

## **Creative Collaborative Exploration in Multiple Environments**

To support creativity in science, engineering, design, and art, we are exploring technologies to provide opportunities for rich data exploration and collaboration among multiple participants in a variety of environments. Rather than relying on a single tool and environment to support the creative process for a class of problems, we seek to provide an array of experiences that can lead to different perspectives and insights. The intuition behind the approach is that the process of discovery, including analysis, synthesis, and creation, is always constrained by the particular mediating tools and technologies, and thus providing a variety of rich environments that encourage collaboration and exploration will allow new ideas and approaches to emerge that might otherwise be difficult to conceive.

More specifically, we are investigating the use of visualization environments that use a range of display technologies and modalities, as well as collaboration techniques, applied to particular problems of scientific and artistic exploration. From small portable computing devices (such as cell phones or PDAs) to large, fully immersive display environments to novel display technologies, we wish to leverage the strengths of each in terms of visualization, sonification, and interaction techniques, and to provide for cross-platform and cross-modality collaboration capabilities. For example, a problem in molecular dynamics might seek insight into protein structures by exploring the interactions of molecules in a solvent. Tools such as VMD are commonly used in this community, but the tool fundamentally limits exploration and thus insight in its typical workstation-level implementation. We seek to provide different windows on the problem through different interactive environments and a range of collaborative possibilities. We are collaborating with colleagues in several scientific disciplines, such as chemistry, nanoscience, neuroscience, and geoscience.

Generalizing a typically single-user tool into a multifaceted, community-use tool can open up new creative and synergistic approaches to such scientific problems, with insight natural to one environment leading to new explorations and insights in the other environments. Similarly, for digital artists, musicians, and designers, we aim to provide new canvases that naturally incorporate collaboration and multiple viewpoints. Our current range of “canvases” includes two very novel interactive visualization environments: various configurations of the interactive “FogScreen” display (an immaterial display that uses a thin layer of mist as a display surface) and a large, multi-person, sensor-rich spherical display environment called the Allosphere.

In addition to providing a common software interface that spans a range of computing environments, this agenda requires investigation into collaboration techniques across such environments, as well as social aspects of collaboration. How can scientists and artists, many who are trained to work individually and with complete control of the process, be motivated to explore a different model of approaching their work?

This project in intelligent systems for supporting creativity seems to be well matched to the goals of the symposium, and we look forward to vigorous discussion about these and related ideas.

Keywords: Immersive and innovative displays, sensor-based interactivity, creative collaboration