The “Rooty Tooty Funny Fruities” present:

“An Agent-Based Model of Plant Cells to Investigate Lateral Root Development”

By Jan Hurt, Ravi Ranjan, and Helen Scott\*

\*Corresponding author: Helen Scott ([hscott@bu.edu](mailto:hscott@bu.edu))

Lateral root development serves as an excellent model system for studying plant organogenesis due to its well-defined stages and cellular processes. A central challenge in studying lateral root development is to understand how mechanisms at one level of biological scale (i.e., cell-level) interact to produce higher-level (i.e., tissue-level) phenomena. Agent-based modeling (ABM) is a computational technique that can be used to model collections of individual biological cells and compute their interactions, which generate emergent tissue-level results. While ABMs of bacterial or animal cells have been developed, in plant science ABMs have predominately operated at larger scales, where agents represent individual plants or plant building blocks (aka metamers). Here we present an agent-based model of growing plant cells, which must follow different physical rules than bacterial or animal cells. Future work will use this ABM to investigate lateral root formation and organogenesis.