

# ARJUN RAMESH

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## EDUCATION

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**Carnegie Mellon University**

Cumulative GPA: **3.87**

**MS + PhD, Electrical and Computer Engineering (2021 - Present)**

Research Area: Embedded Distributed Systems and Architecture

Relevant Coursework: Computer Vision, Mobile/Pervasive Computing,  
Compiler Optimization

**The University of Texas at Austin**

Cumulative GPA: **4.00**

**BS, Electrical and Computer Engineering, Honors, (2017- 2021)**

Relevant Coursework: Computer Architecture, Algorithms,  
Embedded Systems, RTOS, VLSI, Digital Signal Processing,  
Parallelism and Locality, Unconventional Computation,  
Probability, Real Analysis, Algebraic Structures

## HONORS AND SCHOLARSHIPS

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**The Charles W. and Margaret A. Tolbert Scholarship** for high merit in engineering *Fall 2020*

**Centaur Technology Scholarship** on completion of Summer 2019 internship *Fall 2019*

**Ray Fisher Memorial Scholarship** from *Texas Exes* for high-merit *Fall 2019*

**University Honors** from *UT Austin* for maintaining a GPA > 3.5 *Fall 2017 - Spring 2020*

## ACADEMIC EXPERIENCE

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**Undergraduate Teaching Assistant** – *UT Austin, ECE* | Austin, TX *Aug 2018 – Present*

- Responsible for holding review sessions, office hours, designing assignments and grading.
- Guided ECE students in determining their academic tracks of interest
- List of prior positions:
  - Fall 2020: Computer Architecture under Dr. Yale Patt.
  - Fall 2019: Introduction to Computing under Dr. Yale Patt.
  - Spring 2019: Introduction to Embedded Systems under Dr. Jonathan Valvano
  - Fall 2018: Introduction to Computer under Dr. Ramesh Yerraballi

## WORK EXPERIENCE

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**GPU Design Verification Intern** – *Apple Inc.* | Austin, TX

*Jun 2020 – Aug 2020*

- Sped up and improved coverage of test set address generation for memory hierarchy.
- Developed a library to save and restore tests based on metrics for targeted constraint testing.
- Assisted in the building, testing, and bringup of graphics memory hierarchy *UVM* testbenches.

**CPU Design Verification Intern** – *Centaur Technology Inc.* | Austin, TX *May 2019 – Aug 2019*

- Created a real-time debugging tool in Python to visualize chip performance in memory.
- Worked extensively with the ELK stack to aggregate data on interrupt and exception events.
- Tested and debugged Intel AVX-512 instructions using a x86-Ruby DSL for their new chip.

**Software Engineering Intern** – *Qube Cinema Inc.* | Chennai, India *Jun 2018 – Aug 2018*

- Redesigned the iCount - a commercial product to count the seat occupancy in theaters.
- Reworked the deep neural network in Keras using transfer learning on a *ResNet50* model.
- Sufficient image augmentation was performed since training data was predominantly poorly lit.
- Achieved an accuracy of 92% on uncorrelated test set.

**Machine Learning Intern** – *Lucid Imaging Pvt. Ltd.* | Bangalore, India *Jun 2018 – Aug 2018*

- Designed a deep-learning model to detect polypropylene in industrial cotton.
- Transfer learning performed on the *VGG-16* deep learning model in Keras.
- Achieved a 96% accuracy on the test set with 100% on positive samples on negative-skewed training dataset.

## ACADEMIC PROJECTS

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**Vision-Based Localization (Mobile Computing Project)** – *CMU* *Sep 2021 - Dec 2021*

- Developed an end-to-end system to accurately localize a user on CMU campus
- Client application uses vision-based information from Android Gabriel service
- Server application uses trained ML models + triangulation to estimate location
- Worked in a team of 2. [Presentation](#) [Poster](#)

**Extending an ISA (Capstone Research Project)** – *UT Austin* *Sep 2020 - Apr 2021*

- Designing an out-of-order RISC-V CPU from scratch in SystemC and Verilog.
- Adding custom extensions to accelerate operations on linear-probed hash sets and breadth-first-search graph traversal, along with performance benchmarks.
- Worked in a team of 4. [Presentation](#) [Github](#)

**XC2064 FPGA Design (VLSI Final Project)** – *UT Austin* *Nov 2020*

- Reverse engineering the first FPGA in structural verilog using a standard cell library.
- Consists of an 8x8 grid of CLBs, IO buffers, and switch matrix based interconnect.
- Includes a GUI interface to generate the required bitstream to program it for testing.
- Worked in a team of 3. [Github](#)

**1D Cellular Automata (Unconventional Computation Final Project) – UT Austin** *May 2020*

- Reviewed papers related to local pattern formation in 1-d cellular automata.
- Wrote a condensed [paper](#) integrating ideas from various references on the topic.
- Baseline paper: D. Yamins and R. Nagpal, “Automated global-to-local programming in 1-d spatial multi-agent systems,” in *Proceedings of the 7th International Joint Conference on Autonomous Agents and Multiagent Systems - Volume 2*

**RTOS Design and Remote Battleship – UT Austin** *May 2020*

- Bare-metal RTOS built on the TM4C123 microcontroller from scratch.
- Includes thread/process management using a priority scheduler, SD card filesystem, and wireless capabilities to support remote procedure calls.
- Developed a battleship game playable over the internet with synchronized gameplay.
- Worked in a team of 2. Received an honorable mention. [Youtube video](#)

**JASP Cellular Phone (Embedded Lab Final Project) – UT Austin** *Nov 2019*

- Supports call and text functionality and used the Tiva-TM4C123 microcontroller
- Consists of a LCD screen, numpad, real-time clock, and 2G mobile network
- Uses *LittlevGL*: a lightweight embedded GUI library for designing the UI.
- Won first place in the project showcase by popular vote. Worked in a team of 4. [Github](#)

**Enrich – PennApps (Philadelphia, PA)** *Sep 2019*

- Designed a course organization platform to improve the lecture experience and quality for both students and teachers
- Provides live, anonymous lecture statistics, particularly student understanding of a concept and allows professors to organize content accordingly on the application.
- Includes a speech to text transcript conversion in real time
- Worked in a team of 4. [Devpost](#) [Github](#)

**Texas CreateATHon – UT Austin** *Mar 2020, 2019, and 2018*

- *Spring 2020: Portable POV Display* (On hold due to Covid-19)
  - Drafted the design and parts for a portable persistence-of-vision display.
  - Consists of a motor, foldable LED strip, and a TM4C123 microcontroller
  - Renders an image stored locally on the device, and potentially over WiFi.
  - Worked in a team of 5. [Proposal](#)
- *Spring 2019: RecycleMe*
  - Engineered a prototype for a smart trash-can that automatically classifies and segregates trash into 3 categories: Recycle, Compost, and Landfill.
  - Consists of a compartment with a camera to detect and sort trash in real-time.
  - Trained a CNN to run on Raspberry Pi and control the compartment as trash comes in.

- Worked in a team of 5. [Github Proposal](#)
- *Spring 2018: ChairIoT*
  - Designed a prototype for a self-organizing chair that can return to its original position
  - Consists of a movable platform controlled by IMU, which aggregates acceleration data and computes net displacement.
  - Worked in a team of 5. [Github Proposal](#)

### **Home-Unity** – *HackDFW (Fort Worth, TX)*

*Feb 2019*

- Designed a data visualization web platform for the *City of Dallas* to better serve the homeless.
- Developed a mobile app for users to receive notifications about these provisions in real-time.
- Received 1<sup>st</sup> place from the *City of Dallas* and *OmniSci* for the social good category.
- Worked in a team of 5. [Devpost Github](#)

### **Robotics** – *UT Austin*

*Nov 2017 - Mar 2018*

- CURM (Convention for Unconventional Robotic Movement)
  - Designed a 4-legged “spider” robot with motors along two directions to enable lifting of legs and moving legs forward
- Robotathon: Obstacle course racing competition.

### **Stick Fighter (Intro Embedded Final Project)** – *UT Austin*

*Nov 2017*

- Created a two-player stick fighting game made from scratch using *TM4C123* microcontroller
- Assembled our own controller hardware with joysticks, music, and real-time layering of graphics
- Presented in the final class-wide tournament. [Github](#)

## **SKILLSET AND HOBBIES**

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- **Technical:** Experienced with Linux, C/C++, Python, SystemVerilog (UVM), Arm Assembly
- **Languages:** Fluent in Tamil and English
- **Certificates**
  - Machine Learning by Andrew Ng (Coursera)
  - Android App Development (CMS IT Services)
- **Co-curriculars**
  - Music: Formally trained for 7 years in Piano and Guitar
  - Sports: High-altitude trekking and Badminton
  - Speedcubing: Participated in national tournaments with college club team ([Profile](#))