

Postdoctoral Positions at the University of Minnesota Neuromodulation Research Center

The Neuromodulation Research Center (NMRC) is accepting applications for multiple postdoctoral associates. Under the direction of Dr. Jerrold Vitek, the NMRC brings together an interdisciplinary team of experts from neurology, neurosurgery, neuroscience, radiology, and engineering to advance neuromodulation therapies for movement disorders. Our group is part of the Udall Center for Excellence in Parkinson's Disease Research. In the heart of Minnesota's 'Medical Alley,' our NIH funded team fosters inventive, translational research aimed at training the next generation of researchers and clinicians while providing Minnesotans with world-class care. We seek outstanding scientists interested in working in an NIH funded research program studying motor systems neurophysiology, the pathophysiology of Parkinson's disease (PD), mechanisms of deep brain stimulation (DBS) in preclinical animal models of PD, and new DBS approaches. These postdoc positions offer opportunities for multidisciplinary research, training in neuroengineering and neurophysiology, and career development. The projects associated with the available positions are described below.

Basal ganglia cortical coupling and connectivity changes in Parkinson's disease and deep brain stimulation

The major goal of this study is to assess the effect of directional DBS in the internal segment of the pallidum (GPI) and subthalamic nucleus (STN) on parkinsonian motor signs and associated changes in neuronal activity in the basal ganglia-thalamocortical motor circuit. This project is focused on the analysis of large-scale neuronal populations, characterization of circuit connectivity in PD, optimization of directional DBS, and development of closed-loop deep brain stimulation (DBS) approaches by using the MPTP non-human primate model of PD. **Job # 346366**

Neurophysiological mechanisms underlying parkinsonian motor signs

The goal of this study is to identify the specific neurophysiological changes that occur within and across key nodal points of the basal ganglia-thalamocortical motor circuit with the onset of PD and how these evolve as motor signs become increasingly more severe. **Job #346513**

Optimizing coordinated reset deep brain stimulation for Parkinson's disease

Coordinated reset deep brain stimulation (CR DBS) is a novel DBS approach that has the potential to treat parkinsonian motor symptoms with significantly less stimulation compared to traditional DBS. Utilizing the MPTP nonhuman primate model of Parkinson's disease, this project is to optimize critical CR parameters, compare CR DBS in different targets, and understand the mechanism underlying its therapeutic effects. Specifically, this study investigates the changes in neuronal activity across multiple cortical regions, STN and GP that are associated with the therapeutic effect of CR-DBS using different cycle rates and delivered into STN or GPI. **Job #346515**

Neuronal activity in MC and SMA during STN and GPi DBS

In this study, neuronal activity and connectivity changes across motor, premotor and prefrontal cortical areas are correlated with the development of parkinsonian motor signs, their amelioration during DBS and L-dopa therapy, and to changes in the planning, initiation and execution of movement. **Job #346514**

The qualifications required for these positions are:

- PhD in biomedical engineering, neuroscience or related engineering/science field
- Experience conducting neurophysiology experiments in the human and/or animal models
- Signal processing and data analysis
- Programming in MATLAB
- Excellent interpersonal skills and ability to work collaboratively with others
- Strong record of presenting research results through publications and conference abstracts



For more information please email Wyatt Doepke (doep0013@umn.edu) with your CV.

<https://nmrc.umn.edu/>