

ALASKA SUMMER RESEARCH ACADEMY

COMPUTER PROGRAMMING

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June 12-21, 2003

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ABSTRACT

Virtual Reality (VR) environments are the Star Trek holodecks of today. In this ASRA unit students will be introduced to Virtual Reality (VR) programming and will have the opportunity to experiment with prototype VR environments using the Arctic Region Supercomputing Center's (ARSC) Discovery Lab, which surrounds the viewer with realistic 3D computer-generated images on 3 walls and the floor of a 10' x 10' x 8' room known as a CAVE (Computer-Assisted Virtual Environment).

CAVE applications are programmed in C++ using OpenGL to create and interact with objects in the VR environment. The unit will begin with an introduction to C++ programming and progress to the use of the OpenGL graphics library and the GL Utility Toolkit (GLUT) to create computer-generated 3D scenes. The VRjuggler package provides the runtime framework for CAVE applications and controls the display and interaction with 3D objects in the CAVE. VRjuggler includes a CAVE simulator that allows applications to be developed and tested on a PC.

The first session in the Discovery Lab will allow students to explore a variety of existing VR environments and become familiar with the operation of basic VR interfaces. Simple CAVE applications developed by ARSC faculty will be studied and used as the basis for class projects. In subsequent Discovery Lab sessions, students will be able to test and debug their projects. Students will also have the opportunity to create 3D postcards of their work in the CAVE using the lenticular lens technique. The finished projects as well as the process of creating a CAVE application will be described in the ASRA final presentation.

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Location: Chapman 206 and ARSC Discovery Lab

Textbook: OpenGL Programming Guide, Version 1.2, 3rd ed.