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 (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*

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 — *To appear*

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 — *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 — *Remote*

Research Intern with Daniel Berger — *Summer 2021*

- Researched in-kernel disaggregated memory solutions

Yelp — *San Francisco, CA*

Software Engineering Intern — *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

Pure Storage — *Claremont, CA*

Harvey Mudd College Computer Science Clinic — *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*

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

Facebook — *Menlo Park, CA*

Software Engineering Intern — *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*

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

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

Inclusivity Initiatives — *Carnegie Mellon University*

Computer Science Department, PhD program — *July 2020 - Spring 2022*

- 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

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

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*