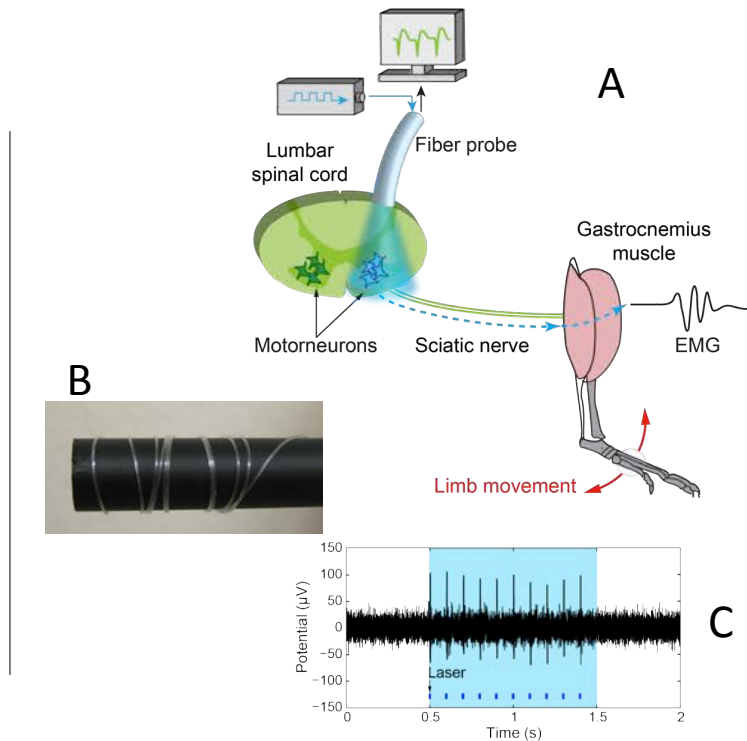
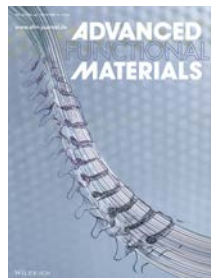


Multifunctional Fiber Probes Provide New Tools for Integrating the Brain and Spinal Cord, P. Anikeeva and Y. Fink (IRG III)

Currently the treatment of neurological and neuromuscular disorders is a significant problem in medicine (e.g. spinal cord injuries). Although great strides have been made recently in understanding the fundamental aspects of neuroscience, the development of advanced materials and devices for interrogating neural function lags behind neuroscience research (deep brain stimulation invented in the 1930s is the current standard). MIT MRSEC researchers have developed flexible, multifunctional implantable probes that make it possible to simultaneously stimulate and record single cell neural activity, with the option of delivering therapeutic agents through the probe. Using these new probes, they report for the first time, the direct control of leg movement via optical spinal cord stimulation in a live mammal (see figure). The new tools provided by this technology may someday help the millions of people suffering from disrupted neural activity (Parkinson's disease, depression, paralysis).



Figures: A. shows the schematic of a multifunctional fiber probe stimulating the movement of a mouse limb. B. Fiber probe is flexible enough to be wrapped around a pencil. C. After implanting in a mouse, devices were able to record spontaneous, single neuron activity.



Canales et al, Multifunctional Fibers for Optical, Electrical and Chemical Interrogation of Neural Circuits in Vivo, *Nat. Biotechnol.*, 2015. 33: p 277-284. (Cover art), Lu et al, Polymer Fiber Probes Enable Optical Control of Spinal Cord and Muscle Functions In Vivo, *Adv. Funct. Mater.* 2014. 42: p. 6732-6737. (Back cover art)