The beautiful thing about The Faculty of Architecture and the Built Environment is the wide range of niches that can be studied. My master’s program started with architecture but I started to feel increasingly uncomfortable with the scale levels and academic position. I simply could not find the right answers to what I wanted to learn.

That is why I switched to Building Technology, given the more focussed courses on research and technique. Also the focus in the design projects was more on the development instead of the conceptual drive behind it. This (design) project is part of the “Sustainable Design Graduation Studio” but it could also be seen as a graduation project of Industrial Design Engineering. This is since the output of the project is a new type of acoustic component: in this case a lamp that has acoustic properties.

There is in this project a strong correlation between design and research, since the knowledge on the combination of additive manufacturing and acoustics is less than 10 years old. Furthermore the direction in which I am going has never been done before, that makes the overall process challenging. It was quite difficult to create a research approach at the start, around P3 I had to make some adjustments to create a more feasible outcome. For example, I wanted to create a full scale prototype but given some delays with 3D printed samples and an additional reverb chamber measurement this became impossible. Regardless of my own planning every new input is valuable information given that my graduation project is part of the ADAM project: Acoustic Design by Additive Manufacturing.

One aspect I find very valuable is the relation with practice, this is why I have chosen to make an integral design for a product. I have, on the other hand, no illusions that producing a product by means of 3D printing, is still far away from reality. Just the price point of 3D printing as a production method is high and in the majority of cases the cheapest alternative is chosen. On the other hand tailoring a product from an acoustical point of view to a space is very new and unique. There are in this case two sides to this story. This degree of uniqueness is however a strong selling point of acoustic products that are made with additive manufacturing.

Sustainability is an increasingly important aspect of any design and during the years that I have spent studying sustainability has become something that you design with instead of design for. In this case sustainability comes from the minimal use of material and production time. The design is in essence performance driven, meaning that the shape comes from a series of optimizations. Acoustically by an evolutionary algorithm and physically by a closest packing operation. The material in question used for printing is PA12, which is a polymer. At first glance one would say that a polymer can be easily recycled and used again for printing. Unfortunately this is not the case, because radiant heat from the laser affect the polymer particles just enough so that they are unusable. Despite this downside the choice for this material was made because of the surface finish, mechanical properties and self-supporting nature of the printing technique. Unfortunately experiments with other more reusable and less wasteful material where not carried out, this is indeed a topic that of value for a future graduation student or possibly within the ADAM project itself.

To conclude I would like to reflect on my personal process while developing this thesis. There is an unwritten rule amongst students that in every graduation project one will hit a dead end or remain on a plateau for too long. Of course this happened to me as well, to be exact, when I was running simulations in MatLab after the feedback from Materialise (partnered commercial AM firm) that the geometry of the prints that I submitted was too small and complex to print. This led to revised simulations with outcomes that where totally unpredicted and unfavourable. I truly wanted to figure out why suddenly everything stopped working. The optimization in MatLab, the simulations but also the design became jeopardized since the geometry needed to become larger by a serious amount. This was my plateau and looking back at this period I wished that I sought help sooner to proceed
the development of my project, because I have the feeling that I have thrown almost 3 weeks down the drain. It bothers me because the period after, the last month before P4 I created a lot of qualitative content. It makes me curious what I could have done more. I did not ask for help sooner, because I wanted to “fix” it myself. Next time a similar event occurs during my professional life I will certainly remember this period and ask for advice.

Lastly I would like to thank my motors Martin Tenpierik and Michela Turrin. Not to forget Foteini Setaki as external specialist. Martin for his seemingly endless sea of knowledge, there was always a paragraph in a 800 page book that he read that was of value for my graduation. Michela for her analytical approach to break down problems and academic attitude. Foteini for the impulsive tutoring sessions with fresh insights. This was of great value to me.

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