





Hossein Sharifi

Contact Information University of Kentucky (859) 213-6972
Department of Mechanical and Aerospace Engineering, Hossein.sharifi@uky.edu
Lexington, KY, 40506
Links :  Personal Website,  Google Scholar,
 Github,  LinkedIn,

Education **University of Kentucky**, Lexington, KY, USA
Ph.D., Mechanical Engineering Expected May 2023
Thesis Topic: *Multiscale Modeling of Cardiac Growth and Baroreflex Control*
Advisor: Jonathan F. Wenk, Ph.D
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*
Advisor: Issam E. Harik, Ph.D
GPA: 4.0/4.0

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

Industry Experience **Dassault Systèmes**, Providence, RI, USA May 2022 - present
Industry Solution Technical (Cardiovascular Biomechanics Engineering) - Intern

- Executed hundreds of FEM simulations of mitral valves (Explicit FEM).
- Performed sensitivity analyses.
- Created a surrogate model of the mitral valve using machine learning techniques to estimate the clinical characteristics of virtual patients trained by physics-based FE models.
- Executed FE modeling of the insertion of the edge-to-edge MitraClip medical device.

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

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

Research Experience **University of Kentucky**, Lexington, KY, USA August 2018 - present
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

Research Interests

Computational Mechanics, Finite Element Analysis, Cardiac Biomechanics, Multiscale Modeling, Machine Learning, Data-Driven Modeling

Publications

• Published

1. **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>
2. **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>
3. **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>
4. **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>

• In Progress

1. **Sharifi H.**, Lee L., Campbell K. S., Wenk J. F. *A multiscale finite element model of left ventricular mechanics incorporating baroreflex regulation* (2023)
2. **Sharifi H.**, Mann C. K., Mehri M., Campbell K. S., Lee L., Wenk J. F. *Multiscale finite element modeling of left ventricular growth in simulations of valve disease* (2023)

Awards

1. Awarded travel funding for attending to **Cardiac Physiome Workshop**

Source of funding: National Science Foundation (NSF)

Amount: \$ 750

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)

• Poster presentations

1. Title: Multiscale modeling of cardiac valve disease using cell-level signals to regulate concentric and eccentric myocardial growth July 2022
Conference: 9th World Congress of Biomechanics (WCB), Taiwan (Virtual)
2. Title: Multiscale modeling of cardiac valve disease using cell-level signals to regulate concentric and eccentric myocardial growth April 2022
Conference: University of Kentucky Center for Clinical and Translational Science (CCTS)
3. Title: Quantifying the Effects of Hypertrophic Cardiomyopathy (HCM) using MRI July 2019
Conference: University of Kentucky Gill Heart & Vascular Institute, Cardiovascular Research Day

Teaching Experience	Teaching Assistant	
	<ul style="list-style-type: none"> 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 	
Relevant Courses	<ul style="list-style-type: none"> Mechanics of Plastic Solids I - ME 603 Spring 2019 Matrix Theory & Numeric Linear Algebra I - MA 522 Fall 2018 Mechanics of Composite Materials - ME 506 Fall 2017 Foundation of Solid Mechanics - ME 641 Fall 2017 Introduction to Finite Element Analysis - CE 621 Spring 2017 Advanced Structural Analysis - CE 682 Fall 2016 Biostatistics - CPH 580 Fall 2018 	
Certificates	<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 	
Volunteer Activites	<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 	