Arman Asgharpoor Golroudbari

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EDUCATION

University of Tehran, *Tehran, Iran* — *Sep 2019 – Sep 2022*

M.Sc. in Space Engineering - *Adviser: Prof. M.H. Sabour* — *GPA: 4.0/4.0*
Thesis: Developing Learning-based Attitude and Heading Estimation Algorithm for Autonomous Vehicles

Academic Center for Education, Culture and Research, *Tehran, Iran* — *Apr 2019 – Apr 2020*
MBA – *AI-based Personalized Medicine.* — *GPA: 4.0/4.0*

University of Applied Science and Technology, *Tehran, Iran* — *Sep 2016 – Jun 2019*
B.Eng. Aircraft Avionics – *Learning-based Inertial Odometry for Indoor Navigation.* — *GPA: 3.8/4.0*

Civil Aviation Technology College, *Tehran, Iran* — *Jan. 2013 – Sep. 2016*
Associate Avionics
Key Courses: C++, Aircraft Computer, Telecommunications, Navigation Systems, Instrumentation

RESEARCH EXPERIENCE

Purdue University
Remote Research Intern, *Systematic Review of Digital Twins in Autonomous Vehicles* — *Oct 2023* – present
Examining the challenges and opportunities of implementing digital twins for autonomous vehicles

Carnegie Mellon University
Research Intern — *Aug 2023* – present
Developing generative models for 3D shape representations, advancing simulations

Milky Way Program *Deep Space Initiative*
Research Intern, *A Systematic Review on In-Space Manufacturing* — *Aug 2023* – present
Leading a team for interdisciplinary research on sustainable in-space manufacturing technologies

University of Colorado Boulder
Remote Research Intern, *Physics-Informed Neural Network Inertial Navigation Systems* — *Jul 2023* – present
Contributing to safer and more precise navigation, particularly in unstructured environments
Elevating the efficiency and success of search and rescue missions.

Students' Scientific Research Center, *Tehran University of Medical Sciences*
Researcher (utilizing Hugging Face tools and resources), ParsLLAMA — *Apr 2023* – present
Developed and implemented Persian language integration into LLAMA framework using LoRA.
Curated and preprocessed large-scale Persian text corpus for model training.
Designed and optimized tokenization pipeline tailored to Persian linguistic features.

Supervisor — *Mar 2023* – present
Guiding 10+ students in creating AI medical imaging tools for early and accurate disease detection

Oxford Machine Learning Summer School, *AI for Global Goals*
Researcher, *Cancer Detection* — *May 2023 – Aug 2023*
Implemented k-fold cross-validation with weighted sampling for Ensemble Learning.
Ranked 1st in The Health and Medicine OxML competition track by achieving an accuracy of 82% [**Kaggle**].

Fuzzy Logic Lab, *University of Tehran*
Researcher
Visual Odometry — *Apr 2022 – Aug 2023*
Developed RCNN-based learning framework using KITTI dataset in Python (Keras) **[GitHub]**.
Inertial Attitude Estimation — *Jan 2020 – Sep 2022*
Enhanced attitude estimation accuracy by 40% using hybrid RCNN-based models **[GitHub]**.
Conducted comprehensive validation against conventional SFAs (KF Family, QUEST, FQA, CF).

Space Lab, *University of Tehran*
Researcher
Exoplanet Transit Detection — *Jun 2023 – Sep 2023*
Applied signal processing techniques to detect subtle transit patterns
Galaxy Redshift Analysis — *May 2023 – Aug 2023*
Developed data analysis pipelines for extracting redshifts from SDSS (Sloan Digital Sky Survey) galaxy spectra
Inertial Odometry — *Sep 2022 – Aug 2023*
Developed end-to-end learning framework for inertial odometry trained by OxIOD, RONIN, and RIDI datasets.
Employed Hyperparameter Optimization (PBT and Bayesian Optimization) in PyTorch **[GitHub]**.
Celestial Mechanics Visualization — *Oct 2022 – Feb 2023*
Developed a visualization tool to illustrate the Solar System using Python
Quantum Computing — *Sep 2020 – Aug 2021*
Explored **Quantum Dot Qubits** for scalable and fault-tolerant quantum computation
Investigated **Paul Trap** for quantum information storage and manipulation
Explored **Superconducting Qubits**, pushing quantum coherence boundaries for future technologies
RK4 Orbit Integrator — *Jan 2020 – Sep 2020*
Developed an RK4 Orbit Integrator for precise and efficient numerical simulation

Advancing trajectory predictions for enhanced asteroid impact modeling

Orbit Determination *Jan 2020 – Sep 2020*
Conducted orbit determination based on initial conditions and gravitational forces

CanSat Competition *Sep 2019 – Sep 2020*
Applied OpenCV to implement optimized ORB-SURF feature detection algorithms via Raspberry Pi.
Implemented EKF parameter optimization, ensuring precise state estimation.

Fuzzy-based Torino Scale *Sep 2019 – Jan 2020*
Implemented Fuzzy Logic to enhance asteroid threat assessment via the Torino Scale.
Optimize decision-making processes in asteroid impact risk analysis.

Aviation Industry Training Center, Avionics Lab
Research Assistant *Oct 2018 – Sep 2020*
Mentored +20 undergraduate students on their thesis project.
Designed and assembled PCBs for fire extinguisher and Flight Management System (FMS) simulator.

PUBLICATIONS

A. Asgharpoor, M. H. Sabour, "End-to-End Deep Learning Framework for Real Time Inertial Attitude Estimation using 6DoF IMU," *Measurement*, *Jun 2023*.

A. Asgharpoor, M. H. Sabour, "Recent Advancements in Deep Learning Applications and Methods for Autonomous Navigation: A Comprehensive Review," *Journal of Field Robotics*, Under Review 2023.

A. Asgharpoor, M. Raissi, "Solving Inertial Navigation System Equations Using Physics-Informed Neural Networks," *IEEE Robotics and Automation Letters*, Work in Progress, 2024.

A. Asgharpoor, S.A. Đurđević, D.K. Mathur, "The Future of In-Space Manufacturing: A Systematic Review of Emerging Technologies, Trends, and Applications for Sustainable Space Exploration and Off-Earth Colonization," *Acta Astronautica*, Work in Progress, 2024.

A. Asgharpoor, Z. Wang, "Exploring the Horizon: A Systematic Review of Digital Twins in Autonomous Vehicles - Unveiling Current Innovations and Envisioning Future Prospects," *IEEE Transactions On Intelligent Vehicles*, Work in Progress, 2024.

SKILLS

Programming: *ROS, Python (PyTorch, TensorFlow, Keras), MATLAB, LaTeX*
Machine Learning: *Deep Learning (LSTM, CNN, TCN), Reinforcement Learning*
Computer Vision: *OpenCV, Image Processing, Object Detection, Facial Recognition*
NLP: *LLM, QA Models, BERT, Sentiment Analysis, Text Classification*
Data Science: *SQL, MySQL, PySpark*
CAD-CAM: *SolidWorks, Inventor, Proteus, Altium Designer*
Hardware: *Arduino, Raspberry Pi, Sensor Interfacing, Actuator Interfacing, PCB Desig*
Hyperparameter optimization:

- Grid & Random Search, Population-based Training, Bayesian Optimization, ASHA

Natural Language Processing:

- QA Models, Sentiment Analysis, Text Classification

Astrophotography:

- Image capture and processing with telescopes and cameras (DSLRs, CCDs)
- Image calibration, stacking, deconvolution (DeepSkyStacker, PixInsight)
- Deep-sky imaging, including narrowband and H-alpha imaging
- Data analysis using Astropy, Matplotlib, and NumPy

Observational Astronomy:

- Telescope operation: mounting, operating (Celestron, Sky-Watcher, GSO)
  - –Mounts: Altazimuth, Equatorial, GoTo
  - –Telescope types: Refractor, Reflector, Catadioptric, H-alpha
- Celestial navigation, star tracking, familiarity with astronomical databases (SIMBAD)

ACADEMIC SERVICES

Supervising

Supervisor, *Tehran University of Medical Sciences(TUMS)* *Jul 2023* – Present
Supervised **six** systematic reviews.

Thesis Supervisor, *Aviation Industry Training Center* *Sep 2019 – Sep 2021*
Supervised **five** undergraduate theses.

Teaching

Co-Instructor, *TUMS* *Sep 2023* – Present

Teaching Assistant, *University of Tehran* *Sep 2022 – Jan 2023*

Instructor *Aviation Industry Training Center* *Sep 2018 – Sep 2021*
Taught 11 courses covering electronics, navigation, and aviation to **150+** students

Review Activities

Referee of Research Council, *Students' Scientific Research Center* *Apr 2019 – Present*

Journals:
IEEE Transactions on Instrumentation & Measurement, ***40 Papers***
The Aeronautical Journal, ***3 Papers***
Elsevier Aerospace Science and Technology, ***14 Papers***
Space: Science & Technology, ***4 Papers***
Elsevier Measurement, ***4 Papers***
IEEE Instrumentation & Measurement Magazine, ***1 Paper***
IEEE Open Access Journal on Circuits and Systems, ***1 Paper***

Conferences
International Federation of Automatic Control (IFAC) World Congress 2023, ***1 Paper***
American Control Conference (ACC) 2024,***1 Paper***

WORK EXPERIENCE

Lead AI Engineer, *Hotelsazi Darya* *Aug 2023 – Present*
Developing a conversational QA model to improve customer service by swiftly addressing common queries.
Employed QLoRA to fine-tune Language Models (BERT, LLAMA, and GPT) through Hugging Face.

Mentor, *Space Generation Advisory Council* *Nov 2020 – Present*
Provide targeted guidance, deliver personalized advice, and offer ongoing support to mentees.

Intern – Aircraft Avionics, *Iran Air, Tehran, Iran* *Jun 2018 – Oct 2018*
Conducted checks on the Airbus A-320's engine and avionics instruments using Aircraft Maintenance Manual
Executed inspection routine, identifying and rectifying anomalies to ensure compliance with safety standards

EXTRA CURRICULAR ACTIVITIES

AI Programming with Python – *Nano degree* *Aug 2023*
Organized by: Udacity and Amazon

Oxford Machine Learning Summer School – *62 Hours* *Jun 2023*
Organized by: AI for Global Goals, CIFAR, and the University of Oxford's Deep Medicine Program

University of Colorado Boulder (Coursera) – *20 Hours* *Jun 2023*
Deep Learning Applications for Computer Vision

DeepLearning.AI (Coursera) – *24 Hours* *May 2023*
Neural Networks and Deep Learning

Oxford Machine Learning Summer School – *48 Hours* *Aug 2022*
Covered topics including the mathematics of machine learning, neural networks, and probabilistic ML

USERN Research Week *6 Courses – 24 Hours* *Sep 2021*
Including: *1. Systematic Review, 2. Data Analysis in SPSS, 3. Scientific Writing, 5. Meta-analysis*

University of Toronto (Coursera) – *26 Hours* *Mar 2021*
State Estimation and Localization for Self-Driving Cars

AWARDS & HONORS

AWS AI & ML Scholarship – *Amazon & Udacity* 2023

Ranked 1st – *OxML Competition Track @ Oxford Machine Learning Summer School* 2023

Appreciated Presenter – *USERN Miniature Talk Competition* 2021

Ranked top 10% in M.Sc. Aerospace Eng. – *National University Entrance Exam* 2019

Ranked 1st in class 2019 – *University of Tehran, Dept. Aerospace*

Medalist – *Iran Martial Arts Federation, National Competitions*
Gold Medalist 2011, 2012, 2018, 2019
Silver Medalist 2015
Bronze Medalist 2016, 2019

Black Belt Dan II – *Nearu Martial Arts* 2015

LEADERSHIP EXPERIENCE

World Astronomy Week (Iran), *Executive Member* *Jan 2017 – Jan 2023*

Astronomy Outreach, *University of Tehran* *Jan 2021 – Sep 2023*

Tehran University of Medical Sciences *Jan 2014 – Jul 2023*
Executive Member
24th Iranian Conference on Health Professions Education
Inter-professional collaboration in the Covid-19 Era: Pros and Cons
4th Student Education Development Festival
20th, 21st, and 23rd Conference of Annual General Meeting

Universal Scientific Education & Research Network *Jan 2021 – Jan 2022*
Executive Member
6th International USERN Congress & Prize Awarding Festival

Health & Art, 7th International Festival of Paintings for Pediatric Patients

University of Tehran *Sep 2019 – Jun 2020*
Core Member – *Cultural Society KARA*
Organizer – *Climate Change Conference*

HOBBIES & INTERESTS Stargazing & Astrophotography, Astronomy Outreach, Chess, Martial Arts, Fine Tunning LLMs.

REFERENCES

Maryam Karbasi	**Mohammad H. Sabour**	**Mandana Shirazi**
Research Group Supervisor	MSc Supervisor	Advisor
m-karbasimotlagh@sina.tums.ac.ir	mohammad.sabour@concordia.ca	mshirazi@sina.tums.ac.ir