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EDUCATION

University of Pennsylvania, Philadelphia, PA — Dec. 2014
Ph.D., Mechanical Engineering and Applied Mechanics
Dissertation: "Overall Mechanical Response of Soft Composite Materials with Particulate Microstructure at Finite Strains"
Advisor: Dr. Pedro Ponte Castañeda

Sharif University of Technology, Tehran, Iran — Dec. 2007
M.Sc., Mechanical Engineering and Applied Mechanics
Dissertation: "Size-Dependent Behavior of Solids Containing Nano-Inhomogeneities"

Iran University of Science and Technology, Tehran, Iran — May 2005
B.Sc., Mechanical Engineering
Dissertation: "Wave Propagation in Dissipative Porous Media"

ACADEMIC APPOINTMENTS

Assistant Professor

Texas A&M University, College Station, TX
Department of Biomedical Engineering — Jan. 2020-Present
Department of Mechanical Engineering (Courtesy Appt) — Sep. 2020-Present
School of Engineering Medicine, EnMed (Courtesy Appt) — Sep. 2023-Present

Adjunct Assistant Professor

Houston Methodist Academic Institute, Houston, TX
Department of Cardiovascular Sciences — Oct. 2020-Present

University of Texas at Austin, Austin, TX — Oct. 2014-Dec. 2019
Willerson Center for Cardiovascular Modeling and Simulation
Oden Institute for Computational Engineering and Sciences
Mentor: Dr. Michael S. Sacks

- **Research Scientist** — Oct. 2018-Dec. 2019
- **Research Associate** — Sep. 2016-Sep. 2018
- **Postdoctoral Fellow** — Oct. 2014-Aug. 2016

Lecturer

University of Texas at Austin, Austin, TX — Jan. 2017-May 2017
Department of Aerospace Engineering & Engineering Mechanics

Lecturer

University of Damavand, Damavand, Iran — Jan. 2009-Aug. 2009

RESEARCH INTERESTS

- Biomechanics of Cardiac Remodeling & Regeneration in Structural Heart Diseases
- Integrated 4D Imaging-Modeling to Personalize Cardiac Diagnosis, Prognosis, and Interventions
- Machine Learning in Cardiovascular and Respiratory Biomechanics and Mechanobiology
- Lung Biomechanics and Heart-Lung Interaction in Cardiopulmonary Diseases
- Integrated Biomechanics-Energetic Study of Cardiometabolic Diseases

HONORS & AWARDS

- Cain Developmental Faculty Fellow, Biomedical Engineering Department, Texas A&M University, 2023
- 2nd Place Poster- Society of South Asian Heart Research, AHA-BCVS, Chicago, 2022
- American Heart Association- Basic Cardiovascular Sciences (BCVS) Abstract Travel Grant, 2021
- American Heart Association- Basic Cardiovascular Sciences Early Career Mentorship Award, 2020
- NIH Pathway to Independence K99/R00 Award, 2018
- American Heart Association Career Development Award, 2018
- Travel Award, 14th U.S. National Congress on Computational Mechanics, Montreal, 2017
- NIH Ruth L. Kirschstein NRSA Postdoctoral Fellowship, 2016
- Fondren Foundation Postdoctoral Fellowship, 2014-2015
- NSF Travel Grant, NSF CMMI Conference, Northeastern University, 2012

PEER-REVIEWED PUBLICATIONS

A. JOURNAL PAPERS

68. V. Naeini, E. Mendiola, A. Rafsanjani, F. Coulter, Q. Xiang, J. Zhang, P. Vanderslice, V. Serpooshan*, and **R. Avazmohammadi***. A computational journey toward an optimal design for metamaterial epicardial sleeves. Preprint on *ResearchGate*, 2025. *Co-corresponding authors.

67. T. Mukherjee, M. Amoli, S. Rezapourdamanab, L. Shammas, M. Tomov, E. Mendiola, V. Serpooshan*, and **R. Avazmohammadi***. Computational Modeling Meets 3D Bioprinting: Emerging Synergies in Cardiovascular Disease Modeling. *Submitted*. *Co-corresponding authors.

66. E. Mendiola, B. Walther, A. Mojiri, J. Cooke, J. Ohayon, R. Pettigrew*, and **R. Avazmohammadi***. Optimal design for multi-compartment cell elasticity estimation using AFM and super-resolution imaging. Preprint on *ResearchGate*, 2025. *Co-corresponding authors.

65. S. Neelakantan, K. Myers, R. Rizi, B. Smith, and **R. Avazmohammadi**. An image-based biophysical model of the lung to investigate the effect of pulmonary surfactant on lung function. *bioRxiv* 2025.02.15.638361.

64. S. Peighambari, T. Mukherjee, E. Mendiola, A. Darwish, L. Timmins, R. Pettigrew, D. Shah, and, **R. Avazmohammadi**. Computational modeling of left ventricular flow using PC-CMR-derived four-dimensional wall motion. *bioRxiv* 2024.08.27.609991.

63. S. Neelakantan, K. Myers, and **R. Avazmohammadi**. Physics-informed dynamic CT phantom of human lungs: Generation, evaluation, and refinement. *Journal of Biomedical Engineering*, 2025.

62. T. Mukherjee, M. Keshavarzian, E. Fugate, V. Naeini, A. Darwish, J. Ohayon, K. Myers, D. Shah, D. Lindquist, S. Sadayappan, R. Pettigrew, and **R. Avazmohammadi**. Complete spatiotemporal quantification of cardiac motion in mice through multi-view magnetic resonance imaging and super-resolution reconstruction. *Scientific Reports*, 2025.

61. S. Neelakantan, E. Mendiola, B. Zambrano, A. Vang, K. Myers, P. Zhang, G. Choudhary*, and **R. Avazmohammadi***. Dissecting contributions of pulmonary arterial remodeling to right ventricular afterload in pulmonary hypertension. *Bioengineering & Translational Medicine*, 2025. *Co-corresponding authors.

60. R. Mehdi, N. Kadivar, T. Mukherjee, E. Mendiola, D. Shah, G. Karniadakis*, and **R. Avazmohammadi***. Non-invasive diagnosis of chronic myocardial infarction via composite in-silico-human data learning. *Advanced Science*, 2025. *Co-corresponding authors.

59. T. Mukherjee, S. Elliott, N. Manikandan, T.J. Higgins, Y. Zhong, S. Montalvo, D. Saha, J. Wansapura, **R. Avazmohammadi***, and P. Alluri*. Principal strain analysis for early detection of radiation-induced cardiotoxicity in a mouse model. *International Journal of Radiation Oncology, Biology, Physics*. In Press. 2025. *Co-corresponding authors.

58. S. Neelakantan, A. Vang, R. Mehdi, H. Phelan, T. Imran, P. Zhang, G. Choudhary*, **R. Avazmohammadi***. Right ventricular stiffening and anisotropy alterations in pulmonary hypertension: Mechanisms and relations to right heart failure. *Journal of the American Heart Association*, 2025. *Co-corresponding authors.

57. T. Mukherjee, M. Usman, E. Fugate, D. Lindquist, S. Sadayappan, R. Pettigrew, and **R. Avazmohammadi**. In-silico heart model phantom to validate cardiac strain imaging. *Computers in Biology and Medicine*, 181, 2024.

56. D. Christian, M. Tomov, H. Chen, S. Nama, S.A., S. Neelakantan, **R. Avazmohammadi**, L.P. Dasi, H. Bauser-Heaton, and V. Serpooshan. "Patient-specific 3d in vitro modeling and fluid dynamic analysis of primary pulmonary vein stenosis. *Frontiers in Cardiovascular Medicine*, 11: 1432784, 2024.

55. L. Ning, S. Zanella, M. Tomov, L. Jin, B. Hwang, M. Saadeh, H. Chen, S. Neelakantan, L. Dasi, **R. Avazmohammadi**, M. Mahmoudi, H. Bauser-Heaton, and V. Serpooshan. Targeted rapamycin delivery via magnetic nanoparticles to address stenosis in a 3D bioprinted in vitro model of pulmonary veins. *Advanced Science*, 2400476, 2024.

54. E. Mendiola, S. Neelakantan, Q. Xiang, S. Xia, J. Zhang, V. Serpooshan, P. Vanderslice*, and **R. Avazmohammadi***. An image-driven micromechanical approach to characterize multiscale remodeling in infarcted myocardium. *Acta Biomaterialia*, 173, 109–122, 2024. *Co-corresponding authors.

53. B. Walther, A. Sears, A. Mojiri, **R. Avazmohammadi**, J. Gu, O. Chumakova, N. Rajeeva, A. Dominic, J. Martiel, S. Yazdani, J. Cooke, J. Ohayon, R. Pettigrew. Disrupted stiffness ratio alters nuclear mechanosensing. *Matter*, 6, 3608-3630, 2023.

52. R. Mehdi, M. Kumar, E. Mendiola, S. Sadayappan, and **R. Avazmohammadi**. Machine learning-based classification of cardiac cell relaxation impairment using calcium and sarcomere length transients. *Computers in Biology and Medicine*, 163, 107134, 2023.

51. D. Li, E. Mendiola, **R. Avazmohammadi**, F. Sachse, and M. Sacks. A multi-scale computational model for the passive mechanical behavior of right ventricular myocardium. *Journal of the Mechanical Behavior of Biomedical Materials*, 142, 105788, 2023.

50. S. Neelakantan, M. Kumar, H. Phelan, E. Mendiola, V. Serpooshan, S. Sadayappan, and **R. Avazmohammadi**. Multiscale characterization of left ventricle active behavior in the mouse. *Acta Biomaterialia*, 162, 240–253, 2023.

49. E. Mendiola, D. da Silva Gonçalves Bos, D. Leichter, A. Vang, P. Zhang, O. Leary, R. Gilbert, **R. Avazmohammadi***, Gaurav Choudhary*. Right ventricular architectural remodeling and functional adaptation in pulmonary hypertension. *Circulation: Heart Failure*, 16(2), e009768, 2023. *Co-corresponding authors.

48. E. Mendiola, S. Neelakantan, Q. Xiang, S. Merchant, K. Li, E.W. Hsu, R.A.F. Dixon, P. Vanderslice, and **R. Avazmohammadi**. Contractile adaptation of the left ventricle post-myocardial infarction: Predictions by rodent-specific computational modeling. *Annals of Biomedical Engineering*, 51, 846–863, 2023.

47. W. Liu, K.M. Labus, M. Ahern, K. LeBar, **R. Avazmohammadi**, C.M. Puttlitz, and Z. Wang. Strain-dependent stress relaxation behavior of healthy right ventricular free wall. *Acta Biomaterialia*, 152, 290-299, 2022.

46. S. Neelakantan, Y. Xin, D.P. Gaver, M. Cereda, R. Rizi, B.J. Smith, and **R. Avazmohammadi**. Computational lung modeling in respiratory medicine. *Journal of the Royal Society Interface*, 19, 20220062, 2022.

45. W. Liu, M. Nguyen-Truong, K. LeBar, K.M. Labus, E. Gray, M. Ahern, S. Neelakantan, **R. Avazmohammadi**, K.C. McGilvray, C.M. Puttlitz, and Z. Wang. Multiscale contrasts between the right and left ventricle biomechanics in healthy adult sheep and translational implications. *Frontiers in Bioengineering and Biotechnology*, 10, 2022.

44. E.A. Mendiola, M.S. Sacks, and **R. Avazmohammadi**. Mechanical interaction of the pericardium and cardiac function in the normal and hypertensive rat heart. *Frontiers in Physiology*, 838, 2022.

43. C.W. Patrick, J. Machek, **R. Avazmohammadi**, D.L. Alge, C.W. Peak, and M. McShane. Process for faculty-driven, data-informed curriculum continuity review in biomedical engineering. *Biomedical Engineering Education*, 1-16, 2022.

42. H. Babaei, E.A. Mendiola, S. Neelakantan, Q. Xiang, A. Vang, R.A.F. Dixon, D.J. Shah, P. Vanderslice, G. Choudhary, and **R. Avazmohammadi**. A machine learning model to estimate myocardial stiffness from EDPVR. *Scientific Reports*, 12, 1-17, 2022.

41. D.J. Talluri, H. Nguyen, **R. Avazmohammadi***, and A.K. Miri*. Ink rheology regulates stability of bioprinted strands. *Journal of Biomechanical Engineering*, 144, 074503, 2022. *Co-corresponding authors.

40. A.J. Clevenger, L.Z. Crawford, D. Noltensmeyer, H. Babaei, S.B. Mabbott, **R. Avazmohammadi**, and S. Raghavan. Rapid prototypable biomimetic peristalsis bioreactor capable of concurrent shear and multi-axial strain. *Cells, Tissues, Organs*, 212, 96-110, 2022.

39. H. Liu, J. Soares, J. Walmsley, D. Li, S. Raut, **R. Avazmohammadi**, P. Iaizzo, M. Palmer, J. Gorman, R. Gorman, and M. Sacks. The impact of myocardial compressibility on organ-level simulations of the normal and infarcted heart. *Scientific Reports*, 11, 1-15, 2021.

38. M. Tomov, P. Lilanni, N. Liqun, C. Huang, J. Bowen, M. Andrew, I. Sahar, A. Theus, G. Kabboul, K. Do, S. Bhamidipati, J. Fischbach,K. McCoy,B. Zambrano, J. Zhang, **R. Avazmohammadi**, A. Mantalaris, D. Frakes, L. Dasi, B. Lindsey, H. Bauser-Heaton, and V. Serpooshan. A 3D bioprinted in vitro model of pulmonary artery atresia to evaluate endothelial cell response to microenvironment. *Advanced Healthcare Materials*, e2100968, 2021.

37. A. Cetnar, M. Tomov, L. Ning, B. Jing, A. Theus, A. Kumar, A. Wijntjes, S. Bhamidipati, K. Do, A. Mantalaris, J. Oshinski, **R. Avazmohammadi**, B. Lindsey, H. Bauser-Heaton, and V. Serpooshan. Patient-specific 3D bioprinted models of developing human heart. *Advanced Healthcare Materials*, e2001169, 2020.

36. D. Li, **R. Avazmohammadi**, J. Gorman, R. Gorman, and M. Sacks. How hydrogel inclusions modulate the local mechanical response in early and fully formed post-infarcted myocardium. *Acta Biomaterialia*, 114, 296-306, 2020.

35. **R. Avazmohammadi**, J. Soares, D. Li, T. Eperjesi, J. Pilla, R. Gorman, and M. Sacks. On the in-vivo systolic compressibility of left ventricular free wall myocardium in the normal and infarcted heart. *Journal of Biomechanics*, 109767, 2020.

34. D. Li, **R. Avazmohammadi**, J. Gorman, R. Gorman, and M. Sacks. Insights into the passive mechanical behavior of left ventricular myocardium using a robust constitutive model based on full 3D kinematics. *The Journal of the Mechanical Behavior of Biomedical Materials*, 103, 103508, 2020.

33. **R. Avazmohammadi**, E. Mendiola, D. Li, P. Vanderslice, R. Dixon, and M. Sacks. Interactions between structural remodeling and hypertrophy in right ventricle in response to pulmonary arterial hypertension. *Journal of Biomedical Engineering*, 141, 091016, 2019.

32. **R. Avazmohammadi**, J. Soares, D. Li, S. Raut, R. Gorman, and M. Sacks. Contemporary biomechanical models of myocardium. *Annual Review of Biomedical Engineering*, 21, 417-442, 2019.

31. **R. Avazmohammadi**, E. Mendiola, J. Soares, D. Li, Z. Chen, S. Merchant, E. Hsu, P. Vanderslice, R. Dixon, and M. Sacks. A computational cardiac model for the adaptation to pulmonary arterial hypertension in the rat. *Annals of Biomedical Engineering*, 47, 138-153, 2019.

30. **R. Avazmohammadi**, D. Li, T. Leahy, E. Shih, J. Soares, J. Gorman, R. Gorman, and M. Sacks. An integrated inverse model-experimental approach to determine soft-tissue three-dimensional constitutive parameters: Application to post-infarcted myocardium. *Biomechanics and Modeling in Mechanobiology*, 17, 31-53, 2018.

29. S. Jang, R. Vanderpool, **R. Avazmohammadi**, E. Lapshin, T. Bachman, M. Sacks, and M. Simon. Relating biomechanical and hemodynamic measures of right ventricular diastolic function: Translating tissue biomechanics to clinical relevance. *Journal of the American Heart Association*, 6(9), e006084, 2017.

28. **R. Avazmohammadi**, M. Hill, M. Simon, and M. Sacks. Transmural remodeling of right ventricular myocardium in response to pulmonary arterial hypertension. *APL Bioengineering*, 1(1) 016105, 2017.

27. **R. Avazmohammadi** and R. Hashemi. Effect of a herringbone mesostructure on the electromechanical properties of piezofiber composites for energy harvesting applications. *Physical Review Applied*, 7, 024017, 2017.

26. **R. Avazmohammadi**, M. Hill, M. Simon, W. Zhang and M. Sacks. A novel constitutive model for passive right ventricular myocardium: Evidence for direct myo-collagen fiber mechanical coupling. *Biomechanics and Modeling in Mechanobiology*, 16, 561-581, 2017.

25. **R. Avazmohammadi** and P. Ponte Castañeda. Macroscopic rheological behavior of suspensions of soft solid particles in yield stress fluids. *Journal of Non-Newtonian Fluid Mechanics*, 234, 139-161, 2016.

24. M. Agoras, **R. Avazmohammadi** and P. Ponte Castañeda. Incremental variational procedure for elasto-viscoplastic composite and application to polymer- and metal-matrix composites reinforced by spheroidal elastic particles. *International Journal of Solids and Structures*, 97-98, 668-686, 2016.

23. **R. Avazmohammadi** and P. Ponte Castañeda. Macroscopic constitutive relations for elastomers reinforced with short aligned fibers: instabilities and post-bifurcation response. *Journal of the Mechanics and Physics of Solids*, 97, 37-67, 2016.

22. **R. Avazmohammadi** and P. Ponte Castañeda. The rheology of non-dilute dispersions of highly deformable viscoelastic particles in Newtonian fluids. *Journal of Fluid Mechanics*, 763, 386-432, 2015.

21. A.K. Miri, N.Y.K. Li, **R. Avazmohammadi**, S.L. Thibeault, R. Mongrain, L. Mongeau. Study of extracellular matrix in vocal fold biomechanics using a two-phase model. *Biomechanics and Modeling in Mechanobiology*, 14, 49-57, 2015.

20. M.H. Siboni, **R. Avazmohammadi**, P. Ponte Castañeda. Electro-mechanical instabilities in fiber-constrained, dielectric-elastomer composites subjected to all-around dead loading. *Mathematics and Mechanics of Solids*, 1-31, 2014.

19. **R. Avazmohammadi** and P. Ponte Castañeda. On the macroscopic response, microstructure evolution, and macroscopic stability of short-fiber-reinforced elastomers at finite strains: I—Analytical results. *Philosophical Magazine*, 94, 1031-1067, 2014.

18. **R. Avazmohammadi** and P. Ponte Castañeda. On the macroscopic response, microstructure evolution, and macroscopic stability of short-fiber-reinforced elastomers at finite strains: II—Representative examples. *Philosophical Magazine*, 94, 1068-1094, 2014.

17. R. Hashemi and **R. Avazmohammadi**. Surface effects on the stability of nanorings under uniform pressure. *Journal of Applied Physics*, 114, 144307, 2013.

16. **R. Avazmohammadi**, R. Naghdabadi. Effective behavior of porous elastomers containing aligned spheroidal voids. *Acta Mechanica*, 112, 1901-1915, 2013.

15. **R. Avazmohammadi** and P. Ponte Castañeda. Tangent second-order estimates for the large-strain, macroscopic response of particle-reinforced elastomers. *Journal of Elasticity*, 112, 139-183, 2013.

14. J.E. Jam, Y. Mirzaei, B. Gheshlaghi and **R. Avazmohammadi**. Size-dependent free vibration analysis of infinite nanotubes using elasticity theory. *Journal of Mechanics of Materials and Structures*, 7, 137-144, 2012.

13. A.K. Miri, **R. Avazmohammadi** and F. Yang. Effect of surface stress on the deformation of an elastic half-plane containing a nano-cylindrical hole under a surface loading. *Journal of Computational and Theoretical Nanoscience*, 8, 231-236, 2011.

12. **R. Avazmohammadi**, R. Hashemi, H.M. Shodja, and M.H. Kargarnovin. Ellipsoidal domain with piecewise non uniform eigenstrain field in one of joined isotropic half-spaces. *Journal of Elasticity*, 98, 117-40, 2010.

11. T. Goudarzi, **R. Avazmohammadi**, R. Naghdabadi. Surface energy effects on the yield strength of nanoporous materials containing nanoscale cylindrical voids. *Mechanics of Materials*, 42, 852-62, 2010.

10. S. Abbasion, A. Rafsanjani, **R. Avazmohammadi**, and A. Farshidianfar. Free vibration of microscaled Timoshenko beams. *Applied Physics Letters*, 95, 143122, 2009.

9. **R. Avazmohammadi**, R. Naghdabadi and G.W. Weng. Finite anti-plane shear deformation of nonlinear composites reinforced by elliptic fibers. *Mechanics of Materials*, 41, 868-877, 2009.

8. **R. Avazmohammadi**, F. Yang and S. Abbasion. A nanosized inclusion in an elastic half-plane with interface stress. *International Journal of Solids and Structures*, 46, 2897-2906, 2009.

7. R. Hashemi, **R. Avazmohammadi**, H.M. Shodja and G.W. Weng. Composites with superspherical inhomogeneities. *Philosophical Magazine Letters*, 89, 439-51, 2009.

6. M. Hasheminejad and **R. Avazmohammadi**. Size-dependent effective dynamic properties of unidirectional nanocomposites with interface energy effects. *Composites Science and Technology*, 65, 2538-46, 2009.

5. **R. Avazmohammadi** and R. Naghdabadi. Strain energy-based homogenization of nonlinear elastic particulate composites. *International Journal of Engineering Science*, 47, 1038-48, 2009.

4. S.M. Hasheminejad and **R. Avazmohammadi**. Dynamic stress concentrations in lined twin tunnels within fluid-saturated soil. *Journal of Engineering Mechanics* (*ASCE*), 134, 542-554, 2008.

3. S.M. Hasheminejad and **R. Avazmohammadi**. Elastic wave scattering in porous unidirectional fiber-reinforced composites. *Journal of Reinforced Plastics and Composites*, 26, 495-517, 2007.

2. S.M. Hasheminejad and **R. Avazmohammadi**. Harmonic wave diffraction by two circular cavities in a poroelastic formation. S*oil Dynamics and Earthquake Engineering*, 27, 29-41, 2007.

1. S.M. Hasheminejad and **R. Avazmohammadi**. Acoustic diffraction by a pair of poroelastic cylinders. *Journal of Applied Mathematics and Mechanics* (*ZAMM*), 86, 589-605, 2006.

B. PROCEEDINGS PAPERS

27. S. Neelakantan, T. Mukherjee, K. Myers, and **R. Avazmohammadi**. An in-silico lung phantom to assess the performance of pulmonary artery segmentation using angiogram. In *2025 47th Annual International Conference of the IEEE Engineering in Medicine & Biology Society* (*EMBC*), 1-4, IEEE, 2025.

26. R. Mehdi, S. Sahoo, S. Neelakantan, K. Myers, S. Sadayappan, and **R. Avazmohammadi**. An in-silico lung phantom to assess the performance of pulmonary artery segmentation using angiogram. In *2025 47th Annual International Conference of the IEEE Engineering in Medicine & Biology Society* (*EMBC*), 1-4, IEEE, 2025.

25. E. Mendiola, Q. Xiang, V. Serpooshan, K. Myers, P. Vanderslice, and **R. Avazmohammadi**. Progressive microstructural remodeling in the infarcted left ventricle analyzed by diffusion tensor MRI.

In *International Conference on Functional Imaging and Modeling of the Heart*, Springer, Cham, 21-30, 2025.

24. R. Mehdi, N. Kadivar, V. Serpooshan, K. Myers, G. Karniadakis, and **R. Avazmohammadi**. Towards non-invasive estimation of myocardial scar stiffness from cardiac strains using deep learning. In *International Conference on Functional Imaging and Modeling of the Heart*, Springer, Cham, 420-429, 2025.

23. S. Neelakantan, D. Pinto, R.R. Mehdi, S.B. Peighambari, K. Myers, and **R. Avazmohammadi**. Intracardiac hemodynamics alteration in myocardial infarction. In *International Conference on Functional Imaging and Modeling of the Heart*, Springer, Cham, 430-441, 2025.

22. T. Mukherjee, S. Neelakantan, C. Tong, and **R. Avazmohammadi**. Four-dimensional speckle tracking for strain imaging in mice. In *Medical Imaging 2025: Ultrasonic Imaging and Tomography*, 1341208, SPIE, 2025.

21. S. Neelakantan, M. Ismail, L. Loza, T. Mukherjee, K. J. Myers, R. Rizi, and **R. Avazmohammadi**. 4DCT-derived lung kinematics in a rodent model of radiation-induced lung injury. In *Medical Imaging 2025: Image-Guided Procedures, Robotic Interventions, and Modeling*, 134082I, SPIE, 2025.

20. S. Peighambari, T. Mukherjee, V. Naeini, D. Shah, and **R. Avazmohammadi**. Role of mitral inflow and wall motion in the left ventricular vortices. In *Medical Imaging 2025: Clinical and Biomedical Imaging*, 1341027, SPIE, 2025.

19. V. Naeini, S. B. Peighambari, R. R. Mehdi, E. Mendiola, T. Mukherjee, and **R. Avazmohammadi**. Effects of scar architecture on cardiac strains in myocardial infarction. *In Medical Imaging 2025: Image-Guided Procedures, Robotic Interventions, and Modeling*, 134082L, SPIE, 2025.

18. T. Mukherjee, E. Mendiola, Q. Xiang, X. Zhang, K. Li, P. Vanderslice, and **R. Avazmohammadi**. Torsional adaptations in the left ventricle post-myocardial infarction. In *2024 Computing in Cardiology (CinC)*, 51, IEEE, 2024.

17. S. Peighambari, T. Mukherjee, R. Mehdi, E. Mendiola, and **R. Avazmohammadi**. Estimating pulmonary arterial pressure differences using integrated machine learning-computational fluid dynamics. In *2024 Computing in Cardiology (CinC)*, 51, IEEE, 2024.

16. V. Naeini, T. Mukherjee, S. Peighambari, E. Mendiola, D. Shah, and **R. Avazmohammadi**. A CMR-based study of torsional behavior of left ventricle post-mitral valve repair surgery. In *2024 Computing in Cardiology (CinC)*, 51, IEEE, 2024.

15. S. Peighambari, T. Mukherjee, E. Mendiola, F. Nezami, A. Darwish, D. Shah, and **R. Avazmohammadi**. Left ventricular hemodynamics: Pre versus post mitral valve prolapse repair. In *2024 46th Annual International Conference of the IEEE Engineering in Medicine & Biology Society* (*EMBC*), 1-4, IEEE, 2024.

14. T. Mukherjee, S. Neelakantan, K. Myers, C. Tong, and **R. Avazmohammadi**. Synthetic ultrasound images to benchmark echocardiography-based biomechanics. In *2024 46th Annual International Conference of the IEEE Engineering in Medicine & Biology Society* (*EMBC*), 1-4, IEEE, 2024.

13. V. Naeini, E. Mendiola, R. Mehdi, P. Vanderslice, V. Serpooshan, and **R. Avazmohammadi**. Multi-material cardiac sleeves with variable stiffness enhance regional strain markers. In *2024 46th Annual*

International Conference of the IEEE Engineering in Medicine & Biology Society (*EMBC*), 1-4, IEEE, 2024.

12. R. Mehdi, E. Mendiola, V. Naeini, G. Choudhary, **R. Avazmohammadi**. Does EDPVR represent myocardial tissue stiffness? Toward a better definition. In *2024 46th Annual International Conference of the IEEE Engineering in Medicine & Biology Society* (*EMBC*), 1-4, IEEE, 2024.

11. S. Neelakantan, T. Mukherjee, K. Myers, R. Rizi, and **R. Avazmohammadi**. Physics-informed motion registration of lung parenchyma across static CT images. In *2024 46th Annual International Conference of the IEEE Engineering in Medicine & Biology Society* (*EMBC*), 1-4, IEEE, 2024.

10. E. Mendiola, R. Mehdi, D. Shah, and **R. Avazmohammadi**. On in-silico estimation of left ventricular end-diastolic pressure from cardiac strains. In *2024 46th Annual International Conference of the IEEE Engineering in Medicine & Biology Society* (*EMBC*), 1-4, IEEE, 2024.

9. T. Mukherjee, E. Mendiola, S. Neelakantan, D. Shah, and **R. Avazmohammadi**. Four-dimensional assessment of left ventricular torsion using cardiac magnetic resonance imaging. In *Medical Imaging 2024: Image Processing*, 129260E, SPIE, 2024.

8. S. Neelakantan, T. Mukherjee, B. Smith, K. Myers, R. Rizi, **R. Avazmohammadi**. In-silico four-dimensional CT lung phantom generated from finite-element simulations, In *Medical Imaging 2024: Image-Guided Procedures, Robotic Interventions, and Modeling*, 1292829, SPIE 2024.

7. M. Usman, E. Mendiola, T. Mukherjee, R. Mehdi, J. Ohayon, P. Alluri, S. Sadayappan, G. Choudhary, **R. Avazmohammadi**. On the possibility of estimating myocardial fiber architecture from cardiac strains. In *International Conference on Functional Imaging and Modeling of the Heart*, Springer International Publishing, 74-83, 2023.

6. E. Mendiola, E. Wang, A. Leatherman, Q. Xiang, S. Neelakantan, P. Vanderslice, and **R. Avazmohammadi**. A micro-anatomical model of the infarcted left ventricle border zone to study the influence of collagen undulation. In *International Conference on Functional Imaging and Modeling of the Heart*, Springer International Publishing, 34-43, 2023.

5. T. Mukherjee, S. Neelakantan, G. Choudhary, and **R. Avazmohammadi**. Improved right ventricular strain estimation in rats using anisotropic diffusion filtering. In *Medical Imaging 2023: Ultrasonic Imaging and Tomography*, 12470, 419-425, SPIE, 2023.

4. S. Neelakantan, M.K. Ismail, T. Mukherjee, B.J. Smith, R. Rizi, and **R. Avazmohammadi**. Volumetric versus distortional deformation in rat lungs. In *Medical Imaging 2023: Image-Guided Procedures, Robotic Interventions, and Modeling*, 12466, 419-425, SPIE, 2023.

3. M. Keshavarzian, E. Fugate, S. Chavan, V. Chu, M. Arif, D. Lindquist, S. Sadayappan, and **R. Avazmohammadi**. An image registration framework to estimate 3D myocardial strains from cine cardiac MRI in mice. In *International Conference on Functional Imaging and Modeling of the Heart*, Proceedings, 273-284, Springer International Publishing, 2021.

2. D. Li, E. Mendiola, **R. Avazmohammadi**, F. Sachse, and M. Sacks. A high-fidelity 3D micromechanical model of ventricular myocardium. In *International Conference on Functional Imaging and Modeling of the Heart,* Proceedings, 168-177, Springer International Publishing, 2021.

1. B. Jing, M. Tomov, A. Wijntjes, S. Bhamidipati, **R. Avazmohammadi**, H. Bauser-Heaton, V. Serpooshan, L. Brooks. Synthesis of ultrasound-compatible linear heart tube phantom using water-soluble 3D printed model for 3D ultrasound flow velocimetry. In *2020 IEEE International Ultrasonics Symposium (IUS)*, 1-4, IEEE, 2020.

C. Book Chapters

1. R. Mehdi, E. Mendiola, A. Sears, J. Ohayon, G. Choudhary, R. Pettigrew, and **R. Avazmohammadi**. Comparison of three machine learning methods to estimate myocardial stiffness. In *Reduced-order Models for the Biomechanics of Living Organs*, 363-382, Elsevier, 2023.

D. Abstracts

29. T. Mukherjee, S. Venketegowda, C. Tong, M. Choudhury, and **R. Avazmohammadi**. Integrated mechano-metabolic measures of diastolic function in mice. *Circulation Research*, Suppl_1, Accepted, 2025.

28. S. Neelakantan, Q. Xiang, X. Zhang, P. Vanderslice, and **R. Avazmohammadi**. Stretch-dependency of the left ventricular viscoelasticity in myocardial infarction. *Circulation Research*, Suppl_1, Accepted, 2025.

27. R. Mehdi, S. Neelakantan, Q. Xiang, X. Zhang, P. Vanderslice, and **R. Avazmohammadi**. Impact of myocardial infarction severity on biomechanical remodeling of the left ventricle. *Circulation Research*, Suppl_1, Accepted, 2025.

26. L. Jin, S. Neelakantan, S. Fineman, R. Nandwani, **R. Avazmohammadi**, and V. Serpooshan. Flow-regulated pathogenesis of hypoplastic left heart syndrome in a 3D bioprinted human heart tube. *Circulation Research*, Suppl_1, Accepted, 2025.

25. S. Neelakantan, K. N. Zimmel, T. Waters, M. Golding, and **R. Avazmohammadi**. Alterations in placental vascular formation in parental alcohol exposure. Physiology 40(S1), 1154, 2025.

24. T. Imran, D. Arcuri, E. Mendiola, **R. Avazmohammadi**, C. Nguyen, J. Gillotti, M. Atalay, W.C. Wu, and G. Choudhary. The association between strain, myofiber orientation, and functional outcomes in heart failure with preserved ejection using CMR feature tracking and diffusion tensor imaging. *Journal of Cardiovascular Magnetic Resonance*, 27, Supplement 1, 101269, 2025.

23. S. Neelakantan, E. Mendiola, R. Mehdi, Q. Xiang, X. Zhang, K. Myers, P. Vanderslice, and **R. Avazmohammadi**. Role of left ventricular anisotropy in the outcome of myocardial infarction: Insights from a rodent model. *Circulation* (Suppl_1), A4146917, 2024.

22. T. Mukherjee, S. Elliott, T.J. Higgins, J. Wansapura, P. Alluri, and **R. Avazmohammadi**. Integrated analysis of ex-vivo biomechanical ventricular remodeling and imaging-based in-vivo strain changes in a pre-clinical murine model of radiation-induced cardiotoxicity. *Circulation Research*, 135 (Suppl_1), AMo024, 2024.

21. S. Neelakantan, R. Mehdi, W. Xiang, X. Zhang, P. Vanderslice, and **R. Avazmohammadi**. Viscoelastic remodeling of the left ventricular myocardium in myocardial infarction. *Circulation Research*, 135 (Suppl_1), ATu048, 2024.

20. S. Rezapourdamanab, Y. Singh, S. Norton, B. Hwang, L. Jin, M. Amoli, S. Karnik, **R. Avazmohammadi**, S. Neelakantan, L. Dasi, R. Romero, H. Bauser Heaton, and V. Serpooshan. Fontan-associated liver disease on a chip. *Circulation Research*, 135 (Suppl_1), AMo089, 2024.

19. R. Ghosh, K. Wong, K. Yaeger, G. Britz, S. Wong, and **R. Avazmohammadi**. Enhanced deep learning approach for multi-class segmentation of carotid bifurcation in digital subtraction angiography roadmaps. *Journal of Vascular Surgery*, 79, e192-e193, 2024.

18. S. Neelakantan, E. Manning, P. Zhang, G. Choudhary, and **R. Avazmohammadi**. Right ventricular myocardial stiffening is associated with pulmonary arterial stiffening in pulmonary hypertension. *Circulation*, 148 (Suppl_1), A14407, 2023.

17. R. Mehdi, S. Neelakantan, E. Wang, P. Zhang, G. Choudhary, and **R. Avazmohammadi**. Contractile adaptation of the right ventricular myocardium in pulmonary hypertension. *Circulation Research*, 133 (Suppl_1), AP2008, 2023.

16. T. Mukherjee, S. Neelakantan, E. Fugate, E. Mendiola, A. Burton, D. Lindquist, S. Sadayappan, and **R. Avazmohammadi**. Association of myocardial stiffening with impaired relaxation in a diabetic murine model of left ventricular diastolic dysfunction. *Circulation Research*, 133 (Suppl_1), AP2008.1, 2023.

15. L. Jin, M. Tomov, H. Chen, **R. Avazmohammadi**, L. Dasi, H. Bauser-Heaton, and V. Serpooshan. A perfused in vitro model of embryonic heart tube: leveraging 3d bioprinting and human induced pluripotent stem cell technologies to study heart development. *Circulation Research*, 133 (Suppl_1), AP1067, 2023.

14. M. Saadeh, M. Tomov, L. Dasi, **R. Avazmohammadi**, V. Serpooshan, and H. Bauser-Heaton. Endothelial to mesenchymal transition frequency increases in Williams syndrome pulmonary artery endothelial cells in novel 3d bioprinted in vitro arterial model. *Circulation Research*, 133 (Suppl_1), AP3024, 2023.

13. T. Imran, T. Garrett, L. Parra, D. Arcuri, C. Nguyen, M. Jankowich, **R. Avazmohammadi**, M. Atalay, W.C. Wu, G. Choudhary. Endothelin-1 and procollagen type-1 carboxy-terminal propeptide are associated with functional tolerance and cardiac structure and function in heart failure with preserved ejection fraction. *Arteriosclerosis, Thrombosis, and Vascular Biology*, 43 (Suppl_1), A245, 2023.

12. S. Neelakantan, M. Kumar, R.R. Singh, S.E. Koch, J. Rubinstein, A.J. Burton, S. Sadayappan, and **R. Avazmohammadi**. Multiscale characterization of left ventricular diastolic dysfunction in diabetic and cardiac myosin binding protein-C phospho-ablated murine models. *Circulation Research*, 131 (Suppl_1), AP3022, 2022.

11. L. Ning, M. Tomov, S. Zanella, B. Zambrano, **R. Avazmohammadi**, M. Mahmoudi, H. Bauser-Heaton, Vahid Serpooshan. Magnetic nanoparticle-mediated targeting of endothelium to address restenosis in a bioprinted in vitro model of pulmonary arteries. *Arteriosclerosis, Thrombosis, and Vascular Biology*, 42 (Suppl_1), A550, 2022.

10. S. Neelakantan, A. Vang, P. Nicely, G. Choudhary, and **R. Avazmohammadi**. Mechanical remodeling of the RV and PA in PH. In *C54. The Two Ventrciles*, A4422, American Thoracic Society, 2022.

9. S. Neelakantan, E.A. Mendiola, A. Burton, S. Sadayappan, Z. Wang, and **R. Avazmohammadi**. Stress relaxation behavior of left ventricular myocardium in mice. *The FASBE Journal*, 36 (S1), 2022.

8. E. Mendiola, S. Merchant, Q. Xiang, S. Neelakantan, E. Hsu, P. Vanderslice, and **R. Avazmohammadi**. Identification of infarct border zone using late gadolinium enhanced MRI in rats. *The FASBE Journal*, 36 (S1), 2022.

7. S. Neelakantan, Q. Xiang, S. Chavan, K. Li, X. Ling, R. Dixon, M. Sacks, P. Vanderslice, and **R. Avazmohammadi**. Structural remodeling in the left ventricular myocardium underlies systolic dysfunction in myocardial infarction. *Circulation*, 144 (Suppl_1), A14303, 2021.

6. M. Keshavarzian, S. Neelakantan, L. McAllister, A. Leatherman, S. Frazier, C. Tong, and **R. Avazmohammadi**. Left ventricular free wall adaptations in heart failure with preserved ejection fraction: Insights from a murine model. *Circulation*, 144 (Suppl_1), A14317, 2021.

5. **R. Avazmohammdi**, A. Vang, S. Neelakantan, T. Mancini, D. da Silva Goncalves Bos, and G. Choudhary. Acute Functional Adaptation of the Right Ventricle in ARDS. In *TP85. A Hard Day's Night-Novel Molecular Mechanisms and Treatment Options in PAH and Beyond: From Pulmonary Vasculature to RV*, A3696, American Thoracic Society, 2021.

4. D. Bos, D. Leichter, A. Vang, A. Nicolas, M. Nowruzpour, **R. Avazmohammadi**, O. Leary, T. Mancini, R. Gilbert, G. Choudhary. Right ventricular myoarchitecture is associated with RV function in pulmonary arterial hypertension. *Circulation*, 142 (Suppl_3), A17254, 2020.

3. M. Tomov, A. Kumar, S. Bhamidipati, K. Do, L. Ning, L. Perez, A. Cetnar, N. Panoskaltsis, **R. Avazmohammadi**, A. Mantalaris, H. Bauser-Heaton, V. Serpooshan. A personalized, 3D printed in vitro model of vascular anastomosis in single ventricle heart defects. *Circulation Research*, 127 (Suppl_1), A405, 2023.

2. M. Tomov, A. Kumar, S. Bhamidipati, B. Jing, L. Ning, L. Perez, N. Panoskaltsis, B. Lindsay, **R. Avazmohammadi**, A. Mantalaris, V. Serpooshan, H. Bauser-Heaton. A patient-specific 3D bioprinted platform for in vitro disease modeling and treatment planning in pulmonary vein stenosis. *Circulation Research*, 127 (Suppl_1), A427, 2020.

1. **R. Avazmohammadi**, E. Mendiola, R. Dixon, and M. Sacks. A multiscale model of cardiac remodeling under pulmonary arterial hypertension: From organ to titin. *Circulation*, 140 (Suppl_1), A15520, 2019.

PRESENTATIONS

A. INVITED TALKS / GUEST LECTURES

25. Leveraging AI for non-invasive assessment of cardiovascular function and remodeling. Challenges & Advancements in Cardiology: Cardio World Congress-2025 (WCAC-2025), Vienna, Austria (Hybrid Event), July 2025.

24. Mechanics-informed AI to detect and predict soft tissue remodeling. The Engineering Medicine Research Summit, Texas A&M School of Engineering Medicine, Houston, Texas, May 2025.

23. Artificial intelligence-assisted lung modeling with application to early detection of radiation-induced lung injury. The 2025 International Workshop on Pulmonary Imaging, Penn Radiology, University of Pennsylvania, Philadelphia, Pennsylvania, February 2025.

22. Multiscale structure-function relationship of the RV in health and pulmonary hypertension. In *Advances in Right Heart Biology: From Physiology to Therapeutics* Symposium, Alpert Medical School, Brown University, Providence, Rhode Island, October 2024.

21. Role of biomechanical remodeling of the heart in its transition to heart failure. 2024 Cardiovascular Research Institute/DeBakey Institute Symposium. College of Medicine, Texas A&M University, College Station, Texas, September 2024.

20. Applications of machine learning in improving the assessment of myocardial remodeling in cardiac diseases. Machine Learning + X seminars, Division of Applied Mathematics, Brown University, Virtual Seminar, April 2023.

19. Image-based multiscale modeling of the lung to quantify regional mechanical stress in vivo. The 2023 International Workshop on Pulmonary Imaging, Penn Radiology, University of Pennsylvania, Philadelphia, Pennsylvania, February 2023.

18. Role of myocardial passive remodeling in right heart dysfunction in pulmonary hypertension: A biomechanical study. CardioPulmonary Vascular Biology COBRE, Alpert Medical School, Brown University, Providence, Rhode Island, January 2023.

17. 4D imaging to assist with assessing pathological cardiac remodeling in vivo. Youth in Biomedical Engineering Program, Virtual Event, July 2022.

16. Integrated 4D imaging-modeling to quantify myocardial remodeling in vivo in cardiac diseases. Department of Biomedical Engineering, New Jersey Institute of Technology, Newark, New Jersey, October 2021.

15. Integrated cardiac imaging-machine learning to advance cardiac diagnosis and therapy. SIBOR Workshop, Department of Physics and Astronomy, Texas A&M University, College Station, Texas, October 2021.

14. Machine learning-assisted modeling of cardiac function in health and disease. Computing in Engineering Forum, Grainger Institute for Engineering, University of Wisconsin-Madison, Wisconsin, September 2021.

13. Computational modeling of biomaterials. Guest Lecture for BMED 7101– Advanced Seminar: Biomaterials & Regenerative. Department of Biomedical Engineering, Georgia Tech, Atlanta, Georgia, September 2020.

12. Subject-specific computational cardiovascular modeling in pulmonary hypertension. Heart, Lung, and Vascular Institute, University of Cincinnati, Cincinnati, Ohio, March 2020.

11. Integrated computational-experimental cardiac modeling: Application to pulmonary arterial hypertension. Department of Biomedical Engineering, Texas A&M University, College Station, Texas, May 2019.

10. Computational cardiac modeling: Application to pulmonary arterial hypertension. Department of Mechanical Engineering, University of Utah, Salt Lake City, Utah, March 2019.

9. Integrated computational-experimental cardiac modeling: Application to pulmonary arterial hypertension and pediatric heart diseases. Children's Heart Research and Outcomes Center (HeRO), Emory University, Atlanta, Georgia, February 2019.

8. Computational cardiac modeling: Application to pulmonary arterial hypertension. School of Engineering and Applied Science, Washington University in St. Louis, St. Louis, Missouri, February 2019.

7. Structural remodeling and volumetric growth in the right ventricle under pulmonary arterial hypertension. Department of Mechanical Engineering, Sharif University of Technology, Tehran, Iran, December 2018.

6. Organ-level computational modeling of heart: Application to pulmonary arterial hypertension. Department of Mechanical Engineering, Colorado School of Mines, Colorado, February 2018.

5. Organ-level computational modeling of heart: Application to pulmonary arterial hypertension. Department of Mechanical Engineering, Tehran University, Tehran, Iran, December 2017.

4. Constitutive modeling of soft engineering and biological materials: The role of microstructure. University of Southern California, Department of Aerospace and Mechanical Engineering, Los Angeles, California, February 2016.

3. Constitutive modeling of soft engineering and biological materials: The role of microstructure. University of Texas at Dallas, Department of Mechanical Engineering, Richardson, Texas, February 2016.

2. Overall response of soft composite materials with particulate microstructure at finite strains. University of Texas at Austin, Institute for Computational Engineering and Sciences, Austin, Texas, April 2014.

1. Homogenization of elastomeric composites at finite strains. University of Pennsylvania, Department of Material Science and Engineering, Philadelphia, Pennsylvania, March 2014.

B. Conference Oral Presentations

74. S. Neelakantan, R. Mehdi, Q. Xiang, K. Myers, P. Vanderslice, and **R. Avazmohammadi**. From myocardial infarction to heart failure: Role of tissue anisotropy and its prediction through probabilistic neural network. ASME SB3C Summer Bioengineering Conference, Santa Ana Pueblo, New Mexico, June 2025.

73. R. Mehdi, S. Neelakantan, S. Sahoo, K. Myers, G. Choudhary, and **R. Avazmohammadi**. Non-invasive estimation of pulmonary vasculature pressure via 1D FSI and transformer model. ASME SB3C Summer Bioengineering Conference, Santa Ana Pueblo, New Mexico, June 2025.

72. E. Mendiola, R. Mehdi, K. Myers, G. Choudhary, and **R. Avazmohammadi**. A machine learning framework for non-invasive prediction of left ventricle end-diastolic pressure using cardiac strains. ASME SB3C Summer Bioengineering Conference, Santa Ana Pueblo, New Mexico, June 2025.

71. E. Mendiola, Q. Xiang, V. Serpooshan, K. Myers, P. Vanderslice, and **R. Avazmohammadi**. Progressive microstructural remodeling in the infarcted left ventricle analyzed by diffusion tensor MRI. International Conference on Functional Imaging and Modeling of the Heart, Dallas, Texas, June 2025.

70. T. Imran, D. Arcuri, E. Mendiola, **R. Avazmohammadi**, C. Nguyen, J. Gillotti, M. Atalay, W.C. Wu, and G. Choudhary. The association between strain, myofiber orientation, and functional outcomes in heart failure with preserved ejection using CMR feature tracking and diffusion tensor imaging. SCMR 2025 Annual Scientific Sessions, Washington, DC, January-February 2025.

69. E. Mendiola, R.R. Mehdi, and **R. Avazmohammadi**. DeepPressure: Non-invasive estimation of the left ventricle pressure-volume loop using cardiac strains. Biomedical Engineering Society Annual Meeting, Baltimore, Maryland, October 2024.

68. S. Neelakantan, R. Rizi, K. Myers, and **R. Avazmohammadi**. LungMotionNet: A deep learning method to estimate strain from static computed tomography images. Biomedical Engineering Society Annual Meeting, Baltimore, Maryland, October 2024.

67. R.R. Mehdi, S. Neelakantan, and **R. Avazmohammadi**. Estimating pressure of pulmonary vasculature by combining patient-specific CFD simulations and physiological variables using machine learning. Biomedical Engineering Society Annual Meeting, Baltimore, Maryland, October 2024.

66. V. Naeini, T. Mukherjee, S. Peighambari, E. Mendiola, D. Shah, and **R. Avazmohammadi**. A CMR-based study of torsional behavior of left ventricle post-mitral valve repair surgery. 2024 Computing in Cardiology Conference, Karlsruhe, Germany, September 2024.

65. T. Mukherjee, E. Mendiola, Q. Xiang, X. Zhang, K. Li, P. Vanderslice, and **R. Avazmohammadi**. Torsional adaptations in the left ventricle post-myocardial infarction. 2024 Computing in Cardiology Conference, Karlsruhe, Germany, September 2024.

64. S. Peighambari, T. Mukherjee, E. Mendiola, F. Nezami, A. Darwish, D. Shah, and **R. Avazmohammadi**. Left ventricular hemodynamics: Pre versus post mitral valve prolapse repair. 46th Annual International Conference of the IEEE Engineering in Medicine & Biology Society, Orlando, Florida, July 2024.

63. T. Mukherjee, S. Neelakantan, K. Myers, C. Tong, and **R. Avazmohammadi**. Synthetic ultrasound images to benchmark echocardiography-based biomechanics. 46th Annual International Conference of the IEEE Engineering in Medicine & Biology Society, Orlando, Florida, July 2024.

62. S. Neelakantan, T. Mukherjee, K. Myers, R. Rizi, and **R. Avazmohammadi**. Physics-informed motion registration of lung parenchyma across static CT images. 46th Annual International Conference of the IEEE Engineering in Medicine & Biology Society, Orlando, Florida, July 2024.

61. S. Neelakantan, R. Mehdi, B. Smith, K. Myers, R. Rizi, and **R. Avazmohammadi**. Artificial intelligence assisted multiscale lung modeling to predict alveolar septal wall stress. Summer Biomechanics, Bioengineering, and Biotransport Conference, Lake Geneva, Wisconsin, June 2024.

60. R. Mehdi, T. Mukherjee, E. Mendiola, S. Neelakantan, and **R. Avazmohammadi**. Deep learning-based biomechanical characterization of infarcted myocardium from strain imaging. Summer Biomechanics, Bioengineering, and Biotransport Conference, Lake Geneva, Wisconsin, June 2024.

59. T. Mukherjee, S. Elliott, P. Alluri, and **R. Avazmohammadi**. The biomechanics of radiation-induced cardiotoxicity in mice. Summer Biomechanics, Bioengineering, and Biotransport Conference, Lake Geneva, Wisconsin, June 2024.

58. E. Mendiola, R. Mehdi, J. Ohayon, R. Pettigrew, and **R. Avazmohammadi**. Optimal design of experiments for nuclear membrane stiffness estimation. Summer Biomechanics, Bioengineering, and Biotransport Conference, Lake Geneva, Wisconsin, June 2024.

57. S. Peighambari, T. Mukherjee, A. Darwish, D. Shah, and **R. Avazmohammadi**. Alterations in LV Hemodynamics: Pre versus post mitral valve prolapse repair. 8th Annual Cardiovascular Bioengineering Symposium at Houston Methodist, Houston, Texas, May 2024.

56. T. Mukherjee, E. Mendiola, S. Neelakantan, D. Shah, and **R. Avazmohammadi**. Four-dimensional assessment of left ventricular torsion using cardiac magnetic resonance imaging. SPIE Medical Imaging 2024: In Medical Imaging 2024: Image Processing, San Diego, California, February 2024.

55. E. Mendiola, S. Neelakantan, and **R. Avazmohammadi**. An image-driven approach to micromechanical characterization of infarcted myocardium. Biomedical Engineering Society Annual Meeting, Seattle, Washington, October 2023.

54. T. Mukherjee, S. Elliott, N. Manikandan, J. Wansapura, P. Alluri, and **R. Avazmohammadi**. Detection of biomechanical alterations in the left ventricle due to radiation-induced cardiotoxicity. Biomedical Engineering Society Annual Meeting, Seattle, Washington, October 2023.

53. S. Neelakantan, D. W. Kaczka, R. R. Rizi, B. J. Smith, and **R. Avazmohammadi**. Machine learning assisted multiscale lung modeling to predict alveolar septal wall stress. Biomedical Engineering Society Annual Meeting, Seattle, Washington, October 2023.

52. T. Mukherjee, S. Elliott, N. Manikandan, J. Wansapura, P. Alluri, and **R. Avazmohammadi**. Detection of biomechanical alterations in the left ventricle due to radiation-induced cardiotoxicity. Cardiovascular Research Institute Symposium, Texas A&M School of Medicine, Bryan, Texas, August 2023.

51. R. Mehdi, E. Mendiola, and **R. Avazmohammadi**. Machine learning model to identify size, location, and stiffness of cardiac scar in myocardial infarction using cardiac strains. 17th U.S. National Congress on Computational Mechanics, Albuquerque, New Mexico, July 2023.

50. S. Neelakantan, P. Zhang, G. Choudhary, and **R. Avazmohammadi**. Integrated right ventricular-pulmonary artery biomechanics in pulmonary hypertension. Summer Biomechanics, Bioengineering, and Biotransport Conference, Vail, Colorado, June 2023.

49. T. Mukherjee, S. Sadayappan, and **R. Avazmohammadi**. Classification-based super-resolution reconstruction in CMR to quantify four-dimensional myocardial strains in mice. Summer Biomechanics, Bioengineering, and Biotransport Conference, Vail, Colorado, June 2023.

48. S. Neelakantan, B. Smith, and **R. Avazmohammadi**. A computational-biophysical model of the lung to investigate the effect of surfactant on lung function. Biomedical Engineering Society Annual Meeting, San Antonio, Texas, October 2022.

47. R.R. Mehdi, M. Kumar, S. Sadayappan, and **R. Avazmohammadi**. A machine learning method to estimate relaxation velocity from calcium kinetics in cardiomyocytes. Biomedical Engineering Society Annual Meeting, San Antonio, Texas, October 2022.

46. V. Naeini, E. Mendiola, A. Rafsanjani, and **R. Avazmohammadi**. Design of reconfigurable auxetic cardiac patch. Society of Engineering Science Annual Meeting, College Station, Texas, October 2022.

45. R. Mehdi, E. Mendiola, and **R. Avazmohammadi**. A machine learning model to identify the size and location of cardiac scar in myocardial infarction using cardiac strains. Society of Engineering Science Annual Meeting, College Station, Texas, October 2022.

44. R. Mehdi, E. Mendiola, and **R. Avazmohammadi**. A deep learning method to estimate myocardial stiffness and collagen undulation. Society of Engineering Science Annual Meeting, College Station, Texas, October 2022.

43. T. Mukherjee, D. Shah, and **R. Avazmohammadi**. Simulations of left ventricular flow by integrating moving boundary technique and magnetic resonance image registration. Society of Engineering Science Annual Meeting, College Station, Texas, October 2022.

42. S. Neelakantan, A. Vang, P. Nicely, G. Choudhary, and **R. Avazmohammadi**. Association between pulmonary hemodynamics and RV remodeling in pulmonary hypertension. Society of Engineering Science Annual Meeting, College Station, Texas, October 2022.

41. W. Liu, K. Labus, M. Ahern, **R. Avazmohammadi**, C. Puttlitz, and Z. Wang. Computational modeling of the passive anisotropic viscoelastic behavior of ovine right ventricles. Summer Biomechanics, Bioengineering, and Biotransport Conference, Eastern Shore, Maryland, June 2022.

40. S. Neelakantan and **R. Avazmohammadi**. Lung biomechanics in ARDS: The effect of inflammation on tissue stress-strain response. Biomedical Engineering Society Annual Meeting, Orlando, Florida, October 2021.

39. E. Mendiola, D. Bos, A. Vang, G. Choudhary, and **R. Avazmohammadi**. Echo-derived TAPSE/RVSP as a measure of ventricular-arterial coupling in pulmonary hypertension. Biomedical Engineering Society Annual Meeting, Orlando, Florida, October 2021.

38. E. Mendiola, H. Babaei, S. Merchant, Q. Xiang, E. Hsu, P. Vanderslice, and **R. Avazmohammdi**. Estimation of regional structure-function relationship in the infarcted left ventricle. 16th U.S. National Congress on Computational Mechanics, Virtual Event, July 2021.

37. M. Nowruzpour, D. Bos, D. Leichter, A. Vang, R. Gilbert, G. Choudhary, and **R. Avazmohammadi**. Mechanisms of right ventricular maladaptation to pulmonary arterial hypertension: Excessive wall stiffening and fiber remodeling. Biomedical Engineering Society Annual Meeting, Virtual Event, October 2020.

36. **R. Avazmohammadi**, S. Chavan, E. Mendiola, S. Xia, Q. Xiang, P. Vanderslice, R. Dixon, and M. Sacks. An integrated modeling approach to characterize left ventricular remodeling in myocardial infarction. Biomedical Engineering Society Annual Meeting, Virtual Event, October 2020.

35. D. Li, **R. Avazmohammadi**, J. Burdick, R. Gorman, and M. Sacks. How hydrogel inclusions modulate local strain reductions in post-infarcted myocardium. Biomedical Engineering Society Annual Meeting, Virtual Event, October 2020.

34. E. Mendiola, **R. Avazmohammadi**, F. Sachse, and M. Sacks. A microanatomical biomechanical model of myocardium in the hypertensive heart. Summer Biomechanics, Bioengineering, and Biotransport Conference, Virtual Event, June 2020.

33. **R. Avazmohammadi**, P. Vanderslice, R. Dixon, and M. Sacks. An integrated inverse modeling approach to characterize subject-specific remodeling of left ventricular free wall under myocardial infarction. Summer Biomechanics, Bioengineering, and Biotransport Conference, Virtual Event, June 2020.

32. **R. Avazmohammadi**, E. Mendiola, R. Dixon, and M. Sacks. A multiscale model of cardiac remodeling under pulmonary arterial hypertension: From organ to titin. Biomedical Engineering Society Annual Meeting, Philadelphia, Pennsylvania, October 2019.

31. **R. Avazmohammadi**, E. Mendiola, R. Dixon, and M. Sacks. A multiscale model of cardiac remodeling under hypertension: From organ to titin. 15th U.S. National Congress on Computational Mechanics, Austin, Texas, July 2019.

30. **R. Avazmohammadi**, E. Mendiola, R. Dixon, and M. Sacks. Structural remodeling and volumetric growth in the right ventricle under pulmonary arterial hypertension. Summer Biomechanics, Bioengineering, and Biotransport Conference, Seven Springs, Pennsylvania, June 2019.

29. D. Li, **R. Avazmohammadi**, S. Merchant, T. Tomonori, E. Hsu, J. Gorman, R. Gorman, and M. Sacks. A robust 3D constitutive model for the passive properties of left myocardium. Summer Biomechanics, Bioengineering, and Biotransport Conference, Seven Springs, Pennsylvania, June 2019.

28. **R. Avazmohammadi**, E. Mendiola, D. Li, R. Dixon, and M. Sacks. A murine computational cardiac model of the adaptation to pulmonary arterial hypertension. Biomedical Engineering Society Annual Meeting, Atlanta, Georgia, October 2018.

27. **R. Avazmohammadi**, E. Mendiola, D. Li, R. Dixon, and M. Sacks. A computational model of heart adaptation to pulmonary arterial hypertension. 13th World Congress in Computational Mechanics, New York City, NY, July 2018.

26. **R. Avazmohammadi** and M. Sacks. A fiber-specific model of myocardial growth and remodeling under hypertension, 8th World Congress of Biomechanics, Dublin, Ireland, July 2018.

25. **R. Avazmohammadi**, E. Mendiola, and M. Sacks. Structurally based Growth and Remodeling of Hypertensive Myocardium, 18th U.S. National Congress on Theoretical and Applied Mechanics, Rosemont, Illinois, June 2018.

24. **R. Avazmohammadi**, E. Mendiola, D. Li, R. Dixon, E. Hsu, and M. Sacks. An in-silico heart model of pulmonary arterial hypertension. Biomedical Engineering Society Annual Meeting, Phoenix, Arizona, October 2017.

23. D. Li, **R. Avazmohammadi**, J. Soares, R. Gorman, and M. Sacks. An integrated simulation-experimental approach to study the effect of hydrogel injections on the structural-mechanical properties of myocardium. Biomedical Engineering Society Annual Meeting, Phoenix, Arizona, October 2017.

22. **R. Avazmohammadi**, E. Mendiola, J. Soares, D. Li, R. Dixon, and M. Sacks. Pulmonary arterial hypertension: From myocardium biomechanics to in silico heart model. Society of Engineering Science 54nd Annual Technical Meeting, Boston, Massachusetts, July 2017.

21. **R. Avazmohammadi**, E. Mendiola, J. Soares, D. Li, R. Dixon, and M. Sacks. An image-based computational heart model of a hypertensive heart. 14th U.S. National Congress on Computational Mechanics, Montreal, Canada, July 2017.

20. **R. Avazmohammadi**, D. Li, and M. Sacks. On the 3D properties of passive myocardium: An inverse model-experimental approach. Computational & Mathematical Biomedical Engineering, Pittsburgh, Pennsylvania, April 2017.

19. **R. Avazmohammadi** and M. Sacks. Adaptive remodeling of right ventricular myocardium in response to pulmonary arterial hypertension. Biomedical Engineering Society Annual Meeting, Minneapolis, Minnesota, October 2016.

18. D. Li, **R. Avazmohammadi**, and M. Sacks. A novel numerical-experimental inverse modeling approach to investigate time-evolving three-dimensional mechanical properties of infarcted myocardium. Summer Biomechanics, Bioengineering, and Biotransport Conference, National Harbor, Maryland, June/July 2016.

17. **R. Avazmohammadi** and M. Sacks. Constitutive modeling of right ventricular myocardium: The role of microstructure. Multiscale Modeling and Validation in Medicine and Biology III, Los Angeles, California, February 2016.

16. **R. Avazmohammadi**, M. Hill, M. Simon, W. Zhang, and M. Sacks. A novel fiber-level structural constitutive model for viable right ventricular myocardium. Society of Engineering Science 52nd Annual Technical Meeting, College Station, Texas, October 2015.

15. **R. Avazmohammadi**, S. Raut, J. Lesicko, and M. Sacks. Estimation of fully three-dimensional properties of infarct myocardium using a coupled inverse model-experimental approach. Biomedical Engineering Society Annual Meeting, Tampa, Florida, October 2015.

14. **R. Avazmohammadi**, S. Raut, J. Lesicko, and M. Sacks. Estimation of fully three-dimensional properties of passive myocardium: A coupled inverse model-experimental study. 13th U.S. National Congress on Computational Mechanics, San Diego, California, July 2015.

13. M. Agoras, **R. Avazmohammadi**, and P. Ponte Castañeda. On the macroscopic elasto-plastic response of metal-matrix composites. EuroMech-Colloquium 577, Micromechanics of Metal Ceramic Composites, Stuttgart, Germany, March 2015.

12. **R. Avazmohammadi** and P. Ponte Castañeda. The macroscopic response and microstructure evolution in short-fiber-reinforced elastomers at finite strains.17th U.S. National Congress on Theoretical and Applied Mechanics, East Lansing, Michigan, June 2014.

11. **R. Avazmohammadi** and P. Ponte Castañeda. Shear band instabilities in nematic elastomers and post-bifurcation macroscopic response. ASME International Mechanical Engineering Congress and Exposition, San Diego, California, November 2013.

10. P. Ponte Castañeda and **R. Avazmohammadi**. Estimates for the macroscopic response of elastomers reinforced with random distributions of fibers at Finite Strains. IUTAM Symposium on Multiscale Modeling and Uncertainty Quantification of Materials and Structures, Santorini, Greece, September 2013.

9. **R. Avazmohammadi** and P. Ponte Castañeda. On the macroscopic response, microstructure evolution, and macroscopic stability of short-fiber-reinforced elastomers at finite strains. Prager Medal Symposium in honor of George Weng, The 50th Annual Technical Conference of the Society of Engineering Science, Providence, Rhode Island, July 2013.

8. P. Ponte Castañeda and **R. Avazmohammadi**. Macroscopic instabilities and soft behavior in fiber-reinforced elastomers at finite strain. ASME International Mechanical Engineering Congress and Exposition, Denver, Colorado, November 2011.

7. P. Ponte Castañeda and **R. Avazmohammadi**. Macroscopic behavior, microstructure evolution and instabilities in nematic elastomers. The 48th Annual Technical Conference of the Society of Engineering Science, Evanston, Illinois, October 2011.

6. P. Ponte Castañeda and **R. Avazmohammadi**. Macroscopic instabilities in fiber-reinforced elastomers. Fifth International Symposium on Defect and Material Mechanics, Sevilla, Spain, June/July2011.

5. P. Ponte Castañeda and **R. Avazmohammadi**. Nematic elastomers: Macroscopic behavior and instabilities. Symposium on Stability and Nonlinear Solid Mechanics in honor of Nguyen Quoc Son, Paris, September 2010.

4. **R. Avazmohammadi** and P. Ponte Castañeda. Macroscopic instabilities in nematic elastomers. Mini-symposium on Instabilities and Microstructures in Non-linear Elasticity, SIAM Conference on Mathematical Aspects of Materials Science, Philadelphia, Pennsylvania, May 2010.

3. **R. Avazmohammadi**, J. Arghavani and R. Naghdabadi. Micromechanics modeling of shape memory alloy fiber composites with slightly weakened interfaces. SPIE Conference of Smart Materials and Nano/Micro-Smart Systems, Australia, December 2008.

2. **R. Avazmohammadi** and R. Naghdabadi. Macroscopic stress analysis for nonlinear elastic composites reinforced by spheroidal particles. Seventh Conference of Iranian Aerospace Society, Tehran, 2008.

1. **R. Avazmohammadi** and S. M. Hasheminejad. Dynamic response of buried viscoelastic pipelines in elastic media to a seismic plane wave. Sixth Conference on Tunnel Engineering, IUST, Tehran, 2004.

C. CONFERENCE POSTER PRESENTATIONS

74. T. Mukherjee, B. Peighambari, A. Bersali, D. Shah, and **R. Avazmohammadi**. Left ventricular hemodynamics pre- and post-mitral valve repair: relationship between intracardiac vortices and myocardial motion. ASME SB3C Summer Bioengineering Conference, Santa Ana Pueblo, New Mexico, June 2025.

73. R. Mehdi, N. Kadivar, V. Serpooshan, K. Myers, G. Karniadakis, and **R. Avazmohammadi**. Towards non-invasive estimation of myocardial scar stiffness from cardiac strains using deep learning. International Conference on Functional Imaging and Modeling of the Heart, Dallas, Texas, June 2025.

72. S. Neelakantan, D. Pinto, R.R. Mehdi, S.B. Peighambari, K. Myers, and **R. Avazmohammadi**. Intracardiac hemodynamics alteration in myocardial infarction. International Conference on Functional Imaging and Modeling of the Heart, Dallas, Texas, June 2025.

71. S. Peighambari, T. Mukherjee, E. Mendiola, Farhad Nezami, Amr Darwish, Dipan Shah, **R. Avazmohammadi**. Assessing Improvements in LV Hemodynamics Post-mitral Valve Repair Surgery via an Integrated CMR-PC-MRI-in-silico Approach. Biomedical Engineering Society Annual Meeting, Baltimore, Maryland, October 2024.

70. S. Peighambari, T. Mukherjee, R. Mehdi, E. Mendiola, **R. Avazmohammadi**. Estimating pulmonary arterial pressure differences using integrated machine learning-computational fluid dynamics. 2024 Computing in Cardiology Conference, Karlsruhe, Germany, September 2024.

69. T. Mukherjee, S. Elliott, T.J. Higgins, J. Wansapura, P. Alluri, and **R. Avazmohammadi**. Integrated analysis of ex-vivo biomechanical ventricular remodeling and imaging-based in-vivo strain changes in a pre-clinical murine model of radiation-induced cardiotoxicity. BCVS Scientific Sessions, Chicago, Illinois, July 2024.

68. S. Neelakantan, R. Mehdi, W. Xiang, X. Zhang, P. Vanderslice, and **R. Avazmohammadi**. Viscoelastic remodeling of the left ventricular myocardium in myocardial infarction. BCVS Scientific Sessions, Chicago, Illinois, July 2024.

67. S. Rezapourdamanab, Y. Singh, S. Norton, B. Hwang, L. Jin, M. Amoli, S. Karnik, **R. Avazmohammadi**, S. Neelakantan, L. Dasi, R. Romero, H. Bauser Heaton, and V. Serpooshan. Fontan-associated liver disease on a chip. BCVS Scientific Sessions, Chicago, Illinois, July 2024.

66. V. Naeini, E. Mendiola, R. Mehdi, P. Vanderslice, V. Serpooshan, and **R. Avazmohammadi**. Multi-material cardiac sleeves with variable stiffness enhance regional strain markers. 46th Annual International Conference of the IEEE Engineering in Medicine & Biology Society, Orlando, Florida, July 2024.

65. R. Mehdi, E. Mendiola, V. Naeini, G. Choudhary, and **R. Avazmohammadi**. Does EDPVR represent myocardial tissue stiffness? Toward a better definition. 46th Annual International Conference of the IEEE Engineering in Medicine & Biology Society, Orlando, Florida, July 2024.

64. E. Mendiola, R. Mehdi, D. Shah, and **R. Avazmohammadi**. On in-silico estimation of left ventricular end-diastolic pressure from cardiac strains. 46th Annual International Conference of the IEEE Engineering in Medicine & Biology Society, Orlando, Florida, July 2024.

63. T. Mukherjee, A. Shree, and **R. Avazmohammadi**. Towards the estimation of tumor stiffness using b-mode ultrasound imaging. Summer Biomechanics, Bioengineering, and Biotransport Conference, Lake Geneva, Wisconsin, June 2024.

62. S. Peighambari, T. Mukherjee, A. Darwish, D. Shah, and **R. Avazmohammadi**. Computational modeling of left ventricular flow using MRI-derived four-dimensional wall motion. Summer Biomechanics, Bioengineering, and Biotransport Conference, Lake Geneva, Wisconsin, June 2024.

61. R. Ghosh, K. Wong, K. Yaeger, G. Britz, **R. Avazmohammadi**, and S.T.C. Wong. Enhanced Deep Learning Approach for Multi-Class Segmentation of Carotid Bifurcation in DSA Roadmaps. Vascular Annual Meeting, Chicago, Illinois, June 2024.

60. S. Neelakantan, P. Zhang, G. Choudhary, and **R. Avazmohammadi**. Integrated right ventricular-pulmonary artery biomechanics in pulmonary hypertension. 8th Annual Cardiovascular Bioengineering Symposium at Houston Methodist, Houston, Texas, May 2024.

59. T. Mukherjee, S. Elliott, J. Wansapura, P. Alluri, and **R. Avazmohammadi**. Biomechanical mechanisms of ventricular remodeling in radiation-induced cardiotoxicity. 8th Annual Cardiovascular Bioengineering Symposium at Houston Methodist, Houston, Texas, May 2024.

58. R. Mehdi, N. Kadivar, E. Mendiola, T. Mukherjee, D. Shah, G. Karniadakis, and **R. Avazmohammadi**. Multi-fidelity deep learning approach to delineate infarcted myocardium using cardiac strains in lieu of LGE imaging. 8th Annual Cardiovascular Bioengineering Symposium at Houston Methodist, Houston, Texas, May 2024.

57. S. Neelakantan, T. Mukherjee, B. Smith, K. Myers, R. Rizi, and **R. Avazmohammadi**. In-silico four-dimensional CT lung phantom generated from finite-element simulations. SPIE Medical Imaging 2024: In Image-Guided Procedures, Robotic Interventions, and Modeling, San Diego, California, February 2024.

56. S. Neelakantan, E. Manning, P. Zhang, G. Choudhary, and **R. Avazmohammadi**. Right ventricular myocardial stiffening is associated with pulmonary arterial stiffening in pulmonary hypertension. American Heart Association Scientific Sessions, Philadelphia, Pennsylvania, November 2023.

55. R. Mehdi, D. Shah, and **R. Avazmohammadi**. The estimation of size and location of myocardial infarction using deep learning approach. Biomedical Engineering Society Annual Meeting, Seattle, Washington, October 2023.

54. V. Naeini, E. Mendiola, and **R. Avazmohammadi**. Optimizing implantable sleeve design for improved left ventricular function post-myocardial infarction: a computational approach. Biomedical Engineering Society Annual Meeting, Seattle, Washington, October 2023.

53. T. Mukherjee, M. Usman, E. Fugate, D. Lindquist, S. Sadayappan, R. Pettigrew, and **R. Avazmohammadi**. In-silico benchmark to validate four-dimensional cardiac motion quantification in small animals. Biomedical Engineering Society Annual Meeting, Seattle, Washington, October 2023.

52. T. Mukherjee, V. Kandala, I. Borazjani, and **R. Avazmohammadi**. On the non-invasive estimation of end-diastolic pressure-volume relationship in the right ventricle. Biomedical Engineering Society Annual Meeting, Seattle, Washington, October 2023.

51. S. Neelakantan, P. Zhang, G. Choudhary, and **R. Avazmohammadi**. Integrated right ventricular-pulmonary artery biomechanics in pulmonary hypertension. Biomedical Engineering Society Annual Meeting, Seattle, Washington, October 2023.

50. R. Mehdi, N. Manikandan, and **R. Avazmohammadi**. Estimation of volume of the right ventricle from the endocardium area of CMR slices using recurrent neural network. Biomedical Engineering Society Annual Meeting, Seattle, Washington, October 2023.

49. A. Tabatabaeishoorijeh, T. Mukherjee, M. Rahimi, and **R. Avazmohammadi**. Utilization of computational fluid dynamics in understanding the pressure-resistance relationship in the development of aneurysmal degeneration. Biomedical Engineering Society Annual Meeting, Seattle, Washington, October 2023.

48. S. Peighambari, T. Mukherjee, D. Shah, and **R. Avazmohammadi**. Computational modeling of left ventricular flow using CMR-derived four-dimensional wall motion. Biomedical Engineering Society Annual Meeting, Seattle, Washington, October 2023.

47. M. Usman, T. Mukherjee, and **R. Avazmohammadi**. Investigating the feasibility of predicting myocardial fiber architecture using cardiac strains. Biomedical Engineering Society Annual Meeting, Seattle, Washington, October 2023.

46. E. Mendiola, D. da Silva Gonçalves Bos, A. Vang, G. Choudhary, and **R. Avazmohammadi**. Right ventricular architecture determines functional adaptation in pulmonary hypertension. Biomedical Engineering Society Annual Meeting, Seattle, Washington, October 2023.

45. R. Mehdi, S. Neelakantan, E. Wang, P. Zhang, G. Choudhary, and **R. Avazmohammadi**. Contractile adaptation of the right ventricular myocardium in pulmonary hypertension. BCVS Scientific Sessions, Boston, Massachusetts, July-August 2023.

44. T. Mukherjee, S. Neelakantan, E. Fugate, E. Mendiola, A. Burton, D. Lindquist, S. Sadayappan, and **R. Avazmohammadi**. Association of myocardial stiffening with impaired relaxation in a diabetic murine model of left ventricular diastolic dysfunction. BCVS Scientific Sessions, Boston, Massachusetts, July-August 2023.

43. L. Jin, M. Tomov, H. Chen, **R. Avazmohammadi**, L. Dasi, H. Bauser-Heaton, and V. Serpooshan. A perfused in vitro model of embryonic heart tube: leveraging 3d bioprinting and human induced pluripotent stem cell technologies to study heart development. BCVS Scientific Sessions, Boston, Massachusetts, July-August 2023.

42. M. Saadeh, M. Tomov, L. Dasi, **R. Avazmohammadi**, V. Serpooshan, and H. Bauser-Heaton. Endothelial to mesenchymal transition frequency increases in Williams syndrome pulmonary artery endothelial cells in novel 3d bioprinted in vitro arterial model. BCVS Scientific Sessions, Boston, Massachusetts, July-August 2023.

41. M. Usman, E. Mendiola, T. Mukherjee, R. Mehdi, J. Ohayon, P. Alluri, S. Sadayyapan, G. Choudhary, and **R. Avazmohammadi**. On the possibility of estimating myocardial fiber architecture from cardiac strains. International Conference on Functional Imaging and Modeling of the Heart, Lyon, France, June 2023.

40. E. Mendiola, E. Wang, A. Leatherman, Q. Xiang, S. Neelakantan, R. Dixon, P. Vanderslice, and **R. Avazmohammadi**. A micro-anatomical model of the infarcted left ventricle border zone to study the influence of collagen undulation. International Conference on Functional Imaging and Modeling of the Heart, Lyon, France, June 2023.

39. R. Mehdi, E. Mendiola, and **R. Avazmohammadi**. A machine learning approach to estimate size and location of myocardial infarction. Summer Biomechanics, Bioengineering, and Biotransport Conference, Vail, Colorado, June 2023.

38. M. Tomov, H. Chen, S. Neelakantan, **R. Avazmohammadi**, L. Prasad Dasi, H. Bauser-Heaton, V. Serpooshan. Studying endothelial to mesenchymal transition (EndMT) in a 3D bioprinted model of pulmonary vein stenosis. 12th Annual Southeastern Pediatric Research Conference, Atlanta, Georgia, June 2023.

37. T. Imran, T. Garrett, L. Parra, D. Arcuri, C. Nguyen, M. Jankowich, **R. Avazmohammadi**, M. Atalay, W.C. Wu, G. Choudhary. Endothelin-1 and procollagen type-1 carboxy-terminal propeptide are associated with functional tolerance and cardiac structure and function in heart failure with preserved ejection fraction. AHA Vascular Discovery: From Genes to Medicine Scientific Sessions, Boston, Massachusetts, May 2023.

36. T. Mukherjee, S. Neelakantan, G. Choudhary, and **R. Avazmohammadi**. Improved right ventricular strain estimation in rats using anisotropic diffusion filtering. SPIE Medical Imaging 2023: In Ultrasonic Imaging and Tomography, San Diego, California, February 2023.

35. S. Neelakantan, M.K. Ismail, T. Mukherjee, B.J. Smith, R. Rizi, and **R. Avazmohammadi**. Volumetric versus distortional deformation in rat lungs. SPIE Medical Imaging 2023: In Image-Guided Procedures, Robotic Interventions, and Modeling, San Diego, California, February 2023.

34. T. Mukherjee, M. Keshavarzian, E. Fugate, D. Lindquist, S. Sadayappan, and **R. Avazmohammdi**. Improving myocardial image registration using classification-based super-resolution reconstruction. Biomedical Engineering Society Annual Meeting, San Antonio, Texas, October 2022.

33. T. Mukherjee, S. Neelakantan, E. Mendiola, A. Burton, S. Sadayappan, and **R. Avazmohammdi**. Effects of passive remodeling on relaxation in left ventricular diastolic dysfunction. Biomedical Engineering Society Annual Meeting, San Antonio, Texas, October 2022.

32. S. Neelakantan, P. Nicely, G. Choudhary, and **R. Avazmohammadi**. Association of RV hemodynamics with RVFW stiffening in pulmonary hypertension. Biomedical Engineering Society Annual Meeting, San Antonio, Texas, October 2022.

31. E.A. Mendiola, S. Neelakantan, Q. Xiang, S. Merchant, K. Li, E. Hsu, R.A.F. Dixon, P. Vanderslice, and **R. Avazmohammadi**. Contractile adaptation of the left ventricle following myocardial infarction: Predictions by computational modeling. Biomedical Engineering Society Annual Meeting, San Antonio, Texas, October 2022.

30. R.R. Mehdi, E. Mendiola, A. Sears, R. Pettigrew, and **R. Avazmohammadi**. Estimation of myocardial mechanical properties by deep learning approach. Biomedical Engineering Society Annual Meeting, San Antonio, Texas, October 2022.

29. T. Mukherjee, S. Neelakantan, E. Mendiola, A. Burton, S. Sadayappan, and **R. Avazmohammdi**. Image-based inverse modeling to study the effect of myocardial stiffness on its relaxation. Society of Engineering Science Annual Meeting, College Station, Texas, October 2022.

28. S. Neelakantan, M. Kumar, R.R. Singh, S.E. Koch, J. Rubinstein, A.J. Burton, S. Sadayappan, and **R. Avazmohammadi**. Multiscale characterization of left ventricular diastolic dysfunction in diabetic and cardiac myosin binding protein-C phospho-ablated murine models. BCVS Scientific Sessions, Chicago, Illinois, July 2022.

27. L. Ning, M. Tomov, S. Zanella, B. Zambrano, **R. Avazmohammadi**, M. Mahmoudi, H. Bauser-Heaton, Vahid Serpooshan. Magnetic nanoparticle-mediated targeting of endothelium to address restenosis in a bioprinted in vitro model of pulmonary arteries. AHA Vascular Discovery: From Genes to Medicine Scientific Sessions, Seattle, Washington, May 2022.

26. S. Neelakantan, A. Vang, P. Nicely, G. Choudhary, and **R. Avazmohammadi**. Mechanical remodeling of the RV and PA in PH. American Thoracic Society Conference, San Francisco, California, May 2022.

25. S. Neelakantan, E.A. Mendiola, A. Burton, S. Sadayappan, Z. Wang, and **R. Avazmohammadi**. Stress relaxation behavior of left ventricular myocardium in mice. Experimental Biology, Philadelphia, Pennsylvania, April 2022.

24. E.A. Mendiola, S. Merchant, Q. Xiang, S. Neelakantan, E. Hsu, P. Vanderslice, and **R. Avazmohammadi**. Identification of infarct border zone using late gadolinium enhanced MRI in rats. Experimental Biology, Philadelphia, Pennsylvania, April 2022.

23. A. Clevenger, L. Crawford, D. Noltensmeyer, H. Babaei, S. Mabbott, **R. Avazmohammadi** and S. Raghavan. Novel 3D Biomimetic Peristalsis Bioreactor Capable of Multi-Axial Strain and Shear. Cellular and Molecular Bioengineering Conference, Indian Wells, California, January 2022.

22. S. Neelakantan, Q. Xiang, S. Chavan, K. Li, X. Ling, R. Dixon, M. Sacks, P. Vanderslice, and **R. Avazmohammadi**. Structural remodeling in the left ventricular myocardium underlies systolic dysfunction in myocardial infarction. American Heart Association Scientific Sessions 2021, Virtual Event, November 2021.

21. M. Keshavarzian, S. Neelakantan, L. McAllister, A. Leatherman, S. Frazier, C. Tong, and **R. Avazmohammadi**. Left ventricular free wall adaptations in heart failure with preserved ejection fraction: Insights from a murine model. American Heart Association Scientific Sessions 2021, Virtual Event, November 2021.

20. H. Babaei, E. Mendiola, and **R. Avazmohammadi**. A machine learning surrogate model to infer myocardial wall properties. Biomedical Engineering Society Annual Meeting, Orlando, Florida, October 2021.

19. M. Keshavarzian, S. Neelakantan, L. McAllister, C. Tong, and **R. Avazmohammadi**. An echocardiography-based approach toward myocardial stiffness quantification. Biomedical Engineering Society Annual Meeting, Orlando, Florida, October 2021.

18. M. Keshavarzian, S. Chavan, E. Fugate, M. Arif, D. Lindquist, S. Sadayappan, and **R. Avazmohammadi**. An image registration framework to estimate 3D myocardial strains from cine cardiac MRI in mice. International Conference on Functional Imaging and Modeling of the Heart, Virtual Event, June 2021.

17. S. Neelakantan, H. Babaei, and **R. Avazmohammadi**. Effects of Covid-19 inflammation on the regional behavior of the lung: A computational study. Summer Biomechanics, Bioengineering, and Biotransport Conference, Virtual Event, June 2021.

16. M. Keshavarzian, S. Neelakantan, L. McAllister, C. Tong, and **R. Avazmohammadi**. In-vivo estimation of myocardial elasticity in HFpEF using four-dimensional ultrasound imaging. Summer Biomechanics, Bioengineering, and Biotransport Conference, Virtual Event, June2021.

15. **R. Avazmohammdi**, A. Vang, S. Neelakantan, T. Mancini, D. da Silva Goncalves Bos, and G. Choudhary. Acute Functional Adaptation of the Right Ventricle in ARDS. American Thoracic Society Conference, Virtual Event, May 2021.

14. D. Bos, D. Leichter, A. Vang, A. Nicolas, M. Nowruzpour, **R. Avazmohammadi**, O. Leary, T. Mancini, R. Gilbert, G. Choudhary. Right ventricular myoarchitecture is associated with RV function in pulmonary arterial hypertension. American Heart Association Scientific Sessions 2020, Virtual Event, November 2020.

13. L. Crawford, M. Nowruzpour, **R. Avazmohammadi**, and S. Raghavan. Peristalsis bioreactor with concurrent multi-axial strain and shear stress to model mechanical microenvironment of the intestine. Biomedical Engineering Society Annual Meeting, Virtual Event, October 2020.

12. E. Mendiola, D. Li, **R. Avazmohammadi**, F. Sachse, and M. Sacks. A high-fidelity 3D micromechanical model of myocardium in the hypertensive heart. Biomedical Engineering Society Annual Meeting, Virtual Event, October 2020.

11. B. Jing, M. Tomov, A. Wijntjes, S. Bhamidipati, **R. Avazmohammadi**, H. Bauser-Heaton, V. Serpooshan, L. Brooks. Synthesis of ultrasound-compatible linear heart tube phantom using water-soluble 3D printed model for 3D ultrasound flow velocimetry. IEEE IUS 2020, Virtual Event, September 2020.

10. M. Tomov, A. Kumar, S. Bhamidipati, K. Do, L. Ning, L. Perez, A. Cetnar, N. Panoskaltsis, **R. Avazmohammadi**, A. Mantalaris, H. Bauser-Heaton, V. Serpooshan. A personalized, 3D printed in vitro model of vascular anastomosis in single ventricle heart defects. BCVS Scientific Sessions, Virtual Event, July 2020.

9. M. Tomov, A. Kumar, S. Bhamidipati, B. Jing, L. Ning, L. Perez, N. Panoskaltsis, B. Lindsay, **R. Avazmohammadi**, A. Mantalaris, V. Serpooshan, H. Bauser-Heaton. A patient-specific 3D bioprinted platform for in vitro disease modeling and treatment planning in pulmonary vein stenosis. BCVS Scientific Sessions, Virtual Event, July 2020.

8. **R. Avazmohammadi**, E. Mendiola, R. Dixon, and M. Sacks. A multiscale model of cardiac remodeling under pulmonary arterial hypertension: From organ to titin. American Heart Association Scientific Sessions 2019, Philadelphia, Pennsylvania, November 2019.

7. E. Mendiola, **R. Avazmohammadi**, and M. Sacks. Role of pericardium on cardiac function in normal and hypertensive hearts. Summer Biomechanics, Bioengineering, and Biotransport Conference, Seven Springs, Pennsylvania, June 2019.

6. **R. Avazmohammadi**, H. Nguyen, A.K. Miri. Effects of bioink rheological properties on the stability of extrusion bioprinting. Material Research Society Meeting, Boston, Massachusetts, November 2018.

5. E. Mendiola, H. Nguyen, **R. Avazmohammadi**, and M. Sacks. A computational study of the role of pericardium on cardiac function in normal and hypertensive hearts. Biomedical Engineering Society Annual Meeting, Atlanta, Georgia, October 2018.

4. **R. Avazmohammadi** and M. Sacks. A novel structural constitutive model for passive right ventricular myocardium: Toward an understanding of remodeling during pulmonary hypertension. Summer Biomechanics, Bioengineering, and Biotransport Conference, National Harbor, Maryland, June 2016.

3. **R. Avazmohammadi** and P. Ponte Castañeda. Homogenization-based model for macroscopic response, microstructure evolution, and macroscopic instability in particle-reinforced elastomers at finite deformations. SIAM Conference, Philadelphia, Pennsylvania, June 2013.

2. P. Ponte Castañeda and **R. Avazmohammadi**. Fiber-reinforced polymeric material systems: A multi-scale, elasto-viscoplastic homogenization approach. NSF CMMI Conference, Boston, Massachusetts, June 2012.

1. **R. Avazmohammadi** and P. Ponte Castañeda. On the effective post-bifurcation behavior of fiber-reinforced elastomeric composites under plane-strain loading. NSF CMMI Conference, Atlanta, Georgia, January 2011.

RESEARCH SUPPORT

Current

NHLBI/NIH (R01HL168368A1). Integrated super-resolution CMR-deep learning to deconvolute passive and active causes of impaired relaxation
Role: PI, Duration: 09/2024-08/2025

NHLBI/NIH Bridge Award (R56HL172052). Role of right ventricular passive remodeling in ventricular-arterial uncoupling in pulmonary hypertension,
Role: PI, Duration: 09/2024-08/2025

NSF-BMMB Program, Collaborative Research (2244995). Changes and impact of right ventricle viscoelasticity under acute stress and chronic pulmonary hypertension,
Role: PI, Duration: 07/2023-06/2026 Other PIs: Dr. Zhijie Wang and Dr. Naomi Chesler

Health Science Center Seedling Grant, **Texas A&M University**. Calcium to cross-bridge coupling in healthy and failing hearts,
Role: Co-I, Duration: 02/2025-01/2027 PI: Dr. Carl Tong

Targeted Proposal Teams Seed Grant, Texas A&M University. Integrated, AI-powered, mechano-energetic approach to identify the mechanisms of heart failure in cardiometabolic diseases,
Role: PI, Duration: 04/2025-03/2026 Other PIs: Dr. Carl Tong and Dr. Mahua Choudhury

2025 TAMU School of Engineering Medicine-Houston Methodist Seed Grant Award. Physics-Informed Risk-Stratification AI Tool to Predict Outcomes in Type B Aortic Dissection,
Role: PI, Duration: 09/2025-03/2027 Other PI: Dr. Maham Rahimi at Houston Methodist Hospital

Completed

NHLBI/NIH Pathway to Independence Award (K99-R00HL138288). The effect of systemic hypertension on prognosis of myocardial infarction: Understanding, prediction, and therapy evaluation,
Duration: 04/2020-03/2024

Biomedical Engineering-College of Veterinary Medicine Seed Grant, **Texas A&M University**. Machine learning to identify markers of sudden cardiac death in a natural canine model,
Role: PI, Duration: 05/2024-05/2025

T3 Seed Grant, **Texas A&M University**. Transmission efficiency and exposure risks of COVID-19 through aerosols: Prediction and mitigation,
Role: PI, Duration: 01/2021-12/2022

NIH Pathway to Independence Award (K99HL138288). The effect of systemic hypertension on prognosis of myocardial infarction: Understanding, prediction, and therapy evaluation,
Role: PI, Duration: 09/2018-12/2019

AHA Career Development Award (18CDA34110383). The effect of systemic hypertension on prognosis of myocardial infarction: Understanding, prediction, and design of stem cell interventions,
Role: PI, Duration: 07/2018-08/2018

NIH Postdoctoral Fellowship (F32HL132543). Adaptive remodeling of the right ventricle in response to pulmonary hypertension: towards physical understanding and prediction,
Role: PI, Duration: 05/2016-06/2018

TEACHING

Texas A&M University

- Soft Tissue Mechanics (BMEN 463/663) Spring 2021, 2022, 2023, 2024, 2025
- Orthopedic Biomechanics (BMEN 457/657) Spring 2020, Fall 2021, 2022, 2023, 2024

University of Texas at Austin

- Introduction to Computer Programming (ASE 301) Spring 2017

MENTORING

A. Postdoctoral Trainees / Research Associates

Name	Training Period	Prior Institution	Research Project Topic
Emilio Mendiola	October 2020 – Present	University of Texas at Austin	Transition from adaptive to maladaptive cardiac remodeling in pulmonary hypertension
Mohsen Nowruzpour	Jan 2020 – Dec 2020	Texas A&M University	Quantifying right ventricular architecture from diffusion tensor imaging
Maziyar Keshavarzian	Nov 2020 – April 2022	University of Texas at Dallas	Developing a software for automated processing of cine cardiac imaging in heart failure patients
Hamed Babaei	Jan 2021- Dec 2021	Iowa State University	Integrated machine learning-imaging for non-invasive characterization of myocardium

B. Doctoral Students

Name	Training Period	Prior Institution	Research Project Topic
Rahul Ghosh (Co-Advised)	Graduated May 2024	University of California, Los Angeles	Improving diagnostic reliability of CT scans through artificial intelligence
Sunder Neelakantan	Aug 2020 – Present	University of Pennsylvania	Contractile adaptation of the left ventricle post-myocardial infarction
Tanmay Mukherjee	Aug 2021 – Present	University of Southern California	Biomechanics of cardiotoxicity in radiation-induced cardiac injury
Rana Raza Mehdi	Jan 2022 – Present	Sejong University	Deep learning for the estimation of myocardial stiffness from cardiac strains
Vahid Naeini	Aug 2022 - Present	Tarbiat Modares University	Electromechanical modeling of the heart in mitral valve prolapse disease
Emilio Mendiola	Jan 2025 - Present	University of Texas at Austin	Micromechanical modeling of cardiac remodeling in myocardial infarction
Ajwad Mohimin	Jan 2025 - Present	Chittagong University of Engineering and Technology	Left ventricular hemodynamics in mitral valve prolapse

C.1. Master Students (Role: Chair)

Name	Training Period	Prior Institution	Research Project Topic	Dept/Degree
Seyed Babak Peighambari	Jan 2023- Aug 2024	Amirkabir University of Technology	CMR-based investigations of fluid-structure interactions in the left ventricle	BMEN/MS
Muhammad Usman	Sep 2022- May 2024	National University of Sciences and Technology	Deep learning for the estimation of myocardial architecture and from cardiac strains	BMEN/MS

C.2. Master Students (Hired as Student Workers/No Thesis)

Name	Training Period	Prior Institution	Research Project Topic	Dept/Degree

Srikanth Sampathkumar	Oct 2024-Present	College of Engineering Guindy	Non-invasive estimation of pulmonary pressure using machine learning	MEEN/MS
Neil Gautam	Sep 2024-Present	Vivek Anand School	Artificial intelligence-powered 4D echocardiography	CSE/MS
Amrutha Hasandka	Sep 2024-Dec 2024	Manipal Institute of Technology	Exploring cardiac mechano-energetic remodeling in heart failure	MBIOT/MS
Kanumuri Ruthvik	Sep 2024-Present	Amrita School of Computing	Machine-learning-based estimation of right ventricular volume	CSE/MS
Adhith Siddharthan	Sep 2023-June 2024	Vellore Institute of Technology	Machine-learning-based estimation of right ventricular volume	AERO/MEng
Mohammed Junaid Ahmed	Sep 2023-Jan 2024	B.M.S. College of Engineering	Non-invasive estimation of the pressure in the pulmonary artery	MEEN/MEng
Nandhini Manikandan	Jan 2023-Sep 2023	Amrita Vishwa Vidyapeetham	Calculations of cardiac strains as markers of cardiotoxicity	AERO/MEng
Suhas Kowshik	2021-2022	National Institute of Engineering	Simulations of cardiac patch to improve organ function	MEEN/MEng
Saurabh Chavan	2020-2021	Rajiv Gandhi Institute of Technology	Algorithm development to map architectural alterations in LVFW	MEEN/MEng
Sai Bhamidipati	2020-2021	Indian Institute of Technology	In-silico modeling of pulmonary arterial atresia	MEEN/MEng

D. Undergraduate Students

Name	Training Period	Research Project Topic
Mason Towery	Oct 2024- Dec 2024	Exploring novel measures of cardiac strains in subjects with radiation-induced cardiotoxicity
Tanner Waters	Jul 2023- Aug 2024	Analyzing cardiac strains in patients with diastolic dysfunction
Alexandra Koustova	Jul 2023- May 2024	Development of in-silico lung phantom from CT imaging
Haley Phelan	Aug 2021- Aug 2023	Characterization of myofiber architecture through histology and microscopy
Eric Wang	Jan 2022- Aug 2023	Reconstruction of left ventricular free wall microstructure through immunostaining
Izaiah Ramirez	2021-2022	Torsional adaptations in rats post myocardial infarction
Abby Leatherman	2020-2021	2D Echocardiographic assessment of diastolic dysfunction in mice
Shruti Prasad	2020	Characterization of myofiber architecture through mechanical testing
Vy Chu	2020	Segmentation of ultrasound images
Xiao Ling	2020	Developing a digital image correlation pipeline for cardiac tissues

E. Visiting Undergraduate Students

Name	Training Period	Institution	Research Project Topic
Moses Hamm	Summer 2024	Purdue University	Image-based non-invasive estimation of arterial pressure
Neha Muvvala	Summer 2023	UC Irvine	Image-based model of cardiac mechano-energetics
Muhammad Hanif	Summer 2023	TAMU Qatar campus	Development of in-silico lung phantom from CT imaging
Symeon Parpounas	Summer 2022	University of Cyprus	Characterization of collagen architecture through histology and microscopy
Melanie Pacheco	Spring 2022	Pontificia Universidad Católica de Chile	Developing a fluid-structure pipeline for the LV using moving boundary approach

F. Graduate Student (Thesis Committee Member)

Muhammad Usman (*Ph.D. in Biomedical Engineering*) 2025-Present
Syed Anas Nisar (*Ph.D. in Mechanical Engineering*) 2024-Present
Zahra Sadat Ghoreyshi (*Ph.D. in Biomedical Engineering*) 2024-Present
Mohamad Mohajeri (*Ph.D. in Biomedical Engineering*) 2024-Present
Swapnil Dolui (*Ph.D. in Biomedical Engineering*) 2024-Present
Yifan Wang (*Ph.D. in Biomedical Engineering*) 2024-Present
Md Hadiur Rahman (*Ph.D. in Electrical Engineering*) 2022-Present
Sharmin Majumder (*Ph.D. in Electrical Engineering*) 2022-Present
Sai Sree Chandra Sirani (*M.S. in Mechanical Engineering*) 2023-Present

Dheep Manish (*M.S. in Computer Science and Engineering*) Graduated 2024
Brandon Walther (*Ph.D. in Biomedical Engineering*) Graduated 2022
Jordan Ankersen (*Ph.D. in Biomedical Engineering*) Graduated 2023
Caleb Davis (*M.S. in Biomedical Engineering*) Graduated 2021

STUDENT AWARDS AND HONORS

- 2025 Biomedical Engineering Graduate Student Research Award, **Sunder Neelakantan**
- Finalist for the 2025 ASME-SB3C PhD Student Paper Competition, From myocardial infarction to heart failure: Role of tissue anisotropy and its prediction through probabilistic neural network, **Sunder Neelakantan**
- Travel award to deliver an oral presentation at the 2025 SPIE Medical Imaging Conference, **Sunder Neelakantan**
- TAMU Competitive Scholarship Non-Resident Tuition Waiver, September 2024 – May 2025, **Raza Mehdi**
- The NASA MUREP Innovation and Tech Transfer Idea Competition (MITTIC) finalist, Fall 2024, **A team of six mentee undergraduate students**
- American Heart Association Predoctoral Fellowship, January 2025 - December 2026, **Raza Mehdi**
- Hagler doctoral fellowship from Hagler Institute for Advanced Studies, January 2025-December 2025, **Raza Mehdi**

- 2024 CVRI symposium presentation award, Biomechanics of radiation-induced cardiotoxicity, **Tanmay Mukherjee**
- Runner-up award for the 2024 SB3C PhD Student Paper Competition, Deep learning-based biomechanical characterization of infarcted myocardium from strain imaging, **Raza Mehdi**
- Best abstract award and a junior trainee talk opportunity, 8th Annual Cardiovascular Bioengineering Symposium at Houston Methodist, **Seyed Babak Peighambari**
- Best abstract award, 8th Annual Cardiovascular Bioengineering Symposium at Houston Methodist, **Raza Mehdi**
- Hagler doctoral fellowship from Hagler Institute for Advanced Studies, June 2024-May 2025, **Sunder Neelakantan**
- American Heart Association Predoctoral Fellowship, January 2024 - December 2025, **Tanmay Mukherjee**
- Hagler doctoral fellowship from Hagler Institute for Advanced Studies, January 2023-December 2023 (Cancelled due to receiving an AHA fellowship), **Tanmay Mukherjee**
- Dissertation fellowship, Texas A&M University, 2023-2024, **Rahul Ghosh**
- Finalist for the 2024 SB3C MS Student Paper Competition. Computational modeling of left ventricular flow using CMR-derived four-dimensional wall motion, **Seyed Babak Peighambari**
- Finalist for the 2024 SB3C PhD Student Paper Competition. Deep learning-based biomechanical characterization of infarcted myocardium from strain imaging, **Raza Mehdi**
- Finalist for the 2024 SB3C PhD Student Paper Competition. The biomechanics of radiation-induced cardiotoxicity in mice, **Tanmay Mukherjee**
- 2023 CVRI symposium presentation award, Biomechanics of radiation-induced cardiotoxicity, **Tanmay Mukherjee**
- Travel award to deliver an oral presentation at the 2024 SPIE Medical Imaging Conference, **Tanmay Mukherjee**
- Honorable mention for a poster presentation, 2023 SPIE Medical Imaging Conference, **Sunder Neelakantan**

PROFESSIONAL SERVICES

Research Proposal Reviewer

- AHA, Artificial Intelligence to Advance Cardiovascular and Cerebrovascular Health, 2025.
- University of South Dakota Seed Grant Program, Extramural Reviewer, 2025.
- CDMRP, PRMRP, Cardiovascular Health, 2024.
- Additional Ventures, Single Ventricle Research Fund, 2024.
- NIH, Emerging Imaging Technologies and Applications (EITA) Study Section, 2023.
- NSF, Review Panel, 2021-2024.
- AHA, Career Development Award Panel, 2022, 2023.
- Catalan Biomedical Research Funding Programme (La Marató de TV3), 2023.
- Postdoctoral Fellowship, European Science Foundation, 2024.
- University of Nebraska System Internal Grant Program, Extramural Reviewer, 2023.

Book Editor

- Lead Editor in “Machine Learning in Cardiovascular Biomechanics: Function, Diagnosis, and Prediction.” Biomechanics of Living Organs Series, Vol. 10, Elsevier, To Be Published in 2026.

Journal Editorial Board

- Scientific Reports, Editorial Board Member
- Cardiovascular Toxicology, Editorial Board Member

Conference Program Committee Member

- International Conference on Functional Imaging and Modeling of the Heart, Dallas, Texas, June 2025.

Workshops

- Tutorial: In-silico phantom simulations for AI-powered 4D cardiac motion estimation. **R. Avazmohammadi**, K. Myers, T. Mukherjee. International Conference on Functional Imaging and Modeling of the Heart, Dallas, Texas, June 2025.

Conference Session Chair/Co-Chair

- AI & Machine Learning in Biofluids, ASME SB3C Summer Bioengineering Conference, Santa Ana Pueblo, New Mexico, June 2025.
- "Digital Twin Peaks": Geometry, Biophysics & Co., International Conference on Functional Imaging and Modeling of the Heart, Dallas, Texas, June 2025.
- AI-Associated Cardiovascular Engineering, Biomedical Engineering Society Annual Meeting, Baltimore, Maryland, October 2024.
- Computational and Multiscale Modeling in Biomechanics, Biomedical Engineering Society Annual Meeting, Baltimore, Maryland, October 2024.
- Image Segmentation Using Machine Learning, 46th Annual International Conference of the IEEE Engineering in Medicine & Biology Society, Orlando, Florida, July 2024.
- Clinical Engineering & Health Technology Management, 46th Annual International Conference of the IEEE Engineering in Medicine & Biology Society, Orlando, Florida, July 2024.
- Advancements in Experimental & Computational Cardiovascular Engineering, Biomedical Engineering Society Annual Meeting, Seattle, Washington, October 2023.
- Computational and Multiscale Modeling in Biomechanics, Biomedical Engineering Society Annual Meeting, Seattle, Washington, October 2023.
- Physics-Informed Modeling of Living Systems, Biomedical Engineering Society Annual Meeting, Seattle, Washington, October 2023.
- Biomechanics session, International Conference on Functional Imaging and Modeling of the Heart, Lyon, France, June 2023.
- Machine Learning in Cardiovascular Modeling and Simulations, Society of Engineering Science Annual Meeting, College Station, Texas, October 2022.
- Cellular and Molecular Biomechanics: Mechanobiology, Biomedical Engineering Society Annual Meeting, Orlando, Florida, October 2021.
- Matrix Effects in Mechanobiology, Biomedical Engineering Society Annual Meeting, Orlando, Florida, October 2021.
- Thrombosis and Hemostasis, Biomedical Engineering Society Annual Meeting, Orlando, Florida, October 2021.
- Biomechanics of Vascular Pathologies, Biomedical Engineering Society Annual Meeting, Philadelphia, Pennsylvania, October 2019.
- Cardiac Mechanics III- Cardiac Function, 16th International Conference on Computer Methods in Biomechanics and Biomedical Engineering, NYC, New York, August 2019.
- Maturation and Remodeling in Native and Engineered Soft Collagenous Tissues, U.S. National Congress on Computational Mechanics, Austin, Texas, July 2019.
- Growth and Remodeling of Living Matter, 18th U.S. National Congress on Theoretical and Applied Mechanics, Rosemont, Illinois, June 2018.

- Growth and Remodeling of Living Matter, Society of Engineering Science, 54th Annual Technical Meeting, Boston, Massachusetts, July 2017.

Journal Reviewer

•Acta Biomaterialia •American Journal of Physiology-Lung Cellular and Molecular Physiology •Annals of Biomedical Engineering •Biomaterials •Bioactive Materials •Bioengineering & Translational Medicine •Biomechanics and Modeling in Mechanobiology •Biophysical Journal •Blood Pressure •British Journal of Radiology •Cardiovascular Diagnosis and Therapy •Cardiovascular Engineering and Technology •Computer Methods and Programs in Biomedicine •Computer Methods in Biomechanics and Biomedical Engineering •Computers in Biology and Medicine •Engineering with Computers •Experimental Mechanics •Frontiers in Bioengineering and Biotechnology •Frontiers in Physiology •Heart and Vessels •Genes & Diseases •Heart and Vessels •International Journal for Numerical Methods in Biomedical Engineering •International Journal of Solids and Structures •iScience •Journal of Biomechanics •Journal of Biomedical Engineering •Journal of Elasticity •Journal of Inflammation Research •Journal of the Mechanical Behavior of Biomedical Materials •Journal of the Mechanics and Physics of Solids •Journal of the Royal Society Interface •Medical & Biological Engineering & Computing •MDPI Bioengineering •MDPI Cells •Medical Physics •MethodsX •Nanoscale •npj Regenerative Medicine •PLOS One •PLOS Computational Biology •Quantitative Imaging in Medicine and Surgery •Scientific Reports •The Journal of Physiology

Textbook Reviewer

- Springer

Conference Abstract/Paper Reviewer

- International Conference on Functional Imaging and Modeling of the Heart, Dallas, Texas, June 2025.
- Biomedical Engineering Society Annual Meeting, Baltimore, Maryland, October, 2024.
- Summer Biomechanics, Bioengineering, and Biotransport, Lake Geneva, Wisconsin, June, 2024.
- Biomedical Engineering Society Annual Meeting, Seattle, Washington, October, 2023.
- Summer Biomechanics, Bioengineering, and Biotransport, Vail, Colorado, June, 2023.
- Biomedical Engineering Society Annual Meeting, Orlando, Florida, October, 2021.
- Summer Biomechanics, Bioengineering, and Biotransport, Virtual, June, 2021.
- Biomedical Engineering Society Annual Meeting, Virtual, October, 2020.
- Summer Biomechanics, Bioengineering, and Biotransport, Virtual, June, 2020.
- Biomedical Engineering Society Annual Meeting, Philadelphia, Pennsylvania, October, 2019.
- Summer Biomechanics, Bioengineering, and Biotransport, Seven Springs, Pennsylvania, June, 2019.
- Biomedical Engineering Society Annual Meeting, Atlanta, Georgia, October, 2018.
- Society of Engineering Science 54nd Annual Technical Meeting, Northwestern University, July, 2017.

Professional Affiliation

- American Heart Association (AHA)
    - Council on Basic Cardiovascular Sciences (BCVS)
    - Council on Cardiovascular Radiology and Intervention (CVRI)
- American Physiological Society (APS)
- American Society of Mechanical Engineers (ASME)
- American Thoracic Society (ATS)
- Biomedical Engineering Society (BMES)
- Computing in Cardiology (CinC)
- European Society of Cardiology (ESC)
    - Working Group on e-Cardiology
    - European Association of Cardiovascular Imaging (EACVI)

- Functional Imaging and Modeling of the Heart (FIMH)
- IEEE Engineering in Medicine and Biology Society (EMBC)
- Society of Engineering Science (SES)
- Society of Photo-Optical Instrumentation Engineers (SPIE)
- United States Association for Computational Mechanics (USACM)