**Design Optimization for MRI-Compatible, Transparent PEDOT:PSS Neural Implants using Mesh Strategy**

The poster introduces simultaneous electrophysiology and magnetic resonance imaging (MRI) monitoring in diagnosing and treating neurodegenerative diseases. Current challenges, such as signal distortions and brain tissue heating in metal-based neural interfaces during MRI, are addressed by a newly proposed MRI-compatible, optically transparent, flexible implantable device. This device enables multichannel mapping and electrical stimulation, demonstrating its efficacy in relieving neuropathic pain in rats. The poster also highlights design optimization for open and close mesh-based neural probes, aiming to reduce induced temperature and eddy current during MRI. The study concludes that open mesh exhibits superior performance, emphasizing the crucial role of connection strategy optimization within the open mesh configuration. The neuro-prosthetic presented in this study holds great promise for analyzing and modulating spatiotemporal neurodynamics without resolution constraints from MRI or optical modalities.