Plant Cell Wall Biomechanics: model and multiscale analysis

Dr. Brian Seguin (Department of Mathematics, University of Dundee, UK)

I will present a microscopic model for plant cell wall biomechanics that takes into account both the microstructure coming from the cellulose microfibrils and the chemical reactions between the cell walls constituents. Particular attention is paid to the role of pectin and the impact of calcium-pectin cross-linking chemistry on the mechanical properties of the cell wall. An outline of how to prove existence and uniqueness of the microscopic system will be given. Finally, a multiscale analysis in the form of homogenization is carried out to obtain a macroscopic model with the hope that the results of numerical simulations can be compared with experiments. I will include a brief introduction to homogenization in my talk.