Hossein Mehnatkesh

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Education

University of Alberta — Alberta, Canada
Doctor of Philosophy in Mechanical Engineering - GPA: 4/4 — *Sep. 2023 – Present*

- Thesis: Machine Learning-Based Modeling and Control of Hydrogen/Diesel Dual-Fuel Engines for Emissions Reduction and Safety Enhancement

Sharif University of Technology — Tehran, Iran
Master of Science in Mechanical Engineering - GPA: 4/4 — *Sep. 2018 – Sep. 2020*

- Thesis: Experimental Modeling of a Transparent Fuel Cell with the Aid of Deep Neural Network to Measure Water Coverage Ratio and Fuzzy Control

K. N. Toosi University of Technology — Tehran, Iran
Bachelor of Science in Mechanical Engineering - GPA: 3.78/4 — *Sep. 2014 – Sep. 2018*

- Thesis: Vehicle Parallel Park Training Using a Haptic Assistance Torque in a Driving Simulation

Publication

Journal Publication

H. Mehnatkesh, D. Gordon, and C.R. Koch, Dynamic Emission Analysis of a Hydrogen/Diesel Dual-Fuel Engine Using Clustering Method, *International Journal of Hydrogen Energy (**IF 8.1**)*, 2025 (published).
H. Mehnatkesh, A. Winkler, E. Sperling, J. Kheyrollahi, M. Shahbakhti, D. Gordon, and C.R. Koch, Systematic Framework for Deep Learning-Based Predictive Injection Control with Bayesian Hyperparameter Optimization for a Hydrogen/Diesel Dual-Fuel Engine, *Control Engineering Practice (**IF 5.4**)*, 2025 (published).
H. Mehnatkesh, S.M.J. Jalali, A. Khosravi, and S. Nahavandi, An Intelligent Driven Deep Residual Learning Framework for Brain Tumor Classification Using MRI Images, *Expert Systems with Applications (**IF 7.5**)*, 2023 (published).
H. Mehnatkesh, A. Alasty, M. Boroushaki, M.H. Khodsiani, M.R. Hasheminasab, M.J. Kermani, Estimation of Water Coverage Ratio in Low Temperature PEM-Fuel Cell Using Deep Neural Network, *IEEE Sensors Journal (**IF 4.3**)*, 2020 (published).

Conference Publication

H. Mehnatkesh, D. Gordon, and C.R. Koch, Temporal Kolmogorov-Arnold Networks for Control-Oriented Modeling of Hydrogen/Diesel Dual-Fuel Engines, *Canadian Society for Mechanical Engineering (CSME)*, Montréal (QC), May 25-28, 2025 (published: peer-reviewed).
H. Mehnatkesh, D. Gordon, and C.R. Koch, Physics-Informed Neural Networks for In-Cylinder Pressure Prediction in Hydrogen/Diesel Dual-Fuel Engines, *11th IFAC International Symposium on Advances in Automotive Control (AAC)*, Eindhoven, Netherlands, June 16-18, 2025 (published: peer-reviewed).
H. Mehnatkesh, E. Sperling, J. Kheyrollahi, M. Shahbakhti, D. Gordon, and C.R. Koch, Emission Analysis in Data-Driven Model Predictive Control of Hydrogen/Diesel Dual-Fuel Engines, *Combustion Institute - Canadian Section, 2024*, Ontario, Canada, May 13-16, 2024 (paper and presentation: not peer-reviewed).
E. Sperling, **H. Mehnatkesh**, J. Kheyrollahi, C.R. Koch, and D. Gordon, Hydrogen Slip Measurement in a Hydrogen Diesel Dual-Fuel Engine, *Combustion Institute - Canadian Section, 2024*, Ontario, Canada, May 13-16, 2024 (paper and presentation: not peer-reviewed).

Technical Skills

Languages: Matlab, Simulink, Python, LabVIEW, C/C++
Developer Tools: Git, Control Desk, Configuration Desk, VS Code, Jupyter Notebook
Libraries: acados, PyTorch, TensorFlow, pandas, NumPy, Matplotlib
Skills: SOLIDWORKS, MicroAutoBox II and III, PLC Delta Series, ARM (STM32), Raspberry Pi, Arduino

Honors

Scholarships: Alberta Innovates (2024-2026)

Last modified: 03 Feb, 2026

Professional Experience

Teaching Assistant: Combustion Engines Sep. 2025 – Present
University of Alberta *Alberta, Canada*

- Design new homework assignments to enhance understanding of the course, based on real engine data.

Teaching Assistant: Advanced Dynamics Dec. 2024 – Present
University of Alberta *Alberta, Canada*

- Design demo for undergrad analytical dynamic course
- Python setup for undergrad analytical dynamic course

Research Assistant: The Mechanical Engineering Energy Control Lab (MEECL) Sep. 2023 – Present
University of Alberta *Alberta, Canada*

- Experimental engine platform & data infrastructure
- Physics-aware & data-driven engine modeling
- Real-time machine learning predictive control (NMPC + ML)
- Cylinder-to-cylinder balancing & safety
- Reinforcement learning & control benchmarking

Senior Control Engineer Jun 2021 - Jun 2023
JETCO Company *Tehran, Iran*

- Led the engine control and diagnostics group for four-stroke internal combustion engines.
- Designed and calibrated engine speed controllers achieving regulation within ± 50 RPM.
- Developed fault detection and diagnosis logic for engine sensors, including oxygen, pressure, temperature, camshaft position, and speed sensors.
- Controlled and calibrated engine actuators, including throttle, ignition coil, fuel injector, and CVVT systems.
- Calibrated control strategies across multiple engine variants for production deployment at IKCO.

Junior Research and Development Engineer July 2020 – May 2021
Black Gold Innovation Research and Development Engineer *Tehran, Iran*

- Conceptual design of fully mechanical mechanisms to operate in tough situations.

Data Science Internship May 2021 – Jun 2021
Rahnema Collage *Tehran, Iran*

- Anomaly detection.
- Use of unsupervised learning for cybersecurity analysts with the aid of HTTP log files.

Research Assistant May 2021 – Jun 2021
Virtual Reality Laboratory *Tehran, Iran*

- Research assistant in a section of car simulation.

Teaching Assistant: Intelligent Systems and Control Feb. 2020 – Jun. 2020
Sharif University of Technology *Tehran, Iran*

- Python instructor and teaching assistant in ”Intelligent Systems and Control” course presented by Dr. Mehrdad Boroushaki.

Teaching Assistant: Instrumentation Sep. 2019 – Dec. 2019
K. N. Toosi University of Technology *Tehran, Iran*

- Arduino instructor for measurement and control in the ”Instrumentation” course presented by Dr. Ali Nahvi.