

## PERSONAL STATEMENT

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My junior year independent work involved describing the interactions of abstract particles in a system called the SYK model. Being a theoretical model, it did not behave like any system I was used to from the real world, making it difficult for me to develop a physical intuition of the behavior. Although I could use the equations to model the system, they would not give me the deep understanding I wanted. I had to choose between simply using the math I had learned to describe them and trying to develop some sort of intuition about them.

The interplay of equations and intuition has been central to my physics education. My earliest lesson came during first or second grade. My dad, an engineering professor, drew a surfer on a napkin at the local deli in our suburb of Milwaukee to teach me about potential and kinetic energy. This surfer interested me so much because the intuitive physical process taking place (as he got lower he got faster) could be described mathematically. Short lessons like these planted the seed for my interest in physics, which would grow late in high school.

Throughout late high school and early college, I continued to develop my physics skills by following both equations and intuition. I built my intuition by extrapolating from real life situations to those in physics problems. This combination worked well for classical Newtonian physics, the study of physics on the human scale, but was thrown off by non-Newtonian courses like quantum mechanics during sophomore year. Since the scenarios were so different from the day-to-day events, I had to give up on the intuition, and follow only the equations.

During junior year, however, I started to nurture a semblance of quantum intuition. I started to approach my non-classical courses first semester (general relativity and another course on quantum mechanics) without intuition. But as I became more comfortable I started to extrapolate from past problems and equations, instead of from the real world. I could then use my new intuition to gain added insight to the SYK model, resulting in a more thorough understanding than I would have achieved from only using the math.

Outside of physics, my main interests since high school have been competitive running and recreational backpacking. In both, I need to craft a plan, whether for practice or a race, for a day of hiking or a whole trip. When carrying out that plan, however, I have to be able to adapt. These adaptations must be built on past experiences, much like intuition in physics.

I stopped competing for the cross country team last fall. Since then, with my increased available time, I have started to tutor students in sophomore-level courses, mainly the physics course, a mechanics class. This activity allowed me to practice teaching, a skill I've often wanted to improve. It also allowed me to give back to the department and help students struggling in the demanding courses.

The physics I am learning now and want to learn in the future is different than the subject I first started studying back in high school and enjoyed so much. It still consists of using equations to describe and predict physical processes, but the processes themselves no longer have obvious relationships with the world we live in. I can no longer rely on intuition gained from the real world, but can now rely on my new intuition, even if it is still developing. That development will be improved by study at the University of California at Berkeley.