

Computer science graduate studies at Stanford would allow me to focus on my two passions: computer vision and entrepreneurship. My goal is to contribute to cutting-edge research in computer vision, enabling robots and computers to understand their surroundings. At the same time, I want to acquire the toolset to found my own venture after my graduate studies. To further these endeavors and to foster the cultural exchange between Germany and the US, the German Fulbright Commission has awarded me one of 75 Fulbright grants.

I am in the final semester of studies for a BSc in electrical engineering at the Technical University of Munich (TUM), where I rank fifth out of 258 students. In parallel, I am studying technology management at the Center for Digital Technology and Management (CDTM). Founded as a joint initiative of MIT and TUM to promote academic exchange, it admits 25 students out of more than 300 applicants from all disciplines every term to work on projects in research, industry and entrepreneurship.

During my exchange at the Hong Kong University of Science and Technology, I participated in courses and projects in robotics, bio-engineering, and multimedia informatics. I was introduced to the challenges of computer vision and was fascinated by their complexity and real-world impact. Back in Munich, I followed this interest in a project at the Fraunhofer Institute. Using OpenCV compiled for Fraunhofer's "Intelligent Camera", I developed the prototype of a computer-vision driven customer analytics tool that counted incoming customers and identified their paths through the store. This project confirmed my interest in computer vision and led to an academic focus on image and video processing, machine learning, and the theoretical foundations of computer vision.

Currently, I am working on my bachelor's thesis project at TUM's Computer Vision Group, led by Prof. Daniel Cremers. My special interest is the recently developed Large-Scale Direct Monocular Simultaneous Localization and Mapping (LSD-SLAM) algorithm – it allows real-time odometry and SLAM from a monocular RGB video stream. I am developing an algorithm that estimates the dominant plane in the SLAM point cloud, by first identifying the most likely plane model with the help of the RANSAC-algorithm and then calculating the optimal plane via Principal Component Analysis, refining the model with later frames. In the next step, I plan to generalize the algorithm to identify several planes in a scene to enable simple object detection and scene segmentation.

I believe that the joint processing of color and 3D information, as demonstrated in Stanford publications such as "Understanding the 3D Layout of a Cluttered Room From Multiple Images" (Bao S.Y., Furlan A., Fei-Fei L., & Savarese S., 2014) and "Convolutional-Recursive Deep Learning for 3D Object Classification" (Socher R., Huval B., Bath B., Manning C.D., & Ng A., 2012), has great potential for addressing challenges in computer vision. In my graduate studies, I would thus like to contribute my knowledge in point-cloud, image and video processing as well as machine learning to answer the question of how depth and color information can be processed jointly for scene segmentation and object recognition purposes. A possible research interest is the application of deep-learning neural networks to RGB-D datasets, as demonstrated by Prof. Ng's research group. Courses such as "Convolutional Neural Networks for Visual Recognition" and "Computer vision: from 3D reconstruction to recognition" would allow me to deepen my theoretical foundations, while the ongoing projects at laboratories such as the Artificial Intelligence Laboratory and the Computational Vision and Geometry Laboratory would enable me to contribute to cutting-edge research.

Algorithms such as the LSD-SLAM will make 3D information available on mobile consumer devices in the near future - algorithms that can make use of this information are thus also relevant from a business perspective. Via programs such as StartX or the DFJ Entrepreneurial Leaders Fellowship, Stanford has given rise to hundreds of startups. My recent project with the Fraunhofer Institute strongly resembled the product development process in a startup; this and other projects at the CDTM have strengthened my wish to establish my own company. Participating in Stanford's entrepreneurship programs would allow me to learn what makes a successful entrepreneur and equip me with the means to found my own computer-vision driven venture in the future.

During my studies at the CDTM and in Hong Kong as well as during my internship in a Chinese company, I thoroughly enjoyed the work with international students and co-workers. I learned that different cultures have different approaches to overcome challenges, and I believe that fostering intercultural collaboration can strongly impact a project's success. Since my first term, I have been studying Chinese in addition to French and English, and I have recently begun Spanish. I would like to contribute my experience and language skills to furthering the intercultural collaboration of students at Stanford.

A Master of Science in Computer Science at Stanford would enable me to contribute to cutting-edge research in computer vision and would advance me greatly on my path to founding my own company. I would be honored to represent Germany and promote the exchange between the US and Europe. Thank you for considering my application, and I look forward to a favorable reply.

Sincerely yours

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Munich, December 8, 2014