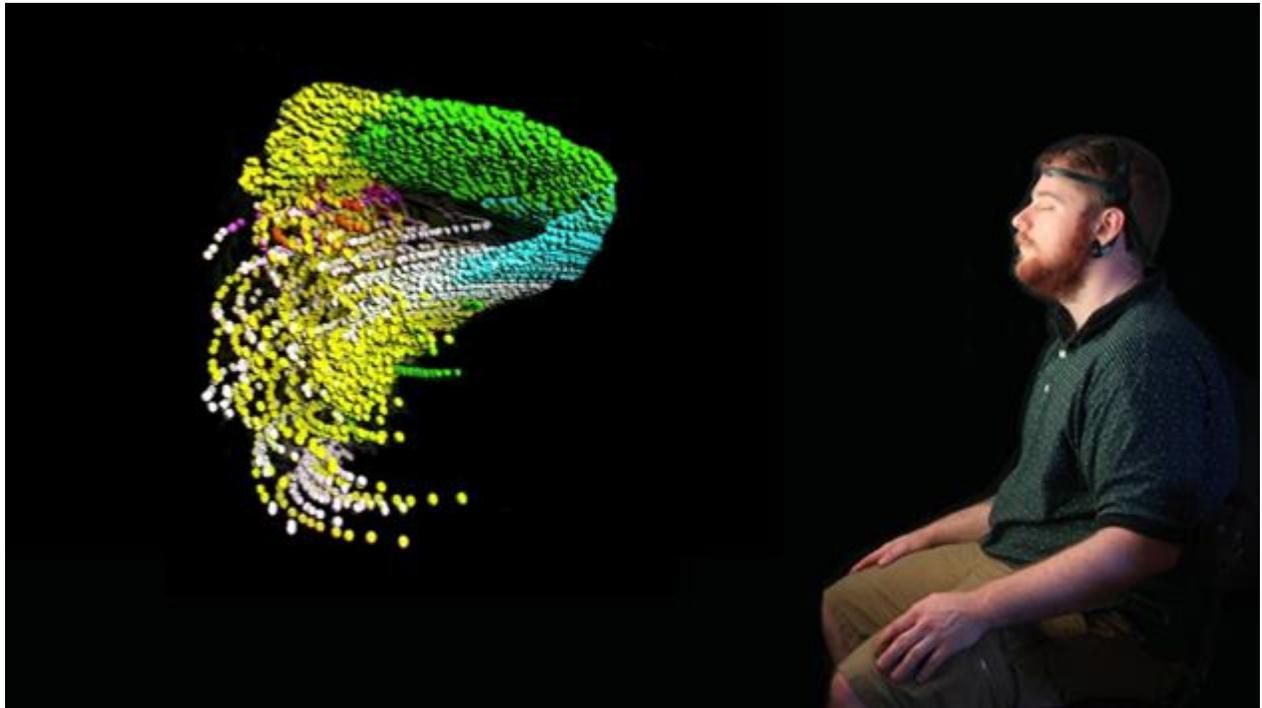


CYCLING '74: TOOLS FOR SOUND, GRAPHICS, AND INTERACTIVITY

Artist Focus: China Blue

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China Blue's work lives in that space where art and science overlap, and commutes to less obvious destinations from there – the Eiffel Tower, the canals of Venice, NASA's Vertical Gun chamber, and the inside of your head. She was kind enough to sit down for a few minutes to talk about her current work.



China, the project “Mind Draw” takes a unique approach to graphics generation – by using brain waves to stimulate the drawing mechanism. What got you interested in this area of exploration?

Mind Draw is the evolutionary result of a decade's worth of exploration, experiments and the occasional side trail that began around 2005. At that time, I was making sound-based art work and was interested in taking common “found” sounds like those of a ping pong game which I then manipulated to animate spaces. Around then, I met my soon-to-be husband who was an auditory neuroscientist who specialized in how the brain hears and responds to sound and vibration. Our conversations focused on the auditory, but as a visual artist, I began thinking about how to translate sound into vision, something he would describe as “multisensory integration,” and I just thought of as a challenge. But it really began my fascination with all things brain related. I am also fascinated by one cognitive science theory which is that consciousness might be the result of cerebral neuronal synchronization and swarming behavior. That inspired the initial design of MindDraw, which starts off as a vortex of spheres constantly swirling around, moving in groups much like a murmuration (AKA flock) of starlings.

An additional motivation was the fact that I like to make work physical. It always feels more real to me if it functions in the physical realm rather than just trapped in a digital medium. That is why I made the

work so that that people can engage with it and can also see their brain shaping the structure of the drawing in real-time. It is also physical when I show it in a performance scenario and invite people to participate in the creative process.

This work has been extremely demanding and required collaboration from two other people. The first part of the collaboration is with my husband, the aforementioned neuroscientist Seth Horowitz who has been a valuable resource for understanding the functioning of neuronal triggering in the brain as well as the mechanics of EEG capture and analysis. I am also lucky to be working with Christopher Konopka who is not only a serious Max For Live (M4L) programmer, but also very talented at pulling in diverse data formats and making them compatible with and manipulable in Max, capturing, translating, scaling, smoothing the raw EEG signal in a way that accurately uses the data, but also helped create the aesthetic by modularizing the orb design and managing the prickly Bluetooth connection that gets the data from the EEG headset to the computer and out to the audience. The lessons that the three of us learned along the way also allowed me to create **Imagining Blue**, a related EEG-based work that also uses M4L, EEG and interactivity, yet the final piece work enables the user to change the colors, patterns and sounds of an LED based sculpture.

You are an artist-in-residence at the Norman Prince Neurosciences Institute at Rhode Island Hospital. How does this open up opportunities for you to explore the brain – and its connection to artistry?

I am working in collaboration with Dr. Peter Snyder, a respected and accomplished neurologist carrying out research into Alzheimer's disease, who is also an artist in his own right. Dr. Snyder is looking at the potential for detection of symptoms of early onset AD in the retinal vasculature (microscopic blood vessels in the eyes). Understanding the research is just the beginning of connecting to art. When I'm making art, the important component is introducing some form of transfiguration. What this means to me is not literally reiterating the research results which is more in the realm of scientific illustration, but rather introducing something more, something interpretive and transformational. One example would be a series of paintings I've done derived from confocal microscopy images of patients' retinal blood vessels. I am using a hand-made paint fabricated with aluminum. This gives them a unique shiny texture, but is also a nod to the fact that traces of aluminum from cooking pans was once thought by some researchers to be a cause of the disease. In addition, I am making two LED-based pieces that convert statistics about Alzheimer's – such as the facts that 2 out of every 3 patients with Alzheimer's are women and that every 66 seconds someone in the US develops the condition – into lighting patterns. These visualizations are being done in Max in collaboration with Christopher Konopka.

Neuroscience is a huge and seemingly ever-expanding field that provides a continual wealth of insight into how we function as humans. Dr. Snyder's research, in particular, has helped me to understand that because the eye connects directly to the brain (and the retina is actually considered a *part* of the brain), what happens in the eye can let us have clues to more global events in the brain even tucked away out of sight in our skull. This is a corollary that does not create a direct artistic "vision," if you will, but points to an underlying interest of mine – the idea of interconnectivity. Whether it is body related as in neural networks or sociologically related as in social networks, interconnectivity is a phenomenon that defines a cohesive property of our world. It is from this vantage point that I am motivated to further investigate the brain.

Your personal 'tag line' is "Exploring the Intersection of Art & Science". What are you working on? What other areas has this led you to explore? And what areas are you hungry to explore in the future?

Pauline Oliveros, one of the most well-known contemporary American composers and proponent of sonic meditations, was a friend and colleague of mine who passed in November 2016. There was a major

memorial and tribute to her on February 6th at the Armory in New York City for which I was invited to contribute a piece. Based on the MindDraw work, I created **MindDraw: Theta for Pauline Oliveros**, in which I sonified the theta brainwaves (which emerge during deep meditation) to be the acoustic component of the work.

I am also currently working with Nona Hendryx, perhaps best known for her work with Labelle in the 1960s-70s and more recently as a solo artist. We are working together on her new project **Sisters MATR (Music, Arts, Technology and Robotics)**, a program that engages young women of color in music and art through robotics and other technology.

My solo exhibition of all of the brain work titled **Creativity of Consciousness** recently opened at the Pennsylvania College of Art & Design

I've explored acoustics in some very interesting and unique environments. One of the sound works of note that I did in collaboration with Seth and a team was recording Paris' Eiffel Tower with seismic microphones. We were able to capture her voice as we listened to her iron anatomy responding to wind and traffic, which resulted in the CD "**UnderVoices**", which plays with the found sounds.

I've also become fascinated with acoustically exploring space and Earth sciences. One of my first projects for NASA was a project to research the acoustics of simulated asteroid impacts at NASA/Ames Research Center Vertical Gun. This is a three story gun that shoots projectiles at up to Mach 10. I was excited to discover that I was the first to propose research based on the sounds created in the target chamber. I worked with Seth on this project with NASA colleagues of his. While the overall study was examining the flow of energy from large cosmic impacts such as the Tunguska event of 1901, one of the runs let us use a listening avatar, basically a Styrofoam head wearing 3d printed ears and binaural microphones, placed in a near vacuum only a meter or so away from a Mach 5 impact to let us simulate what an astronaut on Mars might hear if a meteorite struck near them.

About the future? Well I am currently awed by the images of Saturn's rings just released by NASA's Cassini spacecraft in its final orbits. And hungry is certainly the term for my ambition to explore the rings and the 53 moons that dance around and shape them.

By Darwin Grosse

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