

## **Virtual Environments in Education: Results from Project ScienceSpace**

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For the past six years we have been designing, implementing, and evaluating immersive virtual environments for education, from elementary schools into the first years of college. Project ScienceSpace has produced three applications: NewtonWorld (kinematics and dynamics), MaxwellWorld (electrostatics), and PaulingWorld (molecular structure). MaxwellWorld, in particular, has been used by both high school and college students and compared with non-immersive simulations of the same physical phenomena. NewtonWorld has been tested with high school, middle school, and elementary school students. PaulingWorld was designed for shared use over distance and is undergoing evaluative trials now. During 1999-2000 both MaxwellWorld and PaulingWorld were deployed in classrooms using immersive, interactive virtual environment systems costing less than \$20,000 each. This presentation will describe the virtual worlds of ScienceSpace and review some of the key findings of this research as well as lessons learned from deploying immersive visualization systems into classrooms.

### Speaker's Biography:

R. Bowen Loftin holds a B.S. in physics from Texas A&M University and an M.A. and a Ph.D. in physics from Rice University. Last year he joined Old Dominion University in Norfolk, Virginia as Professor of Electrical and Computer Engineering and Professor of Computer Science. In addition, Dr. Loftin is Director of Simulation Programs with responsibility for the university's graduate programs in modeling and simulation as well as for the Virginia Modeling, Analysis and Simulation Center. Before coming to Old Dominion University, Dr. Loftin was Professor in and Chair of the Department of Computer Science and the Director of the NASA Virtual Environments Research Institute at the University of Houston. Since 1983, Dr. Loftin, his students, and coworkers have been exploring the application of advanced software technologies, such as artificial intelligence and interactive, three-dimensional computer graphics, to the development of training and visualization systems. He is a frequent consultant to both industry and government in the area of advanced training technologies and scientific/engineering data visualization. Dr. Loftin serves on advisory committees and panels sponsored by numerous government and professional organizations. Awards received by Dr. Loftin include the University of Houston-Downtown Award for Excellence in Teaching and Service, the American Association of Artificial Intelligence Award for an innovative application of artificial intelligence, NASA's Space Act Award, the NASA Public Service Medal, and the 1995 NASA Invention of the Year Award. He is the author or co-author of more than one hundred technical publications.