

# Paul Yushin Rapoport

Philadelphia, PA

📞 +1 (518) 533-8186 • ✉ paul.rapoport.phd@gmail.com  
in paul-rapoport-266ba2291 • 🌐 Lorxus

## Summary and Portfolio

---

- Quantitative researcher and mathematics PhD. Skilled at choosing the right abstractions to understand and solve practical problems. At home using advanced statistical and analytical techniques. Expertise in Python scientific computing, mathematical modeling, and data cleaning and visualization. Has worked with large and varied datasets, including economic measures, geographic CSV, and time-series grade datasets. Willing to relocate, including to the US West Coast. Hybrid or on-site work environments preferred.
- Programming Portfolio: <https://github.com/Lorxus/Portfolio/> Varied data science, mathematical modeling, and other coding projects displaying expertise in listed technical skills.

## Technical Skills

---

**Primary Development Language:** Python

**Other Programming Languages:** R, Java, MATLAB, Lean

**Data Science Toolkit:** NumPy, Matplotlib, Looker, scikit-learn, PyTorch

**Data Management:** SQL, Excel + VBA, Google Sheets, MS Office, Github (version control)

**Statistical Techniques:** Linear/polynomial regression, Monte Carlo Markov chain sampling, time-series analysis, causal inference and Bayes nets, A/B testing & randomized controlled trials, k-means & GMM clustering

## Education

---

**University of Illinois, Chicago**

*PhD in Mathematics*

Concentration in geometric group theory with additional work in category theory and model theory

**Chicago**

*2015–Dec 2021*

**Princeton**

*BA in Mathematics*

Senior thesis in knot theory and substantial course work in molecular biology

**Princeton, NJ**

*2011–2015*

## Employment and Experience

---

### Research Grants and Programs

---

**Machine Learning Alignment and Theory Scholars**

*Scholar – Agent Foundations Track*

**San Francisco**

*2024*

- Conducted clustering-based analysis on large and varied datasets including GIS and CSV handling, studied causal inference and Bayes nets, and gained a working familiarity with frontier AI models

## Open Philanthropy, Center on Long-Term Risk

*Independent Researcher Roles*

2023–2024

Long-Term Future Scholarship program

- Conducted independent research on generalizations of imprecise probability theory for applicability to AI safety.

## Vocational

---

**University of Illinois, Chicago; Temple University**

**Chicago, Philadelphia**

*Undergrad Teaching Positions*

2015–2020, 2022–2023

Teaching and grading for math department courses, as support for research in geometric group theory

- Taught 30 total classes totaling over 1,000 undergraduates in courses from College Algebra to Calculus III
- Developed and implemented data-driven pedagogical strategies, using time-series grade analysis to improve student outcomes
- Implemented statistical modeling in Excel to identify and support at-risk students, improving classes' pass rates by an average of 8% above department average and attracting 20 students to quantitative disciplines
- Tracked stand-out students identified in the above analysis to math department programs like REUs and the Mathematical Computing Lab

**University of Illinois, Chicago**

**Chicago**

*Mathematical Computing Lab Fellow*

2016–2017

Primarily responsible for UIC's 3D modeling and printing program

- Aided 12 math majors in an undergraduate project with the coding, 3D modeling, and 3D printing necessary for their projects, which they displayed at the recurring Open House events
- Created over 100 3D prints of different mathematical objects to use as props for lectures and student gatherings

**KAIST and Princeton**

**Daejeon, Korea and Princeton, NJ**

*Research Intern*

2012–2015

Summer research in listed topics

- KAIST, 2012 – Econometrics: Used Visual Basic and random matrix theory to conduct econometric analysis of the time-series price data of over 30 commodities
- Princeton, 2013 – Molecular Biology: Transfected E. coli using CRISPR to produce enzymes and measure rate constants for methylation reactions
- Princeton, 2014–2015 – Mathematics: Wrote two expository papers on knot theory as part of my research

## Academic Publications and Other Major Work

---

- “On the profinite distinguishability of hyperbolic Dehn fillings of finite-volume 3-manifolds”, found at <https://msp.org/agt/2024/24-9/p02.xhtml>. Algebraic & Geometric Topology 24-9 (2024), 4779–4797, DOI 10.2140/agt.2024.24.4779 . Significant for using model theory, a branch of logic, as a relatively novel methodology for advancing geometric group theory.