Dear Patryk,

Your essay is coming along! You have more of the necessary elements for this essay. You do need to spend more time talking about your future projects in the lab, to address the part of the prompt about near-term career-related activities and goals. You do briefly tell us your career goal and that you wish to use science communication, but there’s nothing about your academic work.

You also need to be careful about transitions. When you push return and start a new paragraph, you can’t put forth a totally new idea. Your paragraphs need to build on each other and flow together. This is an issue between almost all of your paragraphs. How do your experiences build on each other?

I like that you added a mentorship example, but it currently takes up too much space and the outcome makes it sound like your mentee’s presentation wasn’t very strong.  
  
I’m happy to look at another draft if you upload the essay to the intake form.

Keep up the good work!

Dr. Miller

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.

My career goal is to make an impact in sustainability through my passion for scientific communication, both by becoming an expert in quantum chemistry and exploring public policy with my disabled identity.

Last year, I embarked on a senior thesis, which involved a theoretical method in quantum chemistry known as GW. Nowadays, wet lab chemists use computation alongside experiments in research, but conventional simulation is not sufficient. For example, GW allows one to effectively probe a candidate for more efficient solar panels. Experimentalists might be asking what kind of modification could be made to the material that composes current solar cells (silicon) to absorb more sunlight, and GW simulation helps get the answer.

The motor impairments caused by my stroke present unique challenges to scientific communication, but with the help of AI tools, I am able to overcome them. For my senior thesis, I wrote a 40-page final report. This would not have been possible by just typing away at a computer. But it was possible with speech-to-text, and to learn it, I joined the Talon Slack, which hosts the community for my free dictation software. Improving the software is a continuous project with everybody contributing. When ChatGPT went viral, I had the idea of interfacing with it to correct my dictated text. This led other people to think about how to use ChatGPT to improve the dictation experience. For example, one user thought of translating a piece of English text into Japanese. Instead of clicking around to get a mediocre translation via Google Translate, you can select the piece of English text, say “Model, please translate to Japanese,” and get back a state-of-the-art translation immediately in your text editor, courtesy of ChatGPT, which is omnilingual. For most people, this saves a few seconds, but for the disabled with difficulty controlling the mouse, it is priceless.

In order to give back to the Caltech Undergraduate Research Journal (CURJ), for which I had written a publication, I took on an editorial position. Throughout last year, I made multiple revisions for a submission in the adjacent field of nonlinear spectroscopy, both asynchronously and over Zoom through a joint meeting with the author and my college writing center. Having my scientific writing edited by senior figures countless times in the past, I was finally able to relay what I learned, but with my own distinct flavor, to somebody else! Having developed an interest in the subject during the editing process, I took a nonlinear spectroscopy class during the spring. One of my classmates was an underclassman with similar interests. On walks back from class, he would tell me about difficult physics classes he was taking out of intellectual interest, wondering out loud if he was doing the right thing; after all, his peers were taking easier classes for a good GPA, thus increasing their chances on paper of getting into top graduate schools. I told him to not stop being himself; this was a simple thing to say, but it took on weight due to what I said next as a mentor. I explained that my academic success had not been due to a great CV, e.g. by having many high-impact research publications, but by recommendations from professors who vouched for my intellectual passion. In our final presentation for the class, he chose a difficult topic, even for the professors watching. Afterwards, everyone praised him. Walking back, he asked me what I thought of his presentation. I gave him the truth. He had reduced the font size to pack a lot of information on each slide; it made the presentation hard to follow. He chose to walk back with me to my dorm to pick my brain, enthralled by the sober advice I had given him.

During the summer, I gave a talk on my senior thesis work at the 4th annual Goldwater Symposium to further hone my presentation skills. My love for scientific communication has only grown—through countless experiences, I have learned that there are wrong ways to explain a concept, but there is never one right way. It takes creativity to craft an explanation for your specific audience, ranging from technically minded scientific researchers to unfamiliar government policy officials.

This summer, I began my PhD studies at Harvard in the Division of Chemistry and Chemical Biology, with a rotation in Prof. Joonho Lee’s group. He is a leading expert on developing quantum chemistry simulations for materials like solar panels. With him, I will be able to use my background in GW to improve simulations of photovoltaics. I also chose Harvard because it has the top school in public policy, the Kennedy School, where influential people come regularly to give talks. I will be doing the research that makes solar panels more efficient. I want to drive the green energy transition by figuring out how to increase consumer access to solar energy, using my expertise on photovoltaics. Policy people don’t like scientists; the stereotype is that we are uninteresting people who can’t communicate. I will change the narrative, participating at Kennedy policy talks with my assistive device.

My background in rehabilitation prepares me for the sustainability movement. Climate change is going to get much worse before it gets better; there is continued resistance to climate solutions even as disasters become commonplace. Not long ago, I was wheelchair-bound at home, last year I lived independently with a walker in a college dorm in nearby Pasadena, and now I navigate the uneven sidewalks of Cambridge with trekking poles. You learn that persistence in the darkest moments pays off.

I am inspired by the story of Caltech Prof. Frances Arnold, who suffered her husband’s suicide and later the son’s death in an accident. She was recently awarded the Nobel Prize for her work on protein evolution, but also oversees corporate sustainability ventures and leads the Biden Sustainability Council. One day, I too hope to make lemonade out of lemons.