# Teaching Statement
## Simon Premože

Education has a great importance in every society as it is a driving force of progress and improves quality of life in many ways. Accumulated knowledge, research experiences and practical tricks of the trade are only valuable if they are shared. However, education and teaching should be more than just conveying mere facts and knowledge. They should also convey passion, enthusiasm, curiosity and inspiration. Most successful teachers are the ones who inspire students.

## Previous Experience

I have been a teaching assistant at the University of Utah for several different classes. My responsibilities among many were leading discussion sections, lecturing, guest lecturing, conducting weekly lab exercises, holding office hours, answering students questions, preparing and grading homework assignments and exams. I have been involved in classes at both undergraduate and graduate levels for several classes: Data Structures, Computer Networks, Advanced Computer Architecture, Advanced Algorithms and Data Structures. As an undergraduate student at the University of Colorado I tutored students in basic programming and data structures. I have also participated in course presentations at Siggraph and organized a course at Siggraph.

I have been exposed to two different educational systems (the US and European). While experiences in each educational system were quite different during my education, I would like to utilize lessons I learned during my education in my teaching philosophy. I briefly outline subjects I would like to emphasize as a teacher.

## Teaching Philosophy

**Interaction.** Interactions with students and discussions in a classroom are crucial not only for conveying coursework material and determining whether student understand the material, but could also become a breeding ground for new ideas. It is often during interaction with students and peers that research ideas get refined. Teaching often helps in understanding concepts better. It is not uncommon to only fully understand a concept or an algorithm when you have to explain it to somebody else.

**Real World Problems.** It is too often that coursework material is too detached from real world problems. It is fine to talk about ideal algorithms, but I strongly believe that students should also be exposed to real circumstances and learn how problems are solved in practice. Furthermore, there are many problems in the real world that are often not addressed at all in classrooms. For example, when real data is acquired with measurements, one is faced with challenging problems of less than perfect data that still has to be somehow made useful. This may not be of any interest for academic publications, but they are nonetheless crucial when trying to find a solution or determining what approach to use.

**Fundamentals.** I strongly believe that there should be a balance between theory and practice. Without understanding the problem theoretically and knowing the underlying principles of how the solve it, the problem cannot be adequately solved in practice. Even in computer graphics where a picture says more than words, the understanding of underlying mathematics, physics and computer science is very important. Too often students know how to implement an algorithm without fully grasping the underlying principles. Being able to think about the problem and its solutions and be able to critically evaluate strong and weak points is as important as being able to implement it on a computer. Therefore, there should be proper balance between "Why Does It Work?" and "How Does It Work'?"

## Teaching Courses and Seminars

As for particular classes I would like to teach, given my experience as a teaching assistant at both undergraduate and graduate levels, I believe that I have enough basic knowledge to teach any core computer science course at undergraduate level. Of course, I would enjoy teaching courses in my primary area of research and expertise the most. Some examples are shown below but the exact content of each of these courses depends on the interest of the students, other courses offered in and around the department:

- **Introduction to Computer Graphics** Fundamentals of 2D and 3D computer graphics, coordinate systems, scene descriptions, polygon rendering systems, basic visibility, shading and shadow algorithms.

- **Advanced Computer Graphics** Image formation, aliasing, human perception, reflection models, textures, global illumination, ray tracing, procedural modeling, image-based techniques.

- **Scientific Visualization** Volume processing and data structures, volume rendering, feature spaces, information visualization, case studies.

- **Computational Photography** Cameras and image formation, image and video processing (filtering, antialiasing), image manipulation, visual perception, high dynamic range imaging and tone mapping, image-based lighting.

- **Animation and Interactive Computer Graphics** Basic animation techniques, motion capture and simulation, hardware rendering, efficiency considerations.

- **Computer Graphics for Games** Introduction to computer graphics, basic animation techniques, efficient illumination and rendering techniques, data structures for games, collision detection, crowd dynamics.

- **Mathematics for Computer Graphics** Relevant topics in physics, matrix analysis and linear algebra, transformations (Fourier, wavelets, etc.), statistics and probability

- **Physically Based Animation** Relevant topics would include an introduction to the animation and simulation of natural phenomena (ocean, smoke, fire, clouds, etc.) Focus is on computational techniques required to simulate a variety physical substances that behave in a highly complex manner.

In addition, I would like to lead advanced graduate courses/seminars which discuss current graphics research or concentrate on narrow topics in computer graphics. With a small audience of highly motivated and interested people there can be as much learning for the formal instructor as for everyone else. Specific topics for such seminars should be determined based on participants' interest.

I am also willing to teach classes that are outside my immediate area of expertise: Compilers, Computer Architecture, Discrete Mathematics, etc.

I am looking forward to interacting with bright people in the classroom and consider this opportunity as one of the main benefits of an academic position.