# Dr Ali Moltajaei Farid

Independent Researcher — Postdoctoral Fellow (2021–2025)
Email: ali.farid@kntu.ac.ir — afarid@uregina.ca

## Professional Summary

Innovative researcher with a PhD in Computer Science (Monash University, 2020), specializing in swarm robotics, UAV control, and reinforcement learning for multi-robot systems. Extensive experience in designing, implementing, and deploying autonomous systems for precision agriculture, intelligent control, and smart environments. Proven record of high-impact publications, successful grant proposals, and international collaborations. Seeking academic research opportunities as well as industrial roles in autonomous systems, AI, and robotics.

## Education

**PhD in Computer Science**, Monash University, 2020
Thesis: *"An Investigation on Patrolling Swarms of UAVs"*
Key Achievements: Developed novel UAV patrolling strategies; explored battery displacement systems; hands-on work with Ardupilot, Pixhawk, ODROID XU3, Kinect, and E-Puck robots.

**MSc in Electronics Engineering**, University of Sistan & Baluchestan, 2013
Thesis: *"Designing Unmanned Aerial Vehicle Based on Neuro-Fuzzy Systems"* – Applied ANFIS to improve control in dynamic systems.

**BSc in Control Engineering**, Qazvin Azad University, 2010
Thesis: *"Designing Smart House Control System"* with sensor-based automation and anti-theft features.

## Research Interests

- Reinforcement learning & multi-objective optimization

- Swarm robotics & multi-agent systems

- Intelligent control systems

- Robot path planning

- Neuro-fuzzy controllers

- Smart environments

## Research & Professional Experience

**Independent Researcher & Academic Supervisor**, Oct 2024–Present
Conduct independent research in multi-robot systems, reinforcement learning, and UAV applications, leading to new publications (2024–2025). Supervise MSc and PhD students at KNTU on UAV control and intelligent guidance. Expanded technical skills through advanced training in AI and robotics. Collaborated with Melorin (2025) on R&D of RF micro-needling medical device (electronics, software, PCB design).

**Postdoctoral Researcher**, K. N. Toosi University of Technology, 2023–Oct 2024
Designed multi-robotic precision farming systems using novel reinforcement learning methods to improve agricultural spraying.

**Postdoctoral Researcher**, University of Regina, 2021–2023
Led a collaborative project with Precision.ai on UAV swarms for weed control. Developed multi-UAV exploration and spraying algorithms.

**Research & Development Engineer**, Pand Industries, 2020–2021
Modernized existing industrial weighing devices and contributed to the development of next-generation smart models. Responsibilities included electronic circuit design and analysis, and microcontroller programming (ARM, PIC).

**Research & Development Engineer**, Maad Zist Fanavar Beynolmelal, 2019– 2021
Contributed to a dynamic R&D team focused on the development of advanced medical devices. Responsibilities included electronic circuit design and analysis, PCB layout design, algorithm development, and embedded programming (ARM, CPLD, PIC). Additionally, led efforts to document and comply with relevant medical standards, including risk management and safety protocols.

# Publications

**Journal Articles (Newest First)**
1. Khajemohammadi, F., Roshanian, J., Farid, A.M. (2025). Deep Reinforcement Learning-Based Optimization of an Innovative Fuzzy Inference System Structure for Quadrotor UAV Control. *Journal of Aerospace Science and Technology*, Published Sept 23, 2025.
2. Farid, A.M., Roshanian, J., Mouhoub, M. (2025). Multiple Aerial/Ground Vehicles Coordinated Spraying Using Reinforcement Learning. *Engineering Applications of Artificial Intelligence*, 151, 110686.
3. Farid, A.M. (2023). Effective UAV Patrolling for Swarm of Intruders with Heterogeneous Behavior. *Robotica*, 41(6), 1673–1688.
4. Farid, A.M., Egerton, S., Kamal, M.A.S. (2021). Search Strategies and Specifications in a Swarm versus Swarm Context. *Robotica*, 39(11), 1909–1925.
5. Farid, A.M., Barakati, S.M. (2013). UAV Controller Based on Adaptive Neuro-Fuzzy Inference System and PID. *International Journal of Robotics and Automation*, 2(2), 73–82.

**Conference Papers (Newest First)**
1. Farid, A.M., Mouhoub, M. (2025). Online Collaborative UAV Path Planning for Mapping and Spraying Missions. *International Conference on Robotics, Computer Vision and Intelligent Systems*, Portugal.
2. Farid, A.M., Roshanian, J. (2024). Reinforcement Learning Application in See & Spray UAVs. *BulTrans 2024*, Bulgaria.
3. Farid, A.M., Mouhoub, M., Arkles, T., Hutch, G. (2024). Multi-UAV Weed Spraying. *International Conference on Robotics, Computer Vision and Intelligent Systems*, Italy.
4. Mete, A., Mouhoub, M., Farid, A.M. (2023). Coordinated Multi-Robot Exploration using Reinforcement Learning. *International Conference on Unmanned Aircraft Systems*, Poland.
5. Farid, A.M., Mouhoub, M. (2023). Multi-Objective Unmanned Aerial Mapping. *International Conference on Unmanned Aircraft Systems*, Poland.
6. Farid, A.M., Mouhoub, M. (2023). Nanobots in Medical Applications, a Future Horizon. *IEEE ICMAME*, UAE.
7. Farid, A.M., Mouhoub, M. (2022). Evolutionary Mapping with Multiple Unmanned Aerial

Vehicles. *IEEE SMC*, Prague, Czech Republic.

8. Farid, A.M., Mouhoub, M., Sharifi, J. (2020). A Comparison on Intelligent Controllers based on Genetic Algorithms for Reducing Energy and Water Waste. *IEEE CEC*, Glasgow, UK.

9. Farid, A.M., Mouhoub, M., Sharifi, J., Barakati, S.M., Egerton, S. (2019). Multiple Objective Optimizers for Saving Water and Energy in Smart House. *IEEE SMC*, Bari, Italy.

10. Farid, A.M., Egerton, S., Barca, J.C., Kamal, M.A.S. (2018). Adaptive multi-objective search in a swarm vs swarm context. *IEEE SMC*, Miyazaki, Japan.

11. Farid, A.M., Egerton, S., Barca, J.C., Kamal, M.A.S. (2018). Search and Tracking in 3D Space Using a Species Based Particle Swarm Optimizer. *IEEE I2CACIS*, Shah Alam, Malaysia.

12. Ghansemi, N., Barakati, S.M., Farid, A.M. (2015). ANFIS Controller Based on RBF Identification for Piezoelectric Actuator in a Positioning System. *Iranian Joint Congress on Fuzzy and Intelligent Systems*, Zahedan, Iran.

13. Farid, A.M., Barakati, S.M. (2014). Implementation of DC Motor Neuro-Fuzzy Controller Using PSO Identification. *Iranian Conference on Electrical Engineering*, Tehran, Iran.

14. Farid, A.M., Barakati, S.M., Seifipour, N., Tayebi, N. (2013). Online ANFIS Controller Based on RBF Identification and PSO. *Asian Control Conference*, Istanbul, Turkey.

# Grants & Awards

- Monash University Fully Funded PhD Scholarship (2015–2020)

- Mitacs Accelerate Postdoctoral Fellowship, Canada (2021–2023)

- Iran's National Elites Foundation Postdoctoral Funding (2023–2025)

- AMSI Internship Research Grant, Australia (2015)

# Teaching Experience

**K. N. Toosi University of Technology (KNTU)**
- Main Instructor, *Artificial Intelligence Fundamentals*, Winter 2024 (In-person, 35 students)
- Main Instructor, *Algorithms and Programming Fundamentals*, Fall 2023 (In-person, 37 students)
- Main Instructor, *Algorithms and Programming Fundamentals*, Winter 2023 (In-person, 20 students)

**University of Regina**
- Main Instructor, *Advanced Algorithms and Data Structures (CS340)*, Summer 2022 (In-person, 44 students)
- Main Instructor, *Advanced Algorithms and Data Structures (CS340)*, Winter 2022 (Online, 43 students)

**Monash University**
- Teaching Assistant, *Theory of Computation (FIT2014)*, Winter 2018 (50 students)
- Teaching Assistant, *Object-Oriented Design and Implementation (FIT2099)*, Fall 2018 (40 students)

# Supervision & Mentoring

- Mentored MSc student **Nima Ghasemi** (2013–2014), Mechatronics Engineering, project: ANFIS Controller Based on RBF Identification for Piezoelectric Actuator in a Positioning System, resulting in a conference publication.

- Mentored BSc Globalink student **Atharva Mete** (May–July 2022), Indian Institute of Technology Bombay, through the MITACS Globalink Research Internship. Project: Multiple Robot Motion Planning in a Dynamic Environment, resulting in a conference publication.

- Co-supervising MSc student **Ali Reza Erfanian**, Aerospace Department, K. N. Toosi University of Technology, project: Intelligent Guidance and Control of a Quadcopter in an Urban Environment Based on Reinforcement Learning (from Jan 2024). Related manuscript currently under review.

- Co-supervising PhD student **Fatemeh Khajemohammadi**, Aerospace Department, K. N. Toosi University of Technology, project: Adaptive Controller Using Reinforcement Learning (from Jan 2024). Related manuscript currently under review.

## Thesis Committees

- Saman Yazdannik – MSc Defense, Cooperative Multi-Copter Control, Sept 2024

## Journal Reviewing

- IEEE Robotics and Automation Letters
- IEEE Access
- Robotica, Springer J. Supercomputing, Scientific Reports

## Grant Proposals

- **Canada:** MITACS UAV Weed Control (with Prof. Mouhoub)
- **Iran:** INEF UAV Swarm Spraying Project (with Prof. Roshanian)

## Technical Skills

- Programming: Python, C++, Assembly, Matlab, ROS
- Electronics: AVR, ARM, PIC, STM32F4, Raspberry Pi, PCB Design (Altium, PROTEL)
- AI/ML: Reinforcement Learning, PyTorch
- Tools: Labview, Webots, Linux, LaTeX

## Languages

- English – Full professional proficiency
- Persian, Turkish – Native/bilingual proficiency
- German, Arabic – Limited working proficiency


## References

Prof. Malek Mouhoub – University of Regina – malek.mouhoub@uregina.ca
Prof. Jafar Roshanian – KNTU – roshanian@kntu.ac.ir
Prof. MAS Kamal – Gunma University – maskamal@gunma-u.ac.jp
Prof. Simon Egerton – La Trobe University – S.Egerton@latrobe.edu.au
Prof. Jan Carlo Barca – Deakin University – jan.barca@deakin.edu.au
Prof. S. Maoud Barakati – USB – smbaraka@gmail.com