1137-92-105 **Mikahl Banwarth-Kuhn**, **Ali Nematbakhsh**, **Weitao Chen**, **Stephen Snipes**, **Andrew Whitaker**, **Venugopala Gonehal** and **Mark Alber*** (malber@ucr.edu), Department of Mathematics, University of California, Riverside, Surge 246, Riverside, CA 92521. *Coupled experimental and computational study of the interplay of mechanical properties and chemical signaling in patterns of stem cell division and differentiation in plants.*

One of the central problems in developmental biology is how chemical and mechanical signals interact in a tissue to produce the final form, size and function of an organ. Cell wall extensibility and distribution of stress contribute to determining rates of cell expansion and orientation of cell division. How cell wall mechanical properties influence cell behavior and how chemical gradients regulating cell mechanical properties are maintained is largely unknown. First, the biological background of the shoot apical meristems (SAMs) of Arabidopsis will be presented. Second, a novel, multi-scale, computational model of the mechanical properties of the SAM will be described along with model calibration using experimental data. Third, a novel signaling model will be demonstrated. Model predictive simulations reveal relative impacts of cell wall extensibility, distribution of stress, and chemical signals on growth rate and division plane orientation in the SAM and illuminate the relationship between individual cell processes and global tissue patterns in stem cell maintenance and differentiation. Multiscale modeling platform provides novel biological insights about stem cells that can be used for studying development of cancerous cells including epithelial cells in the colon. (Received January 29, 2018)