

# Swaleh Owais

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## Experience

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### Autodesk

San Francisco, CA

ADAPTIVE ROBOTICS RESEARCH INTERN

May 2020 - August 2020

- Interned at the Autodesk AI Lab, in the Office of the CTO.
- Successfully co-authored and deployed a cross platform **Python** toolkit for simulating industrial robots (**Windows, Linux, OSX**).
- Wrote **C++** wrapper classes to expose the runtime of a **C++** engine to **Python**. Made detailed documentation for these APIs.
- Used **Autodesk Inventor** to **3D Model** fixtures and mounting brackets for multiple industrial robots (**Universal Robots, KUKA**).
- Routinely used **Git, CMake, Docker**, and other tools to effectively work in a team environment.

### Innovative Automation Inc.

Barrie, ON

CONTROLS ENGINEERING INTERN

May 2019 - Aug. 2019

- Wrote PLC ladder logic for a robotic trim cell that manufactures components for the 2019 Toyota Highlander
- Developed visually appealing and easy to use HMI, with Indusoft Web Studio 7.1.
- Built an interactive **tic-tac-toe playing robot exhibit** with **Python, OpenCV**, and **Universal Robots**.
- Gained extensive experience working with robotics hardware from **FANUC, KUKA, OMRON, Robotiq**, and **Universal Robots**.

### McMaster University

Hamilton, ON

EDUCATIONAL SOFTWARE DEVELOPER CO-OP

May 2017 - Aug. 2017

- Independently designed, built, and launched a web application for automatically grading school assignments.
- Features: Used **NumPy** and basic **linear algebra** to automatically mark course assignments. Created a **PHP / MySQL** backend to store course grades. Integrated an **SMTP** server so that teaching assistants can easily email feedback to students. Designed a modern UI with **Electron, Three.js**, and **JQuery**. Used **Ajax** in **JSON** format to make asynchronous calls to the project server.
- Achieved: The web application has over 500 active users per semester and significantly reduces the workload of teaching assistants. Demo Video: <https://youtu.be/CFAUK3HcKwg>. Presented application at **PyCon Canada 2018**.

RESEARCH ENGINEER ASSISTANT (PART-TIME)

Sept. 2018 - Present

- Facilitated several **robotics** research projects. Routinely used **Arduinos, Raspberry Pis**, and other hardware to **build prototypes**.

## Skills

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**Languages** Python, JavaScript, PHP, C/C++

**Technologies** ROS, Linux, CMake, NumPy, OpenCV, Selenium, Node.js, Electron, AJAX, JSON, Arduino, Raspberry Pis

**Other** Robot Kinematics, CAD, Rapid Prototyping, Precision Machining, 3D Printing

## Technical Projects

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### Autonomous Mobile Robot for Machine Tending (ONGOING)

ROS, LINUX, ARDUINO, PYTHON, C/C++, OPENCV, CAD, AUTODESK INVENTOR, GENERAL MACHINE SHOP TOOLS

- Designed, built, and programmed a **ROS** based mobile robot for automating a 3D Printing Lab.
- Effectively used **librealSense** and **AprilTag** fiduciary markers for localization. Demo: [https://youtu.be/a8\\_sCKVJG2w](https://youtu.be/a8_sCKVJG2w).
- Created **ROS** nodes in **Python** and **C++** for managing tasks like keyboard teleop, image processing, and odometry. Interfaced with robot entirely through **Linux** zsh environment.

### Autonomous 3D Printer + Software App. (2018 Hackaday Prize Semi Finalist, Over 500,000+ Views on YouTube)

PYTHON, JAVASCRIPT, ELECTRON, CAD, AUTODESK INVENTOR, LATHE+MILL, GENERAL MACHINE SHOP TOOLS, ARDUINO

- Independently designed, built, and programmed a **custom fully autonomous 3D printer (500,000+ Views)**.
- Made detailed **CAD** models in **Autodesk Inventor**. Wrote a **print queue management app.** with **JavaScript** and **Electron**.

### BlinkToText: Text with Eye Blinks - Computer Vision Project

PYTHON, OPENCV, PYQT, NLP

- Used **Python** and **OpenCV** to build a desktop application that allows users to **write/send text messages via eye blinks**.

## Education

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### McMaster University

Hamilton, ON

B.ENG. IN MECHANICAL ENGINEERING AND CO-OP

September 2016 - (Exp.) April 2021

**Part-Time Jobs:** Teaching Asst. for COMPSCI 1MD3 (Introduction to Python), Teaching Asst. for ENG 1C03 (Introduction to CAD)