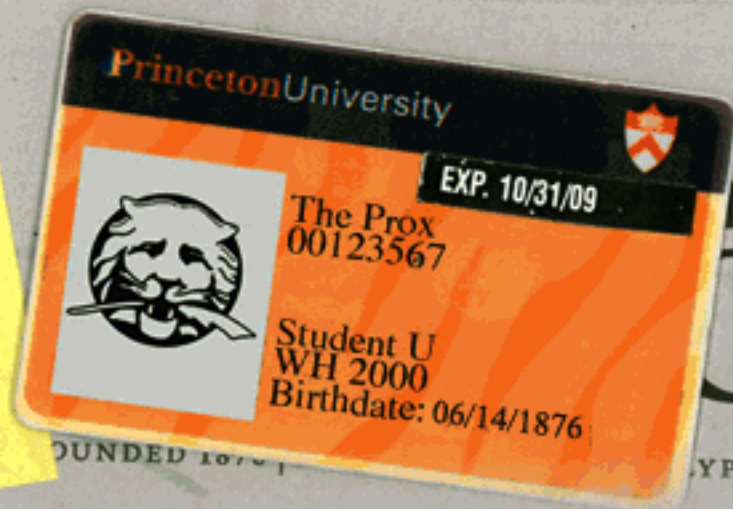


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ABOUT THE PROX



The Prox is a blog about campus life, issues, and events at Princeton University hosted by

The Daily Princetonian and written by staff from several departments, including Opinion and Web.

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TUESDAY, FEBRUARY 24, 2009

Moon-Walking Gorillas



Now you see it, now you don't. Is Mona Lisa really smiling? How wide is that smile, really? See the jump to find out.

While many people can safely assume that they would never miss a "moon-walking" gorilla in their presence, scientists believe that with the proper context, most people will miss the presence of the animal completely.

As part of an ongoing "Science on Saturday" series, Dr. Susana Martinez-Conde, director of the Laboratory of Visual Neuroscience in Phoenix, AZ, spoke to a packed auditorium of high school students and parents at the Princeton Plasma Physics Laboratory last Saturday.

In a talk titled, "Illusion and Reality: At the Boundary of Art and Science", Martinez-Conde explained how her lab's research is more frequently studying art in order to examine how the brain perceives objects. Martinez-Conde presented an interactive lecture, asking the audience to participate in a series of visual experiments and explaining the scientific processes behind the different classifications of illusions presented.

Many centuries ago, the philosopher Aristotle noticed that simply shifting his gaze from a waterfall to nearby rocks made it appear as if the rocks were also in motion. Beginning with the first known recognition of optical illusion by Aristotle, Martinez-Conde explained that many artists, including Leonardo da Vinci took advantage of the flexibility of the brain's optical nerve.

While displaying a photo of da Vinci's Mona Lisa, Martinez-Conde explained that the mystery and fascination behind the famous painting may lie in an optical illusion at the center of her smile that the artist created.

"Mona Lisa's smile changes -- we see a subtle smile because of how our neurons process visual information and the smile really becomes broader as it moves away from the center of our gaze," she said.

Martinez-Conde explained that it is categorized as an anamorphic illusion because of how the smile is drawn with low spatial frequency. Photons of light bounce from the image to our eyes and then travel through a visual pathway to photoreceptors in the eye. However, the focus and resolution changes easily, leaving many confused as to whether or not she is actually smiling and how wide her smile actually is.

She went on to explain that humans were unique from dinosaurs and frogs in that we are able to see moving objects. Even when humans focus their sight and believe their eyes are not moving, there are three different types of microscopic motions, microsaccades, drift and tremors, that occur in the eye. Using stabilization techniques in the lab, researchers discovered that if our eyes were kept completely still, like dinosaurs and frogs, we would be unable to see non-moving objects.

While presenting a series of illusions, such as adaptation illusions, illusory motions, ambiguous figures, and invisibility illusions, she allowed the audience to play the role of her research subjects. Many audience members reacted with verbal surprise when they realized how their perception of different images differed from the actual images on the screen. She also said that many scientists, including those in her lab, have begun working with magicians in order to better understand their techniques and how they affect our brain's neural and visual system.

Martinez-Conde made a reference to a popular movie, The Matrix, to summarize her talk and explain how what we experience, like optical illusions, may just be our brain playing tricks.

"Nobody has put it better than the famous philosopher Keanu Reeves ... all of our subjective experience is a brain construct," she said.

On a side note: this is the 500th Daily Princetonian Prox Post. Many thanks to all of our readers!