# Working as EngD student at...

Hi everyone! My name is Pleuni Lodiers and I used to be a Biomedical engineering student like most of you. During high school, I mostly liked the beta subjects and human biology. After visiting a lot of orientation days at different universities and attending maybe even more student-for-a-day programs, I decided the TU/e and biomedical engineering would be a good match for me. In 2015, during my first year as a student, I still lived at home with my parents, but I did want to meet more new people. Therefore, I decided to join the sports committee at Protagoras. This turned out to be a good choice and at the end of my first year, I moved to Eindhoven to live in a student house. Additionally, I started to participate in even more committees like organizing the prom, creating the first-ever almanac, and to top it off I joined the lustrum committee. As a result of meeting all these nice people, I decided to do a board year at Protagoras during my fourth year while finishing my last two bachelor courses. I became responsible for the finances and the lustrum year.



### **Study direction**

Taking a step back from my studies for a year, helped me in deciding which direction to choose for my master's degree. I realized I mostly enjoyed the courses where I learned to apply mathematics and physics to model human physiology and mechanics. The best match for me was the cardiovascular biomechanics group, led by Frans van de Vosse. Because of Covid uncertainties, I decided to switch the order of internship and graduation project and started with the latter in 2020. I worked on the Perinatal Life Support project and created a computational fluid dynamics model to learn about the blood flow in the umbilical cord. Reaching the end of my graduation project, I had to find an internship. However, the option to go abroad was still uncertain due to Covid. Realizing that until now I only had experience with research and not with the industry, I decided that doing my internship at a company in the Netherlands would be a good opportunity. I found a project at Demcon that I carried out for their client Haermonics, an Eindhovenbased medical start-up. Haermonics is developing a device to apply flush therapy to prevent complications caused by blood clots after open heart surgery. The pictures give an impression of the working principle and the investigational device that is used in a clinical trial.



### **Career choices**

During this last phase of my study, I started thinking more and more about the next step in my career. This internship was still quite research-oriented, but I really liked the fact that my findings contributed to a real medical device which cardiac patients would benefit from. At first, I thought that a PhD would be the best option to do research-oriented work since R&D positions often require work experience. I started looking for PhD job offers but also realized that I would have to really like the subject to work on for four years. During this period, Haermonics also got in contact with the University to learn more about the EngD track to become a Qualified Medical Engineer (QME).

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## Haermonics

They decided to hire someone to join the Haermonics team that would follow this post-master trajectory. After several conversations at Haermonics, the TU/e, and the QME alumni/trainees, I found out that this would be the perfect opportunity. During my internship, I had already discovered that I enjoyed contributing to the development of a medical device by applying my biomedical engineering skills. On top of that, the QME track would guide me and teach me more about medical product design.

### **EngD Qualified Medical Engineer**

When I talk to friends and family about my work, I often get the question of what I do as an EngD student. Most people have a good idea of what a PhD entails, but the EngD is less common. The big difference is that a PhD is research oriented and takes in general four years. An EngD however is a two-year design course. The goal is not to become a researcher but to get a position in the tech industry or healthcare. In the case of Qualified Medical Engineering, you work on improving healthcare processes by using medical technology.



From day one you start working in healthcare or a medical company, where you work on your big design project, worth 60 ECTS. The difference with a master's graduation project is that you go through the entire design cycle up to implementation and evaluation, instead of focusing on a research question. On top of that, you follow courses organized by the TU/e which focus on topics divided into three domains: design skills, professional skills, and QME domain knowledge. You follow these courses together with the other trainees and afterward. you often apply the topics in an assignment at your own company. The courses combined are approximately 30 ECTS. You also spend a few months (15 ECTS) at another hospital/company for an external project to broaden your experience. Because the QME track focuses on defining your own learning goals, there is an additional 15 ECTS that you can divide over mini projects, elective courses, visiting conferences, etc. As long as you can link this to your own defined learning goal, you are relatively free to create your own training.

#### My experience

I really enjoy the combination of learning design topics in courses and immediately applying and experiencing it in practice. This way, I quickly learned that there is more than only the technical aspects when developing a medical device. An important aspect is the analysis and evaluation of risks and benefits. Even more important are the laws and regulations you must comply with to get a new medical device to market. The advantage of working in a start-up is that you get to know almost everything that is going on in the company and not only the technical development. The group of trainees is also a second group of like-minded people with whom you can discuss specific topics concerning the QME track. And on top of that, it is also very nice and often 'gezellig' to take the courses together and see each other almost every month.



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