

## Movement Disorders Fellowship

### Program Overview

This 2-3 year program is designed to train clinician-scientists focused on Movement Disorders. A large component is research training. Our research not only encompasses patient-oriented research but also basic and translational research that covers a broad range of scientific areas. We tailor the specifics of a training program to meet the needs and interests of our fellows – some focus on basic research, patient-oriented research or clinical care. All have the opportunity to gain substantial clinical skills. For the last 30 years, our Movement Disorders program led by Dr. Joel S. Perlmutter has trained 26 fellows with more than 85% remaining in academics as clinician scientists with highly successful careers.



#### **An Eye to the Future:**

Training the next generation of clinicians and clinician-scientists

### Training Overview

**First year:** This year focuses on identifying a particular research interest and clinical training. The Clinical training includes attendance in the Movement Disorders Clinic; participation in deep brain stimulation (DBS) surgeries and programming; learning botulinum injections and hospital consultations. During the first year, fellows identify a research interest and begin background work in that particular area. Others who already have identified an area of research interest will begin and develop work in a particular lab or research group. Fellows review journal articles submitted for publication and are expected to write at least one paper for publication. Fellows also take didactic courses through the CTSA educational programs at Washington University.

**Second year:** This year, the fellow gains greater depth of understanding about less common movement disorders increases clinical skills in the technical aspects of movement disorders. Fellows must continue their research activities with the expectation of producing at least one peer-reviewed journal publication. Fellows learn how to write grants, develop research protocols and design experiments -- working closely with their research mentor. Many fellows choose to write a training grant during this year to support additional research. This can be either a foundation or an NIH grant.

**Third year:** Some choose to continue their fellowship for a third year. These are usually fellows that are focusing on research and need the extra time to hone their skills, complete specific projects, publish additional manuscripts and prepare grant applications.

## Clinical Training

**Scope of Diseases:** The clinical goals include education in a wide variety of Movement Disorders including: Parkinson and Huntington diseases, dystonia, Tourette syndrome, essential tremor, and related conditions. This also includes training in pediatric movement disorders. The goals include an in-depth understanding of the clinical manifestations, pathophysiology, etiology, treatment and social issues for each condition. This includes a basic understanding of the pathology and relevant genetics for each disorder.

**Deep Brain Stimulation (DBS):** A 2nd goal is to gain experience and expertise with DBS including selection of appropriate candidates, stereotactic mapping of implantation coordinates, programming

stimulator devices, and managing complicated medication changes associated with this treatment.

**Botulinum Toxin Injections:** A 3rd goal is to develop expertise in identifying proper candidates for botulinum toxin injections, understand the limitations of these procedures, gain technical expertise in the procedures for different areas.

**Presymptomatic Testing:** Understand the role of presymptomatic testing of relevant neurologic disorders, including the role of a multidisciplinary approach. Gain experience in evaluating people for these tests and learn about relevant societal factors.

**Pediatric Movement Disorders:** A 5th goal of the program is to have a thorough understanding of the common movement disorders that affect children.

## Research Training

Each fellow is expected to participate in research. This may be clinical or preclinical research. Research topics vary depending upon the interests of the trainees. The intent is to learn a skill sufficient to be able to develop a relevant research program including design of experiment, implementing studies, data analysis and

preparation of manuscripts. Two additional components of this training include learning to write grants and review papers submitted for publication. Each fellow will have an identified mentor to assist with research training. Each fellow will be expected to publish during the fellowship.

Possible research topics include:

- Neuroimaging
- Motor physiology
- Motor control
- Genetics & Epidemiology
- Molecular mechanisms
- Neuropathology
- Cognition & dementia
- Neurochemistry
- Clinical Trials



## Didactics & Evaluation

### Didactics:

- Weekly Movement Disorders Journal Club
- Weekly Neurology Grand Rounds
- Weekly Neurology Research Seminar
- Brain Cutting
- Best Clinical Practice & Research Ethics
- Other departmental & medical school seminars

### Evaluation:

- Rating Scale reliability
- Weekly review of new patient evaluations and write-ups by attending.
- Review of all in-patient consultations by attending.
- Clinical evaluation of a patient with a formal oral presentation.

## Faculty

**Director of training: Joel S. Perlmutter, M.D.**  
has overall supervision of all aspects of training including clinical and research components.

**Isabel Alfradique-Dunham, M.D.** (Neurologist)  
She focuses mostly on clinical care of patients with movement disorders with particular expertise in Huntington Disease and presymptomatic genetic testing. She also has a research interest in genetics of movement disorders.

**Stacey Barton, MSW** (Social Worker)  
She coordinates all of the activities of our Huntington Society of America Center of Excellence including clinical care, genetic testing and clinical research studies.

**Bhooma Aravamuthan, M.D., DPhil** (Pediatric Neurologist) Research interests include dystonic cerebral palsy causes, treatments and diagnostics.

**Kevin Black, M.D.** (Neuropsychiatrist)  
He has direct supervision for clinical aspects of movement disorders and relevant psychiatric manifestations of these disorders.

**Meghan Campbell, Ph.D.** (Neuropsychologist)  
She directs studies of dementia in PD and works on behavioral responses to deep brain stimulation.

**Albert (Gus) Davis, M.D., Ph.D** (Neurologist)  
His research is aimed at understanding the molecular and cellular mechanisms of protein aggregation and neurodegeneration in Parkinson Disease.

**Josh Dowling, M.D.** (Neurosurgeon)  
His research focuses on clinical outcomes of neurosurgical treatment of movement disorders, epilepsy, and brain tumors.

**Ryan Duncan, P.T., D.P.T.** (Physical Therapist/Neurologist) Interests include movement and neurodegenerative disease.

**Gammon Earhart, D.P.T., Ph.D.** (Motor physiologist, Director of the Physical Therapy Program at Washington University) She has particular expertise and an active research program in gait and rehabilitation strategies for people with Parkinson disease.

**Erin Foster, OTD, Ph.D.** (Occupational Therapist)  
She directs studies of cognitive function, quality of life and performance based activities of daily living as related to movement disorders.

**Tamara Hershey, Ph.D.** (Neuropsychologist)  
She has expertise in neuropsychological issues relevant to patients with Movement Disorders and is responsible for teaching of clinical research skills regarding cognitive aspects including the effects of deep brain stimulation.

**Helen Hwang, M.D., Ph.D (Neurologist)**  
She is a movement disorders neurologist with a research focus on molecular biology of alpha-synuclein.

**Paul Kotzbauer, M.D., Ph.D.** (Neurologist)  
He is a movement disorders Neurologist who also has a large lab investigating aspects of proteinopathies in Parkinson disease and related conditions. He also develops new radioligands for PET measures of proteinopathies.

**Baijayanta Maiti, M.D., Ph.D.** (Neurologist)  
Research utilizes multimodal, non-invasive, functional imaging techniques to enhance our understanding of the pathophysiologic bases of dementia & gait impairment in PD.

**Susan Nielson, Ph.D.** (Neurologist)  
Research interest includes environmental neuroepidemiology, with a particular emphasis on parkinsonism and Parkinson disease.

**Scott Norris, M.D.** (Neurologist)  
Research focuses on the pathophysiology, etiology and treatment of movement disorders including Parkinson disease, dystonia, and essential tremor.

**Sheel Pathak, M.D.** (Pediatric Neurologist)  
Focus on pediatric movement disorders.

**Zhude Tu, Ph.D.** (Radiochemist)  
His research includes PET radiopharmaceuticals development and validation, quantifying central nervous system receptors, enzymes & transporters.

**Keisuke Uede, M.D.** (Pediatric Neurologist)  
Clinical interests include pediatric movement disorders, tic disorder, deep brain stimulation & botulinum toxin injections.

**Mwiza Ushe, M.D.** (Neurologist)  
His main research interests include patient selection for surgical management of movement disorders, such as DBS for PD, dystonia & ET as well as VP shunting for Normal Pressure hydrocephalus. He leads the clinical affairs of the section.

**Amy Viehoveer, M.D., Ph.D** (Pediatric Neurologist)  
Her research focuses on pediatric movement disorders with a focus on improving the use of Deep Brain Stimulation (DBS) for pediatric primary and secondary dystonia, including Cerebral Palsy.

**Robert White, M.D., Ph.D.** (Neurologist)  
The main goal of his research is to utilize brain imaging technology to identify the neural correlates of dopamine loss in PD.

**Jon Willie, M.D., Ph.D.** (Neurosurgeon)  
Investigates deep brain stimulation to enhance learning and memory, and he is developing novel interventions to treat narcolepsy, hypersomnia, anxiety, brain injury and post-traumatic stress disorder.

## Movement Disorders Fellowship

### FOR MORE INFORMATION

Joel S. Perlmutter, MD  
perlmutterjoel@wustl.edu

Meghan Campbell, PhD  
meghanc@wustl.edu

<http://neuro.wustl.edu/>  
<http://www.nil.wustl.edu/>

### Facilities

#### **Location:**

Training occurs at the Washington University School of Medicine Medical Center and this includes Barnes-Jewish Hospital and St. Louis Children's Hospital. This includes both in-patient and out-patient care.

#### **Clinical Facilities:**

Clinical facilities also include the NeuroClinical Research Unit, the Huntington's Disease Center of Excellence and the American Parkinson Disease Advanced Research Center within the Department of Neurology at Washington University School of Medicine.

#### **Research Facilities:**

All fellows are provided with adequate space and computer access for clinical and research activities. Depending on the research project, fellows have access to state of the art imaging facilities through the Neuroimaging Laboratory Research Center (NIL-RC) and the Center for Clinical Imaging Research (CCIR); animal models and appropriate animal care facilities; specialized equipment for cellular and molecular neurobiology research.

### To Apply:

Please send:

- Cover letter
- CV
- Brief statement of career goals
- 3 Letters of Recommendation

Send to:

Joel S. Perlmutter, MD Department of  
Neurology Washington University in  
St. Louis Campus Box 8225  
660 S. Euclid Ave.  
St. Louis, MO 63110  
perlmutterjoel@wustl.edu (preferred)

