Department of Biomedical Engineering
UNIVERSITY OF WISCONSIN–MADISON

Spring 2026
Seminar Series

Aortic biomechanics and mechanobiology and a vision for the future of UW BME

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The extracellular matrix protein, elastin, provides reversible extensibility to the aorta that is critical for proper function of the cardiovascular system. Elastin is deposited during late embryonic and early postnatal growth, at the same time that blood pressure and flow are increasing. This relationship suggests that mechanobiological signals for elastin deposition are linked to hemodynamic forces. I will discuss how reduced or absent elastin affects aortic mechanics, cardiovascular hemodynamics, aortic wall development, and gene expression in genetically modified mouse models. I will introduce mathematical models that we use to better understand the cause and effect relationships between elastin amounts and cardiovascular hemodynamics. I will show preliminary data on how reduced elastin may affect smooth muscle cell mechanosensing leading to phenotypic changes associated with disease. The combination of experimental work and mathematical modeling will advance our understanding of how the aortic wall is constructed to provide appropriate extensibility for normal cardiovascular function and uncover novel treatment options for cardiovascular diseases associated with elastin defects. I will also discuss my vision to promote and support high-impact research initiatives, development efforts, and the instructional mission in the UW BME department.

ABOUT the SPEAKER

Dr. Jessica Wagenseil is a Professor of Mechanical Engineering and Materials Science and the Vice Dean for Faculty Advancement in the McKelvey School of Engineering at Washington University. She studies vascular mechanics and mechanobiology, specifically focusing on extracellular matrix and aortic wall remodeling in development and disease. Her work is important for determining clinical interventions for diseases such as arterial stiffening, stenosis, and thoracic aortic aneurysms. Her work has been funded by the National Institutes of Health, National Science Foundation, American Heart Association, and the Marfan Foundation. She received the American Society for Matrix Biology Iozzo Award for Mid-Career Investigators. She is a Fellow of the Biomedical Engineering Society, the American Society of Mechanical Engineering, and the American Institute for Medical and Biological Engineering.

Dr. Wagenseil received her BS in Bioengineering from UC San Diego, her DSc in Biomedical Engineering from Washington University, and completed a postdoctoral fellowship in Cell Biology and Physiology at the Washington University School of Medicine. Her first faculty position was in Biomedical Engineering at Saint Louis University, and she moved to Washington University in 2013. Beyond her internationally recognized research program, Dr. Wagenseil is committed to educating and mentoring students and has a demonstrated record of transparent and engaging leadership in faculty, research, and PhD program administration.

Monday, February 16 at Noon
1003 Engineering Centers (Tong Auditorium)