

# Richard Hu

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## Experience

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### Autonomous System and Biomechanics Lab

Toronto, Ontario

Research

Sept. 2018 - Present

- **Robot Development** Developed a robot with SLAM, position controller, and velocity controller capabilities using stereo camera, and Lidar using ROS and C++.
- **Sim-to-Real** Transferred rough terrain navigation model learn using A3C to physical environment by improving simulation fidelity, controller robustness, and applying domain randomization techniques

### MIE443 Mechatronics Systems: Design & Integration

Toronto, Ontario

Teaching Assistant

Jan. 2018 - Apr. 2018

- **Tutorial** Prepared and gave lecture for students on robot navigation and SLAM methods
- **Laboratory** Mentored students during their robot development process

### Conavi Medical

Toronto, Ontario

Mechanical Design Intern - Novasight Hybrid System

May. 2016 - Aug. 2017

- **Technical Design Review** Led 3 major technical design reviews of the intravascular catheter, NOVASight Hybrid, with senior leadership in its R&D phase. Led to accelerated project progress and successful exit of development phase
- **Mechanical Design & Testing** Designed and tested catheter imaging assembly rotary fluid seal component that is critical to patient safety using MATLAB and SolidWorks
- **R&D Inventory Management** Built a R&D phase inventory management system with full traceability, guaranteed validity of the product's 510k submission to US Food and Drug Agency

## Projects

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### aUToronto - Autodrive challenge

Toronto, Ontario

Mapping and Localization Team

Sept. 2018 - July. 2019

- Developed code for processing and parsing semantic map using python, QGIS and Open Street Map
- Implemented real-time kinematics GPS system on the autonomous vehicle for localization

### Toward Smart Cities: Data-driven Road Accident Prevention

Toronto, Ontario

Data Analyst

Sept. 2018 - Dec. 2018

- Binary prediction of road accidents using weather, census, traffic, geography data, feature-engineering, and negative sampling
- Implemented SVM, Random Forest, and Deep Neural Network model, achieving 90% cross validated accuracy and 67% recall for collision

### Pico-Scale Hydro Turbine Design

Toronto, Ontario

Mechanical Design

Jan. 2018 - Sept. 2018

- Designed a variable guide vane mechanism for pico-scale hydro turbine using Solidworks and ANSYS CFX
- Built the pico-scale turbine and pressurized pipeline test rig to mimic operating conditions

### Autonomous Maze Navigation Rover Design

Toronto, Ontario

Software Development & System Design

Sept. 2017 - Dec. 2017

- Implemented 2D histogram localization, ultrasound obstacle detection, A\* path planning algorithm in MATLAB and Arduino
- Architecture to govern autonomous navigation through a maze, localization, path-finding, payload pick-up and delivery

## Honors & Awards

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2018	<b>Best Undergraduate Poster Presentation</b> , CFD Society of Canada	Winnipeg, Ontario
All Terms	<b>Dean's Honour list</b> , University of Toronto	Toronto, Ontario
2015	<b>University of Toronto Excellence Award</b> , University of Toronto	Toronto, Ontario
2015	<b>Shell Canada Limited Engineering Scholarship</b> , University of Toronto	Toronto, Ontario
2015	<b>Best Innovation Award and Best Prototype Award</b> , U of T Engineering Competition Junior Design	Toronto, Ontario

# Education

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**University of Toronto**

*Toronto, Canada*

Master of Applied Science, Mechanical Engineering

*Sept. 2019 - April Present*

**Research** Learning based rough terrain navigation for mobile robots research at Autonomous Systems and Biomechatronics Lab

**University of Toronto**

*Toronto, Canada*

Bachelor of Applied Science, Mechanical Engineering, With Distinction - Dean's Honours List

*Sept. 2013 - April 2018*

**Specialization** Mechatronics Stream and Bioengineering Stream, Robotics and Mechatronics Minor. GPA (3.81/4.00)