

May E. Y. Kim

Personal Statement



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Personal Statement

I don't have the conventional background that other physics majors may have, but I consider this more as an asset rather than a drawback. At Wellesley College, I majored in English, minored in computer science, and had a concentration in pre-medicine. As an English major, I learned to analyze text critically and write articulate essays. With computer science, I learned to program in Java. After having studied one programming language, I discovered that I could pick up others effortlessly. In the summer of 2002, I learned Visual C++ and wrote an MFC application for a company for which I was interning at the time. I even taught myself to use MatLab in my second semester at Michigan Technological University. Concentrating in pre-medicine has also served as a great advantage. The required courses for pre-medicine include four semesters of chemistry with lab, two semesters each of physics with lab and biology with lab. Because physics is intertwined with chemistry and even microbiology at the atomic level, I have a more comprehensive picture of the physical realm than a typical physics student might.

At Rutgers University, I enrolled in undergraduate level courses in physics. Although my grades might not reflect it, I invested a great amount of time and effort into learning the material while commuting forty miles each way from home, working half time in New York, and tutoring. I was finally able to concentrate on physics full time at Michigan Tech, and I proved to myself that I was capable. I took and passed three of the four required qualifying examinations, and maintained a grade point average of 3.81. My research under the mentorship of Dr. Alex Kostinski involved thermodynamic properties of supercooled water in the atmosphere. As my first experience in doing research in physics, I grew accustomed to browsing through textbooks on thermodynamics and performing literature searches. It was exhilarating to find that the articles I once found indecipherable are becoming easier to comprehend.

Although I found my research interesting and Dr. Kostinski is a great mentor, I realized in the course of my time at Michigan Tech that research in quantum information theory is what I would like to pursue and what I would be good at. I enrolled in two courses of graduate level quantum mechanics. Using Kroemer as the text, the first course was an in-depth look into traditional quantum mechanics, with which most of the class was already familiar. However, the second course was more modern in scope. We delved into perturbation theory, the quantum field theory, quantum entanglement, the basics of quantum information theory, and more. Some of the weekly seminars hosted by the Physics Department were also on quantum computation. While learning about the state-of-the-art research being carried out in the field, I realized that the implementation of quantum information was still in the initial stages of development and that it offers tremendous potential. With the growing demand for size and energy cost reduction for computing machines, it only seems natural that quantum computers will soon be actualized. I desired to be involved in such a new and emerging field. With quantum information processing, I realized that I would be able to put my coding and algorithmic skills to practice, as well as my familiarity with solid state physics and quantum mechanics. It is for these reasons that I made a difficult decision to forego the doctoral and pursue a masters degree instead at Michigan Tech so that I could enroll in another institution that can offer me an opportunity to join a quantum information research team.

With the comprehensive education I receive at Northwestern University and the opportunity to perform research in the quantum information field, I will be able to move onto a post-doctoral position. This experience will allow me to advance and diversify my research interest so that I become better prepared for a faculty position. After I acquire a professorship, I would then like to continue advancing my expertise in quantum information, making it my specialty. My foremost goal is to be at the forefront of the research and be credited for its development. While I pursue research, I also want to teach undergraduate and graduate level physics. Not only will I be able to perpetually brush up on fundamental physics, but I could interact with the future generation of physicists. I would love to make physics more meaningful to them and encourage them to take the next step. As a teaching assistant to various levels of physics laboratory at Michigan Tech, I have encountered many types of students and recognized that their learning styles are different. By

adapting my teaching style to meet their needs, I can make physics more accessible and appealing to them.

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