PURDUE INNOVATES | Office of Technology Commercialization

# Flexible Neural Probe for Magnetic Insertion

**Magnetically-guided insertion technology enables the use of soft, tissue-compliant materials for neural probes, minimizing damage and overcoming limitations of conventional stiff electrodes.**

The brain is soft and compliant; a successful probe needs to match the mechanical properties of the brain. Foreign body response is also reduced in objects with small diameters. Small, thin probes lack the mechanical strength needed for implantation. In order to puncture the tissue, they would need to be hard, which is not compatible with the mechanical properties of the brain. In addition, to minimize tissue response, a probe would need to be thin. With conventional materials, this would make the probe brittle and prone to fracture. Probes for neural applications are often limited by their properties; most electrodes are made of hard, stiff materials and are restricted by dimensions for insertion.

Researchers at Purdue University have developed a technology to allow for the use of tissue-compliant materials as neural probes. The technology uses insulated wires affixed to a magnetically responsive tip in order to insert a probe into the brain. This tether allows magnetically induced insertion of small thin probes that minimize tissue damage responses and match the mechanical properties of the brain.

**Advantages**:

-Allows for use of soft, compliant materials that more closely match brain tissue

-Not limited in dimension

-Minimizes tissue damage in deep brain stimulator applications

Potential Applications:

-Medical/Healthcare

-Medical devices

**Technology ID**

65092

**Category**

Materials Science & Nanotechnology/Biomedical & Bioinspired Materials

**Authors**

Pedro Irazoqui

David Jaroch

Jenna Rickus

**Further information**

Clayton Houck

CJHouck@prf.org

**View online**

**TRL:** 5

**Intellectual Property:**

Provisional-Patent, 2008-11-30, United States | NATL-Patent, 2009-11-30, European Patent | PCT-Patent, 2009-11-30, WO | NATL-Patent, 2011-05-27, United States | Provisional-Patent, N/A, United States

**Keywords:** Neural probes, compliant materials, soft materials, brain tissue, magnetically induced insertion, thin probes, tissue damage minimization, deep brain stimulator, medical devices, neural applications