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Boise research institute is making science pay — for more science

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Tim Barber and Mark Changizi developed O2Amp glasses, which they say “dramatically enhances the exact color of deoxygenated blood, under the skin.” Among other marketable uses, they would help phlebotomists, nurses and doctors spot veins more easily.

Look at one of your hands. Ever wonder why it’s shaped the way it is?

Such thoughts pass through our minds, only to be replaced by other more pressing matters of daily life.

Evolutionary neurobiologist Mark Changizi spent months trying to explain the shape of the human hand.

“You don’t really think of it as something that needs an explanation — you can’t see that there’s real design in there and really specific stuff. You only notice it when you examine other primates, and there’s huge variability,” Changizi said.

Changizi, a 42-year-old former assistant professor at Rensselaer Polytechnic Institute in Troy, N.Y., has published more than 35 scientific papers and three books on the human brain, vision and language.

Changizi’s 2011 book, “Harnessed,” challenged the idea that the human brain evolved to master language and music. He argued that speech and music are not instinctive or learned — but that they culturally

evolved to fit us by mimicking aspects of nature.

“Writing systems developed so that the shapes of letters have the kinds of structures you find in the conglomeration of contours in the real world,” he told the Idaho Statesman. “Culture has shaped writing to fit the kind of conglomerations in nature.”

He wasn't surprised when Duke University researchers discovered that baboons can recognize written words, even telling them apart from series of letters that aren't words. That story generated big headlines in the world of science this month.

“The seemingly unique human powers we have, like speech and reading and music, are a redesign of powers that other primates probably possess,” he told The Philadelphia Inquirer.

BRAIN POWER IN BOISE

The New York-based neuroscientist is now teaming with longtime friend Tim Barber in a Boise venture called 2AI Labs (“To Artificial Intelligence” is their favored interpretation of the acronym for the business). Its mission is “researching the mind, what it does and where it's headed,” according to 2AI's website.

The pair, both of whom hold doctorates in mathematics, hope to turn some of their discoveries into marketable products that will support research for years to come. It's likely to be a serendipitous offshoot of whatever interests them at the moment.

“The research that I'm most interested in are things that don't have any obvious application,” said Changizi, who while in high school made “understanding consciousness” his life's goal.

Barber said 2AI is their excuse to finally work together. They grew up in Fairfax, Va., and became friends at the University of Virginia. Changizi had created a discussion group called Tower of Babble.

“We had lofty philosophical discussions about science and cosmology,” Barber recalled.

SCIENTIST, ENTREPRENEUR

Barber, who has lived in Boise about a decade, is an academic turned entrepreneur.

During and after earning his doctorate in math at Princeton University, Barber solved problems and was a cryptographer for the Department of Defense. He left after about a decade and launched Keynetics, a digital retail company that began in his San Diego garage. That evolved into two businesses — ClickBank and Kount— that employ about 180 people in Boise and Boulder, Colo.

A board member lived in Boise, and Barber moved here because he thought it was a better place to raise a family than San Diego. He built and lives in the new castle house on Warm Springs Avenue.

Changizi visits Boise once a month to meet with Barber. He abandoned plans to relocate when his wife, Barbara Kelly Changizi, took a job as a neurologist at the prestigious Mount Sinai Medical Center in Manhattan.

FIRST PRODUCT: LENS THAT MAKES VEINS POP

Changizi and Barber have developed their first product, tentatively called O2 Amp. The idea grew out of Changizi's study of the human eye and how it allows us to perceive human emotion and health.

O2 Amp is a lens that amplifies differences in oxygenation of the blood just beneath the skin. It makes veins more visible and enhances the wearer's ability to read the emotions of the people nearby by the color of their skin.

“We do that without these (lenses),” Changizi said of reading color signals for emotion. “The reason we evolved this is for modulating social connections between primates.”

“You can change facial signals, but these colors on your face and your rump are fundamental signals,” he added. “There are physiological underpinnings that make it an honest signal.”

Barber said they began discussing practical uses of the O2 Amp lens a couple of years ago. They’ve applied for patents and approached eyewear manufacturers.

They believe the first and most obvious use of O2 Amp glasses would be in hospitals, allowing phlebotomists, nurses and doctors to find patients’ veins and gauge health. Barber believes they also could be useful for security officials at airports to detect changes in pallor — those who are nervous because they have ill intentions.

“Supposedly poker players do this all the time,” Barber said of how people read each other’s emotions. “When you’re afraid, you turn whiter. The blood rushes away from your skin.”

They anticipate a version of O2 Amp that might be popular for everyday wear.

“We’re hoping this will be the next big thing for eyewear,” Changizi said.

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