**Statement of Purpose**

"The art challenges the technology, and the technology inspires the art." John Lasseter's words have been a central motivation for my practice from an early age, leading me to follow my goals in the School of Design at Shanghai Jiao Tong University (SJTU). I served as a designer for many important international conferences, such as the China International Import Expo and IEEE VR 2023. However, it wasn't until I discovered the world of computer science and the potential for using technology to revolutionize the design industry that I truly found my calling. On a Friday evening, after spending the entire day creating a complicated architectural model manually, I came across a poster in the university hallway advertising the software engineering department's "Digital ART Lab”. I was immediately drawn to the lab's work with AI-generated design and Augmented Reality (AR). The next day, I rushed to hear more about the lab's projects, and I quickly became convinced that computer science was where I belonged. I therefore switched my major to software engineering with the goal of **combining computing and arts**. I made it my mission to **catalyze creativity through computer science,** and I am excited to see what the future holds in this ever-evolving field.

Innovation has always been at the forefront of my research pursuits, and this was exemplified in my work at the Digital ART Lab of SJTU, my dream lab. Under Professor Xubo Yang's supervision, I began researching human-computer interaction (HCI). As the first author, I published a paper at User Interface Software and Technology (UIST) 2022, a first-tier HCI conference. I deployed the AR tangible souvenir project at the Shanghai Science and Technology Museum for a week and sold approximately 300 pieces a day, finding it became one of the most purchased souvenirs of the exhibition. I found that traditional physical souvenirs in museums lack interactivity, personalization, and connections to the exhibition. To address these problems, I proposed a hybrid tangible AR souvenir that combined a physical firework launcher and AR firework models. My challenge was to incorporate personalized memories into these souvenirs. After investigating, I found photos were the most accessible medium; to incorporate this personal touch into the souvenirs, I developed a picture-based AR fireworks generation algorithm in Unity. At the moment of the firework explosion, sparks are arranged according to the pixels of uploaded photos. To further create multiple-sensory experiences, I implemented hand gesture recognition and transcribed audio with OpenAI API. It was truly satisfying that I was the first researcher to propose tangible AR hybrid souvenirs and develop the potential of customizing users' experiences, opening up new possibilities for catalyzing creativity.

Problem-solving and strong programming skills are key qualities for a developer. Inspired by tremendous interaction techniques at UIST, I joined the MIT Computer Science and Artificial Intelligence Laboratory and was supervised by Professor Stefanie Mueller. My research project, ChromoFiber, taught me to build a complex system and analyze data with mathematical models. We prepared a manuscript and will submit it to UIST 2023. ChromoFiber is a reprogrammable multi-color fiber made from photochromic dyes and embedded LEDs. It can change its color locally in individual color segments, enabling color-changing capability on interactive wearable garments, which could be used in various settings, including fashion, healthcare, and the military. I developed a design tool that allows users to reprogram the color patterns on garments with integrated LED. I faced a challenge aligning the sketches in the design tool with the physical fiber. After trying many existing simulation algorithms and failing, I built a mathematical model in MATLAB to fit two-dimensional surfaces to simulate the property of our dye. I was thrilled to achieve a perfect match. Another difficulty was developing a complex system and coordinating the software and hardware. I divided the entire system into four parts: a LED controller (Arduino and microprocessors), an image processing tool (Python OpenCV), and a design tool (Processing), all implemented individually to construct a comprehensive system. This material has the potential to further advance the field of computational creativity and inspire novelty by creating their own garments.

As a good communicator and team leader, my ability to effectively communicate with different roles and steer the project’s direction was crucial to the success of my game engine development internship at Tencent. While leading the team, I worked closely with the designer to identify and address pain points, and to create an innovative product with intuitive interaction. Simultaneously, I collaborated with developers to implement a complicated and robust system. Our proposed foliage-generating tool in Unreal Engine for large-scale ecosystems significantly increased the efficiency of large-area foliage arrangement in games, with a 20 times improvement compared to the manual arrangement. As it could simulate foliage in different climates with high accuracy, it was applied immediately in Tencent's new game, UNDAWN. During the internship, I found that scene modelers in Tencent spent tremendous amounts of time manually arranging plants, which was tedious and time-consuming. To save their time, I led a group to develop a foliage-generating tool in UE4. I first researched plant symbiosis rules and followed them to make a generating algorithm. Nevertheless, I found the generated forest monotonous. After researching the latest foliage-generating algorithms, I decided to train a Convolutional Neural Network (CNN) with a large dataset of real-world symbiotic plant clusters, allowing it to generate more reasonable plant clusters for use in the game. I also proposed a recommendation algorithm that determined plant clusters' composition based on humidity, temperature, and altitude factors. This internship allows me to solve the designers’ pain points with technology, inspiring me to explore computer-aided design.

I am driven by an intense passion for using computer science to unlock boundless individual and collective creativity. I dream of developing tools that will turbocharge designers' productivity and spark innovation through the power of computer graphics and HCI. **The Master of Engineering** at **UC Berkeley**, with its top-notch faculty and impeccably crafted curriculum, is the perfect incubator for this dream. The specialized concentration in **Visual Computing and Computer Graphics**, featuring courses like Foundation of Computer Graphics and AR/VR Design Experience, will provide me with the knowledge and skills to seamlessly merge computing and design. I am particularly excited to work with the pioneering HCI researcher Prof. Eric Paulos on new media arts, drawing on my previous research experience in interactive design and wearable devices to help push the boundaries of this exciting field. With my research experience to see the big picture and unique blend of design and computer science expertise fueling my creativity, I am confident that I can make a meaningful impact on the future of Berkeley and realize my full potential as a creator of a better tomorrow.