I've got a good taste of the discipline over the four years of chemistry study in college and two semesters of graduate chemical engineering courses. Applications of chemistry and chemical engineering in various fields have opened my eyes. In my undergrad, I joined a research program to coat polyacrylamide gel with polydopamine (PDA) catalyzed by H_2O_2 / Fe^{3+} which would be used for wound infection treatment when the COVID pandemic forced me to stay back in China. This specific gel would offer photothermal disinfection from the nature of PDA and chemodynamics disinfection from hydroxyl radicals derived from H_2O_2 and Fe^{3+}. The gel could potentially cover skin laceration and speed up curing. Moreover, it is porous so the skin wouldn't be in anoxic environment. Another lab I joined in my undergrad was DNA nanotechnology lab. We strove to customize DNA strands and assemble into polygonal shapes. One advantage of such making is its potential of drug delivery carrier due to miniscule size and good chemical bonding with drugs.

During my graduate school period, my degree concentration is energy and climate. Some memorable courses include: green chemical engineering, CO2 capture and utilization, and electrochemistry. In Green Chem, we learned how to design chemical product with minimum sources and how to leverage profit margin and environmental impact. This idea would truly influence me when I conduct lab experiment. Other classes also shape my understanding of the world. Since my undergrad was in chemistry, I only had minimal exposure to industrial trend and society. Having learned Carbon Capture & Utilization and Electrochemistry, I notice the world is in drastic need of renewable and clean energy. These courses experience make me more fascinated about the energy and climate field.

Few semesters of lectures could suit me with an overview of chemical engineering industries. However, a deep understanding of specific field would be only realized by dedicating years in PhD study. So far, I participated in Prof. McNeil's lab to explore how to selectively deposit lead ions over other heavy metal ions under the supervision of Dr. Narouei. The research makes me have deeper understanding in electrochemistry. I realized one can modify the surface of electrode by depositing it

with gold nanomaterial or with organic acid. The modification would enhance the chemical and physical bonding of lead ions to the electrode surface, and therefore benefiting the electrodeposition of lead.

Columbia University intrigues me for its world renowned academia and its location in New York City. NYC offers me numerous stress-relieving events provided that I am in a anxious mood. Moreover, this metropolitan is the pivot of massive academic network. Connection with people from both industry and academy would provide me with insights for my future lab research. Moreover, I'm very looking forward to studying and working with distinguished professors specializing in materials, climate, and environment to explore real life applications. For example, the research topics on electrochemistry and battery from Prof. Alan West are really alluring. His projects emphasize on sustainability and alternative energy from which I am exciting to learn more. Other fascinating projects include Prof. Kumar's pioneering exploration of inorganic nanoparticles for the polymers to unleash numerous potentials for biomimicry, energy storage and conversion. There are many other outstanding professors like Professor Esposito who has done brilliant work in fuel cell and solar ene. It would be such an honor if I were to work closely within their lab and manipulate state of the art facilities. Continuing either one of their studies will go a long way towards addressing my concerns about sustainability and enable me to develop practical designs that benefit people's lives.