

## The statements below should be used alongside Wadhams Personal Statement Workshop.

### Engineering

While visiting the Joint European Torus at the Culham Centre for Fusion Energy, I discovered how strong magnetic fields, radio waves and the injection of high speed neutral atoms can heat plasma to over 300 million degrees to achieve fusion, potentially providing a long term solution for the world's energy crisis. I learnt how mechanical engineering is central to managing the heat transfer; this was a key experience in my choice of course. Following this, I completed an online course from the University of Liverpool: 'Energy: Thermodynamics in everyday life', and read 'The Boltzmann Factor' by E. Brian Smith. I found it fascinating to learn how Boltzmann was able to perform pioneering research by elegantly linking the concepts of thermodynamics and entropy with simple equations, despite aversion from his contemporaries.

I actively seek ways to expand my engineering knowledge, for example visiting the precision engineering company Duckworth and Kent in Reading. There I learnt the process behind machining high quality components using computer aided design and 5-axis CNC routers, a procedure integral to modern manufacture. Another interest of mine is in how mathematical models can be applied to explain the mechanisms behind modern technology. For my Gold Crest project on silicon photonics, I explored how complex formulae can model aspects from the capacitance of electronic components to the expected efficiency of a supercomputer task. I researched the question 'Could photonics be the future of computation and data transmission in supercomputers?' while corresponding with a researcher at the University of Boston, Massachusetts. I took this further by visiting Peregrine Semiconductor who specialise in radio frequency integrated circuits, learning how they design, test and market their products. I enjoyed applying my scientific learning to a real world application. I have also completed practical engineering projects involving researching, designing, and building. I designed and built a 'Cello Chair' from flexi - plywood for my resistant materials coursework; this featured a laminated curved seat in the shape of a cello. I researched and built a desktop computer from individual components and repeated this for the school's 'Falcon' flight simulator, and I will be working with a team on the next stage by configuring monitors, software, and building a moving platform. I enjoy the teamwork aspect of engineering, experiencing university style lectures and completing group projects with other students at a physical sciences summer school at Homerton College, Cambridge, and an engineering course at Villiers Park. I also lead the school Mathematics Society, enjoying the opportunity to create presentations to pass on my enthusiasm in the sciences to younger years.

I enjoy the creativity found in arts based subjects, something I am keen to apply to the design aspect of engineering. I enjoy creative writing, winning the school poetry competition for my poem 'The Crow'. I take pride in my communication and analysis skills, shown by the essay-based projects I have done, for example receiving a 'highly commended' award for my essay 'Germany and Britain: a key alliance for the 21st century?' for the British-German association (where I focused on engineering aspects). Outside of the classroom, I lead the cello section in the school senior and symphony orchestras (at which I have achieved grade 7), organising roles within the section and advising other students. I also volunteered at a nearby Shaw Trust charity shop for 3 months as part of Duke of Edinburgh Bronze, and privately tutor two younger students after school; both of them have improved significantly.

To conclude, I am eager to pursue engineering to use my interest and aptitude for maths and physics to make a tangible difference by solving real-world problems, and believe that a degree at your university will enable me to develop the skills required to do so.

## French and Arabic

My admiration for French extends beyond its beautiful sounds to the richness of its history and culture. For my EPQ, I studied the Charter of Laïcité in French Schools and the history of secularism in France. In order to determine whether I believed it was coherent policy to ban religious symbols in schools, while subscribing to a motto of Liberté, Egalité, Fraternité, I read articles on the subject in both English and French. In addition, I am already able to read Arabic classical script as a practising Muslim. Its poetic nature can be said to have led to ambivalence and thus ideological conflicts and sectarianism. It is this enigmatic quality that fuels my desire to become fluent in the language and gain access to Arab cultures. Both French and Arabic are linked due to former colonial ties, as evident in Kiffe Kiffe Demain and Le Gone du Chaâba. I was struck by the interspersed Arabic and verlan, enriching the novels as they followed the marginalised existences of young Maghrébins and their struggles to assimilate to French culture. While our economy is losing an estimated £50 billion annually due to the lack of modern linguists, I believe this deficit also limits our capacity to appreciate other cultures. Earlier this year during Year 9 Languages Day, I helped lead a session on the Urdu language, teaching students the alphabet and basic phrases. I found it a rewarding experience introducing younger pupils to my personal heritage and promoting intercultural dialogue.

Reading Voltaire's *Candide* prompted me to consider the questions of religious morality and philosophy emerging in 18th century France. Pangloss' unrelenting Optimism is arguably a caricature of Leibniz's philosophy, as he remorselessly describes this world as the best of all possible worlds. For the Oxford 2015 Film competition, I experimented with the Alexandrine poetry style in French by writing the ending for the film 'De Rouille et D'Os' and was awarded a Special Commendation. My work experience at Salisbury Hospital's Speech Therapy department also increased my appreciation of the invaluable asset of language.

My ability in languages was illustrated when I was awarded the GCSE Latin prize. Currently studying AS Latin off-timetable has been a challenging experience yet has rewarded me with a framework for analysing languages. I additionally enjoyed being part of the Southampton University e-Mentoring Languages Scheme, during which I was able to talk to a current French undergraduate. My travels too have strengthened my affinity for languages. My recent visits to Paris and Marrakech have given me the opportunity to discover new cultures. Following my stay in Morocco, I subscribed to *Gazelle*; a 'Magazine de la Femme Maghrébine'.

I value art in a similar way to how I value languages as I believe both have the capacity to communicate powerful messages. Art predates written scriptures by 26,000 years giving insights into unimaginably distant civilisations. Political, revolutionary and religious ideas have always been conveyed through art, from the Lascaux Caves to Manet's controversial *Olympia*. My drive for academic success runs alongside my commitments outside of my studies such as playing the clarinet. Throughout the school I have been asked to fill multiple positions of responsibility. As a Year 7 Prefect, a Senior Academic Mentor and now a Senior Lower School Prefect it has been a rewarding experience supporting younger students and assisting at school events. These roles have developed my leadership and organisational skills and have allowed me to learn essential communication skills when working as part of a team. It was also imperative to communicate well when speaking to a large audience for a Student Voice conference at Exeter University. With my cultural and linguistic interests in French and Arabic I am excited for the opportunities offered on a demanding yet fulfilling degree course.

## Biochemistry

My first exposure to the concept of genetic disease was whilst doing work experience at a deaf school. I found it incredible that the assortment of four bases could have such a tangible effect on health and development. This sparked my curiosity in the theory of genetic mutation, and was my first introduction to Biochemistry.

Attending the Eton Universities Summer School taught me many new concepts and experiments relating to biochemistry. During a lesson, I inserted genetically modified pGLO plasmids into E.Coli. The plasmid contained a gene coding for green fluorescent protein, controlled by the Arabinose operon. While learning the underlying theory of the control system, I was drawn to the Lac Operon. I found it paradoxical how something as simple as bacteria could evolve such an intelligent system as the CAP/Cyclic AMP complex for preferentially choosing glucose as a metabolite. The practical helped me to understand the importance of experimental data in creating and learning about new scientific theories. This, in part, is what drives my ambition to participate in research after my degree.

Wanting to learn more about genetics, I read *The Selfish Gene* by Richard Dawkins, but instead found myself immersed in his chapter on ageing, and the Medawar theory of late acting genes. While it is true that selective pressures to remove late acting genes from the gene pool are few, I couldn't imagine how conditions could exist that would only express genes late in life. I instead aligned more with the free radical theory of ageing, explained by Nick Lane in his book, *Oxygen*. By reading another of his books, *Power, Sex, and Suicide*, I learnt more about the mechanism of this theory, and the role of free radicals in intracellular signalling and gene expression. Maybe the late acting genes Medawar spoke of are normal genes that are periodically expressed in cell function; when the cell is under long term oxidative stress (i.e. from an electron leaking transport chain) the genes' transcription factors could be oxidised, resulting in their continuous expression. The altered proportions of proteins produced could then have a detrimental effect on cell function, and contribute to ageing. While this may not be correct, reading Nick Lane's books gave me a new perspective on the mechanics of ageing, and opened my mind to a theory that I hadn't agreed with previously, by contextualising Medawar's theory.

While reading *A Very Short Introduction to Molecular Biology*, I was struck by a segment on regulatory RNA molecules. I was particularly fascinated by the concept of RNA used in the regulation of gene expression. This led me to a Nature article about Riboswitches: RNA molecules that can bind to a ligand and change their physical conformation. This happens in the expression region of the riboswitch, and determines whether the RNA is transcribed or not, i.e. by forming hairpin loops, or cleaving itself. In this way, RNA can control itself using a system that is both simple and immediate. Taking biochemistry at degree level would allow me to learn more about cell function and control, but would also let me explore the full breadth of the subject, by using chemistry to explain biological processes.

Taking Further Maths has helped my ability to think both logically and analytically, which is particularly useful when I am introduced to new concepts in both my reading and A-Level studies. These skills have also helped me to achieve a silver award in the UKMT Senior Maths Challenge. I particularly enjoy statistics, and the perspective it brings to Biochemistry. Correlating physical conditions to gene mutations can bring us an insight into the role a gene plays in an organism.

Outside academia, I enjoy reading, playing hockey, and taking part in drama productions, both on and off stage. I want to study biochemistry because it offers both an explanation of the way that we as people live and breathe, and an understanding of microscopic worlds.

## Classics

Classical literature has preserved the history and society of the world that they have come from. Most notably, the connection between drama and society is what I find most intriguing. From Aristophanes' *Lysistrata* which seems to serve as a criticism of the ongoing Peloponnesian War, to Homer's *Iliad*, which portrays conventional ideas of masculinity and heroism.

The recent revival and reception of Greek Theatre shown in The National Theatre's production of "*Medea*", as well as The Barbican's production of "*Antigone*", for me, shows the approachability of this subject. Having written an undergraduate level essay with The Brilliant Club, in which I gained a First and explored how Shakespearean plays have been translated into film, I have identified that it is the message that the playwright is trying to convey that enables a work to become timeless. This seems to be true for Greek Tragedy, as it is its articulation of fundamental themes that are still key to our societies, such as relationships and human suffering, that enables it to transcend both cultural and temporal boundaries. For example, Euripides' focus on the victims, rather than the victors in "*Trojan Women*", gives a poignant insight into the aftermath of war and the way in which it affects communities.

I am interested in the way gender is portrayed in classical literature - particularly Greek Tragedy's strong feminine element. Attending lectures delivered by Professor Edith Hall that focused on women in tragedy, as well as lectures by Dr Felix Budelmann at the Oxford Pathways Study Day, which compared the works of the female poet Sappho and the male poet Anacreon, stimulated my love for this area. Of particular interest was the enigmatic life that Sappho is said to have lived which the documentary "*Sappho: Love & Life on Lesbos*", heavily discusses, as well as differences between the ancient Greek concept of homosexuality and our own.

By studying a non-classical subject such as English Literature, I can see how the ancient world is interwoven into contemporary literature, from Shakespeare to F Scott Fitzgerald. Studying postcolonial literature at A level and coming from a Nigerian background, it is clear to see the influence of Classics, especially in the reworking of classical literature by Afro-Caribbean writers. This is exhibited in Wole Soyinka's interpretation of "*The Bacchae*", which incorporates African oral traditions, as well as having a second chorus of slaves to mirror the civil unrest in Nigeria. I find this particularly interesting as it shows the reception of Classics in the non-Western world.

Having the opportunity to study a complex and unique language like Mandarin Chinese for 7 years has allowed me to travel to China and perform traditional songs at the Confucius Institute. It has also shown me how important the language is in understanding a country's history, and that a language cannot be learned in isolation. Travelling to Harbin, and attending daily language lessons was a challenging experience, especially being in an environment where my language proficiency was frequently tested. Experiencing China's distinctive lifestyle has given me a strong appreciation of another country's culture, which I think is essential in studying a language, as well as the ancient world. I hope my scoring 100% in my Mandarin and Spanish GCSE papers sufficiently demonstrates my ability to grasp languages. Also, studying Latin for a year, as well as having beginners Ancient Greek lessons at the Wadham Classics Summer School, shows my passion to study the ancient languages.

Outside of the classroom, I enjoy participating in different sports such as netball, yoga and Chinese martial arts. Balancing my work in school as a language and student council prefect, as well as working part-time, has greatly improved my organisational skills, as well as teaching me how to properly arrange my time. I look forward to applying these skills at university.