

visionaries



While a 16th century proverb purports that eyes are the windows to the soul, in neuroscience research, the eyes are viewed as windows to the brain. NDSU researchers are conducting groundbreaking research examining the mechanisms that control eye movement. Researchers are studying how the eyes and brain work together and how such factors as attention, individual differences and emotion affect visual abilities.

The National Institutes of Health awarded NDSU researchers a five-year \$8.9 million grant in 2004 to establish a Center for Biomedical Research Excellence (COBRE) for visual neuroscience at the university. The proposal of NDSU researchers competed against 40 to 50 other proposals from 20 states. The COBRE grant allows the construction of two state-of-the-art EEG laboratories to conduct electrical brain-imaging experiments. In addition, an advanced driving simulator laboratory will be created. The center's director, Mark McCourt, is a professor of psychology. Senior advisers on the project include Mark Nawrot and Barbara Blakeslee. Individual research projects are directed by Linda Langley, Robert Gordon and Chris Friesen.

Through the competitive grant, NDSU researchers will examine various aspects of the neural mechanisms and functional significance of visual perception, visual attention, visual cognition and action. "This achievement could only happen because of the excellence in the faculty we've assembled in the department," said McCourt. "We have an opportunity to do very significant work."

Three internationally renowned vision scientists comprise the center's external advisory committee. Members include Randolph Blake, Vanderbilt University; Gordon Legge, University of Minnesota; and Christopher Tyler, Smith Kettlewell Eye Research Institute, San Francisco.

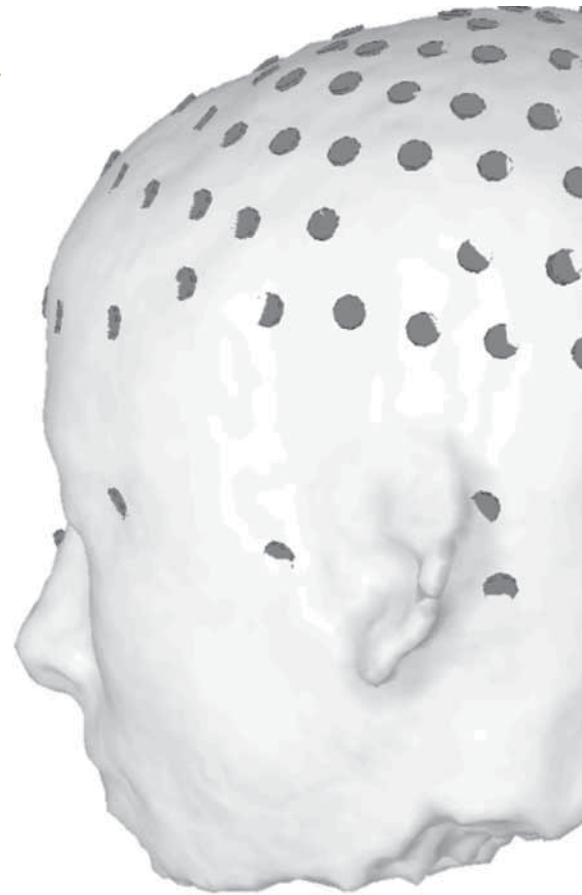
in depth

VISION NEUROSCIENCE IS AMONG SEVERAL AREAS UPON WHICH THE NDSU PSYCHOLOGY DEPARTMENT FOCUSES. A VARIETY OF RESEARCH PROJECTS ARE UNDER WAY.

• Published in the journal Psychological Science, Mark Nawrot's recently reported study shows how a particular type of depth perception, called motion parallax, is disrupted by ethanol intoxication. "Although the study suggests intoxicated drivers may have difficulty determining the relative position of objects using motion parallax," said Nawrot, "this may be only one part of a broader, but more poorly understood, set of visual perception problems caused by ethanol's effect on the eye movement system." Research into the role of eye movements in motion parallax is relatively new. There are four published studies on the subject, three of them by Nawrot, whose work also has appeared in the Journal of Vision and Vision Research.

• In the Cognitive Aging Lab in the Department of Psychology, researchers are examining the patterns of attention and memory performance associated with later life.

• When your friend suddenly looks away in the middle of a conversation, you quickly shift your attention in the same direction to find out what's so interesting. In Chris Friesen's Visual Attention Lab, researchers study the attention effects of directional cues that carry socially relevant meaning. It turns out that cues such as another person's gaze direction, and the direction an arrow is pointing, can trigger rapid and automatic shifts of spatial attention that are different from the types of spatial attention shifts traditionally studied by researchers. Friesen investigates this newly discovered type of visual attention from a cognitive neuroscience point of view, by examining the effects of directional cues on manual responses, eye movements and brain activation.



• Is it perception or reality? Robert Gordon's research focuses on how people perceive their visual environment, the mental representations they form of that environment, and the role of visual attention in determining those representations. In the Scene Perception Lab, issues are studied using a variety of techniques, including the recording of brain activity and eye movements while people view scenes presented on a computer screen. Future research will include using a driving simulator to investigate how the perception and representation of complex, real-world scenes are affected by a perceiver's intentions and by driver distraction.

• NDSU psychology researchers are conducting a study aimed at improving treatment for people with Tourette's Syndrome, an inherited neurological disorder characterized by repeated and involuntary body movements and uncontrollable vocal sounds. Behavioral approaches to treatment are the focus of the NDSU study, evaluating whether tics become worse after being suppressed with behavioral methods. "If we can find out how well kids can suppress their tics, and whether there is a rebound, that will allow us to be better at using behavioral intervention," said psychology professor Ray Miltenberger.

PSYCHOLOGY RESEARCH PROJECTS

• While we all have days we want to "pull our hair out," for some people, the need to act on that feeling produces noticeable hair loss. Psychology professor Ray Miltenberger and his research team are conducting a study to evaluate treatment for the condition, known as trichotillomania. ■