

Nariman Niknejad

Department of Mechanical Engineering, Michigan State University

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Research Interests

- Controls
- Robotics
- Machine Learning

Education

Michigan State University

East Lansing, MI, USA

PH.D. IN MECHANICAL ENGINEERING, GPA: 4.00

Jan. 2023 - Now

- **Research-Related Courses**

Nonlinear Systems and Control: A
Optimal Control: A
Robust Control: A

Auburn University

Auburn, AL, USA

M.Sc. IN BIOSYSTEMS ENGINEERING, GPA: 4.00

Jan. 2021 - Dec. 2022

- **Thesis Title:** Kinematic Equine Gait Analysis and Architecture Trait Phenotyping of Loblolly Pine using 3D Stereo Machine Vision and Deep Learning

- **Research-Related Courses**

Digital Image Processing: A
Machine Learning: A
Reinforcement Learning: A

K. N. Toosi University of Technology

Tehran, Iran

B.Sc. IN MECHANICAL ENGINEERING, GPA : 3.55

Sep. 2015 - Sep. 2019

- **Thesis Title:** An Approach For Controlling a Manufactured Cart-pendulum System in the Presence of Nonlinear Uncertainties

- **Research-Related Courses**

Computer Programming (C++): A
Neural Network: A
Automatic Control: A
Mechanical Vibrations: A

Publications

Robust Model Predictive Control Design for Autonomous Vehicles with Perception-based Observers

JOURNAL: UNDER PREPARATION

2025

- **Authors:** :N. Niknejad, G. S. Sankar, B. Kiumarsi,, H. R. Modares

Online Optimal Chance-constrained Covariance Control using Data and Prior Knowledge

JOURNAL: SUBMITTED TO IEEE TRANSACTIONS ON SYSTEMS, MAN, AND CYBERNETICS: SYSTEMS

2024

- **Authors:** :N. Niknejad, G. G. Zhu, H. R. Modares, T. Han, G. Sankar

Online Learning of Stabilizing Controllers using Noisy Input-Output Data and Prior Knowledge

JOURNAL: UNDER PREPARATION

2024

- **Authors:** :N. Niknejad, F. Adib Yaghmaie,H. R. Modares

Discrete-time Nonlinear System Identification: A Fixed-time Concurrent Learning Approach

JOURNAL: IEEE TRANSACTIONS ON SYSTEMS, MAN, AND CYBERNETICS: SYSTEMS 2024

- **Authors:** : F. Tatari, **N. Niknejad**, H. R. Modares
- **doi:** 10.1109/TSMC.2024.3508267

Physics-informed Data-driven Safe and Optimal Control Design

JOURNAL: IEEE CONTROL SYSTEMS LETTERS 2023

- **Authors:** : **N. Niknejad**, H. R. Modares
- **doi:** 10.1109/LCSYS.2023.3333257
- **Most Popular on IEEE L-CSS:** December 2023 | January, March, April, May, June, July, August, September 2024

Online Reference Tracking For Linear Systems with Unknown Dynamics and Unknown Disturbances

JOURNAL: TRANSACTIONS ON MACHINE LEARNING RESEARCH 2023

- **Authors:** : **N. Niknejad**, F. Adib Yaghamaie, H. R. Modares
- **url:** <https://openreview.net/forum?id=pfbVayaUMc>

Risk-Aware Safe Reinforcement Learning for Control of Stochastic Linear Systems

JOURNAL: UNDER REVIEW/ IEEE TRANSACTIONS ON NEURAL NETWORKS AND LEARNING SYSTEMS 2023

- **Authors:** : B. Esmaeili, **N. Niknejad**, R. Esmzad, H. R. Modares

Phenotyping of Architecture Traits of Loblolly Pine Trees using Stereo Machine Vision and Deep Learning: Stem Diameter, Branch Angle, and Branch Diameter

JOURNAL: COMPUTERS AND ELECTRONICS IN AGRICULTURE 2023

- **Authors:** : **N. Niknejad**, Y Bao, RB Puhl, K Payn, J Zheng
- **doi:** 10.1016/j.compag.2023.107999

Equine Kinematic Gait Analysis using Stereo Videography and Deep Learning: Stride Length and Stance Duration Estimation

JOURNAL: JOURNAL OF THE ASABE, 66(4) 2023

- **Authors:** : **N. Niknejad**, J. L. Caro, R. Bidese-Puhl, Y. Bao, E. A. Staiger
- **doi:** 10.13031/ja.15386

Conferences

Data-Driven Stabilizing Control Design via Minkowski-Lyapunov Inequality: A Zonotopic Framework

CONFERENCE: 2025 MODELING, ESTIMATION AND CONTROL CONFERENCE 2025

- **Authors:** : **N. Niknejad**, H. R. Modares

DASH-RRT: Dynamics-aware Safe Motion Planning Under Adversarial Disturbances

CONFERENCE: 2025 AMERICAN CONTROL CONFERENCE 2025

- **Authors:** : **N. Niknejad**, R. Esmzad, H. R. Modares

SODA-RRT: Safe Optimal Dynamics-Aware Motion Planning

CONFERENCE: 2024 MODELING, ESTIMATION AND CONTROL CONFERENCE 2024

- **Authors:** : **N. Niknejad**, R. Esmzad, H. R. Modares

Conflict-Aware Data-Driven Safe Linear Quadratic Control

CONFERENCE: 2024 MODELING, ESTIMATION AND CONTROL CONFERENCE 2024

- **Authors:** : R. Esmzad, **N. Niknejad**, H. R. Modares

A Deep Learning-Based Smartphone App for Field-Based Blueberry Yield Prediction

CONFERENCE: 2023 ASA, CSSA, SSSA INTERNATIONAL ANNUAL MEETING 2022

- **Authors:** : P. Singh, **N. Niknejad**, S. Ru, Y. Bao

Estimation of Equine Stride Length and Stance Duration Using Stereo 3D Videography and Deep Learning

Houston, TX, USA

CONFERENCE: 2022 ASABE ANNUAL INTERNATIONAL MEETING

2022

- **Authors:** :N. Niknejad, J. Caro, R. B. Puhl, Y. Bao, E. A. Staiger

Phenotyping of Pine Tree Architecture with Stereo Vision and Deep Learning

USA, Virtual

CONFERENCE: 2021 ANNUAL INTERNATIONAL MEETING ASABE VIRTUAL AND ON DEMAND

2021

- **Authors:** : M. Akter , N. Niknejad, Y. Bao , R. Bidese, K. Payn, J. Zheng

Teaching Experience

Michigan State University

TEACHING ASSISTANT

Jan. 2025 – Apr. 2025

- TA of ME 461 Mechanical vibrations

Michigan State University

TEACHING ASSISTANT

Jan. 2023 – Apr. 2023

- TA of ME 451 Control Systems

Michigan State University

TEACHING ASSISTANT

Jan. 2024 – Apr. 2024

- TA of ME 451 Control Systems

Michigan State University

TEACHING ASSISTANT

Jan. 2023 – Apr. 2023

- TA of ME 451 Control Systems

Auburn University

TEACHING ASSISTANT

Jan. 2022 – Apr. 2022

- TA of Control and Instrumentation in Biosystems Engineering

Kanoon Farhangi Amoozesh

HONORY TEACHER

Oct. 2013 – Jun.2014

- Instructed advanced Physics and Mathematics curricula
- Mentored and guided 20+ students as academic success coach

Iran Language Institute

ENGLISH TEACHER

Oct. 2015 – Oct. 2017

- Facilitated English language acquisition for non-native speakers via in-class conversational techniques
- Developed high-stakes assessments with elite educators' consortium

Work Experience

Research Assistant

East Lansing, MI, USA

DR. MODARES' DYNAMICS AND CONTROLS LAB - MICHIGAN STATE UNIVERSITY

Jan. 2023 - Present

- Physics-augmented data-driven control system design
- Regret-bounded tracking algorithm development and analysis
- Machine learning-enabled safe and optimal control and planning synthesis
- Ship deck and differential drive robot simulation development in Gazebo with ROS2

Research Assistant

Auburn, AL, USA

AGCYPHER LAB - AUBURN UNIVERSITY

Jan. 2021 - Dec 2022

- Developed loblolly pine phenotyping via stereo imaging and AI-driven computer vision
- Analyzed equine locomotion using DeepLabCut and 3D point cloud processing
- Engineered autonomous field robot for precision agriculture applications
- Implemented Mask R-CNN for accurate berry detection and quantification
- Developed ROS-based multi-camera communication system for ZED2 stereo sensors

Research Assistant

Tehran, Iran

MECHATRONICS MECHANISMS LABORATORY

Jan. 2019 - Nov. 2019

- Designed and built dual-actuated rotary and linear systems
- Proposed techniques to improve position tracking precision, such as a novel approach for vibration suppression
- discrete-time Sliding Mode controllers for position, torque, and speed control of PMDC machines
- Developed novel algorithms for motion compensation, consisting of nonlinear friction estimation and a new braking method
- Implemented the proposed algorithms and digital control systems on a dual-actuated, manufactured experimental setup

Co-Researcher

DOOSTANE NIK MEDICAL SERVICES COMPANY

Tehran, Iran

Jun. 2018 – Aug. 2018

- Assessed an innovative ceramic hip resurfacing implant design
- Conducted finite element analysis of conventional hip implant mechanical properties
- Mastered ANSYS simulation software for engineering applications
- Acquired proficiency in CNC machine operation and programming
- Developed and optimized control algorithms for manufacturing line efficiency

Honors & Awards

2024	Tau Beta Pie - Alpha Chapter - Michigan State University	Initiated/ Social Media Chair
2020	Best Presentation Award	XIV International Conference on Dynamical Systems: Theory and Applications
2015	Top 0.5 % Nationwide	National University Entrance Examination
2013	First Place	Persian Young Physicists' Tournament, Helli 4 Team
2013	National Finalist	Iranian Physics Olympiad
2011	Got Admitted	National Organization for Development of Exceptional Talents

Skills

Technical Skills

Machine Learning, Python, TensorFlow, SolidWorks, MATLAB/Simulink, AutoCAD, C++, Arduino, Raspberry Pi, LabVIEW, Git, OpenCV, ROS

Non-technical Skills

Musical Performance, Data Analysis, Cross-functional Collaboration, Project Management, Technical Writing, Public Speaking, Microsoft Office Suite, Problem-solving

Language Skills

English - TOEFL: Dec. 2021	OVERALL: 108 , Reading: 29 , Listening: 29 , Speaking: 25 , Writing: 25
English - IELTS: Nov. 2019	OVERALL:8.0 , Reading: 8.5 , Listening: 9.0 , Speaking: 7.0 , Writing: 7.0
German - OKF Certificate	A2 - Intermediate
Persian	Native

Certificates

July 2020	Best Presentation Award - ICDSTA 2020 : XIV. International Conference on Dynamical Systems:Theory and Applications
August 2021	Awarded Membership of Golden Key International Honor Society