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Engineering & Scientific Consulting

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Professional Profile

Dr. Wang specializes in tissue mechanics and injury biomechanics. He develops experimental and computational methods to characterize the material properties of soft biological tissues, and applies this knowledge to evaluate mechanical loading, identify failure mechanisms, and assess injury potential. His work is highly interdisciplinary, involving collaborations with clinicians, pathologists, and imaging specialists to bridge engineering principals with real-world biomechanics challenges in injury assessments and medical device evaluations.

Dr. Wang has extensive experience in material testing of biological tissue, image-based modeling, finite element analysis (FEA), and sensor systems for biomechanical evaluation. He has also designed and implemented custom testing protocols and fixtures to replicate physiological loading conditions. By integrating these skills, he provides comprehensive analyses that link experimental findings with real-world injury scenarios.

Prior to joining Exponent, Dr. Wang was a Graduate Research Assistant in the Cardiovascular Pathomechanics Laboratory at Texas A&M University. In his doctoral research, Dr. Wang developed and validated a novel computational framework for characterizing arterial material properties from imaging data. He applied this framework to quantify multi-component material properties in human coronary arteries and investigate predictive stiffness values for plaque rupture — the primary cause of heart attacks. Dr. Wang also completed a post-baccalaureate fellowship with Rice360 Institute for Global Health Technologies, where he contributed to the development of medical technologies for neonatal health in low-resource settings in sub-Saharan Africa. In this role, he gained extensive experience in medical device research and development (R&D), needs finding, usability testing, and design for global health applications.

Academic Credentials & Professional Honors

Ph.D., Biomedical Engineering, Texas A&M University, 2025

M.S., Biomedical Engineering, University of Utah, 2023

B.S., Mechanical & Biomedical Engineering, Carnegie Mellon University, 2017

Tau Beta Pi Engineering Honor Society

Prior Experience

Graduate Research Assistant, Cardiovascular Pathomechanics Lab, 2019-2025

Post-baccalaureate Fellow, Rice360 Institute for Global Health Technologies, 2017-2019

Publications

Wang YJ, Ferruzzi J, Merchant SS, Yeoh S, Maas SA, Weiss JA, Hsu EW, Timmins LH. An image-based computational framework to evaluate the material stiffness of arterial tissue with high-resolution magnetic resonance imaging. Journal of Biomechanical Engineering 2025; 147(9): 091009.

Berggren CC, **Wang YJ**, Sigler AMF, Timmins LH. Focal comparison of experimental and finite element derived strain fields in a 3D IVUS-based computational model of vascular tissue under loading. Journal of Biomechanics 2025; 187:112689.

Berggren CC*, Jiang D*, **Wang YJ***, Bergquist JA, Rupp LC, Liu Z, MacLeoad R, Narayan A, Timmins LH. Influence of material parameter variability on the predicted coronary artery biomechanical environment via uncertainty quantification. Biomechanics and Modeling in Mechanobiology 2024; 23(3):927–940. *Equal contributions

Asma E, Heenan M, Banda G, Kirby RP, Mangwiro L, Acemyan CZ, Palamountain KM, Kortum P, Kawaza K, Oden ZM, Richards-Kortum R, Technical Collaborative Authorship Group (**Wang YJ**, et al.). Avoid equipment graveyards: rigorous process to improve identification and procurement of effective, affordable, and usable newborn devices in low-resource hospital settings. BMC Pediatrics 2023; 23(Suppl 2):569.

Presentations

Wang YJ, Berggren CC, Yeoh S, Maas SA, Weiss JA, Hsu EW, Timmins LH. Multicomponent mechanical characterization of diseased human coronary artery with image-based computational framework. Poster presentation, ASME SB3C Summer Bioengineering Conference, Santa Ana Pueblo, NM, 2025.

Timmins LH, Usman M, **Wang YJ**, Berggren CC, Jiang D. Computational modeling of the coronary artery biomechanical environment in the setting of uncertainty. Podium presentation, the 10th International Biofluid Mechanics and Mechanobiology Symposium (IBMS 10), Irvine, CA, 2025.

Wang YJ, Ferruzzi J, Maas SA, Weiss JA, Timmins LH. An image-based computational framework to estimate material properties of human coronary lesions. Podium presentation, International symposium on computer methods in biomechanics and biomedical engineering (CMBBE), Vancouver, Canada, 2024.

Wang YJ, Ferruzzi J, Maas SA, Weiss JA, Timmins LH. An image-based computational framework to estimate material properties of human coronary lesions. Podium presentation, Texas A&M 7th Annual Biomedical Engineering Graduate Research Symposium (GRS), College Station, TX, 2024.

Wang YJ, Ferruzzi J, Maas SA, Weiss JA, Timmins LH. An image-based computational framework to estimate material properties of human coronary lesions. Poster presentation, Methodist Research Institute 8th Annual Cardiovascular Bioengineering Symposium, Houston, TX, 2024.

Wang YJ, Maas SA, Weiss JA, Timmins LH. A novel image-based computational framework to evaluate material properties of arterial tissue from high-resolution magnetic resonance image data. Podium presentation, Summer Biomechanics, Bioengineering and Biotransport Conference (SB3C), Vail, CO, 2023.

Berggren CC, Jiang D, **Wang YJ**, Bergquist JA, Rupp LC, Liu Z, MacLeoad R, Narayan A, Timmins LH. Influence of material parameter variability on the predicted coronary artery biomechanical environment via uncertainty quantification. Podium presentation, Summer Biomechanics, Bioengineering and Biotransport Conference (SB3C), Vail, CO, 2023.

Berggren CC, **Wang YJ**, Timmins LH. Establishment of a validated finite element framework to predict the 3D, patient specific arterial mechanical environment. Poster presentation, Summer Biomechanics, Bioengineering and Biotransport Conference (SB3C), Vail, CO, 2023.

Wang YJ, Hsu EW, Timmins LH. A novel image-based computational framework to evaluate in vivo material properties of arterial tissues. Poster presentation, Biomedical Engineering Society (BMES) Annual Meeting, San Antonio, TX, 2022.

Additional Education & Training

Rice360 Global Health Fellowship, 2017-2019