Dr. Sereno has extensive training experience at undergraduate and graduate levels.  Since, 2000, she has successfully trained 7 undergraduate students and 6 graduate students in Neuroscience. She has also served on over 30 graduate student examining or supervisory committees at UT as well as at other institutions. The research in the Sereno lab covers a broad array of methodologies to address higher cognitive function in humans and non-human primates with the long-term goals of understanding attention and memory.  The lab is highly interdisciplinary and includes research in eye tracking technology, non-human primate electrophysiology, behavioral testing of human patient populations, and computational modeling. The lab has four basic lines of experimental and theoretical investigation: 1) neurophysiological investigations of shape and spatial processing, 2) neurophysiological investigations of attention and working memory, 3) investigations of eye movements in human clinical populations in order to design better methods for diagnosis of higher cognitive dysfunctions, to better evaluate treatment effects on cognitive function, and to predict and develop individualized treatments, 4) theoretical and computational models that provide both an overarching framework to guide the experimental studies but also a quantitative method of testing these neurally based hypotheses. Summer 2009 undergraduate research students will contribute to one of the following research projects:

Project 1) Develop a training paradigm to reduce gaze aversion and improve successful gaze following in autistic children. We will develop a computerized protocol in which subjects will make a series of eye movements based on angle of gaze information available in the eyes of face images presented on a computer screen. Subjects will earn points each time they correctly follow the gaze of the face. We will manipulate and control the difficulty of the task by manipulating the number and spatial layout of landing zones and durations of fixations.

Project 2) Further develop a model of reflexive attention. We developed a simple model based on the repetition suppression property of individual neurons in area LIP and the property of mutual inhibition among these neurons. In a unified manner, this model accounts for the facilitatory as well as inhibitory cueing effects observed in a standard reflexive spatial cueing paradigm. Preliminary psychophysical data show that reflexive visual orienting in humans is sensitive to the shape of the cue and the target. More importantly, the shape dependence of reflexive visual orienting is well predicted by the model with dynamic properties similar to biological neurons found in monkey’s LIP. This initial success of linking monkey neurophysiology with human behavior via a theoretical framework warrants further exploration and is the focus of this second project.