



Neural Prosthesis Seminar

"Biologically 'Inspired' Approaches to Enable Next-Generation Intracortical Microelectrodes"

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Biomedical Research Building 105

Case Western Reserve University



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Abstract

To ensure long-term consistent neural recordings, next-generation intracortical microelectrodes are being developed with an increased emphasis on reducing the neuro-inflammatory response. The increased emphasis stems from the improved understanding of the multifaceted role that inflammation may play in disrupting both biologic and abiologic components of the overall neural interface circuit. To combat neuro-inflammation and improve recording quality, the field is actively progressing from traditional inorganic materials towards approaches that either minimizes the microelectrode footprint or that incorporate compliant materials, bioactive molecules, conducting polymers or nanomaterials. However, the immune-privileged cortical tissue introduces an added complexity compared to other biomedical applications that remains to be fully understood. The Capadona Lab utilizes basic science techniques to provide a more complete mechanistic understanding of the molecular and biological-mediated failure modes for intracortical microelectrodes. Their increased understanding provides the framework for the development of targeted materials-based and therapeutic attempts to impact intracortical microelectrode performance. This seminar will provide an overview of the recent highlights and promising strategies to enable long-term clinical successes of intracortical microelectrodes.

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