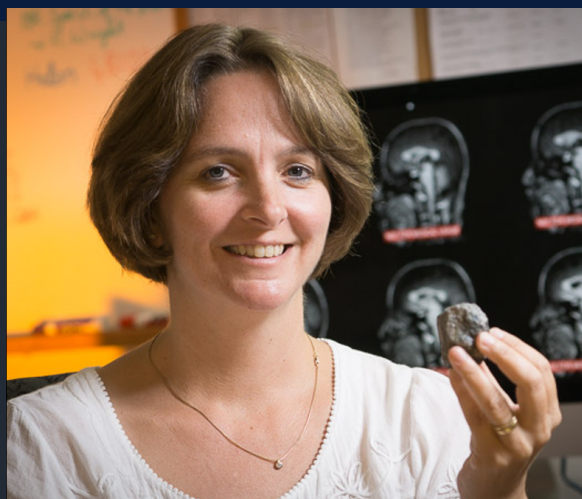# Neuroscience Speaker Series

Sponsored by: NIEHS T32 Training in Environmental Neuroscience Program (TENS)

Advanced Neuroimaging to study the risk of Manganese Toxicity in Welders

An in-person seminar by Ulrike Dydak, PhD Professor of Health Sciences and Biomedical Engineering, Director, Purdue Life Sciences MRI Facility, Purdue University, USA

Dr. Dydak is Director of the Purdue-IU Medical Physics Program and Associate Director of the Women's Global Health Institute at Purdue University. With a background in medical physics, her NIH-supported research is focused on the development of novel magnetic resonance imaging (MRI) and spectroscopy (MRS) techniques and their translation to clinical and life science studies. She pioneered the use of quantitative MRI (qMRI) and edited MRS techniques to determine the effect of exposure to welding fumes on the dynamics of brain manganese (Mn) deposition and on alterations in neurochemicals, such as the inhibitory gamma amino butyric acid (GABA).

She reported on increased brain Mn levels correlating with cognitive outcomes, on novel MRI ways to assess excess Mn on a whole-brain basis, as well as on significantly elevated in vivo levels of GABA. In some brain regions those changes were reversible, with the rate of change being modulated by the amount of life-long exposure to Mn. Current studies use qMRI and advanced MRS editing techniques to explore the dose-response relationships of uptake and elimination of Mn and other heavy metals into specific brain regions of the human brain, the metal burden of the individual brain for risk assessment, and the relationship of brain Mn to oxidative stress markers, neurotransmitter imbalances and neurological outcomes.