

Lab-art-ory

An artist and scientists find common ground at a world renowned genomics institute

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"My conceit is that I can help you do better science," says artist [linkurl:Daniel Kohn](http://www.kohnworkshop.com/) in his fourth floor workspace in the [linkurl:Broad Institute of MIT and Harvard](http://www.the-scientist.com/news/display/52891/). And he's not just pulling my leg - he speaks with confidence and some tangible results under his belt. You might even call them preliminary experimental results.

__Daniel Kohn__

__Photo: Maria Nemchuk__

How did an artist get space at a premier scientific institution? It started with an Email from [linkurl:Todd Golub](http://www.the-scientist.com/article/display/22697/), director of Broad's Cancer Program, and admirer of Kohn's older paintings of house interiors. The two chatted about the relationship between art and science - how one can generate knowledge

through art, and how scientific meaning depends on its cultural context. "Contrary to popular belief," says Golub, "science requires imagination, while art requires much of the practicality of science." They came up with the idea for what Kohn jokingly refers to as "a low-cost collaboration between the Broad and my institute, Kohnworkshop." For the first year, Kohn visited the Broad informally to talk with scientists, and now has a full-blown residency, splitting his time between Cambridge and his home in Brooklyn. For a while, the Broad had some free lab space, which Kohn converted to his art studio. "They were very kind to put up with my mess," Kohn says. Most of his day-to-day interactions with his new lab mates in the shared space were positive. "I tended not to be exposed to the people who thought I was crazy." Kohn's small workspace - a downsized version of the full lab space he used to occupy in the Broad - is filled with dozens of 8x8" watercolor sketches exploring the forms of chemical bonds, DNA sequences, and [linkurl:chromatin](http://www.the-scientist.com/article/display/12792/) structure. "They're not art," explains Kohn, "they're thinking drawings." Despite his humble description, these works are colorful, organic and evocative of the intricacy and messiness of biology.

Kohn has produced over 700 of these small pieces since moving into his studio at the Broad in December 2006. He initially paints them in 3x3 grids, but the modules can later be rearranged and recombined. "It started to look

__Kohn's studio at the Broad last year, before it was "reclaimed by science"__

__Photo: Daniel Kohn__

like a dataset, just like the other large-scale datasets at the Broad," Kohn says. As if arranging [linkurl:high-throughput microarray](http://www.the-scientist.com/article/display/15684/) or chemical screening data, Kohn created a [linkurl:database](http://www.broad.mit.edu/personal/dkohn/) of the paintings to extract deeper meaning through computational analysis and manipulation. Kohn scans the paintings so he can go back to them, print them out again, paint over them, or rearrange them. In the spirit of [linkurl:systems biology](http://www.the-scientist.com/article/display/53421/), Kohn is working to marry his "experimental" data with computation. Rather than re-arranging the 3x3 grids himself, Kohn is training a computer program to imitate his aesthetic choices. "I'm working with a guy who does machine learning to look into making software that emulates the data analysis and pattern discovery process in genomics," Kohn says. The artist says that one version of the software is a call and response between him and the computer. "The machine grows patterns based on what I start off with, but then it sometimes goes off in a direction I would never go."

So, Kohn is letting science influence his art, but how can he help Broad researchers do better science? One answer is

__Epigenetic watercolor by Daniel Kohn and Bang Wong__

__Photo: Daniel Kohn__

pragmatic, another philosophical. Kohn has just helped found the Broad's Visualization Group, a collaboration between biological researchers, graphic designers, software engineers, and artists. "It's hard to propose a new idea and

not be constrained by old visual models," says Kohn, "so we are working on new ways to represent data - to escape the 8.5x11 bottleneck." Kohn overlays gene expression on a [linkurl:stem cell;http://www.the-scientist.com/blog/display/54647/](http://www.the-scientist.com/blog/display/54647/) differentiation map and pins image data to [linkurl:genome;http://www.the-scientist.com/article/display/23065/](http://www.the-scientist.com/article/display/23065/) sequences using a large canvas. "Why not use a 25-foot wall?" he says. "Or let the analysis be dynamic, computer-driven, rather than static on a piece of paper?" "Daniel is coming to the problems of modern biology as someone with a clean slate," says Golub. "This is a strength because the conventional approaches to visualize and interpret data don't really fit with the high-dimensional volumes of data we are generating. I think that the mere act of having a painter in the lab is challenging researchers at the Broad about their preconceptions. Multiple scientists in our community have said, 'This guy has made me think differently about my science.'" Kohn agrees that scientists would benefit from more interdisciplinary thinking. This idea is strongly espoused at the Broad, which fosters the integration of medical research, population genetics, chemical biology, and other disciplines. But this cross-pollination doesn't yet quite extend to the arts. Science, perhaps unlike art, presents itself as linear, objective, and always moving forward, evolving. "But things just evolve, they don't always evolve up," Kohn points out. "In science, you raise as many questions as you solve. Its richness is its complexity. It's deadening to hear science described as just 1-2-3."

If disciplinary boundaries are hampering discovery, artists working in research institutions could be a significant step forward. "I'm developing relationships with scientists here, and at other institutions. We definitely need to let other artists in. And I'm certainly not going away any time soon," Kohn

__Watercolor sketch, 10-8-07#19-27, by Daniel Kohn__

__Photo: Daniel Kohn__

says. Kohn plans to pursue the scientific thread winding through his art. "I'm not gonna do a show of interiors any time soon," says Kohn, referring to the paintings that first captured Golub's attention. "There's too much interesting work to be done at the Broad. I like being at the crossroads for talking about these things." Last year, Kohn was talking with Golub and Bang Wong, the Broad's creative director, when the Institute's director, Eric Lander, happened to walk by. Lander asked what they were talking about, so Kohn took a deep breath, explained his ideas, and asserted: "I can help you do better science." Lander paused and replied, "Of course." Jesse Shapiro mail@the-scientist.com