MAR13-2013-021029

Abstract for an Invited Paper
for the MAR13 Meeting of
the American Physical Society

A Retinal Prosthetic Strategy with the Capacity to Restore Normal or Near-Normal Vision

SHEILA NIRENBERG, Weill Medical College, Cornell University

A pressing problem in neuroscience is determining the neural code. We know that neurons send their signals in the form of trains of action potentials, but we don't know what the code is, that is, we don't know what the unit of information is. Is it the number of spikes per unit time? Is it the individual spike or some pattern of spikes? Getting a clear answer to this affects a great deal of work in neuroscience, both basic and applied. For basic research, it tells us what quantity we need for building models of neural computations (i.e., what spike train features we need). For applied research, it tells us what quantity we need to effectively transmit information from one brain area to another via brain-machine-interfaces or prosthetic devices. Here we describe a strategy for finding neural codes and use it to develop a powerful new kind of prosthetic device for treating blindness.