Retinal prostheses are engineered devices that can be surgically implanted in the eye to assume the job of taking incoming light and transducing it into an electrical signal in the retina, in effect replacing lost photoreceptors. Such a prosthesis can also be programmed to perform the signal processing normally done by the healthy retina. Retinal prostheses have the advantage over biological approaches in that one generally has more control over the engineering of a device compared to manipulating biology or developing a drug. Furthermore, they do not have the potentially reversible and unintended consequences such as formation of tumors in gene therapy trials. So while molecular and biological approaches are an important approach to retinal diseases, a retinal prosthesis may be the shortest path towards reaching the clinic first. Our team has shown that prototype devices can stimulate rodent retinas which have damage to the rods and cones and are now proceeding to conduct tests of the compatibility and functionality of the implant in living eyes. Our goal is to begin implanting a next generation device in our patients within a short few years. This project brings together five world class labs at UC San Diego and one lab from the Salk Institute. Gabriel A. Silva, M.Sc., Ph.D. in bioengineering and ophthalmology, is coordinating the project and brings expertise in neural engineering, translational neuroscience, nanotechnology, calcium optical imaging, and computational neuroscience. William R. Freeman, M.D., director of the Jacobs Retina Center brings his expertise on animal models of degenerative retinal disorders and human clinical trials. Together, Dr. Freeman and Dr. Silva formed and co-direct the Retinal Engineering Center within the Institute for Engineering. Yuhwa Lo, Ph.D. and Deli Wang, Ph.D. from electrical engineering originated the core technology and are experts on conductive nanowires and nanophotonics. Gent Cauwenberghs, Ph.D., co-director of the Institute for Computational Neuroscience is an expert on the design and fabrication of wireless neural circuits. EJ Chichilnisky, Ph.D. rounds out the team at the Salk Institute, where he specializes in ganglion cells and the ganglion cell neural code.