

Teaching Statement

Jan Neumann

jneumann@cs.umd.edu • www.videogeometry.com

Teaching and interacting with students has always been a large part of my motivation to pursue a career in academia. The exchange and passing on of knowledge is an essential part of any research, therefore I believe it is our fundamental duty as researchers to share our knowledge with others at all different levels, from peers and students in our field, to people in other disciplines and outside academia.

Computer vision is an interdisciplinary subject that combines tools from computer science, mathematics, physics, engineering, psychology and biology. It offers many opportunities to enrich lectures with visual examples and real world demonstrations and thereby enhance the learning experience of students. Examples are image-based rendering, face and body modeling, motion capture, activity recognition, image stabilization, or visual illusions. This will allow me to design appealing and interesting courses that will teach students how to apply the fundamental ideas of computer science and mathematics. At the same time students will be able to learn from other fields as well which will prepare them for collaborations with other disciplines. Computer vision courses usually also attract a fair share of students from other departments such as mathematics, engineering, and psychology, which fosters an interdisciplinary atmosphere in the classroom.

I got involved in teaching early during my undergraduate studies in Germany, where I became a teaching assistant for the introductory calculus classes in my second year. In my third year I was offered the privilege of teaching the homework discussions for a full year, the first time in the history of the department that this opportunity was offered to an undergraduate student. I always enjoyed the interaction with students very much, and it also helped me to take my understanding of the subject to another level.

I believe that students learn best when they actively interact with a subject in small projects, while being acutely aware of the overall goal they are trying to achieve. When I designed and taught the graduate course about 3D-photography and inverse rendering in the fall of 2002, I first motivated the subject with many examples and applications and made sure that the students knew what the long-term goals of the class were. Then I taught them the necessary tools to achieve that goal. This instruction was always accompanied by illustrative examples and prepared them for their final project which was a team effort that challenged their creative problem solving skills. I believe it is important to give students the opportunity to think for themselves and allow them to make mistakes on the way, because I think we learn as much from our mistakes as from our successes. Only if we foster creative and unconventional thinking we can hope to educate the innovators of the future. The class materials of my class can be found on the web at www.videogeometry.com/CMSC828Z.

I advised numerous graduate and undergraduate students while I was an instructor and teaching assistant for vision classes taught at the University of Maryland. For the last year and a half I also have mentored two graduate students while they do their independent study projects with me. One student from the Applied Math program, Gunay Dogan, works with me on recovering spatio-temporal models from camera networks using level sets and the other is a computer science student, Alap Karapurkar, who works with me on the color calibration of a camera network consisting of 33 cameras and the visualization of the recovered models. I believe this experience is very valuable and teaches me a lot about my future duties as a professor.

As a professor, I would like to teach courses at all levels about computer vision, computer graphics, signal and image processing, as well as the necessary fundamental computer science courses such as data structures and discrete math. I am also interested to teach special topics courses such as vision for graphics, integrated design of camera networks and vision sensors, and perceptual issues in computer vision which will address advanced topics of the field.

In conclusion, I am looking forward to teaching and interacting with students and feel that my experience has prepared me well for the challenges that lie ahead.