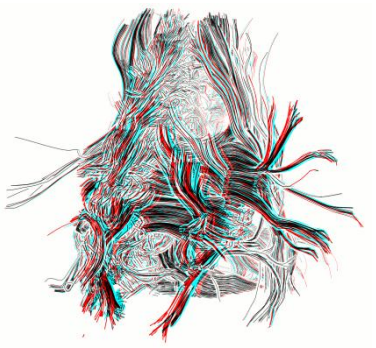
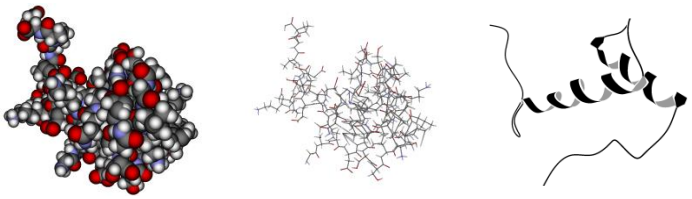
2011 Internship Project Proposal: Illustrative Rendering in a VR Context



Illustrative rendering is a recent development in scientific visualization, incorporating inspirations from traditional illustration into scientific visualization applications. Scientific visualization, in most cases, deals with 3D datasets and, therefore, is very suitable for 3D stereoscopic projection in a VR environment, while illustrative visualization so far mostly has been used to produce 2D images. Some illustrative visualization techniques use only black-and-white rendering, inspired by traditional pen-and-ink techniques, and consequently anaglyphic stereo projection has been used (e.g., see the image on the right). However, true stereoscopic imaging, so far, has not been explored. The goal of this project, therefore, is to take an existing illustrative visualization technique, realize it in a 3D stereoscopic context, and to explore the use of this visualization technique in the 3D realm.



In this project, an existing illustrative visualization technique (see images on the right) for molecular data will be used and will be adjusted for the VENISE CAVE environment at CNRS-LIMSI. The existing visualization supports the illustrative visualization of complex molecules by controlling three independent abstraction parameters of the illustrative visualization: “illustrativeness,” support of spatial perception, and structural abstraction. With these parameters it is possible to adjust the visualization to the specific needs. In addition, the overlaying of two visualizations of the same molecule with different abstraction parameters is possible.

The project requires converting the existing shader code to the EVE environment and implementing an application to control the three visualization parameters in the VR setting. This means that three parameters need to be controlled in a directly-manipulative way. In addition, several view-dependent parameters such as depth cueing using line attenuation need to be adjusted automatically and independently for each viewer. Next, the project will examine local exploration, i.e. locally transitioning from one set of abstraction settings to another, using a virtual 3D lens that is tracked in the 3D space.

Contact: Dr. Tobias Isenberg <tobias.isenberg@limsi.fr>

Group: Virtual and Augmented Reality group VENISE (http://www.limsi.fr/Scientifique/venise/)

Lab: LIMSI-CNRS, Université Paris Sud
Bâtiment 508, B.P. 133, 91403 Orsay cedex

digiteo
Research in science and technology of information