Tell us about your current and near-term career-related activities and goals, as well as why you decided to pursue the specific graduate program(s) and school(s) that you have.

When I returned to campus after the stroke, there was an advertisement for the collegiate chapter of plant-based universities. I was excited to get involved in some sustainability activism, so I attended their first few events. While I maintain that this is a good cause, I found that most of the club gatherings were for social events, like painting posters or attending movie nights. My immune system was compromised because of the chemotherapy so it is advised to avoid social gatherings, but that wasn’t even the main reason that I found it difficult to participate in these events. I run a tight ship, so the social gatherings often felt like a waste of time for me. Honestly, I would have preferred to be using the time to read a textbook or do physical therapy in my room.

When I look back at this situation, I am reminded of the pertinent advice that Stephen Hawking gave to disabled people: “Concentrate on things your disability doesn’t prevent you from doing well, and don’t regret the things it interferes with.”

The skill that I have worked diligently to recover since the stroke has been speech, as it is necessary for scientific communication. This was always a passion of mine: right before the stroke, I was a teaching assistant for a quantum mechanics class at Caltech and was writing a publication for the Caltech Undergraduate Research Journal (CURJ) describing my summer research. In the recovery from the stroke, I practiced singing for intonation, tongue twisters for my intelligibility, and longer book passages for speech rate and interpretation. I have been delighted to put the speech that I have devoted so much effort to into good use in scientific communication. This past year, I chose to embark on a senior thesis project, which involved voice coding and implementation of a method known as the GW approximation, which shows promise as a quantum chemistry method that delivers accurate results at moderate computational cost. As the final product, I dictated a ~40 page report and gave a 15-minute oral presentation. I also took on an editorial position at the CURJ, helping to prepare a submission for publication about research done in the related theoretical chemistry field of nonlinear spectroscopy, where researchers shine more than one (otherwise it would be called linear) laser onto a sample in order to investigate its properties. The material that had been studied was cuprite, which is within the class of materials that show superconductivity at high temperatures, a holy grail of a problem that scientists have been working on for decades since discovering one would revolutionize many fields, such as quantum information or sustainability. I also gave a talk on my senior thesis work at the 4th annual Goldwater Symposium, held virtually in the summer, to further hone my presentation skills. Clearly, I love the challenge of scientific communication because I don’t want to stop doing it! There are definitely wrong ways to explain a certain concept, but I am intrigued by the fact that there isn’t one right way to do it. So it takes a combination of knowledge and imagination to craft an explanation that your audience will understand well.

I am beginning my PhD studies at Harvard in the Division of Chemistry and Chemical Biology. I will be working under Professor Joonho Lee. he is a leading expert on developing the quantum chemistry simulations for periodic (repeating) systems; I hope to aid in the discovery of new materials with sustainability applications, from catalysts to photovoltaics. Specifically, I will be developing atomistic simulations that experimental researchers (in a wet laboratory) will use to discover more efficient solar panels.

I also chose Harvard because it is a place where my work can have an impact outside of just scientific circles. On my graduate student visit to Harvard, I met a former graduate student in the chemistry department, who is planning to go into science policy after he earns his PhD. As he explained to me, Harvard has the top school in political science, the Kennedy School, where people influential in science policy come all the time to give talks. He explained to me that striking the balance of finishing his PhD studies while also attending a few policy talks per week was tough.

I would not be happy just doing a career in science policy if it sacrifices the time I am able to spend on my science; I like quoting to much! My plan is that later in my PhD broken, when I get a few publications out I would attend some policy talks in order to make a network of influential sustainability people. I will be doing the research that makes solar panels more efficient, so I would also like to be part of the effort so that the consumer chooses it. I am inspired by the story of Frances Arnold, who is a recent Nobel laureate from Caltech. She is an expert in her respective field of protein evolution, but she also oversees many corporate sustainability ventures and is the president of the Biden sustainability council.

I hope to become an expert in my scientific field, but also to use my example of adapting to the stroke to help the world adapt to climate change.