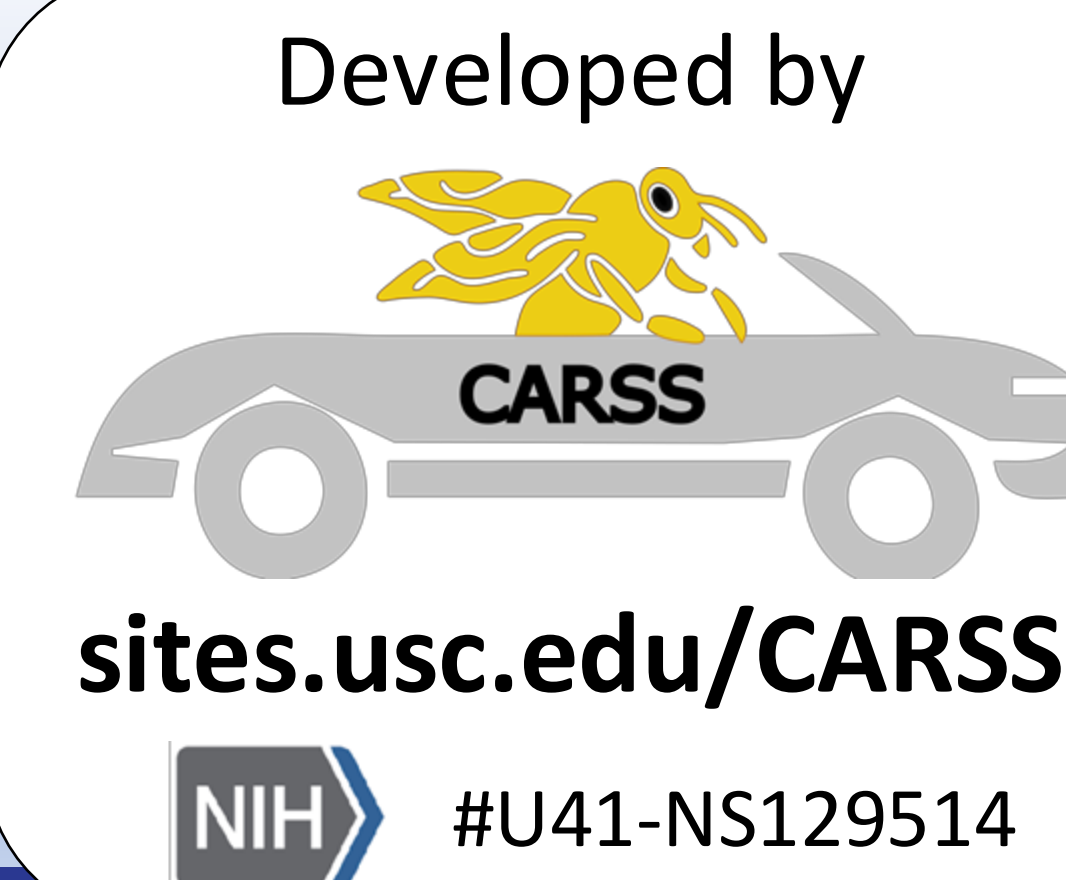




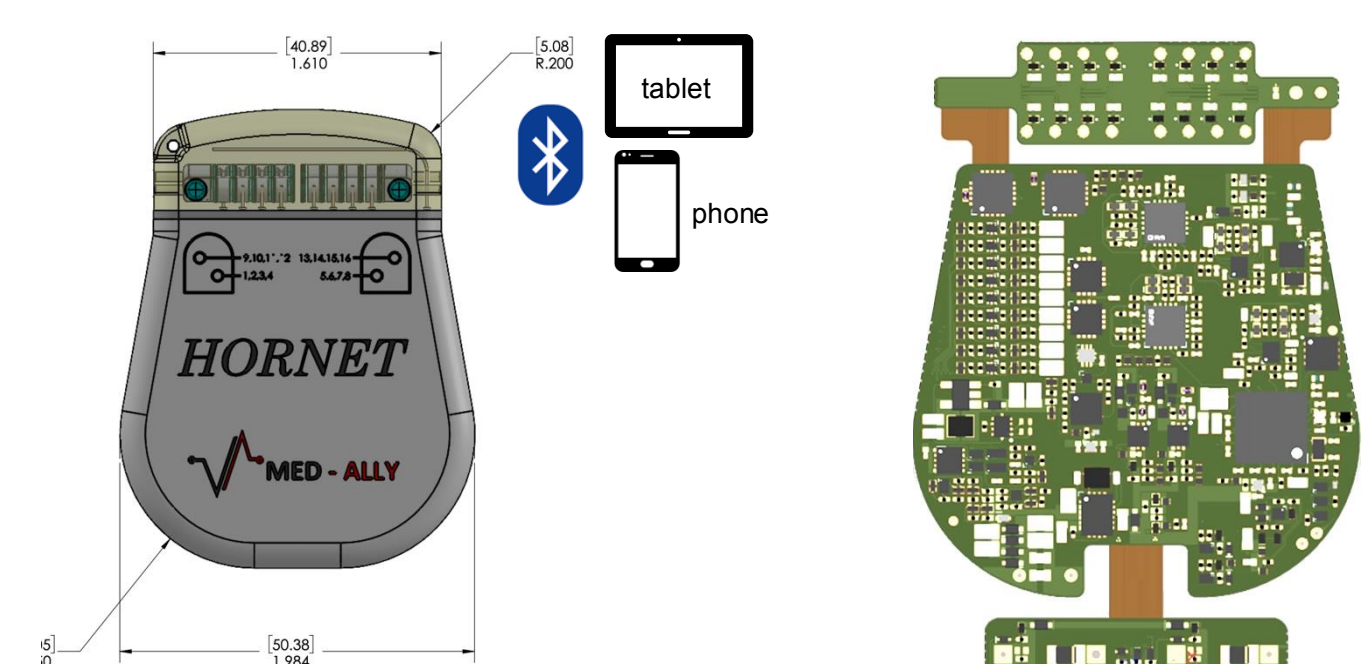
The OpenNerve Platform for Open-Source Bioelectronic Medicine

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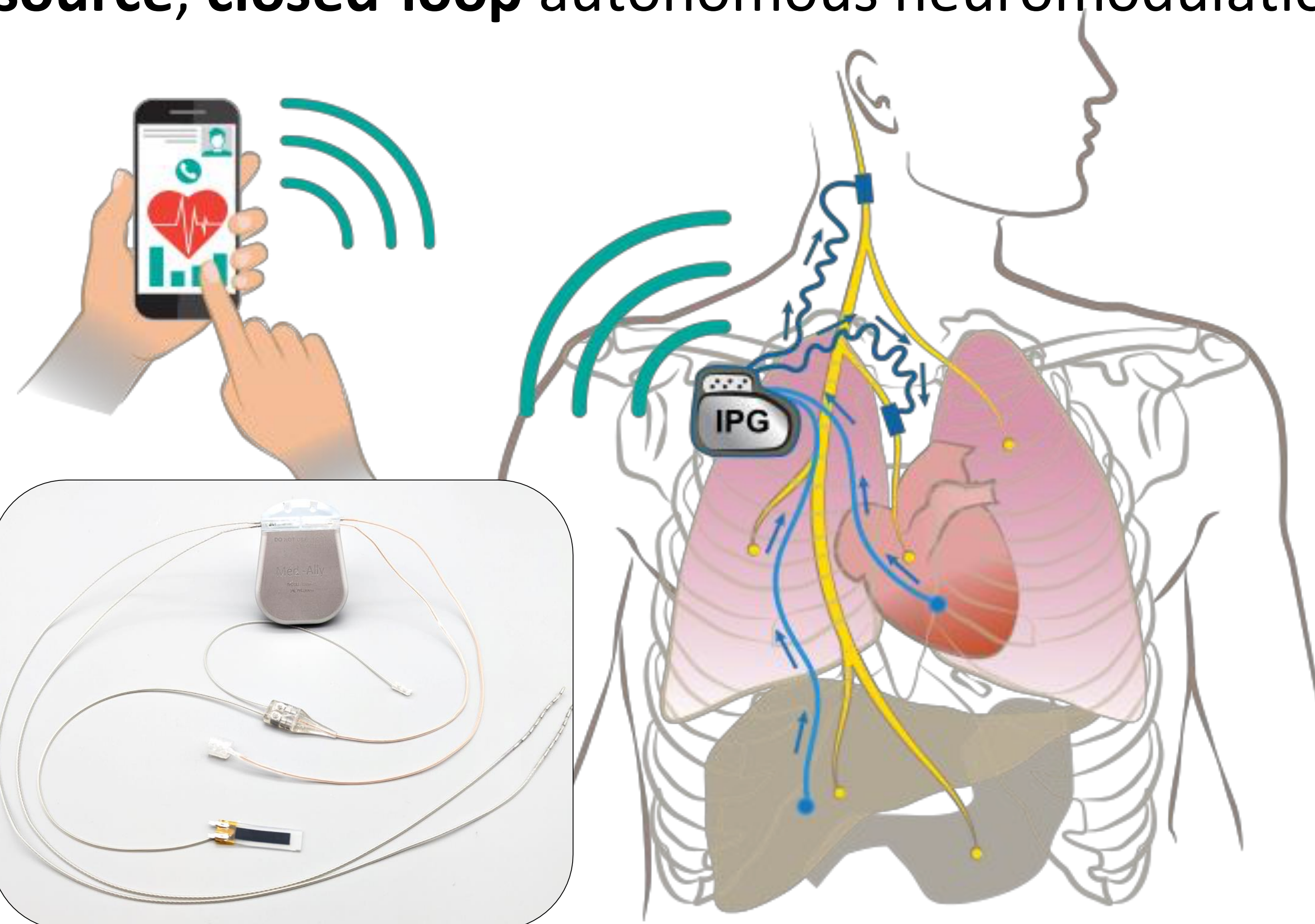


Developing an **open-source, closed-loop** autonomous neuromodulation system for **human use**

Implantable Pulse Generator



- 8 stimulation and 8 sensing channels
- Connect multiple sensing and stimulation leads using interconnects
- Analog front ends for neural recording (CAPs), ECG, EMG, and impedance
- I2C in header for digital in-body communication
- Sine wave generator for low frequency AC nerve block
- Wireless communication via Bluetooth Low Energy (BLE) and 200kHz inductive link
- Primary cell or rechargeable options

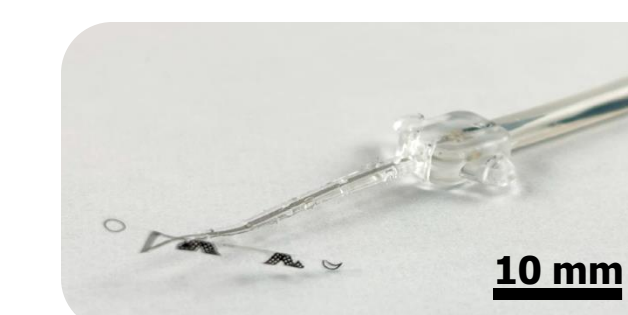
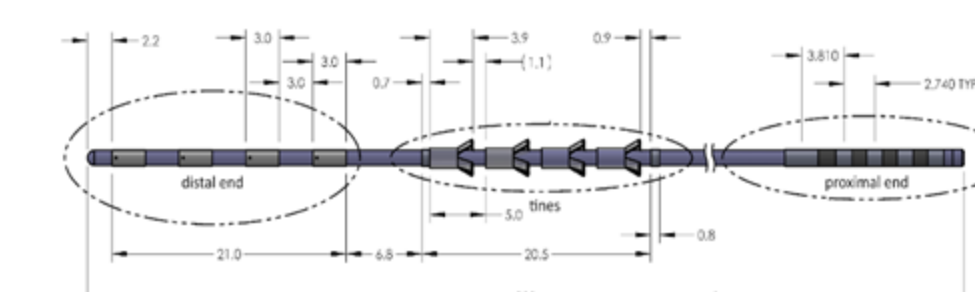


Stimulation Leads



Silicone cuff for cervical vagus nerve

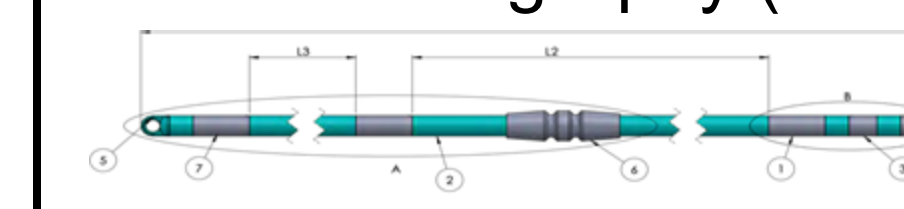
Linear array for sacral nerve



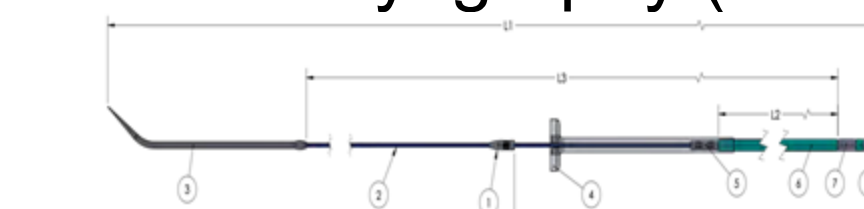
Thin film Parylene C cuff for branch nerves <1mm diameter

Biomarker Leads

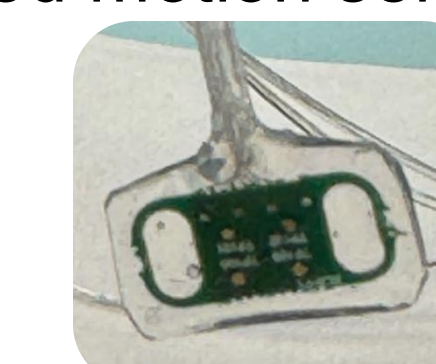
Electrocardiography (ECG)



Electromyography (EMG)



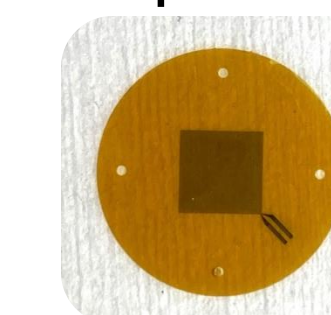
Accelerometer-based motion sensing



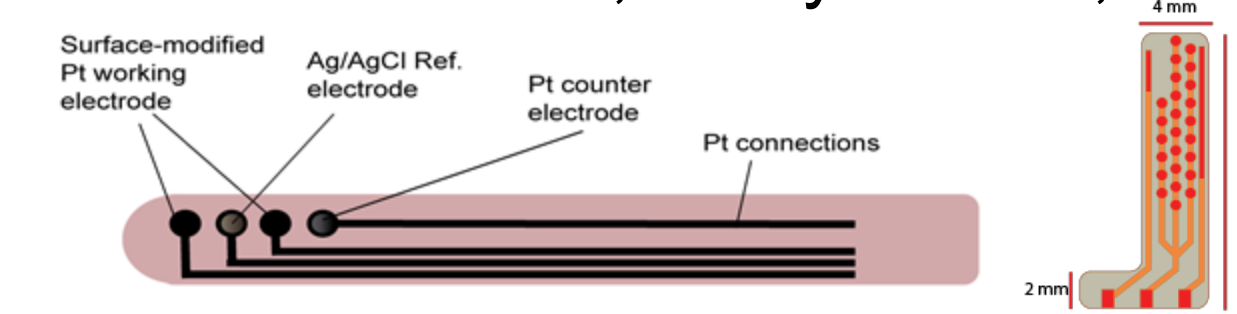
Strain



Temperature



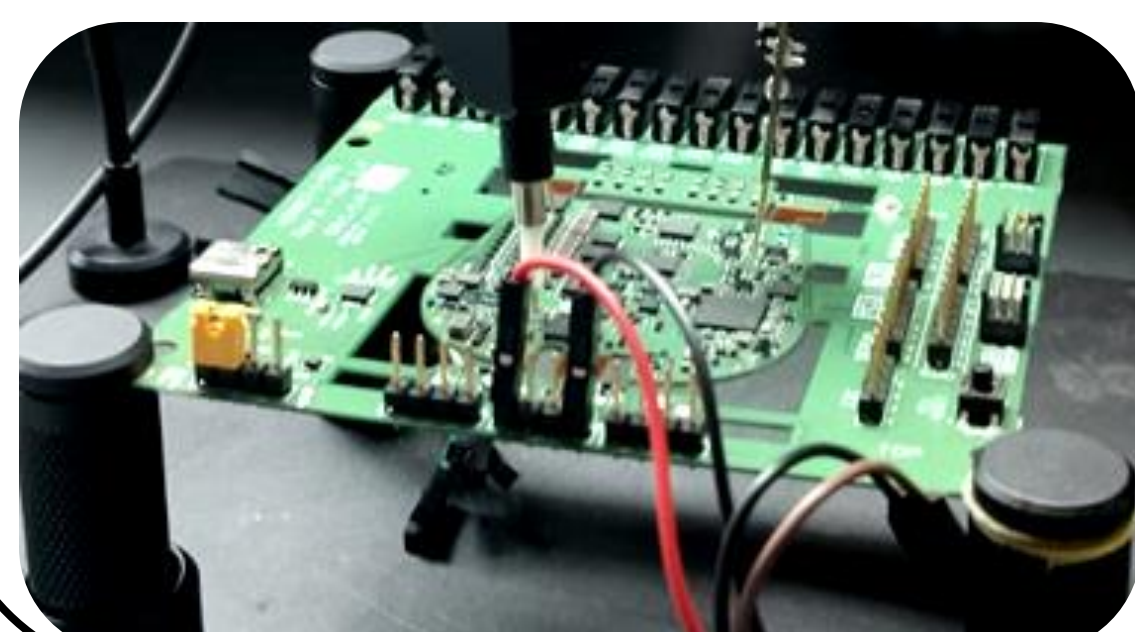
Catecholamines, Acetylcholine, and pH



Work with OpenNerve

Research

Development Board for bench and percutaneous animal testing



Development

Multiple enclosure and lead options for implantation

Modify OpenNerve using open-source resources or work with us to develop your therapy

Translation

Manufacture under GMP / ISO 13485 for GLP and clinical studies



Open-Source Resources

CAD Models



PCBA Files



Software and Firmware Code



Test Protocols and Results



github.com/CARSSCenter
carss@usc.edu