Madison Tian
11th Grade

Hobbies: Piano, reading, archery, video games
Clubs: Orchestra, robotics team, math club
Contest/Competition Experience or Honors: US Physics Team (2024)

Autobiography
My journey in physics started with a couple months of beginners' clarinet lessons in the summer before tenth grade. In a memorable session, my teacher explained that the clarinet can produce notes due to oscillations of different frequencies in pressure and air flow, with each note being a natural resonant frequency. Acoustics was something I hadn't thought much about before, despite playing the piano for years, but the way physics was so essential to music caught my attention immediately.

While I have long since dropped the clarinet, I did develop a lasting interest in physics. During that summer, I loosely followed an AP Physics 1 curriculum, and came away with the discovery that there was still so much I had to learn. When I finally started calculus-based physics, everything began to make sense; all the equations and variables I had seen fit together beautifully. I loved the feeling of being able to identify some of the basic principles behind what was going on in the world around me, and articulating that through mathematical relationships. I found out that a second-order partial differential equation could describe the waves in a clarinet, that Kepler's second law could be derived from the definition of angular momentum, and that yes, I did have to sit down and learn common integration techniques properly.

At the same time, I took my first chemistry class when school started. My favorite unit of the year was on electron configurations and electromagnetic waves, and I wanted to learn more about the physical explanations behind them in more depth. From there I became interested in areas of physics outside of classical mechanics, including modern physics, which I would love to continue exploring in the future.

Motivated to spend more time on physics, I began studying for Olympiad physics, starting on some harder textbooks and trying past exam problems. USAPhO problems guided me to fascinating results in areas like relativity in a really approachable way, which exposed me to topics I likely would not have attempted otherwise. I struggled with some topics, and had quite a few moments where I felt my progress had stagnated, but physics was truly enjoyable for me. It didn't feel like a necessary task, but instead something I wanted to spend my free time on, and definitely something I will continue working hard at.

I was surprised and very honored to be invited to join the U.S. Physics Team. I'm excited to take my problem-solving skills a step further, and keep on improving my knowledge. Of course I wouldn't have been able to make all this progress without support from my parents and friends, and without the help of Mr. Benn and Ms. Liu at American High School, who suggested that I give Olympiad a try; thank you all so much!