



# Harvard University

- Accepted College Essay -

## PUZZLES

When my grandmother came to visit five years ago, she brought me a 3,000-piece jigsaw puzzle. To most, this would not sound very exciting—it would be almost as bad as a shirt saying “My grandparents went to India, and all they bought me was this stupid shirt.” My reaction to the puzzle was different. I cut open the cardboard box as soon as I could, and poured the pieces out onto my puzzle board. I worked patiently on the puzzle for hours at a time, my excitement building as more and more of the picture was revealed. I cut down my sleep time until the image of a picturesque forest was complete. The puzzle overshadowed all else in my life, if only for that short period of time.

Working on puzzles has helped me gain focus, determination, and patience. I have learned to apply these qualities to every task I face, dealing with the outside world in the same fashion as I would a puzzle. My love for science stems largely from this; science requires the same logical and levelheaded approach that a puzzle does, and as evidenced by the many puzzles decorating my house, this is an approach which suits my skills and temperament. This intellectual stimulation, coupled with a desire to discover more about life’s mysteries, compels me to pursue a career in scientific research.

This summer, I worked in a cardiology laboratory at UCLA, looking at proteins associated with HDL to understand how atherosclerosis can be averted. After some experiments provided questionable results, I was given the task of confirming that the viruses we were working with had been packaged and identified correctly. I spent weeks running DNA gels, looking for specific genes in each virus, but my results were inconsistent. I was frustrated, but instead of giving up on my assignment, I was even more determined to find an explanation. I considered every aspect of the experiment, working backwards until I reached the source—the primers I had used to amplify the DNA were nonspecific and ineffective, and thus useless in distinguishing the three genes of interest to us. Knowing this, I was able to alter my experiment accordingly, looking at protein content instead of DNA sequences. I finally showed that two of the three viruses were correct; the third, however, needed to be repackaged. My work was crucial to the undergraduate student I was working with, because he was able to redesign his experiment to account for this third virus.

Working in a lab was an exhilarating experience for me. Even though I gave up lying on the beach to instead play with viruses and chemicals, the compulsion to understand these proteins inspired and motivated me. I am tremendously proud of the piece I contributed to the atherosclerosis puzzle: a small piece, but integral nonetheless. The sense of accomplishment I felt because of my work in the UCLA lab was much the same as that which I felt upon completing the 3,000 piece puzzle my grandmother gave me. This feeling is one I hope to experience throughout my life, because the atherosclerosis puzzle is most assuredly not the last such puzzle I will work on.

## MY UNPOPULAR DECISION

Since I have always been interested in science and technology, I subscribed to many research magazines, including Popular Science and Scientific American. However, until 10th grade, I never had the opportunity to contribute to medical research—something that I had always wanted to do. Then, one day I read an article titled “Print Me a Pancreas, Please” in Popular Science, which described novel tissue engineering research involving modification of off-the-shelf inkjet printers to print out living cells in a “bioink” solution. Having read much about tissue engineering, I realized this “organ printing” approach could potentially address problems of traditional tissue engineering methods, such as the need to precisely place specific cell types in 3D scaffolds. I was so excited that I came up with a few ideas of my own about advancing the printer capabilities. I was impelled to contact the researchers at the Medical University of South Carolina (MUSC) and Clemson University (CU).

I corresponded with the professor at MUSC and visited his lab multiple times, but realized that the actual printers were kept at CU. Therefore, I contacted the researchers at CU, who did not reply to about 50 of my e-mails. Not the one to give up easily, I called the Principal Investigator (PI) and expressed my eagerness to contribute to the research. After seeing my résumé and computer-aided designs (“roadmap to Organ Printing”), he invited me to meet him at his lab on October 18th, which conflicted with my school’s Homecoming dance. To my friends’ bewilderment I made the “unpopular” decision to miss the dance. They could not understand why I preferred driving 26 hours to meet a researcher and miss all the fun at the once-a-year dance. To me, this was clearly the right choice. I was trading a great school experience to literally get my hands into cutting-edge medical research.

The PI was so impressed with my original CAD designs (“roadmap to Organ Printing”) and my resume that he invited me to research at his lab. Over Christmas and other school breaks, I learned many laboratory techniques, conducted novel research, and independently succeeded in “printing” the first functional 3D branching tube of smooth muscle cells (a rudimentary blood vessel). This research helped me win many science competitions and honors, including 2nd Place in Medicine and Health at the Intel International Science and Engineering Fair and become the Top Florida Presenter at the national Junior Science and Humanities Symposium. My computer-aided designs were published in Biomaterials Forum and the Journal of Thoracic and Cardiovascular Surgery.

This remarkable experience inspired me to perform many additional research projects and I consider it a turning point in my life. It has increased my passion for research and my determination to be a physician and work on devices or pharmaceuticals that improve people’s quality of life. I have also become more confident in my research efforts and am able to contact any researcher to pursue a position in their laboratory. I have realized that there are many opportunities for students like myself to contribute to labs and brainstorm solutions for current problems.

## RESEARCHING CANCER

I trod the mud in the misty spring rain. It was Qing Ming, the holiday in China when we honored our deceased ancestors. On the ground of the cemetery, drenched flowers lay in my grandfather's remembrance. That morning—a month before my sixth birthday—I clung tightly to my mother's sleeves and finally learned why he passed away.

My grandfather had been a victim of cancer. Because the diagnosis came too late, all treatment was futile. As my mother whispered this to me with grief in her eyes, I stomped angrily in the mud. I blamed the doctors who couldn't find the tumor in time to save him. That rainy morning launched my dream to help cure cancer—a common wish, but one that fueled a life-changing pursuit. Knowing that the best protection against cancer was to detect it as early as possible, I examined the widely used methods of detection. I read about mammography and was astounded to learn that it failed to detect a large percentage of cases. As I wondered how to make detection more accurate, I heard about a research internship program at \_\_\_\_\_ Cancer Center. I jumped at the opportunity.

There, my mentors encouraged me to investigate cancer's genetic causes. I became intrigued by a gene suspected to play a role in the onset of breast cancer. We examined a process of gene-silencing— known as methylation—that changed DNA structure while keeping the sequence itself intact. Through a series of assays, we pinpointed the methylated sites in the gene sequence that distinguished cancerous breast cells from healthy cells. These were markers of disease!

The thrill came from knowing the vast clinical applications of the discovery. Finding such markers is a step toward the individualization of cancer treatment. genomics-based diagnostics would detect cancer earlier than traditional procedures. Also, since methylation does not change the DNA sequence, it is reversible. Therapeutics could target these sites and minimize harm to healthy tissue.

Personalized cancer diagnostics promise a new dawn, but they are not yet reality. Many more genes need to be studied before we can fully comprehend the roots of the disease. Awed by the complexity of cancer, I realized that my dream was much more intricate than I imagined. However, my youthful passion in medicine did not dwindle. Instead, it strengthened and matured into a strategy. As my vague goals shaped into specific inquiries, my curiosity became insatiable. The joy of uncovering the unknown affirmed my love for science. My generation will keep pushing the boundaries of knowledge, and nothing would give me more fulfillment than continuing to fight in the war on cancer.

I recall that rainy Qing Ming morning when I gazed at my grandfather's gravesite. I wish I could tell him about the adventure he inspired. This war will be arduous, but every little "eureka!" along the way is a portent of victory.

## BIRTHING A BUSINESS

At my age, few people can genuinely claim that they have had a life-changing experience. After attending Leadership in the Business World (LBW) at the Wharton School last summer, I became one of those fortunate people to have experienced a life-changing academic program. Four weeks of meeting business executives, working with teammates through the night perfecting our professional business plan, experiencing the independence and responsibility that will come with college . . . none of this was advertised in the brochure for LBW, but all of this is what made it uniquely meaningful to me.

The business leadership program centered on one culminating activity: the prestigious LBW Business Plan Competition. As we prepared for this, we heard from Wharton faculty members and many corporate heavyweights including Brian Roberts, CEO of Comcast Corporation. Meeting educators, executives and entrepreneurs broadened my knowledge of business, created a strategic network of connections and proved profoundly inspiring; nothing motivates me more than seeing hard work and sharp thinking reach fruition. I vividly remember when a managing director of a venture capital firm singled me out for a networking demonstration. Expecting me merely to pretend to hand him a fake business card, he was dumbfounded by impressed when he glanced back as he accepted an actual business card from my tutoring business. As my business card now rested in Mr. Kimmel's rolodex next to elegant cards from established businesspeople, a lesson was ingrained in my mind about acting uniquely in order to distinguish myself in a field of equally qualified and eager peers.

Despite the inherently competitive nature of LBW, I established enduring friendships with students from far-reaching places, such as Shanghai and Accra. We shared stories over meals in Houston Hall about life at home and engaged in heated discussions about business ethics. regardless of the origin of our passports, we became a family while learning about each other's cultures and future business aspirations. The lessons of compassion and hard work from the business plan competition also heightened my experience. Once when a fellow marketing officer was struggling with determining channels of distribution for our product, I disregarded trying to seem individually superior, and we cooperatively tackled the problem. Putting the team before the individual was a concept that materialized itself during my experience. The bonds between all of the students and advisors spurred my entrepreneurial spirit as I experienced how friendship supports business.

I knew this experience had changed me forever when I triumphantly concluded our team's business presentation, confidently promoting our product and connecting with a crowd of peers and venture capitalists. During the evening following the presentations, my fellow teammates and I beamed with boundless relief and pride when the VCs announced our team, EnTECH LLC, as the first place winners of the competition. Exploring and honing my business and entrepreneurial skills was intimidating initially, yet with creativity, hard work and an unparalleled group dynamic of cooperation, this experience cemented my passion for business and opened grand doors of opportunity.

## HURRICANE TRANSFORMATIONS

I used to spend endless nights wide-eyed, anxiously dreading a high school life teeming with harsh peers and hollow hallways, immersed in a cold atmosphere eternally void of familiarity's warm embrace. I'll admit that this is not a hopeful vision; nevertheless, I certainly risked accepting this ugly reality when I supported my family's decision to uproot itself and move from New Jersey to Florida after my freshman year.

Somewhat flexible, my parents gave me a significant voice in the decision as I would be most profoundly affected. Yet, I had spent my entire life in the same cozy center-hall colonial in the same New Jersey suburb. I had known my friends since youth, when we had snowball fights during the icy winter and ran through lawn sprinklers during the summer. Teachers knew my family and cordially greeted me in the halls. I could never move. In my mind, I was set!

Or was I? Instinct tugged at my heart, something was missing in my life because life is not about being "set." Lured by the concept of a fresh start, I yearned for the chance to write my own story. As the son of Indian immigrants, I had adventure in my blood; the time had come to venture beyond my comfort zone and stake a unique claim in Florida.

The first few months were trying; only birds joined me during lunch and I spend weekends alone writing introspective poetry. My fifteenth birthday centered on a family discussion about our affection for our new home while Hurricane Charley pounded the life out of Florida. I regretted moving. By fortuitous research, however, I learned more about innovative entrepreneurs who were shaping our world. I have not looked back since.

My self-inflicted adversity finally evoked personal growth. I constantly introduced myself to strangers and pursued my passions in different activities. By launching and supporting community organizations, I transformed into a proactive leader as I overcame difficulties in varied contexts. Continuously seeking challenges in the community and IB Program, I teamed up with other motivated citizens and students to thrive and contribute to my new home.

Today I am highly involved in my community with many friends and mentors. Nobody knows me for my family or childhood, just for who I am today. The results of my own decisions and actions mean much more than what has been bestowed upon me. I would risk it all again because I know that I can only enjoy what I have earned. Breaking away from the risk-averse crowd that holds an exaggerated fear for what can be lost has been refreshing. I have gained trust in myself to defy odds because I never would have dreamt of the happiness and accomplishments that I have been honored to achieve in Florida. College will certainly thrust a fiercer Hurricane Charley at me, but I will stare it straight in the eye and exceed expectations, eventually leaving an enduring legacy for the world through my entrepreneurial and philanthropic endeavors.

## A SPECIAL PERFORMANCE

I stood behind the curtains listening to the applause to the previous act. I exhaled, realizing that this was a moment that fulfilled my childhood wish. Tonight was special because instead of an alto aria or a jazz lick, I had prepared a song unique to my identity. I curled my fingers around the microphone and waited impatiently as the curtains opened.

My love for performance stemmed from my appreciation of music as a child. In the city in China where I spent the first ten years of my life, I never found a choir to join and never laid eyes on a grand piano. Nonetheless, I treasured my passion for song and sought ways to bring music into my life. I sang with our old record player when I was barely tall enough to reach it. On certain afternoons, my best friend and I would tape bed sheets to the ceiling as curtains and invite neighbors to come listen. There, we sang in duet, danced, and bowed while clasping each other's hands. Captured in our own musical sanctuary, we never noticed the hours that passed by.

Music evokes in me the emotions that words and pictures cannot. I also revel in the intellectual challenges that music offers. I find it thrilling to tackle difficult, delicious repertoire, and I enjoy composing my own melodies. Through music, I can share and celebrate my past. When I was asked to share my cultural talents at my high school, I looked for a song that my mother sang when I was young, but I could not find the sheet music. A week before tonight, I sat down by the old piano in the practice room at school. With only the old tune ringing faintly in my mind, my hands soon took a life of their own and experimented with chords, arpeggios, and trills. I superimposed these on the original melody and composed variations. My voice, too, frolicked with the piano as I sang the tune repeatedly. I was lost in another musical paradise. I felt like a child again, tucked under the covers, listening to my mother's song as I drifted away to dreams.

Now, dressed in an old Chinese dress that my mother had worn in her youth, I stepped onto the empty stage illuminated by pale blue light. I held the microphone up to my lips and smiled before starting. Then, I brought to life the beautiful ballad that had brightened my childhood in China. My mind overflowed with warm memories of that faraway city as I lulled the audience with my melody. When I caught my mother's face in the audience, I knew she nestled in the same air of nostalgia.

Music allows me to present my native culture and contribute to the diversity in my community. It has stimulated my mind and provided an outlet for my creativity. To me, nothing is more pleasurable than being imaginative. Carrying my childhood love of music through my teenage years has been a gratifying experience, and I look forward to continuing in my undergraduate years.

# Envision High

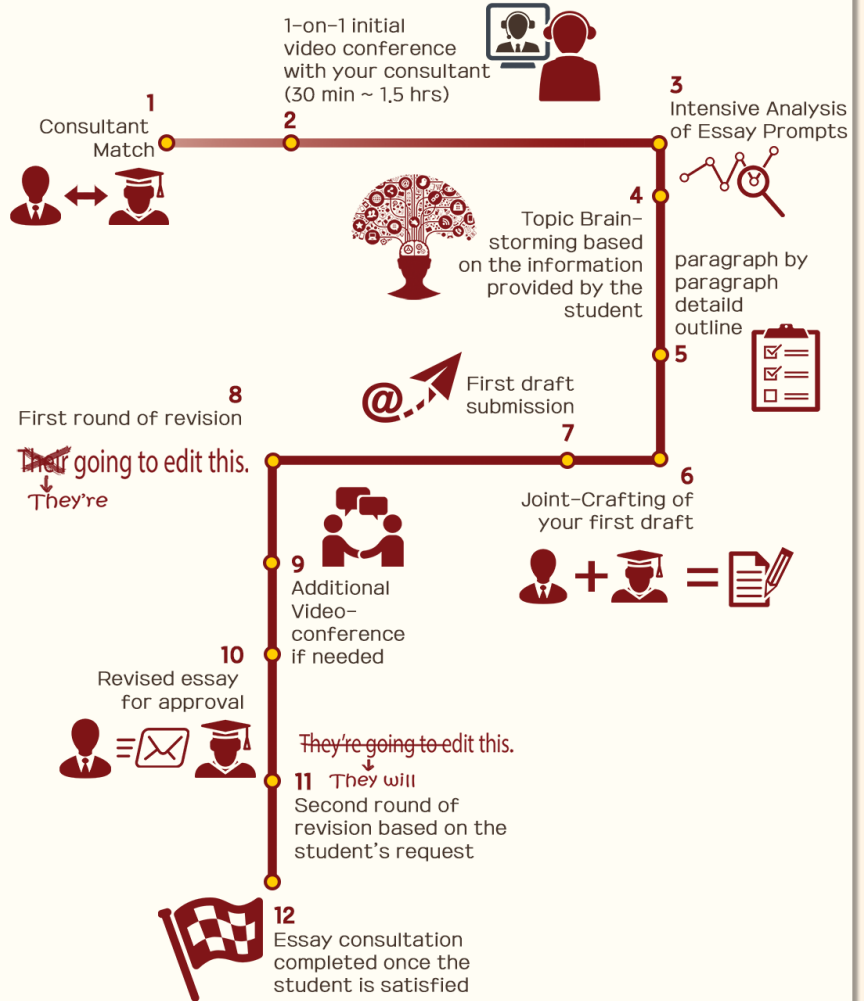
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