Stanford

Ching-Yao Lai

Assistant Professor of Geophysics

Bio

BIO

My group attacks fundamental questions in ice-dynamics, geophysics, and fluid dynamics by integrating mathematical and machine-learned models with observational data. We use our findings to address challenges facing the world, such as advancing our scientific knowledge of ice dynamics under climate change. The length scale of the systems we are interested in varies broadly from a few microns to thousands of kilometers, because the governing physical principles are often universal across a range of length and time scales. We use mathematical models, simulations, and machine learning to study the complex interactions between fluids and elasticity and their interfacial dynamics, such as multiphase flows, flows in deformable structures, and cracks. We extend our findings to tackle emerging topics in climate science and geophysics, such as understand the missing physics that governs the flow of ice sheets in a warming climate. We welcome collaborations across disciplinary lines, from geophysics, engineering, physics, applied math to computer science, since we believe combining expertise and methodologies across fields is crucial for new discoveries.

ACADEMIC APPOINTMENTS

- Assistant Professor, Geophysics
- Member, Institute for Computational and Mathematical Engineering (ICME)

ADMINISTRATIVE APPOINTMENTS

- Executive Committee Member, Topical Group on the Physics of Climate, American Physical Society (APS), (2021-2023)

HONORS AND AWARDS

- Research Scholar Award, Google Research (2023-2024)
- Lamont Postdoctoral Fellowship, Lamont-Doherty Earth Observatory, Columbia University (2018-2019)

PROFESSIONAL EDUCATION

- Ph.D., Princeton University , Mechanical and Aerospace Engineering (2018)
- B.S., National Taiwan University , Physics (2013)

LINKS

- Stanford Icy Physics Group: https://icyphysics.stanford.edu/
- Google Scholar: https://scholar.google.com/citations?user=e1kTy34AAAAJ&hl=en

Teaching

COURSES

2023-24

- Icy Geophysics: GEOPHYS 385I (Aut, Win, Spr, Sum)
- Machine Learning and the Physical Sciences: CME 215, GEOPHYS 148, GEOPHYS 248 (Spr)

STANFORD ADVISEES

Postdoctoral Faculty Sponsor

Olivia MENG

Postdoctoral Research Mentor

Stephanie Olinger