Vincent Wang

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Education

Rice University Houston, TX
B.S. in Mathematics, GPA: 4.0/4.0 *August 2023 – May 2027*

Research Experience

Private Distribution Testing with Prediction Jan 2024 – Present
Rice University, Department of Computer Science

- Designing algorithms for the differentially private distribution testing problems with prediction
- Advisor: Maryam Aliakbarpour

Discontinuous Galerkin (DG) Methods Apr 2024 – Dec 2024
Rice University, Department of Computational Applied Mathematics and Operations Research

- Analyzed Bernstein basis operators and algorithms for applications in discontinuous Galerkin methods
- Optimized operators for PDE simulations, resulting in over 100x speedups (at high orders, $N = 15$)
- Discovered symmetry in a DG lift matrix to reduce complexity in algorithm by 75%
- Authored Julia library BernsteinBasis.jl to easily integrate Bernstein operators into nodal schemes
- Advisor: Jesse Chan

Single-cell RNA Data Analysis Sept 2024 – Dec 2024
Rice University, Department of Computer Science

- Wrote biostatistical models in R to integrate single-cell RNA datasets with genome-wide association studies
- Investigated heuristics to determine optimal cell clustering
- Advisors: Qiliang Lai, Vicky Yao

Self-assembling Biopolymer Modelling June 2022 – Nov 2022
Stony Brook University, Department of Materials Science and Chemical Engineering

- Collaborated in team of 4 as part of larger initiative to test biopolymer-strengthened soil as concrete alternative by simulating effects of charge distribution on hydrogel formation
- Crafted molecular dynamics (LAAMPS) simulations and processed post-simulation data through original C++ and Python scripts
- Advisor: Dilip Gersappe

Directed Readings

Topics in Measure Theory, Alberto Takase Fall 2024
Topics included Banach spaces, Sobolev spaces, convolutions, Radon-Nikodym theorem

Topics in Graph Theory, Neeraja Kulkarni Fall 2023
Based on Bona's *A Walk Through Combinatorics*. Topics included Cayley's formula, Hall's theorem, Kruskal's algorithm

Presentations

- Gulf Coast Undergradute Research Symposium, *Houston, TX* Nov 2024
  Talk: Efficient Julia Implementations of Bernstein Basis Discontinuous Galerkin Methods
  Award: Outstanding Presentation in Computational Applied Mathematics and Operations Research
- SIAM TX-LA, *Waco, TX* Oct 2024
  Poster: Efficient Julia Implementations of Bernstein Basis Discontinuous Galerkin Methods
- RTG Numerical Mathematics & Scientific Computing Annual Workshop, *Houston, TX* Oct 2024
  Poster: Efficient Julia Implementations of Bernstein Basis Discontinuous Galerkin Methods
- Materials Research Society Fall Meeting, *Boston, MA* Nov 2022
  Talk: Molecular Dynamics (MD) Simulations of Soil-Strengthening Nanocomposite-Polyelectrolyte Hydrogels

Awards and Honors

- Putnam **Top 517** (Score: 28) — Dec 2023
- 3x Rice President's Honor Roll — Fall 2023, Spring 2024, Fall 2024
- **Silver Medal** at US Physics Olympiad (2x Qualifier) — May 2022
- 3x AIME Qualifier — 2021-2023
- USA Coding Olympiad Silver Contestant — Jan 2020
- Lam Research Core Values Scholarship — May 2023

Other Activities

MATH 232 Grader, *Honors Multivariable Calculus* — Spring 2024, Spring 2025

Lovett College Academic Fellow — Fall 2024, Spring 2025
Peer tutor for multivariable calculus and real analysis

COMP 182 TA, *Algorithmic Thinking* — Spring 2025

Rice Integration Bee *Problem Setter and Organizer* — Feb 2025

RiceApps | *Full-Stack Developer* — Sept 2023 – May 2024
Launched Speech Babble, a speech therapy app, on the App Store with nonprofit Texas Hearing Institute

Youth4Good English Tutoring Program | *Founder* — Sept 2019 – Aug 2023
Started an English tutoring program for students in rural China with 32 active tutors and raised $800 to support three students' education

Skills

Languages: English (native), Mandarin Chinese (proficient)
Programming: Python, Julia, Rust, Java, C/C++. Familiar with Javascript, HTML/CSS.
Other activities/interests: Social painting club (president), quiz bowl, Spectra, Chinese Student Association, Emulator programming, electronic music production/composition, matcha latte making