**Background:** Virtual Reality (VR) refers to technologies that achieve immersive representations of artificial digital worlds. To this end, a person's perception of the actual environment is reduced, shielded, or superimposed by artificially generated images and sound to give her an intensive feeling of presence in a fictitious or immaterial reality. Furthermore, the person's movements, bodily state, and gestures are captured with tracking sensors in order to let her act as a digital avatar in the artificial world and to manipulate and alter it accordingly. Today, a multitude of technologies, such as CAVEs, Powerwalls, and Head Mounted Displays (HMD), are available as input and output devices in various application areas, including science, gaming, telepresence, and assisted engineering.

Despite the vast possibilities, these developments have not been very successful in the consumer market - mostly due to expensive, unsatisfactory, and immature hardware. However, with the recent availability of cheap commodity components, such as small high-resolution displays, accelerometers, gyroimeters, and magnetometers, infrared position tracking, as well as powerful computers, a wave of novel products like the Oculus Rift, HTC Vive, Google Cardboard, and Sony Morpheus are set to revolutionize the market. The core technologies of this new movement are a wide field of vision, low latency between input and output, high display refresh rates, and low pixel persistence. By this means, the new players in the market try to achieve cost efficiency, low motion sickness, and deep immersion. With the imminent availability of affordable devices, the re-vitalization of the corresponding software development community, the anticipated consumer market penetration, and the coupling of gaming and telepresence with social media we also see emerging possibilities in scientific research.

**Seminar:** The goal of this seminar is to acquire an overview of ideas and technologies from the broad areas of computer graphics (CG), human-computer interaction (HCI), and data visualization that are required to enable or optimize virtual reality experiences. After a brief historic summary, we will particularly cover the topics of input/output hardware, tracking technologies, augmented reality, VR application areas, virtual collaboration, virtual communities, photorealistic VR, and integration of mobile devices.

**Preliminary Meeting (mandatory):** Wed 15.07., 13:00, VISUS Room 00.121 (Allmandring 19)

**Target Audience (exclusive):** MSc/Dipl Informatik/Softwaretechnik and MSc Computer Science

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**Website:** https://www.vis.uni-stuttgart.de/nc/lehre/details/typ/seminar/2560/90.html

**Prior registration required:**
http://uebungsgruppen.informatik.uni-stuttgart.de/