Innovations in Closed-Loop Neural Prosthetics
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Introduction & Impact of Professor’s Research

Neural prosthetics are devices that can interface with the brain to restore lost sensory, motor, or cognitive functions:
The creation and examination of neuronal stimulation and recording circuits is the focus of Professor Sideris’ research project. His research sought to provide insights to the field of closed-loop neural prosthesis chips for biomedical applications by examining key design parameters for safe and effective brain stimulation as well as accurate neuronal recording. The results of this project would be helpful to Professor Sideris’s work in neural stimulation, particularly retinal stimulation, through implementing a constant current in order to generate different output current levels. (Fig. 4) But what could these advancements mean for you?
This research could pave the groundwork for future developments in the field of neural biomedical applications, in order to more effectively restore lost sensory, motor, or cognitive functions for loved ones and even yourself.

Research & Learning Process

Before delving into my SHINE lab project in electrical engineering under Prof. Sideris, the research and learning process was slow, occasionally frustrating. As a circuitry beginner, I had to grasp fundamental concepts like KVL, KCL, and Ohm's Law for effective circuit analysis. Navigating LTspice (Fig. 1) and KiCAD (Fig. 2) demanded time and effort both in and out of the lab. Understanding operational amplifiers, MOSFETs, and other basics were crucial for my project. Despite challenges, this learning journey laid a solid foundation and equipped me to tackle more complex aspects of electrical engineering in SHINE.

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References