

# 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

### 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 (declined)	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

### 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 Grosz, 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

Carnegie Mellon University

NATHAN BECKMANN AND GREG GANGER

Aug. 2019 - Present

- Researched systems that decrease cost of providing internet services at scale
- Analyzed traces from various caching workloads to identify important commonalities between workloads
- Simulated and implemented flash caching systems on different flash interfaces

### Microsoft Research

Remote

RESEARCH INTERN WITH AMAR PHANISHAYEE

Summer 2022

- Researched GPU acceleration for deep learning as part of Project Fiddle

## Microsoft Research

RESEARCH INTERN WITH DANIEL BERGER

- Researched in-kernel disaggregated memory solutions

*Remote*

*Summer 2021*

## Yelp

SOFTWARE ENGINEERING INTERN

- 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

*San Francisco, CA*

*Summer 2019*

## Pure Storage

HARVEY MUDD COLLEGE COMPUTER SCIENCE CLINIC

- 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

*Claremont, CA*

*Aug. 2018 - May 2019*

## Undergraduate Research Assistant

DON PORTER

- 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

*UNC Chapel Hill*

*May 2018 - Aug. 2018*

## Facebook

SOFTWARE ENGINEERING INTERN

- 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

*Menlo Park, CA*

*Summer 2017*

## Research Assistant

ANNA AHN

- 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

*Harvey Mudd College*

*May. 2016 - Jun. 2017*

## Service and Outreach

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### PhD Admissions Committee

COMPUTER SCIENCE DEPARTMENT

- PhD student in charge of reading applications for systems area

*Carnegie Mellon University*

*2021 - 2022*

### Meeting Coordinator

PARALLEL DATA LAB (PDL)

- Invited and scheduled talks for PDL weekly talk series

*Carnegie Mellon University*

*Fall 2021*

### Inclusivity Initiatives

COMPUTER SCIENCE DEPARTMENT, PhD PROGRAM

- 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 Graduate Student Service Award for contributions to course

*Carnegie Mellon University*

*July 2020 - Spring 2022*

### Faculty Search - Student Committee

COMPUTER SCIENCE DEPARTMENT

- Interviewed each invited faculty candidate

*Harvey Mudd College*

*Spring 2019*

### Science Bus

VOLUNTEER AND TREASURER (APRIL 2016 - MAY 2017)

- 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

*Harvey Mudd College*

*Aug. 2015 - May 2018*

### 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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Julian Tutuncu-Macias (CMU undergraduate student)

*Fall 2019 - Spring 2021*

Sheng Xu (CMU masters student)

*Spring 2020*