Hossein Sharifi

Contact Information	University of Kentucky	(859) 213-6972
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	Links : ⊕Personal Website, 🎓Google Scholar,	
	⊙ Github, in Linkedin,	

Education

University of Kentucky, Lexington, KY, USA
Ph.D., Mechanical Engineering   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 - July 2023
Industry Solution Technical (Cardiovascular Biomechanics Engineering) - Intern
- Developed a hemodynamic reflex loop (barorreflex) in a lumped-parameter model of circulation of the heart.
- 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

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Research Interests

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

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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: $ 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)

- **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
	• 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	• 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	• **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 Activities	• Participating in large vaccination of the University of Kentucky's employees and students against delta variant of COVID-19. — September 2021