



Fine Lecture

Lorna Gibson

Professor

Materials Science and Engineering
Massachusetts Institute of Technology

Tuesday, October 11, 2016

4:00pm, Tech L361

Reception to follow in the Willens Wing Atrium

Structure and Mechanics of Bamboo

Bamboo is an abundant, sustainable resource. Traditional bamboo structures use entire culms for framing and woven mats for paneling. Recently, there has been increasing interest in structural bamboo products, engineered materials analogous to wood products such as plywood, oriented strand board and glue-laminated timber. The use of structural bamboo products is limited by lack of material property data and appropriate building codes. In this talk, the structure and mechanical properties of Moso bamboo, the most commercially important species in China, are described. Models, based on composites and cellular solids, give a good description of the data for the compressive and flexural properties. The flexural properties of Moso bamboo are also compared with those of two other commercially important species: Guadua, grown in South America, and Tre Gai, from Vietnam. A model for Moso bamboo OSB, based on a model of wood OSB, available in the literature, is then described; the model gives a good description of the Young's modulus of Moso bamboo OSB..

Biography:

Professor Lorna Gibson graduated in Civil Engineering from the University of Toronto and obtained her Ph.D. from the University of Cambridge. She was an Assistant Professor in Civil Engineering at the University of British Columbia for two years before moving to MIT where she is currently the Matoula S. Salapatas Professor of Materials Science and Engineering. Her research interests focus on the mechanics of materials with a cellular structure such as engineering honeycombs and foams, natural materials such as wood, leaves and bamboo and medical materials such as trabecular bone and tissue engineering scaffolds. She is the co-author of *Cellular Solids: Structure and Properties* (with MF Ashby) and of *Cellular Materials in Nature and Medicine* (with MF Ashby and BA Harley). Recent projects include balsa as a model for bioinspired design of engineering materials; structural bamboo products, analogous to wood products such as oriented strand board; and aerogels for thermal insulation. She teaches two subjects: Mechanical Behavior of Materials and Cellular Solids: Structure, Properties and Applications; both are also offered online through edX. She was recently named a MacVicar Faculty Fellow, MIT's top award for undergraduate teaching. She has served as Chair of the Faculty and Associate Provost at MIT.