

ACCELERATING INNOVATION IN NEUROTECHNOLOGY

Battelle can help you bring new advances in neurotechnology and bioelectronic medicine out of the lab and into the market.

Our job is to solve your problems so you can get to market quickly and manage your risks. We have all the expertise you need to accelerate your development timelines, from concept to FDA registration. At Battelle, you'll find:

- An integrated approach to neurotechnology development, validation and registration
- Proven experience in applying “big data” analytics and advanced machine learning to solve complex problems in neurotechnology and bioelectronic medicine
- World-class expertise across a range of disciplines including electrophysiological signal processing, control systems, automated and robotics systems, sensor development and electrical/electromechanical device design.

MEDICAL DEVICE DEVELOPMENT

- Full device development
- ISO 13485:2016
- Human Centric Design
- Clinical research

ANALYTICS

- Machine learning/deep learning
- Automated signal processing
- Predictive analytics
- Image/data reconstruction

ALGORITHM DEVELOPMENT

- Application-based
- Embedded, target platform-based

BIOANALYSIS

- Assay development
- Assay validation

DRUG DELIVERY

- Targeted drug delivery
- Biologics and formulations

ADVANCED MATERIALS

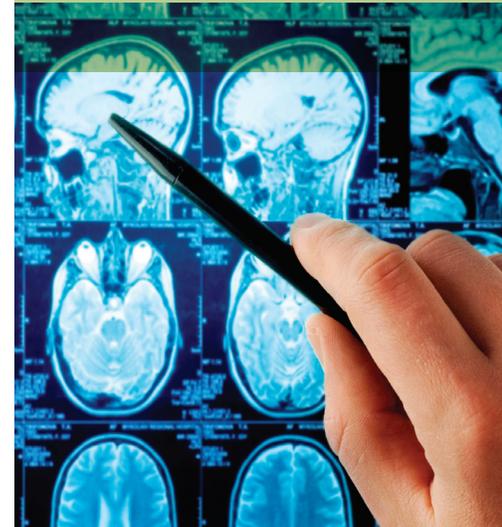
- Material analysis, development and testing
- Manufacturing processes

PRE-CLINICAL RESEARCH

- Safety and efficacy studies
- Large animal modeling capabilities
- Device implantation by DVM surgeons
- Anatomical pathology/histology

Applications

- Neurodiagnostics
- Neuromodulation and Neurostimulation
- Neurorehabilitation
- Neurosensing

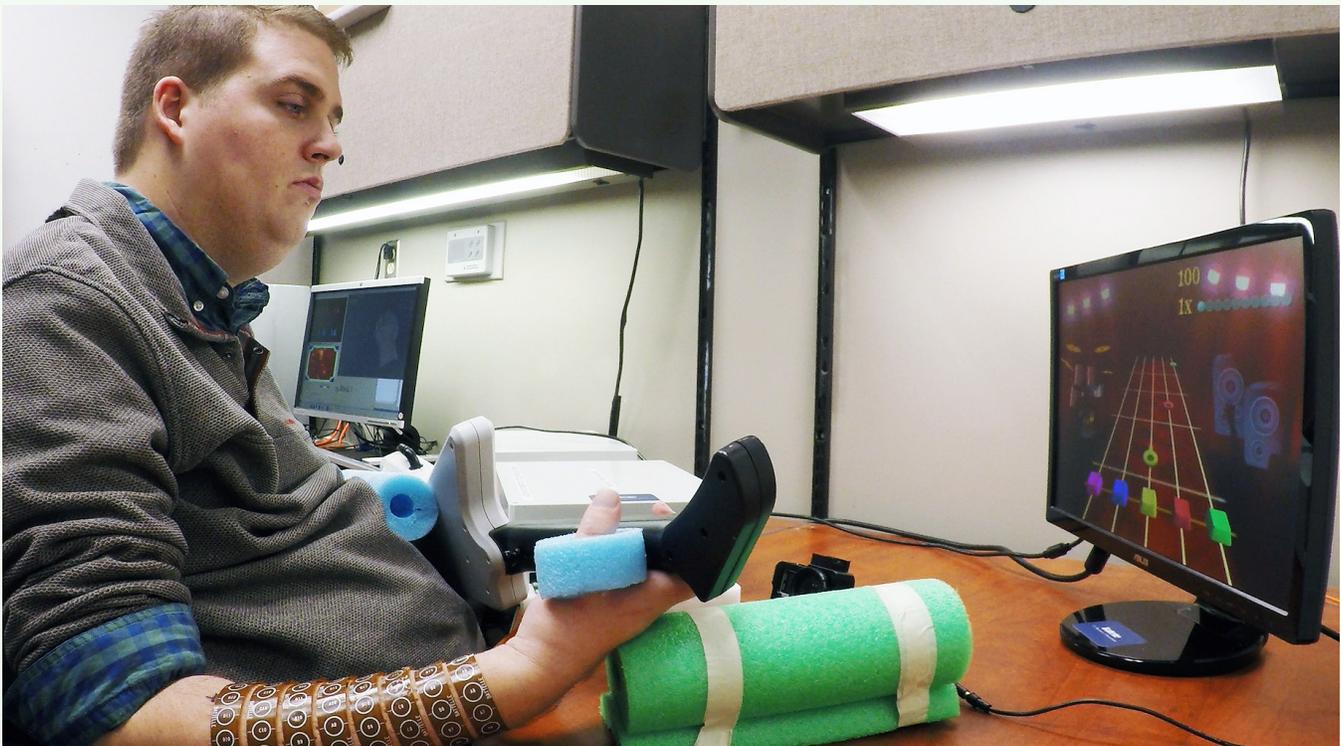


Battelle NeuroLife™: New Hope for Quadriplegic Patients

An innovative neural bypass technology is giving new hope to patients with spinal cord damage. NeuroLife is a Battelle-funded project to restore motor control to the hand, wrist and fingers of a quadriplegic patient. Using a combination of a brain computer interface (BCI) implanted into the motor cortex, a software interface to decode and re-encode brain signals for motor stimulation, and a non-invasive multi-electrode cuff on the subject's arm to provide muscle stimulation, it enables the user to bypass the damaged area of the nervous system and control muscle movements using their thoughts.

A joint study with The Ohio State University (OSU) made international headlines when a quadriplegic patient was able to use the technology to regain conscious control of his hand to perform functional tasks such as dexterous manipulation of everyday objects and playing a guitar video game. Researchers at Battelle and OSU continue to work with the patient to refine and advance the technology. The research was published in prestigious journals (Nature, Scientific Reports), extensively featured in media (Washington Post, New York Times), and won numerous awards including three R&D 100 awards and the Best BCI technology award for 2016.

NeuroLife technology can be extended to help many other types of patients, including stroke victims and patients with traumatic brain injuries. The extended longitudinal data from the study has provided new insights on motor function and brain adaptation. In addition, Battelle scientists and engineers have made significant advances in device engineering and advanced materials that have potential applications in healthcare and beyond.



Battelle NeuroLife bypasses damaged areas of the nervous system by decoding brain data and recoding it into muscle stimulation patterns. The goal is to empower paralyzed patients to move their limbs using conscious thought. Battelle created a custom high-definition neuromuscular electrical stimulator that communicates to more than 120 electrodes wrapped around the participant's forearm. This non-invasive stimulation system enabled fine motor control of the hand, wrist and fingers.

Every day, the people of Battelle apply science and technology to solving what matters most. At major technology centers and national laboratories around the world, Battelle conducts research and development, designs and manufactures products, and delivers critical services for government and commercial customers. Headquartered in Columbus, Ohio since its founding in 1929, Battelle serves the national security, health and life sciences, and energy and environmental industries. For more information, visit www.battelle.org.

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It can be done

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