

Researchers embrace fashion to show off science concepts

Eva Amsen, *Science Writer*

When fashion designers, retailers, and families attend Vancouver Kids Fashion Week, they expect to see models donning the latest in children's fashion. But at an event last October, attendees saw scientists as well. Researchers from Michael Kobor's lab at the University of British Columbia in Vancouver, Canada, had set up a booth to showcase some of the model organisms they study. The fashion twist: Those model organisms later appeared on the runway, on a line of outfits created by fashion designers.

The collaboration between the Kobor lab and the fashion school at Vancouver Community College in British Columbia, Canada, started several months earlier. The researchers were desperate for ways to share their work with a new audience. Some lab members work on human genetics and epidemiology; others on basic research using animal models. The intricacies of the latter research, they found, weren't easy to share with the general public. "The model organism research is just as important, but not as visible," says graduate student Samantha Schaffner, who studies the epigenetics of Parkinson's disease.

Schaffner and her colleagues started brainstorming ways to introduce these model organisms to a wider audience and quickly landed on the idea of a collaboration with a group outside of science. Initially, Schaffner and her team considered a wide range of art collaborators, from illustrators to jewelry designers. But Schaffner remembered another creative field from her childhood: Her mother managed a children's clothing line, working with fashion designers to create hats called "Sam's Tams." Imagining the possibilities of colorful and eye-catching model organism-themed fashion, Schaffner suggested the lab contact the fashion department at the local community college. That's when they reached out to Sarah Murray, the coordinator of Vancouver Community College's fashion arts program.

Fashion Designers in the Lab

This wasn't the first time that Murray had been contacted about a collaboration—her department regularly works with community outreach projects. But project requests were usually based on filling a practical need—designing a tote bag for a charity or adult bibs for a seniors' home. The Kobor lab offered up the



Mechanical engineer Angela Chang and designer Harry Umen came together to create the "Luminous Firefly Dress," aiming to evoke ideas about how body gesture, light, color, and sound enhance personal expression. Image credit: Howard Eglowstein (photographer).

intriguing prospect of designing a new line of kids' clothes inspired by biology.

Budding fashion designers rely on their portfolio to get ahead, and such an unconventional project would give them a chance to demonstrate their skills. The project also attracted a few designers who weren't necessarily keen on kids' fashion but were interested in using science as inspiration—a departure from seeking ideas based on sustainability or textile function. "For us it was an opportunity to explore a different topic," says Murray. "Something far from the realm of what we normally engage with." She gathered a team of seven program alumni, students, and instructors, and together



The fashion designers who visited the Kobor Lab were fascinated by colors and patterns throughout the lab, including the multicolored tape that the researchers use to label reagent bottles and the grid of dots that forms when dilutions of yeast cells are tested on a nutrient plate. Image credit: Helena Brendler (The University of British Columbia, Vancouver, Canada).

they embarked on a summer-long collaboration to create a line of science-themed clothing.

The work started with a look behind the scenes at the Kobor lab, where the fashion-minded visitors examined *Drosophila* through a microscope. "The designers absolutely loved the flies," says Schaffner. Fashion design graduate Nico Gruzling was intrigued by fruit fly anatomy and the experimental setup. "They walked us right through everything they do," she recalls. Postdoc María Aristizabal showed them how the flies are kept awake to study the influence of sleep deprivation on the expression of certain genes. Inspired, Gruzling started working on her designs, which include a T-shirt with a screen print of an overly magnified fruit fly, and the repeating text "NO SLEEP."

Schaffner noted the designers' fascination with parts of her world that she had taken for granted—the multicolored tape that the researchers use to label reagent bottles, the grid of dots that forms when dilutions of yeast cells are tested on a nutrient plate. "It was really neat how they were finding visual patterns in things like plates of yeast," she says. The lab encounter would be the beginning of an unusual collaboration—but not an unprecedented one.

Fashion Forays

Indeed, researchers and fashion designers have worked together before. In 2013, former neuroscientist Yuly Fuentes-Medel, while studying the economy of innovation as a postdoctoral researcher at the Massachusetts Institute of Technology's (MIT) Sloan School of Management in Cambridge, MA, recognized that although science and the arts are both creative endeavors, they use completely different languages. Inspired to explore this disconnect, Fuentes-Medel sought ways to bring together researchers and fashion

designers to find out how they could learn from each other and their respective approaches. This led to the Descience project, which she cofounded with three collaborators, all based in Boston at the time: Immunologist Patricia Torregrosa, a PhD student at Stockholm, Sweden's Karolinska Institute working as a visiting researcher at Massachusetts General Hospital; fashion designer Claire Jarvis, who had just graduated from Massachusetts College of Art and Design; and graphic designer Isidora Valdés (1).

Descience paired up "creators"—one researcher and one fashion designer—as part of a competition. Initially started in the Boston area, the project expanded as interest piqued among researchers and designers at far-flung locales. Sixty-one Descience pairs from cities around the world eventually submitted designs for outfits.

Several pairs worked remotely, adding a further hurdle to the communication barrier. In one case, cancer researcher Esther Baena and designer Arielle Gogh used video chat to create their "Transmutation" dress based on Baena's research (2, 3). "We didn't meet in person until we did the catwalk," says Baena. She was in Boston and Gogh in Philadelphia, but they swapped tumor histology images and dress sketches to share ideas.

Baena wanted to create a fashion piece that evoked the process of tumor growth and how it's studied in the lab. Gogh and Baena found common ground in the use of colors: Baena stained and analyzed her samples, while Gogh experimented with fabric staining methods. "We agreed that changing colors and volumes, as happens during tumor growth, would be a good way to communicate science through fabrics," Baena notes. The final dress shows the transformations a tumor goes through as a result of DNA mutation, which inspired the name Transmutation.

Some designs were feats of engineering, not just fashion, such as a dress created by mechanical engineer Angela Chang and designer Harry Umen, who had met years earlier (4). "Having our own respective expertise in different backgrounds means that we can both lead the way on different fronts," says Chang. Both were interested in exploring the possibilities of combining interactive electronics with textiles. With Chang's engineering experience and Umen's visual design skills, they envisioned the "Luminous Firefly Dress." Chang took a road trip to New Hampshire where she and Umen—aided by seamstress Deborah Caldwell and technologist Howard Eglowstein— assembled the dress. Laced with strips of LEDs connected to a sensor that detects sound in the room, the dress lit up to the beat of the surrounding audio.

A panel of researchers and artists chose a Descience winner at a fashion show at MIT in September 2014. To expand the reach of the project, the show was live-streamed, and an online poll attracted close to 20,000 votes for the "People's Choice" award. Chang and Umen continued working together after Descience, and they have shown an expanded collection at other events (5).

But for Fuentes-Medel, the main objective was to bring different disciplines together to foster innovation. "We weren't focusing on the end product," she says. "We were focusing on the process." Fuentes-Medel

carefully studied the vocabulary and methods that researchers used to explain key concepts of their work to the designers, and vice versa. From this, she built an educational curriculum that she has since used to drive a collaboration between researchers and designers.

Designs on Development

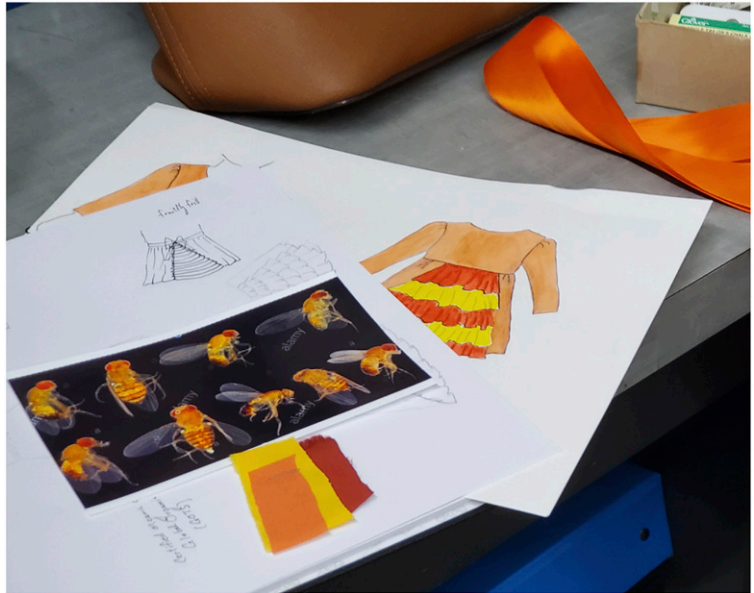
That cross talk was at the heart of another fashion–science collaboration, first started in 1997. Developmental biologist Kate Storey, who specializes in human embryonic development, starting talking with her sister, fashion designer Helen Storey, about the first few weeks of an embryo’s major morphological change. “Helen visited the lab, looked down microscopes, looked at images, looked at movies, and we talked about different stages in development,” says Kate. They faxed sketches back and forth as Helen tried to figure out how to translate biology into a series of dresses inspired by embryonic development (6). Over the summer, they rented a school building and enlisted help from a team of people to turn the designs into outfits. Using a range of different fabrics, such as silk and fake fur, they created a chromosome patterning dress, a neural tube dress, a primitive streak dress, and several others—all encapsulating both biology and fashion form.

In the two decades since, the dresses have travelled the world, from Tel Aviv, Israel to Shanghai, China. For Kate, who is now head of the Division of Cell and Developmental Biology at the University of Dundee in Scotland, public outreach was only a minor aspect of the project. “It didn’t make me design better experiments. It doesn’t work like that,” she says, “But it made me think about the way I present what I do. It taught me different ways in, and ways in which people could relate to the kind of work I do.”

The Descience foray into science and fashion may have had an even bigger impact on Yuly Fuentes-Medel. “It shaped my entire career,” she says. A fashion industry neophyte initially, she is now regularly asked for advice by organizations such as the Council of Fashion Designers of America or Lineapelle, the leather association of Milan, who rely on her expertise in connecting fashion designers with researchers. In her role as project manager for fiber technologies at MIT Materials Research Laboratory, she recently brought students from the Fashion Institute of Technology in New York together with MIT researchers to create an innovative running shoe, a challenge issued by New Balance. Working together, they came up with concepts such as a biodegradable shoe to mitigate landfill waste, and a biosensing shoe that transmits real-time health data.

Public Engagement

Before the Kobor lab connected with the fashion school, they considered other activities, such as a yeast-themed event at a brewery. But they soon recognized that if they hosted their own outreach event, they would attract people who already have an interest in science, so a collaboration would be better. Some science outreach projects have found a wider audience by placing projects in unconventional locations, such as shopping centers or music festivals (7, 8).



Drosophila images from the lab inspired the form and color for fashion designs. Image credit: Helena Brendler (The University of British Columbia, Vancouver, Canada).

So the researchers decided to give that approach a try. According to fashion show attendee and researcher Simon Goring, they succeeded. “They really reached a new audience,” says Goring.

Goring, an assistant researcher in the department of geography of the University of Wisconsin, Madison and an adjunct professor of computer science at the University of British Columbia, attended the show because he has a general interest in the way that researchers use outreach to connect with their communities. He was particularly impressed with how subtly the science was incorporated into the clothes. In Gruzling’s outfits, for example, the screen print of the fly with the text “NO SLEEP” does not immediately evoke an inspiration related to genetic research. “People could appreciate it for the fashion that it was,” he says. “I liked that the designers had gone into the lab and taken [science] as inspiration rather than designing things that were really on the nose.” One of the designers had created a dress using fabrics laden with the red and orange hues of the fruit flies, and the designer pair who became fascinated with lab tape created T-shirts with scattered stripes in the tape’s pastel colors.

Although the researchers did invite friends and colleagues, Goring was one of relatively few researcher attendees. Murray says the model organism runway presentation attracted a crowd similar to what they see at other Vancouver Kids Fashion Week events: parents and their children, designers, media, and others with an interest in the fashion industry. Schaffner says the lab is planning to hold a separate event for the research institute.

But the show and the Kobor lab visit have already left a lasting impression on both researcher and designer. “We’re both curious about our world,” notes Schaffner, “and trying to figure out how to express it in new, creative ways.”

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