

Niyousha Rahimi

Website | nrahimi@uw.edu | LinkedIn | Google Scholar

EDUCATION

University of Washington

PhD in Aeronautics and Astronautics Engineering

Seattle, WA

2018 – Nov 2023

University of Washington

M.Sc. in Mechanical Engineering

Seattle, WA

2016 – 2018

Sharif University of Technology

B.Sc. in Mechanical Engineering

Tehran, IRAN

2011 – 2016

TECHNICAL SKILLS

- **Languages:** Python, C#/C++, MATLAB
- **Packages and Platforms:** Pytorch, TensorFlow, CUDA, AirSim, Unreal Engine
- **Software:** CVX, ROS, Simulink, Git, LaTeX

EXPERIENCE

Internship at Amazon, Project Kuiper

Los Angeles, California

June-Sept 2022

- I worked with a team of applied scientists on designing robust controllers for the fast steering mirrors installed on satellite systems. Further, I worked on the satellite installation's communication network design and control.

Internship at NASA Jet Propulsion Laboratory (JPL)

Section 347N (Maritime and Multi-Agent Autonomy), California Institute of Technology

Jan-Mar 2022

- **Robust Controller Synthesis for Vision-based Spacecraft Guidance and Control**

I developing a method for Robust Controller synthesis for Vision-based Spacecraft guidance and control. The method was built around the use of a photo-realistic simulator (Unreal Engine), where a camera is deployed on a tracking spacecraft (Ego) to observe an uncontrolled vehicle (Target) in a Low Earth Orbit (LEO).

Under the supervision of Amir Rahmani

Robotics, Aerospace, Information, and Networks (RAIN) Lab

University of Washington

Aug 2019 – present

- **Thesis: Machine Learning in Feedback Systems:**

Provable methods for safe and robust autonomy.

Scale-independent Multi-modal Automated Real Time Systems (SMARTS) Lab

University of Washington

Sept 2017 – Aug 2018

- **Multi-Agent Consensus Optimization in Large-Scale Supply Networks**

Multi-agent systems are characterized by (semi)-autonomous agents with decentralized decision-making capabilities. In this work, we bring the notion of multi-agent systems to clustered supply-demand networks such that each supplier acts as an independent agent. Consequently, consensus-based auction bidding methods were adapted to optimize the assignment of demands to the suppliers with known communication pathways and resource constraints.

Internship at Umbra Cuscinetti, Inc.

Everett, Washington

June 2017 – Sept 2017

AREA OF INTEREST

- Vision-based Navigation and Control
- Stochastic planning
- Data-driven Optimal control
- Multi-agent Systems

HONORS & AWARDS

- **Finalist** for the **Best Graduate Student Paper Competition**, AIAA Guidance Navigation and Control, SciTech 2024
- **Amazon Science Fellowship**, UW + Amazon Science Hub, 2022
- **Ruth C. Hertzberg Endowed Fellowship**, William E. Boeing Department of Aeronautics & Astronautics Engineering, 2018
- **Ranked 81st** among more than 300,000 participants in nationwide university entrance exam for BS degree, 2011.

PUBLICATION

- Taewan Kim, **Niyousha Rahimi**, Abhinav G. Kamath, Behcet Acikmese, Mehran Mesbahi, Jasper Corleis **Approach and Landing Trajectory Optimization for a 6-DoF Aircraft with a Runway Alignment Constraint**, Under review, AIAA Journal of Guidance, Control, and Dynamics, 2024.
- **N. Rahimi**, M.Mesbahi **Data-Guided Regulator for Adaptive Nonlinear Control**, AIAA SciTech Forum and Exposition, 2024.
- A. Deole, S. Talebi, S. Kraiser, **N. Rahimi**, M. Mesbahi, S. Bandyopadhyay, V.P.Gehlot, W. Seto, A. Rahmani, J. Becktor **Multi-Agent Passivity-based Control for Perception-based Guidance**, AIAA SciTech Forum and Exposition, 2023.
- S. Bandyopadhyay, V.P.Gehlot, W. Seto, A. Rahmani, S. Kraiser, S. Talebi, A. Deole, **N. Rahimi**, M. Mesbahi, J. Becktor **Robust Vision-based Multi-spacecraft Guidance Navigation Control using CNN-based Pose Estimation**, IEEE Aerospace Conference, 2023.
- **N. Rahimi**, S.Talebi, A.Deole, M.Mesbahi, S.Bandyopadhyay, A.Rahmani **Robust Controller Synthesis for Vision-based Spacecraft Guidance and Control**, AIAA SciTech Forum and Exposition, 2022.
- S.Talebi, S.Alemzadeh, **N. Rahimi**, M.Mesbahi, **On Regularizability and its Application to Online Control of Unstable LTI Systems**, IEEE Transactions on Automatic Control, 2022 December issue.
- S.Talebi, S.Alemzadeh, **N. Rahimi**, M.Mesbahi, **Online Regulation of Unstable LTI Systems from a Single Trajectory**, IEEE Conference on Decision and Control, 2020.
- **N. Rahimi**, J. Liu, A. Shishkarev, I. Buzysky, A. Banerjee, **Auction Bidding Methods for Multi-Agent Consensus Optimization in Supply-Demand Networks**, IEEE Robotics and Automation Letters, 2018.

SELECTED COURSE PROJECTS

Deep Learning

Oct 2019 – Dec 2019

- **DDPG for UAV Autonomous Landing on a Moving Platform:** In this work, I implemented the Deep Deterministic Policy Gradients (DDPG) algorithm for UAV Autonomous Landing on a Moving Platform.

Advanced Robotics

Oct 2017 – Dec 2017

- **MDP and Collision avoidance for Multi Robots:** In this work I implemented the Markov Decision Processes (MDP) algorithm for two homogeneous robots in an indoor environment, the goal of which was to take two victims out of a corrupted building, autonomously, without collision to obstacles or to one another.

SELECTED COURSES

Mathematics

- Optimization: Fundamentals and Applications
- Convex Optimization
- Numerical Optimization
- Mathematical Foundations of Systems Theory

- Real Analysis
- Probability and Random Processes
- Advanced Stochastic Process
- Fundamental Concepts of Analysis

Control Systems

- Linear Systems Theory
- Linear Multivariable Control
- Nonlinear Control
- Robust Control
- Networked Dynamics Systems

Learning and Robotics

- Deep Learning
- State Estimation & Kalman Filtering
- Robotics Algorithms & Application
- Advance Robotics

TEACHING EXPERIENCE

University of Washington

Sept 2018 – June 2019

- Teaching Assistant: Classical Control Theory
- Teaching Assistant: Linear Systems Theory
- Teaching Assistant: Orbital and Space Flight Mechanics