# Yimin Lin

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## EDUCATION

**University of California, Berkeley**, Berkeley, CA — GPA:3.9
*Bachelor of Arts*, Mathematics, — Dec 2018
*Bachelor of Arts*, Computer Science, — Dec 2018

**Rice University**, Houston, TX — GPA:3.9
*Master of Arts*, Computational and Applied Mathematics, — Sep 2020
*Doctor of Philosophy*, Computational and Applied Mathematics, — Expected May 2024

## RESEARCH INTERESTS

Computational Fluid Dynamics, Numerical PDE, Numerical Analysis, Numerical Linear Algebra, Computational Geometry.

## RESEARCH EXPERIENCE

**Spectral Element Methods for Molten Salt Reactors** - *Argonne National Laboratory* — Jun 2021 - Present
Developing a spectral element discretization for the incompressible Navier-Stoke equations coupled with the Nernst-Planck equations. Performing large scale simulations of molten salt reactors with software Nek5000/NekCEM. A paper in preparation.

**Positivity Limiting for Nodal Entropy Stable Discontinuous Galerkin (ESDG) Methods** - *Rice University* — Nov 2020 - Present
Developing a positivity limiting approach for nodal ESDG methods using graph viscosity and convex limiting. A paper in preparation.

**ESDG Methods for Compressible Flow** - *Rice University* — Sep 2020 - Jan 2021
Developed a modal entropy stable DG formulation for compressible Navier-Stokes equations. Performed various numerical experiments verifying the robustness and accuracy of the proposed method. A paper submitted.

**Entropy Stable DG-Fourier Methods** - *Rice University* — Sep 2019 - Sep 2020
Developed a provably entropy stable DG-Fourier method on wedges through a tensor product formulation. Achieved further computational efficiency through a GPU implementation in Julia. A paper in preparation.

**Mathematical Synergy Analysis** - *UC Berkeley* — Sep 2017 - Dec 2018
Worked in Prof. Sachs' group on mathematical synergy analysis applying to radiation research. Applied statistical methods such as Monte Carlo simulation and numerical scheme for solving ODE. Two papers were published.

## EXPERIENCE

**Givens Associate** - *Argonne National Laboratory* — Jun 2021 - Present
Summer research assistant in Department of Mathematics and Computer Science at Argonne National Lab. Mentored by Misun Min and Paul Fischer.

**Reader** - *Rice University* — Aug 2019 - Present
Grader for CAAM 336: Differential Equations in Science and Engineering, and CAAM 519: Computational Science I.

**Tutor** - *SY Academy* — Aug 2017 - May 2019
Part-time tutoring for college students. Topics include Calculus, Linear Algebra, Discrete Mathematics and C++.

**Course Reader, Lab Assistant** - *UC Berkeley* — Jan 2015 - Dec 2018
Grader for Math 104: Introduction to Analysis. Lab assistant for CS 61A: structure and interpretation of computer programs and CS 61B: Data Structures.

**AWARDS**

**USNCCM16 Conference Award** - *USNCCM16* Apr, 2021
**Best Poster Award** - *SIAM CSE21* Mar, 2021
**SIAM Student Travel Awards** - *SIAM CSE21* Feb, 2021
**Dorothea Klumpke Roberts Prize** - *UC Berkeley* Dec, 2018
*Awarded to a senior or seniors who have demonstrated truly exceptional scholarship in mathematics*

**PUBLICATIONS**

[1] *Entropy stable modal discontinuous Galerkin schemes and wall boundary conditions for the compressible Navier-Stokes equations*, with J.Chan, T.Warburton, submitted to Journal of Computational Physics.

[2] *Entropy Stable Discontinuous Galerkin-Fourier methods*, Master thesis.

[3] *Simulating galactic cosmic ray effects: synergy modeling of murine tumor prevalence after exposure to two one-ion beams in rapid sequence*, with EG.Huang, R.Huang, L.Xie, P.Chang, G.Yao, B.Zhang, DW.Ham, EA.Blakely, RK.Sachs, Life Sciences in Space Research.

[4] *Synergy theory for murine Harderian gland tumors after irradiation by mixtures of high-energy ionized atomic nuclei*, with EG.Huang, M.Ebert, DW.Ham, Y.Zhang, RK.Sachs, Radiation and environmental biophysics.

**TALKS**

[1] *Developing Spectral Element Methods for Molten Salt Reactors*, ANL SASSy, Aug 2021

[2] *Entropy Stable Schemes for the Compressible Navier-Stokes Equations: Boundary conditions and Positivity Preserving Schemes*, USNCCM16, Jul 2021

[3] *Various Aspects of Entropy Stable Discontinuous Galerkin methods*, Rice CAAM seminar, Mar 2021

[4] *Entropy Stable Discontinuous Galerkin-Fourier Methods*, Master Thesis defense, Sep 2020

**POSTERS**

[1] *Entropy stable modal discontinuous Galerkin schemes and wall boundary conditions for the compressible Navier-Stokes equations*, with J.Chan, T.Warburton, poster, SIAM CSE21, Mar 2021

**SOFTWARE**

**ESDG-CNS** [github.com/yiminllin/ESDG-CNS]
Julia implementation of modal Entropy Stable Discontinuous Galerkin methods solving compressible Navier-Stokes equations. Implementation in 2D with various boundary conditions.

**ESDG-Fourier** [github.com/yiminllin/ESDG-Fourier]
Julia implementation of Entropy Stable Discontinuous Galerkin-Fourier method. Implementation in 2D, 3D, accelerated by GPU using CUDA.jl.