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'The Vision Revolution': Eyes are the source of human 'superpowers'

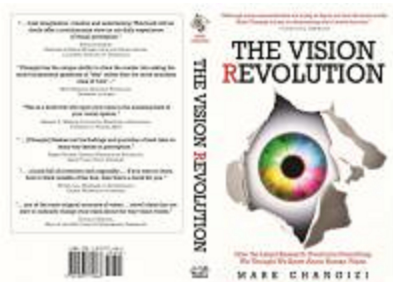
New book challenges conventional wisdom on why human vision, brains have evolved to perform extraordinary feats

Troy, N.Y. – For Mark Changizi, it's all in the eyes.

About half of the human brain is used for vision, and sight is the best understood and most thoroughly investigated of the five senses. This is why Changizi, a neurobiology expert and assistant professor in the Department of Cognitive Science at Rensselaer Polytechnic Institute, has spent the past several years researching, writing, and challenging some of the most basic scientific assumptions about human vision.

Reaching beyond "how," and instead inquiring "why" vision evolved as it has over millions of years, Changizi made a startling discovery: human beings do, indeed, have superpowers. And it turns out that these superpowers, all related to vision, have been instrumental in shaping the way we interact with and see the world.

The end result of Changizi's eye-opening efforts is *The Vision Revolution: How the Latest Research Overturns Everything We Thought We Knew About Human Vision*. The new book, which hit store shelves this month, is published by BenBella Books.



"Our brains don't come with user's manuals listing all the powers we're capable of – much of what our eyes can do is still not yet known," Changizi said. "That's why I think this is new, important, exciting stuff, because we are still today learning about powers we didn't even know we have."

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Based on a series of peer-reviewed journal articles, *The Vision Revolution* was carefully framed and tuned by Changizi to be accessible and engaging to non-experts as well as science aficionados and career neuroscientists. The new book is a guided tour in which readers accompany Changizi as he rolls up his sleeves and sets out to answer four misleadingly simple questions: 1) Why do we see in color? 2) Why do our eyes face forward? 3) Why do we see illusions? 4) Why does reading come so naturally to us?

The short answers, surprisingly, are in the parlance of Peter Parker and Clark Kent: 1) Because we are telepathic. 2) Because we have X-ray vision. 3) Because we can see into the future. 4) Because we can commune with the dead.

The longer answers, however, are more Charles Darwin than comic books. For example, our X-ray vision is actually advanced binocular vision that developed to allow our primate ancestors to see the forest through a vast clutter of leaves and trees. Our telepathy is actually our color vision, which

evolved to allow us to sense the emotions on the faces of others. And our clairvoyance is actually an ages-old hack that enables our minds to compensate for the one-tenth of a second lag between when we see something and when the visual information is received by our brain. (The very same delay, Changizi said, is at the heart of most optical illusions.)

In *The Vision Revolution*, Changizi tackles his four questions with a unique, interdisciplinary perspective. A self-described "square, stick-in-the-mud, pencil-necked scientist," he employs humor, a sprinkling of pop culture references, and intuitive everyday analogies to paint a rich picture of leading-edge theoretical neuroscience and evolutionary biology.

From asking readers to imagine themselves as somber squirrels, to explaining why a uniocular, unbrowed cyclops of legend would likely best today's teens at violent video games, *The Vision Revolution* explains with ease research that in the last two years has landed Changizi in the pages of *Time*, *Newsweek*, *The New York Times*, and *USA Today*.

"In targeting the book toward non-experts as well as my research peers, I believe it becomes more exciting for both kinds of readers," Changizi said. "Non-experts don't want a book written just for non-experts. They want to read a book they know is genuinely part of the scientific conversation. And experts don't always need to have all the enjoyment sucked out of their readings, as in most journal articles."

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The research explored in *The Vision Revolution* was funded in part by the U.S. National Institutes of Health.

Prior to joining Rensselaer in 2007, Changizi was the Sloan-Swartz Fellow in Theoretical Neurobiology at the California Institute of Technology. His research spans vision, cognitive science, and theoretical neurobiology, and his first book, *The Brain from 25,000 Feet: High Level Explorations of Brain Complexity, Perception, Induction and Vagueness*, was published in 2003.

For more information on Changizi's research, visit: <http://www.changizi.com> and www.rpi.edu/dept/metastite/news/magazine/march2009/human_superpowers.html.

The BenBella Books press release for *The Vision Revolution* can be found at: http://www.benbellabooks.com/media/press_kits/Vision_Revolution_PressKit.pdf.

Rensselaer news releases on Changizi's X-ray vision and optical illusion research can be found at: <http://news.rpi.edu/update.do?artcenterkey=2486> and <http://news.rpi.edu/update.do?artcenterkey=2448>.

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