Emily Ryu

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EDUCATION

Cornell University   Ithaca, NY
Ph.D. in Computer Science   2021–Present

- Advisers: Profs. Éva Tardos & Jon Kleinberg
- Coursework includes: Analysis of Algorithms, The Structure of Information Networks

Princeton University   Princeton, NJ
Bachelor of Arts in Chemistry   2017–2021

- *Certificates:* Applied & Computational Mathematics, Applications of Computing, Materials Science & Engineering
- *Overall GPA:* 3.98/4.00
- Coursework includes: Advanced Algorithm Design, Probability Theory, Economics & Computing, Combinatorics, Applied Algebra

RESEARCH EXPERIENCE

- Theory Group, Cornell University Department of Computer Science   June 2021–Present
  Advisers: Profs. Éva Tardos & Jon Kleinberg
  - Study sequential submodular optimization with applications to recommender systems.

- Princeton University Department of Computer Science   May 2020–Present
  Adviser: Prof. Matthew Weinberg
  - Study multi-item auctions to bound the Bulow-Klemperer competition complexity for independent additive buyers.
  - Senior thesis: *Bounding the Competition Complexity via Dual Flows, Discretizations, and Symmetries* (recipient of Applied and Computational Mathematics Independent Project Prize)

- Knowles Group, Princeton University Department of Chemistry   September 2018–May 2021
  Adviser: Prof. Robert Knowles
  - Developed novel photoredox catalytic method for heterocyclic olefin hydroamination (formation of functionally useful carbon-nitrogen bonds); modeled thermodynamic properties of method using density functional theory.
  - Senior thesis: *Intramolecular Benzimidazole Hydroamination Enabled by Proton-Coupled Electron Transfer*

PUBLICATIONS

[1] **E. Ryu**, H. H. Xia, G. L. Guo, and L. Zhang, "Trends in mortality of alcoholic liver disease among adults in the United States, 1999-2017", *medRxiv (pre-print)*, 2020. DOI: 10.1101/2020.06.17.20133827.

AWARDS AND HONORS

- **2021**   Phi Beta Kappa, *Princeton University*.
- **2021**   Sigma Xi, *Princeton University*.
- **2021**   Applied and Computational Mathematics Independent Project Prize, *Princeton University*, awarded for best independent research project.

- **2021** Robert T. McCay Prize, *Princeton University*, awarded for best performance on comprehensive physical chemistry prize exam.
- **2020** William Foster Memorial Prize in Chemistry, *Princeton University*, awarded to one junior for in department for outstanding academic, research, and leadership ability.
- **2018, 2019** Shapiro Prize for Academic Excellence, *Princeton University*, awarded to top 2-3% of class for range, depth, and difficulty of academic program.

Teaching Experience

- **Cornell University** (graduate)
  CS 2850: Networks*, Teaching Assistant*   Fall 2021

- **Princeton University** (undergraduate)
  COS 445: Economics & Computation*, Course Grader*   Spring 2021
  ORF 309: Probability & Stochastic Systems*, Teaching Assistant*   Spring 2021
  CHM 304: Organic Chemistry II*, Teaching Assistant*   Spring 2019 & 2020

Professional Experience

- **Valkyrie Trading**, Derivatives Trader Intern   May–August 2021
  Developed algorithms to identify mispricings in the options trading market; used in combination with volatility modeling to generate positive expectancy portfolio suggestions.

- **Five Rings Capital**, Quantitative Trading Intern   June–August 2020
  Researched cross-symbol market microstructural patterns to develop and backtest trading signals and strategies.

- **Art of Problem Solving**, Grader/Releaser   April 2017–Present
  Provide students with homework feedback for online classes covering prealgebra, algebra, geometry, number theory, combinatorics, precalculus, and olympiad-level chemistry; review feedback written by newer graders.

Service & Leadership

- **Residential College Adviser**   August 2019–May 2021
  Manage a Princeton University residence hall of 20-30 undergraduate students; advise students on academic and personal needs; foster development of a diverse and inclusive community.

- **Princeton University Mathematics Competition**, Assistant Coordinator   October 2018–November 2019
  Organized participant registration, host/student matching, guest speaker, and day-of-contest logistics.

- **CityStep Princeton**   September 2017–December 2019
  Taught weekly dance outreach classes to students at underserved public elementary schools in Trenton, NJ.

Skills

Technical: Python, Java, R   **Language:** Spanish (conversational proficiency)