

# JIAJIE (JERRY) LUO

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## EMPLOYMENT

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### Postdoctoral Researcher

September 2024 – Present

The Knowledge Lab

University of Chicago

Faculty Mentor: Professor James Evans

### Ph.D. Research Intern

June 2022 – September 2022

Mathematics, Statistics, and Data Science

Pacific Northwest National Laboratory

Mentors: Dr. Tegan Emerson; Dr. Gregory Henselman-Petrusek Roek

## EDUCATION

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### University of California, Los Angeles

September 2019 – June 2024

Ph.D. in Mathematics.

Thesis Title: Topics in Persistent Homology and Complex Social Systems

Advisor: Professor Mason Porter

### University of California, Santa Barbara

September 2017 – June 2019

M.A. in Mathematics.

Thesis Title: On Abstract Witt Rings and Quadratic Extensions

Advisor: Professor Bill Jacob

### University of California, Santa Barbara

September 2014 – June 2017

### College of Creative Studies

B.S. in Mathematics, *Highest Honors*

Faculty Advisor: Professor Jeffrey Stopple

## RESEARCH INTERESTS

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Topological Data Analysis, Persistent Homology and Applications, Complex Systems, Opinion Dynamics on Networks

## PREPRINTS & PUBLICATIONS

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**J. Luo**, G. Henselman-Petrusek, *Interval Decomposition for Persistence Modules Over a Principal Ideal Domain*, arXiv:2310.07971

G. J. Li\*, **J. Luo**\*, M. A. Porter, *Bounded-Confidence Models of Opinion Dynamics with Adaptive Confidence Bounds*, arXiv:2303.07563 (\*Equal Contribution), To Appear in *SIAM Journal on Applied Dynamical Systems*

A. Hickok\*, B. Jarman\*, M. C. Johnson\*, **J. Luo**\*, M. A. Porter, *Persistent Homology for Resource Coverage: A Case Study of Access to Polling Sites*, arXiv:2206.04834 (\*Equal Contribution), Published in *SIAM Review*

V. Chayes, K. Miller, R. Bhalerao, **J. Luo**, W. Zhu, A. Bertozzi, W. Liao, S. Osher, *Pre-Processing and Classification of Hyperspectral Imagery Via Selective Inpainting*, Published in *ICASSP2017*

## EXPOSITORY ARTICLES

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G. J. Li, **J. Luo**, K. Peng, and M. A. Porter. *Using Mathematics to Study How People Influence Each Other's Opinions*, arXiv:2307.01915, To Appear in *Frontiers for Young Minds*.

## AWARDS, HONORS & FELLOWSHIPS

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Pacific Journal of Mathematics Dissertation Prize	2024
ModELing and uNdersTanding human behaviOR (MENTOR) Fellowship	2021–2022
College of Creative Studies Commencement Speaker	2017
Adil Yaqub is my Hero Scholarship	2016

## TALKS & PRESENTATION

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<b>Southern California Applied Mathematics Symposium (SOCAMS)</b> Bounded-Confidence Models of Opinion Dynamics with Adaptive Confidence Bounds	April 2024
<b>Graduate Student Topology and Geometry Conference (GSTGC2024)</b> Interval Decomposition of Persistence Modules over a Principal Ideal Domain (Poster Session)	April 2024
<b>Joint Mathematics Meetings 2024 (JMM 2024)</b> <b>AMS Special Session on Complex Social Systems I</b> Persistent Homology for Assessing Facility Placement	January 2024
<b>2023 Algorithms for Threat Detection PI Workshop (ATD2023)</b> Bounded-Confidence Models of Opinion Dynamics with Adaptive Confidence Bounds	October 2023
<b>Computation Persistence Workshop (ComPer23)</b> Interval Decomposition for Persistence Modules of Free Abelian Groups	September 2023
<b>SIAM Conference on Applications of Dynamical Systems (DS23)</b> Bounded-Confidence Models of Opinion Dynamics with Adaptive Confidence Bounds	May 2023
<b>Southern California Applied Mathematics Symposium (SOCAMS)</b> Persistent Homology for Resource Coverage: A Case Study of Access to Polling Sites	April 2023
<b>SIAM Workshop on Network Science (NS22)</b> Bounded-Confidence Models with Adaptive Confidence Bounds	September 2022
<b>Virtual Research Symposium, Pacific Northwest National Laboratory.</b> Topological Data Analysis and Machine Learning	August 2022

## TEACHING EXPERIENCE

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<b>As Graduate Student Instructor (UCLA)</b> Math 110A: Abstract Algebra	Winter 2024
Math 115A: Linear Algebra (proof-based)	Winter 2023
<b>As Graduate Teaching Assistant (UCLA)</b> Math 31AL: Differential and Integral Calculus Laboratory	Winter 2021
Math 115A: Linear Algebra (proof-based)	Fall 2020, Spring 2021
Math 31B: Integration and Infinite Series	Spring 2020
Math 33A: Linear Algebra and Application	Winter 2020, Fall 2020, Spring 2021
Math 3B: Calculus for Life Sciences II	Fall 2019, Winter 2021
<b>As Graduate Teaching Assistant (UCSB)</b> Math 117: Methods of Analysis	Spring 2019
Math 108A: Introduction to Linear algebra (proof-based)	Winter 2019
Math 4A: Linear Algebra and Applications	Fall 2018
MATH 100B: Mathematics for Elementary Teaching II	Summer 2018

## UNDERGRADUATE MENTORING

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### Research Mentoring:

Leila Thompsky — A Bounded-Confidence Model with Adaptive Edge Weights	Fall 2023 – Present
Amos Ancell — Persistent Homology for Resource Coverage	Fall 2023 – Spring 2024
Ruyi Lu — Bounded-Confidence Models on Random Configuration Models	Winter 2023 – Fall 2023
Xinyue (Serena) Li — Persistent Homology for Resource Coverage	Winter 2023 – Spring 2023
Xiaohe (Haley) Zhang — Bounded-Confidence Models with Repulsion	Winter 2022 – Spring 2022

### Directed Reading Program:

DRP Committee	Fall 2021 – Spring 2024
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### Students:

Yuexuan (Yolanda) Wu — Models of Opinion Dynamics	Spring 2024
Leila Thompsky — Complex Social Systems	Fall 2023
Amos Ancell — Applied Topology, Persistent Homology	Winter 2023 – Spring 2023
Xinyue (Serena) Li — Applied Topology, Persistent Homology	Fall 2022 – Winter 2023
Ruyi Lu — Opinion Dynamics on Networks	Fall 2022 – Winter 2023
Haoyang Lyu — Applied Topology, Persistent Homology	Winter 2022 – Spring 2022
Chenxin (Amy) Shen — Applied Topology, Persistent Homology	Fall 2021 – Spring 2022
Xiaohe (Haley) Zhang — Opinion Dynamics on Networks	Fall 2021 – Winter 2022
Tanishq Bhatia — Topics in Persistent Homology	Winter 2021 – Spring 2021

### Other Mentoring:

Mentor for UCLA Applied Mathematics REU (ATD Traffic Challenge)	Summer 2021
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#### Students:

- Matthew Hudes (Tufts University)
- Naji Sarsam (UCLA)
- Chenxin (Amy) Shen (UCLA)
- Wenwen Tang (USC)

## MISCELLANEOUS

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Citizenship: United States  
Programming Experience: Python, MATLAB, R., C++  
Languages: Chinese (Mandarin), English.