Sara McAllister

PhD Candidate, Carnegie Mellon University

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Education

Carnegie Mellon University — *Pittsburgh, PA*
PhD in Computer Science, Advisors: Nathan Beckmann and Greg Ganger — *Aug. 2019 - Present*
Masters in Computer Science Research — *May 2022*

Harvey Mudd College — *Claremont, CA*
B.S. in Computer Science, Graduated with High Distinction — *Aug. 2015 - May 2019*

Honors and Awards

2022	**Graduate Student Service Award**, For the development of 15-996 CS-JEDI	*CMU*
2021	**Best Paper Award**	*SOSP*
2021	**Graduate Fellowship**, NDSEG	*DoD*
2021	**Graduate Research Fellowship**, GRFP	*NSF*
2019	**Class of '94 Award**, Outstanding CS graduate in a combination of course work, research, and service	*Harvey Mudd*
2019	**Departmental Honors**, Computer Science Department	*Harvey Mudd*
2019	**Clinic Team Award**, Outstanding performance on a team	*Harvey Mudd*
2019	**Outstanding Undergraduate Researcher Award**, Honorable Mention	*CRA*
2019	**Best Malware**, Most creative malware during capture the flag (CTF) competition	*Yelp*

Publications

CS-JEDI: Required DEI Education, by CS PhD Students, for CS PhD Students — *SIGCSE 2023*
Bailey Flanigan, Ananya Joshi, Sara McAllister, Catalina Vajiac

Kangaroo: Theory and Practice of Caching Billions of Tiny Objects on Flash — *ACM ToS*
Sara McAllister, Benjamin Berg, Julian Tutuncu-Macias, Juncheng Yang, Sathya Gunasekar, Jimmy Lu, Daniel S. Berger, Nathan Beckmann, Gregory R. Ganger — *August 2022*

Kangaroo: Caching Billions of Tiny Objects on Flash — *SOSP 2021 (Best Paper)*
Sara McAllister, Benjamin Berg, Julian Tutuncu-Macias, Juncheng Yang, Sathya Gunasekar, Jimmy Lu, Daniel S. Berger, Nathan Beckmann, Gregory R. Ganger — *Acceptance Rate: 16%*

External-memory Dictionaries in the Affine and PDAM Models — *ACM ToPC*
Michael A. Bender, Alex Conway, Martin Farach-Colton, William Jannen, Yizheng Jiao, Rob Johnson, Eric Knorr, Sara McAllister, Nirjhar Mukherjee, Prashant Pandey, Donald E. Porter, Jun Yuan, Yang Zhan — *September 2021*

The CacheLib Caching Engine: Design and Experiences at Scale — *OSDI 2020*
Benjamin Berg, Daniel S. Berger, Sara McAllister, Isaac Grosof, Sathya Gunasekar, Jimmy Lu, Michael Uhlar, Jim Carrig, Nathan Beckmann, Mor Harchol-Balter, Gregory R. Ganger — *Acceptance Rate: 18%*

Small Refinements to DAM Can Have Big Consequences for Data-Structure Design — *SPAA 2019*
Michael A. Bender, Alexander Conway, Martin Farach-Colton, William Jannen, Yizheng Jiao, Rob Johnson, Eric Knorr, Sara McAllister, Nirjhar Mukherjee, Prashant Pandey, Donald E. Porter, Jun Yuan, Yang Zhan — *Acceptance Rate: 40%*

Talks and Posters

FairyWREN: A Superb Cache Co-optimized for Write-Limited Flash	*PDL Retreat, 7 Nov 2022*
Caching on Flash: Kangaroo and Beyond	*Meta, 11 Mar 2022*
Kangaroo: Caching Billions of Objects on Flash	*Microsoft Research, 22 Nov 2021*
Kangaroo: Caching Billions of Objects on Flash	*SOSP, 27 Oct 2021*
Building a Stronger, More Just Academic Community Through Mandatory Anti-bias Learning	*UPitt Diversity Forum, 28 Jul 2021*
Kangaroo: Caching Billions of Objects on Flash	*Cache@Scale, 4 Mar 2021*
Modeling Parallelism in SSDs	*NVMW, Poster, 10 Mar 2019*
Measuring Stride Intervals using Wearable Devices for Solo and 3-legged Walking	*MSSE, Poster, 2 Jun 2017*

Professional Experience

Graduate Research Assistant
Carnegie Mellon University

ADVISORS: NATHAN BECKMANN AND GREG GANGER
Aug. 2019 - Present

- Researched caching systems to decrease cost of providing internet services at scale while maintaining performance
- Explored new memory and storage hardware interfaces, particularly for caching applications

Research Intern
Microsoft Research

MENTOR: AMAR PHANISHAYEE
Summer 2022

- Researched serving large NLP models

Research Intern
Microsoft Research

MENTOR: DANIEL BERGER
Summer 2021

- Researched in-kernel disaggregated memory solutions using CXL

Software Engineering Intern
Yelp

DATABASE TEAM
Summer 2019

- Designed and implemented a Python library to track and update MySQL users and privileges
- Planned and started gradual roll out system, fully rolled out after internship across production

Clinic Project
Harvey Mudd College

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Aug. 2018 - May 2019

- Designed and implemented consistency mechanisms on top of NFS for a two controller environment
- Provided failover protocols for both VM and controller failure
- Technical lead on team of 4 in the areas of file systems and network partitioning solutions

Undergraduate Research Assistant
UNC Chapel Hill

ADVISOR: DON PORTER
May 2018 - Aug. 2018

- Investigated the effects of parallelism in SSDs on data-structure design
- Engineered extended attributes on BetrFS, a write-optimized research file system
- Completed theoretical and experimental analysis of node size's effect on write-optimized dictionaries

Software Engineering Intern
Facebook

DEVLEPER EXPERIENCE TEAM
Summer 2017

- Developed and tested a Python library to restart and repair development servers
- Created a React and Hack PHP user interface to receive and store user inputs

Research Assistant
Harvey Mudd College

ADVISOR: ANNA AHN
May. 2016 - Jun. 2017

- Led analysis of data and comparison of three-legged walking to solo walking
- Constructed and tested an analysis package for gait in Matlab from wearable device data
- Mentored both a high school student on research project

Service and Outreach

CS-JEDI and Other DEI Initiatives
Carnegie Mellon University

COMPUTER SCIENCE DEPARTMENT, PHD PROGRAM
July 2020 - Present

- Spearheaded grass-roots development of inclusivity initiatives with 2 other PhD students
- Developed 15-996 CS-JEDI, a mandatory course about diversity, equity, and inclusivity for incoming CMU CSD PhD students
- Created about student experiences and developed 8 concrete action items to improve inclusion within department
- Awarded CMU's Graduate Student Service Award for contributions to course

PhD Admissions Committee
Carnegie Mellon University

COMPUTER SCIENCE DEPARTMENT
2021 - 2022

- PhD student in charge of reading applications for systems area

Meeting Coordinator
Carnegie Mellon University

PARALLEL DATA LAB (PDL)
Fall 2021

- Invited and scheduled talks for PDL weekly talk series

Faculty Search - Student Committee
Harvey Mudd College

COMPUTER SCIENCE DEPARTMENT
Spring 2019

- Interviewed each invited faculty candidate

Science Bus
Harvey Mudd College

VOLUNTEER AND TREASURER (APRIL 2016 - MAY 2017)
Aug. 2015 - May 2018

- Instructed 4th and 5th graders in hands-on science activities at local underserved elementary schools
- Managed ∼$3000 of grant money to ensure funding for supplies through entire year

STEAM:coders *Harvey Mudd College*
Site Coordinator and Volunteer Instructor *Summer 2016*
- Led activities for 25 middle-school aged students while students learned basic computer science concepts
- Helped students from disadvantaged communities create Scratch projects

Teaching

Carnegie Mellon University

Parallel Computer Architecture and Programming (15-418/618) *TA, Spring 2022*
Diversity, Equity, and Inclusion in Computer Science and Society (15-996) *Co-Creator and TA, Spring 2021*

Harvey Mudd College

Programming Languages (CS131) *Grader and Tutor, Spring 2019*
Introduction to Computer Systems (CS105) *Grader and Tutor, Fall 2018*
Introduction to Computer Systems (CS105) *Grader and Tutor, Spring 2018*
Data Structures and Programming Development (CS70) *Grader and Tutor, Fall 2017*
Principles of Computer Science (CS60) *Grader and Tutor, Spring 2017*
Introduction to Biology and Computer Science (CS5 Green) *Grader and Tutor, Fall 2016*

Invited Speaker

Data Center Computing (CMU 18-847C) *Spring 2022*
CS-JEDI: Intro to Justice, Equity, Diversity, and Inclusion in Computer Science (CMU 15-996) *Spring 2022*
Computer Systems (CMU 18-213) *Fall 2021*
Storage Systems (CMU 18-746) *Fall 2021*

Mentoring

Akshath Karanam (CMU ECE masters student) *Fall 2022 - Present*
Yucong (Sherry) Wang (CMU ECE undergraduate student) *Fall 2022 - Present*
Priyal Suneja (Univesity of Washington CS PhD student) *Fall 2021 - Present*
Julian Tutuncu-Macias (CMU CS undergraduate student) *Fall 2019 - Spring 2021*
Sheng Xu (CMU CS masters student) *Spring 2020*