

Arjun Ramesh

✉ arjunr2@andrew.cmu.edu

☎ (512)-743-1885

🌐 arjunramesh.me

🔗 [arjunr2](#)

RESEARCH STATEMENT

My research interests encompass **software virtualization** and **debugging** with a strong focus on applications targetting cyber-physical edge systems. With a comprehensive systems background – OS, embedded, compilers, architecture – I am dedicated to enabling robust, usable, and performant software ecosystem design at the edge.

EDUCATION

Carnegie Mellon University <i>PhD+MS, Electrical & Computer Engineering</i>	VMs, Compilers, Distributed/Edge Computing, OS, Networking, CV	<i>Aug 2021 - Present</i> <i>GPA: 3.87</i>
The University of Texas at Austin <i>BS, Electrical & Computer Engineering</i>	Comp. Arch., Algorithms, Embedded, RTOS, VLSI, HW/SW Parallelism	<i>Aug 2017-2021</i> <i>GPA: 4.00</i>

PUBLICATIONS

Empowering WebAssembly With Thin-Kernel Interfaces <i>A. Ramesh, T. Huang, B. Titzer, A. Rowe</i>	<i>Under Review (EuroSys '25)</i> <i>Virtualization, OS</i>
Unveiling Heisenbugs with Diversified Execution <i>A. Ramesh, T. Huang, J. Riar, B. Titzer, A. Rowe</i>	<i>Minor Revision (OOPSLA '25)</i> <i>SW Testing, Edge Systems</i>
Bringing Runtime Prediction up to Speed for the Edge <i>T. Huang, A. Ramesh, E. Ruppel, N. Pereira, A. Rowe, C. Joe-Wong</i>	<i>Under Review (MLSYS '25)</i> <i>ML, Edge Systems</i>
A Framework for Orchestration of Edge-Cloud Distributed Systems <i>E. Ruppel et. al (including A. Ramesh)</i>	<i>Under Review (RTAS '25)</i> <i>Distributed, Real-Time, Edge</i>

INVITED TALKS

Unveiling CPS Heisenbugs at Scale	<i>Bosch RDS Tech Colloquium</i>	<i>Oct 2024</i>
Leveraging WebAssembly as a Debugging Target	<i>Wasm Research Day</i>	<i>Jun 2024</i>
Leveraging WebAssembly Instrumentation	<i>Wasm Research Day (with T. Huang)</i>	<i>Oct 2023</i>
Giving the Cloud an Edge with WebAssembly	<i>Wasm Research Day (with T. Huang)</i>	<i>Oct 2022</i>

HONORS AND SCHOLARSHIPS

Charles W. and Margaret A. Tolbert Scholarship	High Merit in Engineering	<i>Fall '20</i>
Centaur Technology Scholarship	Summer 2019 Internship Package	<i>Fall '19</i>
Ray Fisher Memorial Scholarship	High Merit University-Wide	<i>Fall '19</i>
UT Austin University Honors	Exemplary GPA (4.0) standing	<i>Fall '17 - Spr '20</i>

ACADEMIC EXPERIENCE

University Teaching Assistant		
Virtual Machines and Managed Runtimes	<i>Ben Titzer, CMU</i>	<i>Fall '24</i>
Distributed Embedded Systems	<i>Anthony Rowe, CMU</i>	<i>Fall '22</i>
Computer Architecture	<i>Yale Patt, UT</i>	<i>Fall '20</i>
Introduction to Computing Systems	<i>Yale Patt, Ramesh Yerraballi, UT</i>	<i>Fall '19, '18</i>
Introduction to Embedded Systems	<i>Jonathan Valvano, UT</i>	<i>Spr '19</i>

INDUSTRY EXPERIENCE

IoT Cloud and Edge Integration Intern — <i>Bosch Research (Pittsburgh, PA)</i>	<i>Jun-Aug 2022</i>
Designed an edge-orchestration framework (Silverline) for real-time industrial automation	
GPU Design Verification Intern — <i>Apple Inc. (Austin, TX)</i>	<i>Jun-Aug 2020</i>
Memory hierarchy testing improvements (speed/coverage); UVM testbenches for M2 Graphics	
CPU Design Verification Intern — <i>Centaur Technology Inc. (Austin, TX)</i>	<i>May-Aug 2019</i>
Memory testing tools for x86/AVX-512 chip and live analysis of CPU exception events	
Software Engineering Intern — <i>Qube Cinema Inc. (Chennai, India)</i>	<i>Jun-Aug 2018</i>
RNN transfer learning for seat occupancy detection at movie theaters	
Machine Learning Intern — <i>Lucid Imaging Pvt. Ltd. (Bangalore, India)</i>	<i>Jun-Aug 2018</i>
Transfer learning of CNNs for polypropylene detection in cotton production lines	

TECHNICAL PROJECTS

Vision-Based Localization Framework — <i>CMU</i>	<i>Dec 2021</i>
Android app to localization of users on CMU campus using environment triangulation	Talk Poster
RISC-V CPU Design and ISA Extension — <i>UT Austin (Capstone)</i>	<i>Apr 2021</i>
Out-of-order RISC-V CPU with custom extensions to accelerate hashsets and graph search	Talk Github
Recreating the First FPGA (XC2064) — <i>UT Austin</i>	<i>Dec 2020</i>
8x8 CLB FPGA design in Structural Verilog with GUI-based bitstream generation tool	Github
Cellular Automata Survey Paper — <i>UT Austin</i>	<i>May 2020</i>
Local ID pattern formation and checkability theorems in cellular automata	Paper
The JASP Cellular Phone — <i>UT Austin (445L Class)</i>	<i>Dec 2019</i>
Cellphone designed from scratch with call+text capability; Won 1 st place in project showcase	Github
RTOS Design on Bare-Metal Microcontroller — <i>UT Austin (445M Class)</i>	<i>Apr 2020</i>
Fully featured with process loading, priority scheduling, FAT filesystem, and wireless RPCs	Talk
Texas CreateATHon (Building Innovative Solutions) — <i>UT Austin</i>	<i>Spr '19, Spr '18</i>
<i>RecycleMe</i> : Real-time waste segregation with offloaded CNN classification	<i>2019</i> Github
<i>ChariIoT</i> : Localizable chair platform with IMU-based displaced tracking	<i>2018</i> Github
Home-Unity App — <i>HackDFW (Fort Worth, TX)</i>	<i>Feb 2019</i>
Ecosystem to improve food/shelter provisioning for homeless; Two 1 st place awards	Dev Github
Stick Fighter Embedded System Game Design — <i>UT Austin (319K Class)</i>	<i>Nov 2017</i>
Two-player fighter game (on TI μ C) with custom controller hardware, music, and graphics	Github