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Two Fields, One Dream

While working at the Broad Institute of MIT and Harvard as a software engineer, I constantly found myself in rooms where everyone had starkly different backgrounds, including data scientists, healthcare providers, product owners, user interface designers, research fellows, financial advisors, and other engineers. We worked as a team to overcome the language barriers and limitations of our individual professions in order to achieve the dream of creating a specific and tangible product to help real patients. This is the sort of environment where I thrive – as a software engineer turned medical student, interdisciplinary collaboration is a defining feature of my professional history and future career.

My history with computer science started when I was twelve years old: my father, a delightfully nerdy software engineer, had concluded that evening HTML/CSS lessons were the perfect father-daughter bonding activity. Although I was initially resistant, I eventually loved being able to come up with an idea and work incrementally until my vision was realized. As I grew older, this principle of engineering – the iterative process by which you design, implement, and reassess – became the cornerstone of how I approach all problems.

While computer science acted as a creative outlet, my strong sense of curiosity drew me towards the health sciences. It was immensely satisfying to be able to learn about the human body and relate that information to my personal experiences. I found strength and a sense of control from understanding the scientific mechanisms behind difficulties that I faced, such as being hospitalized for an enterohemorrhagic E. Coli infection and grieving for my aunt who passed away from complications of pulmonary hypertension. Science was a tool – one that could explain, console, and empower – one that I wanted to learn how to wield.

I regarded my passions in the health sciences and computer science as separate until an internship at the Massachusetts General Hospital presented me with rewarding work at the intersection of these two fields. My team, composed of medical professionals and engineers, partnered with the CURE Children's Hospital of Uganda to devise a detection device for neonatal hydrocephalus using inexpensive infrared technology. My time was divided between designing and building components in the labs with electrical engineers and physicists, testing prototypes by taking measurements on newborns in neonatal intensive care units with healthcare providers, and writing code with senior software engineers to analyze the device's outputs. We would then collaborate remotely with the Ugandan healthcare providers at the CURE Hospital to communicate progress, clarify needs and limitations, and elucidate further design requirements. This constant interaction between different disciplines is precisely what made the project successful. Every individual's personal and professional experiences contributed multiplicatively to the team's overall ability and efficiency of development. When the physicists suggested using a particular filter, the engineers suggested a more

durable and affordable alternative. When the engineers proposed a deluxe monitoring feature, the on-field healthcare professionals who were aware of the device's intended high-volume, low-resource setting helped whittle it down into a more practical version. I was incredibly inspired by this multidisciplinary yet united team and knew that I wanted to seek similarly synergistic environments for my future endeavors.

The years since my internship at MGH have been defined by multiple interdisciplinary projects in the field of medical technology. For my undergraduate capstone project, I worked with the Harvard Program in Refugee Trauma on a team of healthcare providers and software engineers to create an online service for clinicians to store patient information, facilitate difficult conversations with patients, and perform analytics on large patient datasets. At the Broad Institute of MIT and Harvard, I helped develop a cloud-based computational biology research platform. My current projects include a machine-learning algorithm for prosthetic arm control and a remote-control wearable ultrasound fetal monitor, both of which are in collaboration with incredible colleagues from the electrical engineering, computer engineering, biomedical engineering, physics, and medical departments. These experiences have taught me much about what it means to be a good member of a multidisciplinary team: communicating scientific and technical knowledge effectively to individuals with different backgrounds, differentiating when to self-learn versus when to defer to a colleague with greater expertise, and being cognizant of my role in the project's bigger picture. I have also learned that personal experience is sometimes more informative than professional experience; it is invaluable to collaborate with patients and receive feedback while developing a patient-facing device, especially when many patients are enthusiastic to aid in the empowering scientific and technological conquering of their afflictions. Being able to speak both the languages of medicine and technology has been an incredibly valuable asset on my past interdisciplinary teams, and I am eager to continue to use my multifaceted educational and professional background to tackle complex medical technological problems.