

Nanoscale Sensors and Actuators for Advanced Measurement and Control of Neuronal Cell Function In vivo

PI: James B. Delehanty, Naval Research Laboratory

Academic Collaborator: Rafael Yuste, Columbia University

Project Summary: The overall objective of this program is to implement state of the art nanoscale voltage sensors (semiconductor quantum dots) and voltage actuators (gold nanoparticles) developed at NRL into in vivo models of brain imaging and stimulation. This pursuit will enable us to address the fundamental questions of targeting the probes to specific neuronal cells, direct measurement of plasma membrane heating during photostimulated depolarization, and wireless optical recording. This will advance these critical nanotechnologies on the developmental pathway (TRL 5/6). Success here will usher in the new field of 'nano-optics': the wireless recording and control of neuronal cell function without the need for drugs, surgery, or genetic manipulation/transformation.
