Postdoctoral Research Associate in Human Brain Plasticity
Beckman Institute for Advanced Science and Technology
University of Illinois at Urbana-Champaign

Scientific and technological innovation at the University of Illinois continues to advance our understanding of the human brain, with each breakthrough leading to new paths of discovery and ways of thinking about the nature of the human mind. Refined approaches to understanding the mind have been driven by greater sophistication in how we design experiments, analyze statistical data, and measure the underlying neural, hormonal, cellular and genetic mechanisms. Beyond further precision in these respects, the study of the human mind at the University of Illinois has benefited from a number of discrete multidisciplinary approaches that investigate how the brain supports the spectrum of mental activities across a broad range of contexts – including how mental capacities emerge through evolution and development, are cultivated through experience and intellectual engagement, are shaped by physical fitness and nutrition, and are altered through cognitive aging and neurological disease. As the significance and scope of these issues would suggest, many fundamental questions about the nature of the human mind remain to be investigated and have inspired multidisciplinary research that transcends traditional scientific and technological disciplines.

A powerful insight that has unified research across disciplines derives from the brain's most unique and essential characteristic: *plasticity*. The brain demonstrates a remarkable capacity to reconfigure itself – to continually update prior knowledge on the basis of new information and to actively generate internal predictions that guide adaptive behavior and decision making. Rather than lying dormant until stimulated, contemporary research and theory are converging on the idea of the brain as a dynamic and active inference generator that anticipates incoming sensory inputs, forming hypotheses about that world that can be tested against sensory signals that arrive in the brain. Plasticity therefore provides a powerful mechanism for updating prior beliefs, generating dynamic predictions about the world, and adapting in response to ongoing changes in the environment. Emerging clinical research further indicates that plasticity is a hallmark of the brain's response to traumatic injury and neurological disease, promoting the formation of new neurons, connections, and blood supply pathways that enable the brain to adaptively reorganize neural circuits and to promote functional recovery.

Through scientific discovery and technological innovation, the *Center for Brain Plasticity* at the University of Illinois provides a hub for basic and translational research that aims to measure, model, and elicit brain plasticity. It promotes interdisciplinary studies of the neurobiological foundations of brain plasticity, and innovative methods and technologies to drive neural plasticity through the application of cognitive training, non-invasive brain stimulation, physical fitness training, mindfulness meditation, and nutrition, among others. It also encourages clinical trials that investigate science and technology that aims to mitigate or reverse the effects of cognitive aging, traumatic brain injury, stroke, and neurological disease. The Center for Brain Plasticity also builds upon the incredible wealth of plasticity research and data at the University of Illinois to provide a nexus for future long-term university wide collaborations. It will bring together the plasticity community by drawing on the interdisciplinary strengths of the University of Illinois, the Beckman Institute (especially the newly formed Intelligence, Learning and Plasticity community), the Interdisciplinary Health Sciences Initiative (IHSI), and Carle Foundation Hospital, to support and foster an environment rich in intellectual, technological, and information resources dedicated to the study of brain plasticity.

The *Center for Brain Plasticity* provides ample opportunity for the development of innovative, focused research and a broad collaborative cognitive neuroscience experience through affiliations with the Cognitive Neuroscience Division of the Department of Psychology at the University of Illinois, the Intelligence, Learning, and Plasticity Initiative at the Beckman Institute for Advanced Science and Technology, and the National Center for Supercomputing Applications, among others. The Center utilizes a Siemens Magnetom Prisma, state-of-the-art, 64-channel MRI scanner with 80 mT/m gradients, along with a 64-channel head coil.

This research fellowship is designed as a three-year experience that includes a speaker series, journal article discussions, laboratory presentations and discussions, tutorial training, and the teaching of skills necessary to conduct original cognitive neuroscience research. Ph.D.'s with a strong background in cognitive neuroscience, fMRI, and human connectomics are encouraged to apply. Salary and benefits are competitive and commensurate with NIH guidelines. For further information, contact Aron K. Barbey, Ph.D., Director, Decision Neuroscience Laboratory, at Barbey@Illinois.edu and see www.DecisionNeuroscienceLab.org/. To apply, send CV and three recommendations to Barbey@Illinois.edu by May 15, 2017. The University of Illinois is an equal opportunity employer committed to creating a diverse, cooperative work environment. Women, members of under-represented minority groups, and individuals with disabilities are encouraged to apply.

Aron K. Barbey, Ph.D.