

Nanomeshing Adds Multifunctionality to Conventional Neuroelectrodes

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The Fang research group is committed to innovating scalable nanotechnologies to address various grand challenges facing our society. In this talk, I will introduce the concept of nanomeshing microelectronics that we recently conceived to develop next-generation neuroelectrode arrays. Notably, by stacking individual layers of polymer, metal, and low-impedance coating reliably in a same nanomeshed pattern, the final multilayer multifunctional nanomeshes achieved system-level performance from all individual layers, in addition to nanomesh advantages. Neuroelectrodes from multifunctional nanomeshes achieve simultaneous, on-demand electrochemical impedance, mechanical flexibility/stretchability and optical transparency, with scalability down to a single neuron. We envision that this unique approach will shift the neuroelectrode paradigm from the current rigid, opaque electrode arrays towards ultrasoft transparent ones, and produce transformative impacts in both biology and medicine.