



School of Natural Sciences

Special Seminar UCMERCED

"Exploring the Cell Biological Mechanisms of Gut Development"

By **Stephanie Woo**

Abstract:

Although much progress has been made in identifying the molecular and genetic factors that contribute to gastrointestinal tract development and disease, how these factors are translated into dynamic cell behaviors that shape the organ is less well understood. The zebrafish is an excellent model system for studying the cell biology of gut formation in vivo as the embryo develops externally, is optically transparent, and is amenable to numerous methods for manipulating gene function. The gastrointestinal epithelium is derived from the endoderm. In zebrafish, endodermal cells are specified just prior to gastrulation and soon after become highly motile and quickly disperse across the inner surface of the embryo. These scattered cells then undergo a switch in migratory behavior to converge into a coherent endodermal sheet, which ultimately gives rise to the epithelial lining of the gut tube. Previously, we showed that early endodermal cell migration is driven by Nodal-dependent actin dynamics and Rho GTPase activity. Currently, we are investigating the mechanisms driving the transition from single-cell migration to epithelial sheet formation, focusing on changes in cell-cell adhesion, plasma membrane integrity, and cytoskeletal rearrangements.

Biography:

Throughout Woo's research career, she has been interested in how organ systems are formed during embryonic development. As an undergraduate student at the University of Texas Austin, she worked with Peter Vize on the role of sonic hedgehog in patterning the embryonic kidney in *Xenopus laevis*. As a graduate student with Timothy Gomez at the University of Wisconsin, Madison, Woo combined her interests in developmental and cell biology and studied the mechanics of axon guidance. In particular, she was interested in how integrin-dependent adhesion structures dynamically remodel in response to specific axon guidance cues. For her postdoctoral work Woo joined the lab of Didier Stainier at the University of California San Francisco in order to study in vivo, multicellular cell motility within developing zebrafish embryos, focusing first on morphogenesis of the early heart tube before turning my attention toward endodermal cell motility. When the Stainier lab moved to the Max Planck Institute for Heart and Lung Research in 2013, Woo used this opportunity to join Orion Weiner's lab at UCSF and gain experience with imaging and optogenetics technology development. Currently, her lab at UC Merced is interested in the cell biological mechanisms of gastrointestinal tract development using zebrafish as a model organism. By utilizing techniques including whole embryo microscopy, genome editing, and optogenetics-induced gene expression, she aims to understand how individually migrating endodermal cells are able to coalesce into a coherent gut epithelium.

Date:

Tuesday,
March 14, 2016

Time:

12:00PM

Location:

SE1 270K

**For More
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