

Kyle Onghai

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Education

Princeton University

Ph.D. Operations Research & Financial Engineering

Princeton, NJ

August 2024 – Present

- Focus on stochastic control and mathematical finance and their application to energy markets and decentralized finance.
- Fortunate to be advised by Professor Ronnie Sircar in collaboration with Princeton's DeCenter.

University of California, Los Angeles

B.S. Mathematics, Specialization in Computing

Los Angeles, CA

September 2020 – June 2024

- Highest Honors, Honors College, Alumni Scholar's Club
- Top 500 on 81st William Lowell Putnam Mathematical Competition

Research Experience

Princeton University

Ph.D. Student

Princeton, NJ

May 2025 – Present

- Forecasting load growth from data centers and its effect on wholesale electricity prices through continuous-time stochastic processes.
- Formulating and solving the problem of expanding supply to maximize profit of a central planner to meet load growth through a stochastic control framework.
- Investigating methods for solar generators to hedge intermittency risk through decentralized physical infrastructure networks (DePINs).

Massachusetts Institute of Technology

Summer Geometry Initiative (SGI) 2023 Fellow

Cambridge, MA

July 2023 – August 2023

- Modeled clogging within three-dimensional stochastic Poisson-Voronoi foams by calculating the distribution of edge lengths and simulating in Voro++.
- Generalized a method that generates helix-free stripes in knit graph designs to handle more than two boundaries and compute the relevant harmonic interpolations in Geometry Central.
- Devised a mesh decimation algorithm based on iterated local operations that adheres to preferred edge alignment directions in libigl.

Centre de Recherches Mathématiques

12th Montreal Industrial Problem Solving Workshop

Montreal, QC

August 2022

- Built a prototype for the International Air Transport Association to map air turbulence using real-time eddy dissipation rate data.
- Incorporated pilot feedback to optimize plots for interpretability.

Moravian University

REU: Research Challenges of Computational Methods in Discrete Mathematics

Bethlehem, PA

June 2022 – August 2022

- Introduced distribution graphs in the study of chip-firing games on simple graphs.
- Classified the contractions of non-supereulerian, 2-edge-connected, graphs with maximum matching number at most 4.

Collaborative Mathematical Research Program

Undergraduate Researcher

Online

June 2021 – August 2021

- Showed that there are infinitely many k -Diophantine m -tuples over a finite field with a sufficiently large, odd prime cardinality.
- Proved a closed-form formula for the number of 3-Diophantine triples in a finite field with an odd prime cardinality.
- Developed an asymptotic formula for the number of k -Diophantine m -tuples in a finite field with an odd prime cardinality.

Stony Brook University

Simons Summer Research Fellow

Stony Brook, NY

June 2019 – August 2019

- Added photoacoustic tomography functionality to the Orthopaedic Bioengineering Lab's proprietary quantitative ultrasound machine.
- Adapted a numerical algorithm to reconstruct images of phantoms using Fourier transforms in MATLAB to the lab-specific hardware.

Publications and Presentations

Journal Articles

Hammonds, Trajan, Seoyoung Kim, Steven J. Miller, Arjun Nigam, **KO**, Dishant Saikia, and Lalit M. Sharma. "k-Diophantine m-tuples in finite fields". In: *International Journal of Number Theory* 19.04 (2023), pp. 891–912. DOI: 10.1142/S1793042123500458. URL: <https://doi.org/10.1142/S1793042123500458>.

Presentations

Fiorini, Eugene, Max Folger, **KO**, Jacob Porter, Danae Rupp, and Andrew Woldar. *Properties of Chip-Firing Distribution Graphs*. Poster presentation at JMM 2023.

Fornaci, Alberto, Adrian Ganea, Brent King, Katsiaryna Vashchankova, Javier Almonacid, Sean Bohun, Douglas Bowen, Thomas Gkelsinis, Slim Ibrahim, Michael R. Lindstrom, Joy Liu, and **KO**. *Creating a Heat Map and Building a Seasonal Diagram*. Oral presentation at 12th Montreal Industrial Problem Solving Workshop Concluding Symposium.

Hammonds, Trajan, Seoyoung Kim, Steven J. Miller, Arjun Nigam, **KO**, Dishant Saikia, and Lalit M. Sharma. *k-Diophantine m-tuples in finite fields*. Recorded oral presentation at Young Mathematician Conference (August 2021) at The Ohio State University.

Keitly, Benjamin, Samuel Murray, **KO**, Tony W. H. Wong, and Taoye Zhang. *Non-Supereulerian, 2-Edge-Connected Graphs with Matching Number at Most 4*. Poster presentation at JMM 2023.

Web Articles

Adapala, Sanjana, Sara Ansari, Shalom Abebaw Bekele Bekele, **KO**, and Andrew Spielberg. *Probabilistic Design and Analysis of Lattice Structures*. en-US. Available at <https://summergeometry.org/sgi2023/probabilistic-design-and-analysis-of-lattice-structures/>. Oct. 2023.

Altintas, Gizem, Emi Neuwald, **KO**, Hossam Saeed, and Frank Yang. "Simplifying Meshes Along Frame Fields". In preparation.

Kargi, Sahana, **KO**, Anthony Ramos, and Edward Chien. "Knitting Foliations". In preparation.

Teaching and Community Involvement

Princeton University

Teaching Assistant

Princeton, NJ

August 2025 – Present

- Teaching Probability and Stochastic Systems (ORF 309) through weekly precepts and office hours.

Massachusetts Institute of Technology

Summer Geometry Initiative (SGI) 2024 Volunteer

Cambridge, MA

July 2024 – August 2024

- Facilitated research dialogue between mentors and fellows in various topics within geometry processing including medical imaging and architectural algorithms.

Skills

Software: C/C++, Python, LaTeX, MATLAB, Lua, GNU/Linux

Languages: English (Native), Mandarin (Intermediate), Latin