**PD Soros for New Americans**

**Tell us about your experiences as a New American. Whether as an immigrant yourself, or as a child of immigrants, how have your experiences as a New American informed and shaped who you are and your accomplishments?**

As a child of Polish Americans, from an early age, I was exposed to environmentalism, albeit from a different guise. My mother grew up in the communist regime in Poland, which was a difficult living situation. However, when she was in high school, she fell in love with nature. Her version of a vacation was to hike from hostel to hostel in the Carpathian mountains. She instilled this passion into my brother and me by taking us on camping trips to Sequoia, Yosemite, Zion, and the Grand Canyon National Parks, to name a few. Some of my best memories are from these trips, from the time that I fell into a fire pit of hot embers after walking backwards while playing with my brother as a child, sustaining a third-degree burn on my arm, to going camping alone with my ex-girlfriend as a college student to a remote, but beautiful sector of Sequoia National Park called Mineral King. At the same time, I realize that my relationship, as an affluent, white male with nature is different from others. One of my favorite comedians, Trevor Noah, quipped that unlike white people, black people don't like going camping because it reminds them of the poor living circumstances that their ancestors endured. However, preserving nature is in everybody's best interest; we all want clean air and water and a lack of natural disasters, to name a few. However, these things that we take for granted are in danger of being destroyed by anthropogenic pollution and climate change.

The relationship from my dad's side of the family with nature is different. Most of his early childhood was spent in Silesia, a Polish region known for its coal mining. My grandfather was a mining engineer, and as an early retiree, he would travel to volunteer to help build mines in underdeveloped countries. As a byproduct, my dad grew up in places like India, Pakistan, and Nigeria. Even though this was done with the best intentions, my grand father, through mining coal, was taking part in extractive capitalism, which is the extraction of natural resources for the aim of profit. It is this acceptance of extractive capitalism that explains why modern society is unable to kick its fossil fuel habit; we think that we can take whatever from the earth, without consequence. But then, is my connection to extractive capitalism really unique? Anybody who drives a car, or even does something as simple as flipping on a light switch, is sourcing energy from dirty fossil fuels, as for the most part, the electrical grid is not running on renewables. It is from this dual family heritage relationship towards environmentalism that my interest in sustainability has arisen as a new American.

During my freshman year in college, I became interested in chemistry, and specifically, in the underlying quantum physics. Fast forward to a few years later, and I find myself pursuing my graduate studies in quantum chemistry . However, along the way, there was a small hiccup. In the middle of my junior year, I was diagnosed with leukemia and then suffered a stroke in my brain stem, which impaired my motor skills. The presentation of the stroke is such that my gross motor skill for walking is impaired, so I use a walker (and now hopefully more of trekking poles) to walk, I have a fine motor impairment, so my ability to handwrite or type is slow, and I have spastic dysarthria, so the rate, intonation, and intelligibility of my speech is affected.

These last two bits are most important for my academic aspirations as they are the prerequisites for effective scientific communication. So I have learned to use dictation to code by voice, which alleviates my fine motor impairment and also happens to be very good speech therapy for me! AI not only is behind these speech models, but I am also a daily user of the generative AI tools, like GitHub Copilot (you can kind of think of it as an advanced version of autocomplete for programmers) and Perplexity, which surfs the web to find the most relevant sources relating to my query to the chatbot. The thing that gets me most excited about these AI tools is their low cost. My dictation software is free, I get GitHub Copilot as a student for free, and Perplexity is simply a page on the web. Therefore, AI can help to break down the barriers for students facing socio-economic challenges. The fact that this technological innovation originated in silicon valley makes me proud to be an american.

The physical disability is not a worry because of the Americans with Disabilities Act. You don't think about these things when you don't need them, but I have found that most doors that I must pass are accessible through an electric assist and I have a parking pass which enables my driver to park closer to my destination. For natural reasons, I have been afraid of doing any kind of airplane travel, because airports are a place of constant bustle, at which my slower speed of using trekking poles to get around would not fly. But after flying to a few different cities across America for graduate school visits, I realize that I have no reason to be afraid of airplane travel. I tell this as a joke to my friends, but it is actually what happens: I go to the check-in desk at the airport, tell the person that I need wheelchair assistance, and then I am wheeled into my seat on the airplane. I joke to my friends that I get through the TSA faster than anybody in this way because they wheel me to the front of the line.

Because of my family's history with environmentalism and the disability accommodations I am able to use, I have been emboldened to pursue a research career in sustainability.

**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.**

I am a first-year graduate student at Harvard in the Division of Chemistry and Chemical Biology. I will apply Green's functions to elucidate the spectroscopy of solid-state systems. In plain speak, I plan to aid in the designing of new materials for more efficient solar panels.

But first, a bit about how I got here. My general chemistry class got me interested in the field and during my freshman summer, I was using quantum chemical computational methods to study a chemical system in inorganic chemistry. I was intrigued about these quantum chemistry methods that were so powerful; instead of just doing chemistry in a wet lab, you could also simulate it on a computer to gain insight for experiments. The next year, I specifically switched to a quantum chemistry research group, where I benchmarked some computational methods that had been recently developed in house for periodic materials for the purpose of studying heterogeneous catalysis for the sustainable production of artificial fertilizers. During this period, I was a teaching assistant for an introductory quantum mechanics class and I wrote a paper on my summer research for my college research journal. I enjoy the challenge of scientific communication, which involves explaining concepts that you know well to an audience that doesn't.

Then I was diagnosed with leukemia and suffered a stroke, so I was on medical leave from Caltech for a few years. To deal with my resulting fine motor impairment, I discovered voice coding and the generative AI tools that have enabled me to return to science. While it is true that I still encounter many obstacles in my capacity to do science, the way I do it now via dictation is amazing. I can speak any thought into existence; it makes me feel like a wizard. And then it feels like the GitHub Copilot AI coding assistant is reading my mind, by suggesting code that I myself was just going to write.

Sometimes I think about how the stroke affected my scientific capability. After all, back then, I was a successful student-athlete who had just been awarded the Goldwater scholarship. I would be lying if I said I am a better scientist right now just through the AI tools. Though the AI tools do help a lot and I work hard to put them to use, daily activities of life take longer for me, handwriting is difficult, and it is a struggle to be understood by computer speech models and other humans. However, doctors say that I have a prognosis for a complete recovery of my motor functions, which can take 5-10 years. The fact that I have a desire to learn new material, while learning how to walk, is telling. As my mastery of the AI tools improves as I recover from the medical situation, there will be no limit to what I can do. I will come out of this a much improved scientist.

I am also motivated for my graduate research because I have a sense of the sustainability picture that my work falls within. As I make improvements to photovoltaic materials, I will gain expertise on solar panels, which are the key renewable energy source. In a social science class at UCI, I learned that technology won't save us from the climate crisis. After all, everything has largely to do with a deeply entrenched fossil fuels lobby. However, by designing improved solar panels, we can make them the more cost-effective energy option and thereby influence consumers, who at the end of the day are the agents of political change.

I chose Harvard because my adviser, Professor Joonho Lee, is a premier electronic structure theorist with an emphasis on the materials of sustainability research, ranging from photovoltaics to heterogeneous catalysts. He is not a good adviser for people who aren’t willing to be fully engaged in their work. But since my return from medical leave, the science (and some physical therapy on the side) is all that interests me, so it feels like the perfect match.

I also chose Harvard because I hope to build a network of people influential in the sustainability sphere. Harvard has the top school in political science, the Kennedy School, where people from Washington come all the time. I don't think the career of exclusively science policy interests me, but I would be in the perfect place to make relevant connections.

I am most inspired by Professor Frances Arnold's story. As a recent Nobel laureate from Caltech, she is an expert in directed protein evolution. But she also oversees many corporate sustainability ventures and is the president of the Biden Sustainability Council. Similarly, 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.