

UNIVERSITY OF CONNECTICUT



INSTITUTE OF MATERIALS SCIENCE

POLYMER PROGRAM SEMINAR

“The Hierarchical Structure and Mechanics of Plants”

**Prof. Lorna J. Gibson
MIT**

**Friday, February 28, 2014
1:30 PM, IMS Room 20**

The cell walls in plant tissues are made up of just four basic building blocks: cellulose, the main structural fiber of the plant kingdom, hemicellulose, lignin and pectin. Although the microstructure of plant cell walls varies in different types of plants, broadly speaking, cellulose fibers reinforce a matrix of hemicellulose and either pectin or lignin. The cellular structure of plants varies from the honeycomb-like cells of wood to the closed-cell, liquid-filled foam-like parenchyma cells of apples and potatoes. The arrangement of the four basic building blocks plant cell walls and the variations in cellular structure give rise to a remarkably wide range of mechanical properties: the Young's moduli span 4 orders of magnitude while the compressive strengths span nearly 3 orders of magnitude. Here, we review the microstructure of both the cell wall and the cellular structure in four plant materials (wood, arborescent palm stems, bamboo and parenchyma) to explain the wide range in mechanical properties in plants.

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