Niloofar Rezaei

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EDUCATION

Ph.D. in Engineering (Emphasis in Electrical and Computer Engineering) Aug 2021 - Summer 2027 (Expected)
University of Georgia, College of Engineering, Athens, GA

- **Dissertation:** *Estimating and Modeling Operator Cognitive Load Across Stations in Manual Assembly: A Multimodal State-Space Approach* (Comprehensive Examination passed Fall 2024).
- **Advisor:** Dr. Jaime A. Camelio. **Advisory Committee:** Dr. Beshoy Morkos, Dr. Hongyue Sun, Dr. Joshua D. Summers (The University of Texas at Dallas).

M.Sc. in Industrial Engineering (Healthcare Systems Engineering) Feb 2020
Tarbiat Modares University, Tehran, Iran

- **Thesis:** *Assessing the Success of Vitiligo Treatment Based on Image Processing* (published in *Skin Research and Technology*, 2021).

B.Sc. in Industrial Engineering (Planning and System Analysis) Jul 2014
Islamic Azad University, Arak Branch, Arak, Iran

- **Senior Project:** *Industrial Cluster Development Model Based on Batch Production*.

RESEARCH AREAS

Human-centered smart manufacturing; multimodal estimation of operator cognitive load and fatigue; state-space production modeling and adaptive work instructions; computer vision, wearable physiological sensing, and Industrial IoT.

RESEARCH APPOINTMENTS

Graduate Research Assistant, Price Industries Innovation Factory Aug 2021 - Present
College of Engineering, University of Georgia, Athens, GA

- Designed and executed a multimodal sequential-assembly feasibility study (published in *IISE Annual Conference Proceedings*, 2025) integrating wearable physiological sensors, cycle-time telemetry, and NASA-TLX ratings under paper versus video work instructions.
- Formulated a state-space production model of operator cognitive load, stress, and fatigue across multi-station assembly lines, building on a co-authored multi-layer operational, environmental, and social value-stream mapping framework (*Manufacturing Letters*, 2025).
- Developed an IIoT-enabled, non-contact dual-camera framework combining facial-expression and body-posture recognition to inform line balancing, break scheduling, and operator training (*Manufacturing Letters*, 2024).
- Developing synchronized wearable-physiological, camera-vision, and workstation-telemetry pipelines on the Price Industries Innovation Factory assembly testbed to evaluate adaptive work instructions during multi-station manual assembly.

Graduate Research Assistant and Cracking Sub-Team Lead Aug 2021 - Aug 2025
USDA-ARS Smart Pecan Processing Project (Agreement No. 6042-21220-014-000-D), University of Georgia

- Led the Cracking sub-team for four years: instrumented industrial cracking machinery with high-speed imaging and process sensors, executed factorial process-optimization experiments, and led multimodal data curation and ablation analysis (one co-authored journal paper under review; two manuscripts in preparation).
- Co-authored an industry-wide survey of 53 members of the pecan industry identifying moisture-conditioning and cracking-efficiency bottlenecks (published in *ASME IDETC/CIE*, 2023).

PUBLICATIONS

Peer-Reviewed Journal Article

- **J1.** Khatibi, T., **Rezaei, N.**, Ataei Fashtami, L., & Totonchi, M. (2021). Proposing a novel unsupervised stack ensemble of deep and conventional image segmentation (SEDCIS) method for localizing vitiligo lesions in skin images. *Skin Research and Technology*, 27(2), 126-137. doi:10.1111/srt.12920

Peer-Reviewed Conference Papers Published in Manufacturing Letters (SME NAMRC)

- **C4.** Heydarzade, A., **Rezaei, N.**, Vaezi, S. A., & Camelio, J. A. (2025). Multi-layer multi-variable value stream mapping: A comprehensive framework across operational, environmental, and social layers with integrated KPIs

interrelationships. *53rd SME North American Manufacturing Research Conference (NAMRC 53). Manufacturing Letters*, 44, 184-194. doi:10.1016/j.mfglet.2025.06.023

- **C3. Rezaei, N.**, Vaezi, S. A., & Camelio, J. A. (2024). Decoding the silent language: A framework for advanced visual emotion recognition to enhance worker well-being on IIoT-enabled manufacturing. *52nd SME North American Manufacturing Research Conference (NAMRC 52). Manufacturing Letters*, 41, 1357-1365. doi:10.1016/j.mfglet.2024.09.162

Peer-Reviewed Conference Proceedings

- **C2. Rezaei, N.**, Vaezi, S. A., Mahmoudi, H., & Camelio, J. A. (2025). Smart sensors, smarter workplaces: Multi-modal cognitive load assessment in Industry 4.0. *Proceedings of the IISE Annual Conference & Expo 2025*, pp. 1-6.
- **C1.** Smith, L., Bowen, M. B., **Rezaei, N.**, Mozaffar, F., Rahmanpour, M., Das, R. P., & Morkos, B. (2023). Industry's take on challenges in the agricultural post-harvesting industry. *Proceedings of the ASME 2023 International Design Engineering Technical Conferences and Computers and Information in Engineering Conference (IDETC/CIE 2023)*, Paper DETC2023-117157. doi:10.1115/DETC2023-117157

Manuscript Under Review and Manuscripts in Preparation

- **R1.** DeLoach, R., Floyd, A. C., Halloran, H., Heydarzade, A., Singh, A., **Rezaei, N.**, Valiate, B. K., Wagner, B., & Morkos, B. Comprehensive characterization of an end-to-end pecan cracking system for optimal crack quality assessment. Under review at *Applied Food Research* (Manuscript AFRES-D-26-01550).
- **Rezaei, N.**, Vaezi, S. A., Camelio, J. A., & Morkos, B. Leakage-aware multimodal video-and-process ablation and condition-robustness analysis in automated pecan cracking. In preparation (first-author study from the USDA Cracking sub-team dataset).
- Vaezi, S. A., **Rezaei, N.**, Morkos, B., & Camelio, J. A. Vision-enabled 360-degree fracture metrology and factorial process optimization in industrial pecan cracking. In preparation.

AWARDS AND HONORS

Winner, 2025 SME Blue Sky Competition & David Dornfeld Manufacturing Vision Award Jun & Oct 2025

North American Manufacturing Research Institution of SME (NAMRI | SME), NAMRC 53, Greenville, SC

- First-listed member of the winning six-person UGA entry (*"Manufacturing Empathy: Sensorial AI for Rewriting Human-AI Collaboration"*); wrote the final competition submission, prepared the finalist slide deck, and delivered the live presentation.

Winner, NSF/ASME 2025 Student Design Essay Competition (Graduate Category) Aug 2025

ASME Design Engineering Division, IDETC/CIE 2025, Anaheim, CA

- Sole-author winner for *"The Sentient Factory: Cultivating Human Agency and Purpose in AI-Driven Manufacturing of 2040."*

NAMRC 54 Outstanding Reviewer Award, NAMRI | SME 2026

- Selected as one of four conference-wide Outstanding Reviewers at the 54th SME North American Manufacturing Research Conference (NAMRC 54, 2026).

Academic Scholarships and Travel Grants 2024 - 2025

- Certificate of IAAP-DC Scholarship, Iranian American Academics and Professionals, Washington, DC (2025); UGA Graduate School Conference Travel Grant for NAMRC 52 (2024).

TEACHING AND MENTORING

Classroom Instruction

Co-Instructor (with Dr. Jaime A. Camelio), MCHE 4440: Design and Control of Production Systems Fall 2025

Upper-level undergraduate elective (~42 students), College of Engineering, University of Georgia

- Shared course instructional and assessment operations: co-designed and delivered two 75-minute lectures on facility layout, Systematic Layout Planning, and digital manufacturing; wrote homework and exam problems; graded with custom rubrics; and coordinated guest speakers and accommodations.
- Built and ran live slide-embedded Microsoft Forms comprehension quizzes across regular class sessions (33-37 student responses per session) plus a mid-semester feedback survey (October 30, 2025; 22 responses) to check real-time understanding and adjust pacing.

Undergraduate Teaching Assistant, Industrial Engineering 2012 - 2014
Islamic Azad University, Arak Branch, Iran

- Supported problem sessions and grading in *Maintenance Planning* and *Quality Management*.

Research Mentoring and Capstone Co-Supervision

Research Team Mentor, Innovation Factory VIPR (Vertically Integrated Projects in Research) Fall 2025 - Present

- Mentored eight undergraduates in research sub-teams across three consecutive semesters on computer-vision and wearable-sensing projects, guiding an undergraduate team to a Spring 2026 UGA CURO Symposium poster presentation.

Capstone Design Co-Supervisor (with Dr. Luis Eduardo Izquierdo) Fall 2023 - Spring 2024

- Co-supervised a four-student senior design team sponsored by SMI Composites on an Automated Guided Vehicle (AGV) material-handling concept aimed at reducing high-risk manual transport on the plant floor.

Graduate Sub-Team Lead & Undergraduate Research Mentor, University of Georgia Aug 2021 - Aug 2025

- **USDA Smart Pecan Processing Cracking Sub-Team (2021-2025):** Mentored six undergraduate students, one M.S. student, and two first-year Ph.D. students in sensor calibration, factorial experimentation, quality-control protocols, and technical reporting.
- **Price Industries Innovation Factory (2022-2023):** Mentored four undergraduate researchers on laboratory instrumentation and computer-vision prototyping.

PRESENTATIONS

- **[Invited Webinar]** *"Manufacturing Empathy: Sensorial AI for Rewriting Human-AI Collaboration."* Inaugural session of the NAMRI | SME Manufacturing Research Pulse Webinar Series, January 29, 2026.
- *"The Sentient Factory: Cultivating Human Agency and Purpose in AI-Driven Manufacturing of 2040."* Poster presentation, ASME IDETC/CIE 2025, Anaheim, CA, August 2025.
- *"Manufacturing Empathy: Sensorial AI for Rewriting Human-AI Collaboration."* Finalist oral presentation, SME Blue Sky Competition, NAMRC 53, Greenville, SC, June 2025.
- *"Smart Sensors, Smarter Workplaces: Multi-Modal Cognitive Load Assessment in Industry 4.0."* Oral presentation, IISE Annual Conference & Expo, Atlanta, GA, June 2025.
- *"Decoding the Silent Language: Visual Emotion Recognition in Manufacturing."* Oral presentation, NAMRC 52, Knoxville, TN, June 2024.

PROFESSIONAL SERVICE, OUTREACH, AND PRIOR INDUSTRY ROLES

- **Peer Review:** Invited journal reviewer for ASME *Journal of Computing and Information Science in Engineering (JCISE)* (2026); invited technical paper reviewer for SME NAMRC across NAMRC 52 (2024, 3 papers) and NAMRC 54 (2026, 6 papers), with Outstanding Reviewer recognition at NAMRC 54 (2026).
- **Coalition & Workforce Outreach:** Active participant in statewide Georgia AIM (Artificial Intelligence in Manufacturing) coalition meetings and outreach events at UGA (Fall 2025-present).
- **Prior Industrial Engineering Roles (Iran):** Assistant Project Manager, Pars Ab Tadbir Consulting Engineering (Jul-Oct 2018; project scheduling and milestone tracking); Junior Industrial Engineer, RailRoad Engineering Company (Jul 2016-Feb 2017; workflow time studies and production documentation).
- **Memberships & Technical Skills:** Member of SME, ASME, IISE, and SWE. Programming and Methods: Python, MATLAB, R, C++; multimodal physiological and visual signal processing; OpenCV and deep-learning computer vision; statistical experimental design and state-space modeling; IRB human-subject study design.