

## Lu Jing

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### WORK EXPERIENCE

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| <b>Tsinghua University, China</b><br><i>Assistant Professor</i> in the Institute for Ocean Engineering, Tsinghua Shenzhen International Graduate School (SIGS)  | 2022-     |
| <b>Northwestern University, USA</b><br><i>Postdoctoral Fellow</i> in the Department of Chemical and Biological Engineering (Laboratory for Complex Systems and Nonlinear Dynamics in Fluids and Granular Materials) | 2018-2022 |
| <b>University of Twente, The Netherlands</b><br><i>Visiting Scholar</i> in the Multi-Scale Mechanics Group  | 2018      |
| <b>The University of Hong Kong, Hong Kong, China</b><br><i>Senior Research Assistant</i> in the Department of Civil Engineering   | 2017-2018 |

### EDUCATION

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| <b>The University of Hong Kong, Hong Kong, China</b><br><i>PhD</i> in Geotechnical Engineering<br>Advisor: Dr. Fiona Kwok<br>Dissertation: Segregation, runout and deposition of debris flow | 2013-2017 |
| <b>Tongji University, China</b><br><i>MEng</i> in Geotechnical Engineering   | 2010-2012 |
| <b>Tongji University, China</b><br><i>BEng</i> in Civil Engineering  | 2006-2010 |

### HONORS & AWARDS

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| <b>Best Paper Award for Young Researcher</b><br>International Geotechnics Symposium, Hong Kong             | 2016 |
| <b>Most Accessed Article</b><br>International Journal for Numerical and Analytical Methods in Geomechanics | 2016 |
| <b>Excellent Graduate Student Scholarship</b><br>Tongji University   | 2011 |

## GRANTS INVOLVED

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<b>A multiscale study of non-uniform granular beds</b>	2022-2025
Sponsor: National Natural Science Foundation, China PI: Lu Jing	
<b>Multiscale study of basal resistance for geophysical granular flows over complex topography</b>	2022-2025
Sponsor: Research Grants Council of Hong Kong, Hong Kong PI: Fiona Kwok	
<b>Towards a physics-based, multiscale paradigm for the modeling of debris flow entrainment</b>	2021-2024
Sponsor: Research Grants Council of Hong Kong, Hong Kong PI: Fiona Kwok	
<b>GOALI: Flow driven segregation at the particle level</b>	2019-2022
Sponsor: National Science Foundation, USA PI & Co-PIs: Richard M. Lueptow, Julio M. Ottino, Paul Umbanhowar	
<b>Study on debris flow transport mechanisms based on coupled fluid-particle method</b>	2018-2019
Sponsor: State Key Laboratory of Geohazard Prevention and Geoenvironment Protection (Chengdu University of Technology), China PI: Fiona Kwok	
<b>Experimental and numerical investigation of depositional mechanism of mountainside debris flows</b>	2017-2018
Sponsor: State Key Laboratory of Hydraulics and Mountain River Engineering (Sichuan University), China PI: Fiona Kwok	
<b>Coupled fluid-particle modeling for debris flows</b>	2015-2017
Sponsor: Research Grants Council of Hong Kong, Hong Kong PI: Fiona Kwok	

## PUBLICATIONS

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### Journal Papers

1. **Jing, L.**, Ottino, J. M., Umbanhowar, P. B., & Lueptow, R. M. (2022) Drag force in granular shear flows: regimes, scaling laws and implications for segregation. *Journal of Fluid Mechanics*, 948, A24.
2. Duan, Y., **Jing, L.**, Umbanhowar, P. B., Ottino, J. M., & Lueptow, R. M. (2022) Segregation forces in dense granular flows: Closing the gap between single intruders and mixtures. *Journal of Fluid Mechanics*, 935, R1.

3. Cui, K. F. E., Zhou, G. G. D., **Jing, L.** (2022) Particle segregation and diffusion in immersed granular shear flows. *Physical Review Fluids*, 7, 014305.
4. Yang, G. C., **Jing, L.**, Kwok, C. Y., & Sobral, Y. D. (2021) Size effects in underwater granular collapses: Experiments and LBM-DEM simulations. *Physical Review Fluids*, 6, 114302.
5. **Jing, L.**, Ottino, J. M., Lueptow, R. M., & Umbanhowar, P. B. (2021) A unified description of gravity- and kinematics-induced segregation forces in dense granular flows. *Journal of Fluid Mechanics*, 925, A29.
6. Cui, K. F. E., Zhou, G. G. D., **Jing, L.** (2021) Viscous effects on the particle size segregation in geophysical mass flows: Insights from immersed granular shear flow simulations. *Journal of Geophysical Research: Solid Earth*, 126, e2021JB022274.
7. **Jing, L.**, Ottino, J. M., Lueptow, R. M., & Umbanhowar, P. B. (2020) Rising and sinking intruders in dense granular flows. *Physical Review Research*, 2(2), 022069.
8. Cui, K. F. E., Zhou, G. G. D., **Jing, L.**, Chen, X., & Song, D. (2020) Generalized friction and dilatancy laws for immersed granular flows containing large and small particles. *Physics of Fluids*, 32, 113312.
9. Zhou, G. G. D., Cui, K. F. E., **Jing, L.**, Zhao, T., Song, D., & Huang, Y. (2020) Particle size segregation in granular mass flows with different ambient fluids. *Journal of Geophysical Research: Solid Earth*, 125, e2020JB019536.
10. Weinhart, T., Orefice, L., Post, M., Schroyen Lantman, M. P., Denissen, I. F. C., Tunuguntla, D. R., Tsang, J. M. F., Cheng, H., Shaheen, M. Y., Shi, H., Rapino, P., Grannonio, E., Losacco, N., Barbosa, J., **Jing, L.**, Alvarez Naranjo, J. E., Roy, S., Otter, W. K., & Thornton, A. R. (2020) Fast, flexible particle simulations - An introduction to MercuryDPM. *Computer Physics Communications*, 249, 107129.
11. Yang, G. C., **Jing, L.**, Kwok, C. Y., & Sobral, Y. D. (2020) Pore-scale simulation of immersed granular collapse: Implications to submarine landslides. *Journal of Geophysical Research: Earth Surface*, 125(1).
12. **Jing, L.**, Yang, G. C., Kwok, C. Y., & Sobral, Y. D. (2019) Flow regimes and dynamic similarity of immersed granular collapse: A CFD-DEM investigation. *Powder Technology*, 345, 532–543.
13. Yang, G. C., **Jing, L.**, Kwok, C. Y., & Sobral, Y. D. (2019) A comprehensive parametric study of LBM-DEM for immersed granular flows. *Computers and Geotechnics*, 114, 103100.
14. **Jing, L.**, Kwok, C. Y., & Zhao, T. (2019) Understanding dynamics of submarine landslide with coupled CFD-DEM. *Rock and Soil Mechanics*, 40(1), 388-394.
15. **Jing, L.**, Yang, G. C., Kwok, C. Y., & Sobral, Y. D. (2018) Dynamics and scaling laws of underwater granular collapse with varying aspect ratios. *Physical Review E*, 98, 042901.
16. **Jing, L.**, Kwok, C. Y., Leung, Y. F., Zhang, Z., & Dai, L. (2018) Runout scaling and deposit morphology of rapid mudflows. *Journal of Geophysical Research: Earth Surface*, 123(8), 2004–2023.
17. Duan, K., Kwok, C. Y., Wu, W., & **Jing, L.** (2018) DEM modeling of hydraulic fracturing in permeable rock: influence of viscosity, injection rate and in-situ states. *Acta Geotechnica*, 13(5), 1187–1202.
18. Meng, Y., Zhu, H. J., Kwok, C. Y., Kuo, M., **Jing, L.**, & Huang, X. (2018) Effect of coefficient of friction on arch network in shearing process under low confinement. *Powder Technology*, 335, 1–10.
19. van der Vaart, K., Thornton, A. R., Johnson, C. G., Weinhart, T., **Jing, L.**, Gajjar, P., Gray, J. M. N. T., & Ancey, C. (2018) Breaking size- segregation waves and mobility feedback in dense granular avalanches. *Granular Matter*, 20(3), 46.

20. **Jing, L.**, Kwok, C. Y., & Leung, Y. F. (2017) Micromechanical origin of particle size segregation. *Physical Review Letters*, 118, 118001.
21. **Jing, L.**, Kwok, C. Y., Leung, Y. F., & Sobral, Y. D. (2016) Characterization of base roughness for granular chute flows. *Physical Review E*, 94, 052901.
22. **Jing, L.**, Kwok, C. Y., Leung, Y. F., & Sobral, Y. D. (2016) Extended CFD–DEM for free-surface flow with multi-size granules. *International Journal for Numerical and Analytical Methods in Geomechanics*, 40(1), 62–79.

### Conference Papers

1. **Jing, L.**, Ottino, J. M., Lueptow, R. M., & Umbanhowar, P. B. (2021) Exploring shear-induced segregation in controlled-velocity granular flows. *EPJ Web of Conferences*, 249, 03012.
2. Cui, K. F. E., Zhou, G. G. D., **Jing, L.** (2021) Mechanisms of size segregation in granular flows with different ambient fluids. *EPJ Web of Conferences*, 249, 14015.
3. Thornton, A. R., Post, M., Orefice, L., Rapino, P., Roy, S., Polman, H., Shaheen, M. Y., Alvarez Naranjo, J. E., Cheng, H. Y., **Jing, L.**, Shi, H., Mbaziira, J., Roelplal, R., & Weinhart, T. (2020) Faster, more flexible particle simulations: The future of MercuryDPM. In *8th International Conference on Discrete Element Methods (DEM8)*. Jul 21–26, 2019, Enschede, The Netherlands.
4. Yang, G. C., **Jing, L.**, Kwok, C. Y., & Sobral, Y. D. (2019) A question of scaling in immersed granular collapses. In *Second International Conference on the Material Point Method (MPM2019)*. Jan 8–10, 2019, Cambridge, UK.
5. Yang, G. C., **Jing, L.**, Kwok, C. Y., & Sobral, Y. D. (2019) Simulation of pore pressure effects on granular flow dynamics. In *Second JTC1 Workshop on Triggering and Propagation of Rapid Flow-like Landslides*. Dec 3–5, 2018, Hong Kong, China.
6. **Jing, L.**, Yang, G. C., Kwok, C. Y., & Sobral, Y. D. (2018) Coupled fluid-particle modeling of submerged granular collapse. In *micro to MACRO mathematical modelling in soil mechanics*. May 29–31, 2018, Reggio Calabria, Italy.
7. Yang, G. C., **Jing, L.**, Kwok, C. Y., & Sobral, Y. D. (2018) Effects of dilation and contraction on immersed granular column collapse. In *micro to MACRO mathematical modelling in soil mechanics*. May 29–31, 2018, Reggio Calabria, Italy.
8. **Jing, L.**, Kwok, C. Y., Zhao, T. & Zhou J. (2018) Effect of particle size segregation in debris flow deposition. In *GeoShanghai International Conference 2018*. May 27–30, 2018, Shanghai, China.
9. Shen, W., Zhao, T., Dai, F., **Jing, L.** (2018) Investigation of dry debris flow impact against a rigid barrier via a discrete element approach. In *GeoShanghai International Conference 2018*. May 27–30, 2018, Shanghai, China.
10. **Jing, L.**, Kwok, C. Y., Leung, Y. F., & Sobral, Y. D. (2017). Effect of geometric base roughness on size segregation. In *EPJ Web of Conferences*: 140, 03056. Jul 3–7, 2017, Montpellier, France.
11. **Jing, L.**, Kwok, C. Y., Leung, Y. F., & Sobral, Y. D. (2017). Basal effect in mono- and bi-disperse chute flows. In *Proceedings of 7th International Conference on Discrete Element Methods (DEM7)*: 445–453. Aug 1–4, 2016, Dalian, China.

12. **Jing, L.**, Kwok, C. Y., Leung, Y. F., & Sobral, Y. D. (2015). Discrete element modelling of grain size segregation in bi-disperse granular flows down chute. In *PARTICLE-BASED METHODS IV Fundamentals and Applications*. Sep 27–30, 2015, Barcelona, Spain.
13. **Jing, L.**, Kwok, C. Y., & Leung, Y. F. (2014). A coupled CFD-DEM model for fluid-particle flows with free surface: Formulation and validation. In *Geomechanics from micro to macro* (IS-Cambridge 2014): 485–490. Sep 1–4, 2014, Cambridge, UK.

## PRESENTATIONS

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### Invited Talks

1. A particle-scale force approach to granular segregation. XIV Summer Workshop in Mathematics, University of Brasilia, Jan 19, 2021, Virtual.
2. Modelling particle size segregation in rock avalanches: Starting from the particle level. The 11th Asian Rock Mechanics Symposium, Oct 23, 2021, Virtual.
3. Modeling the flow of granular materials: A multiscale perspective. Mechanics Seminar, Department of Mathematics, University of Brasilia, Oct 13, 2021, Virtual.
4. Tackling multiscale challenges in granular-material mechanics for a more sustainable future. Department of Engineering, Durham University, Jun 3, 2021, Virtual.
5. Modeling the flow of granular materials: A multiscale perspective. SPREE Seminar Series, Northwestern University, May 5, 2021, Evanston, USA.
6. Mechanics of granular and particle-fluid systems from *micro* to *MACRO*. Department of Hydraulic Engineering, Tsinghua University, Dec 18, 2020, Virtual.
7. Discrete element method and its coupling with fluids. Department of Geotechnical Engineering, Tongji University, Jun 8 & 15, 2020, virtual.
8. Segregation, basal effect, and roles of ambient fluid in geophysical flows. Multi-Scale Mechanics Group, University of Twente, Apr 24, 2018, Enschede, The Netherlands.
9. Dynamics of particle-fluid systems from *micro* to *MACRO*. College of Water Resource and Hydropower, Sichuan University, Jun 12, 2017, Chengdu, China.
10. Continuum and discrete modeling of debris flow-related phenomena. Department of Geotechnical Engineering, Tongji University, Apr 25, 2017, Shanghai, China.

### Other Conference Presentations

1. Drag on a sphere in granular shear flows. APS March Meeting 2022, Mar 14-18, Chicago, USA.
2. Exploring shear-induced segregation in controlled-velocity granular flows. Powders and Grains 2021, Jul 5–Aug 6, 2021, Virtual.
3. Flow of highly polydisperse granular materials: starting from forces at the particle level. 17th GM3 Workshop: Geomechanics from Micro to Macro, Dec 14–15, Newcastle University, Virtual.

4. Unifying gravity- and kinematics-induced segregation forces in dense granular flows. 73rd Annual Meeting of the APS Division of Fluid Dynamics, Nov 22–24, 2020, virtual.
5. A segregation force model for mixtures. AIChE Annual Meeting, Nov 15–20, 2020, virtual.
6. Predicting size and density segregation in granular flows. Blending & Segregation Forum (BSF2019), Aug 5–8, 2019, West Lafayette, USA.
7. Driving forces in size and density segregation. 2019 APS March Meeting, Mar 4–8, 2019, Boston, USA.
8. Feedback effect of base roughness on particle size segregation in bi-disperse granular avalanche. 2017 AGU Fall Meeting, Dec 11–15, 2017, New Orleans, USA.
9. Characterization of geometric base roughness in mono- and bi-disperse chute flows. Powders & Grains 2017, Jul 3–7, 2017, Montpellier, France.
10. Experimental and numerical study of depositional mechanism of mudflows. International Geotechnics Symposium *cum* International Meeting of CSRME 14th Biennial National Congress (IGS/IMCSRME), Dec 14–17, 2016, Hong Kong, China.
11. Basal effect in mono- and bi-disperse chute flows. 7th International Conference on Discrete Element Methods (DEM7), Aug 1–4, 2016, Dalian, China.
12. Characterization of base roughness for granular chute flows. Engineering Mechanics Institute Conference 2016 (EMI2016), May 23–25, 2016, Nashville, USA.
13. Grain size segregation in chute flows. IV International Conference on Particle-Based Methods (PARTICLES 2015), Sep 27–30, 2015, Barcelona, Spain.
14. Extended CFD-DEM for fluid-particle flows with free surface. International Symposium on Geomechanics from Micro to Macro (IS-Cambridge 2014), Sep 1–4, 2014, Cambridge, UK.

## ACTIVITIES & SERVICE

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### Journal Reviewer (Selected)

Journal of Geophysical Research: Earth Surface · Landslides · Computers and Geotechnics · Granular Matter · Powder Technology · Physical Review E · Physics of Fluids · Journal of Fluid Mechanics (Assisted)

### Professional Affiliations (2019-)

American Physics Society (APS) · American Institute of Chemical Engineers (AIChE)