Yue (Olivia) Meng

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West Lafayette, IN 47907 (609) 255-6542

EDUCATION

2022 **Massachusetts Institute of Technology, Boston, Massachusetts**
Ph.D. Civil and Environmental Engineering
Advisor: Ruben Juanes
Thesis: *Photoporomechanics: A New Technique to Explore Grain-scale Mechanisms for Fluid-driven Fractures in Granular Media*

2020 **Massachusetts Institute of Technology, Boston, Massachusetts**
Master of Science in Civil and Environmental Engineering
Advisor: Ruben Juanes
Thesis: *Jamming Transition and Emergence of Fracturing in Wet Granular Media*

2018 **The University of Hong Kong, Hong Kong**
Bachelor of Engineering, Civil and Environmental Engineering
Minor in Engineering in Computer Science
Advisor: Fiona Kwok
Thesis: *Discrete Element Modeling of the Formation of Arch Network in Granular Media During Shearing Process*

PROFESSIONAL EXPERIENCE

2025 – present **Assistant Professor, Department of Civil Engineering, Purdue University**

2023 – 2024 **Stanford Icy Physics Group, Department of Geophysics, Stanford University**
Postdoctoral Scholar, Advisor: Dr. Ching-Yao Lai
- Coupling remote sensing with physics-based models to quantify the ice mélange buttressing against calving
- Combining discrete element model with graph neural network to simulate complex physics in ice mélange

2022 – 2023 **The Lai Research Group, Department of Geosciences, Princeton University**
Postdoctoral Research Associate, Advisor: Dr. Ching-Yao Lai
- Poromechanical modeling on the vulnerability of firn to hydrofracture in Greenland

2018 – 2022 **Subsurface Energy and Mechanics Lab, Massachusetts Institute of Technology**
PhD Student, Advisor: Dr. Ruben Juanes
- Experimental study on fracturing in wet granular media using photoporomechanics
- Discrete element modeling on multi-phase flow and granular mechanics: wettability control on hydraulic fracturing patterns

2015 – 2018 **Department of Civil and Environmental Engineering, The University of Hong Kong**
Undergraduate Research Assistant, Advisor: Dr. Fiona Kwok
- Experimental investigations on mechanical properties of sand-rubber mixture
- Discrete element modeling of the formation of arch network in granular media during shearing process

AWARDS

2024 Early Career Investigator Prize, APS March Meeting, GPC

2018 Hui Ying Hin Fellowship, University of Hong Kong
2018 Wing Lung Bank Ltd. Prize in Civil Engineering in Hong Kong
2018 Centenary Scholarships for Civil Engineering Students, University of Hong Kong
2017 Gammon Construction Limited Prize in Civil Engineering
2016 Chan Hon Chuen Scholarship, University of Hong Kong

JOURNAL PUBLICATIONS

Peer Reviewed Articles

Meng, Y., Lai, C. Y., Culberg, R., Shahin, M., Stearns, L., Burton, J., & Nissanka K. (2025). Seasonal Changes of Mélange Thickness Coincide with Greenland Calving Dynamics. *Nature Communications,16*, 573. 10.1038/s41467-024-55241-7

Meng, Y., Culberg, R., & Lai, C. Y. (2024). Vulnerability of Firn to Hydrofracture: Poromechanics Modeling. *Journal of Glaciology,* 1-14. 10.1017/jog.2024.47

Meng, Y., Li, W., & Juanes, R. (2023). Crossover from Viscous Fingering to Fracturing in Cohesive Wet Granular Media: A Photoporomechanics Study. *Soft Matter, 19*(37), 7136. 10.1039/D3SM00897E

Guével, A., **Meng, Y.**, Peco, C., Juanes, R., & Dolbow, J. E. (2023). A Darcy-Cahn-Hilliard Model of Multiphase Fluid-driven Fracture. *Journal of the Mechanics and Physics of Solids*, *181*, 105427. 10.1016/j.jmps.2023.105427

Meng, Y., Li, W., & Juanes, R. (2022). Fracturing in Wet Granular Media Illuminated by Photoporomechanics. *Physical Review Applied, 18*(6),064081. ** Editor's Suggestion*. 10.1103/PhysRevApplied.18.064081

Li, W., **Meng, Y.**, Primkulov, B. K., & Juanes, R. (2021). Photoporomechanics: An Experimental Method to Visualize the Effective Stress Field in Fluid-filled Granular Media. *Physical Review Applied*, *16*(2), 024043. 10.1103/PhysRevApplied.16.024043

Meng, Y., Primkulov, B. K., Yang, Z., Kwok, C. Y., & Juanes, R. (2020). Jamming Transition and Emergence of Fracturing in Wet Granular Media. *Physical Review Research*, *2*(2), 022012. 10.1103/PhysRevResearch.2.022012

Juanes, R., **Meng, Y.**, & Primkulov, B. K. (2020). Multiphase Flow and Granular Mechanics. *Physical Review Fluids*, *5*(11), 110516. 10.1103/PhysRevFluids.5.110516

Meng, Y., Zhu, H., 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. 10.1016/j.powtec.2018.05.002

INVITED TALKS

2024 Dec 11 *"Seasonal Changes of Mélange Thickness Coincide with Greenland Calving Dynamics"*, AGU Fall Meeting, 2024.
2024 Dec 10 *"3D Discrete Element Model and Continuum Theory for Granular Flow of Ice Mélange"*, AGU Fall Meeting, 2024.
2024 May 16 *"Seasonal Changes of Mélange Thickness Coincide with Greenland Calving Dynamics"*, Mathematics On Ice Forum.

2024 Apr 11 *"Bridging pore and grain-scale physics to the changing cryosphere",* Department of Earth, Atmospheric & Planetary Sciences Colloquium, MIT.

2024 Mar 19 *"Soft earth geophysics for energy and climate: from grain to landscape scales",* Department of Civil Engineering Colloquium, Purdue University.

2024 Mar 11 *"Soft earth geophysics for energy and climate: from grain to landscape scales",* Department of Civil and Environmental Engineering Colloquium, Carnegie Mellon University.

2024 Feb 29 *"Bridging pore and grain-scale physics to the changing cryosphere",* Department of Geophysics, Stanford University.

2024 Feb 13 *"Soft earth geophysics for energy and climate: from grain to landscape scales",* Department of Earth, Environmental and Planetary Sciences Colloquium, Rice University.

2024 Feb 8 *"Bridging pore and grain-scale physics to the changing cryosphere"*, Department of Earth, Environmental, and Planetary Sciences Colloquium, Washington University in St. Louis.

2023 May 5 *"Photoporomechanics: A new technique to explore grain-scale mechanisms for fluid-driven fractures in granular media"*, American Rock Mechanics Association Future Leader Webinar Series.

2023 Apr 27 *"Photoporomechanics: A new technique to explore grain-scale mechanisms for fluid-driven fractures in granular media"*, Department of Civil Engineering, McMaster University, Canada.

2022 Apr 15 *"Fracturing in wet granular media illuminated by photoporomechanics"*, Solid Earth Brown Bag, Department of Geosciences, Princeton University.

2021 Jun 2 *"Jamming transition and emergence of fracturing in wet granular media",* Earth Resources Laboratory Annual Founding Members Meeting, Massachusetts Institute of Technology.

2019 May 22 *"DEM modeling of coupled multiphase flow and granular mechanics: Wettability control on fracture patterns",* Earth Resources Laboratory Annual Founding Members Meeting, Massachusetts Institute of Technology.

MENTORING EXPERIENCE

2024 – 2025 Ben Alessio (PhD in Dr. Ching-Yao Lai Group, Stanford University)
2024 – 2025 Lexi Arlen (PhD in Dr. Earle Wilson Group, Stanford University)
Fall 2024 Qing Xia (Research assistant in Dr. Ching-Yao Lai Group, Stanford University)
Summer 2024 Jello Zhou (Undergraduate Student in Dr. Ching-Yao Lai Group, Stanford University)
Fall 2023 Judy Liu (Undergraduate Student in Dr. Ching-Yao Lai Group, Stanford University)
Spring 2023 Hugh Shields (Undergraduate Student in Dr. Ching-Yao Lai Group, Princeton University)
2022 – 2023 David Dai & Feihu Ke (PhD Students in Dr. Fiona Kwok Group, University of Hong Kong)

PROFESSIONAL ACTIVITIES

2018 – present Member, American Physical Society
2018 – present Member, American Geophysical Union

Reviewer: International Journal for Numerical and Analytical Methods in Geomechanics, SPE Journal, The Cryosphere, Physics of Fluids

CONFERENCE PARTICIPATIONS

Meng, Y., Lai, C. Y., Culberg, R., Shahin, M., Stearns, L., Burton, J., & Nissanka K, Seasonal Changes of Mélange Thickness Coincide with Greenland Calving Dynamics, *AGU Fall Meeting*, 2024.

Meng, Y., Culberg, R., Shahin, M., Stearns, L., Burton, J., Nissanka K, & Lai, C. Y., 3D Discrete Element Model and Continuum Theory for Granular Flow of Ice Mélange, *APS DFD Meeting*, 2024.

Meng, Y., Culberg, R., Shahin, M., Stearns, L., Burton, J., Nissanka K, & Lai, C. Y., 3D Discrete Element Model and Continuum Theory for Quasi-static Granular Flow of Ice Mélange, *California Geophysical Fluid Dynamics Meeting (CalGFD)*, 2024.

Meng, Y., Culberg, R., Shahin, M., Stearns, L., Burton, J., Nissanka K, & Lai, C. Y., 3D Discrete Element Model and Continuum Theory for Quasi-static Granular Flow of Ice Mélange, *Gordon Research Conference: Granular Matter*, 2024.

Alessio, B., **Meng, Y.**, Lai, C. Y., Granular Rheological Inversion from Physics-Informed Neural Networks, *Gordon Research Conference: Granular Matter*, 2024.

Meng, Y., Culberg, R., Shahin, M., Stearns, L., Burton, J., Nissanka K, & Lai, C. Y., 3D Discrete Element Model and Continuum Theory for Quasi-static Granular Flow of Ice Mélange, *APS March Meeting*, 2024.

Meng, Y., Lai, C. Y., Culberg, R., Shahin, M., Stearns, L., Burton, J., & Nissanka K, Thickness of Pro-glacial Mélange Impacts Calving Dynamics of Greenland Glaciers, *AGU Fall Meeting*, 2023.

Nissanka, K., Burton, J. C., Amundson, J. M., Robel, A., Lai, C. Y., & **Meng, Y.**, Experimental-informed Ice Mélange Rheology and Buttressing During Quasistatic Flow, *AGU Fall Meeting*, 2023.

Meng, Y., Culberg, R., Shahin, M., Stearns, L., Burton, J., Nissanka K, & Lai, C. Y., Thickness of Pro-glacial Mélange Impacts Calving Dynamics of Greenland Glaciers, *APS DFD Meeting*, 2023.

Meng, Y., Culberg, R., & Lai, C. Y., Vulnerability of Firn to Hydrofracture, Part I: Poromechanical Modeling, *EGU General Assembly*, 2023.

Culberg, R., **Meng, Y.**, & Lai, C. Y., Vulnerability of Firn to Hydrofracture, Part II: Greenland's Ice Slab Regions, *EGU General Assembly*, 2023.

Meng, Y., Culberg, R., & Lai, C. Y., Vulnerability of Firn to Hydrofracture, Part I: Poromechanical Modeling, *Future of Greenland Ice Sheet Science Workshop*, 2023.

Culberg, R., **Meng, Y.**, & Lai, C. Y., Vulnerability of Firn to Hydrofracture, Part II: Greenland's Ice Slab Regions, *Future of Greenland Ice Sheet Science Workshop*, 2023.

Meng, Y., Li, W., & Juanes, R., Photo-poroelastic Imaging of Fracturing in Wet Granular Media, *AGU Fall Meeting*, 2021.

Li, W., **Meng, Y.**, Primkulov, B. K., & Juanes, R., Photo-poromechanics: Visualizing the Evolving Effective Stress in Fluid-filled Granular Media, *AGU Fall Meeting*, 2021.

Meng, Y., Primkulov, B. K., Yang, Z., Kwok, C. Y., & Juanes, R., DEM Modeling of Coupled Multiphase Flow and Granular Mechanics: Wettability Control on Fracture Patterns, *Engineering Mechanics Institute Conference*, 2019.

Meng, Y., Primkulov, B. K., Yang, Z., Kwok, C. Y., & Juanes, R., DEM Modeling of Coupled Multiphase Flow and Granular Mechanics: Wettability Control on Fracture Patterns, *AGU Fall Meeting*, 2019.

Meng, Y., Primkulov, B. K., Yang, Z., Kwok, C. Y., & Juanes, R., DEM Modeling of Coupled Multiphase Flow and Granular Mechanics: Wettability Control on Fracture Patterns, *APS DFD Meeting*, 2019.

Meng, Y., Primkulov, B. K., Yang, Z., Kwok, C. Y., & Juanes, R., DEM Modeling of Coupled Multiphase Flow and Granular Mechanics: Wettability Control on Fracture Patterns, *Transport in Disordered Environments Seminars*, Princeton Center for Theoretical Science, 2019.

Meng, Y., Primkulov, B. K., Yang, Z., Kwok, C. Y., & Juanes, R., DEM Modeling of Coupled Multiphase Flow and Granular Mechanics: Wettability Control on Fracture Patterns, *AGU Fall Meeting*, 2018.