

Educational Background

- **Ph.D. in Mechanical Engineering**, Department of Aerospace and Mechanical Engineering, College of Engineering, The University of Arizona, Tucson, AZ, US, 2016 - 2022, GPA: 4.0

Working Experience

- **Assistant Professor**, James Worth Bagley College of Engineering, Department of Mechanical Engineering, Mississippi State University, Starkville, MS, US, 2023 - Current
- **Postdoctoral Research Associate**, School of Mechanical Engineering, Purdue University, West Lafayette, IN, US, March 1st, 2022 - Aug 10th, 2023

Field of Interest

- Rigid Multi-Body Fluid-Structure Interactions (RMB-FSI), Multi-Physics System of Systems (SoS), Computational Multibody 2D/3D Dynamic Systems, Lumped Parameter Modeling, and 2D/3D Mechanism Design, with application to floating offshore wind turbines (FOWT) with horizontal or vertical axes, bladeless wind turbines (BWT), and wave energy convertors (WEC).
- Nonlinear Dynamic, Bifurcation, Chaos Theory, Mechanical Vibrations in Linear/Nonlinear Discrete/Continuous Systems, with application to vibration absorption, nonlinear energy sink, energy harvesting in rotating systems, MEMS and NEMS resonator design, and health monitoring and damage detection of rotating machinery.
- Nonlinear Adaptive/Robust Control Systems Design, Digital Control, Robotics, Mechatronics, and Automation, with application to autonomous systems, under actuated systems, quadcopters, legged robots, bio-inspired robots, and rehabilitation robots.
- Perturbation Analysis of Nonlinear Time-Periodic System of Coupled Differential Equations with application to self-excited and parametrically excited systems, gyroscopic systems, nonholonomic systems, and elastic structures exposed to nonconservative forces.

Rewards and Honors

- Outstanding Graduate Teaching Assistant, Department of Aerospace and Mechanical Engineering, The University of Arizona, Spring 2021.

Funded Research Grant

- National Aeronautics and Space Administration (NASA), Collaborative Research, To develop the technologies needed to establish Resilient Extraterrestrial Habitats, \$75,000, Sep1, 2023 - Aug 31, 2024, PI: Shirley Dyke from Purdue University
- Global Development Seed Grant Award (GDSG), Numerical, Analytical, and Experimental Analysis on Improving the Efficiency of the Bladeless Wind Turbine, \$10,000 (50% GDSG & 50% MSU), Jan 1, 2024 - Dec 31, 2024, PI: Mohsen Azimi

Computer Skills

- Proficient in MATLAB and SolidWorks
- Familiar with Ansys, Python, AutoCAD, CATIA, C++

Practical Skills

- Proficient in implementing digital electronic circuits, programming microcontrollers in C and Assembly languages, and software-hardware interface
- Proficient in 3D printing
- Familiar with CNC Machines
- Familiar with Hydraulic and Pneumatic systems
- Familiar with PLC programming, integration, and fault detection

Subject Areas Taught

Graduate level

- Advanced Dynamics, Advanced Vibration, Advanced Control, Digital Control
- Nonlinear Dynamics, Nonlinear Vibration, Nonlinear Control
- Advanced Engineering Analysis, 3D Multibody Dynamic Systems

Undergraduate level

- Dynamic, Dynamics of Machinery, Design of Mechanisms, Mechanical Vibration, Classic Control
- Mechatronics, Robotics, 2D Multibody Dynamic Systems
- Engineering Analysis, Differential Equations, Numerical Methods
- Statics, Engineering Materials, Finite Element Methods

Professional Experiences

Research Experiences

Michael W. Hall School of Mechanical Engineering, Mississippi State University, Starkville, MS, US, 2023 - Current

- Energy harvesting in offshore area, bladeless wind turbine, and rotating systems

School of Mechanical Engineering, Purdue University, West Lafayette, Indiana, US, 2022 - 2023

- Safety Control and Trade Study of a Resilient Deep Space Habitats

Ridgetop Group Inc. 3580 W Ina Rd, Tucson, AZ 85741-2276, US

- Piezoelectric Energy Harvesting in Rotary Machinery, 2021 - 2022
- Real Time Health Monitoring of Geared Systems via Shaft Mounted Wireless Accelerometer, 2018 - 2021

Department of Aerospace and Mechanical Engineering, University of Arizona, Tucson, Arizona, US

- Energy Harvesting in System of Nonlinear Oscillators with Strong Coupling, 2021 - 2022
- Stability and Bifurcation in System of Nonlinear Parametrically Excited Coupled Equations; with Application to Geared Systems, Fall 2018 - 2021
- Dynamic Analysis and Simulation of Nanofiber in Electrospinning Process, Dr. Eniko Enikov, Fall 2016 - 2018

Teaching Experiences

Department of Mechanical Engineering, Mississippi State University, Starkville, Mississippi, US

- Mechatronic Systems, Spring 2024
- Introduction to Vibration and Control, Fall 2023-2024

Department of Aerospace and Mechanical Engineering, University of Arizona, Tucson, Arizona, US

- Control System Design, Summer 2018-19
- Dynamics of Machines, Summer 2018-21
- Mechanical Vibration, IPSA Exchange Program, Fall 2019
- Mechatronics, IPSA Exchange Program, Fall 2017-19
- Mechanical Vibration Lab, IPSA Exchange Program, Fall 2017-19

Teaching Assistant Experiences

Department of Aerospace and Mechanical Engineering, University of Arizona, Tucson, Arizona, US

- Advanced Engineering Analysis, Prof. Barry D. Ganapol, Spring 2022
- Engineering Analysis, Dr. Wane Hacker, Fall 2021
- Control System Design, Prof. Eniko T Enikov, Fall 2020 & Spring 2021
- Advanced Control, IPSA Exchange Program, Prof. Eniko T Enikov, Fall 2019
- Dynamics, Dr. Paul Reverdy, Spring 2019 & Dr. Wayne Hacker, Fall 2020
- Dynamics of Machines. Prof. Erick Butcher, Fall 2018
- Mechatronics, Prof. Eniko T Enikov, Spring 2017-18 & 2020-22
- Numerical Methods, Prof. Barry D. Ganapol, Spring 2017, Fall 2021
- Mechanical Vibrations, Dr. Morad Nazari, Fall 2016

List of Publications

Journal Papers in Progress

- Mohsen Azimi, Alana Lund, Yuguang Fu, Herta Montoya, Luca Vaccino, Murali Krishnan, Seungho Rhee, Leila Chebbo, Adnan Shahriar, Zixin Wang, Amin Maghareh, Shirley J. Dyke, (2023) “HabSim: A Modular Coupled Virtual Testbed for Simulating ExtraTerrestrial Habitat Systems,” *American Institute of Aeronautics and Astronautics*.
- Luca Vaccino, Mohsen Azimi, Shirley J. Dyke, Dawn Whitaker, (2023), “Exploring Contingency Responses to Disruptive Events During Transitions in Deep Space Missions,” *American Institute of Aeronautics and Astronautics*.
- Luca Vaccino, Alana K. Lund, Shirley J. Dyke, Mohsen Azimi “Modelling Disruption, (2023), Detection, Propagation, and Repair for Multi-physics Deep Space Habitat,” *Advances in Engineering Software*.
- Saeid Nazari, Mohsen Azimi, “Bipedal Robot Joint Trajectory Generation for Predetermined ZMP”

Conference Paper in Progress

Journal Papers Published

- R Murali Krishnan, Kairui Hao, Sreehari Manikkan, Jiachen Wang, Chuanyu Xue, Zixu Zhang, Mahira Morris, Mohsen Azimi, Paul Parsons, Song Han, Ilias Bilionis “MCVT-HMS: A Model-based Systems Engineering Testbed for Investigating Situational Awareness and Autonomy for Resilient Deep-space Habitation,” *American Institute of Aeronautics and Astronautics*, 2024
- Zixin Wang, Mohammad R. Jahanshahi, Mohsen Azimi, Shirley J. Dyke, "Sensor Fault Detection in Smart Extraterrestrial Habitats Using Unsupervised Learning," *American Institute of Aeronautics and Astronautics*, 2023
- Mohsen Azimi, “Pitchfork and Hopf Bifurcation of Geared Systems with Nonlinear Suspension in Permanent Contact Regime” *Nonlinear Dynamics. Springer Netherlands*, 2023.
- Mohsen Azimi, “Parametric Stability of Geared Systems with Linear Suspension in Permanent Contact Regime” *Nonlinear Dynamics. Springer Netherlands*, 2022.
- Mohsen Azimi, “Parametric Frequency Analysis of Mathieu-Duffing Equation,” *International Journal of Bifurcation and Chaos*, 2021.
- Mohsen Azimi, “Stability and Bifurcation in Mathieu-Duffing Equation,” *International Journal of Non-Linear Mechanics*, 2022.
- Mohsen Azimi, and M.R. Hairi Yazdi, “Energy Dissipation Rate Control and Parallel Equations Solving Method for Planar Spined Quadruped Bouncing Robot,” *Journal of Mechanical Science and Technology (JMST)*, 2017.
- Mohsen Azimi, and M.R. Hairi Yazdi - “Energy Dissipation Rate Control via a Semi-Analytical Pattern Generation Approach for Planar Three-Legged Galloping Robot based on the Property of Passive Dynamic Walking,” *Journal of Applied Mechanic (JAMECH)*, 2015

Conference Paper Published

- Mohsen Azimi, Nazanin Tajik, Naoufel Ghannami, Ethan Vallerga, Olivia Leatherman, Abel Nettles, Cameron Entremont, Dalila Belaidi, Luca Vaccino, Seungho Rhee, Zixin Wang, Leila Chebbo, Adnan Shahriar, "Challenges in the Decommissioning of a Resilient Smart Deep Space Habitat," *53rd International Conference on Environmental Systems, CES-2024*
- Vaccino, L., Pritchard, K., Azimi, M., Dyke, S., Lund, A. “Simulation-Based Assessment of Hazardous States in a Deep Space Habitat.” *Detection, Propagation, and Repair for Multi-Physics Deep Space Habitat*. 2023
- Azimi, M., Enikov, E. T., Pena, W. “Implementation of Shaft-Mounted Accelerometer in the Local Fault Diagnosis of Geared Systems.” *Society for Experimental Mechanics Annual Conference and Exposition*, (pp. 31-54), 2023
- Mohsen Azimi, and M.R. Hairi Yazdi, “Energy Dissipation Rate Control for Planar Quadruped Bouncing Robot Based on the Property of Passive Dynamic Walking,” *The 2nd RSI International Conference on Robotics & Mechatronics (ICRoM)*, October 15-17, 2014.
- Mohsen Azimi, and M.R. Hairi Yazdi, “Energy Dissipation Rate Control for Planar Biped Walking Robot Based on the Property of Passive Dynamic Walking”, *IMECH2014 - ASME2014 International Mechanical Engineering Congress and Exposition*, Montreal, November 14-20, 2014