

# Graphene-based Neural Interfaces for Probing Neural Activity

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# Multimodal: Electrical and Optical

Studying dynamics of neural circuits:

-**Spatial** location and firing patterns with high **temporal** resolution

## Electrophysiology:

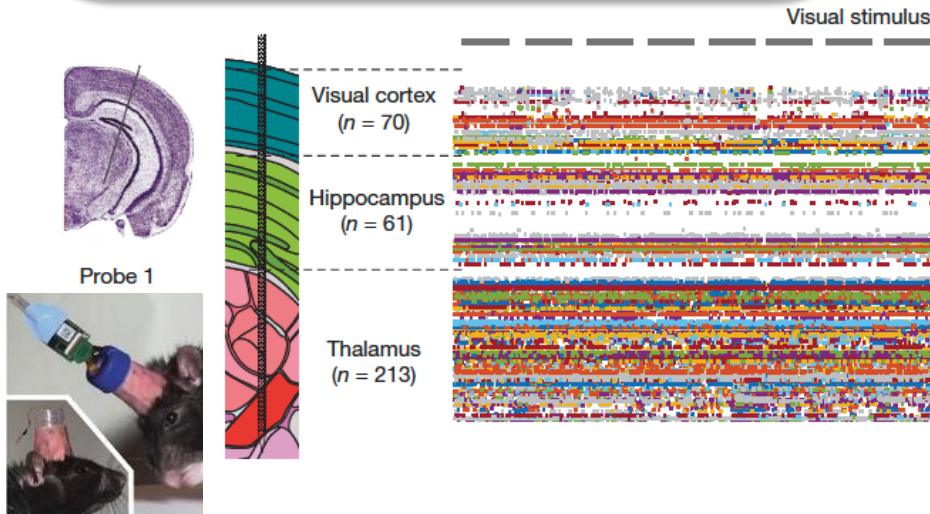
High temporal, but limited spatial resolution

✓ Good to measure spikes

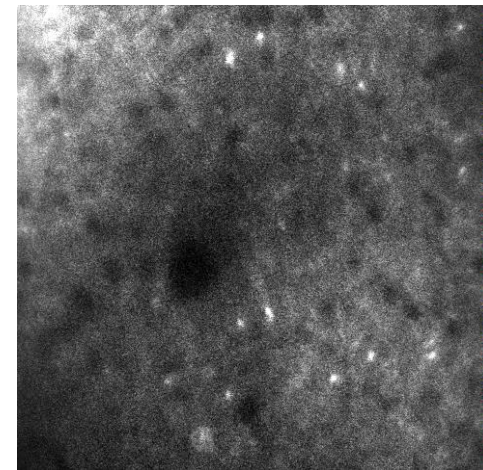
## Functional Optical imaging:

Cellular spatial resolution, but slow kinetics of indicators and low frame acquisition rates

✓ Great to image 1000s neurons

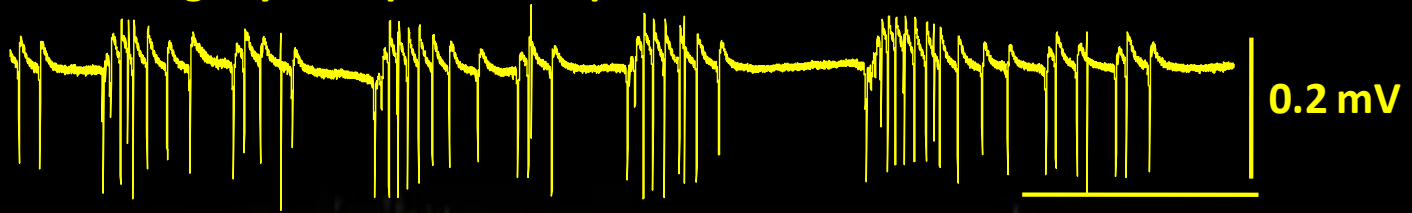


Source: Neuropixels

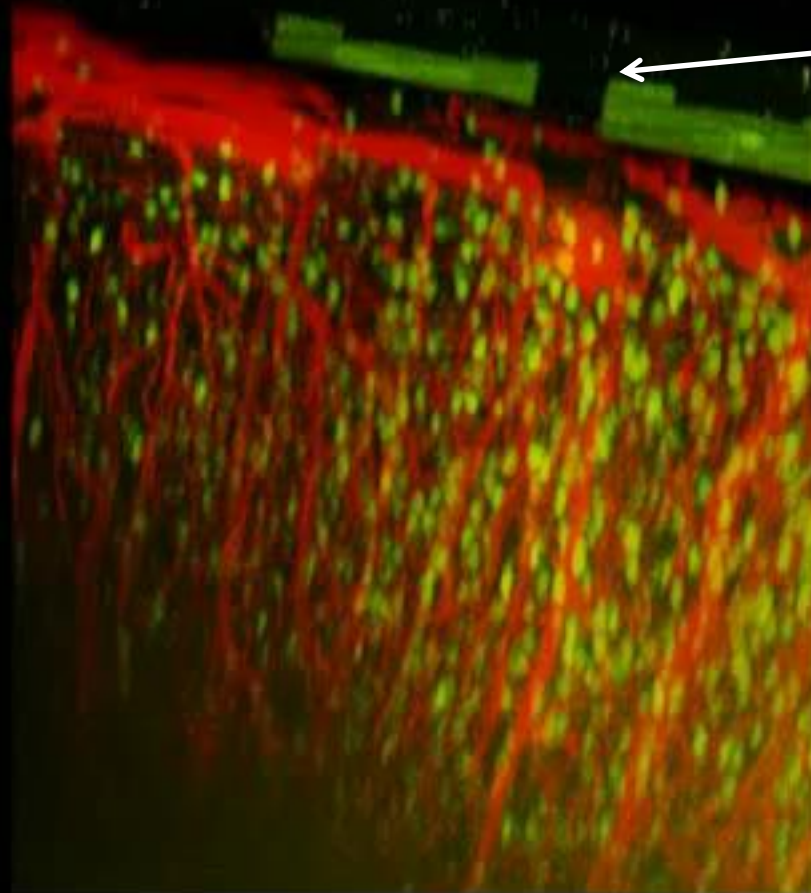


Lu, Kuzum et. al. Adv. Func. Mat. 2018

## Recordings by transparent Graphene electrode



20 s



Transparent Graphene Array  
(false-colored green)

Multimodal imaging, recording and stimulation