Amir Hossein Khatami

amirkhatami888@gmail.com | +98 912 060 4872 | amirhosseinkhatami.ir
linkedin.com/in/amir-hossein-khatami | github.com/amirkhatami888 | ORCID: 0009-0006-9045-6635

Research Profile

Research-oriented structural and computational engineer with experience in adaptive finite element methods, GPU-accelerated scientific computing, and machine learning for engineering systems. My work focuses on scalable numerical methods, high-performance computing, and reinforcement learning approaches for complex computational problems in structural mechanics and scientific computing.

Research Interests

Computational Mechanics • Adaptive Finite Element Methods • High-Performance Computing • GPU/GPGPU Computing • Scientific Machine Learning • Reinforcement Learning • Evolutionary Optimization • Structural Engineering

Education

K. N. Toosi University of Technology, Tehran, Iran — Sep 2020 – Jan 2023
M.Sc. in Structural Engineering

- Thesis: Two-Dimensional Adaptive Finite Element Analysis Using GPGPU Computing
- Supervisor: Dr. S. Asil Gharebaghi
- GPA: 14.27/20
- Relevant Coursework: Finite Element Method, Numerical Methods in Structural Engineering, Structural Dynamics, Nonlinear Analysis of Structures, Stability of Structures, Elasticity Theory, Micro-mechanics of Damage in Solids

Islamic Azad University, Tehran South Branch, Tehran, Iran — Sep 2015 – Jun 2020
B.Sc. in Civil Engineering

- GPA: 15.30/20

Publications

CMA-MAPPO: Integrating Covariance Matrix Adaptation Evolution Strategy with Multi-Agent Proximal Policy Optimization for Enhanced Exploration in Sparse-Reward Environments — Accepted / Published

Amir Hossein Khatami
Swarm and Evolutionary Computation (Elsevier)
DOI: 10.1016/j.swevo.2026.102330

PyAdMesh: A Novel High-Performance Software for Adaptive Finite Element Analysis — Accepted /Published

S. Asil Gharebaghi, Amir Hossein Khatami
Simulation Modelling Practice and Theory (Elsevier)
DOI: 10.1016/j.simpat.2025.103074

Two-Dimensional Adaptive Finite Element Using GPGPU — Accepted / Published

Amir Hossein Khatami, S. Asil Gharebaghi
Civil Engineering Journal (Amirkabir University of Technology)
DOI: 10.22060/ceej.2025.23113.8111

Selected Research Projects

PyAdMesh: High-Performance Adaptive Finite Element Software — Repository

- Developed a software framework for adaptive finite element analysis with emphasis on efficient inter-mesh data transfer during refinement.

- Implemented parallel workflows on CPU and GPU platforms using multiprocessing, CUDA/OpenCL-oriented acceleration strategies, and scientific Python tools.
- Designed the framework to integrate with existing finite element workflows, enabling adaptive meshing with minimal changes to solver infrastructure.
- Evaluated performance and numerical reliability on two-dimensional elasticity problems involving large meshes and repeated refinement cycles.

CMA-MAPPO: Evolutionary Multi-Agent Reinforcement Learning Repository

- Proposed a hybrid learning framework combining Covariance Matrix Adaptation Evolution Strategy (CMA-ES) with Multi-Agent Proximal Policy Optimization (MAPPO).
- Investigated improved exploration mechanisms for sparse-reward cooperative environments in multi-agent reinforcement learning.
- Benchmarked the approach against baseline methods and observed stronger convergence behavior and reward accumulation on standard tasks.

Project Manager Dashboard Repository

- Developed a web-based project management system using Django and MySQL for organizational deployment.
- Implemented role-based access control, multi-level approval workflows, and financial tracking features for distributed operations.
- Deployed the application using production-oriented tools including Gunicorn and static-file serving solutions.

Professional Experience

Structural Engineer, Iranian Red Crescent Society, Tehran, Iran Nov 2024 – Nov 2026

- Review and verification of structural design documents submitted by contractors for branch facilities across multiple cities.
- Development of an internal digital dashboard for project monitoring and administrative workflow management.
- Coordination of engineering review processes with attention to code compliance, documentation quality, and implementation requirements.

Construction Estimator / Project Manager(Internship), Rahyan Khak Consultants, Tehran, Iran March 2021 – September 2021

- Managed construction planning and cost estimation activities for building projects.
- Performed structural design and analysis of steel and reinforced concrete systems using SAP2000, ETABS, and SAFE.

Technical Skills

Programming: Python, C, SQL

Scientific Computing and AI: NumPy, SciPy, CuPy, PyTorch, Numba, CUDA, OpenCL, tensorflow , CMA-ES,

Engineering and Simulation: Finite Element Analysis, OpenSeesPy, SAP2000, ETABS, SAFE, AutoCAD, Autodesk Revit, abaqus, solidwork ,msc adams , autocad 2d and 3d ,

Software and Tools: Django, MySQL, Linux, Git, Docker, LaTeX

Academic Profiles

LinkedIn: linkedin.com/in/amir-hossein-khatami
GitHub: github.com/amirkhatami888
ORCID: 0009-0006-9045-6635
Website: amirhosseinkhatami.ir

Languages

Persian: Native English: Professional working proficiency (toffel socre :100)