



Maria-Elisenda Alaball Pujol is a PhD candidate in the van Nimwegen group at the Biozentrum, University of Basel. Her research project is about quantifying the responses to antibiotic compounds at the single cell level using microfluidic devices. These are hand size chips with channels or chambers where fluids and gases can flow at a very small scale, in the range of micro- or nanometers. Because microfluidics work on such a small scale, the interactions between bacteria and antibiotics can be observed and manipulated. For her project, Maria-Elisenda is both creating new microfluidic designs in order to test several antibiotics and bacterial strains at the

same time, and performing microfluidic experiments. In the experiments, she exposes bacterial *Escherichia coli* (*E. coli*) cells to antibiotic treatments, acquires time-lapse microscopy images and then she analyses these images to extract single-cell information. Maria-Elisenda can then analyse this data and quantify how cells respond to the treatments and if their physiological and gene expression state before, during and after the treatment gives information about whether a cell will survive the treatment or not. The goal is to better understand why antibiotics are not always effective against disease, in this case *E. coli* infection.

Maria-Elisenda was born in Barcelona, Spain, where she did her undergraduate studies in Biomedical Engineering at Universitat Pompeu Fabra. In her third year, she became interested in Synthetic Biology, and did an internship and her bachelor's thesis in Parc de Recerca Biomèdica de Barcelona (PRBB). She then moved to London to do an MRes degree in Systems and Synthetic Biology where she did her thesis research at the London Institute of Medical Sciences (LMS).

Since she was little, Maria-Elisenda loved both science and art. While she decided to pursue a scientific career, outside of work she likes to continue painting, singing, and taking photographs, both digital and film. She also loves travelling and discovering new places and cultures, and she speaks Catalan, Spanish, English, a bit of French and is studying German.

An interview with Maria-Elisenda Alaball Pujol:

The biggest challenge facing women scientists today is...

...regardless of gender, being a scientist is hard. I think that while women are still underrepresented in academia, especially in higher positions, this happens in society in general. There is more and more effort put into bringing awareness and encouraging women to pursue science. Nevertheless, I think this should not be forced, and scientists should be valued for their work no matter what their gender or ethnicity is or where they come from. I hope for a society that brings equality and where we do not need to ask questions such as this one.

I chose a scientific career because...

...ever since I was little my favourite courses were Maths and Science. My family tells me that I have always been curious and asking the why of everything. Even though I like both science and art, before my bachelor studies I was taking engineering-related courses. When it was time to choose a bachelor program, I was indecisive, as I wanted to apply Maths and Physics to something, and then I discovered Biomedical Engineering. Throughout the four years, I was more interested in the Biology side than the medical one. I met other people doing PhDs, and as I learned about their research, I

became interested in working with genetically modified bacterial cells, as well as modelling its behaviour.

If I weren't a scientist, I would be...

When I was younger, I had lots of ideas of what I wanted to be, always thinking of ways of combining several jobs that I liked. For a long time, I wanted to be an archaeologist, as I have always been interested in the ancient Egyptian culture. But I hardly see myself becoming anything else than a scientist now.

What I like most about being part of the NCCR AntiResist project...

... being part of such a project that brings together many people coming from different backgrounds and specialised in different fields and techniques. It is great to be able to collaborate between groups and discuss the different approaches with all the experts.

A typical day for me working on the AntiResist project looks like...

When I arrive at the lab, I turn on my computer, look at my notes and start the day. I mainly work in the lab - in the microscopy room doing microfluidic experiments, but the image analysis and the data analysis I do on my computer at my desk. If I have to do experiments, I usually check the cells I have prepared the day before to start the experiment, or prepare the following one. For lunch we gather with the group and go outside if it is sunny. After work, either I meet with friends or I go home, read, and listen to music and prepare for the next day!

What I am most proud of...

...to be where I am right now. I never would have imagined that I would have finished my bachelor, done a master degree in London and then moved here to do a PhD. And, I am proud to say that I did it by myself, and whatever happens next, no one can take that from me.

Do you/did you have a mentor or role model who inspired you to pursue science?

Not really, I have always been surrounded by lawyers in my family, so I am the black sheep there. I started having role models in science when I was in high school. I really liked one of my teachers who studied medicine and engineering. Then during my bachelor studies, I looked up to the two PhD students who were supervising my project. We really got along and were very similar, and they encouraged me to do a master degree and continue in science.

What is your wish for girls studying science in school today?

That they continue fighting for their dreams, that if it is what they want to do is going to work out. I hope that there will be less and less prejudice and more women in high positions in academia who they can look up to.

If you could talk to your 15 year-old self, what would you say?

To not be afraid and to believe in myself. That even though it might be hard sometimes, it is worth continuing and fighting for what I want.