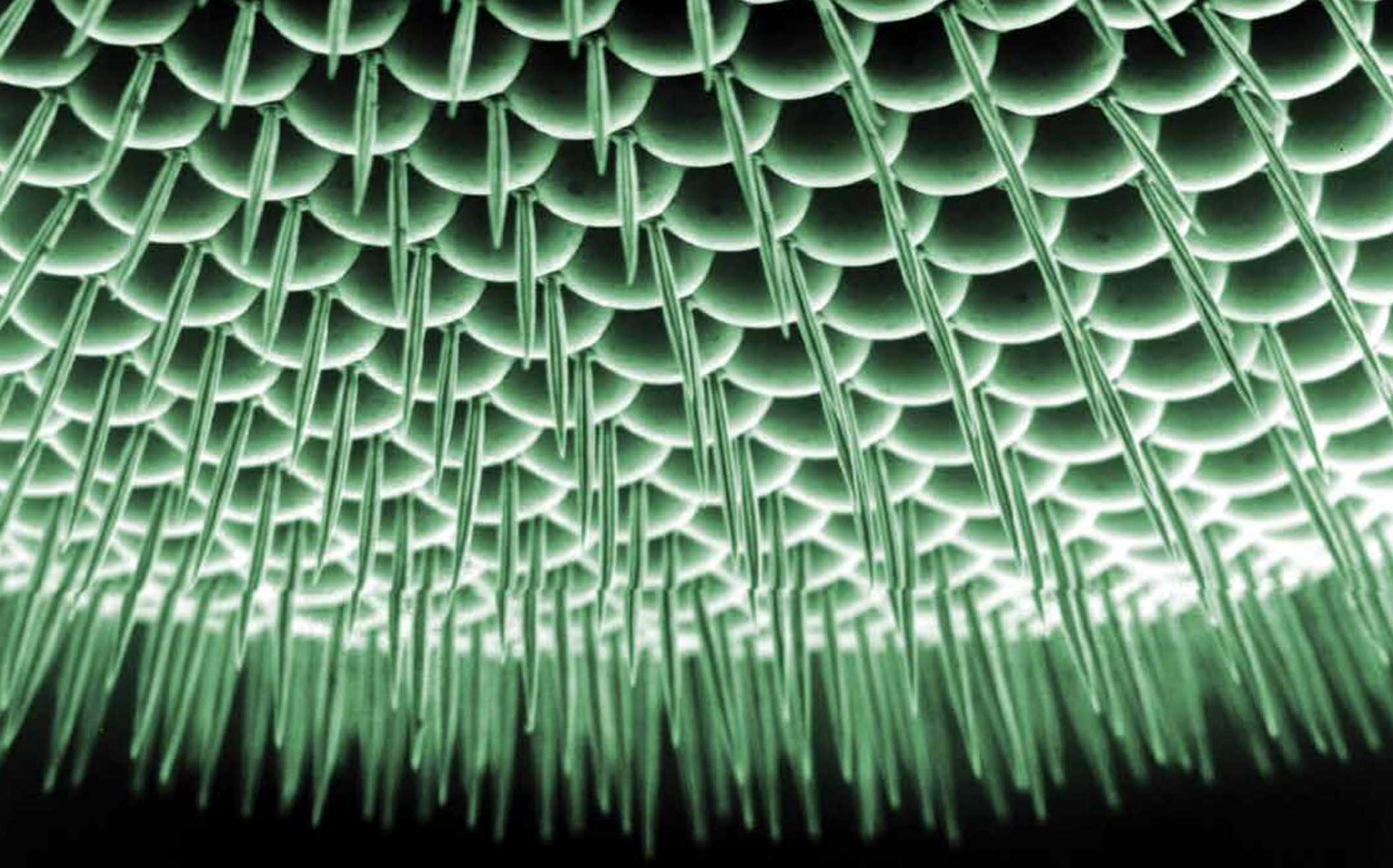

G. Milton Wing Lecture Series

October 2015

With Professors Lani Wu and Steven Altschuler

Department of Pharmaceutical Chemistry, School of Pharmacy,
University of California–San Francisco

Reverse Engineering Wiring Principles of the Fly Eye: How Flies Avoid Double, Double, Double Vision | Public Lecture

Thursday, October 22, 4:50–6:05 p.m.
Dewey Hall, Room 1101

How do complex neural circuits assemble during development? The wiring of compound eyes to the fly brain provides a fascinating model system for studying this question: each point in visual space is captured by multiple photoreceptors, each in a different ommatidium, that wire to the same synaptic unit in the brain. We describe recent studies that combine intravital imaging and data-driven computational modeling to identify three simple self-organizing principles that underlie this wiring process.

Symmetry Breaking in Yeast: Can Mathematics Provide Novel Biological Insights?

Friday, October 23, 1–2:15 p.m.
Goergen Hall, Room 108

How do cells break symmetry? Many models have been proposed, including the classic pattern formation model of Turing. Here we discuss work in symmetry-breaking behavior for budding yeast. We find that the probability of creating spatial clusters of molecules changes as the number of molecules goes from small to large. We describe experimental studies in yeast that show agreement with theoretical predictions.

Cellular Heterogeneity: Differences That Make a Difference in Cancer and Drug Treatment

Friday, October 23, 4–5 p.m.
Goergen Hall, Room 108

Mathematics has been highly successful in developing approaches for identifying equivalence relationships and classifications of objects. However, in biology, it is unclear how to begin such an approach. Since every cell is different, what are good criteria for grouping cells by "similarity"? How many different states are there within a population of cells? And, how do cell states diversify in response to perturbations? We will discuss new approaches for classifying cellular states and interpreting their changes in response to drugs and cancer.

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