

# Fangyuan Lin

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## EDUCATION

University of California, Berkeley

May. 2020 – Aug. 2024

*B.A. in Mathematics and Computer Science (GPA: 3.953/4)*

Berkeley, CA

- **Dorothea Klumpke Roberts Prize in Mathematics:** “awarded to seniors who have demonstrated truly exceptional scholarship in mathematics, with a cash prize.” [[link](#)]
- **Highest Honors in Mathematics**
- **Outstanding Undergraduate Student Instructor Award** [[link](#)]

## PUBLICATIONS & PREPRINTS

1. **Revisiting the Unicity Distance through a Channel Transmission Perspective**  
Fangyuan Lin (2024). *Preprint, Submitted for Publication.* ([arXiv:2410.14816](#))
2. **From Local Interactions to Global Patterns: An Analysis of Silk Density in Spider Webs**  
Fangyuan Lin, Jason Jiang, Seewoo Lee, Grant Yang, Norman Sheu (in preparation).
3. **Applications of the Theory of Aggregated Markov Processes in Stochastic Learning Theory**  
Fangyuan Lin (2023). *arXiv Preprint.* ([arXiv:2311.01476](#))

## RESEARCH EXPERIENCE

**Research Assistant (Optional Practical Training)**

Aug. 2024 – Present

*Research Assistant to Professor Steven N. Evans (UC Berkeley)*

Berkeley, CA

- Developed programs to identify non-isomorphic simple edge-weighted trees with the same joint distribution of the random length vector, extending the work *Recovering a Tree from the Lengths of Subtrees Spanned by a Randomly Chosen Sequence of Leaves*.
- Contributing to ongoing theoretical research in stochastic processes, focusing on extending the assumptions of mean-field interacting multi-type birth-death processes.

**Revisiting the Unicity Distance through a Channel Transmission Perspective**

May. 2024 – Oct. 2024

*Independent project supervised by Professor Per-Olof Persson (UC Berkeley)*

Berkeley, CA

- Designed and implemented algorithms to break simple substitution ciphers using frequency analysis, Markov chain Monte Carlo, and machine learning, under the supervision of Professor Persson. [[code](#)]
- Studied the expected lower bound on message length required for feasible attacks from an information-theoretic approach and presented a novel proof of the unicity distance formula using reliable communication theory, under the supervision of Professor Steven Evans. [[paper](#)]

**GeoDes (Geometry in Design) Lab, UC Berkeley**

May. 2024 – Present

*Undergraduate Researcher*

Berkeley, CA

- Collaborating on interdisciplinary research exploring geometric properties of spider web structures, including surface reconstruction, cusp points, and silk density.
- Co-authoring a paper currently in preparation, presenting findings on silk density patterns and their role in inferring structural properties of spider webs.

**When is a function of a Markov process Markov?**

May. 2023 – Aug. 2023

*Summer Undergraduate Research Fellowship (UC Berkeley)*

Berkeley, CA

- Supervised by Professor Steven N. Evans on literature review of aggregated Markov processes and stochastic learning theory and received a stipend of \$5000 as part of the Summer Undergraduate Research Fellowship.
- Presented novel applications of classical results on aggregated Markov processes to substantiate the Markovian properties of models within stochastic learning theory. [[paper](#)]

## DIRECTED READING

**Graduate-Level Differential Geometry**

May. 2024 – Present

*Supervisor: Dr. Norman Sheu (UC Berkeley)*

Berkeley, CA

- Studied *Introduction to Manifolds* by Loring W. Tu and participated in weekly half-hour discussions with Dr. Sheu.
- Developed detailed notes. The source code is available here: [[LaTeX Source Code](#)]

**Graduate-Level Information Theory**

May. 2024 – Aug. 2024

*Supervisor: Professor Steven N. Evans (UC Berkeley)*

Berkeley, CA

- Studied the classical text *Elements of Information Theory* by Joy A. Thomas and Thomas M. Cover and participated in weekly one-hour discussions with Professor Evans.
- Produced comprehensive notes and problem set solutions. [[LaTeX Source Code](#)]

ACADEMIC AWARDS AND SCHOLARSHIPS

Dorothea Klumpke Roberts Prize in Mathematics, 2023-24	<a href="#">link</a> ;	Department of Mathematics, UC Berkeley
Highest Honors in Mathematics, 2023-24;		Department of Mathematics, UC Berkeley
Outstanding (Under)Graduate Student Instructor Award, 2023-24	<a href="#">link</a> ;	The Graduate Division, UC Berkeley
High Distinction in General Scholarship 2023-24;		College of Letters and Science, UC Berkeley
High Distinction in General Scholarship 2023-24;		College of Computing, Data Sci, & Society, UC Berkeley
Summer Undergraduate Research Fellowship (\$5,000 USD), 2023	<a href="#">link</a> ;	UC Berkeley

TEACHING EXPERIENCE

<b>MATH 54: Linear Algebra &amp; Differential Equations</b>	Jan. 2024 – May. 2024
<i>Teaching Assistant for Professor Zvezdelina Stankova (UC Berkeley)</i>	Berkeley, CA
<ul style="list-style-type: none"><li>Taught 6 discussion sections per week and held 2 office hours, managing grading, proctoring, and administrative duties for a class of 56 students.</li><li>Received exceptional feedback in official course evaluations and recognized as an <b>Outstanding Undergraduate Student Instructor</b>. <a href="#">[Teaching Evaluation]</a></li></ul>	
<b>MATH 1B: Calculus</b>	Aug. 2023 – Dec. 2023
<i>Teaching Assistant for Dr. Norman Sheu (UC Berkeley)</i>	Berkeley, CA
<ul style="list-style-type: none"><li>Taught 6 discussion sections per week and held 2 office hours, managing grading, proctoring, and worksheet creation for a class of 48 students.</li><li>Received exceptional feedback in official course evaluations and recognized as an <b>Outstanding Undergraduate Student Instructor</b>. <a href="#">[Teaching Evaluation]</a></li></ul>	

OTHER EMPLOYMENT HISTORY

<b>MATH 104: Introduction to Analysis</b>	Jun. 2023 – Aug. 2023
<i>Reader for Dr. Norman Sheu (UC Berkeley)</i>	Berkeley, CA
<ul style="list-style-type: none"><li>Composed detailed grading rubrics and prepared comprehensive exam solutions.</li><li>Graded homework assignments and exams with a focus on consistency and fairness.</li></ul>	
<b>MATH 160: History of Mathematics</b>	Jan. 2023 – May. 2023
<i>Reader for Professor Ole H. Hald (UC Berkeley)</i>	Berkeley, CA
<ul style="list-style-type: none"><li>Assisted with grading assignments and supported administrative tasks for the course.</li></ul>	
<b>Mathematics &amp; Statistics Tutor</b>	Jun. 2021 – Aug. 2022
<i>Student Learning Center, UC Berkeley</i>	Berkeley, CA
<ul style="list-style-type: none"><li>Provided tutoring and academic advising for courses including MATH 1A&amp;B Calculus, MATH 54 Linear Algebra &amp; Differential Equations, and MATH 55 Discrete Mathematics.</li><li>Conducted 7 hours of tutoring per week, helping students grasp complex mathematical concepts, solve problems, and prepare for exams.</li></ul>	

TECHNICAL COURSEWORK (UC Berkeley, 2020–2024)

**Mathematics:** MATH 53 *Multivariable Calculus* (A), MATH 54 *Linear Algebra and ODE* (A+), MATH 55 *Discrete Math* (A), MATH 74 *Intro to Upper-Div Math* (A+), MATH 104 *Real Analysis* (A), MATH 106 *Probability Theory* (A+), MATH 110 *Abstract Linear Algebra* (A+), MATH 113 *Abstract Algebra* (A), MATH 115 *Number Theory* (A-), MATH 124 *Programming in Math* (A+), MATH 128A *Numerical Analysis* (A+), MATH 135 *Set Theory* (A), MATH 141 *Differential Topology* (A-), MATH 142 *Algebraic Topology* (A), MATH 160 *Math History* (A), MATH 185 *Complex Analysis* (A+), MATH 196 *Honors Thesis* (A), MATH 199 *Independent Study*, MATH 202A *Graduate Analysis* (A-), MATH 205 *Graduate Complex Analysis* (A)

**Other Technical Courses:** STAT 150 *Stochastic Processes* (A), CS 61A *Program Structures* (A), CS 61B *Data Structures* (A), CS 161 *Computer Security* (A), CS 171 *Cryptography* (A), CS 188 *Artificial Intelligence* (A+), EECS 126 *Probability & Random Processes* (A), EECS 127 *Convex Optimization* (A), PHYSICS 7A *Mechanics* (A), PHYSICS 7B *Heat & Electricity* (A)

SKILLS & MISC.

• <i>Language</i>	English (professional), Mandarin (native)
• <i>Programming</i>	C, Golang, Java, Matlab, Julia, Mathematica, Python, Scheme, SQL
• <i>Tools</i>	L <sup>A</sup> T <sub>E</sub> X, Anaconda, Git, Abode Illustrator.
• <i>Hobbies</i>	Violin, piano, running, bodybuilding, etc.