

High Density Optoelectrical Neural Interfaces for Direct Stimulation and Recording of Neural Activity

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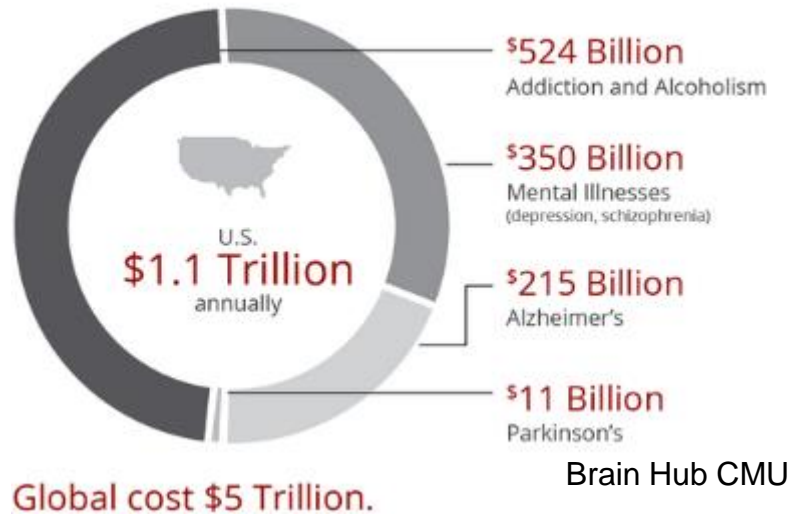


Cracking the Neural Code

Neural Prostheses

Nervous System Disorders

Economic Cost



Brain-machine interfaces



University of Pittsburg-UPMC

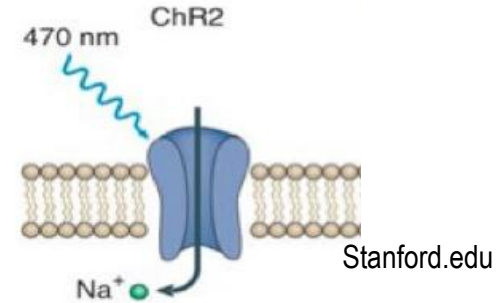
Internet of things+ brains



Terra Swarm UCB

Optical Stimulation (Optogenetics)

- Study of CNS disorders
- Cracking neural codes
- Isolating circuit elements of the network



Evolution of light delivery mechanisms



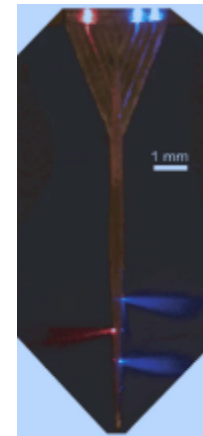
Fiber optics



Fibers glued to probe shanks



Waveguides

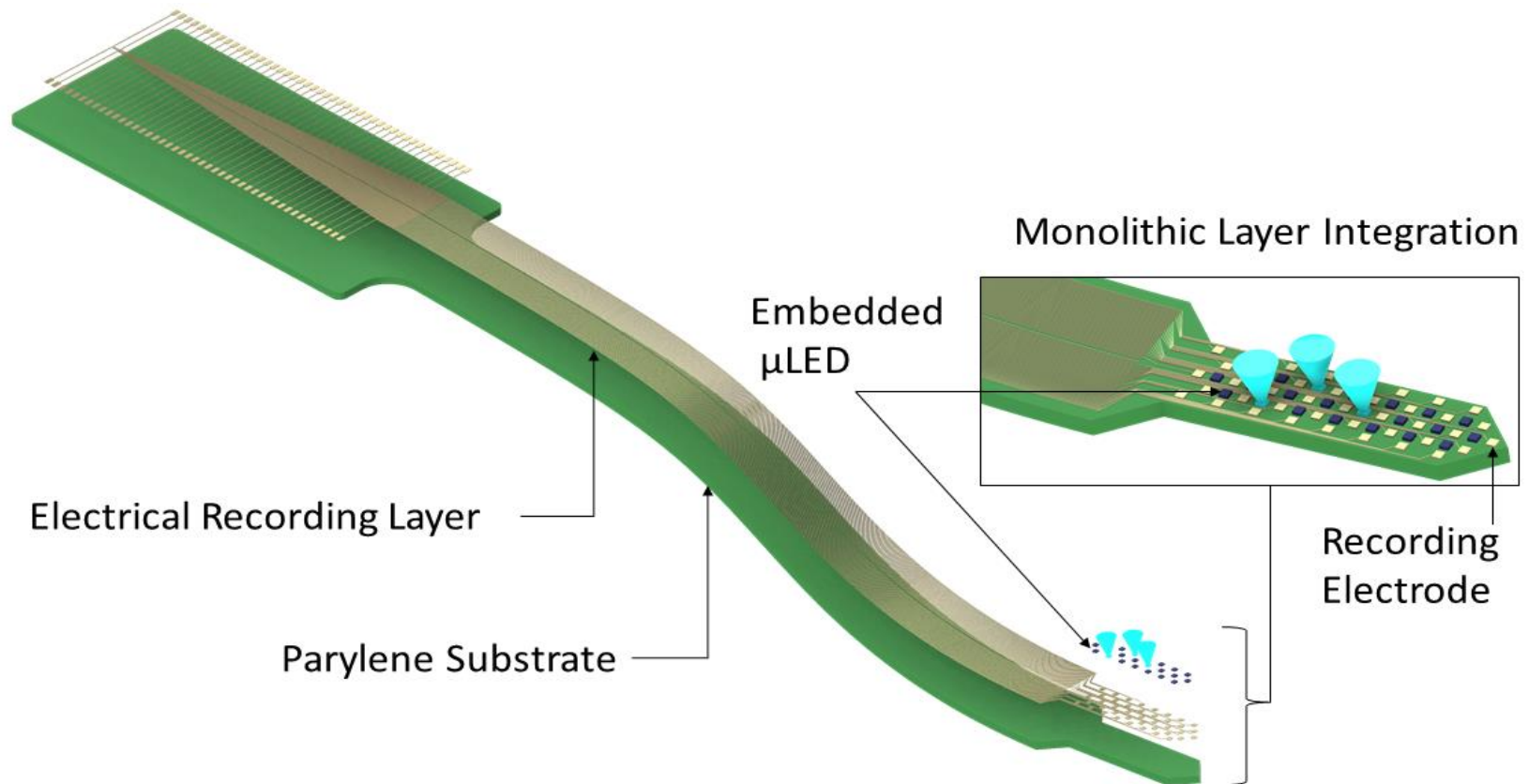


(~20 μ m waveguides)

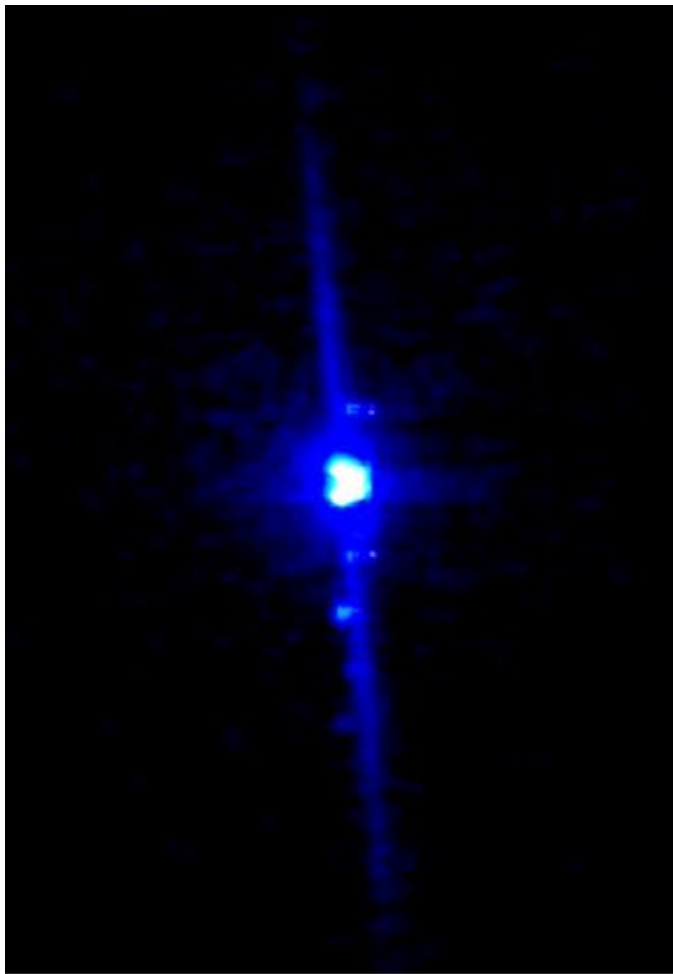
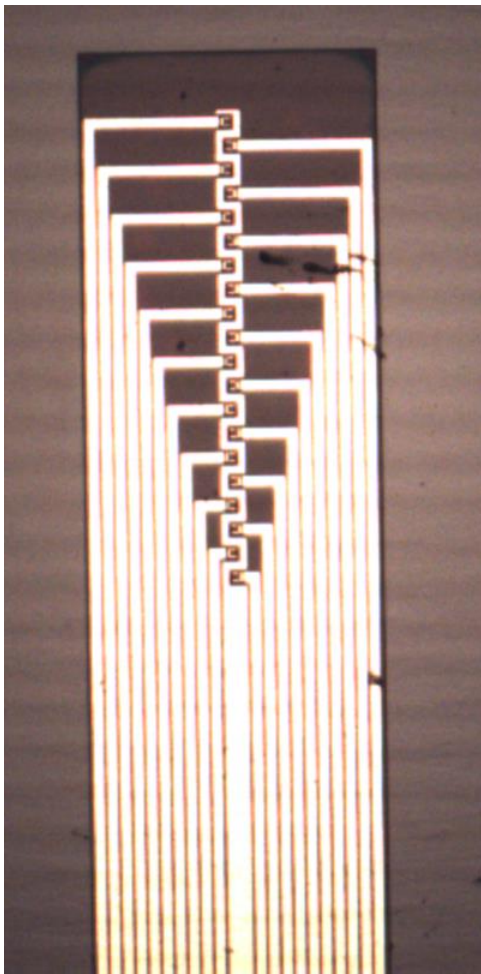


Our Solution

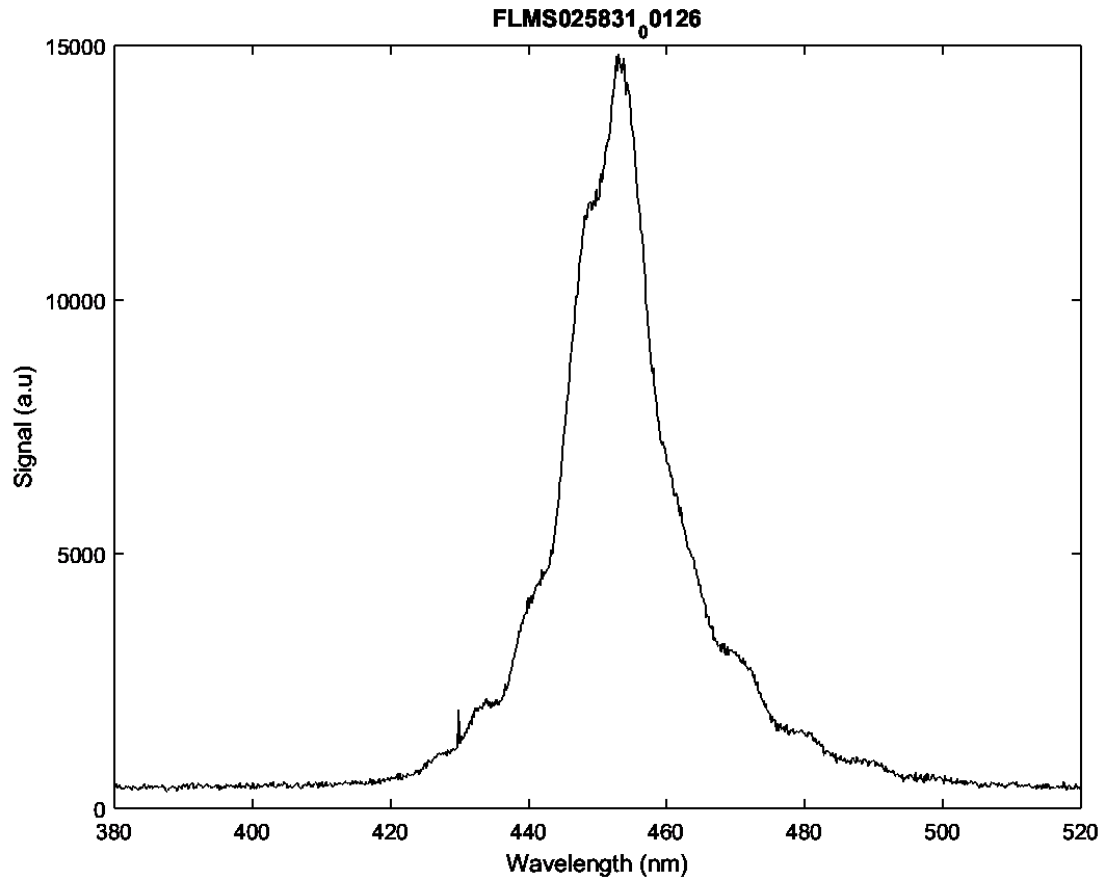
- Flexible implantable μ -LEDs



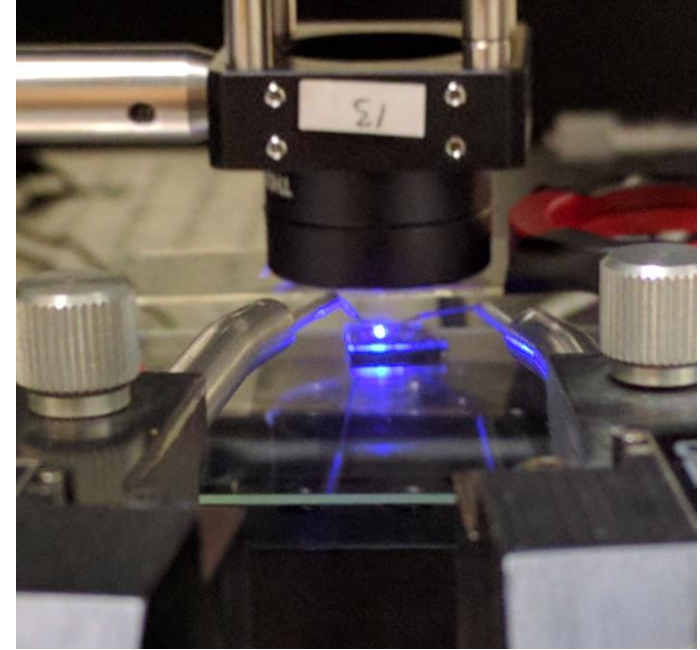
Bright Light Emission Possible!



Emission Spectrum



$\lambda = 453 \text{ nm}$ FWHM $\sim 14 \text{ nm}$



Bright-field Image of a Brain Slice

- A μ -LED on a brain slice

