

## **William Guan**

Grade 11

**Hobbies:** Physics, Violin, Reading, Gaming, Computer Science, Kayaking, and Chess

**Clubs:** Buchholz Science Team, Buchholz Math Team, Podcast Club, Computer Oriented Mathematical Problem Solving Club

**Contest/Competition Experience or Honors:** American Invitational Mathematics Examination Qualifier (AIME) (2019-23), USA Junior Mathematics Olympiad Qualifier (USAJMO) (2022), USA Physics Olympiad (USAPhO) Qualifier (2022-23), USAPhO Silver (2022), USAPhO Gold (2023), Boston University Tanglewood Institute Young Artists Orchestra (2022), AP Scholar with Distinction, placed in Mu Alpha Theta Competitions

### **Autobiography:**

I have always been fascinated by what variables compel things to happen. The inner workings of each facet of life have always captured my imagination. When I discovered the field of physics, I felt as if I had finally found what I was looking for. I had hoped to find something that could explain every phenomena, and physics does just that.

In fifth grade, I did a presentation on wormholes after watching the movie *Interstellar*. To prepare, I read the book *The Science of Interstellar*, which introduced me to the vast world of theoretical physics. It piqued my curiosity and opened the door to my physics journey. When I was in tenth grade, I discovered the US Physics Olympiad competitions. While I was preparing for those competitions, I uncovered deep connections between numerous branches of physics. The interwovenness of these subjects catalyzed my interest. The following subjects were all intertwined: mechanics, thermodynamics, electromagnetism, and relativity.

Each one of these new discoveries captivated me, and each problem I contemplated motivated me to explore more. For example, the relation between mass and gravity in mechanics is analogous to the relationship between charge and the electric force in electromagnetism. As a result, many of the methods used to solve equations involving gravity could also be used to solve equations in electromagnetism. Relativity is also almost entirely built on concepts in classical mechanics. Connections like these that appear throughout physics are what makes the subject so exhilarating.

Now, as I delve deeper into the study of how things work, more theories become intertwined. In the past, the giants of the field put all of our knowledge of physics into one monumental equation: the Standard Model Equation of Motion. This incredibly abstract formula can, in theory, explain all phenomena associated with three of the four fundamental forces of the universe. As I approach the future, I dream of exploring the driving machinery of the universe and finally reaching the goal of explaining everything.

Finally, I would like to thank a few individuals. Thank you to my parents and the science and mathematics community at Buchholz for being ever so supportive all the time. Thank you to Mr. Frazer for creating that wonderful environment of learning. Thank you to Dr. Jie Gu for the in-depth explanations to my many questions. Last but definitely not least, a special thanks to Mr. Moody for introducing me to and teaching me physics, for organizing, proctoring, and creating opportunities to participate in Olympic physics, and for entertaining my ridiculous theories. Without these people, I would've had no chance of making it this far, so again, thank you all so much for the support.