

When I was five years old, a pair of social workers arrived at my Michigan home to take my three siblings and me and separate us into foster care—temporary homes for children whose parents are unable to take care of them. As I boarded a big, blue social services van with a bag of my clothing, I consoled my fears by vowing that, one day, **I would use my experiences to help others in need**. The vulnerability and neglect that I faced as a child living in foster homes and safehouses was painful; and the inconsistency of changing schools eleven times during my K-12 career posed great challenges to my education. But time and again, I have found that the **vow I formed when I was young has continued to guide my life and my mission**.

Looking over my work thus far, one might think that I always knew I would be building systems for early childhood development. But I didn't realize that I could fully dedicate my life to this mission until my undergraduate experiences showed me how research and technology could be a vehicle for change. I sought a bachelor's degree in order to formally explore my passions and create a better economic future for myself, and I'm now seeking a graduate degree to learn the skills necessary to make a **high-impact, meaningful contribution to building technologies for early childhood development**.

#### Interdisciplinary Foundations: Teaching Preschool to Support Children and Families

After graduating from high school, I decided to move to Colorado and teach preschool to explore my passion for communicating with young children. Many of my students were recent immigrants to the U.S., spoke English as a second language, were low-income, had experienced a death or trauma in their family, were adopted or were in foster care, or were receiving support for a disability. **Teaching gave me a rich opportunity to learn broadly about the unique needs of young children and their diverse families**.

My greatest lessons in early childhood development came from working with our experienced team of teachers to (1) observe each child, (2) analyze the observations and the child's portfolio of work, (3) assess the child's development across cognitive, social, emotional, language, and motor domains, and (4) use our resulting data to co-create plans to support the child's development. I often led parent-teacher conferences and conferred with the parents on how our team could help support their own needs and goals. Repeatedly, I found that our school's most effective way of creating positive change for a struggling child was to **work together with all of the caregivers in the child's life**—parents, grandparents, nannies, therapists, and teachers. I called this the *round table* effect: **When we shared our insights, we were able to create the most immediate and impactful improvement in the child's development goals**.

During June of 2010, the preschool helped fund my travels to the Dominican Republic so that I could hone my language skills to **support our Spanish-speaking students**. I volunteered at a village library, Fundación Mahatma Gandhi, in a community that was experiencing high rates of child trafficking and sex trafficking. First, I attended a seminar (in Spanish!) with the United Nations Children's Fund (UNICEF) as well as local organizations to discuss how we could help prevent these crimes and protect the children. Then, I coordinated with the library's director to plan and facilitate daily creative activities for the community's children with the purpose of providing them a **safe opportunity to build their skills, see their strengths, and craft their visions of the future**. In turn, their passion, commitment, and willingness to learn inspired me to pursue my own education.

### Intellectual Merit: Facing New Challenges with Technologies and the Mind

After four years of teaching preschool while attending community college and earning my certificate in Early Childhood Education, I was hungry to learn more about **creating innovations to support the developing mind**. I was attracted to the University of Colorado Boulder's reputation as a strong research institution and its vast opportunities for undergraduate research; I enrolled in the neuroscience track and soon joined the computer science program.

My first semester, I began working as a research assistant in the Cognitive Development Center. There, we studied the development of young children to understand "**how the brain secretes the mind**." I worked under the guidance of a Ph.D. student to research how children's sense of trust may influence their cognition, and we specifically sought to determine if trust might affect the executive functioning skill of delaying gratification. We hypothesized that untrustworthy situations would yield smaller durations of delay. I helped design and conduct experiments, control confounds, code data, and analyze results. Later results<sup>1</sup> confirmed our hypothesis, and I saw how **the design of children's environments can influence their expression of skills**.

To dive more deeply into brain science, I also began working with the Center for Health and Addiction: Neuroscience, Genes, and the Environment. I was awarded an Undergraduate Research Opportunities Program grant to fund my assistantship, and I worked with a team of three Ph.D. students and two undergraduate students to study how aerobic exercise might help mitigate the effects of alcohol abuse in the brain. I guided participants through fitness testing to determine their aerobic range, reviewed fMRI scans of their brain activity, and coded their resulting study data using the Statistical Analysis Software Package. Our results<sup>2</sup> found that aerobic exercise moderated the effect of heavy alcohol consumption on brain damage, and this **further fueled my mission to promote health and wellness through cultural supports**.

Meanwhile, as I was taking courses in computer science, I quickly saw how **computing technology could be a vehicle for translating research into practice**. In the final project for my Data Structures & Algorithms course, I decided to program an object-oriented game in C++ to train people how to safely respond in the event of an emergency. One of our campus departments had recently been threatened with violence, and I wanted to ensure that people knew how to safely respond to a crisis. I took an online course from the Department of Homeland Security and became certified in Active Shooter Preparedness; I then interviewed a commander from our campus police department who shared his expertise in safety protocol. I worked with three other classmates to **integrate these insights into an experiential learning game** that trained participants in responding effectively to an escalating active shooter situation. This experience showed me that I had both the vision and the emerging skills to create change.

Next, in my User Centered Design course, **I created and led a project called *TakeBack* with four other computer science students to help people repair and reinvent their community spaces through crowdsourcing and collaboration**. Having grown up in metropolitan Detroit, I was keenly aware of how the quality of an environment can affect the well-being of a population, and I had also seen how well-being can increase when people are actively engaged in improving the livability of their shared spaces. For this project, I conducted user interviews with people (ages 20-70) from five different countries, analyzed and synthesized user data, created prototypes for a mobile application, and executed user testing. Inspired by the impact, I continued working

on the project through my subsequent courses in Software Engineering and Startup Essentials. After many iterations of the user centered design cycle and with the support of my Startup Essentials' professors, **I pitched our *TakeBack* startup in the city's New Venture Challenge (NVC) for Innovation and Entrepreneurship** and won the Best Minimum Viable Product.

Never one to shy away from a challenge, my undergrad experience rapidly exposed me to new learning and skill-development opportunities. As a first generation college graduate—and **graduating #1 in my class**—I became emboldened with the confidence that I possessed the determination necessary to achieve my goals. Graduate school was on my horizon.

#### Broader Impacts: Supporting Communities in Creating Change

In addition to my initiatives to improve health and wellness described above, I am passionate about **bringing people from diverse backgrounds together to collaborate**. At the campus level, I serve on an interdisciplinary action team with the Vice Chancellor of Research to increase innovation opportunities for students in *all* campus disciplines. At the city level, I serve on the NVC's board of industry and academic professionals to contribute initiatives to **increase entrepreneurial support for women and underrepresented populations**. At the global level, I participated in The Story Collider to help scientists become better communicators such that **science becomes more engaging and accessible to the public**. I recorded a personal narrative about the amazing brain and The Story Collider chose my story to publish on their podcast and to share across social media! Now, I'm empowered to continue creating and publishing work so that I can contribute to our collective knowledge.

I am also a mentor in the Guardian Scholars program which provides **collegiate support to former foster youth like me**. The Guardian Scholars program exists to combat low rates of college completion for former foster youth, and research suggests that only 2-9% of former foster youth attain a bachelor's degree.<sup>3</sup> The program supported me during my undergrad, and now I support the program by **mentoring former foster youth in accessing research and professional opportunities** on campus to propel their success *and* their impact. It is crucial to me that people from diverse backgrounds are envisioning, building, and leading our futures.

#### Aspirations for the Ph.D. & Future Goals

I am pursuing graduate education to develop the skills necessary to **plan and execute long-term, high-impact projects**. I chose the University of Colorado Boulder because of the strong relationships I formed with my professors during my undergrad—they have continually supported my needs as an underrepresented, nontraditional student and they have supported my goal to **build meaningful technologies for underserved populations**. In my Ph.D., I will fully utilize this extraordinary opportunity by immersing myself in the methods and tools of *human centered computing* as I bridge my past with my future by contributing to early childhood development needs. This will prepare me for an entrepreneurial career in innovation as I fulfill my childhood vow: I will develop technologies to support the bright futures of children in need.

[1] Michaelson, L.E. and Munakata, Y. (2016). [2] Karoly, H. C. et al. (2013). [3] *National Factsheet on the Educational Outcomes of Children in Foster Care* (2014).