**Current Topics in Plant Biology**

**PLS/MCB/EEB 560**

**Fall semester 2011**

**M, W, F 9:00-9:50 AM**

**Education Building, room 432**

**3 Credits**

**Instructor: Dr. Karen Schumaker**

**Course Description and Objectives**

This course will build on your fundamental knowledge in the fields of plant biology, genetics, molecular biology, and biochemistry to enable you to gain a better understanding of plant regulatory processes involved in growth and development and how these processes change during plant interactions with the environment and with other organisms. Information will be presented through lectures, review of the primary literature, and classroom discussions. An equally important goal will be to foster development of the skills needed to critically evaluate the primary research literature and effectively communicate scientific concepts orally and in writing.

In fall 2011, we will discuss major advances in the field of plant signaling during growth and development and in plant interactions with the environment, pathogens, and insects. Along the way, we will interpret formative experiments and identify key outstanding questions for these interactions. Through the use of comparative studies at the molecular, genetic, and genomic levels, we will identify evolutionary changes in key molecular players that form the basis for these interactions.

**Examples of signaling during growth and development:**

* The role of auxin signaling in the regulation of plant body plan patterning during embryogenesis
* How plants sense light and coordinate the molecular events underlying photomorphogenesis
* The signaling networks that maintain the position and activity of stem cells within the shoot apical meristem and that organize the initiation of lateral organs on the meristem periphery
* Signaling pathways that give rise to the precise arrangements of stomatal complexes
* Contributions of miRNAs to the regulation of the transition to flowering
* Signaling molecules and downstream genetic pathways that direct differentiation of distinct cell types during reproductive development
* Contribution of small regulatory RNAs to the specification of floral organ identity and the control of floral organ shape and size
* Transcriptional regulation of phenotypic variation

**Examples of signaling during plant interaction:**

* Communication between plant and fungal symbionts
* Kinase signaling and the plant immune system
* Hormone signaling during systemic acquired resistance
* Chemical signals involved in plant-insect interactions
* Phosphorylation and regulation of ion homeostasis during salinity stress

**Format**

Lectures

Discussion of the primary literature

Classroom discussions

In and out of class activities

**Skill Development**

 Critically read and evaluate the primary literature

 Clearly and concisely present data orally and in writing

**Graded Activities (subject to modification)**

Journal club discussions

 As leader

 As participant

 Written summaries

 Take home exam

**Course prerequisites**

Upper division undergraduate courses in genetics, molecular biology, plant development, and biochemistry are recommended.

For more information or if you have questions, please contact Dr. Karen Schumaker (schumake@ag.arizona.edu)