Cincinnati, Ohio, USA
(859) 213 6972
✉ *Hosseinsharifi71@gmail.com*
HosseinSharifii
linkedin.com/in/hossein-sharifi-phd-98a805bb

Hossein Sharifi, PhD, MS

Summary

PhD in Mechanical Engineering with over seven years of expertise in multiphysics finite element modeling using ANSYS, Abaqus, LS-DYNA, and open-source FEA tools (e.g., FEniCS) for biomedical and engineering applications. Proficient in Python and MATLAB for algorithm development and automation of scalable simulations. Experienced in leading cross-functional R&D teams to deliver innovative modeling and simulation solutions that ensure safety, accuracy, and regulatory compliance. Skilled in presenting complex technical insights to diverse stakeholders to drive impactful design and integration decisions.

Contact & Links

Google Scholar | GitHub | LinkedIn

Highlights

- **Expert in Multiphysics FEM**: Hold a PhD in Mechanical Engineering, specializing in multiphysics finite element modeling.
- **Proficient in Finite Element Analysis (FEA) Simulations:** Over 7 years of experience in static and dynamic multiphysics FEM simulations (electromagnetic, electromechanical, structural) using ANSYS, Abaqus, and LS-DYNA for biological (e.g. heart) and engineering applications.
- **SIMULIA R&D Intern**: 15-month internship with Dassault Systèmes' SIMULIA R&D team on the *Living Heart Project*, developing advanced Abaqus-based FE simulations for biomedical applications.
- **Algorithm and Digital Twin Development**: Skilled in programming multiphysics FEM algorithms and digital twins in Python, formulating governing partial differential equations for electromagnetic and structural applications.
- **Proficient Programmer**: Expert in Python for software development, data analysis, and machine learning.
- **Proven R&D Leadership**: Delivered over three years of impactful contributions to innovative R&D projects, driving solutions through computational modeling and cross-functional collaboration.
- **Effective Technical Communicator**: Authored technical reports and presented findings to technical and non-technical stakeholders, including peer-reviewed publications and federal grant proposals.

Technical Skills

FEA & Simulation Software	Abaqus, ANSYS, LS-DYNA, Isight, STAAD Pro, SAP2000, ETABS, CSI Bridge

Programming	Python (FEniCS, NumPy, SciPy, scikit-learn, Keras, TensorFlow, PyTorch, OpenCV, MPI4PY, pandas, Matplotlib), C++, MATLAB, JavaScript, HTML
OS	Linux, Windows, HPC (high-performance computing for large-scale simulations)

Experience

Aug 2023–Present **Computational Scientist**, *Genetesis, Inc.*, Mason, OH.

- Developed multiscale FEA models using open-source FEniCS to simulate cardiac electrophysiology and reproduce magnetic field measurements, known as magnetocardiograms (MCGs).
- Investigated the impact of various cardiac diseases on the heart's magnetic field, recorded as magnetocardiograms (MCGs), through computational simulations validated against clinical data.
- Led the development of an inverse modeling algorithm for magnetocardiograms (MCGs), fostering cross-functional collaboration with R&D and design teams to evaluate a new product line and drive business growth through predictive simulations.
- Designed a novel algorithm to reconstruct the heart's anatomical shape from MCG signals.
- Conducted static and dynamic FEM simulations on high-performance computing (HPC) systems to optimize designs under complex loading conditions.
- Wrote Python scripts for post-processing, visualization, and weekly R&D progress reporting to stakeholders.

Jan 2025–April 2025 **Contract Consultant Scientist**, *Ligence Heart Company.*, Remote.

- Developed Python-based software tools for strain analysis pipelines, integrating deep learning algorithms to segment structures from imaging data.
- Advised R&D team on implementing strain analysis and deep learning-based segmentation from imaging datasets, optimizing workflow accuracy.
- Developed a data visualization tool for reporting cardiac strain data (bullseye plot) as a part of finalized software product.

May 2022–Jul 2023 **Biomechanical Engineer Intern**, *Dassault Systèmes*, Providence, RI.

- Simulated MitraClip deployment for edge-to-edge mitral valve repair in the ENRICHMENT project, collaborating with clinical advisors to validate device performance, informing FDA regulatory strategies and contributing to the published playbook.
- Conducted large-scale FEM simulations of mitral valve dynamics using Abaqus, generating key insights for device safety and supporting in silico clinical trial (ISCT) credibility for the ENRICHMENT project.
- Developed surrogate machine learning models to create virtual patient cohorts, enabling scalable ISCT simulations and accelerating medical device evaluation timelines.
- Integrated baroreflex loops into lumped-parameter cardiac circulation models for device evaluation.
- Presented simulation outcomes to principal investigators and external researchers, fostering engagement with the leadership communities.

Aug 2018–May 2023 **Graduate Research Assistant**, *University of Kentucky*, Lexington, KY.

- Developed multiscale FEA algorithms in Python using FEniCS to simulate the electromechanical function of the heart, optimizing constitutive models.
- Simulated left ventricular function by developing a 0D lumped-parameter model for the `PyMyoVent` pipeline.
- Developed the `PyCMLutil` Python package for scientific visualization, streamlining data analysis workflows.
- Quantified myocardial strain in mouse hearts by collecting and analyzing MRI data, collaborating with a multidisciplinary team from the Department of Physiology.
- Presented research findings at national conferences, engaging with engineering and scientific communities.

Education

2018–2023 **PhD, Mechanical Engineering**, *University of Kentucky*, Lexington, KY.
GPA: 3.94/4.0; Dissertation: *Multiscale Modeling of Cardiac Growth and Baroreflex Control*

2016–2018 **M.S., Civil Engineering**, *University of Kentucky*, Lexington, KY.
GPA: 4.0/4.0; Thesis: *Finite Element Evaluation of 2-Cell RC Box Culverts*

2010–2014 **B.S., Civil & Environmental Engineering**, *Shiraz University*, Shiraz, Iran.

Certifications

2022 Introduction to Computer Vision and Image Processing

2022 Introduction to Deep Learning & Neural Networks with Keras

2022 Machine Learning with Python

2020 Applied Plotting, Charting & Data Representation

2020 Introduction to Data Science in Python

2015 Introduction to Programming with MATLAB

Publications

2024 Mehri, M., **Sharifi, H.**, Mann, C. K., Rockward, A. L., Campbell, K. S., Lee, L. C., Wenk, J. F. *Multiscale fiber remodeling in the infarcted left ventricle using a stress-based reorientation law. Acta Biomaterialia*, 189:337–350. DOI:10.1016/j.actbio.2024.09.049

2024 **Sharifi, H.**, Mehri, M., Mann, C. K., Campbell, K. S., Lee, L., Wenk, J. F. *Multiscale finite element modeling of left ventricular growth in simulations of valve disease. Ann Biomed Eng.* DOI:10.1007/s10439-024-03497-x

2024 **Sharifi, H.**, Lee, L., Campbell, K. S., Wenk, J. F. *A multiscale finite element model of left ventricular mechanics incorporating baroreflex regulation. Comput Biol Med.* DOI:10.1016/j.compbiomed.2023.107690

2022 **Sharifi, H.**, Mann, C. K., Wenk, J. F., Campbell, K. S. *A multiscale model of the cardiovascular system that regulates arterial pressure via closed-loop baroreflex control. Biomech Model Mechanobiol.* DOI:10.1007/s10237-022-01628-8

2021 **Sharifi, H.**, Mann, C. K., Rockward, A. L., et al. *Multiscale simulations of left ventricular growth and remodeling. Biophys Rev*, 13:729–746. DOI:10.1007/s12551-021-00826-5

2022 **Sharifi, H.**, Mann, C. K., Noor, A. Z., et al. *Reproducibility of systolic strain in mice using cardiac magnetic resonance feature tracking. Cardiovasc Eng Tech.* DOI:10.1007/s13239-022-00621-7

2021 **Sharifi, H.**, Peiris, A., Harik, I. E. *Triage Method for Load Rating Bridge Size Two-Cell Reinforced Concrete Box Culverts for the AASHTO LRFD Design Load. Structure and Infrastructure Eng.* DOI:10.1080/15732479.2021.2015793