1023-92-1820 **Eric Mjolsness*** (emj@uci.edu), Departments of Computer Science & Mathematics, University of California, Irvine, CA 92697, **Marcus Heisler**, California Institute of Technology, CA, **Henrik Jonsson**, Lund University, Sweden, **Elliot Meyerowitz**, California Institute of Technology, CA , and **Bruce Shapiro**, California Institute of Technology, CA. *Mathematical models of likely mechanisms for phyllotaxis: Polarized auxin transport, cell growth, and dynamic connectivity.*

A collaboration between mathematical, computational, and biological specialists was created in order to obtain and explain new observations of the phyllotactic pattern in the shoot apical meristem (SAM) of the plant Arabidopsis thaliana. Key elements of the resulting family of mathematical models that seem to agree with experiment include (1) a positive feedback loop between auxin concentration and the directionality of subcellular localization of proteins that regulate the transport of auxin; (2) the continual growth of SAM cells until a division threshold is reached; and (3) the changes in connectivity in the roughly polyhedral subdivision of a three-dimensional tissue comprised by these cells as they grow and divide. We suggest some directions for relevant mathematical frameworks for modeling in developmental biology. (Received September 26, 2006)