Mohammad Zamani

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Education

University of Tehran *2019 - 2022*
M.Sc. in Structural Engineering
School of Civil Engineering
Thesis: Mathematical Modeling of Bone Fracture Healing

Hekmat University *2014 - 2017*
B.Sc. in Civil Engineering

Technical Expertise

Programming	Python (Advanced), MATLAB (Proficient)
ML & AI	PyTorch, TensorFlow, Keras, Scikit-learn
Data Science	Pandas, NumPy, SciPy, Matplotlib, Jupyter
Engineering Software	Abaqus (FEA), Mathematica
Development Tools	LaTeX, Git, MS Office Suite

Research Experience

University of Tehran - HPC Lab 2021 - Present
Graduate Research Assistant

- Developed a novel framework for simulating bone fracture healing using FEM
- Led comparative analysis of ML methods on engineering datasets
- Improved multiscale homogenization with enhanced efficiency
- Designed and tested topology optimization algorithms
- Applied reinforcement learning to structural optimization

Graduate Research Projects 2019 - 2022
University of Tehran

- Developed numerical implementations in MATLAB and Python:
  - **Advanced FEM & Meshless Methods**: Adaptive mesh refinement and non-linear solvers
  - **Multiscale Computing**: Homogenization, quasi-continuum methods, statistical mechanics
  - **AI Applications**: Reinforcement learning and generative AI for materials
  - **Optimization**: Gradient-based and heuristic methods
  - **Composite Materials**: Laminate theory and micromechanics

Publications

Journal Papers

Computers in Biology and Medicine, 2024

Published

"Finite Element Solution of Coupled Multiphysics Reaction-Diffusion Equations for Fracture Healing in Hard Biological Tissues"

Under Review 2025

"The Impact of Data Splitting Methods on Machine Learning Models: A Case Study in Predicting the Concrete Workability"

Book Chapter

Wiley, 2023

"Biomechanics of Hard Tissues (Parts 6.1 & 6.4)" in *Multiscale Biomechanics* (S. Mohammadi)

Conference Papers

ISME, 2025

"3D Multiscale Topology Optimization for Conceptual Design of a Quadrotor Aerial Taxi"

"Inverse Design of New Mechanical Metamaterial for Base Isolator"

Teaching Assistant Experience

Engineering Mathematics 2022 – 2024

University of Tehran

- Held tutorials and graded assignments for undergraduate students

Finite Element Methods 2023 – 2024

University of Tehran

- Assisted students in coding assignments and FEM implementation

Mechanics of Material II 2021 – 2022

Shahid Beheshti University

- Conducted problem-solving sessions and exam preparation

References

Dr. Soheil Mohammadi
Full Professor, M.Sc. Supervisor
University of Tehran
smoham@ut.ac.ir

Dr. Houshang Dolatshahi
Associate Professor
University of Tehran
mdolat@ut.ac.ir