

Joao Pedro Bicalho Andrade

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Education

Bachelor of Applied Science & Engineering, University of Toronto

2020 – 2025

Major in Engineering Physics - Minor in Artificial Intelligence Engineering and Minor in Robotics and Mechatronics

University Of Toronto International Scholar Award - Faculty Of Applied Science And Engineering – \$100,000

Technical Skills

Programming Languages: Python, C++, C, Bash, SQL, ARM Assembly, MATLAB

Technologies/Skills: Linux, Git, CI/CD, Unit/Integration Testing, Docker, ApacheSpark, Hadoop, Tensorflow, Latex.

Experience

MannLab

May 2024 - Present

Thesis Research - Analysis of Signal Processing and Machine Learning Algorithms for EEG Data

- Conducting thesis research under Dr. Steve Mann, widely regarded as the Father of Wearable Computing, inventor of the smartwatch and HDR technology, which is used in nearly every digital camera and smartphone today.
- Nominated for Engineering Science Centennial Thesis Award .
- Developed Python pipelines for various EEG signal processing methods, including the Adaptive Chirplet Transform, Fourier Transform, Wavelet Transform and more.
- Researched and implemented Machine Learning models that did sleep stage classification based on EEG data.
- Published paper in IEEE ICCE (International Conference on Consumer Electronics) 2025

Coactum S.A.

May 2022 – August 2022 // June 2023 - November 2023

Software Engineering Intern

(Aerospace Startup in Switzerland developing Orbital Transfer Vehicle)

- Developed the testbench for the on board flight software (OBSW) from scratch.
- Designed the hardware portion of the testbench with a main CPU board and peripheral boards including SpaceWire, CAN and RS485/232.
- Configured Spacewire board using provided out of tree Linux kernel drivers and patched it to improve functionality.
- Built a scalable and automated framework for validation tests for the OBSW.
- Researched a variety of different software testing frameworks, converging to one (Gauge).
- Deployed and configured Gauge through a Linux command line and ran tests for the Telecommunication Stack .
- Wrote python mocks (scripts that emulate hardware) for all sensors used in spacecraft. The mocks were launched automatically by gauge and multithreaded to allow for matching the frequency of transmission to and from OBC.
- Wrote the libraries to communicate with each of the sensors/mocks and daemon threads acting as the OBC that read through and processed the messages received.
- Performed functional tests of each of newly received units (IMU, startracker, PCDU) testing all operation modes.

Relevant Coursework

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|---|------------------------------|-------------------------|
| • Microprocessors and Embedded Microcontrollers | • Applied Machine Learning | • Computational Physics |
| • Algorithms and Data Structures | • Control Systems | • Computer Programming |
| | • Probability and Statistics | • Electronics |

Projects

General Relativity | Python

Fall 2024

- Built a Python script to calculate important properties for solving Einstein's Field Equations.
- Script computes the inverse metric, Christoffel symbols, Riemann curvature tensor, Ricci tensor, and Ricci scalar, given the components of the metric tensor.
- Used the script to perform calculations under Kerr and Schwarzschild spacetime geometries .

Seam Carving Image Processing | C

April 2021

- Created an image processing tool that resizes images in a content-aware manner such that most interesting features of the image are preserved.
- Image uploaded to the program is reduced in size by one vertical path of connected pixels for each iteration and user is able to run it up to a desired reduced size.