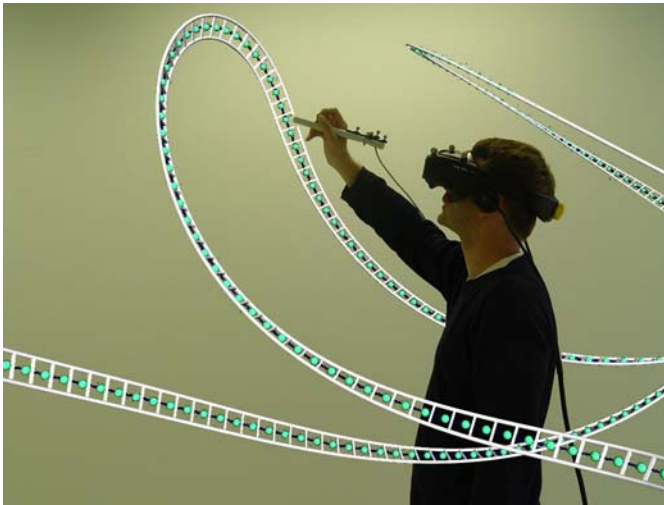


### 3D Visualization

The aim of the 3D-Visualization project is to develop and implement various applications of mechanics and biomechanics such as motion simulation, design of complex mechanical systems in virtual space, and the visualization of motion of the musculoskeletal system. The visualization methods we use are either projection with shutter glasses or an head-mounted display (HMD) which is optionally semi-transparent. The position of the viewer, and respectively the position and orientation of the shutter glasses or HMD, is determined using optical tracking based on infrared cameras and reflective markers.



The first application of the 3D-Visualization was developed in cooperation with the "Roller-coaster virtual design and simulation" project where it is possible to design a roller coaster track in virtual space. This means that one can use a pen, whose position is also tracked, to design and manipulate the course of the track.

Using the projection screen and the shutter glasses, it is possible to virtually test drive the recently developed roller coaster track. This technique can be enhanced by combining the visualization of the roller coaster's ride on the HMD with a simulation of the acceleration by a RoboCoaster. For more information see the "Kuka KR 500 Motion Simulator Moving Dome®" project.



ATTENTION: Photo composition !  
Motion is not possible until fall 2008

Another application of the 3D-Visualization was developed for the biomechanics project "Proreop", where the viewer (such as a doctor) wears a semi-transparent HMD so that he can see the real patient as well as the virtual bones. With this technique it is possible for the user to observe the motion of the bones "in the patient" and to better understand the effects on the musculoskeletal system. For the interaction with the biomechanical model, a pen and a panel are used in addition to mouse and keyboard. The position and the orientation of the pen and the panel are also detected in real time so that a virtual graphical user interface can be overlaid on the panel and interacted with using the pen.

#### Contact

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