Yue (Olivia) Meng

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# 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

2023 – present **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

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| 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**

***Under Review***

**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.

<https://www.researchsquare.com/article/rs-3893234/v1>

***Peer Reviewed Articles***

**Meng, Y.**, Culberg, R., & Lai, C. Y. (2024). Vulnerability of Firn to Hydrofracture: Poromechanics

Modeling. *Journal of Glaciology,* accepted. [10.1017/jog.2024.47](https://doi.org/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](https://doi.org/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](https://doi.org/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](https://journals.aps.org/prapplied/abstract/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](https://doi.org/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](https://doi.org/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](https://doi.org/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](https://doi.org/10.1016/j.powtec.2018.05.002)

# INVITED TALKS

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| 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

# Summer 2024 Jello Zhou (Undergraduate Student in Dr. Ching-Yao Lai Group, Stanford University)

# 2024 – present Ben Alessio (PhD in Dr. Ching-Yao Lai Group, Stanford University)

# 2024 – present Lexi Arlen (PhD in Dr. Earle Wilson 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

# CONFERENCE PARTICIPATIONS

**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.