

# RAYMOND MATSON

Website: <https://raymondmatson.com> ◇ Email: [email@raymondmatson.com](mailto:email@raymondmatson.com)

## EDUCATION

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### University of California, Riverside

2019 - 2024

Ph.D. in Mathematics under the supervision of Peter Samuelson

GPA: 3.94

Dissertation: Stated Skein Theory and Double Affine Hecke Algebra Representations

### University of California, Davis

2012 - 2017

Bachelors of Science in General Mathematics

## RESEARCH INTERESTS

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Quantum representation theory, Hecke algebras, skein theory, character varieties, (co)homology theories

## PROFESSIONAL EXPERIENCE

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### Data Annotation

June 2025 - Present

AI Data Curator

Remote

Label, tag, and curate texts, images, and audio, to create structured high-quality datasets to evaluate large language models.

- Annotate and label training large-scale texts to generate diverse and high-quality training examples for LLM development.
- Design challenging, PhD level problems that expose weaknesses in some of the best models (ChatGPT, Claude, and Gemini).
- Research and synthesize the latest STEM literature to create and expand data points for these models' knowledge base.

### HP Labs

September 2023 - September 2024

Researcher

Milpitas, CA

Engaged in cutting-edge research, both theoretically and experimentally, focusing on advancing networking technologies and machine learning solutions.

- Optimized generic power usage over multiple GPUs to reduce total carbon emission and electricity cost for ML algorithms, cryptocurrency mining, HPC, and other general GPU usages.
- Modelled and optimized configuration settings for traffic policer systems, allowing for faster and more consistent internet traffic throughput and goodput.
- Developed novel and computationally efficient queuing scheduler algorithms that achieve better metrics over standard schedulers.

### Aruba Networks

March 2017 - July 2019 & May 2023 - September 2023

Network Engineer

Roseville, CA

Set up, maintain, and troubleshoot networks, servers, virtual machines, product test cells, and other systems in the Remote Test Lab data center as a network systems administrator.

- Developed a TensorFlow neural network to predict internal product usage from tracked data through multiple MySQL databases.
- Offered cross-platform support for CentOS, RHEL, Ubuntu, and Windows clients and servers.

- Racked, cabled, and properly configured hundreds of product test cells, primarily consisting of ProCurve and Aruba devices, as well as console servers, APC power units, Ixia traffic generators, and several networks via Telnet, Putty, WinSCP, and more.
- Designed layouts for thousands of VLANs and IPs and produced scripts to implement these proposals.
- Used Ixia products to generate traffic among networking test equipment to emulate varieties of traffic and protocols.
- Used VMWare vCenter to deploy and administer thousands of virtual machine workstations throughout the lab.
- Supported converged networks for IP & FCoE connectivity on ESXi hosts for SAN/site connections.
- Constructed and managed vital infrastructure systems including DHCP, DNS, TFTP, plus six other private and public networks.

## PAPERS

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- E. Sharafzadeh, R. Matson, J. Tourrilhes, P. Sharma, S. Ghorbani, *Self-Clocked Hybrid Scheduling for Fast Packet Processing Pipelines* NSDI USENIX, 2025
- R. Matson, P. Samuelson, *Stated Skeins and DAHAs*, Knots, Skein Modules and Categorification, Contemp. Math. (To appear)
- R. Matson, E. Sharafzadeh, A. Tariq, J. Tourrilhes, P. Sharma, S. Ghorbani, *The Case for Configuring Traffic Policers for TCP Traffic* (Submitted to IEEE/ACM Transactions on Networking)
- E. Sharafzadeh, R. Matson, J. Tourrilhes, P. Sharma, *Seamless Policy Changes in Fair Scheduling* (In preparation for submission to CoNEXT 2026)

## TEACHING

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**Department Instructor**  
Mathematics Department

*June 2021 - September 2024*  
*University of California, Riverside*

Math 197: Research for Undergraduates, Spring 2022  
Algebra Qualification Exam Workshop, Summer 2022  
Algebra Qualification Exam Workshop, Summer 2021

**Teaching Assistant**  
Mathematics Department

*September 2019 - September 2024*  
*University of California, Riverside*

Math 9C: Calculus III, Spring 2024  
Math 9B: Calculus II, Winter 2024  
Math 31: Applied Linear Algebra, Fall 2023  
Math 10A: Calculus of Several Variables, Spring 2022  
Math 9B: Calculus II, Spring 2022  
Math 22: Calculus for Business, Winter 2022  
Math 4: Introduction to College Mathematics for Business, Winter 2022  
Math 31: Applied Linear Algebra, Fall 2021  
Math 10A: Calculus of Several Variables, Fall 2021  
Math 7B: Integral Calculus for Life Sciences, Fall 2021  
Math 31: Applied Linear Algebra, Spring 2021  
Math 4: Introduction to College Mathematics for Business, Winter 2021

Math 31: Applied Linear Algebra, Fall 2020  
 Math 5: Precalculus, Fall 2020  
 Math 31: Applied Linear Algebra, Spring 2020  
 Math 7A: Differential Calculus for Life Sciences, Spring 2020  
 Math 31: Applied Linear Algebra, Winter 2020  
 Math 7B: Integral Calculus for Life Sciences, Fall 2019

## CONFERENCE PRESENTATIONS & INVITED TALKS

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|                                                                                                |                                                      |
|------------------------------------------------------------------------------------------------|------------------------------------------------------|
| <b>AMS Graduate Chapter Seminar</b><br>DAHAs and Knot Complements                              | <i>Ohio University</i><br>09/19/2024                 |
| <b>USTARS 2024</b><br>Stated Skein Theory and DAHA Representations                             | <i>University of Iowa</i><br>04/20/2024              |
| <b>USTARS 2023</b><br>The Stated Skein Algebra of the Marked Torus                             | <i>University of Washington</i><br>03/18/2023        |
| <b>MSRI Workshop: New Directions in Representation Theory</b><br>Stated Skein Modules of DAHAs | <i>University of Hawai'i at Hilo</i><br>06/27/2022   |
| <b>What is Mathematics</b><br>Technology and Mathematics                                       | <i>University of California, Davis</i><br>05/01/2018 |

## UC RIVERSIDE DEPARTMENT TALKS

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|--------------------------------------------------------------------|------------|
| <b>Graduate Student Seminar</b>                                    |            |
| Representation Theory of Finite Monoids                            | 02/02/2024 |
| Getting in Line: An Introduction to Queuing Theory                 | 10/13/2023 |
| Towards Defining DAHAs                                             | 02/03/2023 |
| Research Lightning Talk                                            | 01/13/2023 |
| Stated Skein Modules of DAHAs                                      | 09/30/2022 |
| Stated Skein Theory                                                | 04/15/2022 |
| Heegaard Splittings and Dehn Surgery                               | 02/25/2022 |
| Intro to Machine Learning and Neural Networks                      | 04/02/2021 |
| The Game of Cops and Robbers on Graphs                             | 01/17/2020 |
| <b>Lie Theory Seminar</b>                                          |            |
| Quantum Groups, Part II: Representations of $U_q(\mathfrak{sl}_2)$ | 04/25/2024 |
| The Kazhdan-Lusztig Presentation                                   | 05/02/2023 |
| Stated Skein Modules of DAHAs                                      | 10/04/2022 |
| Representation Theory in the BGG Category $\mathcal{O}$            | 01/25/2022 |
| Supercharacter Theories of Pattern Groups                          | 03/03/2020 |
| <b>Math Club</b>                                                   |            |
| Quantum Representations and Skein Theory                           | 03/03/2023 |
| <b>Representation Theory Seminar</b>                               |            |
| Approaches to Hecke Algebras                                       | 02/09/2023 |
| Stated Skein Modules of DAHAs                                      | 10/13/2022 |
| Two Truths and a Lie                                               | 10/06/2022 |

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|------------------------------------------------------|------------|
| From Knot Invariants to Double Affine Hecke Algebras | 04/28/2022 |
| Quantum Groups and Skein Theory                      | 03/03/2022 |
| An Introduction to Supercharacter Theory             | 10/28/2021 |
| <b>Topology and Geometry Seminar</b>                 |            |
| Heegaard Splittings and Dehn Surgery                 | 02/23/2022 |

## SERVICE

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**Introduction to Group Theory Seminar** Winter 2024  
Organized and delivered a seminar for undergrads that were concurrently enrolled in an abstract algebra course as well as a preparatory course beforehand.

**Teaching Fellow** Fall 2023  
I provided essential mentorship and teaching training for first year graduate students, including teaching observations, individual meetings, and progress reports.

**Representation Theory Seminar** Fall 2022 - Spring 2023  
Invited and scheduled speakers for the Representation Theory seminar at UCR as well as collected and announced titles and abstracts on a weekly basis.

**Recruitment Ambassador** Fall 2022 - Spring 2023  
Attended local and national recruitment events, actively participated in recruiting efforts, communicated department research interests, and created a welcoming environment for prospective students.

**AMS Student Chapter** Fall 2021 - Spring 2022  
Co-organized UCR's AMS student chapter by scheduling events and applied for grants through the American Mathematical Society to run a Graduate Student Seminar.

**OOP in Python Workshop** February 19, 2021  
Organized and ran a workshop to teach graduate students how to code using object oriented programming in python.

## HONORS AND AWARDS

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**Vernon A. Kramer Memorial Service Award** Fall 2022 - Spring 2023  
For "going the extra mile with contributions to the mathematics department, consistently helping other grads and instructors, helping with events, and more."

**Outstanding Teaching Award** Fall 2020 - Spring 2021  
For "consistent superior teaching performance" as recognized by the Department of Mathematics and Graduate Division at UCR.

## PROGRAMMING KNOWLEDGE

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**Proficient:** Python, C/C++, Java, Perl, Tcl, LaTeX, SQL, and Bash.

**Familiar:** HTML/CSS, JavaScript, Ruby, Matlab, Mathematica, and Excel.