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UROP – Summer 2020 (undertaken in the Dept of Mathematics)

A Perspective: Stability of fluids

How my motivation of doing the UROP

My whole life has revolved around Mathematics, studying it at University however has made me develop a desire to seek an analytical truth to deeper scientific questions as well as wonder how I could use my genuine passion in order to improve people's lives. This is what motivated me to direct my ambitions towards this programme.

More than that, this was going to be a great chance for me to work alongside some of my university's academics and actually encounter the world of research, enabling me to get a taste of an academic career while building strong professional relations beneficial for possible future research as a postgraduate.

How I secured the placement

I started thinking about doing an UROP during the first term of my 3rd year, but I was not completely sure about the topic I would like to do research in. However, having Dr. Andrew Walton as a lecturer, I came to the realisation that Applied Mathematics truly is the core of many real-life processes, the acknowledgement of its applications being essential. Being intrigued by his examples during lectures, I was curious to find out more about his work in fluid dynamics leading me to organise a face-to-face meeting which proved decisive for what I would like to work on.

Skills and experiences gained from undertaking the UROP

This UROP introduced me to the field of Fluids Stability as I have had no previous knowledge of this topic. I personally believe that further study is the best way to acquire knowledge because you do not just learn an established material or concept, but you also stimulate both, your creativity and intuition. As my project consisted in determining the stability of various flows and seeking numerical results by using Python implementation, apart from the knowledge gained, it gave me the amazing opportunity to become confident in using this programming language.

More than that, working with the help of a PhD student and under the supervision of Dr. Andrew Walton, I had the chance to work in a research group, learning how to seek of help, where to look for relevant information, how to communicate my findings and eventually build on someone else's work as well.

Problems I encountered and how I resolved them

Towards the end of the project, after managing to find similar results to a research paper, I tried deriving similar results for a different type of flow. The difficult part was the fact that apart from true eigenvalues that were generated in my implementation, some false ones were appearing as well. I had a difficult time trying to apply some conditions and get rid of them.

How it might influence the remainder of my course and my future career pathway

After this UROP I feel a lot more experienced in applying my mathematical knowledge in an applied context. At the end of this experience, I feel inspired to pursue a career in the research field, wanting to do a PhD and continue my studies after my degree.

Additionally, I would like to thank Dr. Andrew Walton for making this very interesting eight-week placement possible for me and giving me a helping hand at any point during its duration. I am very grateful for the continuous guidance of Dr. Walton's PhD student as well, because without her pieces of advice nothing would have been possible.