

To the Members of the Michigan Garden Clubs:

My interest in plants began at a young age. My father, an avid outdoors person, raised in northern Minnesota, never left for a hike or a boy scout camping trip without his wildflower and North American plants handbooks. Still an enthusiastic camper to this day, I am always on the lookout for rare and unusual wildflowers every trip I take into the wilderness. I still have vivid memories of racing to see who could identify the most species on walks, or getting excited over a rare find like trilliums, ghost pipes, or the various orchids native to the northern Midwest.

When I went to high school, my interest shifted to trees, manifesting in the form of a fascination with bonsai. The idea of taking a tree that would normally grow up to 50ft tall and training its growth such that it would happily live in a small pot while still looking like a mature specimen of the species was incredible. I devoured all of the information that the mid-2000's internet had to offer on the subject and collected seeds and seedlings from a wide variety of trees. This past spring, a combination of early budding and a late, unexpected frost killed a Japanese maple that I transplanted from a seedling in 2005, which was a very hard loss to take.

Upon entering college, I decided to study pre-med in an attempt to follow in my father's footsteps, so my interest in plants took a backseat to human biology. Unfortunately, in 2010, after 3 years of studying biomedical sciences at WMU, my brother was involved in a fatal car accident, and my studies were swiftly derailed. When I returned to school in 2014 after a break prompted by several semesters of struggling in classes, the only thing that I was certain about was that I did not want to use my degree to go to medical school. I ended up taking Dr. Barkman's Molecular Biology Laboratory, where I rediscovered my fascination with plants and genetics, as well as biology in general.

After I finally completed my undergraduate degree, I was certain that I wanted to continue my biology education, although I was not certain what I wanted to study specifically. While applying for graduate programs I took a job performing manual labor at a greenhouse. Due to the nature of my work at the greenhouse, I had ample time throughout the day to listen to podcasts. I found the Skeptics Guide to the Universe (a skeptical science education podcast) and listened to them 8 hours a day, 5 days a week, immersing myself in science and skepticism. It was there in the greenhouse, surrounded by beautiful flowers, that I realized that I wanted to study plants.

After the greenhouse, I was hired into the chemistry department at Pfizer. While working on and subsequently submitting my application to the MS Biology program at WMU, still working full-time at Pfizer, I signed up for the first two classes of the program as a non-degree student: Eukaryotic Cell Biology and Plant Physiology. In plant physiology, the instructor, Dr. Yan Lu, assigned us to write a mock grant proposal for a study we found interesting. For my proposal, I chose a paper in which they attempted to re-engineer the green algae *Chlamydomonas* to accept a different form of chlorophyll, potentially increasing its photosynthetic capacity to a significant degree. As it happened, Yan's research was focused on the chaperone proteins

involved in the chloroplast import and thylakoid membrane insertion of light-harvesting complex proteins, another potential avenue for vastly increasing photosynthetic efficiency in plants. Naturally, I found this line of research extraordinarily intriguing, and after that semester I was officially accepted into the MS program, where I have been working in the Lu lab since.

The very functioning of our society is so intimately linked with plants that the more we understand about the intricacies of their function, the better outcomes we can have for all living beings on the planet. A deeper understanding of, and control over, plants can be used for limitless applications, including protecting future generations from a limited food supply chain, an ever-growing population, rampant anthropogenic climate change, and the ever-nearing possibility of global ecological collapse. I hope that one day I will be able to say that my contribution to plant science was able to help humanity survive the growing number of difficulties that we will face as we move forward. Unfortunately, the SARS-CoV-2 pandemic has set our research back significantly, which will have the effect of delaying my graduation, so any additional funding would go a long way towards making my dreams a reality.

Thank you for your consideration for the Michigan Garden Clubs scholarship.

Sincerely,

A handwritten signature in black ink, appearing to read "Alex Kolstoe", with a stylized flourish at the end.

Alex Kolstoe

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