

ACADEMIC EMPLOYMENT, EDUCATION, AND TRAINING

- **Research Assistant Professor, Medical Modeling and Simulation** *Jun 2025 - Present*
Old Dominion University, Norfolk, VA

Affiliations:
 - Macon and Joan Brock Virginia Health Sciences, Old Dominion University
 - * National Center for Collaboration in Medical Modeling and Simulation
 - Office of Enterprise Research and Innovation, Old Dominion University
 - * Center for Health, Education, and AI Learning
 - Institute for Engineering in Medicine, Health, and Human Performance, Old Dominion University
- **Postdoctoral Research Associate, Biomedical Engineering** *Apr 2023 - May 2025*
Department of Biomedical Engineering, Lab of Amanda Randles Duke University, Durham, NC
- **Postdoctoral Research Fellow, Department of Pediatrics** *Sep 2022 - Mar 2023*
Herma Heart Institute, Children's Wisconsin, Lab of John LaDisa Medical College of Wisconsin (MCW), Milwaukee, WI
- **Doctoral of Philosophy, Biomedical Engineering** *Dec 2017 - Aug 2022*
Joint Department of Biomedical Engineering, Lab of John LaDisa MCW and Marquette University, Milwaukee, WI
- **Master of Science, Aerospace Engineering** *Sep 2012 - Jan 2015*
Department of Aerospace Engineering, Lab of Ali Abedian Sharif University, Tehran, Iran
- **Bachelor of Science, Mechanical Engineering** *Sep 2007 - Sep 2012*
Department of Mechanical Engineering, Lab of Majid Ghasemi K.N. Toosi University of Technology, Tehran, Iran

HONORS AND AWARDS

- American Heart Association Career Development Award (26CDA1588384) 2026 to 2029, Total funding amount: \$231,000
- Doctoral of Philosophy Outstanding Dissertation Award, MCW Graduate School (2023)
- Diversity Travel Grant for the Summer Biomechanics, Bioengineering, and Biotransport Conference (2019)
- Graduate Student Travel Research Award, BME Department, MU (2019)
- Cardiovascular Center AO Smith Fellowship Scholars Program, Vasculata 2019, MCW (2019)

PUBLICATIONS

1. **Ghorbannia, A**, Azarnoosh J, LaDisa J. Severity and duration-dependent aortic stiffening in a rabbit coarctation model identifies constitutive material parameters as promising regional biomarkers for hypertension progression *Scientific Reports* (2026). [DOI](#)
2. Geddes, JR, Jensen CW, Tanade C, **Ghorbannia A**, Fudim M, Patel M, Randles A. Digital twins for noninvasively measuring predictive markers of right heart failure. *Nature Digital Medicine* (2025). [DOI](#)
3. **Ghorbannia, A.**, Vardhan M., Tanade C., Sadia Khan N., Yousef A., Chi J., Roychowdhury S., Das A., Leopold J., Chi E., Randles A. Simulation-based machine learning for real-time assessment of side-branch hemodynamics in coronary bifurcation lesions. *International Journal of High Performance Computing Applications* (2025). [DOI](#)
4. **Ghorbannia, A.**, Randles, A. Systematic characterization and automated alignment of coronary tree geometries. *2024 46th Annual International Conference of the IEEE Engineering in Medicine and Biology Society (EMBC)*. *IEEE*, **2024**, pp. 1-4. [DOI](#)

5. **Ghorbannia, A.**, Maadooliat, M., Jurkiewicz, H., Nasif, L., Ahmed, A., Co-Vu, J., Woods, R.K., Armstrong A., LaDisa, J.F. Coarctation duration and severity predict risk of hypertension precursors in a preclinical model and hypertensive status among patients. *Hypertension*, **2024**, 81, 5. [DOI](#)
6. **Ghorbannia, A.**, Spearman, A., Sawalhi S., Woods, R.K., Maadooliat M., LaDisa, J.F. A Novel Diastolic Doppler Index Less Affected by Aortic Arch Anomalies Co-existing with Coarctation. **2024**, *Pediatric Cardiology*, [DOI](#)
7. **Ghorbannia, A.**; Maadooliat, M.; Woods, R.K.; Audi, S.H.; Tefft, B.J.; Chiastra, C.; Ibrahim, E.S.H.; LaDisa, J.F. Aortic Remodeling Kinetics in Response to Coarctation-Induced Mechanical Perturbations. *Biomedicine* **2023**, 11, 1817. [DOI](#)
8. **Ghorbannia A.**, LaDisa Jr JF. Intravascular imaging of angioplasty balloon under-expansion during pre-dilation predicts hyperelastic behavior of coronary artery lesions. *Frontiers in Bioengineering and Biotechnology* **2023**, 11, [DOI](#)
9. Azarnoosh, J., **Ghorbannia, A.**, Ibrahim, E.S.H. et al. Temporal evolution of mechanical stimuli from vascular remodeling in response to the severity and duration of aortic coarctation in a preclinical model. *Sci Rep* **2023**, 13, 8352. [DOI](#)
10. LaDisa, J.F., Jr.; **Ghorbannia, A.**; Marks, D.S.; Mason, P.; Otake, H. Advancements and Opportunities in Characterizing Patient-Specific Wall Shear Stress Imposed by Coronary Artery Stenting. *Fluids* **2022**, 7, 325. [DOI](#)
11. **Ghorbannia A.**, Ellepola C.D., Woods R.K., Ibrahim E.H., Maadooliat M., Martinez Ramirez H., LaDisa J.F. Clinical, Experimental, and Computational Validation of a New Doppler-Based Index for Coarctation Severity Assessment. *Journal of the American Society of Echocardiography* **2022**, 35, 12, 1311-1321. [DOI](#)
12. **Ghorbannia A.**, Ellepola C.D., Woods R.K., LaDisa J.F. Validation of a Continuous Flow Pressure Gradient for Coarctation Severity Assessment. *Circulation* **2021**, 144, A10882. [DOI](#)
13. **Ghorbannia Hassankiadeh, A.**, Marks, D. S., and LaDisa, J. F., Jr. Correlation of Computational Instantaneous Wave-Free Ratio With Fractional Flow Reserve for Intermediate Multivessel Coronary Disease. *ASME. J Biomech Eng.* **2021** 143(5): 051011. [DOI](#)
14. **Ghorbannia Hassankiadeh, A.**, Marks, D. S., and LaDisa, J. F., Jr. A computational study assessing threshold criteria for the treatment of left main coronary artery bifurcations containing multiple stenoses. *Biomedical Sciences Instrumentation* **2019** 55(2): 428-35. [DOI](#)
15. Shahidian A.*, **Ghorbannia Hassankiadeh, A.***. Stress analysis of internal carotid artery with low stenosis level: The effect of material model and plaque geometry. *Journal of Mechanics in Medicine and Biology* **2017** 17(6): 1750098. [DOI](#)

In-press

1. **Ghorbannia, A.**, Azarnoosh J., Ladisa J. Severity and duration-dependent aortic stiffening in a rabbit coarctation model identifies constitutive material parameters as promising regional biomarkers for hypertension progression. *In Press - Scientific Reports* (2026).
2. **Ghorbannia A.**, Tanade C., Sadia Khan N., Yousef A., Vardhan, M., Roychowdhury S., Das A., Chi J., Leopold J., Chi E., Randles A. Understanding the Role of Anatomy Physiology Interplay in Hemodynamics Assessment of Coronary Bifurcation Lesions. *Computers Methods and Programs in Biomedicine*
3. Jensen, C. W., **Ghorbannia, A.**, Urick, D., Moya-Mendez, M., Vekstein A. M., Draeger E., Williams A. R., Hughes C. G., Randles A., Predicting Downstream Aneurysmal Degeneration Following Type A Dissection Repair With Computational Fluid Dynamics. *Circulation*

INVITED PANELIST, (SEMI) PLENARY, AND FEATURED SESSIONS

1. Virginia Biomedical Research Diamond Symposium, Cardiometabolic Health: New approaches to obesity, diabetes, metabolic syndrome, and cardiovascular disease session, Richmond, VA (June 2026). "Digital Twin-Guided Prevention of Hypertension in Congenital Heart Disease Survivors"
2. Cardiovascular Research Symposium Bridging Gaps and Advancing Care, Norfolk (2025). "Emerging Technologies in Heart Health: From Bench to Bedside."

INVITED CONFERENCE AND WORKSHOP TALKS (SELECTED)

1. Biomedical Engineering Society, Baltimore, Maryland (2024). "Systematic characterization and automated alignment of coronary tree geometries". *Selected for Poster presentation*
2. Annual International Conference of the IEEE Engineering in Medicine and Biology Society, Orlando, FL (2024). "Systematic characterization and automated alignment of coronary tree geometries". *Selected for Poster presentation*
3. Cardiovascular Center Research Retreat, Milwaukee, WI (2022). "Patient-specific coronary plaque characterization through ex vivo pre-dilation". *One of the two Herman Heart Institute nominees for oral presentation*
4. Herma Heart Institute Quality, Outcomes, and Research Seminar Series, Milwaukee, WI. (2022). "A non-invasive assessment approach to prevent refractory hypertension in coarctation patients after treatment." *Invited for oral presentation*
5. European Solid Mechanics Conference: Galway, Ireland (2022). "Toward material characterization and in vivo validation of human coronary artery plaques for patient-specific prediction of restenosis." *Selected for oral presentation by the abstract committee*
6. Society for Cardiovascular Magnetic Resonance (SCMR) Scientific Session: Fort Lauderdale, FL(2022). "Image-based validation of a new Doppler-based index for coarctation severity assessment." *Selected for oral presentation by the abstract committee*
7. American Heart Association (AHA) Scientific Session, Boston, MA(2021). "Validation of a Continuous Flow Pressure Gradient for Coarctation Severity Assessment." *Selected for poster presentation by the abstract committee*
8. ISMRM & SMRT Annual Meeting & Exhibition: Vancouver, BC, Canada (2021). "Differentiating cardiac function and hemodynamics in treated and untreated models of aortic coarctation". *Selected for oral presentation by the abstract committee*
9. Summer Biomechanics, Bioengineering, and Biotransport Conference, Virtual(2020). "Coronary artery plaque characterization using optical coherence tomography and uniaxial extension testing." *Selected for oral presentation by the abstract committee*
10. 15th US National Congress on Computational Mechanics (USNCCM), Austin, TX(2019). "A Robust Approach for Patient-specific Parameter Estimation of Lumped Coronary Boundary Conditions in a Case of Intermediate Coronary Stenosis." *Selected for oral presentation by the abstract committee*
11. The Summer Biomechanics, Bioengineering and Biotransport Conference, Seven Spring, PA(2019). "Correlation of Computational Instantaneous Wave-free Ratio with Fractional Flow Reserve in The Case of Multiple Intermediate Coronary Artery Stenosis in A Left Main Bifurcation." *Selected for oral presentation by the abstract committee*
12. 6th International Conference of Clinical and Engineering Frontiers in Pediatrics and Congenital Heart Disease: Philadelphia, PA (2019). "Coarctation induced mechanical changes in proximal and distal aorta from an experimental model mimicking the clinical condition." *Selected for oral presentation by the abstract committee*
13. The 56th Annual Rocky Mountain Bioengineering Symposium & the 38th Great Lakes Biomedical Conference, Milwaukee, WI(2019). "A computational study assessing threshold criteria for the treatment of left main coronary artery bifurcation containing multiple stenosis." *Selected for oral presentation by the abstract committee*

POSITIONS AND RESPONSIBILITY

Reviewer: Journal of Biomedical and Health Informatics	May 2026
Reviewer: BMC Medical Education	March 2026
Reviewer: Scientific Reports	2025
Reviewer: Journal of Biomechanics	Aug 2024
Organizer: Computational Health Seminar Series, Duke Center for Computational and Digital Health Innovation	2024
Reviewer: Journal of Computer Methods and Programs in Biomedicine	Jun 2023
Organizer: Duke Computational Biomedicine Seminar Series	2023
Reviewer: ASME Journal of Biomechanical Engineering	Apr 2019

PROFESSIONAL AFFILIATIONS

IEEE: Engineering in Medicine and Biology Society	<i>2023-present</i>
AHA/ASA Member: Council of Atherosclerosis, Thrombosis and Vascular Biology	<i>2019-Present</i>
AHA/ASA Member: International Atherosclerosis Society	<i>2019-Present</i>
American Society of Mechanical Engineering:	<i>2019</i>