures Along a Circular, Bimaterial, Experimental Fault. In AGU Fall Meeting Abstracts (Vol. 2020, pp. S030-0004).
- **Sandeep, C. S.**, & Senetakis, K. (2019). An experimental micromechanical study on the shearing behavior of soil. *Proceedings of the 25th Australasian Conference on Mechanics of Structures and Materials.* Wang, C. M., Ho, J. C. & Kitipornchai, S. (eds.). Springer, p. 571-580 (Lecture Notes in Civil Engineering; vol. 37).
- **Sandeep, C. S.**, and Senetakis, K. (2018). An experimental study on the tangential contact behaviour of soil interfaces. *Micro to MACRO Mathematical Modelling in Soil Mechanics.*Giovine, P., Mariano, P. M. & Mortara, G. (eds.). Springer Nature Switzerland AG, p. 309-317 (Trends in Mathematics).
- Li, W., Kwok, C. Y., Senetakis, K., and **Sandeep, C. S.** (2018). Effect of rubber inclusion on the friction angle at critical state for different host sands. *Micro to MACRO Mathematical Modelling in Soil Mechanics.* Giovine, P., Mariano, P. M. & Mortara, G. (eds.). Springer Nature Switzerland AG, p. 309-317 (Trends in Mathematics).
- **Sandeep C.S.,** and Senetakis K. (2018). Tribological study of sand-grain contacts. The 22nd Annual Conference of HKSTAM-2018 & 14th Shanghai-Hong Kong Forum on Mechanics and Its Applications, Hong Kong (April 2018).
- **Sandeep C.S.,** Todisco M.C., Senetakis K. (2017). Experimental contact mechanics of weathered tuff granules. The 21st Annual Conference of HKSTAM 2017 & The 13th Jiangsu – Hong Kong Forum on Mechanics and Its Application, Polytechnic University of Hong Kong, 8 April 2017, Hong Kong