Yulong Lewis Pan (潘聿龙)

yllpan@berkeley.edu | math.berkeley.edu/ yllpan

Education

Ph.D. in Applied Mathematics
UC Berkeley, Berkeley, USA 2021 – 2026 (Expected)
Advisors: Per-Olof Persson and Michael Lindsey

B.A. in Applied Mathematics and Computer Science
UC Berkeley, Berkeley, USA 2015 – 2019

Research interests

Numerical analysis, high-order methods, iterative solvers, computational fluid mechanics, electronic structure theory, automatic mesh generation

Publications and preprints

[1] **YP** and Michael Lindsey. *Fast adaptive discontinuous basis sets for electronic structure.* arXiv preprint: 2510.21213. (2025)

[2] **YP**, Michael Lindsey and Per-Olof Persson. *Geometric adaptive smoothed aggregation multigrid for discontinuous Galerkin discretisations.* arXiv preprint: 2504.13373 (2025)

[3] William Thacher, **YP** and Per-Olof Persson. *Optimisation of a triangular Delaunay mesh generator using reinforcement learning.* Comput.-Aided Des. 103964. (2025)

[4] **YP** and Per-Olof Persson. *Half-closed discontinuous Galerkin discretisations.* JJ. Comp. Phys., Vol. 524, 113731. (2025)

[5] Arjun Narayanan, **YP** and Per-Olof Persson. *Learning topological operations on meshes with application to block decomposition of polygons.* Comput.-Aided Des. 103744. (2024)

[6] **YP** and Per-Olof Persson. *A face-upwinded spectral element method.* J. Comp. Phys., Vol. 503, 112825. (2024)

[7] **YP** and Per-Olof Persson. *High-order accurate finite difference discretisations on fully unstructured dual quadrilateral meshes.* J. Comp. Phys., Vol. 461, 11201. (2022)

[8] **YP** and Per-Olof Persson. *Agglomeration-based geometric multigrid solvers for compact discontinuous Galerkin discretisations on unstructured meshes.* J. Comp. Phys., Vol 454, 110906. (2022)

Conference proceedings

[1] Amit Nayak, **YP** and Per-Olof Persson. *Half-closed discontinuous Galerkin methods for incompressible flow problems.* AIAA SciTech 2025 Forum.

[2] **YP** and Per-Olof Persson. *A stabilised face-upwinded high-order method for incompressible flows.* AIAA Aviation 2023 Forum.

Selected awards

- Bernard Friedman Memorial Prize in Applied Mathematics, UC Berkeley (2025) [*top applied math graduate student*]
- Outstanding Graduate Instructor Award, UC Berkeley (2022)

Open source software

- **adaptiveMG:** *main developer*, available on Github
  Julia package implementing adaptive multigrid preconditioners for discontinuous Galerkin discretisations. Supports scalar equations (e.g. Poisson, advection), using different flux formulations including Interior Penalty, local DG, and more.
- **dgSCF:** *main developer*, available on Github
  Julia package for quantum chemistry simulations using adaptive discontinuous basis sets. Functionality includes self-consistent Hartree–Fock and density functional theory calculations.

Teaching experience

UC Berkeley – Graduate Student Instructor
- Fall 2021: Math 1A, Calculus
- Spring 2022: Math 124, Programming for Mathematics
- Fall 2022: Math 54, Linear Algebra
- Fall 2023: Math 221, Numerical Linear Algebra
- Fall 2023: Math 126, Partial Differential Equations
- Summer 2023: Math 128A, Numerical Analysis
- Fall 2024: Math 128A, Numerical Analysis
- Fall 2025: Math 170, Mathematical Methods for Optimisation

Conference presentations

- **Geometric adaptive smoothed aggregation multigrid for discontinuous Galerkin discretisations**, International Conference on Spectral and High Order Methods, Montréal, 2025.
- **Half-closed discontinuous Galerkin methods**, World Congress on Computational Mechanics, Vancouver, 2024.
- **A face-upwinded spectral element method**, US National Congress on Computational Mechanics, Albuquerque, 2023.
- **A stabilised face-upwinded high-order method for incompressible flows**, AIAA Aviation, San Diego, 2023.

Other activities

- Co-organiser of Computational Math Seminar, UC Berkeley
- Mentor for Directed Reading Program, UC Berkeley