



Thomas J. Royston, Ph.D.

Interim Vice Chancellor for Innovation and Strategic Partnerships, University of Illinois

Date Friday, February 6, 2026

Time 12:00 to 1:00 PM

Location CBB 108

Title: *Force, Fibers, Finiteness, Fractals and Fractional Calculus in Elastography*

Abstract: Join us for an BME seminar on how dynamic elastography attempts to reconstruct quantitative maps of the viscoelastic properties of materials by noninvasively measuring mechanical wave motion in them. The target motion is typically transversely-polarized relative to the wave propagation direction, such as bulk shear wave motion. In addition to neglecting waveguide effects caused by small lengths in one dimension or more, many reconstruction strategies also ignore nonzero, non-isotropic quasi-static preloads. Significant anisotropic prestress is inherent to the functional role of some biological materials of interest, which also are small in size relative to shear wavelengths in one or more dimensions. In our research we examine the interplay between the confounding effects of nonzero stress conditions, anisotropy and finite boundaries. A coordinate transformation approach to simplify the reconstruction of prestressed transversely isotropic material properties based on elastography measurements is introduced.

Bio: Thomas J. Royston is the interim vice chancellor for innovation and strategic partnerships at the University of Illinois Chicago in 2024. Royston also is a professor and head of the Richard and Loan Hill Department of Biomedical Engineering.

A highly respected scholar and scientist, Royston is renowned for his research in mechanical wave motion and its applications in medical diagnostics and therapies. His numerous accolades include the National Institute of Biomedical Imaging and Bioengineering's Nagy Award and the Acoustical Society of America Lindsay Award. Additionally, he is a fellow of the Acoustical Society of America, the American Institute for Medical and Biological Engineering, and the American Society of Mechanical Engineers.