Title: Micro Scale Implantable Bioelectronic Interfaces for Targeted Nerve Stimulation and Ultra Low Power Wireless Data Transmission

Authors: **Morgan Riley**, FNU Tala Ph.D, Mehdi Bandali Ph.D, Katherine J. Johnson DVM, and Benjamin C. Johnson Ph.D

Abstract:

Selective neuromodulation of peripheral nerves is an emerging treatment for neurological diseases that are resistant to traditional drug therapy. A truly low-cost and effective method of creating a custom cuff has not been accessible to researchers to prototype new methodologies and therapies in acute studies. Furthermore, deeply implanted bioelectronic devices that selectively record and stimulate peripheral nerves have the potential to revolutionize healthcare by delivering on-demand, personalized therapy. A key barrier to this goal is the lack of a miniaturized, robust, and an energy-efficient wireless link capable of transmitting data from multiple sensing channels. Here we present an inexpensive highly repeatable method to create multi-contact nerve cuffs, as well as a wireless galvanic impulse with energy-efficient, high data rate link that uses two planar electrodes on the outside of the nerve cuff to transmit data to a wearable receiver on the skin's surface at rates greater than 1Mbps.

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