

# Amir (Ghasem) Boshrouei Shargh

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*Ph.D. researcher applying machine learning and uncertainty quantification to engineering, with expertise in active learning, generative modeling, seismic performance assessment, and reliability-based design.*

## Education

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**PhD in Architectural Engineering** Jan. 2023 – Present  
**Expertise in Structural Engineering** (NSF-funded)

The Pennsylvania State University, PA, USA CGPA (WES): 3.8/4

**NHERI Converging Design Project**  
*Multi-objective Optimization of Resilient Structural Spines*

**ICDS Mid-Scale Seed Grant**  
*Reinforcement Learning for High-Dimensional Adaptive Surrogate Modeling*

**Relevant Courses:**

Probabilistic Structural Reliability Analysis, Computational Intelligence and Analysis of Randomness, Stochastic Processes and Monte Carlo Methods, Pattern Recognition and Machine Learning, Structural Design for Dynamic Loads, Computational Design and Optimization.

**MSc in Civil & Environmental Engineering** Sep. 2015 – Sep. 2018  
**Expertise in Earthquake Engineering** (Full Scholarship)

Ferdowsi University of Mashhad, Iran CGPA (WES): 3.88/4

**Thesis Title:** *Seismic Assessment of Structures Considering Spectral Shape Parameters*

**Relevant Courses:**

Random Vibrations, Seismic Structural Design, Probabilistic Seismic Hazard Analysis, Advanced Seismology, Structural Rehabilitation and Retrofitting, Structural Dynamics, Theory of Elasticity and Plasticity.

**BSc in Civil & Environmental Engineering** Sep. 2011 – Jul. 2015  
(Full Scholarship)

Shahrood University of Technology, Iran CGPA (WES): 3.13/4

## Publications

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### Journal Articles

- Shargh, G. B., Papakonstantinou, K. G., Brown, N. (2026) “Generative Modeling for Inverse Engineering Design.” In preparation.
- Shargh, G. B., Barbosa, A. R., van de Lindt, J. W., Brown, N. C. (2026) “A Parametric Computational Framework for Modeling and Seismic Design of Post-Tensioned Mass Timber Rocking Walls.” Under Review.
- Shargh, G. B., Papakonstantinou, K. G., van de Lindt, J. W., Barbosa, A. R., Simpson, B., Sinha, A., Brown, N. (2026) “Reliability-Based Design Optimization of Mass Timber Self-Centering Rocking Walls.” *Journal of Structural Engineering*. DOI: [10.1061/JSENDH.STENG-15751](https://doi.org/10.1061/JSENDH.STENG-15751)
- Shargh, G. B., Barati, R. (2023) “Probabilistic Assessment of Ground Motion Rotation Impact on Seismic Performance of Structures.” *Engineering Structures*. DOI: [10.1016/j.engstruct.2023.116383](https://doi.org/10.1016/j.engstruct.2023.116383)
- Shargh, G. B., Barati, R. (2021) “Estimation of Inelastic Seismic Input Energy.” *Soil Dynamics and Earthquake Engineering*. DOI: [10.1016/j.soildyn.2020.106505](https://doi.org/10.1016/j.soildyn.2020.106505)

## Conference Papers

- **Shargh, G. B.**, Brown, N. (2026) “*Physics-Aware Bayesian Optimization for Reliable PT-CLT Rocking Walls: Impact of Feature Representations.*” Accepted for oral presentation at the 13th U.S. National Conference on Earthquake Engineering (13NCEE), EERI.
- **Shargh, G. B.**, Barbosa, A., Simpson, B., Sinha, A., van de Lindt, J. W., Brown, N. (2024) “*Multi-Objective Optimization of Cross-Laminated Timber Shear Walls.*” 18th World Conference on Earthquake Engineering.
- **Shargh, G. B.**, Barati, R., Brown, N. (2024) “*Angular Efficiency of Intensity Measures.*” 18th World Conference on Earthquake Engineering.
- Barati, R., **Shargh, G. B.** (2024) “*Seismic Intensity Measure Selection Considering Record-to-Record and Angle-to-Angle Uncertainties.*” 9th International Conference on Seismology and Earthquake Engineering.
- Barati, R., **Shargh, G. B.**, Karamodin, A. (2019) “*Evaluation of Methods Estimating Structural Strength Reduction Factor under Far-Field Records.*” 8th International Conference on Seismology & Earthquake Engineering.

## Open-Source Software

- **Parametric-PT-CLT** — A parametric finite element modeling framework for post-tensioned cross-laminated timber (PT-CLT) rocking wall systems. Automates model generation, seismic design, and nonlinear analysis in OpenSeesPy while supporting seismic performance assessment, risk and reliability analysis, and performance-based design optimization.

## Professional Experience

**Research Assistant**, Pennsylvania State University Jan. 2023 – Present

- Developed Python-based parametric FE and probabilistic models for PT-CLT rocking walls.
- Performed UQ, sensitivity analysis, and physics-aware Bayesian optimization.
- Integrated ML-based surrogate modeling for efficient multi-objective design exploration and robustness assessment.

**Research Assistant**, Ferdowsi University of Mashhad Oct. 2018 – Jan. 2023

- Conducted probabilistic seismic analysis and nonlinear dynamic simulations using OpenSees.

## Awards and Honors

- Awarded a Mid-Scale Seed Grant from the Institute for Computational and Data Sciences (ICDS), Pennsylvania State University.
- Awarded a full Research Assistantship (RA) for an NSF-funded research project.
- Recipient of full national scholarships for both graduate and undergraduate studies.
- Graduated in the top 5% of the M.Sc. class of 2018.
- Ranked in the top 4% nationwide in the Iranian M.Sc. entrance exam for Civil Engineering.
- Ranked in the top 1% in the Iranian national university entrance exam.
- Achieved 6th place in the Khwarizmi National RoboCup Student Competition for developing autonomous agents in C++.

## Technical Skills

**Programming & ML Frameworks:** Python (NumPy, SciPy, TensorFlow, PyTorch), MATLAB, R, C++, Fortran

**Engineering & Simulation Software:** OpenSees (Py-TCL), ETABS, SAP2000, AutoCAD

**Specialized Competencies:** Probabilistic Structural Analysis, Uncertainty Quantification, Reliability-Based Design, Active Learning, Generative Modeling, Bayesian Optimization, Surrogate Modeling, Reinforcement Learning, Nonlinear Dynamic Analysis, Seismic Risk Assessment