SciArt Initiative

APRIL 2020

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RESIDENCY

Real Science/Real Art
Broad Institute of MIT and Harvard

"Unfolding" by Guhapriya Ranganathan (2011-2012). Installation shot of paintings, mixed-media artworks and sculpture from the residency show at the Broad Institute. Photo: Lynn Barry Hetherington.

By Joe Ferguson, contributor

Science and Art is a strange marriage. Not because they occupy opposite ends of the intellectual spectrum, residing in the nooks and

For instance, developing optic technology may have inspired Duchamp's Nude Descending a Staircase, but it was not a collaborative effort with any scientist of his day. Roberto Matta was influenced by early 20th century developments in physics when he painted his interpretation of *Star Travel*, but no physicist was commissioned in its production. Sure, Hockney did collaborate with Falco, but more on historical work than anything artistic.

It is exciting, then, when we discover a place where real collaboration is happening - a place where scientists influence artists, and artists influence scientists. That place is Broad Institute of MIT and Harvard.

Rather than give you an overview through dry, expository copy, we talked to Shannon Humphreys, coordinator of operations for the artist-in-residence program; Daniel Kohn, the artist who helped found the Broad residency and served as its first artist-in-residence; and Guhapriya (Gupi) Ranganathan, a former artist-in-residence. Here's what they had to say...

Installation by Daniel Kohn. Image courtesy of the artist.

Joe Ferguson: *Shannon, give us a top-down view of the Broad Institute.*

Shannon Humphreys: Broad Institute is a non-profit biomedical research enterprise that is empowering a revolution in biomedicine to accelerate the pace at which the world conquers disease. We launched 15 years ago, in 2004, to empower a generation of creative scientists to transform medicine. The Broad Institute seeks to describe the molecular components of life and their connections; discover the molecular basis of major human diseases; develop effective new approaches to diagnostics and therapeutics; and disseminate discoveries, tools, methods, and data openly to the entire scientific community.

The institute includes faculty, professional staff, and students from throughout the MIT and Harvard biomedical research communities and beyond, with collaborations spanning over a hundred private and public institutions in more than 40 countries worldwide.

JF: *And what kind of science is being done at the Broad Institute?*

Daniel Kohn: In 2003 an oncologist, Todd Golub, wrote me an email: "I'm an oncologist, an amateur pianist, and am interested in the visual arts. I've always been fascinated by how these things communicate." This struck the chord of my own interest in physics and philosophy, and so we started a discussion about art and science, how they communicate and why. We found early on that rather than defining art and science as polar opposites - where science is objective and art is subjective and therefore cannot communicate - it was much more interesting to define both art and science as attempts to describe the world, from a point of view, within a tradition, with the tools of that tradition. Seen in this light they are two closely related human pursuits of knowledge, similar enough to offer many venues for collaboration.

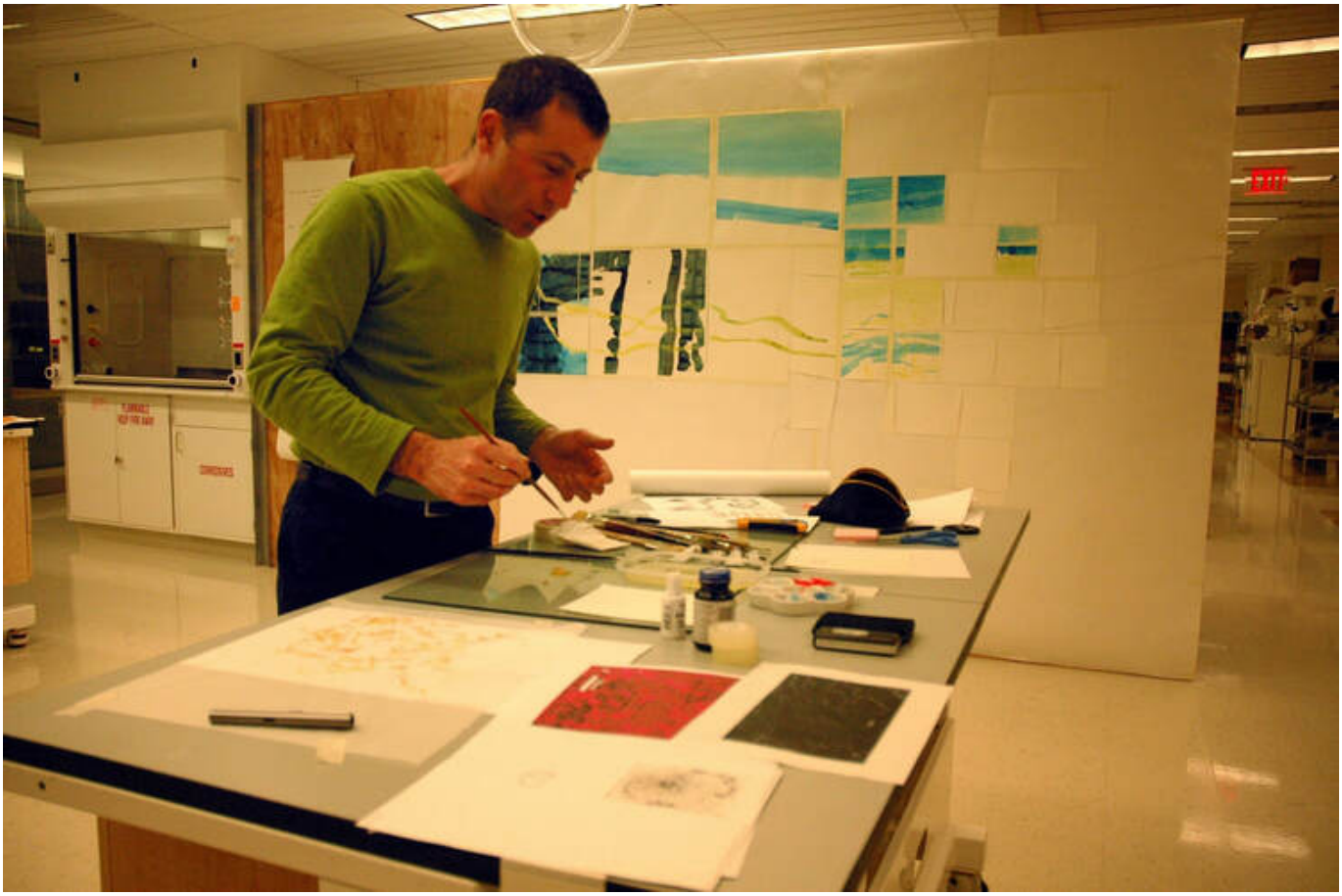
That initial understanding between us led to my first visit to his lab, his to mine, and eventually to an ongoing relationship with the Broad Institute, which Todd co-founded in 2004, and a formal residency for a couple of years. It led also to a deep shift in the focus of my work from looking at the physicality of place to exploring the place of science. I wanted to ask: "What are the structures in science that allow us to understand the world? To do research? Are they similar to what happens in art? And is there something there to help us understand how we exist in the world today?

"Cultured Interactions: Evolving Landscape" by Guhapriya Ranganathan (2018). Site-specific commissioned permanent installation. Photo credit: Will Howcroft.

JF: *Broad Institute has an incredible artist-in-residence program. Shannon, what kind of artists are you looking for?*

SH: In a word, the artists we invite to collaborate with researchers at the Broad Institute are curious. They have accomplished much in th

unique. Our residency alums are diverse in every way, including how they came into our orbit and the reasons they were invited.



Daniel Kohn. Image courtesy of the artist.

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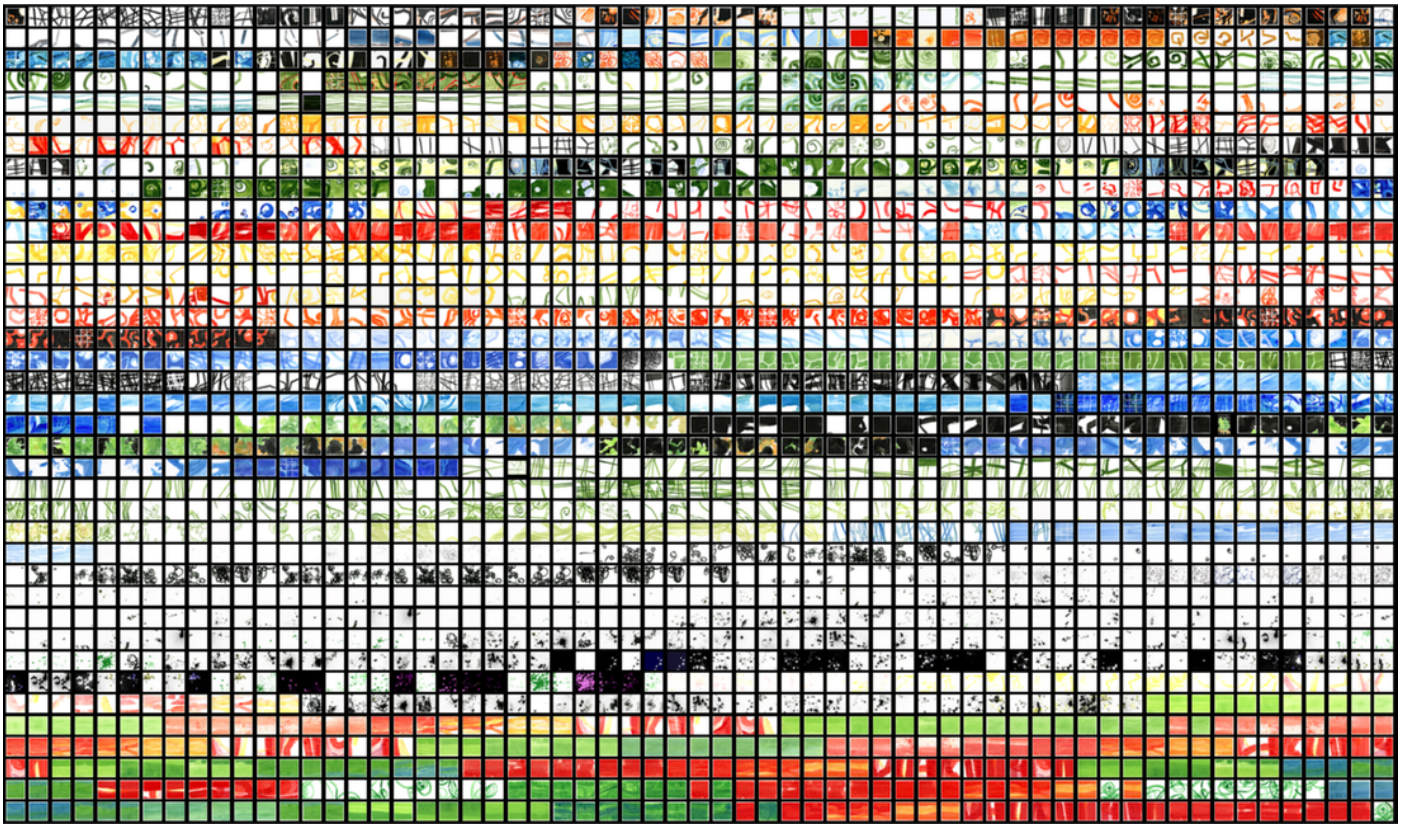
JF: *Daniel, you were the first. What were some of the obstacles you faced, and how did you overcome them?*

DK: When we started there was no artist-in-residence program, and as in many scientific endeavors, there was money for scientific research but no way to pay an artist/collaborator. It's an interesting underlying structural element that says something about the separation of disciplines.

So our modality for the first two and half years was that I would go up to Cambridge a couple of days a month. Todd paid for my travel out of his discretionary funds, and I slept in his spare bedroom. It was worth it for me, as I felt I needed to pursue this research and was willing to self-fund to do it. But it was not sustainable.

In 2007, the Broad was able to identify funds for a modest honorarium and travel expenses for me to be there for longer durations, and we started the first six month residency. Magically, as we surveyed spaces that might be available - the basement, a shared office, the mechanicals eighth floor - it appeared that 1,000 square feet on floor six of the brand new Cambridge Center building were unaccounted for for the following six months. So my first studio was fantastic.

We purchased some four-by-eight sheets of plywood and I put up a long wall to work on right in the middle of the lab. While there, I start



Daniel Kohn's Watercolor Dataset. Image courtesy of the artist.

Installation by Daniel Kohn. Image courtesy of the artist.

Installation by Daniel Kohn. Image courtesy of the artist.

Installation by Daniel Kohn. Image courtesy of the artist.

JF: *Gupi, how did you find the Broad?*

Guhapriya Ranganathan: As graduate student at MassArt in 2006, I worked on a series of drawings and prints exploring memories after spending a summer with my grandmother who was suffering from memory loss. The initial research on Alzheimer's disease and dementia for that project led me to study and focus on the phenomenology and mapping of memories, and scientific research. A mutual acquaintance who had seen my recently-installed work *Recombinations* at Simmons University, asked me to get in touch with Daniel Kohn, the first Broad artist-in-residence. When I walked in to chat with Daniel, I had no idea what the meeting or the Broad Institute was about.

During that crucial meeting - that went well beyond the scheduled hour - we discussed our interests in art and science, the nascent Broa

GR: The application process was intense, extensive, and started with Daniel visiting my studio. He informed me that I would need to come in for interviews to meet with Todd Golub, the head of the Broad artist-in-residence program and the Cancer Lab, and Bang Wong, the Creative Director who worked with data visualization. Over the year, I met with them three times. During my first meeting, I shared my portfolio with a presentation. We chatted about exploring Paul Gauguin's famous questions: "Where do we come from? What are we? Where are we going?" with my art, and my work that focused on memories and mapping.

There were specific questions about what I meant by memories, especially focusing on cellular memories and evolution, and about being open to a shared collaboration process and working in the labs and offices with scientists in a manner that would be very different from other residencies. They asked me if I could meet them with works-in-progress from my current projects after three months. The second meeting continued our discussions about our expectations for the residency, and focused on the work that was developing in my studio.

When I met them at the Broad for the third time, I was pleasantly surprised when Todd and Bang congratulated me on becoming the second artist-in-residence. They introduced the four scientists - Sarah Calvo, Dawn Thompson, Catherine Luce, and Erez Aiden Lieberman - who had volunteered to collaborate with me. They shared readings and online video courses for me to learn from over the summer before starting the residency that fall. Todd, Bang, and these four scientists - in addition to working with me on their projects - helped me navigate my way through the residency by introducing me to other researchers and scientists.

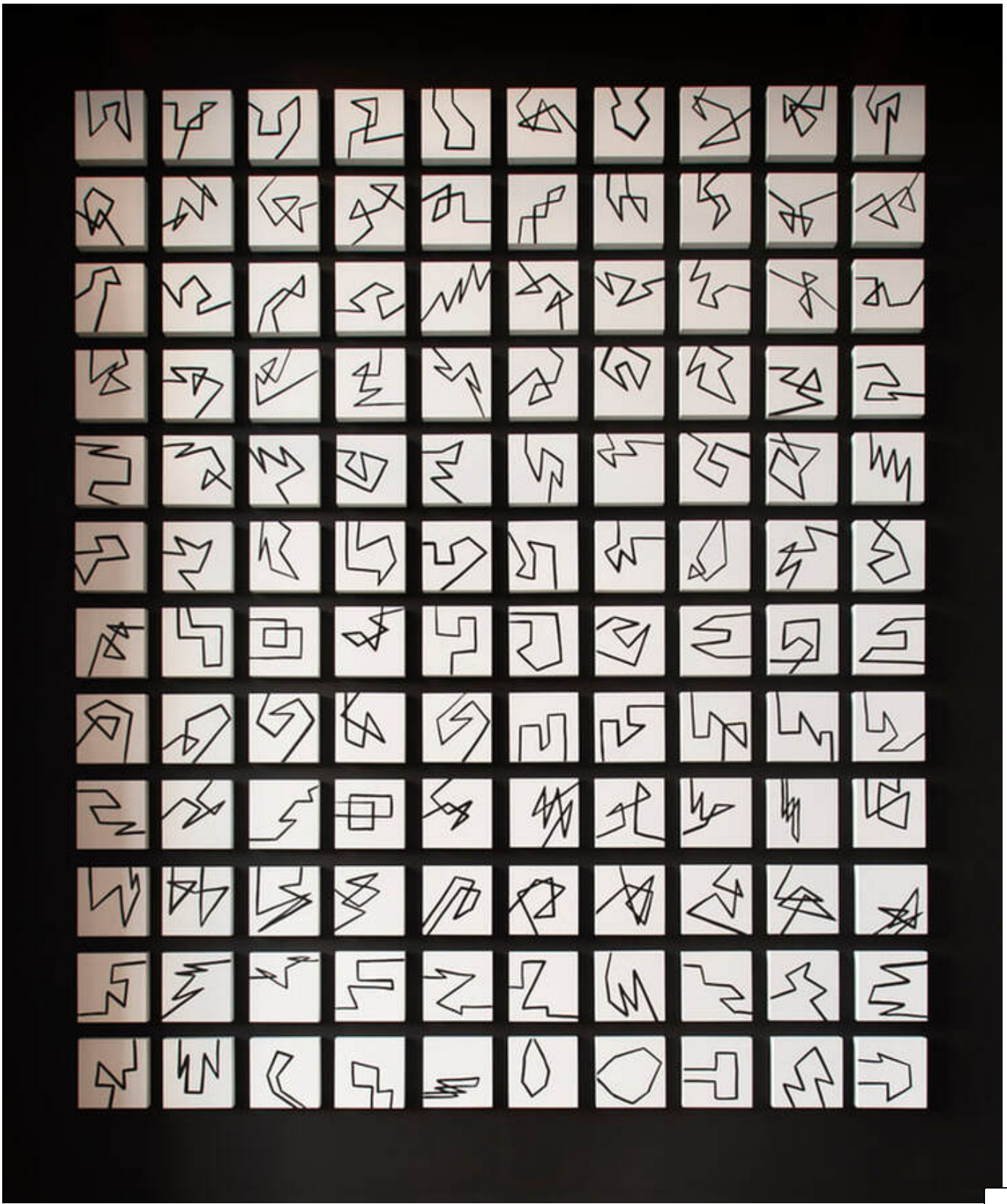
Guhapriya Ranganathan working at Broad on different projects, clockwise from top left: Printing at the Golub Cancer Lab at Broad Institute, "Unfolding" 2009; working for the Creative Kick-Off in studio, 2012; working on the Stanley Center for Psychiatric Research ten-year anniversary "Cultured Interactions: Evolving Landscape" installation, 2017, drawing on the wall for the "Cultured Interactions: Art, Science and Broad" installation, 2018

JF: *What were some of the challenges you faced there?*

GR: When I started my residency at Broad, I found the large amount of shared information overwhelming. Despite my enthusiasm for the information flowing my way, my first challenge was learning to process it in a way that would be effective. Dawn Thompson suggested picking an initial basic project that was easiest for me to understand, and to use what I learned to explore all the other research projects.

That first project was genome folding with Erez Lieberman. When he first showed me his paper on the fractal globule and the genome, I saw it in visual, artistic terms - as a line with area and volume, whereas his descriptions were scientific and mathematical. I wasn't sure how I could contribute. Over time, as we loosened up, our interactions slowly evolved to become free-flowing, covering diverse topics while drawing. Drawing became a way of seeing together. I started seeing my work through new eyes, asking new questions and exploring

work through the cultural interactions of art, science and Broad show and presentation in 2013.



"Unfolding: 120 Drawings" by Guhapriya Ranganathan (2011-2012). Site-specific installation at the Broad Institute. Photo credit: Lynn Barry Hetherington.

sometimes come in with some rough ideas of a proposal, artists aren't normally required to produce anything during their time here. (They often do produce work, but it rarely looks like whatever was envisioned at first!)

I check in with them regularly and am available to answer questions and help bounce ideas around. I order supplies, book open spaces, that sort of thing - my role is primarily to remove obstacles.

JF: *Daniel, how did your experience - as the first - shape subsequent residencies?*

DK: After two years as the artist-in-residence, it seemed important to me that the residency not be just about Daniel Kohn, and to do so would involve a rotating cast of artists. I was introduced to Gupi by a collaborator, the curator Barbara O'Brien, who was then directing the Simmons College art gallery. I thought she was awesome and introduced her to Todd. I think passing from a single artist to the next was the real first step in making this a residency.

JF: *And, I would guess, the experience shaped - and continues to shape - your work…*

DK: The years I spent at the Broad were completely transformative. I arrived as an artist with a solo studio practice and left with a profound need to be part of collaborative processes. It made me explore the reasons why people from all disciplines were increasingly drawn to working across disciplines and to develop a theoretical and historical understanding for why this was happening now.

Not only was my own work completely transformed by the experience, but I also retrained myself to work with others, across disciplines, starting with these early scientist interviews, the visualization group, and later, by working to support art-science efforts in New York where I still live.

This trajectory led me, 13 years later, in 2016, to attend a National Academies of Science interdisciplinary conference focused that year on the deep ocean. At that workshop, I came up with the question: Does the ocean have memory, and, if so, what forms does it take? That subsequently led to two interconnected research grants, and a year later, to our team winning one of three final NAKFI Challenge grants to pursue trans-disciplinary research on Ocean Memory. This group, which I co-lead, brings together some 30 people from diverse disciplinary points of view to ask questions of ecosystems in a new integrated way.

"Broad@15: Celebrating Art and Science at the Broad" installation by Guhapriya Ranganathan, including two mixed-media artworks on paper from "Unfolding," and "transform: a study for liminal meanderings". Photo credit: Will Howcroft.

JF: *Why is this type of program important for artists and scientists?*

GR: The question most frequently asked by scientists from when I started my residency has to do with creativity. Both scientists and artists as visual thinkers are involved with the active process of seeing. Scientific research involves stepping into the unknown without fixed or definite answers. The abstract nature of the questions and the experimentation involved in a combined approach to research mirrors my process of creating art and becomes a metaphor for my experience of life. By mapping the structures and patterns as they transform and evolve, I explore how changes at the microcosmic level lead us to visually and spiritually reflect on the macrocosm.

Working on the genome-folding project at the Broad Institute led Erez Lieberman and his team to study variants of the Hilbert curve that they may not have otherwise have explored. In 2015, a few years after my residency, I started seeing the mixed-media drawings created in 2010 as artistic interpretations for DNA "super loops" - a term that he coined and hypothesized in scientific articles about the XX chromosome, the Barr body, and genome editing released by his lab. It blew my mind away to see that I had been able to contribute as an artist to influence and advance a research project. It essentially changed the way I viewed scientific research and the way I viewed my artistic process. This type of program requires practicing open-mindedness, flexibility and adaptability, and responding swiftly to changes. I learned through my residency experience that being aware of continuous change means an opportunity to transform, evolve and grow in ways beyond our conscious imagination.

JF: *Daniel, what do you think scientists have to gain from this type of experience?*

DK: Mine may be a controversial point of view. Science is at the forefront of our attempts to ward off the worst of human-induced planet change. But science is also part of the root causes of the mess we are in. Sure, Science comes out of ancient Greek and Arabic traditions

JF: *Broad Institute offers a unique collaboration. Final thoughts for scientists, artists, viewers?*

SH: Broad Institute is committed to the idea that to meet the emerging challenges of biomedicine, we need to work in a highly integrated fashion, with diverse and nimble self-organized teams. We foster an atmosphere of creativity, risk-taking, and open sharing of data and research, and then we step back. Broad's artist-in-residence program allows leading scientists and forward-thinking artists to work, communicate, and learn together to benefit both science and art, spurring the creative thinking that drives innovation.

GR: From the very beginning, human beings have tried to understand life and the world around them by seeing in different ways through different lenses. We have divided and classified these different ways of seeing as different disciplines of study - science, art, philosophy, engineering, medicine, law, etc. - for our own convenience.

As the studies became deeper and more specialized, these divisions have become more rigid. When we work together, we consciously remember that information, knowledge, and ideas cannot be restricted to one series or one project. As specialists working in different fields - artists and scientists - we can use such experiences to loosen these self-imposed barriers and frames of reference so our frames of reference either get shifted or get broadened. Along with providing us with answers and the next round of questions, these points of intersection that come about as we search and follow the invisible together, bring us moments of deeper realization and understanding of the meaning of the experience of life and what it means to be human. Sharing the process and communicating through artworks bring the viewers and specialists closer together by enlarging and deepening the conversations. They remind us that the whole is greater than the sum of its parts - that no matter who we are, and what we do, as parts of the whole, we can work together to contribute in useful, meaningful, and relevant ways to inform the conversations that will define life and our future as human beings.

DK: Art and science are modes of exploration. They allow us, in different but connected ways, to probe nature and better understand it. The pictures we develop, be they made of paint or Petri dishes, of visual forms, mathematical equations, or algorithms, allow us to see nature in new ways, to update our ever evolving relationship with the world we inhabit.

As is obvious with anthropogenic climate change, species collapse, and now the current SARS CoV2 pandemic, we cannot continue to live as we have on our planet and hope to survive. We need to find new ways to see and new ways to act. Some of this is visible to the viewer in art objects or scientific papers, but most of this transformation is a deep society-wide tidal wave of change in the way we relate to each other, to nature, and to the planet to which we belong.

That is why we are working together.

"Cultured Interactions: Art, Science and Broad" by Guhapriya Ranganathan. Installation shot at Broad Institute including wall drawing and mixed-media drawings on paper. Photo credit: Will Howcroft.