

OXBRIDGE PERSONAL STATEMENT

Do two objects meet if their paths never cross? Most people would say no and yet over 400 years ago mathematicians took a bold step in conceptualizing imaginary numbers. A whole new dimension was added to the number system and previously unsolvable equations yielded solutions. It is the application of abstract ideas like these that draws me to mathematics. Two years ago, when my brother asked for help with maths homework based on finding Pythagorean triples, from trial and error I observed a pattern which aided the derivation of formulae for special cases when the hypotenuse is one or two units longer than the adjacent side. From independent research, I discovered that Euclid (amongst others) had derived methods for the general case. Since that day I have been more attuned to the proof of mathematical propositions.

AS Mathematics and Further Mathematics have revealed a rich variety of mathematics I had not come across before, in particular, calculus, linear algebra and complex numbers. The exposure to these new branches of mathematics has left me with tools but also questions that have driven me towards a degree in mathematics. Physics and Chemistry both depend heavily on equations to succinctly summarise the physical laws to which nature adheres. Quantum physics is an intriguing topic in AS Physics; I found the coupling of familiar mathematics to novel concepts such as wave-particle duality engaging. "Erwin Schrödinger and the Quantum Revolution" by John Gribbin describes the birth of the quantum age, revealing the paradoxical conclusions that arose from the new theory. The highlight of the book was reading about the development of Heisenberg matrix mechanics and Schrödinger's wave equation. The coalescence of different mathematical branches into one core idea resonates with me, giving me the impetus to pursue quantum mechanics as a subsidiary module in a mathematics undergraduate course.

Having the zest for mathematical proofs, I attended a FMSP Maths Conference on problem solving. The day gave me a unique opportunity to explore proof by contradiction and mathematical induction in an imaginative setting. I left the problem solving day with the motivation to read more deeply into proofs, with Martin Liebeck's "A Concise Introduction into Pure Mathematics" appealing to my intellectual curiosity. The book acquainted me with the essence of the axiomatic approach to mathematics as well as formal mathematical notation and fundamentals of set theory establishing its connections with the mathematics I often use. Liebeck's book provided me with an intellectual challenge as it is amply filled with exercises requiring ingenuity and a scrupulous mind. I found these good practice for the problem sets typically given to undergraduates.

I spend my free time playing the piano and listening to music. Classical music entertains me most because behind its impressive technicality is a subtle yet rich range of emotions. I have achieved grade five in music theory and I am working towards grade six in piano. The hours spent practising the piano convert effortlessly to the focus required to flourish academically. Furthermore, the time spent learning the musical notation and bringing musical ideas to the score have enhanced my mathematical development as my mind is malleable to different ways of expressing ideas in concise notation and relishes the intellectual freedom that both disciplines educe. In the years ahead, I see myself going into further studies beyond an undergraduate degree and aspire to contribute to future research and development in the field of mathematics.