

RAYMOND MATSON

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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

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

AMS Graduate Chapter Seminar

DAHAs and Knot Complements

Ohio University

09/19/2024

USTARS 2024

Stated Skein Theory and DAHA Representations

University of Iowa

04/20/2024

USTARS 2023

The Stated Skein Algebra of the Marked Torus

University of Washington

03/18/2023

MSRI Workshop: New Directions in Representation Theory

Stated Skein Modules of DAHAs

University of Hawai'i at Hilo

06/27/2022

What is Mathematics

Technology and Mathematics

University of California, Davis

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 KNOWLEDGE

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

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