

Dear Lugians,

My name is Wouter Mulder and I used to do the track Production Technology & Logistics within the IEM master. At the time there was no specialization within this track which allowed me to choose subjects from a broader range. Nevertheless, I would like to inform you about the Design Project and Research Project that I chose to do.

Whereas there is no fixed order in which you have to do these projects, I think most students do their Design Project before they do their Research Project. The Design Project can be regarded as an internship at a company in which you perform tasks at this company but are assessed by the university in the end. The Research Project on the other hand is carried out at the university and usually requires you to do research into a specific topic. The combination of these two projects make that you end up familiar with both the practical implications of what you've learned (Design Project) and to dig deeper into the theory of it (Research Project).

Let's cover the projects that I've done in chronological order, starting with the Design Project. When looking for a Design Project, you have to get out of your comfortable University of Groningen environment and reach out to companies that might offer internship positions to students. It is recommended to check the requirements that the University sets on a design project and keep these in mind when looking for and discussing an internship position. Next, you want to contact the person in charge of the Design Projects and ensure that your project is in line with guidelines set by the University.

For me, the Design Project was an opportunity to leave Groningen behind for several months and discover what living abroad means. As such, I looked for opportunities to do an internship abroad. The quick and easy way to do so is to contact one of the organizations that are familiar with placing IEM students abroad, which I did. I communicated my desire to do an internship in South Africa with the UNSA (Uitwisseling Nederland Suid-Afrika) and they arranged many things for me including the internship, a place to stay and a car. If you are interested in doing a Design Project abroad, I would recommend to check the organizations that facilitate this and have prior experience with IEM students. Alternatively, you can contact students that did their Design Project abroad and ask for contact information of the company.

My project was carried out at Tubecon, a producer of steel tubes and profiles. At Tubecon, I looked into the costs that were associated with roller bearings and aimed to reduce these. This included many tasks ranging from setting up meetings with bearing suppliers to assisting the operators at the machines. Although I missed the academic aspect of things, I liked to actually add value to an organization and solve real problems.

After finishing my Design Project the only thing that stood between me and my master's degree was the Research Project (and a single course that I failed the first time). The Research Project started with an exploration phase in which I send mails to several professors asking if they had suggestions a possible subject for my Research Project. Since I usually started to regret the subject I had chosen during projects, due to an absence of relevant literature or irrelevance of the subject itself, I was glad to see the willingness of professors to hand me directions for a subject.

During the meeting with Claudio De Persis, I was handed three possible topics for a design project. I decided to choose one of these and as such my Design Project topic became: 'Resilient Self-Triggered Consensus'. To you this should sound as confusing as it did to me the first time I encountered it.

This topic was handed to me along with a few papers that might serve as important resources for the duration of the Design Project. I really enjoyed that the topic and several sources were suggested by a professor and that how I wanted to carry out the research was completely up to me.

The task of the design project was pretty straightforward, attempting to design a Resilient Self-Triggered algorithm. Claudio De Persis had published a paper in which he introduced a Self-Triggered Consensus algorithm, a specific type of algorithm that smart agents can use to reach agreement. It was up to me to explore options to make this algorithm resilient that is to adjust it such that it still performs when some of the agents do not cooperate and try to prevent agreement. I read lots of papers on the subject to come up with ideas that I would write down mathematically such that I could run them in simulations and attempt to verify them mathematically. This might all sound confusing but keep in mind that you spend months full time on this single project which allows you to really dig deep into the subject.

Since Claudio De Persis is one of the members of the 'Smart Manufacturing Systems' research group, my research was connected to this group. The advantage of this is that at the time I understood my subject and had some idea about what I wanted to do, I was assigned a PhD student (Danial Senejohnny) I could turn to for questions. I greatly appreciated his assistance and the many discussions we had about the algorithms in development.

In summary, I enjoyed both projects. The Design Project was as practical as the Research Project was theoretical and it is this combination of these extremes that I liked. My advice for the Design Project would be to initiate contact with companies and maintain a close connection with the university to ensure that the project meets the university's requirements. For the Research Project I suggest to ask professors about potential research subjects. This can be done the way I did, after finishing the courses, but you might also come across something interesting during a course.

I hope to have given you some inspiration regarding the two big projects at the end of your IEM master. Good luck in choosing your projects!

Kind regards,

Wouter Mulder