

# Balaji Venkatesh

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## Skills

- Programming: C, C++ Java, Python, Assembly, Scripting, Web Development, AI/ML
- Hardware Design: Verilog, HLS, AMD Vivado / Vitis, Intel Quartus, AWS F1 FPGA
- Electronics: Microcontrollers (Arduino, Raspberry Pi), Breadboarding, PCB Design, Prototyping
- Professional: Self-lead Research & Development, Collaboration, Management, Problem-solving

## Work Experience

### Platform Developer

Altium Education [Web Development, Node.js]

Altium Limited, San Diego / Remote, Mar 2021 - Mar 2023

- Developed web platforms and curriculum for courses about printed circuit board design
- Integrated services together with open-source libraries
- Worked with an international team of developers, designers, and teachers
- Presented to over 200 students and industry leaders at the IPC APEX Expo, Jan 2022, Jan 2023

### Undergraduate Research Assistant

Belief Propagation Accelerator [C, HLS, Verilog, AWS F1 FPGA]

University of Toronto, Canada, Sep 2023 - Apr 2024

- Built a hardware accelerator for the residual belief propagation algorithm on AWS FPGA
- Learned task-based speculative parallelism
- Implemented hardware designs with HLS and Verilog and programming with C for RISC-V
- Migrated Chronos scripting from Bash to Tcl

### Undergraduate Research Assistant

Multi-FPGA Matrix Multiplier [C, HLS, Verilog, AMD Xilinx FPGA]

University of Toronto, Canada, May 2023 - Aug 2023

- Conceptualized hardware accelerator for very large matrix processing over networked FPGAs
- Designed accelerator cores in Verilog/HLS, and then programmed application software in C
- Tested easyDMA direct memory interface using AXI streams

### Undergraduate Research Assistant

Doppler Radar Simulator Improvements [MATLAB, Python, AI/ML]

University of Toronto, Canada, May 2021 - Sep 2021

- Improved a simulator for training a doppler radar neural network in MATLAB
- Collaborated with an international research team based in Canada and the UK
- Wrote image processing scripts in Python

# Education

## **Bachelor of Applied Science in Engineering Science with Honours**

Major in Electrical & Computer Engineering

University of Toronto, Canada, Sep 2020 - Apr 2024

- Computer Architecture, Computer Systems Programming [C, C++, Benchmarking]
- Digital and Computer Systems, Computer Organization [Intel Quartus Verilog, ARMv7 / NIOS II Assembly]
- Internetworking, Computer Networks I & II
- Cumulative GPA of 3.54/4, 4th-year GPA of 3.9/4
- Dean's Honour List: 2020F, 2021W, 2021F, 2022W, 2023F, 2024W
- Undergraduate Summer Research Program Dean's Pivot Fellowship Award, Sep 2021

## **Implementing and Administering Cisco Solutions**

Preparation for Cisco Certified Network Associate

Cisco U, Remote, Nov 2024 - Present

- Install, operate, configure, and verify basic IPv4 and IPv6 networks
- Configure network components, such as switches, routers, and wireless LAN controllers
- Manage network devices and identify basic security threats
- Describe and define network programmability, automation, and software-defined networking

# Volunteer Experience

## **Computer Systems Administrator / Webmaster** [Scripting, Web Development]

Engineering Society, University of Toronto, Canada, May 2022 - May 2024

- Administrated cloud storage, emails, and websites for most (over 50) UofT Engineering Society design teams, clubs, and associated organizations
- Modernised legacy computing equipment and migrating to cloud services
- Managed an office network

## **Electrical Team Member** [PCB Design]

Robotics for Space Exploration, University of Toronto, Canada, May 2022 - Aug 2022

- Conceptualized a circuit board for space rover peripheral power control
- Implemented the neopixel protocol to control LEDs
- Designed the PCB using Altium Designer

## **Head Mentor and Director** [Java, Python, Prototyping]

Markham Community FIRST Robotics Club, Canada, Jun 2017 - Jun 2024

- Managed finances for a not-for-profit corporation
- Mentored youth in business strategy, mechanical design, software programming, and team leadership
- Planned outreach events and proposing sponsorships to local businesses

# Publications

**Automation of Thermal Energy Storage for Homes using Artificial Neural Networks** [MATLAB, AI/ML]

IEEE Canadian Conference on Electrical and Computer Engineering, London, Canada, Sep 2020

- Developed AI controller for a thermal energy storage system
- [DOI: 10.1109/CCECE47787.2020.9255680](https://doi.org/10.1109/CCECE47787.2020.9255680)

**Thermal Energy Storage for Homes** [MATLAB, Breadboarding, Prototyping]

2018 IEEE International Conference on Smart Energy Grid Engineering, Oshawa, Canada, Aug 2018

- Theorised a system to storage solar energy in thermal mass of homes
- [DOI: 10.1109/SEGE.2018.8499511](https://doi.org/10.1109/SEGE.2018.8499511)