

Xiaole Han | Postdoc Researcher

Department of Civil, Environmental and Construction Engineering (CECE), University of Hawaii at Manoa, USA

Tel. No.: +1 (808) 202-8588; Email: xiaolehan9@gmail.com

Personal Website: <https://kimile599.github.io/>

Education

2017 - 2022	Ph.D.	Geotechnical Engineering	University of Hawaii at Manoa, US (Supervisor: Ningjun Jiang)
2014 - 2017	Master	Mining Engineering	China University of Mining and Technology, China (Supervisor: Jixiong Zhang)
2013 - 2014	Exchange student	Geology	North Dakota State University, US (Supervisor: Allan Ashworth)
2010 - 2013	Undergraduate	Mining Engineering	China University of Mining and Technology, China

Projects

- (1) Concrete Tank Degradation Inspection and Retrofit (experiment design and data analysis). University of Hawaii/U.S. Navy Red Hill Partnership (2023.02-2024.08)
- (2) Deep learning applications in Geotechnical and Coastal Environmental Engineering (experiment design and algorithm deployment). University of Hawaii at Manoa (2020.01-2022.10)
- (3) Characterization of clay desiccation cracks with computer vision (SfM) and deep learning (Video Instance Segmentation). (hardware design and algorithm deployment). University of Hawaii at Manoa (2021.01-2022.12)
- (4) Coastal dune erosion mitigation through bio-mediated geotechnical approach (experimental parts). University of Hawaii at Manoa (2020.05-2020.08)
- (5) Sustainable low viscosity cement grouts for permeation grouting in erodible calcareous and coral sands (experimental parts). Hawaii DOT (2020.01-2022.12)
- (6) Indo-US Joint Center of Development of Sustainable Materials for Soil Remediation (experimental parts). IUSSTF (2019.05-2021.05)

Research | Internship | Working Experience

2023.8 – Now	Postdoctoral Researcher	University of Hawaii at Manoa, US
	<ul style="list-style-type: none">Utilizing Alkali-Activated Concrete mitigates heavy metal ions in the soilDeveloping Alkali-Activated Concrete mix with machine-learning algorithmsEvaluation Redhill fuel tank sealing effects with advanced binder material and computer vision method	
2023.3 – Now	Geotechnical Engineer (Part-time)	Yogi Kwong Engineers LLC, US
	<ul style="list-style-type: none">Piiholo 50MG Reservoir Improvement(DOA)Hawaii State Rockfall Assessment(Hawaii Department of Transportation)Pali Highway Rockfall Analysis(Hawaii Department of Transportation)	
2017.08 – 2022.11	Ph.D.	University of Hawaii at Manoa, US
	<ul style="list-style-type: none">Preparing technical reports/publications/presentationsConducting geotechnical experiments on calcareous sand stabilization with AAS and biochar3D modeling using SfM (Structure from Motion) technique on structure health monitoringDeploying deep learning algorithms in geotechnical and environmental-related fields	
2014.09 – 2017.06	Master	China University of Mining and Technology, China
	<ul style="list-style-type: none">Designing coal mine roadway support system for backfill mining working faceDEM modeling to simulate gangue backfill mining technology in the coal mineConducting in-situ coal mine roof subsidence data collection and analysisConducting laboratory rock sample strength experiments and physical scaled model test	

Themed Conference

Invited Talks

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| 2023 | Deep learning and Computer vision applications in Geotechnical Engineering, Institute of Geotechnical Engineering, Southeast University, Nanjing, China, June 2023 |
| 2022 | Applications of Structure-from-motion (SfM) method in Engineering fields, College of Ocean and Resources |

Oral presentation

- 2023 17th Asian Regional Conference on Soil Mechanics and Geotechnical Engineering 2023, Kazakhstan
2022 4th International Conference on Information Technology in Geo-Engineering (4ICITG), Singapore
2021 1st IACM Conference on Machine Learning and Digital Twins for Computational Science and Engineering
San Diego, USA
2020 3rd International Symposium on Coupled Phenomena in Environmental Geotechnics, Kyoto, Japan
2018 B2G-Atlanta 2018, Atlanta, USA

Poster presentation

- 2022 20th International Conference on Soil Mechanics and Geotechnical Engineering, Sydney, Australia
2020 Geo-congress 2020, Minneapolis, USA
2019 Engineering Mechanics Institute Conference, California, USA

Teaching Experience

Lecturer for Undergraduate Courses

- 2020 Spring CEE270-Applied Mechanics (I)
2024 Fall CEE375-Construction Materials

Teaching Assistant for Undergraduate Courses

- 2017 Fall, 2018 Fall, 2019 Spring and 2019 Fall CEE355-Geotechnical Engineering (I)

Publications

Journal papers

- [1]. **Han, X.-L.**, Jiang, N.-J., Hata, T., Choi, J., Du, Y.-J., & Wang, Y.-J., (2023). Deep learning based approach for automated characterization of large marine microplastic particles. Marine Environmental Research, 105829. <https://doi.org/10.1016/j.marenvres.2022.105829>
- [2]. **Han, X. L.**, Jiang, N.J., Jin, F., Reddy, K. R., Wang, Y.J., Liu, K.W, & Du, Y.J. (2022). Effects of biochar-amended alkali-activated slag on the stabilization of coral sand in coastal areas. Journal of Rock Mechanics and Geotechnical Engineering. <https://doi.org/10.1016/j.jrmge.2022.04.010>
- [3]. **Han, X. L.**, Jiang, N. J., Yang, Y. F., Choi, J., Singh, D. N., Beta, P., ... & Wang, Y. J. (2022). Deep learning based approach for the instance segmentation of clayey soil desiccation cracks. Computers and Geotechnics, 146, 104733. <https://doi.org/10.1016/j.compgeo.2022.104733>
- [4]. Wang, Y. J., **Han, X. L. (Co-first authors)**, Jiang, N. J., Wang, J., & Feng, J. (2020). The effect of enrichment media on the stimulation of native ureolytic bacteria in calcareous sand. International Journal of Environmental Science and Technology, 17(3), 1795-1808. <https://doi.org/10.1007/s13762-019-02541-x>
- [5]. Zhou, N., **Han, X. L.**, Zhang, J. X., & Li, M. (2016). Compressive deformation and energy dissipation of crushed coal gangue. Powder Technology, 297, 220-228. <https://doi.org/10.1016/j.powtec.2016.04.026>
- [6]. Tai, Y., Ju, F., & **Han, X. L* (Corresponding author)**. (2019). Investigation of the kinetic energy transformation pattern of gangue particles in a buffer system. Powder Technology, 344, 926-936. <https://doi.org/10.1016/j.powtec.2018.12.077>
- [7]. Li, B., Jiang N.J.,& **Han,X. L.** (2023) Denoising of Brillouin gain spectrum images for improved dynamic measurements of BOTDR, IEEE Photonics Journal. <https://doi.org/10.1109/JPHOT.2023.3291465>.
- [8]. Li, B.;Jiang, N. J.; & **Han, X. L.** (2023) Denoising of BOTDR Dynamic Strain Measurement Using Convolutional Neural Networks. Sensors, 23, 1764. <https://doi.org/10.3390/s23041764>
- [9]. Wang, Y. J., Jiang, N. J., **Han, X. L.**, Doygun, O., & Du, Y. J. (2022). Shear behavior of bio-cemented calcareous sand treated through bio-stimulation under the direct shear condition. Bulletin of Engineering Geology and the Environment, 81(10), 413. <https://doi.org/10.1007/s10064-022-02907-5>
- [10]. Wang, Y. J., Jiang, N. J., **Han, X. L.**, Liu, K., & Du, Y. J. (2022). Biochemical, strength and erosional characteristics of coral sand treated by bio-stimulated microbial induced calcite precipitation. Acta Geotechnica, 1-13. <https://doi.org/10.1007/s11440-022-01491-y>
- [11]. Wang, Y. J., Jiang, N. J., **Han, X. L.**, & Du, Y. J. (2023). Shear behavior of biochar-amended biocemented calcareous sand

treated by biostimulation. International Journal of Geomechanics, 23(1), 04022260. [https://doi.org/10.1061/\(ASCE\)GM.1943-5622.0002634](https://doi.org/10.1061/(ASCE)GM.1943-5622.0002634)

- [12]. Goli, V. S. N. S., Paleologos, E. K., Farid, A., Mohamed, A. M. O., O'Kelly, B. C., El Gamal, M. M., ... **Han, X. L.** etc. (2024). Extraction, characterisation and remediation of microplastics from organic solid matrices. Environmental Geotechnics, 11(4), 259-292. <https://doi.org/10.1680/jenge.21.00072>
- [13]. Wang, Y. J., Chen, W. B., Yin, J. H., **Han, X. L.**, Zhang, Y., Du, Y. J., & Jiang, N. J. (2024). Role of Biochar in Drained Shear Strength Enhancement and Ammonium Removal of Biostimulated MICP-Treated Calcareous Sand. Journal of Geotechnical and Geoenvironmental Engineering, 150(2), 04023140. <https://doi.org/10.1061/JGGEFK.GTENG-11809>
- [14]. Wang, Y., Jiang, N., Saracho, A. C., Doygun, O., Du, Y., & **Han, X. L.** (2023). Compressibility characteristics of bio-cemented calcareous sand treated through the bio-stimulation approach. Journal of Rock Mechanics and Geotechnical Engineering, 15(2), 510-522. <https://doi.org/10.1016/j.jrmge.2022.05.007>
- [15]. Jiang, N. J., Wang, Y. J., Chu, J., Kawasaki, S., Tang, C. S., Cheng, L., ... **Han, X. L.** & Wang, Y. Z. (2022). Bio-mediated soil improvement: An introspection into processes, materials, characterization and applications. Soil Use and Management, 38(1), 68-93. <https://doi.org/10.1111/sum.12736>
- [16]. Liu, K. W., Jiang, N. J., Qin, J. D., Wang, Y. J., Tang, C. S., & **Han, X. L.** (2021). An experimental study of mitigating coastal sand dune erosion by microbial-and enzymatic-induced carbonate precipitation. Acta Geotechnica, 16, 467-480. <https://doi.org/10.1007/s11440-020-01046-z>

Conference papers

- [17]. **Han, X. L.**, Jiang, N. J., Wang, Y. J., & Guo, K. X. (2023). Desiccation crack characterization in clay using deep learning based video instance segmentation method. In Smart Geotechnics for Smart Societies (pp. 2013-2021). CRC Press.
- [18]. **Han, X. L.**, Jiang, N. J., & Wang, Y. J. (2021). A laboratory investigation of coastal sand stabilization using biochar-enhanced alkali-activated slag. Japanese Geotechnical Society Special Publication, 9(6), (pp. 292-295).
- [19]. **Han, X. L.**, Jiang, N. J., & Wang, Y. J. (2020, February). Stabilization of calcareous sand by applying the admixture of alkali-activated slag (AAS) and biochar. In Geo-Congress 2020: Foundations, Soil Improvement, and Erosion (pp. 469-475). Reston, VA: American Society of Civil Engineers.
- [20]. Wang, Y. J., **Han, X. L.**, Zhang, Y., & Jiang, N. J. (2023). A preliminary study on the enrichment of indigenous ureolytic and nitrifying bacteria in beach sand: Implication for coastal erosion control. In Proc., 9th Int. Congress on Environmental Geotechnics. Chania, Greece: Auspices of the International Society for Soil Mechanics and Geotechnical Engineering..
- [21]. Jiang, Ning-Jun, **Han, Xiaole**, Wang, Yijie & Du, Yan. (2022). Shear strength behavior of bio-cemented carbonate sand treated by biochar- enhanced bio-stimulation approach.
- [22]. Wang, Y. J., **Han, X. L.**, & Jiang, N. J. (2018). Enriching indigenous ureolytic bacteria in coastal beach sand. In the international congress on environmental geotechnics (pp. 340-347). Springer, Singapore.
- [23]. Wang, Y. J., **Han, X. L.**, and Jiang, N. J. (2018). A preliminary study on the enrichment of indigenous ureolytic and nitrifying bacteria in beach sand: implication for coastal erosion control. In Proceedings of B2G symposium, Atlanta, USA.

Patterns

- [24]. Zhang, J. X., **Han, X. L.**, Zhang, Q., Lan, L. X., Chen, Y., & Tai, Y. (2020). Method for determining physical similarity simulation material of solid backfill body. Patent No. US10697873B2. Washington, DC: U.S. Patent and Trademark Office.
- [25]. Zhang, J. X., Zhang, Q., Mei, M. C., Fang, K., & **Han, X. L.** (2020). Method for recovering room-mining coal pillars by solid filling in synergy with artificial pillars. Patent No. US10612378B2. Washington, DC: U.S. Patent and Trademark Office.
- [26]. Zhang, J. X., Fang, K., An, B. F., **Han, X. L.**, Yan, H., & Quan, K. (2018). Consolidated solid strip backfill mining method for coal mine. Patent No. WO2018045633.
- [27]. Zhang, J. X., **Han, X. L.**, Fang, K., Zhang, Q., Chen, Y. D., & Zhong, S. J. (2017). A method for determining the size and spacing of artificial pillars for recycling room pillars in coal mine. Patent No. CN201710161348.2. Beijing, China National Intellectual Property Administration.

Awards & Scholarships

2018	E.E. Black Scholarship in Civil and Environmental Department, University of Hawaii at Manoa, US
2016	Scholarship of Merits Graduate in China University of Mining and Technology (Grade 1), China
2013	Excellent Student Cadre in Jiangsu Province, China
2013	Meritorious Prize of the 2013 Interdisciplinary Contest in Modeling (ICM), COMAP Ranking 95/957, US
2013	Global Undergraduate Exchange Program Scholarship, U.S. Department of the State, US
2012	Scholarship of Merits Undergraduate in China University of Mining and Technology (Grade 2), China
2012	Second Prize of the 2011 China Society of Electronic Engineering Math Modeling Competition, China

Service & Activities

Journal Reviewer

- [1]. Journal of Rock Mechanics and Geotechnical Engineering
- [2]. Biogeotechnics
- [3]. Scientific Reports
- [4]. Journal of Materials in Civil Engineering
- [5]. Soils and Foundations
- [6]. International Journal of Geosynthetics and Ground Engineering
- [7]. Energy Science & Engineering
- [8]. The Journal of Geophysics and Engineering
- [9]. Environmental Earth Sciences
- [10]. Regional Studies in Marine Science

Skills

Programming: Python, Matlab

Software: AutoCAD, Pix4D, Agisoft Metashape, Cloud compare, Meshlab, EDEM, SLOPEW, SEEPW, RocFall 3

Language: Professional English, Native Chinese