



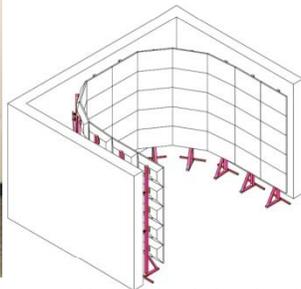
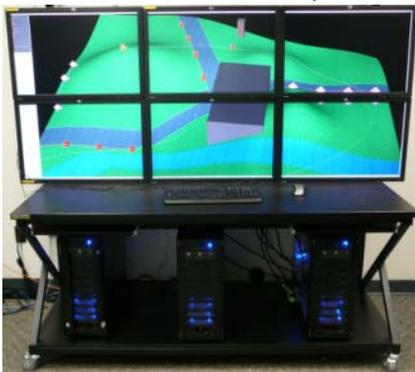
## STUDENT SUMMER INTERNSHIPS – 2010 VISUAL ANALYTICS & AUGMENTED REALITY

3D Virtual and Mixed Environments (Code 5581)  
Information Technology Division  
Naval Research Laboratory (NRL)  
Washington, DC

NRL is the corporate research laboratory for the Navy and Marine Corps and conducts a broad program of scientific research and advanced development. The Information Technology Division is one of NRL's largest, producing over 125 refereed publications annually. The 3D Mixed and Virtual Environments section researches in two fields. One is basic and applied research in augmented reality and virtual environments (AR/VE) techniques and applications. Recent work has focused on visual representations of 3D and 2D data as well as perceptual user studies; some projects have led to award-winning papers. The second area is visual analytics, where we are focusing on multi-layer visualization and large display environments, as well as user studies related to these topics.

Our primary research need is the design and implementation of a vision-based tracking system to track users' gaze and hands in front of a display wall. This project will require experience in computer vision. Other potential projects include user studies in mobile AR. Current research thrusts include:

- Visual analytics: large-scale visualization, mathematical models, user interfaces
- Augmented reality: usability evaluation, situation awareness, training/military applications



We seek graduate students or unusually gifted junior/senior undergraduates with strong backgrounds in these areas. Strong programming skills in C++ or C are required. Expertise with Linux, Windows, Cygwin, OpenGL, GPGPU, or Open Scene Graph is useful for certain projects. Scholastic experience with visual analytics or visualization, AR/VE, computer vision, HCI, or closely related fields is mandatory.

Our visual analytics equipment includes two PC visualization clusters with six-tile display walls, tracking and interaction devices, and a 3D spatial audio system; a much larger, U-shaped display wall will come on-line in Spring 2010 (See image above.) and will include cameras as well as other tracking equipment. Our Mobile AR Lab includes: wearable mobile AR backpacks (computers, displays, interaction devices, and tracking systems), see-through and video-overlay head-worn displays, tracking hardware using technologies such as computer vision, GPS, inertial, and ultrasonic sensors, and a van for vehicle-based applications.

Unfortunately, due to current DoD procedures, we are able to consider only applicants who hold U.S. citizenship or permanent residency status (green card). All applicants **must** indicate their citizenship status in their CV or in a cover letter. NRL is not easily accessible by public transportation, so we recommend interns have a car available. Interns have found local housing without much difficulty.

Send resumes (PDF preferred) or questions to <[interns5581@itd.nrl.navy.mil](mailto:interns5581@itd.nrl.navy.mil)>. For more details about our group, see <<http://www.ait.nrl.navy.mil/3dvmel/>>. Resumes will be accepted until positions are filled.