Mehrdad Shoeibi

Machine learning researcher. Ph.D. student, Industrial Engineering and Management Systems, University of Central Florida, Orlando, FL, USA

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SUMMARY

Machine learning researcher working on reliability under weak supervision and distribution shift, with applications to transcriptomics, CRISPR perturbation screens and healthcare decision support. Author of nine peer-reviewed journal articles and three arXiv preprints, eight as first author. Builds reproducible evaluation pipelines in Python (PyTorch, scikit-learn, XGBoost) with pre-registered protocols, locked environments and audited reported numbers. Seven years of prior industry experience in project control and cost management for large construction programs.

EDUCATION

Ph.D., Industrial Engineering and Management Systems 2025 – present
University of Central Florida, Orlando, FL. Focus: reliable machine learning for biomedical data under weak supervision and distribution shift

M.S., Information Technology 2023 – 2025
Worcester Polytechnic Institute (full scholarship) Worcester, MA

M.S., Industrial Engineering 2018 – 2021
Institute for Management and Planning Studies (full scholarship) Tehran, Iran

B.S., Industrial Engineering 2010 – 2014
Islamic Azad University Tehran, Iran

RESEARCH EXPERIENCE

Doctoral Researcher 2025 – present
University of Central Florida, Department of Industrial Engineering and Management Systems Orlando, FL

– Designed a pre-registered, test-once evaluation framework for frozen transcriptomic foundation models (Geneformer, scGPT, UCE): outcome rule, seeds and target-gene-grouped splits locked before any test data are seen; each model scored against a strong expression baseline, a matched-capacity Gaussian control and a shuffle control. On two external Perturb-seq datasets (RPE1, K562) all three cleared the controls, none reliably beat the baseline (arXiv:2608.26170).
– Formalized *supervision drift* and benchmarked Ridge, Random Forest and XGBoost on CRISPR-Cas13d RNA-seq across two cell lines and timepoints: in-domain learning held (ridge R^2 = 0.356, Spearman ρ = 0.442) while temporal transfer collapsed (XGBoost R^2 = -0.155, ρ = 0.056); proposed feature stability as a pre-deployment diagnostic (arXiv:2604.05002).
– Showed on the Virtual Cell Challenge benchmark that four deterministic magnitude scalars drive CRISPRi perturbation-effect prediction on held-out target genes; a linear model on them beat the strongest expression-only classical model and transferred positively to two external CRISPRi screens where expression-only predictors did not (arXiv:2608.00152).
– Co-developed BIOGEN, an evidence-grounded multi-agent reasoning framework for transcriptomic interpretation in antimicrobial resistance (Frontiers in Bioinformatics, 2026).
– Maintains reproducible pipelines: Salmon quantification of public SRA RNA-seq, version-locked environments, and an audit trail mapping every reported number to its source file.

Research Assistant, SmartWAnDS Project Aug 2023 – May 2025
Worcester Polytechnic Institute Worcester, MA

– Led a systematic review of generative AI for the production, classification and annotation of chronic wound images (AMCIS 2024).
– Developed and evaluated AI-assisted tools for wound image annotation, classification and clinical decision support.
– Ran literature screening, data extraction and reproducibility assessment, and wrote for peer-reviewed submissions in healthcare AI.

PUBLICATIONS

Machine learning for biology and healthcare

1. **Shoeibi, M.** and Yousefi, N. (2026). Pre-Registered External Evaluation Yields a Consistent Partial-Replication Category across Three Transcriptomic Foundation Models. *arXiv preprint*. arXiv:2608.26170
2. **Shoeibi, M.** and Yousefi, N. (2026). Response Magnitude as a Dominant Signal for Held-Out CRISPRi Perturbation Effect Prediction. *arXiv preprint*. arXiv:2608.00152
3. **Shoeibi, M.**, Hossain, E., Garibay, I., and Yousefi, N. (2026). Learning Stable Predictors from Weak Supervision under Distribution Shift. *arXiv preprint*. arXiv:2604.05002

4. Hossain, E., **Shoeibi, M.**, Garibay, I., and Yousefi, N. (2026). BIOGEN: Evidence-Grounded Multi-Agent Reasoning Framework for Transcriptomic Interpretation in Antimicrobial Resistance. *Frontiers in Bioinformatics*, 6. doi:10.3389/fbinf.2026.1846404
5. **Shoeibi, M.**, Tulu, B., and Agu, E. O. (2024). Utilizing Generative AI for the Production, Classification, and Annotation of Chronic Wound Images: A Systematic Review. *AMCIS 2024 TREOs*, 193. aisel.aisnet.org/treos_amcis2024/193
6. **Shoeibi, M.** and Baghbadorani, P. R. (2023). Moving Toward Resiliency in Health Supply Chain. *International Journal of Industrial Engineering and Operational Research*, 5(3), 63–74.

Optimization, reinforcement learning and secure IoT systems

7. Khatami, S. S., **Shoeibi, M.**, Ershadi Oskouei, A., Martín, D., and Keramat Dashliboroun, M. (2025). 5DGWO-GAN: A Novel Five-Dimensional Gray Wolf Optimizer for Generative Adversarial Network-Enabled Intrusion Detection in IoT Systems. *Computers, Materials & Continua*, 82(1), 881–911. doi:10.32604/cmc.2024.059999
8. Sharifi Nevisi, M. M., **Shoeibi, M.**, Hernando-Gallego, F., Martín, D., and Khatami, S. S. (2025). An Evolutionary Deep Reinforcement Learning-Based Framework for Efficient Anomaly Detection in Smart Power Distribution Grids. *Energies*, 18(10), 2435. doi:10.3390/en18102435
9. Vaziri, A., Sadatian Moghaddam, P., **Shoeibi, M.**, and Kaveh, M. (2025). Energy-Efficient Secure Cell-Free Massive MIMO for Internet of Things: A Hybrid CNN–LSTM-Based Deep-Learning Approach. *Future Internet*, 17(4), 169. doi:10.3390/fi17040169
10. Khatami, S. S., **Shoeibi, M.**, Salehi, R., and Kaveh, M. (2025). Energy-Efficient and Secure Double RIS-Aided Wireless Sensor Networks: A QoS-Aware Fuzzy Deep Reinforcement Learning Approach. *Journal of Sensor and Actuator Networks*, 14(1), 18. doi:10.3390/jsan14010018
11. **Shoeibi, M.**, Ershadi Oskouei, A., and Kaveh, M. (2024). A Novel Six-Dimensional Chimp Optimization Algorithm–Deep Reinforcement Learning-Based Optimization Scheme for Reconfigurable Intelligent Surface-Assisted Energy Harvesting in Batteryless IoT Networks. *Future Internet*, 16(12), 460. doi:10.3390/fi16120460
12. **Shoeibi, M.**, Sharifi Nevisi, M. M., Khatami, S. S., Martín, D., Soltani, S., and Aghakhani, S. (2024). Improved IChOA-Based Reinforcement Learning for Secrecy Rate Optimization in Smart Grid Communications. *Computers, Materials & Continua*, 81(2), 2819–2843. doi:10.32604/cmc.2024.056823
13. **Shoeibi, M.**, Sharifi Nevisi, M. M., Salehi, R., Martín, D., Halimi, Z., and Baniasadi, S. (2024). Enhancing Hyper-Spectral Image Classification with Reinforcement Learning and Advanced Multi-Objective Binary Grey Wolf Optimization. *Computers, Materials & Continua*, 79(3), 3469–3493. doi:10.32604/cmc.2024.049847

PEER REVIEW

Conferences: NeurIPS 2026 workshops (Trustworthy AI Evaluation; I Can't Believe It's Not Better, Biology); HICSS.
Journals: Applied Soft Computing (36 reviews); Knowledge-Based Systems (13 reviews); Scientific Reports; Discover Internet of Things; Computers & Electrical Engineering.

SKILLS

- **Programming and ML:** Python, PyTorch, scikit-learn, XGBoost, SHAP, Keras, MATLAB, Bash, LaTeX; evaluation under distribution shift, weak and proxy supervision, feature-stability and interpretability analysis, reinforcement learning, metaheuristic optimization
- **Biomedical data:** bulk and single-cell transcriptomics, Perturb-seq and CRISPR screens, Salmon quantification, transcriptomic foundation models (Geneformer, scGPT, UCE), systematic reviews (PRISMA)
- **Data and reproducibility:** NumPy, pandas, Jupyter, Google Colab, Git/GitHub, GitLab, Docker, Linux; pre-registered evaluation protocols, version-locked environments
- **Analytics and engineering tools:** statistical analysis, Minitab, Tableau, operations research, mathematical programming; MS Project, Primavera P6, Navisworks, Vensim, Visio, Azure

AWARDS AND HONORS

Doctoral Fellowship, University of Central Florida (2025); Full Scholarship, M.S. in Information Technology, Worcester Polytechnic Institute (2023); Full Scholarship, M.S. in Industrial Engineering, Institute for Management and Planning Studies (2019); Top 1% of more than 20,000 applicants, Iranian National Graduate Entrance Exam for Master's programs (2018).

TEACHING

Teaching Assistant, Institute for Management and Planning Studies, Tehran: Game Theory (Feb – Jun 2021); Energy Pricing (Feb – Jun 2019). Course delivery support, grading and student tutoring.

INDUSTRY EXPERIENCE (2013 – 2023)

Project Control Manager, Aalam Architectural & Structural Consultants, Tehran Dec 2019 – Apr 2023
Scheduling, progress tracking, cost estimation and BIM coordination for large programs (Iran Telecommunication Twin Towers, Atiehgharb Hospital, the 2,000-unit Ronika Palace development); led an eight-member project-control team.

Project Control Specialist, Payasazeh Pasargad, Tehran Jun 2018 – Dec 2019
Project schedules, progress reporting and value-engineering recommendations.

Project Control Engineer, Aalam Architectural & Structural Consultants, Tehran Jan 2013 – Jul 2015
Scheduling, reporting and coordination for architectural and structural projects.