

# Sara McAllister

PhD Student, Carnegie Mellon University

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## Education

### Carnegie Mellon University

PHD IN COMPUTER SCIENCE

Pittsburgh, PA

Aug. 2019 - Present

### Harvey Mudd College

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

Claremont, CA

Aug. 2015 - May 2019

## Publications

### 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%

### 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

### 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

## Honors & Awards

2021 **Best Paper Award**

SOSP

2021 **Graduate Fellowship**, NDSEG

DoD

2021 **Graduate Research Fellowship**, GRFP (declined)

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

## Research Experience

### Graduate Research Assistant

Carnegie Mellon University

ADVISORS: NATHAN BECKMANN AND GREG GANGER

Aug. 2019 - Present

- Designed system that decreases flash write rate by 40x while improving miss ratio >10% for large-scale small-object (~100 byte) workloads
- Analyzed traces from various caching workloads to identify important commonalities between workloads
- Mentored a masters and an undergraduate student on research project

### Undergraduate Research Assistant

UNC Chapel Hill

SUPERVISOR: 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

## Research Assistant

SUPERVISOR: 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

## Industry Experience

### Microsoft Research

RESEARCH INTERN

- 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

### Facebook

SOFTWARE ENGINEERING INTERN

- Developed and tested a Python library to compare user responses and coordinate with automation systems 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

## Outreach and Service

### Inclusivity Initiatives

COMPUTER SCIENCE DEPARTMENT, PHD PROGRAM

- Spearheaded grass-roots development of inclusivity initiatives with 2 other PhD students
- Created report with student experiences and 8 concrete action items to improve diverse student experience within department
- Developed mandatory course about diversity, equity, and inclusivity for incoming PhD students

Carnegie Mellon University

July 2020 - Present

### Faculty Search - Student Committee

COMPUTER SCIENCE DEPARTMENT

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 about \$3000 of grant money to ensure funding for supplies through entire year

Harvey Mudd College

Aug. 2015 - May 2017

### STEAM:coders

SITE COORDINATOR AND VOLUNTEER INSTRUCTOR

- Led fun activities for 25 middle-school aged students while students learned basic computer science concepts
- Helped students create Scratch projects
- Coordinated parent contact including sign-in/out, admittance into program, and make-up work reminders

Harvey Mudd College

Summer 2016

## Teaching Experience

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|------|--|-------------|
| 2021 | <b>15-996 Spring</b> , Diversity, Equity, and Inclusion in Computer Science and Society, Creator and Moderator | CMU         |
| 2019 | <b>CS 131 Spring</b> , Programming Languages, Grader and Tutor   | Harvey Mudd |
| 2018 | <b>CS 105 Spring and Fall</b> , Introduction to Computer Systems, Grader and Tutor                             | Harvey Mudd |
| 2017 | <b>CS 70 Fall</b> , Data Structures and Programming Development, Grader and Tutor                              | Harvey Mudd |
| 2017 | <b>CS 60 Spring</b> , Principles of Computer Science, Grader and Tutor   | Harvey Mudd |
| 2016 | <b>CS 5 Green Fall</b> , Introduction to Biology and Computer Science, Grader and Tutor                        | Harvey Mudd |
| 2016 | <b>CS For All</b> , Introduction to CS on edX, Content development and production assistant                    | Harvey Mudd |