The Allobrain
Interactive Brain audivisual feedback in the Allosphere@UCSB

The **Allosphere** is a 3-story high spherical space in which fully immersive, interactive, stereoscopic/pluriphonic virtual environments can be experienced. Housed in the California Nanosystems Institute at the University of California at Santa Barbara, the Allosphere enables works in which art and science contribute equally and serves as an advanced research instrument in two overlapping senses.

Scientifically, it is an instrument for gaining insight and developing bodily intuition about environments into which the body cannot venture: abstract, higher-dimensional information spaces, the worlds of the very small or very large, the very fast or very slow, from nanotechnology to theoretical physics, from proteomics to cosmology, from neurophysiology to the spaces of consciousness, from new materials to new media.

Artistically, the Allosphere is an instrument for the creation and performance of avant-garde new works and the development of entirely new modes and genres of expression and forms of immersion-based entertainment, fusing future art, architecture, music, media, games, or cinema.

The space itself is already a part of the final instrument, a three-story near to anechoic cube, containing a built-in spherical screen, ten meters in diameter. The Allosphere is a project of the **Media Art And Technologies Initiatives** at the University of Santa Barbara California. For more information see the website at www.mat.ucsb.edu/allosphere or contact MATi Director Dr. JoAnn Kuchera-Morin or Associate Director Dr. Xavier Amatriain.

In this demonstration, we are presenting the scientific instrument in partial development. We will project on half of the sphere using four stereo projectors. The system will also contain 3D audio with sixteen channels of sound and wireless sensor controllers for interactive exploration of the data.

Upon completion, the Allosphere instrument will contain 14 stereo projectors and 500 channels of audio for 3D immersive visual and audio data exploration, as well as a sensor grid including camera and microphone arrays and sensor networks for interactivity.

The test bed project that we are demonstrating is the reconstruction of an interactive 3D model of Professor Marcos Novak's brain from fMRI data. The current model contains two layers of tissue blood flow, and we have created an interactive environment where twelve agents navigate the space and gather information to deliver back to the researchers within the scientific instrument that are standing within the brain data. Two interactive wireless controllers allow you to navigate the space. One controller contains twelve buttons that control the twelve agents. By pushing one of the buttons, the researcher calls that agent to the front of the visual field and that agent is a particular color based on the region of the brain it was exploring. It also contains audio information that is associated with that region. If the agent detects the highest level of blood density, a group of clustering, chaotic agents are called to that area for further examination. The controller also allows you to move the ambient sounds spatially around the sphere. The second controller allows you to navigate the space.

This virtual interactive prototype illustrates some of the key issues in the Allosphere such as multimedia/multimodal computing, interactive immersive spaces and scientific data understanding through art.

The AlloSphere simulation contains several generative audio-visual systems written by Lance Putnam, John Thompson and Graham Wakefield. These systems are stereo-optically displayed and controlled by two wireless (Bluetooth) input devices designed and built by Dan Overholt. The controllers feature custom electronics, integrating several MEMs sensor technologies. The shape of the larger one is based on the hyperdodecahecron, a 4-dimensional geometrical polytope, and the final object represents its shadow projected into 3 dimensions. It was developed using procedural modeling techniques (the mathematical model was algorithmically sculpted to provide a more organic look and feel while preserving the 600 internal vertices), and constructed with a 3-D printer capable of building solid objects.

Team:
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