

JAYLEN WANG

Carnegie Mellon University

Email: jaylenw@andrew.cmu.edu

Department of Electrical and Computer Engineering

Website: <https://jaylenwang7.github.io>

BRIEF BIOGRAPHY

My work bridges computer architecture and software systems, demonstrating the importance of that bridge in enabling sustainable data center systems via solutions that span the compute stack.

As the demand for web services continues to grow, data centers are scaling up to meet the demand, consuming a massive amount of energy and producing significant carbon emissions. **My research focuses on addressing the growing carbon emissions, produced both by running and manufacturing hardware, of data centers by analyzing inefficiencies across computer architecture and software systems and designing solutions to make these systems more energy and carbon efficient.**

My work is one of the first to examine the environmental impact of hyperscale web systems and to provide actionable insights to reduce it. My work integrates carbon efficiency into computer system design, as it is crucial for sustainable growth and access to critical web services in both developed and developing nations. Critically, my carbon-efficient solutions are starting to be deployed at hyperscale, reducing 0.23% of global carbon emissions by 2030—equivalent to eliminating the annual emissions of entire countries like Nigeria/Kuwait.

My research has been recognized with an IEEE Micro Top Pick, an NSF Graduate Research Fellowship Program (GRFP) Award, the 2023 Benjamin Garver Lamme/Westinghouse Graduate Fellowship, a Ford Foundation 2023 Predoctoral Fellowship Competition Honorable Mention, and the Jack and Mildred Bowers Scholarship in Engineering.

EDUCATION

Ph.D., Electrical and Computer Engineering

Advisor: Prof. Akshitha Sriraman

NSF GRFP Fellow

Dissertation Title: Enabling Sustainable Web Systems

Carnegie Mellon University

Aug 2022 - Present

B.Sc., Electrical Engineering

PIs: Profs. David Brooks & Gu-Yeon Wei

Minor in Computer Science

Graduated *Summa Cum Laude* (GPA: 4.0/4.0); *Member of Phi Beta Kappa*

Harvard University

Aug 2018 - May 2022

AWARDS AND HONORS

GreenSKU selected as an IEEE Micro Top Pick

Awarded to the top 12 computer architecture papers of 2024

2025

Finalist (2nd place) at SOSP Student Research Competition (SRC), Graduate Category

At SOSP'24 SRC, selected as finalist after poster session, and 2nd place after presenting

2024

Jack and Mildred Bowers Scholarship in Engineering

Full tuition support for third year of PhD

2024

NSF Graduate Research Fellowship Program (GRFP) Award Winner

Awarded \$171,000 as part of prestigious fellowship supporting exceptional graduate students in STEM

2023

Ford Foundation 2023 Predoctoral Fellowship Competition Honorable Mention

Honorable mention given to top Ford Fellowship candidates

2023

Benjamin Garver Lamme/Westinghouse Graduate Fellowship

Full tuition support for second year of PhD

2023

Carnegie Institute of Technology Dean's Fellow

Awarded \$83,000 towards tuition, stipend, and travel

2022

Harvard SEAS Dean's Engineering Design Award

Awarded \$500 for having one of the top 7 (out of 43) best Senior engineering design projects


2022

Sophia Freund Prize	2022
Awarded \$1000 as highest ranking undergraduate in the Electrical Engineering department	
Phi Beta Kappa Member	2022
Admitted into Harvard's chapter, one of 146 out of 1962 (7.4%) students	
Derek Bok Center Distinction in Teaching	2020, 2021
Awarded to most highly rated (by students) TAs; received distinction in three semesters	
John Harvard Scholar	2020
Award given to top 5% (4.0 GPA) of students in respective class	
Harvard College Research Program Funding Recipient	2019
Awarded \$3,500 to perform independent research during the summer	
Detur Prize Winner	2019
Recognizes students with top academic standing in their first year at Harvard	

PEER-REVIEWED CONFERENCE AND JOURNAL PUBLICATIONS

- **Jaylen Wang**, Melissa Z. Pan, Udit Gupta, and Akshitha Sriraman. *(Under submission) Title omitted to maintain anonymity*. International Conference on Architectural Support for Programming Languages and Operating Systems (**ASPLOS 2026**). March 2026.
- **Jaylen Wang**, Daniel S. Berger, Fiodar Kazhamiaka, Celine Irvine, Chaojie Zhang, Esha Choukse, Kali Frost, Rodrigo Fonseca, Brijesh Warriar, Chetan Bansal, Jonathan Stern, Ricardo Bianchini, and Akshitha Sriraman. *Enabling Sustainable Cloud Computing with Low-Carbon Server Design*. IEEE Micro. Issue: **Top Picks** in Computer Architecture from Conferences in 2024. June 2025.

Shows how, for the first time, to design and build real production-ready, low-carbon servers and how to evaluate servers' carbon-saving potential at scale prior to deployment.



- **Jaylen Wang**, Daniel S. Berger, Fiodar Kazhamiaka, Celine Irvine, Chaojie Zhang, Esha Choukse, Kali Frost, Rodrigo Fonseca, Brijesh Warriar, Chetan Bansal, Jonathan Stern, Ricardo Bianchini, and Akshitha Sriraman. *Designing Cloud Servers for Lower Carbon*. 51st International Symposium on Computer Architecture (**ISCA 2024**). June 2024. 

IEEE Micro Top Picks







Received the Artifact "Available", "Functional", and "Reproducible" ACM badges

First work to systematically show how to design cloud servers to significantly reduce cloud carbon emissions while meeting performance goals; this solution is being adopted across Microsoft Azure, saving 0.1% of global carbon emissions, which is on par with eliminating Austria/Greece's annual emissions

PEER-REVIEWED WORKSHOP PUBLICATIONS & POSTERS

- **Jaylen Wang**, Melissa Pan, Udit Gupta, and Akshitha Sriraman. *Giving Old Servers New Life at Hyper-scale*. Presented Poster at **SOSP 2024**. Nov 2024.
- **Jaylen Wang**, Asser Tantawi, Olivier Tardieu, and Akshitha Sriraman. *Making Multi-Cluster Scheduling Carbon-Aware*. 2nd Doctoral Workshop (**SysDW 2024**) held in conjunction with **SOSP 2024**. Nov 2024.
- **Jaylen Wang**, Daniel S. Berger, Fiodar Kazhamiaka, Celine Irvine, Chaojie Zhang, Esha Choukse, Kali Frost, Rodrigo Fonseca, Brijesh Warriar, Chetan Bansal, Jonathan Stern, Ricardo Bianchini, and Akshitha Sriraman. *Designing Cloud Servers for Lower Carbon*. 2nd Workshop on Hot Topics in System Infrastructure (**HotInfra 2024**) held in conjunction with **SOSP**. Nov 2024.
- **Jaylen Wang**, Melissa Pan, Udit Gupta, and Akshitha Sriraman. *Giving Old Servers New Life at Hyper-scale*. 6th Young Architect Workshop (**YArch 2024**) held in conjunction with **ASPLOS**. June 2024.
- **Jaylen Wang**, Udit Gupta, and Akshitha Sriraman. *Peeling Back the Carbon Curtain: Carbon Optimization Challenges in Cloud Computing*. 2nd Workshop on Sustainable Computer Systems (**HotCarbon 2023**). July 2023.  

Performs the first ever characterization of server generations for microservice-based web services to enable hardware lifetime extension





- Jialun Lyu, **Jaylen Wang**, Kali Frost, Chaojie Zhang, Celine Irvine, Esha Choukse, Rodrigo Fonseca, Ricardo Bianchini, Fiodar Kazhamiaka, and Daniel S. Berger. *Myths and Misconceptions Around Reducing Embedded Carbon for Cloud Platforms*. 2nd Workshop on Sustainable Computer Systems (**HotCarbon 2023**). July 2023.  
 - **Jaylen Wang**, Udit Gupta, and Akshitha Sriraman. *Giving Old Servers New Life at Hyperscale*. 1st Workshop on Hot Topics in System Infrastructure (**HotInfra 2023**) held in conjunction with **ISCA**. June 2023. 
 - **Jaylen Wang**, Udit Gupta, and Akshitha Sriraman. *Characterizing Datacenter Server Generations for Lifetime Extension and Carbon Reduction*. 1st Workshop on NetZero Carbon Computing (**NetZero 2023**) held in conjunction with **HPCA**. Feb 2023. 
 - Sahana Rangarajan, **Jaylen Wang**, Sara Mahdizadeh Shahri, Pratyush Patel, and Akshitha Sriraman. *Designing Equitable Data Center Scheduling Systems*. Career Workshop for Inclusion and Diversity in Computer Architecture (**CWIDCA 2022**) held in conjunction with **MICRO**. Oct 2022. 
- Introduces equity as a first-order design metric in modern data center scheduling systems*
- **Jaylen Wang**, Abdulrahman Mahmoud, Gu-Yeon Wei, and David Brooks. *A Dataflow-Aware Fault Resilience Analysis Framework for Deep Neural Network Accelerators*. 4th Young Architect Workshop (**YArch 2021**) held in conjunction with **ASPLOS**. March 2022. 
- Introduces a new framework and tool to quickly and accurately assess the reliability of deep neural network accelerator designs to random bit flips, providing insights for resilient accelerator design*

INVITED SEMINAR TALKS

Designing Cloud Servers for Lower Carbon

	University of Washington (CSE), Host: Prof. Baris Kasikci	Jun 2025
	MSR India, Host: Dr. Ramachandran Ramjee	Oct 2024
	AMD Research, Host: Dr. Srilatha (Bobbie) Manne	Oct 2024
	Intel Processor Architecture Research Lab, Host: Dr. Shankar Balachandran	Oct 2024
	Princeton University (CS), Host: Prof. Margaret Martonosi	Oct 2024
	Rutgers University (CS), Host: Prof. Santosh Nagarakatte	Oct 2024
	Google SystemsResearch@Google (SRG) Group, Host: Dr. David Culler	Sep 2024
	ISCA, Buenos Aires	Jun 2024
	University of California San Diego (CSE), Host: Prof. Jishen Zhao	Apr 2024
	University of California Riverside (ECE), Host: Prof. Shaolei Ren	Apr 2024
	University of Southern California (ECE), Host: Prof. Murali Annavaram	Apr 2024

SELECTED PRESS

- *IEEE Spectrum* Nov 2024
“Servers Get a Second Life for Sustainability” 
- *MSN* Oct 2024
“Researchers discover new method to curb cloud computing’s harmful impact: ‘We targeted planned obsolescence’” 
- *TechXplore* Oct 2024
“New methodology enables design of cloud servers for lower carbon” 
- *Carnegie Mellon University News* Oct 2024
“Designing Cloud Servers for Lower Carbon Emissions” 

AWARDED GRANT PROPOSALS COLLABORATED ON




- *AWS Cloud Credit for Research*, “Carbon-Aware Scheduling to Reduce Hyperscale Carbon Emissions”, Award: \$76,000, Award period: 2024-25

PROFESSIONAL SERVICE/IMPACT

Program committee chair

- Wild and Crazy Ideas Mar 2026
(**WACI 2026**) held in conjunction with ASPLOS

Co-organizer/founder of workshop or panel

- *Workshop Co-Founder* for 1st Workshop on Hot Topics in Ethical Computer Systems Apr 2024
(**HotEthics 2024**) held in conjunction with ASPLOS 
- *Workshop Co-Founder* for 1st Workshop on Hot Topics in Ethical Computer Systems Apr 2024
(**HotEthics 2024**) held in conjunction with ASPLOS 
- *Panel Co-Organizer* for Panel on Sustainable Systems at The 19th Workshop on Hot Topics in Operating Systems (**HotOS 2023**)  Feb 2023

Invited contributor, speaker, or panelist

- *Invited Speaker* for ACT Tutorial (Architectural Carbon Modeling Tool) Nov 2024
held in conjunction with MICRO
- *Graduate Student Panelist* for Undergrad Architecture Mentoring Workshop (**uArch**) Jun 2024
held in conjunction with ISCA
- *Co-Author* in ACM SIGARCH Computer Architecture Today blog article *Reducing Embodied Carbon is Important* (**ACM SIGARCH 2023**)  Aug 2023

Artifact evaluation committee member

- Architectural Support for Programming Languages and Operating Systems (**ASPLOS 2025**) Feb 2025
- International Symposium on Microarchitecture (**MICRO 2024**) Sep 2024
- Architectural Support for Programming Languages and Operating Systems (**ASPLOS 2024**) Oct 2023

PROFESSIONAL EXPERIENCE

Azure Systems Research Intern, Microsoft Research, Redmond, WA May 2025 - August 2025
Mentors: Fiodar Kazhamiaka and Daniel Berger

Leading research project on novel approaches to optimize data center carbon efficiency through a combination of strategic resource management and workload identification.

IBM Research Intern, IBM Research, Yorktown Heights, NY May 2024 - August 2024
Mentor: Asser Tantawi

Created new frameworks and strategies for more sustainable cross-cluster batch job scheduling.

Azure Systems Research Intern, Microsoft Research, Redmond, WA May 2023 - August 2023
Mentors: Fiodar Kazhamiaka and Daniel Berger

Designed and built a novel framework to understand the data center-scale impacts of server design to improve resource and carbon efficiency. Work has reached early production and is being considered by Azure as a strategy towards achieving Microsoft’s 2030 decarbonization targets.

Graduate Research Assistant, Carnegie Mellon University Aug 2022 - Present
Advisor: Prof. Akshitha Sriraman

Introducing sustainability as a first-order hardware/software system design metric for hyperscale systems and redesigning data center systems to promote hardware reuse.

Undergraduate Research Assistant, Harvard University March 2021 - Aug 2022
Lab: Harvard Architecture, Circuits, and Compilers Group
Advisors: Dr. Abdulrahman Mahmoud, Profs. Gu-Yeon Wei and David Brooks

Developed a hardware-aware framework for analyzing the resilience of deep neural network accelerators to soft errors, considering the reuse of values in an accelerator's dataflow propagation.

Engineering Development Group Intern, MathWorks

May 2021 - Aug 2021

Team: Deep Learning HDL Toolbox

Supervisors: Wang Chen, Siyuan Xu

Enabled efficient mapping of non-square convolution kernels onto square processing-element arrays, allowing users to deploy models using non-square kernels onto FPGAs

Undergraduate Research Assistant, Harvard University

May 2020 - Aug 2020

Lab: Harvard Edge Computing Lab

Advisor: Prof. Vijay Janapa Reddi

Analyzing how using SLAM for localization affects efficiency and power usage within autonomous drone applications by integrating SLAM algorithms into an open-sourced drone benchmarking framework.

Undergraduate Research Assistant, Harvard University

May 2019 - Aug 2019

Lab: Hoffman Physics Lab

Advisor: Prof. Jenny Hoffman

Developed a tensioning system for an XY-walker system to extend the range of a scanning tunneling microscope used to research the proximity effect of superconductivity.

TEACHING EXPERIENCE

Invited guest lecture on sustainable computing

- *Computer Systems & the Hardware-Software Interface (18-344)*; Profs. Akshitha Sriraman & Brandon Lucia Fall 2024

Undergraduate teaching assistant, Harvard University

- *Systems Programming and Machine Organization (CS 61)*; Prof. Eddie Kohler Fall 2020, 2021
- *Circuits, Devices, and Transduction (ES 152)*; Profs. Gage Hills & Woodward Yang Fall 2021
- *Systems and Control (ES 150)*; Profs. Li Na & Yue Lu Fall 2021
- *Introduction to Electrical Engineering (ES 50)*; Profs. Chris Lombardo & Marko Loncar Spring 2021
- *Integration, Series and Differential Equations (MATH 1B)*; Dr. Hakim Walker Fall 2019

LEADERSHIP & VOLUNTEERING

- CMU Institute of Technology K-12 Outreach, STEM Volunteer 2023-Present
- President of Harvard Club Tennis 2019-2022
- President of Harvard College Engineering Society 2020-2021
- Co-President of Harvard Engineering Peer Concentration Advisors 2020-2021

REFERENCES

1. Prof. Akshitha Sriraman (akshitha@cmu.edu)
Assistant Professor, Carnegie Mellon University
2. Daniel S. Berger (daberg@microsoft.com)
Researcher in Azure Systems Research Group, Microsoft
3. Fiodar Kazhamiaka (fkazhamiaka@microsoft.com)
Researcher in Azure Systems Research Group, Microsoft
4. Prof. David Brooks (dbrooks@g.harvard.edu)
Haley Family Professor of Computer Science, Harvard University
5. Prof. Udit Gupta (ugupta@cornell.edu)
Assistant Professor, Cornell University