# BI-CO MATHEMATICS COLLOQUIUM


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*"Differential growth and residual stress in cylindrical elastic structures"*

## Wednesday, January 21, 2009

Talk at 4:15 – Park 328
Tea at 4:00 – Park 355, Math Lounge


**Abstract:**

Cylindrical forms are among one of nature's fundamental building blocks. They serve many different purposes from sustaining body weight to carrying flows. Their mechanical properties are generated through the often complex arrangements of the walls. In particular, in many structures which have elastic responses such as stems and arteries, the walls are in a state of tension generated by differential growth. Here, we study the role of tissue tension in the overall rigidity and stability of the cylinder. A detailed analysis, based on nonlinear elasticity, of the effect of tissue tension on the mechanical properties of growing cylinders reveal a subtle interplay between geometry, growth, and nonlinear elastic responses that help understand some of the remarkable properties of stems and arteries.


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