

Farzaneh Tatari, Ph.D.

Senior Control & AI Engineer

+1 517 220 8218 • fa_tatari@yahoo.com • US Permanent Resident

[LinkedIn](#) • [Google Scholar](#) • [GitHub](#)

Professional Summary

Senior Control & AI Engineer with 10+ years of experience designing and validating real-time embedded control systems for automotive powertrains and complex electromechanical systems. Three years of production experience with electrified powertrain controls at Drive System Design spanning MIL/SIL/HIL through vehicle-level integration, now bringing that expertise to software architecture in electrified propulsion at Stellantis. Strong foundation in model predictive control, state estimation, and data-driven CAE modeling for energy and thermal management, with a Ph.D. in control and an IEEE publication record in learning-based control and system identification. Experienced collaborating across global engineering teams.

Experience

Control Software Architect , Mid-level Professional

Aug 2026 – Present

Stellantis, Auburn Hills, MI

- Responsibilities to be added.

Senior Control & AI Engineer

Apr 2023 – Aug 2026

Drive System Design, Farmington Hills, MI

- Designed, implemented, and validated embedded control systems for electrified powertrains across MIL, SIL, HIL, and vehicle-level testing.
- Developed data-driven CAE models using supervised machine learning and deep learning for thermal estimation in electrically excited and rare-earth-free synchronous motors, enabling reduced sensor count and improved energy management in production powertrain controllers.
- Technical Lead of a team of 8 engineers across the US and North Africa, automating systems engineering analysis of diagnostic default-action disclosure reports for production embedded software.
- Managed a team of 4 engineers across the US and UK developing embedded control and diagnostic software for production powertrain controllers.
- Designed automation pipelines in MATLAB/Simulink that reduced controls software analysis and report-generation time.
- Partnered with OEM/supplier customers (Allison Transmission, Stellantis) on production-ready embedded controls software, diagnostics, and validation deliverables.
- Collaborated on Design Failure Mode and Effects Analysis (DFMEA) for powertrain control systems in support of safety-related design analyses.

Research Assistant (Ph.D.)

Aug 2021 – May 2023

Michigan State University, East Lansing, MI

- Conducted NSF- and ONR-funded research on stochastic and deterministic learning systems, focusing on finite-time system identification and online learning under uncertainty for control of complex electromechanical systems.
- Developed algorithms for data-regularized concurrent learning and adaptive-control approaches with formal convergence guarantees, validated on vehicle and robotic dynamics case studies.
- Published several IEEE journal papers on learning-based control, system identification, and stability analysis of dynamic systems.

Postdoctoral Researcher

Feb 2019 – Nov 2020

KIOS Center of Excellence, University of Cyprus, Nicosia, Cyprus

- Designed finite-time distributed learning and estimation algorithms for nonlinear interconnected systems with relevance to multi-subsystem powertrain and energy networks.
- Collaborated with multi-disciplinary teams on cyber-physical system modeling, networked control, and robust estimation.

Assistant Professor (Control Systems)

Sep 2016 – Feb 2019

Semnan University, Semnan, Iran

- Led research on distributed optimal and adaptive control of multi-agent networked systems using reinforcement learning and game theory.
- Taught modern, nonlinear, optimal control, ...; supervised graduate research in control of complex dynamic systems.

Selected Projects & Research

- **Data-driven Thermal Management for Electric Powertrains:** Deep learning models for thermal estimation in electrically excited and rare-earth-free synchronous motors, supporting virtual sensing and predictive energy

management in production powertrain controllers. Published at IEEE ITEC (2024) and GVSETS (2026).

- **Hybrid MPC + Learned Control Architecture (Independent Project, 2025–2026):** Self-directed project combining MPC with a Soft Actor-Critic policy for safe vehicle lateral control. Demonstrated safe composition of a learned policy with MPC to retain hard dynamic and stability constraints. Python/PyTorch with pytest-based unit tests.
- **Distributed Adaptive Control of Networked Systems:** Distributed optimal adaptive control of networked systems using reinforcement learning and game theory; finite-time identification methods for estimating subsystem coupling.
- **Online Stochastic Learning for Vehicle & Robot Dynamics:** Online stochastic learning algorithms with formal finite-time convergence guarantees for vehicle and robot dynamics models, suitable for real-time control under noise and uncertainty.

Technical Skills

- **Control:** Optimal, Adaptive, Robust, Model Predictive Control, Nonlinear, Linear, State Estimation, Kalman Filtering, System Identification
- **Embedded & Validation:** MIL / SIL / HIL / vehicle-level testing, embedded controls software, real-time controls, diagnostics, model-based design, DFMEA
- **Modeling & Simulation:** MATLAB/Simulink, physics-based and data-driven CAE modeling, vehicle and powertrain simulation, Rhapsody
- **Machine Learning / AI:** Supervised Machine Learning, Deep Learning, Reinforcement Learning, Optimization, PyTorch
- **Programming:** C++, Python, MATLAB
- **Tools:** Git, pytest, CANalyzer, Polaron, ALM, Plastic

Education

- **Ph.D., Mechanical Engineering (Control)** — Michigan State University, East Lansing, MI (2021–2023). GPA 4.0/4.0. *Dissertation: Stochastic and Deterministic Finite-time System Identification.*
- **Ph.D., Electrical Engineering (Control)** — Ferdowsi University of Mashhad, Iran. Ranked 1st. GPA 4.0/4.0. *Dissertation: Online Optimal Control in Differential Graphical Games Using Reinforcement Learning.*
- **M.Sc., Electrical Engineering (Control)** — Ferdowsi University of Mashhad, Iran. GPA 4.0/4.0.
- **B.Sc., Electrical Engineering (Control)** — Shahrood University of Technology, Iran. Ranked 1st.

Selected Publications

- 2026** Tatari, F. et al., “Deep Learning-based Rotor Temperature Estimation for Rare-earth-free Motors,” *Ground Vehicle Systems Engineering and Technology Symposium (GVSETS)*.
- 2025** Tatari, F. et al., “Data-Regularized Gradient-Descent Learning for Noisy Functions,” *IEEE Transactions on Systems, Man, and Cybernetics*.
- 2024** Tatari, F. et al., “Data-driven Thermal Modeling for Electrically Excited Synchronous Motors — A Supervised Machine Learning Approach,” *IEEE Transportation Electrification Conference and Expo*.
- 2024** Tatari, F. et al., “Discrete-Time Nonlinear System Identification via Fixed-Time Concurrent Learning,” *IEEE Transactions on Systems, Man, and Cybernetics*.
- 2023** Tatari, F. et al., “Deterministic and Stochastic Fixed-time Stability of Discrete-time Autonomous Systems,” *IEEE/CAA Journal of Automatica Sinica*.
- 2021** Tatari, F. et al., “Fixed-Time System Identification Using Concurrent Learning,” *IEEE Transactions on Neural Networks and Learning Systems*.

Honors & Service

- Fitch Beach Medal for Outstanding Graduate Research, Michigan State University (2023).
- GOF and DCF Fellowships, Michigan State University (2022–2023).
- Guest Associate Editor, *Frontiers in Control Engineering*; Reviewer for *Automatica*, *IEEE TNNLS*, and other journals.