

YANG LI

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Department of Civil and Environmental Engineering, Northwestern University, Evanston, IL, USA

EDUCATION

Doctor of Philosophy, The University of Tokyo, Japan Sep 2019 - Sep 2022

Master of Engineering, Tongji University, China Sep 2016 - Jul 2019

Bachelor of Engineering, Tongji University, China Sep 2012 - Jul 2016

WORK EXPERIENCE

Postdoctoral Scholar Dec 2022 - Nov 2024
Department of Civil and Environmental Engineering, Northwestern University *Evanston, IL, USA*

Guest User March 2023 - Nov 2024
GSECARS, The University of Chicago, Argonne National Lab *Lemont, IL, USA*

Postdoctoral Researcher Sep 2022 - Nov 2022
Industrial of Institute Science, The University of Tokyo *Tokyo, Japan*

RESEARCH EXPERIENCE

Department of Civil and Environmental Engineering, Northwestern University Dec 2022 - present

Advisor: Prof. Giuseppe Buscarnera

- Coevolution of particle size and shape during particle breakage using DEM simulations and X-ray computed tomography.
- Generalization of continuum breakage mechanics (CBM) model incorporating shape effects.

Profesional skills: LS-DEM, PFC3D, MATLAB, Avizo, ImageJ, OCT

GSECARS, The University of Chicago, Argonne National Lab March 2023 - Nov 2024

Mentor: Dr. Mark Rivers

- Particle crushing tests with synchronized X-ray microtomography.

Profesional skills: X-ray computed tomography

Institute of Industrial Science, The University of Tokyo Sep 2019 - Dec 2022

Supervisor: Prof. Reiko Kuwano, co-supervisor: Prof. Junichi Koseki

- Microscopic investigation on non-spherical granular materials using DEM and X-ray.
- Laboratory element tests on the effects of particle shape and surface roughness of granular materials.
- Application of wave measurements to correlate the elastic waves with soil fabric and soil stiffness.
- Imaging processing techniques for the particle shape and surface roughness quantification.

Professional skills: LAMMPS, MATLAB, advanced triaxial testing, dynamic wave measurement, QICPIC, optical interferometer

Department of Geotechnical Engineering, Tongji University

Oct 2015 - Aug 2019

Supervisor: Prof. Zhiyong Ai

- Analytical theory and FEM-BEM method on the dynamic response of multilayered transversely isotropic media.
- Numerical modelling of transient soil-structure interactions.

Professional skills: FORTRAN, ABAQUS

PUBLICATION (* CORRESPONDING AUTHOR)

Journal Papers

1. **Li, Y.**, Buscarnera, G. (2024) Shape and force attractors for brittle granular materials during particle breakage: A numerical exploration. **xxx**, under preparation.
2. Lal, D., **Li, Y.**, Buscarnera, G. (2024) Shape Enhanced Breakage Model: Integrating Statistical Representation of Particle Shape. **xxx**, under preparation.
3. **Li, Y.**, Singh, S., Buscarnera, G. (2024) X-ray microtomography measurements of coevolving particle size and shape. **Journal of Geotechnical and Geoenvironmental Engineering**, under review.
4. Otsubo, M., **Li, Y.**, Kuwano, R., Nadimi, S., Angelidakis, V. (2023) Contact-scale insights into G0 development of non-spherical particle assembly. **Géotechnique**, under review.
5. Jiang, H., Nie, J., Debanatha, O. C., **Li, Y.*** (2024) Dynamic column collapse of dry granular materials with multi-scale shape characteristics. **Computers and Geotechnics**, accepted.
6. **Li, Y.**, Buscarnera, G. (2024) Stress transmission and strain energy storage of granular materials with non-uniform particle size and shape: A DEM analysis. **Géotechnique Letters**, accepted.
7. **Li, Y.**, Dong, Y., Jiang, H., Shi, Z. (2024) Exploring the micromechanical origin of shear response in granular materials induced by size non-uniformity. **Granular Matter**, 26:100.
8. Jiang, H., Debanatha, O. C., Chen, F., Kawamoto, R., **Li, Y.*** (2024) Analyzing the mechanical behavior of granular materials: A multi-morphological approach using spherical harmonics and LS-DEM. **Powder Technology**, 445: 120078.
9. Ye, Z., Su, R., Ai, Z., Chen, Y., **Li, Y.**, Xue, D. (2024) Vertical dynamic analysis of a rigid disc in a layered transversely isotropic unsaturated soil. **Computers and Geotechnics**, 171: 106342.
10. Jiang, H., Kawamoto, R., **Li, Y.*** (2024) Shape-induced clusters of ellipsoids during triaxial compression: a multiscale analysis using LS-DEM. **Computers and Geotechnics**, 169: 106235.
11. **Li, Y.***, Otsubo, M., Kuwano, R. (2024) Elastic waves during continuous triaxial shearing influenced by particle morphology. **Soils and Foundations**, 64(2), 101443.
12. **Li, Y.**, Otsubo, M., Vasileios, A., Kuwano, R., Nadimi, S. (2024) Exploring the micro-to-macro response of granular soils with real particle shapes by way of μ CT-aided DEM analyses. **Géotechnique**, doi.org/10.1680/jgeot.23.00162.
13. **Li, Y.***, Otsubo, M., Liu, J., Kuwano, R. (2024) Effect of particle morphology on stress and strain characteristics of granular materials during triaxial compression. **Acta Geotechnica**, 19, 2753–2773.

14. **Li, Y.***, Otsubo, M., Kuwano, R. (2023) Evaluation of soil fabric using elastic waves during load-unload. **Journal of Rock Mechanics and Geotechnical Engineering**, 15(10), 2687–2700.
15. **Li, Y.***, Otsubo, M., Kuwano, R. (2022) Interpretation of static and dynamic Young's modulus and Poisson's ratio of granular assemblies under shearing. **Computers and Geotechnics**, 142:104560.
16. **Li, Y.**, Otsubo, M., Ghaemi, A., Dutta, T., Kuwano, R. (2022). Transition of gap-graded soil fabric – shear wave measurements and dispersion relation. **Soils and Foundations**, 62(1), 101092.
17. **Li, Y.***, Otsubo, M., Kuwano, R. (2021). DEM analysis on the stress wave response of spherical particle assemblies under triaxial compression. **Computers and Geotechnics**, 133, 104043.
18. **Li, Y.***, Otsubo, M., Kuwano, R., Nadimi, S. (2021). Quantitative evaluation of surface roughness for granular materials using Gaussian filter method. **Powder Technology**, 388, 251-260.
19. Ai, Z., Ji, W., **Li, Y.**, Li, H. (2021). Dynamic response of saturated multilayered soils with elastic superstrata subjected to vertical impulsive loadings. **Applied Mathematical Modelling**, 91, 875-891.
20. **Li, Y.**, Ai, Z. (2020). Transient analysis of a fixed-head pile group in multi-layered transversely isotropic media due to horizontal loadings. **Computers and Geotechnics**, 127, 103772.
21. **Li, Y.**, Ai, Z. (2020). Horizontal transient response of a pile group partially embedded in multilayered transversely isotropic soils. **Acta Geotechnica**, 16(1), 335-346.
22. Ai, Z., Ye, Z. **Li, Y.** (2019) Quasi-static response of a multilayered transversely isotropic porothermoelastic material subjected to a cylindrical heat source. **Computers and Geotechnics**, 107:201-213.
23. Ai, Z., **Li, Y.**, Liu, C. (2018) Behavior of a multilayered transversely isotropic half space due to horizontal transient loadings. **Computers and Geotechnics**, 97:217-221.
24. Ai, Z., **Li, Y.**, Mu, J. Li, H. (2018) Transient dynamic response of multilayered saturated media subjected to impulsive loadings. **International Journal for Numerical and Analytical Methods in Geomechanics**, 42:1157-1171.

Conference Papers

1. Otsubo, M., **Li, Y.**, Kuwano, R. (2024). Sensitivity of G0 and stress-strain relation of geomaterials to grain shape and surface roughness. In E3S Web of Conferences (Vol. 544, p. 05006). EDP Sciences.
2. **Li, Y.***, Otsubo, M., Kuwano, R. (2022). Microscopic insight into the soil fabric during load-unload correlated with stress waves. In Proceedings of the 4th International Conference on Performance Based Design in Earthquake Geotechnical Engineering (Beijing 2022). PBD-IV 2022. Geotechnical, Geological and Earthquake Engineering, vol 52. Springer, Cham. **Invited theme lecture**
3. Otsubo, M., Ghaemi, A., **Li, Y.**, Kuwano, R., Dutta, T. T. Relating dynamic properties of gap-graded soils to the stress transmission in soil fabric. Proceedings of the 7th International Young Geotechnical Engineers Conference – Scott (Ed.) © 2022 Australian Geomechanics Society, Sydney Australia, ISBN 978-0-9946261-5-8

ORAL PRESENTATION

1. **Li, Y.**, Otsubo, M., Kuwano, R. Effects of granular particle morphology on mechanical responses under consistent tapping method. JSCE 77th Annual Meeting, September 2022, Japan **Outstanding presenter award**

2. **Li, Y.**, Otsubo, M., Kuwano, R. Nadimi, S., Angelidakis, V. DEM simulations on triaxial shearing using the non-spherical particles reconstructed from X-ray computed tomography. 18th UK Travelling Workshop: GeoMechanics: from Micro to Macro (GM3), December 2021, UK
3. **Li, Y.**, Otsubo, M., Kuwano, R. The influence of surface roughness on dynamic responses of spherical glass beads during triaxial compression tests. JGS 56th Annual Meeting, July 2021, Japan **Excellent presentation award**
4. **Li, Y.**, Otsubo, M., Kuwano, R. Stress wave responses of spherical granular assemblies during triaxial compression: A DEM case study. JSCE 76th Annual Meeting, September 2021, Japan
5. **Li, Y.**, Otsubo, M., Kuwano, R. The influence of particle shape and surface roughness on stress strain responses of granular materials. JGS 17th Geo-Kanto Annual Meeting, November 2020, Japan
6. **Li, Y.**, Otsubo, M., Kuwano, R. Effects of particle shape and roughness on mechanical responses of granular materials in triaxial tests. JSCE 22nd International Summer Symposium 2020 & JSCE 75th Annual Meeting, September 2020, Japan

AWARDS

2022 Invited theme lecture of 4th PBD-IV conference
 2022 Outstanding presenter award of 77th JSCE annual meeting
 2021 Excellent presentation award of 56th JGS annual meeting
 2019 Excellent master thesis award of Tongji University
 2018 National Scholarship for Graduate Student (top 3%)
 2013 National Encouragement Scholarship for undergraduate student (top 10%)
 2013, 2015 annual scholarships of Tongji University for undergraduates

PROFESSIONAL SERVICE

Guest editor of the special issue "Advances in Geotechnologies in Infrastructure Engineering" in Infrastructures

Reviewer of Géotechnique, Computers and Geotechnics, Journal of Rock Mechanics and Geotechnical Engineering, International Journal for Numerical and Analytical Methods in Geomechanics, Powder Technology, Soils and Foundations, Journal of Mountain Science
 Member of JSCE, JGS