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Year 3 (2020-21): MEng Molecular Bioengineering

UROP (Summer 2021) undertaken in the Dept of Bioengineering

UROP title: Metabolic engineering on yeast for eco-friendly dye bioproduction

I first met my supervisor, Dr. Ledesma-Amaro, and started being interested in his research in synthetic biology and metabolic engineering last year, at the beginning of my 3rd year of MEng in Molecular Bioengineering. Indeed, I decided to take his elective module "Industrial applications of cellular engineering", which included workshops aimed at working on market strategy and start-up development for a new metabolic engineering-based technology. The research on sustainable textile dyes bioproduction that I conducted as part of my UROP started as a group project in the workshops framework of the module and subsequently resulted in Dr. Ledesma-Amaro offering me a summer internship in his lab.

I was, in general, interested in doing a research-based summer internship/UROP because I am considering a career in research and I am currently in the process of applying for PhD positions and further graduate studies. However, I felt a particularly strong interest towards this specific project because of my involvement in its development since day 1 and because I recognise the always growing importance of the field of synthetic biology.

The majority of the preparation for the UROP happened in December, during the workshops. Particularly, the aim of the latter was to find a potential use of metabolic engineering to develop a technology to patent and eventually commercialize. This first period of research was crucial to understand what had been done already and what was already on the market, what were the commercial possibilities and broadly define the pathways and specific host that we were interested in. This examination was then my starting point when I finally commenced my UROP in June and planned out the lab work that had to be carried on .

The skills that I got to learn and improve in my 8 weeks of UROP are basic and fundamental (synthetic) biology techniques (such as Golden Gate Assembly, MiniPrep, PCR, Digestion, Ligation, Transformation ,…) that are quite transversal competences in the lab. Particularly, the advantage of now being more confident with such techniques is that it will be possible for me to use them on bacteria, other yeasts, plant or animal cells with just minor adaptations. This is extremely important for me because it might increase my chances of having a strong PhD application in the animal research field, in which I am particularly interested.

Throughout this UROP I think that the most important thing that I learnt is that research is long and requires a huge amount of time. Obviously, I expected it; however, there is nothing like testing it out to fully comprehend the extent of it. This influences greatly my timeline for my 4th year thesis project, which I am now planning on starting anticipatedly to save time and be able to obtain as many results as possible. Additionally, this UROP confirmed my desire of continuing my pathway in education and research before potentially dedicating to industry.

Finally, it is important to mention that the pandemic partially impacted the research, as the lab space was restricted to guarantee full compliance with the COVID regulations. However, I believe that it was also Brexit, on top of COVID, that caused delays in our timeline due to constantly postponed delivery of the necessary genes, primers and reagents.