Paul Yushin Rapoport

1324 N Broad St – Philadelphia, PA
+1 (518) 533-8186 • paul.rapoport.phd@gmail.com
paul-rapoport-266ba2291 • Lorxus

Summary and Portfolio

- Quantitative researcher with a PhD in mathematics, bridging theoretical research with practical data science applications. Specialized in advanced analytical techniques, with expertise in Python scientific computing, data cleaning and visualization, mathematical modeling, and advanced statistical analysis. Seeking to apply rigorous mathematical reasoning to complex data challenges.
- 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: Java, MATLAB, Lean

Data Science Toolkit: NumPy, Matplotlib (for visualization), scikit-learn, PyTorch

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

Education

University of Illinois – Chicago **Chicago**
PhD in Mathematics *2015–Dec 2021*
Concentration in geometric group theory with additional work in category theory and model theory

Princeton **Princeton, NJ**
BA in Mathematics *2011–2015*
Includes a senior thesis in knot theory and substantial course work in molecular biology

Employment and Experience

Vocational

Temple University **Philadelphia**
Research-Track Postdoctoral Instructor *2022–2023*
Primarily teaching of lower-level courses, with opportunities to continue research in geometric group theory

- Taught 6 total classes totaling over 250 undergraduates in Precalculus and Calculus I
- Further developed data-driven pedagogical strategies, using time-series grade analysis to improve student outcomes
- Implemented statistical modeling to identify and support at-risk students, improving classes' pass rates by 11% above department average and attracting 5 students to quantitative disciplines

University of Illinois – Chicago **Chicago**
Graduate Teaching Assistant *2015–2020*
Teaching and grading for a variety of math department courses from College Algebra to Calculus III
- Taught 25 total classes totaling over 800 undergraduates in courses from College Algebra to Calculus III
- Began use of data-driven pedagogical strategies, using time-series grade analysis to improve student outcomes
- Implemented statistical modeling to identify and support at-risk students, improving classes' pass rates by 8% above department average and attracting 12 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 undergraduate math majors in Daniel Groves's 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 **Daejon, 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 in the Rabinowitz lab to measure rate constants for methylation reactions
- Princeton, 2014–2015 – Mathematics: Wrote two expository papers on knot theory as part of my research under David Gabai

Research Grants and Programs

ML Alignment and Theory Scholars **San Francisco**
Scholar – Agent Foundations Track *2024*
Mentored by Tsvi Benson-Tilsen
- Conducted clustering-based analysis on large and varied data-sets 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.

Academic Publications and Other Major Work

- "On the profinite distinguishability of hyperbolic Dehn fillings of finite-volume 3-manifolds", found at `https://arxiv.org/abs/2102.10445`. To appear in a forthcoming issue of the Journal of Algebraic and Geometric Topology. Significant for using model theory, a branch of logic, as a methodology for advancing geometric group theory.
- MATS 6.0 Poster: "Categorical Latents A La Wentworth" `https://drive.google.com/file/d/1utluxZ-sk6eftGglCs-7GnP4kXqvuW9V/view`