

# Amin Yahyaabadi

University of Manitoba, Winnipeg, Canada

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## Education



**University of Manitoba**  
*M.Sc., Mechanical Engineering*  
– GPA: [4.27/4.5](#)

Winnipeg, Canada  
Sep 2018 - Sep 2021



**Isfahan University of Technology (IUT)**  
*B.Sc., Mechanical Engineering*  
– GPA: 18.03/20 ([3.91/4](#))      2014-2018  
17.89/20 ([3.81/4](#))      overall

Isfahan, Iran  
Sep 2013 - Feb 2018

## Research Interests



Robotics:

- UAVs
- Legged Robots
- Manipulators



Control Systems:

- Adaptive, Fuzzy, Model Predictive



Machine Learning and Artificial Intelligence:

- Artificial Neural Networks
- Meta-heuristic Algorithms, Swarm Intelligence
- System Identification
- Differential Programming

## Publications

- 📄 **A. Yahyaabadi**, M. Driedger,..., P. Ferguson, "ManitobaSat-1: A Novel Approach for Technology Advancement," in *the Journal of IEEE Potentials*, 2020, [Link](#)
- 📄 **A. Yahyaabadi**, M. Driedger,..., P. Ferguson, "ManitobaSat-1: Making Space for Innovation," in *IEEE Canadian Conference of Electrical and Computer Engineering (CCECE)*, Edmonton, Canada, 2019 [Link](#)
- 📄 **A. Yahyaabadi**, P. Ferguson, "An intelligent multi-vehicle drone testbed for space systems and remote sensing verification," in *Canadian Aeronautics and Space Institute (CASI) ASTRO*, Montreal, Canada, 2019 [Link](#)
- 📄 **A. Yahyaabadi**, P. Harrison, P. Ferguson, "Auto Code Generation for Onboard Space Object Detection and Other Flight Software Applications - A Feasibility Study," in *Canadian Aeronautics and Space Institute (CASI) ASTRO*, Montreal, Canada, 2019 [Link](#)

## Research Assistance Experiences

### An Intelligent Drone Testbed for Control Systems and Verication

I develop an accessible intelligent multi-vehicle drone testbed for validation of new satellite or drone control algorithms and hardware. System identification of drone's dynamics is done intelligently with minimal measuring using PSO/GA.

AI PSO/GA UAV System Identification Control Pixhawk Parrot Matlab

Supervisor: Dr. P. Ferguson

M.Sc.Thesis

### Intelligent vibration control with self-sensing piezoelectric actuator

I developed an intelligent control method for a distributed system using a self-sensing piezoelectric actuator. I modeled the dynamics of the system with a custom programmed FEA beside FDA to simulate the system and test the controller.

AI PSO/GA Smart Material System Identification Control FEA Matlab

Supervisor: Dr. S. Ziaei-Rad

B.Sc.Thesis

### Auto Code Generation for Onboard Space Object Detection and Flight Software Applications

We developed machine learning and analytical image processing algorithms for satellite's onboard detection of resident space objects (RSOs) from commercial-off-the-shelf star trackers using a Matlab's syntax and special guidelines, and we compared the performance of generated hardware optimized C/C++ code to handwritten code.


[Link](#)

Machine Learning Image Processing Xilinx Arm Cortex Intel Matlab C++/C

Supervisor: Dr. P. Ferguson

M.Sc. Project

## ManitobaSat Satellite's "Onboard Computer" and "Flight Software" Leader

We design a modular onboard computer (OBC) for ManitobaSat-1, which is a 3U sized CubeSat satellite to expose special geological samples to space environment. OBC uses new technologies such as a "system on a chip" (Soc) and MRAM. We develop a custom real-time flight software using FreeRTOS to control all the satellite's operations such as attitude and determination control.  [Link](#)

Mechatronics Control Smart Fusion Arm Cortex RTOS C++/C

Supervisor: Dr. P. Ferguson

M.Sc. Project

## Honors and Awards

Fellowship for Education Purposes - \$40,500, UoM, Canada. .... 2018-2021  
Faculty of Graduate Studies Program Completion Scholarship - \$2,500, UoM, Canada. .... 2021  
International Graduate Student Entrance Scholarship (IGSES) - \$6,000, UoM, Canada. .... 2018  
Awarded Full Fellowship to Study at IUT for M.Sc Program without Entrance Exam, IUT, Iran .... 2017  
Among top 10% students in the Mechanical Engineering Department, IUT, Iran .... 2017  
Ranked top 0.3% among 260000 participants in Iranian University Entrance Exam for B.Sc. Studies, 2013  
Qualified as very good in Mathematics Olympiad Final International Round in Netherlands .... 2012  
Ranked 1st in Mathematics Olympiad National Round in Iran .... 2011

## Notable Projects

### Rhino XR-3 5 DOF Robot Arm Real-time Control and Simulation via Arduino and Matlab

Robotics Control C/C++ Matlab Arduino

Selected Topics in Robot Technology, Supervisor: Dr. S. Balakrishnan

### Barrett WAM 7 DOF Robot Arm Simulation and Analysis via Matlab

Robotics Control Matlab

Robotics, Supervisor: Dr. H. Mousavi

### Model Predictive Control of Robot Arm via Neural Networks

Machine Learning Control Robotics Matlab

Neural Networks, Supervisor: Dr. M. Kamali

### Intelligent Fuzzy PID Controller for a Bluetooth controlled DC Motor via AVR

AI Fuzzy Logic Control AVR Matlab


Intelligent Control, Mechatronic Systems, Sup: F. Sheikholeslam, M. Danesh

### Custom Simulated Annealing Investigation for Salesperson Problem - A New Mathematical Proof of Multidimensional Newton's Weights Optimization Algorithm



















Machine Learning AI SA Neural Networks Matlab

Applied Computational Intelligence, Sup: K. Ferens


## GRE


 Quantitative: 170/170      Verbal: 151/170      Analytical Writing: 3.5


## Selected Courses

 Applied Computational Intelligence: 4.5/4.5	 Vehicle Dynamics: 18.3/20
 Selected Topics in Robot Technology: 4.5/4.5	 Mechatronics Lab 1 & 2 : 18.25/20 & 19/20
 Mechatronics: 20/20	 Applied Electrical/Electronics: 19.03/20
 Robotics: 19.5/20	 Dynamics: 18.5/20
 Neural Networks: 20/20	 Computer-aided design: 18.1/20
 Intelligent Control: 18/20	 Engineering Mathematics: 20/20
 Applied Vibrations: 19.6/20	 Differential Equations: 20/20
 Acoustics: 19.5/20	 General Mathematics: 20/20
 Machinery Dynamics: 19.3/20	 Advanced Dynamics (Auditing)

## Software and Programming Skills

 **Programming Languages:** C++, Rust, Python, Matlab, Simulink, Julia, D, Verilog, PLC, LabView, Maple, TypeScript, AssemblyScript, JavaScript

 **Embedded Processors:** Xilinx Zynq 7020 SoC/FPGA, Smart Fusion 2 SoC/FPGA, Pixhawk Flight Controller (Px4), Parrot Mambo Flight Controller, Arm Cortex A9, Arm Cortex M3, Arduino Due /Uno, AVR Atmel STK500, Intel/AMD x86

 **Technical Software:** Abaqus, Xilinx SDSoc - Vivado, Simpack, MSC Adams / Car, MSC Actran, Autodesk Inventor, CATIA, Proteus, Modelsim

## Attended Conferences

Canadian Aeronautics and Space Institute (CASI) ASTRO

Montreal, Canada, 2019

📁 Submitted two papers and presented them:

- "An intelligent multi-vehicle drone testbed for space systems and remote sensing verification" 📄 [Link](#)
- "Auto Code Generation for Onboard Space Object Detection and Other Flight Software Applications" 📄 [Link](#)
- Presented my colleagues' works:
  - V. Parthasarathy, "A Virtual Ground Station for Automated Spacecraft Health Monitoring" 📄 [Link](#)
  - J. Campos, "Industry Project Management Tools for Nanosatellites Teams" 📄 [Link](#)
  - V. Platero, "Outreaching for the Stars with ManitobaSat-1" 📄 [Link](#)

## 📁 ArcticNet (ASM) 2018

Ottawa, Canada, 2018

- Presented my work by poster and oral presentation:
  - "A multi-vehicle drone testbed for space systems and remote sensing verification" 📄 [Proceedings P. 198](#)

## Work Experience

### The Main Member of Drone Testbed Lab at the University of Manitoba Sep. 2018 - Current

- Perusing my main research "An intelligent multi-vehicle drone testbed for space systems and remote sensing verification"
- Helping other teams use my testbed in different research areas such as:
  - Using hand gestures for controlling drone movements
  - Using artificial neural networks as the controller for the drones

### Summer Internship in Bama Co

Summer 2014/2016

- Condition monitoring and predictive maintenance planning of machinery & vehicles in [Bama Co](#)

### Special Membership in Isfahan Mathhouse

2013-2018

- Being a member of the Jury in [Isfahan Mathhouse](#) for choosing qualified participants for International Competitions (e.g., Olympiad)
- Olympiad competition participants test grader in Isfahan Mathhouse

### Teaching Assistant at the Isfahan University of Technology

Fall 2016

- Statics, instructor: Dr. S. Akbarzadeh

## Voluntary Experience

### Volunteering as an Open Source Programmer

- The leader of 🐙 [Atom-Community](#) organization that brings an integrated development environment to Atom
- The author of 🐙 [Zadeh](#), which is a library for fast fuzzy filtering and matching written in C++
- The author of 🐙 [minijson](#), which is a library for the fast minification of the JSON files written in D, C, and AVX2 and SSE4.1 SIMD.
- The author of 🐙 [AcuteML](#), which is an intelligent markup language for web development written in Julia
- The leader of 🐙 [JuliaMatlab](#) organization which is an open source alternative for Matlab written in Julia
- An owner of 🐙 [JuliaMusic](#) organization which provides music research tools (e.g. 🐙 [MusicXML](#)) in Julia
- Other projects that are available on 🐙 [Github](#)

### Music Performances in Morrow Gospel Church

Sep. 2018/Jan. 2019

- Two Blues/Folk performances in Blues Nights events, Winnipeg, Canada

## References

Dr. P. Ferguson, Associate Professor of Mechanical Eng.

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University of Manitoba, Canada  
MIT Alumni, NSERC Research Chair

Dr. S. Balakrishnan, Professor of Mechanical Eng.

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University of Manitoba, Canada

Dr. S. Ziaie-Rad, Professor of Mechanical Eng.

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Isfahan University of Technology, Iran  
Imperial College London Alumni

Dr. K. Ferens, Assistant Professor of Electrical and Computer Eng.

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