Photo courtesy of Tobin Rothlein

Physics tour inspires dance

When I set out for Chicago with a group of artists last year, I knew almost nothing about particle physics or about Fermilab, where we hoped to find inspiration for a singular performance project called "Principles of Uncertainty."

Choreographer Amanda Miller and I had founded the Miro Dance Theatre in Philadelphia four years ago to explore the intersections of contemporary dance, video, and visual art. When video artist Nadia Hironaka asked us to collaborate on a live performance modeled on particle acceleration, involving drummers, dancers, and video artists, we were happy to take on the project. Our other collaborator, sound experimentalist Eugene Lew, had an interest in physics; but until that point Amanda and I had little experience with the topic, and on the flight to Chicago we pored over a couple of basic physics books and some images pulled from a Web site in the hope of appearing at least minimally informed when we got there.

For our part of the project, we needed formulas or calculations that could translate into the movement of bodies through space and guide the dancers as they improvised. As we toured Fermilab, learning more about the machines and the science and brainstorming with physicists, we found what we were looking for.

We were first put in the hands of Rob Plunkett, who showed us a model of the accelerator and talked about the science behind the machine, with a joyful emphasis on smashing things apart. My imagination was sparked by his enthusiasm for the unknown, from dark matter to neutrinos. Our next host, Linda Bagby of the DZero experiment, picked up where he left off. Even with my limited scientific understanding, I soon realized what was happening here: Just as we artists continually break things down during rehearsal to reach some truth and simplicity in performance, physicists break down matter to discover simplicity and truth in the universe.

As our tour continued, we found incredible beauty in the intricacy of detector circuitry, the lines and patterns made by miles of wire trailing through the floors and ceilings, and the way light was refracted through sheets of translucent material. All the while, I must admit, I felt a sort of overwhelming nervousness as I contemplated what was actually happening behind the aluminum foil and thick wall of concrete. The more we learned the more questions we had, and we were amused and excited when our questions elicited opposite answers from two of our hosts. The gray areas of physics fascinated us, from Schrödinger's cat and the power of the observer to the ever-changing nature of the neutrino. We were soon brainstorming with Herman White and Doug Jensen across a cafeteria table: How could we make a fat male dancer become a skinny female dancer, then turn purple, then become someone else, then go through a wall? Of course our performance would not be that literal, but this is where the conversations went.

Meeting with theorist Thomas Becher helped refine our ideas and make them more practical. We learned about the physical behaviors of each particle, about spin and trajectory. Later, in a Fermilab meeting room, we hashed out a structure and system for our experimental performance based on the information we had collected.

Our research developed into a large-scale outdoor performance at the Philadelphia Live Arts Festival involving 50 drummers, 15 dancers, two video artists, and the science of particle acceleration, all witnessed by more than 1000 people in the course of a single evening (see Gallery, page 34). Inspired by the way it turned out, Amanda and I are now creating a dance-theater piece called "Spooky Action" based on quantum entanglement. Commissioned in partnership with the Lively Arts program at Indiana University of Pennsylvania, it is scheduled to premiere in spring 2009. "Spooky Action" will explore the invisible strands that connect us across seemingly insurmountable distances. Diving into this new science-inspired performance, we look forward to continuing our relationship with Fermilab as a valuable resource for understanding physics and how it relates to the arts.

Tobin Rothlein is a dance, video, and performance artist whose work has been presented internationally. He produced and directed the 1997 documentary Eyes of the Storm, *collaborated on the contemporary operas* Adam's Apple *and* Cremenville, *was a founding member of Phrenic New Ballet and co-founded Miro Dance Theatre in Philadelphia, where he is producing artistic director. Rothlein is also a 2006 Pew Fellow in performance art.*