

# Toward Improved 3D Telepresence

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## ABSTRACT

Telepresence dreams have been inspired for decades by science fiction holodecks, while teleconferencing developments have been inspired by dreams of much-reduced travel budgets and overcrowded classrooms. Meanwhile however, even high-end commercial teleconferencing systems are a far cry from these dreams; they restrict participants to fixed seats, and they inhibit such simple activities as walking around and writing on white boards, and fail to support even simple eye contact with remote participants. This talk with focus on recent developments both in meeting-room based systems, as well as mobile units that allow the remote participant to travel to non-instrumented meeting rooms, to laboratories, factories, hospitals, and clinics. Recent progress in room-based systems include multi-viewer autostereo displays that provide each user with a distinct view, to give an illusion of a window into a remote 3D environment. Recent progress in 3D acquisition of these remote environments include real-time acquisition and reconstruction based on multiple consumer-priced depth-plus-color cameras. To improve mobile telepresence, our UNC team, lead by Professor Greg Welch, has been developing a mobile physical-virtual avatar with a life-size moving human mannequin which takes on the dynamic appearance and mimics the head pose of its remote human "inhabiter." The talk will conclude with speculation about the direction of future progress in these areas, toward systems appropriate for individual offices and homes.

## BIOGRAPHY

Henry Fuchs (PhD, Utah 1975) is the Federico Gil Distinguished Professor of Computer Science and Adjunct Professor of Biomedical Engineering at the University of North Carolina at Chapel Hill. He is a member of the National Academy of Engineering, a fellow of the American Academy of Arts and Sciences, and a fellow of the ACM. He is recipient of the 1992 ACM SIGGRAPH Achievement Award, the 1992 Academic Award of the National Computer Graphics Association, and the 1997 Satava Award of the Medicine Meets Virtual Reality Conference. Fuchs has been active in computer graphics since the 1970s, coauthoring over 170 publications on rendering algorithms (BSP Trees), real-time hardware (PixelPlanes and PixelFlow), virtual environments, tele-immersion systems and medical applications. He is a member of the Steering Committee of the International Symposium on Mixed and Augmented Reality (ISMAR), External Advisory Board of Harvard's Neuroimage Analysis Center, Editorial Advisory Board of Computer & Graphics Journal, and the Editorial Advisory Board of International Journal of Virtual Reality. He has also served as a member of the National Research Council's Computer Science and Telecommunications Board and DARPA's Information Science and Technology Study Group (ISAT). He is co-founder and Special Technical Advisor of InnerOptic Technology, Inc.