

Beckman Scientists Launch INSIGHT Study

As President Obama's BRAIN Initiative looks at ways to better understand how the human mind works, researchers at the Beckman Institute are leading innovation in the science of brain training by examining new ways to improve reasoning and problem solving.

A multidisciplinary study based at the Beckman Institute is being conducted by researchers across the world to determine what kind of training best improves adaptive reasoning and fluid intelligence.

The project, named INSIGHT, recently received \$12.7 million in funding over 42 months from the Intelligence Advanced Research Projects Activity (IARPA), under the Office of the Director of National Intelligence. The INSIGHT project directly supports IARPA's SHARP (Strengthening Human Adaptive Reasoning and Problem-solving) program, whose goal is to develop evidence-based tools and methods that can improve the quality of human judgment and reasoning in complex, real world environments.

The study, headed by Aron Barbey, full-time faculty member in Cognitive Neuroscience, is designed to establish a comprehensive and rigorous brain training protocol that incorporates the best available cognitive, physical fitness, neuroscience, and nutritional interventions for the enhancement of fluid intelligence.

The INSIGHT brain training system is based on recent evidence in cognitive neuroscience indicating that specific training interventions may lead to increased general cognitive abilities,

including enhancement in fluid intelligence, which is the ability to effectively solve problems and recognize meaningful patterns in novel situations, Barbey said.

"For decades, scientists at the Beckman Institute have developed powerful interventions to improve human performance," said Barbey. "For the first time, these discoveries are being implemented within a comprehensive brain training system that is designed to enhance fluid intelligence. The INSIGHT brain training system incorporates some of the best available scientific evidence for building better brains and, we believe, has great potential for success."

Barbey's research group investigates the neural architecture of human intelligence, with particular emphasis on the prefrontal cortex. In a series of landmark studies, Barbey and colleagues have mapped several brain systems related to general intelligence, fluid intelligence, working memory, and cognitive flexibility. Their study of fluid intelligence is considered to be one of the largest and most comprehensive analyses yet in this exciting area of neuroscience research.

INSIGHT will be one of the largest scientific studies investigating fluid intelligence conducted to date: nearly 2,000 individuals organized into four cohorts over a three-and-a-half year period, for more than 100,000 hours of planned data collection. INSIGHT program participants will engage in the training activities over 18 weeks in an effort to improve reasoning and problem solving skills.



New Magnet Moves Into BIC

The Biomedical Imaging Center (BIC) at the Beckman Institute recently acquired a second 3 Tesla Trio whole-body magnetic resonance imaging (MRI) scanner, which will increase its capacity for bioimaging research and development.

BIC provides magnetic resonance (MR) services not only for Beckman researchers, but for researchers around the world. BIC's MRI systems are research-dedicated scanners used to pursue imaging studies in both humans and animals. Recent studies have included work by neuroscientists and psychologists on the

effects of exercise on cognitive function in children and adults; an examination of the emotional and cognitive function of adults with traumatic brain injuries; and studies by researchers from the Departments of Animal Science and Nutrition to map the brains of pigs in an effort to develop clinical interventions for humans.

The new MRI will be heavily used to conduct brain imaging for the INSIGHT study (see above). To watch a timelapse video of the MRI installation, visit go.illinois.edu/MRItimelapse.