

# 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

Pittsburgh, PA

Aug 2019. - Present

### Carnegie Mellon University

MASTERS IN COMPUTER SCIENCE RESEARCH

Pittsburgh, PA

Aug 2019. - May 2022

### Harvey Mudd College

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

Claremont, CA

Aug. 2015 - May 2019

## Honors and Awards

2023	<b>Best Paper Award</b>	SIGCSE
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

## Refereed Journal Publications

### 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

### 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

## Refereed Conference Publications

### CS-JEDI: Required DEI Education, by CS PhD Students, for CS PhD Students

🏆 SIGCSE 2023

Bailey Flanigan, Ananya Joshi, Sara McAllister, Catalina Vajiac

Acceptance Rate: 35%

### Kangaroo: Caching Billions of Tiny Objects on Flash

🏆 SOSP 2021

Sara McAllister, Benjamin Berg, Julian Tutuncu-Macias, Juncheng Yang, Sathya Gunasekar, Jimmy Lu, Daniel S. Berger, Nathan Beckmann, Gregory R. Ganger

Acceptance Rate: 16%

### The CacheLib Caching Engine: Design and Experiences at Scale

OSDI 2020

Benjamin Berg, Daniel S. Berger, Sara McAllister, Isaac Groszof, 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

### Overcoming Write Limitations to achieve Sustainable Flash Caching

University of Toronto, 20 Mar 2023

### 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**  
**Modeling Parallelism in SSDs**  
**Measuring Stride Intervals using Wearable Devices for Solo and 3-legged Walking**

*Cache@Scale, 4 Mar 2021*  
*NVMW, Poster, 10 Mar 2019*  
*MSSE, Poster, 2 Jun 2017*

## Leadership and Service

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### CS-JEDI and Other DEI Initiatives

Developed and implemented inclusivity initiatives with 2 other PhD students including an informal climate survey, a mandatory DEI class for CS PhD students, an advisor-advisee feedback form, and being awarded CMU's Graduate Student Service Award

*Carnegie Mellon University*  
*July 2020 - Mar. 2023*

### PhD Admissions Committee

PhD student in charge of reading applications for systems area in the Computer Science Department

*Carnegie Mellon University*  
*Dec. 2021 - Mar. 2022*

### Parallel Data Lab (PDL) Meeting Coordinator

Invited and scheduled talks for PDL weekly talk series

*Carnegie Mellon University*  
*Fall 2021*

### Introductory Course (IC) Committee

Co-organizer for first virtual orientation in the Computer Science Department

*Carnegie Mellon University*  
*Fall 2020*

### Faculty Search - Student Committee

Interviewed each invited faculty candidate for the Computer Science Department

*Harvey Mudd College*  
*Spring 2019*

### Mentor and Proctor (Residential Assistant)

Led residential activities and crisis response in East Dorm with 82 residents

*Harvey Mudd College*  
*Fall 2016 - Spring 2019*

### Science Bus Volunteer and Treasurer

Instructed 4th and 5th graders from under-resourced schools in hands-on science lessons and managed ~\$3000 of grant money (April 2016 - May 2017)

*Harvey Mudd College*  
*Aug. 2015 - May 2018*

### STEAM:coders Site Coordinator and Instructor

Led CS-related activities for 25 middle-school ages students from disadvantaged communities

*Harvey Mudd College*  
*Summer 2016*

## Teaching

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### Carnegie Mellon University

Parallel Computer Architecture and Programming (15-418/618)  
Diversity, Equity, and Inclusion in Computer Science and Society (15-996)

*TA, Spring 2022*  
*Co-Creator and TA, Spring 2021*

### Harvey Mudd College

Programming Languages (CS131)  
Introduction to Computer Systems (CS105)  
Introduction to Computer Systems (CS105)  
Data Structures and Programming Development (CS70)  
Principles of Computer Science (CS60)  
Introduction to Biology and Computer Science (CS5 Green)

*Grader and Tutor, Spring 2019*  
*Grader and Tutor, Fall 2018*  
*Grader and Tutor, Spring 2018*  
*Grader and Tutor, Fall 2017*  
*Grader and Tutor, Spring 2017*  
*Grader and Tutor, Fall 2016*

### Invited Speaker

Computer Systems (CMU 18-213/613)  
Data Center Computing (CMU 18-847C)  
CS-JEDI: Intro to Justice, Equity, Diversity, and Inclusion in Computer Science (CMU 15-996)  
Computer Systems (CMU 18-213)  
Storage Systems (CMU 18-746)

*Fall 2022*  
*Spring 2022*  
*Spring 2022*  
*Fall 2021*  
*Fall 2021*

## Mentoring

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Yucong (Sherry) Wang (CMU ECE undergraduate student)  
Akshath Karanam (CMU ECE masters student)  
Priyal Suneja (University of Washington CS PhD student)  
Julian Tutuncu-Macias (CMU CS undergraduate student)  
Sheng Xu (CMU CS masters student)  
Karina Mejia (Ontario High School)

*Fall 2022 - Present*  
*Fall 2022*  
*Fall 2021 - Summer 2022*  
*Fall 2019 - Spring 2021*  
*Spring 2020*  
*Summer 2016*

## Professional Experience

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### Graduate Research Assistant

ADVISORS: NATHAN BECKMANN AND GREG GANGER

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

*Carnegie Mellon University*

*Aug. 2019 - Present*

### Research Intern

MENTOR: AMAR PHANISHAYEE

- Researched serving large generative ML models more efficiently

*Microsoft Research*

*Summer 2022*

### Research Intern

MENTOR: DANIEL BERGER

- Researched in-kernel disaggregated memory solutions using CXL

*Microsoft Research*

*Summer 2021*

### Software Engineering Intern

DATABASE TEAM

- Designed and implemented a Python library to manage MySQL database permissions
- Planned and started gradual roll out system, fully rolled out after internship across production

*Yelp*

*Summer 2019*

### Clinic (Capstone) Project

SPONSORED BY PURE STORAGE

- Designed and implemented failover mechanisms for NFS VMs running on a two-controller system
- Technical lead, about file systems and network partitioning, on a team of 4

*Harvey Mudd College*

*Aug. 2018 - May 2019*

### Undergraduate Research Assistant

ADVISOR: DON PORTER

- Investigated theoretical and experimental analysis of write-optimized dictionaries

*UNC Chapel Hill*

*May 2018 - Aug. 2018*

### Software Engineering Intern

DEVELOPER EXPERIENCE TEAM

- 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

*Facebook*

*Summer 2017*

### Research Assistant

ADVISOR: ANNA AHN

- Led data analysis of a three-legged walking study

*Harvey Mudd College*

*May. 2016 - Jun. 2017*