HHMI
HOWARD HUGHES MEDICAL INSTITUTE

RESEARCH NEWS

JUNE 14, 2006

Dancing Science

Emily Jacobs-Palmer finds some of today's political and social attitudes toward science appalling. "I want to live in a world that respects scientists and values our work," says the molecular biology and biochemistry major, a senior at Wesleyan University. To create such a world, however, Jacobs-Palmer believes science must become more accessible—more comprehensible and interesting—to the general public.

It never occurred to her that one path to that goal might be through dance. Then she met Liz Lerman, winner of a MacArthur Foundation "genius" award and founder of the Liz Lerman Dance Exchange. Lerman was spending the year as an artist-in-residence at Wesleyan, while she choreographed *Ferocious Beauty: Genome,* a dance about the human genome.

> "The genome dance project got me thinking that there may be many more untapped ways to make science matter to non-scientists."
> **— Emily Jacobs-Palmer**

One of Lerman's artist-in-residency projects was an HHMI-supported symposium on science and dance, in which Jacobs-Palmer participated. "Before that, the last way I would have thought to present science to the public was through dance," Jacobs-Palmer remarks.

Wesleyan, a small, private university in Middletown, Connecticut, led in commissioning the genome dance project after Pam Tatge, director of the university's Center for the Arts, saw Lerman's troupe perform. Lerman, known for her choreography of political and social issues and her intergenerational troupe of dancers, mentioned her desire to do a dance based on the human genome. So Tatge introduced her to Laura Grabel, a professor of biology who was then dean of natural sciences and mathematics at Wesleyan. Grabel danced professionally herself while she was in graduate school and as a postdoctoral fellow, and she was intrigued by the idea of using dance to communicate science to the public.

As artists-in-residence at Wesleyan, Lerman and Dance Exchange members immersed themselves in the life of a campus already known for its strength in the arts as well as the sciences. They joined a class that Grabel teaches with

philosophy professor Lori Gruen, called "Reproduction in the 21st Century," inventing science in movement, such as a menstrual cycle dance. They also met with Wesleyan's dance faculty and taught a master class for dance students.

To prepare themselves to create a dance about genetics research, the promises it makes, and the issues it poses, the dancers began getting to know the science faculty in their native habitat. Lerman filmed Grabel studying the development of mouse embryos. Dancer Ted Johnson—who eventually performed the role of pioneering monk- geneticist Gregor Mendel in the two-act, multimedia production—got acquainted with biology professor Laurel Appel's room full of fruit flies.

Lerman, Appel, and Michael Weir, director of an HHMI-supported undergraduate science education program at Wesleyan, hatched plans for *Breaking Boundaries: Scientists and Dancers, Investigations and Choreography*, a summer symposium for students. It was at that all-day symposium in June 2005 that Jacobs-Palmer and some three dozen undergraduate summer research fellows supported by the Hughes grant discovered how much science and dance have in common.

To Wesleyan senior Adrienne Santiago, art and science have always lived side by side. A sculptor as well as a neuroscience and behavior major, Santiago uses the materials of science—such as pipettes—in her sculptures. Torn between studio art or science as a major, she loves what she calls "the rationale of science and the way it carries over so well into art." For example, she explains, "cells are very small and they come together and become something bigger than themselves. Complexity grows from simplicity, in science and in art."

But the idea of using movement as a powerful way to express scientific concepts and issues was new to Santiago. "We did movement activities to comprehend where we are in physical space, and we modeled molecules and cells interacting and protein conformations."

She also realized, to her surprise, that the dancers were grouping her with students from many other scientific fields as "the scientists." Santiago says, "It made a common circle of all the sciences. That was quite a change from the usual, 'I'm a neuroscientist and you're a molecular biologist, so we have nothing in common,'" she recalls.

The students discovered that dance too has fields and specializations that normally don't interact with each other. And the dancers learned as much as the students. They found that scientists—like dancers—look for patterns. And scientists "rehearse" in their labs much as dancers rehearse on stage, changing their moves when things don't work. They realized that both scientists and dancers are seeking truth and trying to communicate it to each other and the world outside.

While Lerman and her dancers worked with Wesleyan students and faculty, they also assembled a stellar cast of supporting scientists across the nation,

including HHMI investigator Bonnie Bassler from Princeton University, Claire Fraser from The Institute for Genomic Research, and Nancy Wexler of Columbia University. Bassler, like Lerman, had been a MacArthur Fellow, and she readily agreed to spend a day with the Dance Exchange, explaining her research into how cells communicate and helping the dancers find ways to express it in movement. "It will go down as one of the magical days of my life," she recalls.

At first, Wesleyan's science faculty was concerned about whether Lerman and her dancers could get the science right in their genome dance. The professors needn't have worried. The choreographer and her troupe spent six months immersing themselves in the history and concepts of genetics and the Human Genome Project. "She asked such good questions," Laurel Appel recalls. "She said, 'Our toolkit is movement, costumes, lighting, and music. What is your toolkit?'"

In February 2006, *Ferocious Beauty: Genome* premiered at Wesleyan to a sold-out house and a rave review in the *New York Times*. The Dance Exchange also presented the performance at Williams College in Williamstown, Massachusetts during February. The journal *Science* published a photo of the dancer playing Gregor Mendel, garbed in flowing white, guiding another white-clad dancer on a journey that retraces evolution's footsteps, and the *Chronicle of Higher Education* reported on the singular production, which explores not only the history of genetics, but its implications for society, particularly in issues of ancestry, aging, and perfection.

Now Lerman is taking her genome dance on a national tour. The group performed in Flint, Michigan in March, and continued on to San Francisco in April. They're scheduled to perform at Duke University August 28–September 17; at the University of Illinois at Urbana–Champaign, September 18–23; at the Museum of Contemporary Art in Chicago September 25–October 1; and at the Mayo Clinic, Rochester, Minnesota, November 5–10.

Michael Weir is thrilled with the way the project worked out. "One of the primary goals of our Hughes program at Wesleyan is to build bridges between the life sciences and other fields and to nurture interdisciplinary curriculum and research," he explains. "This collaboration with Lerman and members of her company was so successful at making science more accessible to non-scientists that I'm thinking about using this theatrical approach to explore other issues of public understanding of science, in our freshman and sophomore general education courses."

Jacobs-Palmer thinks that is an excellent idea. "The genome dance project got me thinking that there may be many more untapped ways to make science matter to non-scientists," she says.

Upcoming performance residencies and performances of *Ferocious Beauty: Genome*

August 28–September 16*:* Duke Performances, Duke University, Durham, North Carolina.

September 18–23: Krannert Center for the Performing Arts at University of Illinois at Urbana-Champaign.

September 25–October 1: Museum of Contemporary Art, Chicago, Illinois.

November 5–10: Mayo Clinic, Rochester, Minnesota.

April 26–29, 2007: Washington Performing Arts Society (WPAS), Washington, DC.