STOCKTON COLLEGE
THE RICHARD STOCKTON COLLEGE OF NEW JERSEY

NSF Grant Helps Math, Science Students at Stockton College and Kean University

GeoDome to Create 3-D Immersive Environment for Simulation and Modeling

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Galloway Township, NJ- Researchers will admit that it is a difficult task to mentally visualize the complex problems that they investigate each day. This visualization obstacle has been solved by Dr. Russell Manson and his colleagues at The Richard Stockton College of New Jersey. Dr. Manson has been awarded a National Science Foundation (NSF) major research instrumentation grant to bring a GeoDome to Stockton College. The GeoDome provides an environment to present simulations and visualizations for research.

The GeoDome is an inflatable, portable, immersive visualization dome with the entire interior surface acting as a three-dimensional projection screen. The hemispherical dome is rapidly deployable and easily dismantled for quick storage. The dome comfortably fits 20 people or more and is wheelchair accessible. The GeoDome is a cost effective way to bring scientific data and stories to life in an interactive, three-dimensional environment. When inside the GeoDome, an audience is completely immersed in a virtual environment.

Dr. Manson is an associate professor of computational science and program director for Stockton's Master of Science in Computational Science (MSCP) graduate degree program, which debuted in spring 2010. He collaborated with Dr. Nancy Ashton, associate professor of psychology, and Dr. Claude Epstein, professor of environmental studies, to draft a grant for visualization hardware. A team of professors from Kean University also contributed to the grant writing process, and they too were awarded funding for visualization hardware on their campus.

Professor Manson said, "Anyone can purchase a GeoDome and pre-made visualizations, but at Stockton, students and faculty members will be creating original simulations from scratch."

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As a result of the acquisition of the GeoDome, there is anticipation of an institute for modeling and visualization with facilities at both Stockton College and Kean University. Through Stockton's and Kean's visualization hardware, a community of researchers and students will have the tools to advance their investigations. Professor Manson said, "Stockton College and Kean University will be founders of the institute for modeling and visualization, which will begin as a virtual network open to other higher education institutes."

Astronomical applications may be the first to come to mind, but the GeoDome's applications are endless. Professor Ashton plans to utilize the GeoDome for applications in psychology. For example, current research is showing that exposure to nature, greenery and water have positive effects on human cognition, behavior and stress levels. With the GeoDome, individuals can be immersed in a simulated natural setting. Different environmental features can be systematically varied, and with enough data collection, researchers can identify which elements of nature have the most significant effects on humans.

Professor Epstein plans to use the GeoDome to simulate the development of Pine Barrens streams under specific conditions. He will be able to create visual changes in stream morphology by varying the type and distribution of the substrate (i.e. peat versus sand), varying surrounding land use, and varying volume of rainfall (to project drought or extreme rainfall). The GeoDome will present a visual snapshot of stream evolution, which has never been done in the New Jersey Pine Barrens, and very few attempts have been made elsewhere.

Professor Manson will use state-of-the-art programming tools, advanced numerical algorithms and the GeoDome to model the Mullica River Estuary in New Jersey and Loch Etive in Scotland. Professor Manson said, "We are encouraging others to get involved too. A simple visualization can be created with a camera and a fisheye lens, and a complex visualization can be created through coding and advanced software. The GeoDome has great potential."

To learn more about the GeoDome, please visit www.geodome.info.

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