RAYMOND MATSON

Website: https://raymondmatson.com ⋄ Email: email@raymondmatson.com

EDUCATION

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

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

PROFESSIONAL EXPERIENCE

HP Labs *September 2023 - September 2024*
Research Intern *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 Intern *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.

- Created a neural network using TensorFlow to predict general usage of internal products, using information tracked through several different 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

R. Matson, P. Samuelson, *Stated Skeins and DAHAs*, Knots, Skein Modules and Categorification, Contemp. Math. (To appear)

E. Sharafzadeh, R. Matson, J. Tourrilhes, P. Sharma, S. Ghorbani, *Self-Clocked Hybrid Scheduling for Fast Packet Processing Pipelines* NSDI USENIX, 2025 (To appear)

D Tootaghaj, L. Cao, B. Lantz, R. Matson, P. Sharma, *A Carbon-Aware Container Platform for Heterogeneous GPU Data Centers* (In preparation for submission to SIGCOMM 2025)

R. Matson, E. Sharafzadeh, J. Tourrilhes, P. Sharma, *Optimal TCP Policer Burst Size* (In preparation for submission to SIGMETRICS 2025)

TEACHING

Department Instructor *June 2021 - September 2024*
Mathematics Department *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 *September 2019 - September 2024*
Mathematics Department *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

AMS Graduate Chapter Seminar — *Ohio University*
DAHAs and Knot Complements — 09/19/2024

USTARS 2024 — *University of Iowa*
Stated Skein Theory and DAHA Representations — 04/20/2024

USTARS 2023 — *University of Washington*
The Stated Skein Algebra of the Marked Torus — 03/18/2023

MSRI Workshop: New Directions in Representation Theory — *University of Hawai'i at Hilo*
Stated Skein Modules of DAHAs — 06/27/2022

What is Mathematics — *University of California, Davis*
Technology and Mathematics — 05/01/2018

UC RIVERSIDE DEPARTMENT TALKS

Graduate Student Seminar

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

Lie Theory Seminar

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

Math Club

Quantum Representations and Skein Theory	03/03/2023

Representation Theory Seminar

Approaches to Hecke Algebras	02/09/2023
Stated Skein Modules of DAHAs	10/13/2022
Two Truths and a Lie	10/06/2022
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

Topology and Geometry Seminar

Heegaard Splittings and Dehn Surgery	02/23/2022

SERVICE

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

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 LANGUAGES

Proficient: Python, C/C++, Java, Perl, Tcl, LaTeX, SQL, and Bash.
Familiar: HTML/CSS, JavaScript, Ruby, Matlab, Mathematica, and Excel.