When I was 14, I fell in love with visual arts. I greedily consumed the great works of cinema, TV series, storytelling video games and VR shorts. I believed visual art was the best way to reach to our insides and bring us together. Then, I entered Pomona College as a film studies major. I am grateful for the freedom I had in here in exploring my interest. As I delved deeper into the field, I gradually realized the importance of technology on the development of visual art. As I saw the visual effects in movies like *The Curious Case of Benjamin Button* and *Avengers*, I was attracted by how graphics technology could be waived into storytelling. I realized that technology and art are related rather than separated. Thus, I wished to explore new ways to enrich storytelling and interactions with graphic technologies.

My journey in research began with the goal to create better graphics. I first looked into computer graphics, but there was not much research opportunity in my college, so I switched my studies to computer vision. It was not a deviant shift, since there are more and more applications of machine learning in graphics tasks. I self-taught the contents with Jeff Heaton's Keras lectures, Stanford CS231 Convolutional Neural Networks and CS330 Meta Learning. I also took math courses that were helpful to my understanding of neural networks, such as probability, advanced linear algebra, differential equations and math of big data.

In order to get a deeper understanding in the subject, I started my first research project in facial recognition with professor Weiqing Gu at Harvey Mudd College. I proposed to use a joint network combining the prediction of face shape recognition and CNN recognition on extracted areas. To accelerate the progress, I registered the project in a college-wise machine learning club and recruited three students through the organization. As the group leader, I led the research direction, held group discussions and distributed research works. Based on what I learned, we implemented the distance recognition with Gaussian model clustering. I learned to read the papers, set the research goal, do presentations and write academically, and I was determined to keep on doing research after this experience.

Another thing I learned was that researchers must keep track of new academic result in their respective field in order to make most relavant contributions. Earlier this year, in Vincent Sitzmann's twitter, I read about the exciting work of NeRF. The model could achieve high-quality rendering, but the training took too long so I thought of accelerating it with meta-learning. As I saw MetaSDF, which applied a Model-Agnostic Meta-Learning (MAML) model to a neural rendering function for computer-generated scenes, I confirmed the idea that first-order meta-learning methods could have great effects on accelerating the training of neural rendering tasks. After I implemented MAML-NeRF, it performed only slightly better than a blank model, and became worse as the iteration increased. Rather than giving up, I went on looking for other meta-learning methods. I soon discovered another optimization-based meta-learning algorithm - Reptile. Since this method could have much more inner steps, I was able to make Reptile-NeRF treat each scene as an inner task, and thus shuffle the rays to decrease the variance of inner training data. This approach improved the result of the original training and enabled me to achieve a better result. I experienced the whole process of research alone in this project. It was also the first time for me to write a paper as first author. For details, I received help from my research partner Alex Beatson, a PhD at Princeton University. My writing was also trained in my thesis project – a survey of rendering functions for neural rendering. Also, Inspired by Reptile-NeRF, I surveyed rendering functions in computer graphics that could be used in neural rendering. I wondered if a wiser choice of the rendering function could also improve the training efficiency.

With a solid understanding on computer vision and computer graphics, I became curious about how they could benefit people's lives. This decision brought me to professor Misha Sra at UCSB in July, and our collaboration was the turning point of my research interest. Prof Sra gave me a lot of independence and trust. She encouraged me to start a new project rather than joining an existing one. To decide upon the topic, we debated over each of my proposals and negated most of them, until we finally settled on the current one – AR assisted language learning. In short, we let our participants walk around an outdoor area holding a smartphone, through which they would see word tags in the foreign language attached to real objects so as to learn those words. I discussed a lot of details with prof Sra on how to display the words in the most comfortable way and how to control the time spent on the walking procedure. In such way, we refuted the initial plan to generate the words with machine learning models and instead made an interface to let other people create the tags. Designing the first user study in my life was quite challenging, so I went through every detail in relevant studies and learned the HCI principles behind them. In this way, I finished experiment setup and testing metrics. Eventually, I successfully designed a pipeline that could demonstrate the effectiveness of AR learning in fair comparison, and implemented an Android AR app with cloud anchors to give participants a comfortable user interface. At this point, we have all the details set and we hope to conduct the user study in April inside the UCSB campus.

Besides how to design the app and write the questions in a research, professor Sra taught me that the value of technology was largely dependent on how we used it. She also broadened my sight on the field of HCI. As we talked about sports training simulation, VR drawing, storytelling and graphical memorization, I was surprised by how much more we could do with the technologies to change people's lives. The best part in this research was knowing that my idea could actually help people learn the language by making it easier and more interesting. I realized that HCI was the field I truly wished to work in.

I sincerely hope to join professor Misha Sra's group. She has a wide variety of projects in applying vision and graphics technologies to create better user experience. My favorite of her works are *Walking and Teleportation in Wide-area Virtual Reality Experiences*, *Time Travel MIT* and *VMotion*. I'm mostly interested in working with her and AR Rahman on the design of novel storytelling techniques. Other possible topics include technology-facilitated depression detection and recovery, cinematic experience in AR/VR and friendly 3D modelling interface. I will definitely accept the offer once accepted to the Perceptual Engineering Lab.

Furthermore, I'd also like to join professor Tobias Höllerer in Four Eyes Lab. I can continue the lab's work on *AR annotation and 3D reconstruction in VR*. I also like to continue the work, *Illumination for 360 Degree Cameras,* on lightfield capturing, or wide-angle capturing.

UCSB has a strong cs department in interactive visual technologies in general. There are great professors with an excellency in different fields, such as prof Lingqi Yan in graphics, prof Pradeep Sen in neural rendering, and prof Jennifer Jacobs in computer-aided design. Their knowledge will be great aids for my HCI research. In all, I believe that I will thrive in UCSB.