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Letter of motivation for the M.A. Design & Computation

Dear Admissions Committee,

My name is Antonia Mühleck, I am writing to express my keen interest in the Master's program *Design and Computation*. I completed my Bachelor's degree in *Sustainable Systems Engineering (SSE)* at the University of Freiburg in Spring 2024. SSE is an interdisciplinary engineering program, and during my Bachelor's, I enjoyed the variety it offered. However, over time, I've realised that I'm drawn to an even more diverse and interdisciplinary environment.

Growing up as the daughter of two art teachers, I was raised to appreciate the value of creativity. In school, I enjoyed a broad mix of subjects, especially Fine Arts, Maths, Physics, Literature, and Politics. When it came time to choose a Bachelor's degree, I remember that it was difficult to focus on just one area. I decided to study engineering because I wanted to deepen my knowledge of maths and physics—subjects I felt would be harder to continue exploring purely as hobbies.

I wrote my Bachelor's thesis in the chair of "Systems Optimisation and Control" in the field of Airborne Wind Energy. The term "airborne wind energy" describes a technology that uses tethered flying devices, such as kites or drones, to harness wind power at higher altitudes where winds are very strong and consistent. The title of my thesis was "A dynamic wake model based on vortex rings for airborne wind energy systems". The goal was to develop a computationally cheap yet accurate wake model for kites that could be used in trajectory optimisation. I continued working on this project after my thesis and got the opportunity to join the Airborne Wind Energy Conference 2024 in Madrid. This was a very exciting experience and also my first step into the "research world".

The conference in general, but also one specific moment, showed me that there is currently a big need for interdisciplinarity in research. In a talk given by one of the organizers, the speaker described the social challenges involved in climate action. He then asked all engineers in the audience to raise their hands,and the entire audience proceeded to do so. Out of the remaining hands, one was from a psychologist, actively conducting research on the social acceptance of airborne wind energy. The others were investors. Of course, it makes sense that the community working on a new energy technology mostly consists of engineers, but the challenges that come with developing and establishing such a new technology are spreading across multiple disciplines.

During my Bachelor's it became increasingly clear to me that climate change is now much more a political and social challenge than a technical one. The technical solutions are mostly developed; we "just" have to implement them. To accomplish that, a close connection between the technical and social/economic disciplines is needed. For engineers, I believe that understanding the political and economic context within which we work is crucial, because it helps ensure that technical solutions are feasible not only on a technical, but on a *socio-technical* level.

This, of course, also goes the other way around, as social scientists or policy makers should also have a basic understanding of the important technologies. Only if the challenges and possible solutions regarding climate change are understood by a majority of society will we be able to successfully fight it. Therefore, I believe that the communication of science and technology is equally crucial. One specific goal or idea for a project I would like to follow during my Master's is scientific communication through short-form content on social media platforms like TikTok or Instagram Reels. I'm particularly keen on understanding the psychological mechanisms behind these formats and how they might be leveraged to make complex and often overlooked topics, such as heat pumps or energy kites, more accessible and engaging.

As a concrete project idea, I think it would be very interesting to develop short-form videos in a collaborative team setting. Ideally, this team would bring together both people with technical knowledge and people with diverse backgrounds, for example in psychology and marketing, who can contribute insights into how to capture and hold attention in these fast-paced digital environments.

A more general topic that I would be interested in following during my Master's is Systems Theory. I developed a strong interest in this field during my Bachelor’s, and I am keen to expand my knowledge in this field and also apply what I have already learned to both technical and non-technical systems.

I have always been a person with diverse and interdisciplinary interests. Seeing that there currently is a big need for people with an interdisciplinary skill set motivates me to explore the Design & Computation Masters. I believe that this program presents the perfect opportunity for me to apply my diverse background to explore current research problems. Thank you very much for considering my application.

Kind regards,
Antonia Mühleck