

# Arash Bahari Kordabad - Curriculum Vitae

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## CONTACT INFORMATION

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## EDUCATION & RESEARCH EXPERIENCE



**Max Planck Institute for Software Systems**, Kaiserslautern, Germany

Postdoctoral Researcher

May 2023 - present

- Topic: “Multi-agent awareness and control with temporal logic specifications”
- Supervisor: [Prof. Sadegh Soudjani](#)
- Project: [SymAware](#)



**Norwegian University of Science and Technology (NTNU)**, Trondheim, Norway

Ph.D., [Department of Engineering Cybernetics](#)

Feb 2020 - April 2023

- Thesis Topic: “Theoretical properties of learning-based MPC”, [\[link\]](#)
- Supervisor: [Prof. Sébastien Gros](#)
- Co-Supervisor: [Prof. Anastasios Lekkas](#)
- Committee: Prof. Ole Morten Aamo, Prof. Lars Grüne, and Prof. Rolf Findeisen



**Aalborg University**, Aalborg, Denmark

Visiting Ph.D. Researcher, [Department of Electronic systems](#) Nov 2021 - Aug 2022

- Research topic: Safe Reinforcement learning
- Host: [Prof. Rafal Wisniewski](#)



**Sharif University of Technology**, Tehran, Iran

M.Sc., [Department of Mechanical Engineering](#)

Sep 2017 - Sep 2019

- Thesis Topic: “Control of bifurcation and chatter suppression in peripheral milling process”
- Supervisor: [Prof. Hamed Moradi](#)
- GPA: 19.41/20



**University of Tabriz**, Tabriz, Iran

B.Sc., [Department of Mechanical Engineering](#)

Sep 2013 - Sep 2017

- Thesis Topic: “On the muscle models as viscoelastic material and comparison of force-length models for active skeletal muscle”
- Supervisor: [Prof. Kamal Jahani](#)
- GPA: 18.1/20

## RESEARCH INTERESTS

My research interests primarily lie at the intersection of **Markov Decision Processes (MDPs)**, **Economic Model Predictive Control (MPC)**, and **Reinforcement Learning (RL)**, with applications in *energy systems* and *autonomous vehicles*. Another key focus of my work is providing probabilistic guarantees for stochastic systems under **temporal logic** specifications. Additionally, my research encompasses [distributionally robust optimization](#), [second-order RL algorithms](#), and [data-driven MPC](#).

## SELECTED PUBLICATIONS (TOP 5)

- [J8] **A. Bahari Kordabad**, M. Zanon, S. Gros, “[Equivalence of optimality criteria for Markov decision process and model predictive control](#)”, *IEEE Transactions on Automatic Control*, 2024.
- [C16] **A. Bahari Kordabad**, M. Charitidou, D. V. Dimarogonas, and S. Soudjani, “[Control barrier functions for stochastic systems under signal temporal logic tasks](#)”, *22nd European Control Conference (ECC)*, 2024.

- [C14] **A. Bahari Kordabad**, D. Reinhardt, A. S. Anand, and S. Gros, “[Reinforcement Learning for MPC fundamentals and current challenges](#)”, *22nd IFAC World Congress*, 2023.
- [J2] **A. Bahari Kordabad**, S. Gros, “[Q-Learning of the storage function in economic non-linear model predictive control](#)”, *Engineering Applications of Artificial Intelligence*, 2022.
- [C10] **A. Bahari Kordabad**, H. Nejatbakhsh Esfahani, W. Cai, and S. Gros, “[Quasi-Newton iteration in deterministic policy gradient](#)”, *American Control Conference (ACC)*, 2022.

#### SELECTED TALKS

- “Reinforcement Learning for MPC: Fundamentals and Current Challenges” in an invited session entitled *Recent Advances in Automated Learning and Calibration of MPC Policies*, IFAC, +75 audience, Japan. (photo) **July 2023**
- “Introduction to optimization with temporal logic”, NTNU, Trondheim, Norway. **Mar 2023**
- “Intersection of Reinforcement Learning and MPC”, Eindhoven University of Technology, Netherlands, Host: Prof. Dinesh Krishnamoorthy. **Feb 2023**
- “MPC-based Reinforcement learning”, École polytechnique fédérale de Lausanne (EPFL), Lausanne, Switzerland, Host: Prof. Alireza Karimi. **Jan 2023**
- “Optimality Equivalence of MDP and MPC”, KTH, Stockholm, Sweden, Host: Prof. Bo Wahlberg. **Jan 2023**
- “Intelligent control for time-delay systems”, KTH, Stockholm, Sweden, Host: Prof. Håkan Hjalmarsson. **Jun 2019**

#### SELECTED SCIENTIFIC COURSES

Advanced Nonlinear Systems, Numerical Optimal Control, Intelligent Systems, Nonlinear Control, Robust Control, Advanced Mathematics, Stochastic Control, Advanced Dynamics, Automatic Control, Modern Control, Robotic.

#### SELECTED TRAINING COURSES

Basic University Didactics, Research Ethics, Research-Based Innovation, Seminar

#### JOURNAL PUBLICATIONS

- [J8] **A. Bahari Kordabad**, M. Zanon, S. Gros, “[Equivalence of optimality criteria for Markov decision process and model predictive control](#)”, *IEEE Transactions on Automatic Control*, 2024.
- [J7] **A. Bahari Kordabad**, S. Gros, “[Lyapunov-based robust optimal control for time-delay systems with application in milling process](#)”, *International Journal of Dynamics and Control*, 2024.
- [J6] W. Cai, **A. Bahari Kordabad**, S. Gros, “[Energy management in residential microgrid using model predictive control-based reinforcement learning and shapely value](#)”, *Engineering Applications of Artificial Intelligence*, 2023.
- [J5] H. Nejatbakhsh Esfahani, **A. Bahari Kordabad**, W. Cai, and S. Gros, “[Learning-based state estimation and control using MHE and MPC schemes with imperfect models](#)”, *European Journal of Control*, 2023.
- [J4] K. Seel, **A. Bahari Kordabad**, S. Gros, J.T. Gravdahl, “[Convex neural network-based cost modifications for learning model predictive control](#)”, *IEEE Open Journal of Control Systems*, 2022.
- [J3] **A. Bahari Kordabad**, R. Wisniewski, S. Gros, “[Safe reinforcement learning using Wasserstein distributionally robust model predictive control](#)”, *IEEE access*, 2022.
- [J2] **A. Bahari Kordabad**, S. Gros, “[Q-Learning of the storage function in economic non-linear model predictive control](#)”, *Engineering Applications of Artificial Intelligence*, 2022.
- [J1] **A. Bahari Kordabad**, M. Boroushaki, “[Emotional Learning based intelligent controller for MIMO peripheral milling process](#)”, *Journal of Applied and Computational Mechanics*, 2019.

- [C17] **A. Bahari Kordabad**, E. E.Vlahakis, L. Lindemann, D. V. Dimarogonas, and S. Soudjani, “Distributionally robust control for chance-constrained signal temporal logic specifications”, *63rd Conference on Decision and Control (CDC)*, [accepted], 2024.
- [C16] **A. Bahari Kordabad**, M. Charitidou, D. V. Dimarogonas, and S. Soudjani, “Control barrier functions for stochastic systems under signal temporal logic tasks”, *22nd European Control Conference (ECC)*, 2024.
- [C15] S. Sawant, D. Reinhardt, **A. Bahari Kordabad**, and S. Gros, “Model-free Data-driven predictive control using reinforcement learning”, *62nd Conference on Decision and Control (CDC)*, 2023.
- [C14] **A. Bahari Kordabad**, D. Reinhardt, A. S. Anand, and S. Gros, “Reinforcement Learning for MPC fundamentals and current challenges”, *22nd IFAC World Congress*, 2023.
- [C13] **A. Bahari Kordabad**, and S. Gros, “Continuous-time chance-constrained stochastic model predictive control using multiple shooting and CVaR”, *21st European Control Conference (ECC)*, 2023.
- [C12] **A. Bahari Kordabad**, and S. Gros, “Bias correction of discounted optimal steady state using cost modification”, *21st European Control Conference (ECC)*, 2023.
- [C11] **A. Bahari Kordabad**, and S. Gros, “Functional stability of discounted MDPs using economic MPC dissipativity theory”, *20th European Control Conference (ECC)*, 2022.
- [C10] **A. Bahari Kordabad**, H. Nejatbakhsh Esfahani, W. Cai, and S. Gros, “Quasi-Newton iteration in deterministic policy gradient”, *American Control Conference (ACC)*, 2022.
- [C9] W.Cai, H. Nejatbakhsh Esfahani, **A. Bahari Kordabad**, and S. Gros, “Optimal management of the peak power penalty for smart grids using MPC-based reinforcement learning”, *60th Conference on Decision and Control (CDC)*, 2021.
- [C8] W.Cai, **A. Bahari Kordabad**, H. Nejatbakhsh Esfahani, A. M. Lekkas, and S. Gros, “MPC-based reinforcement learning for a simplified freight mission of autonomous surface vehicles”, *60th Conference on Decision and Control (CDC)*, 2021.
- [C7] **A. Bahari Kordabad**, W. Cai, and S. Gros, “Multi-agent battery storage management using MPC-based reinforcement learning”, *IEEE Conference on Control Technology and Applications (CCTA)*, 2021.
- [C6] **A. Bahari Kordabad**, and S. Gros, “Verification of dissipativity and evaluation of storage function in economic nonlinear MPC using Q-Learning”, *7th IFAC Conference on Nonlinear Model Predictive Control*, 2021.
- [C5] H. Nejatbakhsh Esfahani, **A. Bahari Kordabad**, and S. Gros, “Approximate robust NMPC using reinforcement learning”, *19th European Control Conference (ECC)*, 2021.
- [C4] **A. Bahari Kordabad**, H. Nejatbakhsh Esfahani, and S. Gros, “Bias correction in deterministic policy gradient using robust MPC”, *19th European Control Conference (ECC)*, 2021.
- [C3] **A. Bahari Kordabad**, W. Cai, and S. Gros, “MPC-based reinforcement learning for economic problems with application to battery storage”, *19th European Control Conference (ECC)*, 2021.
- [C2] H. Nejatbakhsh Esfahani, **A. Bahari Kordabad**, and S. Gros, “Reinforcement learning based on MPC/MHE for unmodeled and partially observable dynamics”, *American Control Conference (ACC)*, 2021.
- [C1] **A. Bahari Kordabad**, H. Nejatbakhsh Esfahani, A. M. Lekkas, and S. Gros, “Reinforcement learning based on scenario-tree MPC for ASVs”, *American Control Conference (ACC)*, 2021.

WORKING PAPERS  
(AS THE MAIN  
AUTHOR)

- [W2] Robust Model Predictive Control for Aircraft Intent-Aware Collision Avoidance. Conference publication.
- [W1] Distributionally Robust Risk-based Control for Signal Temporal Logic Specifications. Journal publication.

HONORS AND  
AWARDS

Having received the honor of first rank in M.Sc. Mechanical Engineering at the Sharif University of Technology, Tehran, Iran. **2018**

Selected among the top 40 Mechanical Engineering students nationwide to participate in the scientific Olympiads for university students in Iran. **2017**

Ranked fifth among 99 Mechanical Engineering students in the Bachelor’s program. **2017**

Placed in the top 0.25% (669<sup>th</sup>) of over 252,000 participants in the national universities entrance exam for the B.Sc. degree. **2013**

TEACHING  
EXPERIENCE

*Teaching Assistant*, Sharif University of Technology, Tehran, Iran. **2018**  
Course: Mechanical vibration.

*High school mathematics teacher*, [Kanoon Farhangi Amoozesh](#), Tehran, Iran. **2017-2019**  
Teacher and *coordinator* for high-school mathematics courses.

*Teaching Assistant*, University of Tabriz, Tabriz, Iran. **2014-2016**  
Courses: Calculus I and II, Ordinary Differential Equations, and Engineering Mathematics.

A full **teaching statement** can be found [here](#).

Projects

**SymAware, 2023-** : I am a postdoctoral researcher in the [SymAware](#) project which addresses the need for a new framework for awareness in multi-agent systems. Funded by the European Union (European Innovation Council). The partners include Max Planck Institute for Software Systems, KTH, Uppsala University, Eindhoven University of Technology, and two companies:

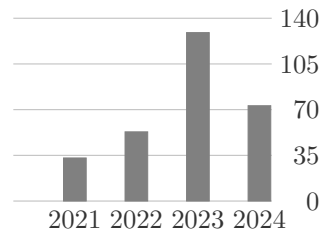
- [Netherlands Aerospace Centre \(NLR\)](#),  
Reference person: Sybert Stroeve, Email: [Sybert.Stroeve@nlr.nl](mailto:Sybert.Stroeve@nlr.nl)
- [Siemens Digital Industries Software](#),  
Reference person: Mohsen Alirezai, Email: [m.alirezai@tue.nl](mailto:m.alirezai@tue.nl)

**SARLEM, 2020-2023:** Part of the Ph.D. project “Safe Reinforcement Learning using Model Predictive Control” (SARLEM, project no. UV988962100) at NTNU. Supported by the Research Council of Norway (RCN, grant no. NFR 300172) with involvement from companies such as [DNV GL](#) and [Kongsberg Maritime](#) in Norway.

**Machinery company, 2017-2019:** MSc project in Tehran, Iran, focused on controlling and reducing milling process vibration (chatter). The project, including thesis work and data modeling, was partially funded by a machinery company. The team included one professor and three students.

Google Scholar  
(Update: August 5,  
2024)

Cited by	All	
	All	Since 2019
Citations	288	288
H-index	11	11
i10-index	11	11



LANGUAGE

Azerbaijani (mother tongue), Persian (native), English (advanced), Norwegian (A2), Danish (A1)

## REFERENCES

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NTNU  
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Sadegh Soudjani  
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Rafael Wisniewski  
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[raf@es.aau.dk](mailto:raf@es.aau.dk)