

# YUNI FUCHIOKA

fuchioka@cs.ubc.ca ◦ yunifuchioka.github.io

## EDUCATION

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### University of British Columbia

*Master of Science, Computer Science*

September 2021 – April 2023 (Expected)

*Vancouver, Canada*

- Supervisor: Professor Michiel van de Panne.
- Thesis topic: Quadruped robot control through deep reinforcement learning and trajectory optimization.
- Overall average: 91.5%

### University of British Columbia

*Bachelor of Applied Science, Engineering Physics (with distinction)*

September 2015 – April 2021

*Vancouver, Canada*

- Fully accredited engineering program covering topics in mechanical, electrical, and software engineering, and its connection to foundational physics and mathematics.
- Elizabeth and Leslie Gould Scholarship in Engineering.
- Dean's Honour List Designation (received every academic year).
- Overall average: 85.1%

## EXPERIENCE

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### Research Assistant

*UBC Motion Control and Character Animation Group (MOCCA)*

June 2021 – Present

*Vancouver, Canada*

- Sourced parts for, assembled, debugged, and set up control software for the Solo 8 quadruped robot designed by the Open Dynamic Robot Initiative, the first legged robot owned by the lab. Used the robot to research reinforcement learning and trajectory optimization based control—see Publication section below.
- Collaborating with Ahead.IO, a local company producing the Stella quadruped robot, to design a quadruped simulation model suitable for training with reinforcement learning.

### Research Intern, Humanoid Robotics Group

*Honda Research Institute Japan/Honda R&D*

June 2018 – April 2019

*Tokyo, Japan*

- Researched methods of modelling and controlling bipedal locomotion through the application of geometric nonlinear control theory, feedback linearization, and template models, as applied to planar biped systems. Supervised by Dr. Chunjiang Fu.

### Strategic Reporting and Data Migration Intern

*UBC Information Technology*

January 2017 – April 2017

*Vancouver, Canada*

- Programmed web-based data visualizations and developed a prototype web application for centralized master data management, for a university-wide project to replace the legacy student information system.

### Mechanical Part Inspector

*Kodak Canada*

July 2016 – August 2016

*Burnaby, Canada*

- Inspected CNC-machined laser components with micrometer-scale tolerances for defects and reported findings to production engineers, for a manufacturing plant that produced industrial offset printers.

### Mechanical Team Member

*UBC Solar*

September 2015 – June 2017

*Vancouver, Canada*

- Member of a volunteer student-led engineering team that built a solar powered car for the American Solar Challenge. Machined and fabricated several safety critical components of the first operational vehicle made by the team.

## PUBLICATIONS

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### **OPT-Mimic: Imitation of Optimized Trajectories for Dynamic Quadruped Behaviors**

**Yuni Fuchioka**, Zhaoming Xie, and Michiel van de Panne

*Under Review for ICRA 2023. ArXiv Preprint:* <https://arxiv.org/abs/2210.01247>

Website: <https://www.cs.ubc.ca/~van/papers/2022-opt-mimic/index.html>

## OTHER PROJECTS

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### **Block Coordinate Descent for 2D Quadruped Centroidal Dynamics**

January 2022 – April 2022

*Graduate Course Project, EECE 571Z: Convex Optimization*

- Modified and implemented the methods of the paper "Rapid Convex Optimization of Centroidal Dynamics using Block Coordinate Descent" by Shah et al. 2021 for a simplified 2D quadruped model.

### **Gibbon Pose Estimation from Videos**

September 2021 – December 2021

*Graduate Course Project, CPSC 533R: Visual AI*

- Evaluated two 2D pose estimation methods from research literature on videos of brachiating gibbons, characterizing the various pre- and post-processing techniques needed to account for the challenge of limited, low quality training data and the necessity to adapt research techniques to real-world problems.

### **Bicopter Drone**

May 2019 – August 2019

*Personal Hobby Project*

- Designed and built a radio controlled drone that flies using only two propellers, using limited financial and fabrication resources. Programmed an Arduino for stable flight control, rather than using an off-the-shelf flight controller.

### **Autonomous Robot Competition**

June 2017 – August 2017

*Undergraduate Course Project*

- Designed and built a robot for a 6 week design competition within a 4 member team, placing 4th out of 16 teams. The robot was required to follow a taped track, grasp objects, and place them on a target location autonomously with no remote control.

## TEACHING

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**Teaching Assistant**, CPSC 426: Computer Animation

Spring Term 2021–2022

**Teaching Assistant**, PHYS 170: Mechanics I

Winter Term 2020–2021

**Teaching Assistant**, PHYS 170: Mechanics I

Spring Term 2019–2020

## SERVICE

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Reviewer for ICRA 2023.

## SKILLS

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**Programming Languages**

Python, C++, MATLAB, Java, SQL

**Numerical Computing Libraries**

PyTorch, CasADi, Numpy, Eigen, IPOPT

**Robotics Software**

ROS package management (Colcon, CMake), Git, Ubuntu Linux

**Mechatronics**

Machine shop, Electrical prototyping, CAD (Onshape, Solidworks)

**Spoken Languages**

English (primary language), Japanese