1125-92-1249 **Kang-Ling Liao*** (kangling325@gmail.com), NC, and **Roger D. Jones** (rogerdjonesphd@gmail.com), **Patrick McCarter** (pcmccart@email.unc.edu), **Meral Tunc-Ozdemir** (meraltuncozdemir@gmail.com), **James A. Draper** (drapja@live.unc.edu), **Timothy C. Elston** (timothy_elston@med.unc.edu), **David Kramer** (kramerd8@cns.msu.edu) and **Alan M. Jones** (alanjones@bio.unc.edu). *A shadow detector for photosynthesis efficiency.*

Plants tolerate large variations in the intensity of the light environment by controlling the efficiency of solar to chemical energy conversion. To do this, plants have a mechanism to detect the intensity, duration, and rapid change in light as they experience moving shadows, flickering light, and cloud cover. Our previous work used experiments and mathematical model to show that the heterotrimeric G protein complex in plant including its receptor-like Regulator of G signaling protein, AtRGS1, detects both the concentration and the exposure time of sugars. In this talk, I will use numerical simulation and experiments to show that another property of the signaling system is to detect large changes in light while at the same time, filtering types of fluctuation in light that do not affect photosynthesis efficiency. When AtRGS1 is genetically ablated, photosynthesis efficiency is reduced in a changing- but not a constant-light environment. Our mathematical modeling revealed that information about changes in the light environment is encoded in the amount of free AtRGS1 that becomes compartmentalized following stimulation. We propose that this property determines when to adjust photosynthetic efficiency in an environment where light intensity changes abruptly caused by moving shadows. (Received September 15, 2016)