



Department of
Biomedical Engineering

UNIVERSITY OF WISCONSIN-MADISON

Celebrating 25 Years

Spring 2025
Seminar Series

The Death and Re-Birth of the Intervertebral Disc Cell

Lori A. Setton, PhD

Chair of Biomedical Engineering and Lopata Distinguished Professor
McKelvey School of Engineering
Washington University in St. Louis

Corrine Bahr Memorial Lecture

Intervertebral disc disorders are among the greatest contributors to pain and disability annually, such that low back pain and neck pain are ranked #1 and #4 for disease impact globally. Microenvironmental conditions for resident cells of the intervertebral disc contribute to an early decrease in cellularity, and associated tissue destruction, loss of hydration and eventual disc collapse or herniation. The most vulnerable of disc cells are the nucleus pulposus cells, derived from embryonic notochord, that are distinct from the neighboring mesenchymal cells that form the annulus fibrosus. Our laboratory has studied the micromechanical environment of these nucleus pulposus cells and factors that regulate nucleus pulposus cell phenotype and biosynthesis. We have demonstrated an ability to promote biosynthesis and survival by presenting key peptides and proteins to pathological nucleus pulposus cells, that replicate some features of notochordal development. We have also advanced knowledge of environmental cues that promote a healthy, biosynthetically active nucleus pulposus cell, and identified biomaterial strategies to restore a healthy environment for the pathological disc. This talk will review an understanding of the micromechanical environment and mechanobiology of the disc cells, and our work with engineering substrates and protein-conjugated biomaterials to promote matrix regeneration, cell differentiation and consequently cell “re-birth” in the intervertebral disc.



ABOUT the SPEAKER

In 2015, Lori A. Setton joined Washington University in St. Louis as the Lucy and Stanley Lopata Distinguished Professor of Biomedical Engineering from Duke University, where she was the William Bevan Professor of Biomedical Engineering and Bass Fellow and associate professor of orthopaedic surgery. She joined the Duke faculty in 1995. She is a fellow of the Biomedical Engineering Society and of the American Institute of Biological and Medical Engineering and earned a Presidential Early Career Award from Scientists and Engineers (PECASE) in 1997, as well as several awards for excellence in mentoring.

Professor Setton earned master's and doctoral degrees, both in mechanical engineering and biomechanics, in 1988 and 1993, respectively, from Columbia University. She earned a bachelor's degree in mechanical and aerospace engineering from Princeton University.

Corrine Bahr Memorial Lecture Series: Every year, the biomedical engineering department at the UW–Madison hosts an honorary speaker selected by the student community in memoir of one departments pioneers, Corrine Bahr. Corrine was the department's administrator who was always characterized by her commitment to support both students and faculty who came from diverse places and cultures and making them feel like home here at Madison.

Monday, March 31 at Noon
1003 Engineering Centers (Tong Auditorium)

