

# Sara McAllister

PhD Candidate, Carnegie Mellon University

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## Education

### Carnegie Mellon University

PHD IN COMPUTER SCIENCE, ADVISORS: NATHAN BECKMANN AND GREG GANGER

MASTERS IN COMPUTER SCIENCE RESEARCH

Pittsburgh, PA

Aug. 2019 - Present

May 2022

### Harvey Mudd College

B.S. IN COMPUTER SCIENCE, GRADUATED WITH HIGH DISTINCTION

Claremont, CA

Aug. 2015 - May 2019

## Honors and Awards

2022	<b>Graduate Student Service Award</b> , For the development of 15-996 CS-JEDI	CMU
2021	<b>Best Paper Award</b>	SOSP
2021	<b>Graduate Fellowship</b> , NDSEG	DoD
2021	<b>Graduate Research Fellowship</b> , GRFP	NSF
2019	<b>Class of '94 Award</b> , Outstanding CS graduate in a combination of course work, research, and service	Harvey Mudd
2019	<b>Departmental Honors</b> , Computer Science Department	Harvey Mudd
2019	<b>Clinic Team Award</b> , Outstanding performance on a team	Harvey Mudd
2019	<b>Outstanding Undergraduate Researcher Award</b> , Honorable Mention	CRA
2019	<b>Best Malware</b> , 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*

Sara McAllister, Bailey Flanigan, Ananya Joshi, 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

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

ADVISORS: NATHAN BECKMANN AND GREG GANGER

Carnegie Mellon University

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

MENTOR: AMAR PHANISHAYEE

Microsoft Research

Summer 2022

- Researched serving large NLP models

### Research Intern

MENTOR: DANIEL BERGER

Microsoft Research

Summer 2021

- Researched in-kernel disaggregated memory solutions using CXL

### Software Engineering Intern

DATABASE TEAM

Yelp

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

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Harvey Mudd College

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

ADVISOR: DON PORTER

UNC Chapel Hill

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

DEVELOPER EXPERIENCE TEAM

Facebook

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

ADVISOR: ANNA AHN

Harvey Mudd College

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

COMPUTER SCIENCE DEPARTMENT, PHD PROGRAM

Carnegie Mellon University

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

COMPUTER SCIENCE DEPARTMENT

Carnegie Mellon University

2021 - 2022

- PhD student in charge of reading applications for systems area

### Meeting Coordinator

PARALLEL DATA LAB (PDL)

Carnegie Mellon University

Fall 2021

- Invited and scheduled talks for PDL weekly talk series

### Faculty Search - Student Committee

COMPUTER SCIENCE DEPARTMENT

Harvey Mudd College

Spring 2019

- Interviewed each invited faculty candidate

### Science Bus

VOLUNTEER AND TREASURER (APRIL 2016 - MAY 2017)

Harvey Mudd College

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

SITE COORDINATOR AND VOLUNTEER INSTRUCTOR

- Led activities for 25 middle-school aged students while students learned basic computer science concepts
- Helped students from disadvantaged communities create Scratch projects

Harvey Mudd College

Summer 2016

## Teaching

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### 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

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Akshath Karanam (CMU ECE masters student)

Fall 2022 - Present

Yucong (Sherry) Wang (CMU ECE undergraduate student)

Fall 2022 - Present

Priyal Suneja (University 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