# AMRO AL-BAALI

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#### **EXPERIENCE**

Software Engineer - Localization and mapping Pickle Robot ## 02/2024 - Present **♀** Cambridge, MA

Leading the effort on state estimation, localization, and mapping for a robot equipped with cameras and 2D LIDARS. The primary tools used in this job are ROS, Python, VIO, state estimation.

Software Developer - Robotics Team Vention

**#** 05/2023 - 02/2024

Montreal, Canada

Developed and tested the robot API that allows clients to write custom software that controls the robot operation, both in simulation and on the physical robot. The primary tools used in this job are ROS, C++, Python, JavaScript, and Docker.

Software Developer - Localization and Mapping Avidbots

**1** 09/2021 - 03/2023

♥ Kitchener, Canada

Developed and tested calibration, localization, and mapping algorithms for a robot equipped with a 2D LIDAR and a monocular camera. The primary tools used in this job are ROS, C++, Python, OpenCV, and nonlinear least squares (e.g., Ceres). The algorithms were tested in simulation and on robots, both in-house and on clients' robots.

Graduate Student - SLAM DECAR group (McGill University)

**#** 05/2019 - 08/2021

Montreal, Canada

Collaborated with Voyis and Sonardyne to develop a SLAM back-end algorithm for an AUV equipped with a third-party INS treated as a black box and the Voyis Insight Pro high-precision laser scanner. The primary tools used in the project are: Lie groups, state estimation, optimization (convex, on-manifold), MATLAB, and C++.

Mechanical Engineering Intern MY01

**1** 05/2018 - 04/2019

♥ Montreal, Canada

Designed and executed mechanical tests on the MY01 device to pass the medical certification. This included programming the testing platform using Python, which involved designing a GUI for the user. Furthermore, I also customized the CAD storage tool Autodesk Vault using C# to generate reports in MY01's standards.

### **EDUCATION**

M. Eng Mechanical McGill University

**#** 05/2019 - 08/2021

- CGPA: 3.77/4.00. Supervisor: Prof. J. R. Forbes.
- Thesis title: Augmenting Sensor Measurements with INS Estimates in a Graph Based SLAM Problem.
- Publication: A. Al-Baali. T. Hitchcox and J. R. Forbes. "Combining DVL-INS and Laser-Based Loop Closures in a Batch Estimation Framework for Underwater Positioning," in IEEE Journal of Oceanic Engineering, doi: 10.1109/JOE.2023.3286854.

B. Eng Honours Mechanical, Minor in Computer Science McGill University **1** 09/2014 - 04/2019

• CGPA: 3.83/4.00. Supervisor: Prof. J. R. Forbes.

• Thesis title: Parallel Feedforward Control Using Linear Matrix Inequalities.

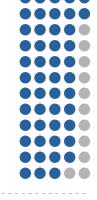
### **AWARDS**

- Best Seminar Award 2021
- MEUSMA Award, 2019
- NSERC-USRA Award, 2019
- McGill SURE award, 2017
- Habib Abou-Fayssal Prize, 2018
- Dean's Honour List, 2015, 2018
- Rio Tinto-Evans Exchange Award, 2018

### **SKILLS**

#### Theory

Linear Algebra **Numerical Optimization Probability SLAM State Estimation** Kalman filtering Particle filtering **Factor graphs Computer Vision Multiview Geometry** Matrix Lie Groups **Control Systems** 



#### **Programming**

C++ **Pvthon** Julia Bash **MATLAB ₽TFX** 



#### **Software**

Linux **ROS** ROS 2 Eigen Ceres GTSAM OpenCV Docker



## **LANGUAGES**

**English Arabic** 

