By **Elisabeth Pain**

En pointe

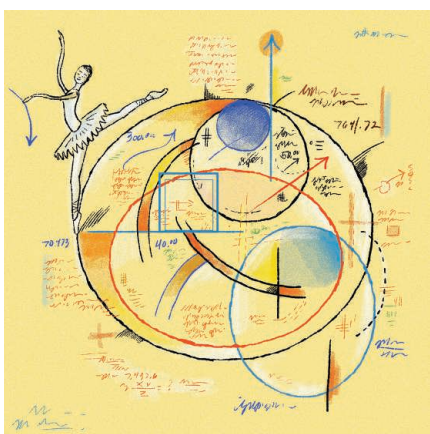
An engineer, a musician, and a dancer, Lina Colucci lives in multiple worlds. Now in the third year of a Ph.D. at the Harvard-Massachusetts Institute of Technology (MIT) Health Sciences and Technology (HST) program, she's working to develop a portable hydration sensor for patients with congestive heart failure. Since high school, she has also been redesigning the shoes used by ballerinas. Her presentation at the TEDxBrussels event last December began with a ballet performance. We asked her why she continues to pursue all of her time-consuming passions. This interview was edited for brevity and clarity.

Q: Describe your pointe shoes project.
A: A hundred years ago, running shoes were just being invented—and just look at where we are now with the technology that's been put into athletic shoes. Ballet shoes, on the other hand, haven't changed much at all in the past 200 years. They are still extremely primitive. So I asked myself, "How can we make these primitive shoes better?" I've used my understanding of biomechanics to change the materials and structural design in different parts of the ballet shoes to make them more comfortable and to provide what the body needs in terms of support and flexibility.

Q: How did you end up combining engineering and ballet?
A: My dad is an engineer, so I knew about engineering from a young age. I found ballet and music when I was very young as well, and I have always loved these three things. Without a doubt, my priority is engineering, but I've tried not dancing, I've tried not playing music, and it doesn't work. I have to do these other things to be more effective in my engineering work.

Q: Why? What's the connection?
A: In all these endeavors, a final product is born from feelings and fragmented ideas. Also, I think everyone needs something that feeds their mind, body, and spirit. Of course, most activities don't serve just one purpose. Dancing on stage is a spiritual experience as much as it is a physical one. Learning or choreographing new steps can be as intellectually stimulating as doing lab research.

Music and dance have also given me self-discipline and effective working methods. I have learned, for example, how to teach myself a new piece of music: sitting down for hours, starting to play slowly, and then adding different elements like speed, dynamics, and phrasing to build up to a final performance. This is like facing a hard engineering problem and breaking it down into smaller pieces until you are finally able to tackle the entire problem. And ballet has taught me that even if I'm not feeling well one day—even if I am exhausted—I still go to ballet class and put my best effort forward. That kind of discipline is directly transferable to any academic pursuit.



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Q: Including the HST program?
A: Yes. It is hard, but it's really exciting. My classmates and I come from a variety of classical engineering disciplines. We study engineering at MIT, but we also go through some medical training at Harvard Medical School. I go from control systems class to an autopsy, from the MIT Media Lab to shadowing doctors at the hospital. The aim is to train us to innovate within medicine. I find it invaluable to have that firsthand experience with the medical world.

Q: Where do you see this taking you?
A: I want to pursue entrepreneurship within health care engineering, to make the health care system a better experience for patients. I believe that technology, like the sensors I'm working on, is going to play a really big role in the health care system of the future. The idea is to free up doctors' time with technology so that they can get back to focusing on patient interaction. ■

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