

# Amin Yahyaabadi

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Department of Mechanical Engineering

## Education



**University of Manitoba**  
*M.Sc., Mechanical Engineering*  
– GPA: 4.27/4.5

Winnipeg, Canada  
Sep 2018 - Current



**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

- Machine Learning
- ANNs, Differential Programming, System Identification
- Artificial Intelligence:
- Meta-heuristic Algorithms, Swarm Intelligence
- Robotics
- UAVs, Swarms, Legged Robots, Manipulators
- Control Systems
- Adaptive, Fuzzy, Model Predictive

## 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 multi-vehicle drone testbed for space systems and remote sensing verification**  
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. .... 2018-2020  
 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      Verbal: 151      Analytical Writing: 3.5

## Selected Courses







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

## Software and Programming Skills

Languages	Embedded Processors	Technical Software
☉★ Matlab	☉★ Xilinx Zynq 7020 - Zybo Z720 SoC/FPGA	Xilinx SDSoc - Vivado
☉★ Julia	Smart Fusion 2 SoC/FPGA	☉★ Abaqus
☉★ C++/C	☉★ Pixhawk Flight Contrller (Px4)	Simpack
Python	☉★ Parrot Mambo Flight Controller	MSC Adams
☉★ Simulink	☉★ Arm Cortex A9	MSC Adams Car
Labview	Arm Cortex M3	MSC Actran
Maple	☉★ Arduino Due/Uno	☉★ Autodesk Inventor
Verilog	AVR Atmel STK500	☉★ CATIA
Linux	☉★ Intel x64/x86	Proteus
☉★ L <sup>A</sup> T <sub>E</sub> X	☉★ PLC Programming	Modelsim
		☉ – Fynort

## 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

- **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., Alympiad)
  - Alympiad 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**
  - Owning  [Atom-Community](#) organization that brings an integrated development environment to Atom
  - Owning  [AcuteML](#), which is an intelligent markup language for web development written in Julia
  - Owning  [JuliaMatlab](#) organization which is an open source alternative for Matlab written in Julia
  - Owning  [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. University of Manitoba, Canada  
MIT Alumni, NSERC Research Chair
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- **Dr. S. Balakrishnan**, Professor of Mechanical Eng. University of Manitoba, Canada
  - ✉ [subramaniam.balakrishnan@umanitoba.ca](mailto:subramaniam.balakrishnan@umanitoba.ca)  [Page](#)  [Page](#)
- **Dr. S. Ziaie-Rad**, Professor of Mechanical Eng. Isfahan University of Technology, Iran  
Imperial College London Alumni
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- **Dr. K. Ferens**, Assistant Professor of Electrical and Computer Eng. University of Manitoba, Canada
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