SLAC COLLOQUIUM SERIES

Toward a natural-resolution neural interface: artificial retina

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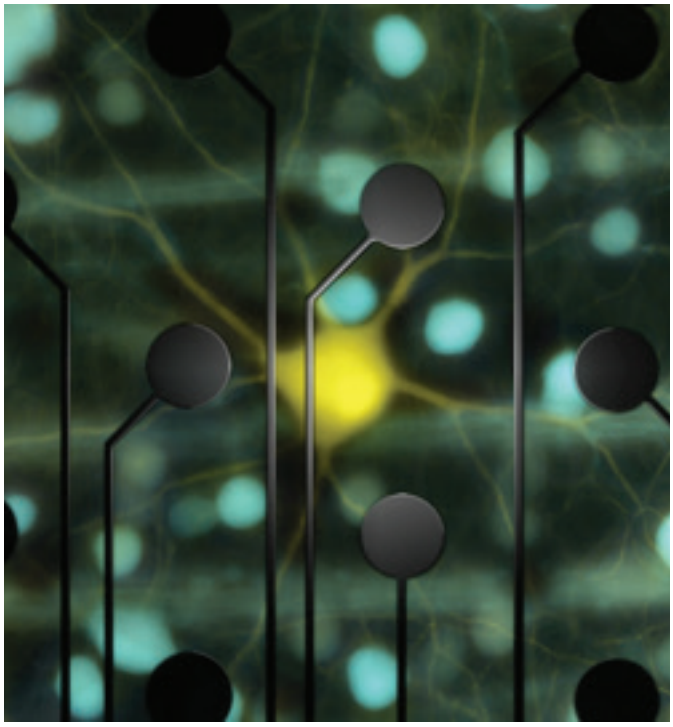
Abstract:
Retinal prostheses represent an exciting development in science, engineering, and medicine – an opportunity to create devices that exploit our knowledge of neural circuitry in order to replace or even enhance normal function. The lessons we learn in developing them may apply to many neural interfaces of the future. Existing retinal prostheses demonstrate proof of principle in treating incurable blindness, but they produce limited visual function. Some of the reasons for this can be understood based on the exquisitely precise and specific circuitry that mediates visual signaling in the retina. These considerations suggest that future devices may need to operate at single-cell, single-spike resolution in order to mediate naturalistic visual function. I will show data indicating that, in some cases, such resolution is possible. I will also discuss the limits of current technology, and propose that we can substantially improve the performance of retinal prostheses, and presumably other neural interfaces, by designing bi-directional devices that adapt to the specific configuration of the neural circuity and thus produce more natural function.



October 1, 2018, Kavli Auditorium, Refreshments and Colloquium Start at 3:00 pm