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Wayne State researcher awarded \$1.9M NIH grant to identify memory networks in children

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National Institute of Mental Health of the NIH, MH107512

Newswise — DETROIT — Noa Ofen, Ph.D., a Wayne State University researcher in lifespan cognitive neuroscience, received a five-year, \$1.9 million grant from the *National Institute of Mental Health* of the National Institutes of Health to study the development of memory networks in children. Researchers will investigate brain activity predictive of memory formation in children who undergo surgery as part of clinical management of medically uncontrolled epilepsy.

“Little is known about how memory systems develop in the human brain,” Ofen said. “In this project, we will use a combination of unique neuroimaging methodologies that allow us to add new insights about the neural basis of memory development. We also hope this project will be a first step toward clinical applications that can ultimately improve the quality of life of children with focal epilepsy.”

Commonly used noninvasive neuroimaging methods — such as functional MRI (fMRI) or EEG — cannot simultaneously measure the spatial and temporal dimensions of the neural correlates of memory at high resolution. In this project, the researchers will use intracranial EEG recordings — also referred to as electrocorticography (ECoG) — from electrodes implanted directly on the surface of the brain of pediatric patients undergoing pre-surgical brain mapping as part of clinical management of epilepsy. ECoG provides excellent spatial and temporal resolution, making it a powerful tool for examining the neural basis of human memory. The researchers will capture the temporal dynamics of information flow in the brain that are predictive of whether studied information or experiences will be remembered.

Ofen will use ECoG to map memory networks in patients and collect additional fMRI data from a subset of these patients and a large sample of matched healthy children to determine age differences in activation and patterns of functional connectivity between key

regions in the memory network. “Our overarching goal is to identify the spatial and temporal dynamics of memory networks in the developing human brain,” Ofen said. She also hopes to lay the foundation to extend mapping of the brain’s “eloquent tissue” in children to include pre-surgical brain mapping of memory networks to reduce the post-surgery memory decline that can occur after surgical removal of the seizure focus. This memory decline is directly linked to health-related decreased quality of life in later years.

Ofen is jointly appointed to Wayne State’s Department of Psychology in the College of Liberal Arts and Sciences and the Institute of Gerontology’s Lifespan Cognitive Neuroscience Program that — together with research laboratories at the Merrill Palmer Skillman Institute for Child & Family Development — apply a cognitive neuroscience approach to study developmental effects from pre-birth to old age.

The project is in collaboration with Wayne State University School of Medicine faculty member Eishi Asano, M.D., a member of the Epilepsy Surgery Program at Children’s Hospital of Michigan; Vaibhav Diwadkar, Ph.D.; Robert Rothermel, Ph.D.; and Harry Chugani, M.D. (now at Nemours/Alfred I. duPont Hospital for Children in Delaware). Robert Knight, M.D., of the University of California, Berkeley, is also an integral member of this project.

The award number for this National Institutes of Mental Health grant is MH107512.

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The Institute of Gerontology researches aging, educates students in gerontology, and presents programs on aging issues relevant to professionals, caregivers and older adults in the community (www.iog.wayne.edu). The Institute is part of the Division of Research at Wayne State University, one of the nation’s preeminent public research institutions in an urban setting. For more information about research at Wayne State University, visit <http://www.research.wayne.edu>.

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