

Seeing science with an artist's eye

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Neuroscientist Heather Bimonte-Nelson uses paint on canvas to explain her research in a way that words can't. Credit: Pete Zrioka, OKED

For many, the words “scientific research” call to mind a collection of cartoonish clichés – white lab coats and goggles, microscopes and bubbling beakers. But research isn’t just a set of props and piles of data. It’s a story that starts with a question and journeys to an answer, an ongoing narrative that can be told in a variety of ways.

Heather Bimonte-Nelson, a neuroscientist at Arizona State University, explores the brain and its functions through [science](#) and explains her science through art. Armed with spatulas, acrylic paints, inks and a handful of appropriated household tools, she produces intensely detailed paintings that further the story of her research.

“Science is really about convincing people that your hypothesis or theory could be the truth in nature,” says Bimonte-Nelson, an associate professor of psychology. “And if you’re not a good storyteller, people

will never believe it. You could have the best theory ever, but if you can't communicate it effectively so others understand it, it doesn't count."

Bimonte-Nelson is the head of the Memory and Aging Laboratory, which focuses on learning, memory and brain changes that occur as we age. Recently, researchers in the lab demonstrated a link between the birth control shot and memory loss in rodents. The scientists juggle multiple projects, mostly related to hormone therapies and the impact they have on brain functions and memory. Bimonte-Nelson's paintings are reflections of her research work, depicting spidery neurons, fading memories and cell death.

While she describes herself as "always crafty," Bimonte-Nelson only began painting about a year ago, and has since then produced an estimated 40 pieces. Some adorn her office, others she's given to students and friends. Works in progress and finished pieces dominate her dining room, which serves as her makeshift studio.

A cut above a diagram in the average psychology textbook, the paintings explain the interworking of the mind in intricate and striking detail.

Bimonte-Nelson and her husband Matthew Nelson have two daughters, Hailey, 8, and Brooke, 6. Both girls have a history of epilepsy, and while their conditions are in remission, it's always in the forefront of Bimonte-Nelson's mind – and her art.

One painting, simply titled "GABA," functions as a portrait of her daughters' seizures, and the quest to control them. Even tones of light green and cerulean blue streak down the canvas, but are disrupted on one side in a dramatic blood-red band.

The colors represent neurotransmitters in the brain. The blues and greens

are the inhibitory gamma-aminobutyric acid, or GABA, and the red is glutamate, an excitatory neurotransmitter.

“GABA is very soothing, a great inhibitor,” explains Bimonte-Nelson. “Without GABA, you’d be running around with no control. With a seizure, there’s a big imbalance between these inhibitory and excitatory systems in the brain.”

While “GABA” could be considered as more of a personal piece, Bimonte-Nelson’s inspiration to paint first came in the form of writer’s block.

“I was writing a grant and I had a vision of a painting in my head. I couldn’t really formulate the words for it, but I saw the picture,” she recalls.

After painting for a while, Bimonte-Nelson understood the connection she was looking for. She had found the right words for her grant, and was able to complete it. After she finished that first piece, “Dancing Neurons,” she says she felt a sense of accomplishment and a greater understanding of the science she was working on at the time.

A network of black neurons dominates the painting, with different color pockets evenly distributed across the canvas, representing the different neurotransmitters inside the brain.

During sleep, your brain goes through a process called consolidation, in which the neurons that have fired throughout the day in a specific pattern fire in again that pattern, said Bimonte-Nelson. Consolidation is how information goes from short- to long-term memory.

The prominent dark blue hues give “Synchrony of Memory in Replay” a calming, restful feel, while the neuron seems to crackle with the

electricity of coding memories.

“Synchrony of Memory in Replay” exemplifies the most engaging attribute of Bimonte-Nelson’s paintings. As art, they’re attractive enough to find a home in an ornate frame. But it’s the inspiration, the science from which they are derived that makes them interesting, captivating pieces. Even people with little or no understanding of science can understand the processes her paintings depict.

Bimonte-Nelson’s husband of nearly 10 years, Matthew Nelson, sees that accessible quality in his wife’s work.

“People tend to reach a point when talking to scientists where they just glaze over,” says Nelson, a research operations manager at the Barrow Neurological Institute in Phoenix. “With something like Heather’s paintings you don’t get lost in the words, you just get lost in the art.”

These literal representations of cerebral processes are engaging to not only the scientifically challenged but also those intensely familiar with science.

“As a scientist, I think the mixture of art and science is absolutely beautiful,” says Jazmin Acosta, a postdoctoral fellow in Bimonte-Nelson’s lab. “Not only can we see a representation of what we’re studying, but it also gives us another perspective. It illustrates things very clearly.”

Bimonte-Nelson’s husband, who worked as a researcher for 15 years prior to moving into administration, asserts that most scientists fail to become independent researchers because they can’t sell their ideas.

In other words, they can’t tell their story.

Bimonte-Nelson doesn't seem to have that problem. In her lectures, she's animated and full of energy. In her lab, she sells the story of her research with words and data. In her art, she provides an unconventional and beautiful way to look at science.

“In anything you are passionate about, it is necessary to be a good communicator and storyteller – you can do that through art, through words or through presentations,” Bimonte-Nelson says. “Silence does not change the world. You have to be good at conveying information or your ideas, scientific or not, will never come across. If you can not express, in some form, what you want the world to hear or interpret, it is as if that thought never existed.”

Provided by Arizona State University

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