

UROP: Undergraduate Research Opportunities Programme

A Personal Perspective by Cristian Ciuca

Cristian had just completed the second year of his undergraduate degree in Aeronautics, and embarked on an UROP research experience in the summer of 2015 under the supervision of Prof Silvestre Pinho (Department of Aeronautics).

Placement Title: Modelling of Reinforced Sandwich Composites

My initial reason for joining the UROP scheme was brought about by my desire to work with my personal tutor, Professor Pinho. His advice, given to me during the course of my first two years of study, helped me develop my work ethic, as well as better adapt to my new environment and learning process. This led me to believe that I can learn a lot more from him, so I sought to secure an UROP placement under his guidance. When I approached him with the idea, he was more than open to it, suggesting that we build together a strong application to secure some of the funding opportunities available on the UROP website. After we had agreed on the project, its duration, the start and end dates, and completed the application process, everything was set to go.

The underlying motivation for my joining this program stemmed from the wish to gain an insight into the world of research. This was due mostly because of the fact that I was considering pursuing a PhD at the end of my undergraduate studies. I particularly enjoyed a course in numerical methods I took in my second year, which led me to seek a project related to the field of numerical methods applied in engineering. I found exactly what I was looking for with my project related to the modelling of reinforced sandwich composites, which did not only help me understand how numerical methods are applied in engineering, but also expand my knowledge related to the mechanical behaviour of composites.

The preparation I undertook before the start of my project spanned two weeks and involved getting familiar with: Abaqus, Python scripting for Abaqus, Object Oriented Programming (OOP), the mechanical behaviour of composites, Shell Theory, and the mathematical background of the periodic boundary conditions involved in my project. The placement was very challenging at first, but really rewarding once we started obtaining the results desired. Overall, it was a great learning experience which helped me in various ways.

Firstly, the project helped me give practical sense to some of the theoretical results learned so far in my studies. Moreover, through this project I have expanded my knowledge in mechanics, structural analysis, composites, and programming. I have gained the desired insight into the world of research. So far, in my studies I had only worked on problems which already had solutions, but now I had to tackle a project where there were no already known answers, a task which I found challenging, but fascinating. What is more, through the help of the weekly meetings I learned to clearly express the results of my work, and have benefited from the necessary guidance when tackling such a project.

Secondly, having worked together with a Masters student on this project helped me improve my teamwork skills, while seeing how my personal tutor managed his research team gave me good insight into team leading. Having to present my progress and my struggles weekly, contributed greatly to my communication skills, while having a clear outline of the project, its objectives, and the timeframe from the beginning, helped me to better organise myself.

After the conclusion of this project, I am even more inclined to pursue a PhD at the end of my undergraduate studies, focused on numerical methods applied in engineering. I found the research field to be even more interesting and demanding than I have previously imagined, and overall I found the UROP experience to be very rewarding and satisfying. Thank you for the opportunity!