New Research Affiliates Join CHDD

Research Affiliates of the CHDD are faculty members at the University of Washington with special interest and special expertise in the field of neurodevelopmental disorders. Over 100 affiliates are actively participating in CHDD-relevant research activities and are critical to our strategic plans and our efforts to intensify our basic and translation research mission.

Efforts to further expand and enhance our research program continue as six new Research Affiliates have recently joined the CHDD. Their areas of expertise range widely and include cochlear implants, noninvasive assessment for muscular dystrophy, use of nanoparticles to diagnose and treat neurodevelopmental disorders, cellular mechanisms of autism spectrum disorder, preventing postpartum HIV transmission, and identifying risk factors for post-hemorrhagic hydrocephalus. To introduce these new affiliates to the CHDD community, their research programs are described below.

Mike Guralnick, Ph.D., Director and Professor

David Horn, M.D., is an Assistant Professor of Otolaryngology/Head and Neck Surgery. Dr. Horn’s major research interest is in the auditory development of infants who receive cochlear implants (CIs). Despite early detection and intervention, not all infants with CIs develop adequate spoken-language skills to support auditory-oral communication development, and long-term clinical outcomes remain extremely variable and difficult to predict. Horn’s research is designed to improve our understanding of how basic psychoacoustic skills emerge and relate to spoken-language acquisition in CI infants. The results may lead to the development of clinically useful tools to assess the auditory benefits for infants receiving CIs.

Donghoon Lee, Ph.D., is a Research Associate Professor of Radiology. Dr. Lee’s research focuses on quantitative magnetic resonance imaging (MRI) and magnetic resonance spectroscopy (MRS) to noninvasively assess disease progression and monitor responses to therapeutic treatment for muscular dystrophy. He has developed a new reference signal injection method of MRS to noninvasively quantify metabolites in vivo and multi-parametric MRI methods as noninvasive biomarkers of various disorders. Lee’s recent research interest is to develop drug delivery under hyperthermia induced by MR guided high intensity focused ultrasound.
Elizabeth Nance, Ph.D., is an Assistant Professor of Chemical Engineering. Dr. Nance’s work focuses on engineering nanoparticles, both as biophysical probes and imaging biomarkers, to understand disease physiology and pathology in the central nervous system (CNS). Specifically, her lab uses nanotechnology based platforms (polymer, dendrimer, quantum dot) to understand transport limitations at the macro and micro scale in the CNS. Nance developed the first nanoparticles that could both penetrate and move within the brain to improve imaging and treatment of brain disorders including autism, stroke, and cerebral palsy. Her group is particularly interested in using nanotechnology to characterize how common disease hallmarks, such as inflammation, impaired fluid flow, and excitotoxicity, play a role in the ability to diagnose and treat neurodevelopmental disorders including autism, neonatal stroke, traumatic brain injury, and epilepsy.

Stephen Smith, Ph.D., is an Assistant Professor of Pediatrics. Dr. Smith’s lab is exploring how the diverse genetic and environmental insults converge on common cellular or molecular processes to cause the core symptoms of autism spectrum disorder. Smith’s lab uses a combination of approaches, including a powerful new proteomic technique (Quantitative Multiplex Immunoprecipitation), to develop a mechanistic understanding of how networks of interacting proteins, which have each been independently genetically linked to autism, transmit synapse-modifying signals at the glutamate synapse and modulate social behavior in mice and humans. Smith’s ultimate goal is to define common mechanisms of action shared among different autism risk factors in order to identify biologically meaningful subgroups of patients with autism; to identify novel drug targets that correct synaptic deficits in autism; and to explore fundamental mechanisms of glutamate synapse homeostasis and function.

Donald Sodora, Ph.D., is an Affiliate Associate Professor of Global Health. Dr. Sodora’s research interests focus on preventing postpartum HIV transmission, especially in resource-poor settings. Children infected with HIV are at a significant risk for poor developmental outcomes, including adverse impacts on neurocognitive function and physical growth. Sodora’s current work assesses the impact of Bacillus Calmette-Guerín and Oral Polio Vaccine immunizations on SIV susceptibility in rhesus macaques. Understanding the mechanism behind vaccine-enhancement of HIV susceptibility is essential if we are to design policies and treatments for preventing mother-to-child transmission of HIV.

Hannah Tully, M.D., is an Acting Assistant Professor of Neurology. Dr. Tully’s research is working to identify risk factors for post-hemorrhagic hydrocephalus among infants with intraventricular hemorrhage. She is especially interested in correlates between anatomy, CSF flow, and intracranial blood dynamics as well as the long-term clinical outcomes of children with hydrocephalus. Findings from her research will be used to guide genomic investigations of the factors that give rise to different types of hydrocephalus, and to differences in clinical outcomes. The goal of Tully’s research is to obtain a deeper understanding of why hydrocephalus develops, a better grasp of its clinical implications, and how best to tailor treatment to each individual child.