

# Michael Szpakowicz

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## Experience

### *Self Driving Cars Instructor*

*Coursera & UofT: 2022 – Present*

- Corrected course material errors and revised assignments to enhance learning outcomes in Coursera's *Introduction to Self Driving Cars* specialization.

### *Robotics Software Engineer*

*AdMetal/BeaverBot: 2021 – Present*

- Managing a team of three to create a **hospital delivery robot** by adding QR code tracking, object recognition, and elevator traversal to a mobile robot with an arm on a **Python** and **ROS** backend.
- Developed a **real-time human tracking** solution for an autonomous golf cart running object detection and depth estimation **neural networks** with **Python** on a **Jetson Nano**.
- Created a **monocular part localization** system for pick-and-place tasks with **OpenCV** and **Python**.
- Implemented **RTAB SLAM** with LiDAR/RGBD sensor fusion on a restaurant waiter robot running **ROS**.

### *Teaching Assistant*

*University of Toronto: 2017 – 2020*

- Built and configured **5 autonomous driving platforms** (MIT Racecar) for *Intro to Mobile Robotics*.
- Led weekly tutorials for up to 40 students, marked tests and assignments, and provided office hours on *Software Design* and *Computer Organization* courses, as well as on their related topics.
- Assisted the professor and answered questions on **Python** during *Intro to Programming* lectures.

### *Set Animation Engineer*

*Little Canada: 2017 – 2018*

- Implemented an Arduino-powered waterfall simulation using LED strips and interfaced it with **UART**.
- Developed a **C++ Arduino library** for complex PWM signal sequencing, resulting in 60% less coding.

## Projects and Hobbies

### *Researcher*

*Autonomous Car Projects: 2019 & 2020*

- Worked with a team of 6 at the RVL Lab on 5 MIT Racecars running **ROS** to study the influence of digital billboards on vision-based self driving cars through **adversarial noise**. We implemented and trained **CNNs** with **PyTorch**, and we got promising results after significant **neural network optimization**.
- Collaborated with 2 other students to convert 3 toy cars into indoor self-driving platforms using a smartphone for image capture and processing, and an Arduino hardware interface. **Traditional computer vision techniques** were attempted for floor mapping, but an imitation learning **Keras CNN** worked best.

### *Founder, Lead, and Mentor*

*UTM Robotics Club: 2019 – 2021*

- Led weekly meetings on **design, electronics, control systems, autonomous vehicles, and drones**.
- Conducted workshops on **Arduinos, 3D Printing, PID Loops, and Deep Learning**.
- Created a self-balancing pendulum and began implementing **SLAM** on MIT Racecars.

## Technical Skills

*Software* **Programming Language Expertise:** Python, C++, C, Java, Bash Script

**Software Expertise:** TensorFlow, TensorRT, PyTorch, OpenCV, ROS, Gazebo

*Hardware* **Electronics:** Reading and assembling electronic circuits; familiarity with various I/O devices

**Mechanical:** Shop tools & machinery, 3D printing, computer-aided design

## Education

*M.Eng. Robotics Engineering*

*University of Toronto - 2023*

*H.B.Sc. Computer Science Specialist*

*University of Toronto - 2020*