1144-92-224 **Mikahl Banwarth-Kuhn*** (mbkuhn@math.ucr.edu), **Ali Nematbakhsh**, **Stephen Snipes**, **Kevin Rodriguez**, **Carolyn Rasmussen**, **G. Venugopala Reddy** and **Mark Alber**. *Study of how Regulation of Mechanical Properties of Stem Cells in Plants Determines Shape of a Developing Tissue.*

One of the central problems in animal and plant developmental biology is deciphering how chemical and mechanical signals interact within a tissue to regulate cell behavior and produce the final shape, size and function of an organ. To address this problem, a novel, multi-scale, cell-based computational model of the stem cells of the shoot apical meristem (SAM) of Arabidopsis thaliana is developed and calibrated using experimental data. Novel features of the model include separate, detailed descriptions of cell wall extensibility and mechanical stiffness, the middle lamella and the dynamics of increase in cytoplasmic pressure generating internal turgor pressure. Model simulations are used to test a novel hypothesized mechanism of formation of the shape and structure of the growing, multilayered SAM. It combines contributions of mechanical properties of sub-cellular components of individual cells determining anisotropic cell expansion across three different SAM layers, and varied cell growth rates based on WUS concentrations of individual cells. Model predictive simulations also provide a detailed distribution of stresses in the growing tissue which can be tested in future experiments. (Received August 26, 2018)