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Barrow Researchers Say 3D Films Like Harry Potter Movie May Help Scientists Understand the Brain

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PHOENIX, July 13, 2011 /PRNewswire/ -- With the 3D release of the final Harry Potter film this week, leading visual neuroscientists at Barrow Neurological Institute say 3D illusions not only provide great entertainment, but might also tell us a lot about how our brains function.

Top researchers Susana Martinez-Conde, PhD, and Stephen Macknik, PhD, have spent years examining the correlation between vision and the brain. Â Recently they have teamed up with some of the world's best magicians, including Penn and Teller, Apollo Robbins and Mac King, to try to fully understand why the brain becomes "blind" to many simple visual experiences.

Dr. Macknik points out that magicians are real world wizards, who unlike Harry Potter, must trick the brain rather than cast a magic spell. "With our 'neuromagic' research, we are trying to help solve a number of medical mysteries related to cognitive problems in neurological diseases such as autism and Alzheimer's." Â Drs. Macknik and Martinez-Conde's work with magicians has led to the recent publication of their first book *"Sleights of Mind."*

"Examining the way that 3D movies, like this Harry Potter film, deceive an audience is another step in helping us understand the way our brains work," says Dr. Martinez-Conde, director of the Laboratory of Visual Neuroscience at Barrow in Phoenix. Â "Cognitive neuroscience could have advanced faster if we would have paid more attention to visual illusions and how magicians artfully manipulate our awareness and consciousness."

By studying what happens when the brain looks at an illusion such as a 3D movie or is tricked by the wizardry of a magician â€" the Barrow researchers can separate what the eye itself picks up from the brain's interpretation of what is happening.

"When perception doesn't match physical reality, it allows you to isolate and understand the actual brain process, which is why 3D movies are so interesting to see and to study," says Dr. Macknik, who directs the Laboratory of Behavioral Neurophysiology at Barrow. "The brain creates a rich visual world from only partial bits of information. This happens in the real world and in 3D movies, games and TV. Â Our research is examining how and why the brain creates this world."

Dr. Martinez-Conde believes these brain processes reveal nothing less than clues to human consciousness. Â "The brain circuits that interpret visual stimuli include the neurons that comprise consciousness," says Dr. Martinez-Conde. Â "If we understand these circuits and their neural underpinnings, we will learn the neural bases of visual awareness."

3D technology is also of interest to scientists, says Dr. Macknik because recent studies suggest 3D entertainment systems are potentially damaging to the brain. "Some people experience eye strain when viewing 3D images. Â But some people also experience eye strain after being fitted for spectacles, though correcting optical defects of the eye is certainly a good move for the brain," Dr. Macknik noted.

In normal vision, viewing objects at different depths requires the observer to converge or diverge their eyes depending on whether the objects are nearer or farther away from the eyes. The lens of the eye must also accommodate to focus the images at different distances. Â In 3D films and other 3D entertainment, the brain also compares the images from the two eyes, but all of the objects that appear at different depths are actually on a flat screen, and are therefore the same distance from the eyes.

"This can be a source of eye strain for some because when their eyes move between objects at different depths, their eyes automatically accommodate to different image distances, even though all the objects are actually the same distance from the eyes. The mismatch that occurs can cause strain," Dr. Macknik said. "Most people do not suffer from eye strain during 3D entertainment. Even those who do suffer from strain may adjust with practice. The way the brain adjusts is something neuroscience research, magicians, and even wizards don't yet understand."

About Barrow: Â Barrow Neurological Institute is internationally recognized as a leader in neurological research, diagnosis and patient care. Â Its world-renowned physicians treat patients with a wide range of neurological conditions, including brain and spinal tumors, cerebrovascular conditions, movement and neuromuscular disorders.Â Barrow's clinicians and researchers are dedicated to providing excellent patient care and innovative approaches to treat neurological disorders. Â Barrow was founded in 1962 at St. Joseph's Hospital and Medical Center in Phoenix Arizona. Â St. Joseph's is consistently voted among the Top 10 hospitals for neurological services in the United States. Â In 2011 Barrow expanded to include a pediatric services location at Phoenix Children's Hospital.

SOURCE Barrow Neurological Institute