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Engineering & Scientific Consulting

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Professional Profile

Mary Hashemitaheri, Ph.D., is a Senior Associate at Exponent specializing in computational simulations, predictive modeling, and data-driven engineering. She integrates physics-based modeling with machine learning to translate complex analytical results into practical solutions for real-world engineering challenges, focusing on structural analysis, external aerodynamics, manufacturing, and sensor applications.

Before joining Exponent, Dr. Hashemitaheri worked as a simulation engineer at Volvo Group North America, where she applied computational fluid dynamics, predictive modeling, and data analytics to support product development, performance optimization, and regulatory compliance. Previously, as a postdoctoral researcher at Wright State University, she combined computational modeling with physics-informed machine learning to optimize optical sensor system designs for environmental monitoring and industrial safety. Specifically, her work focused on developing advanced predictive frameworks capable of accurately detecting and quantifying trace amounts of hazardous volatile organic compounds within complex gas mixtures using sensor data.

During her Ph.D. research in mechanical engineering at the University of North Carolina at Charlotte, Dr. Hashemitaheri focused on predictive analytics, structural dynamics, and uncertainty quantification to improve the reliability of manufacturing processes. She investigated the feasibility and uncertainty of machine learning models for chatter prediction/avoidance in machining. By combining physics-based models with machine learning, she developed practical methods to evaluate how complex systems behave and prevent process instability. Her work connected theoretical engineering models with real-world empirical data to improve both system efficiency and product quality.

Academic Credentials & Professional Honors

Ph.D., Mechanical Engineering, University of North Carolina, Charlotte, 2023

M.S., Mechanical Engineering, IAU South Tehran Branch, 2013

B.S., Mechanical Engineering, University of Kashan, 2009

Prior Experience

Simulation Engineer, Volvo Group North America, Greensboro, North Carolina, 2024-2026

Postdoctoral Researcher, Digital Twin Research Laboratory, Wright State University, Dayton, Ohio, 2023-2024

Graduate Research Assistant, University of North Carolina at Charlotte, North Carolina 2018-2023

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Publications

Hashemitaheri M, Ebrahimi E, de Silva G, Attariani H. Optical sensor for BTEX detection: integrating deep learning for enhanced sensing. Advanced Sensor and Energy Materials 2024; 3(3).

Hashemitaheri M, Mittal R, Cherukuri HP, Singh R. Extracting the In-process structural dynamics parameters in micro-milling operations. Proceedings of ASME MSEC 2022.

Mekarthy SMR, Hashemitaheri M, Cherukuri HP. A combined finite element and machine learning approach for the prediction of specific cutting forces and maximum tool temperatures in machining. Electronic Transactions on Numerical Analysis 2022; 56:66–85.

Mojahedin A, Hashemitaheri M, Salavati M, Fu X, Rabczuk T. A deep energy method for the analysis of thermoporoelastic functionally graded beams. International Journal of Computational Methods 2022.

Hashemitaheri M, Mekarthy SMR, Cherukuri HP. Prediction of specific cutting forces and maximum tool temperatures in orthogonal machining by Support Vector and Gaussian Process Regression Methods. Proceedings of NAMRC 48 2020.

Jabbari, M., Hashemitaheri, M., Mojahedin, A. and Eslami, M.R. Thermal buckling analysis of functionally graded thin circular plate made of saturated porous materials. Journal of Thermal Stresses 2014; 37(2):202–220.

Presentations

Hashemitaheri M, Le TT, Cherukuri HP, Khan T. A multivariate Newton-Raphson method approach to extract structural dynamics parameters during milling operations. Presentation, AeroMat, 2022.