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TEMASEK LIFESCIENCES LABORATORY

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Sem Rm 05-41 (Level 5)

Stomatal development as a model system for cell specification and environmental signaling

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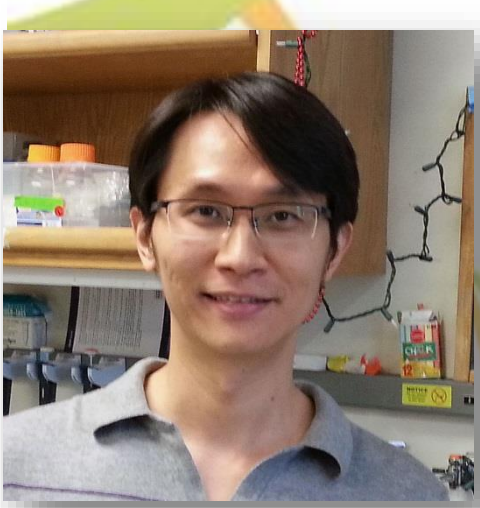
Stomata are epidermal pores critical for water and gas exchange in plants. The production and patterning of the stomatal guard cells requires processes fundamental to cell and developmental biology, such as specifying cell fate, creating cell polarity and regulating stem cell-like divisions. In my talk, I will discuss my recent work on the initiation of the stem cell behavior in this lineage. I took a genome-scale approach, first identifying the targets of a master transcription factor through an improved ChIP assay and then integrating this information with other large-scale resources. From these analyses, I could define new features involved in cell polarity and signaling. Many decades of work have indicated that stomata are critical for optimal physiology and are highly responsive to the environment, although the precise molecular details are not understood. I will discuss my future plans to use stomatal development and the genetic and genomic tools I have created to address the broad issues of environmental control of cellular differentiation and cell-type specificity.



Dr. Lau is interested in the molecular mechanisms underlying developmental processes. He completed his Ph.D. in Molecular, Cellular and Developmental Biology at Yale University, and received the John S. Nicholas Prize for his doctoral work. He is currently a postdoctoral scholar in the lab of Prof. Dominique Bergmann at Stanford, focusing on how an adult stem cell lineage in plants—the stomatal lineage—is initiated. In 2016, he will serve as an Assistant Professor at NUS.

Recent Publications:

1. **Lau OS,** Davies KA, Chang J, Adrian J, Rowe MH, Ballenger CE and Bergmann DC. (2014) Direct roles of SPEECHLESS in the specification of stomatal self-renewing cells. Science 345:1605-09.
2. Matos JL*, **Lau OS*,** Hachez C*, Cruz-Ramírez A, Scheres B and Bergmann DC. (2014) Irreversible fate commitment upon exit from stem-cell-like divisions in the Arabidopsis stomatal lineage requires a FAMA and RETINOBLASTOMA-RELATED module. eLife 3:e03271. (*co-first authors)
3. **Lau OS** and Bergmann DC. (2012) Stomatal development: a plant's perspective on cell polarity, cell fate transitions and intercellular communication. Development 39:3683-92.