

Hossein Sharifi

Contact Information Cincinnati, Ohio, USA (859) 213-6972
Links :  Personal Website,  Google Scholar, Hosseinsharifi71@gmail.com
 Github,  LinkedIn,

Education **University of Kentucky**, Lexington, KY, USA
Ph.D., Mechanical Engineering May 2023
Thesis Topic: *Multiscale Modeling of Cardiac Growth and Baroreflex Control*
GPA: 3.94/4.0

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

Shiraz University Shiraz, Iran
B.S., Civil and Environmental Engineering, December 2014

Computer Skills

- Engineering software: Abaqus, LS-DYNA, ANSYS, FEniCS Project, ParaView, CANDE, STAAD Pro, SAP 2000, ETABS, SAFE, CSI Bridge, BRASS-CULVERT, Solidworks, Autodesk
- Programming languages: Python, JavaScript, HTML, MATLAB
- Python packages: NumPy, pandas, SciPy, scikit-learn, Keras, TensorFlow, MPI4PY, Matplotlib

Industry Experience **Genetesis**, Mason, OH, USA Aug 2023 - present
Computational Scientist

- Developed a multi-scale model of cardiac electrophysiology (EP), enhancing the understanding of heart's electrical functions at different scales.
- Conducted forward in-silico modeling of magnetocardiography (MCG) and electrocardiography (ECG).

Dassault Systèmes, Providence, RI, USA May 2022 - July 2023
Industry Solution Technical (Cardiovascular Biomechanics Engineering) - Intern

- Developed a hemodynamic reflex loop (baroreflex) within a lumped-parameter model of cardiac circulation.
- Executed hundreds of finite element method (FEM) simulations of mitral valves using Explicit FEM techniques.
- Created a surrogate model of the mitral valve using machine learning techniques, trained by physics-based FE models to estimate clinical characteristics of virtual patients.
- Performed finite element (FE) modeling for the insertion of the edge-to-edge MitraClip medical device, simulating procedural impacts and device performance.

Kentucky Transportation Center (KTC), Lexington, KY, USA Summer 2019
Structural Engineer (Graduate Student Assistant)

- Simulated FE load rating of bridge size reinforced concrete culverts.

Pey-Azad Co., Shiraz, Iran 2015 - 2016
Structural Engineer

Tak-Khiz Fars Co., Shiraz, Iran 2014 - 2015
Construction Project Engineer

Research Experience

University of Kentucky, Lexington, KY, USA August 2018 - May 2023
Research Assistant - Dept. of Mechanical and Aerospace Engineering

- Developed a multiscale FE model of left ventricular mechanics using FEniCS solver. (MyoFE project).
 - Multiscale modeling of left ventricular growth
 - Multiscale modeling of acute myocardial infarction
 - Multiscale modeling of baroreflex control of arterial pressure
- Developed PyCMLuti Python package for generating scientific plots.
- Contributed to the development of a single hemispherical model of left ventricular function (PyMyoVent project).
- Acquired cardiac magnetic resonance imaging (DENSE, dark and bright blood) of mice using 7T Bruker MR scanner.
 - Performed strain analysis of mice heart using cardiac magnetic resonance feature tracking.

University of Kentucky, Lexington, KY, USA Jan 2017 - May 2018
Research Assistant - Dept. of Civil Engineering

- FE-based load rating of bridge size reinforced concrete box culverts.

Shiraz University, Shiraz, Iran May 2015 - March 2016
Department of Civil and Environmental Engineering

- Investigated seismic behavior of retrofitted reinforced concrete beam-column joints by FRP sheets

Publications

1. **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, (2024).
<https://doi.org/10.1007/s10439-024-03497-x>
2. **Sharifi H.**, Lee, L., Campbell K. S., Wenk J. F. *A multiscale finite element model of left ventricular mechanics incorporating baroreflex regulation*, Computers in Biology and Medicine, (2024).
<https://doi.org/10.1016/j.combiomed.2023.107690>
3. **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 of chronotropism, cell-level contractility, and vascular tone*, Biomech Model Mechanobiol, (2022).
<https://doi.org/10.1007/s10237-022-01628-8>
4. **Sharifi, H.**, Mann, C.K., Rockward, A.L. et al. *Multiscale simulations of left ventricular growth and remodeling*, Biophys Rev 13, 729–746 (2021).
<https://doi.org/10.1007/s12551-021-00826-5>
5. **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, (2022). <https://doi.org/10.1007/s13239-022-00621-7>
6. **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 Engineering (2021).
<https://doi.org/10.1080/15732479.2021.2015793>

Awards

1. Awarded travel funding for attending to **Cardiac Physiome Workshop**
Source of funding: National Science Foundation (NSF)
Amount: \$ 800 April 2023
2. Awarded travel funding for attending to **Cardiac Physiome Workshop**
Source of funding: Dept. of Mechanical and Aerospace Engineering, University of Kentucky
Amount: \$ 900 April 2023
3. Awarded travel funding for attending to **Summer Biomechanics, Bioengineering, and Biotransport Conference (SB3C)**
Source of funding: Dept. of Mechanical and Aerospace Engineering, University of Kentucky
Amount: \$ 900 June 2022

Presentations

• Podium presentations

1. Title: Multiscale Modeling of Baroreflex Feedback Loop in Response to Acute Myocardial Infarction June 2023
Conference: **Summer Biomechanics, Bioengineering, and Biotransport Conference (SB3C)**, United States, Vail, CO
2. Title: Multiscale Modeling of Baroreflex Feedback Loop in Response to Acute Myocardial Infarction April 2023
Conference: **Cardiac Physiome Workshop**, United States, Irvine, CA
3. Title: Multiscale modeling of cardiac growth in simulations of valvular disease- PhD project February 2023
Conference: **The Living Heart Project webinar**, United States, (Virtual)
4. Title: 2022 Living Heart Technology Update December 2022
Conference: **8th International Symposium on The Living Heart And Virtual Twin For Humans**, United States, Brooklyn, NY (Virtual)
5. Title: Multiscale modeling of cardiac valve disease using cell-level signals to drive myocardial growth June 2022
Conference: **Summer Biomechanics, Bioengineering, and Biotransport Conference (SB3C)**, United States, Cambridge, MD
6. Title: Multiscale modeling of LV growth under autonomic regulation of baroreflex feedback loop July 2021
Conference: **Modeling the Cardiac Function: Theory, Numerical Methods, Clinical Applications**, Italy (Virtual)
7. Title: Multiscale modeling of LV growth under autonomic regulation of baroreflex feedback loop June 2021
Conference: **Summer Biomechanics, Bioengineering, and Biotransport Conference (SB3C)**, United States (Virtual)

Teaching Experience

- Teaching Assistant
- ME 501 - Mechanical Design with Finite Element Methods Fall 2019
Department of Mechanical and Aerospace Engineering, University of Kentucky
 - CE 584 - Design of Timber and Masonary Structures Fall 2017
Department of Civil Engineering, University of Kentucky

Certificates	<hr/> <ul style="list-style-type: none"> • Introduction to Computer Vision and Image Processing March 2022 • Introduction to Deep Learning & Neural Networks with Keras Feb 2022 • Machine Learning with Python Feb 2022 • Applied Plotting, Charting & Data Representation July 2020 • Introduction to Data Science in Python June 2020 • Introduction to programming with MATLAB Sept 2015 • HSE Management System training course by TUV Rheinland May 2014 <hr/>
Volunteer Activities	<ul style="list-style-type: none"> • Participating in large vaccination of the University of Kentucky's employees and students against delta variant of COVID-19. September 2021