

Statement of Motivation

Georgia Institute of Technology – Georgia Tech

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I decided to study computer science during an internship at the Fraunhofer Institute for Communication, Information and Ergonomics (FKIE) in 2011. I learned programming during school and gathered some early experience in a two week internship at FKIE in 2009. During the internship in 2011, I could improve my programming skills by developing a simple web application for database access. In the end I was absolutely convinced that I wanted to study computer science and it was one of the best decisions in my life. I am passionate about computer science because it is versatile, elegant, simple and interdisciplinary. Computer science offers both the depth of theory and the most interesting applications of today's world.

I chose RWTH Aachen University for my studies as it is one of the most challenging universities for technology in Europe. Due to my programming experience, the courses in mathematics were the most demanding ones and, thus, interested me most. Therefore, I enrolled in a bachelor degree in mathematics in addition to my degree in computer science.

I want to pursue an academic career in machine learning because the idea of machine learning inspires me. Considering the number of operations per second, a state-of-the-art computer is a lot faster than the human brain. Nevertheless, we are able to perform tasks a computer has immense difficulties to perform – for example recognizing faces and facial expressions or understanding human language. Such tasks cannot be formulated as algorithms. We learn to perform them based on experience and prior knowledge. But how to teach a computer to learn? – This is the problem I want to solve.

My current coursework focusses on machine learning and its applications. The lectures “Machine Learning” and “Computer Vision” by Prof. Leibe combine the theoretical background of machine learning with its application in computer vision. Data mining offers another interesting application of machine learning concepts. In addition, I am writing a seminar paper on neural networks and their application in pattern recognition. Two courses on numerical analysis by Prof. Dahmen, which I took during my mathematics minor, form a solid background on numerical computations which is useful in all areas mentioned. I plan to write my bachelor thesis on a topic in the area of computer vision. Possible topics include support surface detection and semantic segmentation based on depth information using superpixel approaches.

Beneath challenging coursework, teaching is another demanding and yet fascinating task. This semester I am tutoring a group of first year students in a course on basic calculus. I enjoy teaching as it gives me the opportunity to pass on my knowledge and to inspire young students. Moreover teaching mathematics requires a profound understanding of the mathematical way of thinking and a lot of creativity concerning the way of teaching. In my opinion, teaching is a valuable experience for all students planning to pursue an academic career. It is important not only to generate new knowledge but also to pass on this knowledge to future generations.

Therefore, I am eager to study abroad and to experience different approaches to teaching on university level. Differences in culture, language, as well as politics may have great influence on the teaching culture. I expect this experience to be of great value both for future teaching appointments as well as for my personal studies.

In addition, a year abroad will contribute to my personal development in many ways. In particular, it will help to improve and develop new soft skills as intercultural communication or conflict management. I think, especially in academia, it is important to work in international teams as both research and teaching greatly benefit from a deep pool of experience and knowledge to build upon. The community of computer scientists is a very international one and I want to be a part of it.

With its wide range of courses and its master specialization in machine learning, the College of Computing at the Georgia Institute of Technology will allow me to pursue every single aspect of my interests. Especially the variety of courses offered in the area of machine learning, its applications and its theoretical background fit my academic career plans perfectly. Furthermore, the international student body will encourage me to work in international teams and the american teaching culture with its small classes and its ideal student-to-faculty ratio will ensure a unique learning experience. In addition, I appreciate the course structure at Georgia Tech as most courses offer regular lab assignments as well as course projects and the final grades are often based both on coursework as well as on final exams.

The year abroad will be the logical continuation of my bachelor studies. I plan to focus my coursework on machine learning and its application. In addition, I will use the year to glance left and right to discover other interesting areas of computer science. Among these are cryptography, computer graphics as well as artificial intelligence which offer interesting applications of theoretical concepts.

In conclusion, a year abroad at Georgia Tech will be an important step both for my personal development as well as for my academic career. It offers an experience too extensive to fully describe in this statement of motivation. Therefore, I am applying for this program as to *make* this experience rather than further speaking of it.