

# Mustafa Nisar

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## EDUCATION

### University of Toronto

Toronto, ON

*Bachelor of Applied Science and Engineering, Computer Engineering — minor in AI (+PEY) Sep 2021 – May 2026*

## TECHNICAL SKILLS

**Programming:** C/C++, Python, Java, JavaScript, HTML/CSS, REST APIs, System Verilog, Assembly, SQL, CI/CD

**Technologies:** GIT, GitHub, SSH, PyTorch, TensorFlow, OpenGL, OpenCL, Vulkan, MATLAB, Google Colab, Intel Advisor, Jupyter Notebook, Altium Designer, Fusion360, AMD's in-house packet-analysis tools

**Soft Skills:** Teamwork, Management, Responsible, Problem Solving, Quick Learner, Communication, Writing

## EXPERIENCE

### Firmware Engineer (Co-op)

May 2024 – Present

*AMD, RLC Firmware Engineering*

*Markham, ON*

- Developed and maintained RLC firmware in C and assembly for AMD's discrete and embedded graphics products, managing multiple clock and power domains and secure microcode loading.
- Authored performance optimizations and created custom C/C++ tools to automate firmware testing and analysis workflows.
- Debugged complex FW/HW interactions using waveform-level analysis and supported pre-silicon validation on system simulators.
- Leveraged graphics (OpenGL, Vulkan) and compute (OpenCL) APIs along with GPU-level profilers (Microsoft PIX, RenderDoc) and AMD's in-house packet-analysis tools (PKTtool, Framebench) to optimize rendering pipelines; ensured driver reliability via Microsoft HLK/WHQL certification.
- Collaborated with global architects, test teams, and cross-functional stakeholders in a hybrid work model (2–3 days/week on-site).
- Produced comprehensive documentation for all firmware components, ensuring clarity and maintainability.
- Built and maintained from scratch a computer system farm for automated firmware testing, integrating remote management and monitoring for 100+ nodes.

### Research Assistant: Neuromorphic Architecture

Aug 2023 – May 2024

*University of Central Florida (Remote)*

*Orlando, FL*

- Collaborating with Prof. Di Wu from UCF to develop on a neuromorphic engineering project, using C/C++, Python Frameworks such as SNNtorch.
- Researching on various applications of the neuromorphic computing paradigm, to implementing a proof of concept on a neuromorphic hardware, and present results at an international conference.
- Developed a Spiking Neural Network without using preexisting libraries for a cache application, by using optimization and simulation tools such as intel advisor and GEN5 to develop custom architecture.

### Computer Science Content Developer

Sep 2023 – May 2024

*University of Toronto*

*Toronto, ON*

- Assisting in the design of new educational initiative to create online educational modules for students in biotechnology, computing, and related disciplines.
- Developing Google Colab worksheets for students in genetics courses as an introduction to machine learning and modern biotechnology over a course of 8-weeks.
- Conducting research on various applications of machine learning in biology as well as ways to present python fundamentals to a new audience.

### Research Assistant: Aspirometer Embedded Development

May 2023 – Sep 2023

*University of Toronto*

*Toronto, ON*

- Contributed to an Aspirometer (device used to detect dysphagia) project, by designing a custom PCB for signal processing and data transmission.
- Developed firmware in C for STM32/TI development boards, based on legacy Arduino Due MCU and code base, utilizing STM32 Cube IDE.
- Researched on data transmission protocols (SPI) and contributed to the integrated PCB design with a micro controller, explored improvements such as Bluetooth.

## Undergraduate Research Assistant

Sep 2022 – Apr 2023

University of Toronto

Toronto, ON

- Conducted a systematic literature review of over 100 articles to create a manuscript using Endnote and Word. Aided in publishing literature based on findings.
- Carried out a literature search using major databases on various aspects of engineering students' career pathways, and compiled a bibliography of relevant articles.
- Utilizing qualitative and quantitative methods, analyzed, and identified various trends in engineering students and graduates' career pathways to develop 8 research questions which may be used to improve engineering education at University of Toronto.

## PROJECTS

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### Seat Belt Detection | *APS360: Applied Fundamentals of Deep Learning*

May 2023 – Sep 2023

- Implemented various data collection, augmentation and optimization techniques to build a dataset of 3500 images for a python deep learning project.
- Used various deep learning libraries and tools such as TensorFlow, CUDA, PyTorch, Jupyter notebook to build the project over a course of 4 months.
- Using YOLOV5 we achieved an accuracy of 97% on unseen data.

### Flexible Radio Transceiver | *ECE295: Hardware Design and Communication*

Jan 2023 – May 2023

- Designed a RX Filter, Limiter, and Quadrature Mixer for a Radio in a group of 3 using Altium designer, NI Multisim and PyVISA.
- Executed essential hardware design skills such as soldering (SMD/through hole), placing traces and general design etiquette.
- Learnt about engineering communication and how to present your design to a non technical audience.

### An Enhanced HDL Processor | *ECE243: Computer Organization*

Jan 2023 – May 2023

- Designed an 8 register 16-bit processor in Verilog, supporting 8 instructions.
- Integrated the processor with memory unit and input/output devices.
- Tested functionality with programs using ModelSim and Intel Quartus Prime.

## INVOLVEMENT

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### Robotics for Space Exploration | *University of Toronto*

May 2023 -Present

- Designing, developing, and maintaining software for robotic systems used in space exploration missions. This includes both software for controlling the robots and software for processing and analyzing data collected by these robots.

### University of Toronto Aerospace Team - Unmanned Aerial Systems | *University of Toronto*

May 2023 – Present

- Primarily involved in developing software and algorithms that enable autonomous racing drones to perform at their best. Working on various aspects such as computer vision, control systems, AI, and real-time data processing to achieve high-performance autonomous racing capabilities.

### Science Communicator | *Science Fuse*

Dec 2019 – May 2021

- Science Communicator: Taught interesting science concepts to children with a twist.
- Scientists of Tomorrow Programme: Used to train teachers from underserved schools on how to teach STEM education.
- Science Podcasts: Recorded podcasts in a fun engaging manner for kids and families to listen.