Neuroscience & Sleep:
(Faculty: Ebner, Iber, Nick, Vitek)

This curricular option builds on the combination of: growing clinical activity; very strong neuroscience research; and revitalization of Neurology under the new leadership of Jerrold Vitek, MD, PhD. The Hennepin County Regional Sleep Center has a long history of excellence in clinical research and care. Dr Iber, Head of the Sleep Section and recent Past President of the American Academy of Sleep Medicine, recently move from HCMC to become Director of the rapidly growing Fairview-University Sleep Program. He brings extensive knowledge of respiratory control and breathing disorders of sleep to the clinical research arena, including recent device intervention trials for sleep apnea. For rigorous basic training the Neurosciences Graduate Program offers expertise in: addictive diseases, autonomic regulation, ion channels and neuroimaging. We recognize the national shortage of researchers in sleep medicine and we will direct appropriate individuals to consider this area specifically.

Timothy J. Ebner, M.D., Ph.D., Professor and Chair, Neurosciences

Neuronal spatial integration and control in the cerebellum and motor cortex: Our lab studies how single neurons and populations of neurons encode the information needed to plan and execute movements. Our goal is to decipher how the brain represents different movement parameters and then uses this information to control movements. Using analytical and statistical techniques we sort out how information about movement parameters is embedded in the neuronal discharge. At a higher level of integration, we are interested in how information in the brain is represented spatially and temporally in populations of neurons. Our studies in primates and murine models of neurological diseases use electrophysiological and optical imaging techniques - essential foundations for future studies by trainees of neural regulation of respiration.

Teresa Nick, PhD, Associate Professor of Neuroscience

Neural Plasticity and Behavior Modulations: My laboratory uses a vertebrate model, the songbird, to study neural mechanisms of behavioral modulation. The song system is a dedicated neural circuit that includes cortical nuclei and that has an easily recordable and analyzable output. The acquisition of song behavior follows a well established time course and can be easily manipulated. One area of specific interest is examining the dynamic control of auditory activity during sleep and studying the regulation of the sleep cycle in the songbird.

Conrad Iber, MD, Professor of Medicine, Head, Sleep Section

Sleep Disordered Breathing. I am interested in new therapies for the treatment of abnormalities of respiratory control, such as Cheyne-Stokes respiration, and of sleep disordered breathing. Recently I have been studying use of implanted neural stimulators to treat obstructive sleep apnea. I also am involved in studies comparing the accuracy and use of home / portable sleep monitoring devices with full PSG.

Jerold Vitek, MD, PhD, Professor and Chair, Neurology

Deep Brain Stimulation and Movement Disorders. My recent research has focused on the use of deep brain stimulation as a treatment for Parkinson’s disease, dystonia and tremor and on understanding their underlying pathophysiology. I also want to explore new uses for DBS in medicine and psychiatry.