

## **Brainwaves Faculty Feature: David Lacomis, MD**

*For our inaugural Faculty Feature, we're highlighting the revolutionary clinical work of Dr. David Lacomis, professor of neurology and pathology, chief of the neuromuscular division, director of the MDA Clinic and co-director of EMG Laboratory at UPMC Presbyterian. Currently in charge of coordinating study design for an NIH-funded clinical trial, Dr. Lacomis will select patients to receive a brain-computer interface implant that can translate their brainwaves into computer commands.*

Since arriving in Pittsburgh in the early 1990s, Dr. David Lacomis has watched the neurology department steadily expand from just a dozen faculty members to upwards of 100 faculty, residents and fellows of varying clinical and research backgrounds, plus numerous community affiliate partners.

“When I started, there were about 12 full-time faculty and only one person did research,” said Dr. Lacomis. As new department chairs took over throughout the late ‘90s and early 2000s, “they brought in more and more clinical faculty, research faculty...the growth has been astronomical and the increase in research funding has also been astronomical.”

Dr. Lacomis joined the University of Pittsburgh and UPMC health system in 1993 after completing medical school at the Penn State Health Milton S. Hershey Medical Center; a neurology residency in the Harvard Longwood program; and a two-year fellowship in electromyography (EMG), neuromuscular diseases and neuropathology at the University of Massachusetts Medical Center.

“I was attracted to UPMC because there was little competition for patients with neuromuscular diseases, a large referral network and the opportunity for me to work in both neurology and neuropathology,” said Dr. Lacomis. “The neurology department was very small, but good clinically and there was great opportunity for growth.”

Currently, Dr. Lacomis serves on a large interdisciplinary team comprised of fellow neurologists, pulmonologists, neurological interventionalists, anesthesiologists and bioengineers from UPMC, Carnegie Mellon University and Mt. Sinai Health System working on a [novel brain-computer interface](#) (BCI). Considered a “first-of-its-kind” BCI due to its minimally invasive implantation procedure, Dr. Lacomis’ team was awarded an initial \$10 million grant from the National Institutes of Health to move the technology into the clinical trial phase.

Although the technology behind BCIs already exists, the Command Trial involves a unique device implantation method. Rather than opening the skull and placing impulse-receiving electrodes directly onto the brain—a complex and invasive procedure that can lead to brain infection if left for an extended period—the device is inserted via the neck veins and into a sinus cavity that wraps around the back of the skull.

“The beauty of this study is getting the device in through the veins without having to open up the skull,” said Dr. Lacomis. “Once this is implanted in the vein, it might be able to stay there indefinitely. We don’t know that for sure yet, but that would be the other positive of putting it in in that manner.”

Once implanted, the device translates an individual’s brainwaves into commands that would normally be executed using a keyboard, mouse or trackpad. For people living with paralysis from various neurologic diseases, a BCI could help them accomplish daily tasks like sending texts, composing emails, playing online games or operating smart home technology. In the future, this technology could even be

used in tandem with robotic prosthetics or speech-generating software to provide more autonomy for incapacitated patients.

“The overall goal [of the Command Trial] is to enhance quality of life in these patients and to reduce some of the burden on the caregivers,” said Dr. Lacomis. “We want the patient to have a little more independence than they would have ordinarily.”

Beyond his work on the Command Trial, Dr. Lacomis spends much of his time in the EMG Laboratory and the Muscular Dystrophy Association (MDA) Clinic working with patients suffering from muscle diseases and myasthenia gravis. He served as director of the MDA-ALS multidisciplinary clinic for nearly 20 years before stepping down to focus on ALS research.

In addition to his clinical research involving BCI, Dr. Lacomis is involved in clinical drug trials for ALS. He collaborates with colleagues at Pitt’s LiveLikeLou Center for ALS Research in studying genetic causes and disease pathways in individuals with ALS with the hope of targeting treatments to groups or individuals with common pathology.

Outside of the hospital, Dr. Lacomis enjoys spending much of his free time outdoors. His hobbies include birdwatching, fishing, hiking, gardening, traveling and outdoor photography—in fact, he shares some of his photos on his social media for residents to follow and stay connected. He also spends quite a bit of time playing frisbee with his Australian Shepherd, Beau.

“I like to say I’m a neurologist who stays out of the brain, I’m doing more work with nerves and muscles,” said Dr. Lacomis. “But this focus on BCI is kind of perfect...it fits with the *Brainwaves* name!”