

Since two years old, I have lived with the diagnoses of Asperger syndrome and other disabilities. While these diagnoses provided me with many challenges, they also presented me with as many opportunities. They enabled me to experience life with others with disabilities, face adversity, and grow as a person. I have always been drawn to observing others' behaviors, needs, and wants, so as to address my weaknesses in nonverbal communication. In facing adversity and watching my peers do the same, I learned of many challenges faced by those suffering from chronic disabilities and conditions. A patient, who I will refer to as Patient S, has said, "People don't know what they're missing until it's gone" but for many it was never there to begin with. I have constantly grown through my appreciation of these individuals' uphill battles. These experiences have enabled me to find my calling; I seek to become a physician who will utilize his knowledge and experience to improve the quality of life of those who need help throughout their lives, a physician-scientist.

I am awed by the many ways that today's technology partners with healthcare to improve the quality of life of patients with disabilities. It is for this reason that I majored in biomedical engineering. "After my accident, I just thought I would be stuck at home with no hand," said S soon after the transradial loss of his right arm. S once said that he did not think he would ever have significant sensation or function in his right extremity back again, but, when he did, he said "it's *my* hand", his prosthetic "tool" becoming a true extension of himself. His phantom pain, too, was gone. His story exemplifies the ways today's technology can partner with healthcare to improve patient lives. A physician, however, can help those patients find the best technology for them thus best improving their quality of life. Seeing what can be done as healthcare and technology converge inspires, encourages, and fuels my motivation to pursue my dream of becoming a physician.

Knowing the technology alone was not enough for me, so I was eager to get involved with patients. By shadowing Dr. David Shenassa, an orthopedic surgeon and specialist in hand surgery, I learned to appreciate the impact a physician can have on patients' lives. I also volunteered for a year in a hospital. On both accounts, my observations indicated that trust and communication are of the utmost importance in physician-patient relationships and continuum of care; a lack thereof can significantly reduce quality of care. This level of trust simply cannot be achieved without the strong rapport a doctor builds with their patients.

This notion was further substantiated by Professor Dustin Tyler, a sensory restoration researcher, who said that many researchers were so focused on the mechanics of the prosthesis that they missed something the patient wanted most. Patient S wanted to feel. Those able to get prostheses often abandon them because of difficulty of use and lack of utility. As a physician-scientist, I want to intimately discuss patient treatments with them and use my skills to create effective solutions for them, rather than burden them with costly treatments that fail to help. I have already taken steps to do this.

For my senior project, I aimed to improve that communication through a rhythm game to train amputees to control their prostheses, reaching out to Professor Tyler's lab myself. The game can provide detailed metrics of patient improvements to researchers and is able to be taken home so the patient can practice outside the lab. Also furthering my desire to pursue medicine was my growing passion for science. My curiosity deepened through my projects focused on prosthetics and brain-computer interfaces (BCIs) to improve quality of life for amputees and others. I have spent two years working on several BCI technologies as a board member and project lead at the first student-run research lab at my college, the Neurotechnology Exploration

Team. Dr. Daniel Phillips, PhD, our advisor, gave us space to work and access to human subjects facilities. We hoped to help amputees and those with amyotrophic lateral sclerosis and muscular dystrophy by improving their mobility and ability to use computers. With non-invasive BCI, we have already designed tools for this but we still need brain wave data to complete them. These patients all share the desire to enjoy quality and depth in their lives and healthcare. I plan to use my game design experience to provide the most accessible care and make entertainment accessible for those of all disabilities.

The more I immerse myself in the medical field, the more I want to become a doctor. I look forward to a career combining clinical medicine with research, committing every day to science that carries the potential to positively impact the lives of thousands or more with one discovery and to practice to help each individual. The numerous opportunities for collaboration between the medical community and other disciplines to improve lives inspires me. Just as my desire to be a physician has evolved from my experiences, I hope to be fortunate enough to see the growth and contributions that may come from my hopeful future as a physician-scientist.