

Opportunity for Emergent Disciplines at the Interface of Engineering and Plant Science

William D Beavis and Lizhi Wang

Departments of Agronomy and Industrial and Manufacturing Systems Engineering

Iowa State University

wdbbeavis@iastate.edu and lzwang@iastate.edu

From the philosophers to the practitioners of science, it is now recognized that the most important scientific advances occur at the interfaces of scientific disciplines. It is well documented that both special and general theories of relativity emerged at the interface of physics and geometry. In our own generation we have seen the emergence of Bioinformatics and Computational Biology at the interface of Biology and Computer Science. Such an opportunity now exists at the interface of engineering and plant science. The emergence of breakthroughs and new disciplines at the interface of engineering and plant science will require cross-disciplinary education. While there will be a few adventurous scientists from plant science and engineering who will accept the challenge of learning each other's disciplines, most established scientists in each discipline will view each other as either 'tool makers' to advance discoveries in plant science or 'new markets' for engineering tools. Recognizing these distinctions and opportunities, six years ago we began learning each other's disciplines and cross educating each other's graduate students. After several 'outstanding' (but unfunded) grant proposals to federal funding agencies as well as several successfully funded proposals to commercial seed companies, we are beginning to recognize some educational lessons as well as some emergent properties at the interface of plant breeding and systems engineering.