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Creating Windows into the Brain

Abstract

The burden of neurological disease represents a large unmet need with significant societal and economic impact. While promising in-roads for treatment have been made for some conditions, the application of medical technology to address the broader space neurological disorders is often limited by the lack of understanding of the natural pathophysiology, and, in particular, the response of a diseased neural circuit to existing and potential treatments. Technologists are helping to address this issue by creating translational research tools for neuroscientists, permitting the chronic probing of diseased circuits. Working together, the hope is that clinicians, scientists and engineers can then use these “windows into the brain” to build up therapeutic concepts from scientific and engineering first-principles. To help make these systems practical, several constraints must be considered in order to achieve the scientific goals of the research team while balancing the risks and benefits of the system from the patient’s perspective. Our goal is to help catalyze an ecosystem of translational research merging engineering design methods with basic neuroscience to explore the next generation of therapies to treat neurological disorders.