IML 454: Advanced Techniques of 3D Representation

Working Syllabus - Subject to change
Todd Furmanski

Course Description:

Advances in computer graphics and digital techniques have allowed incredible new possibilities for visualization and imagery, while making such potential more accessible to a wider population. This course looks further into the uses and foundations of 3-D digital imagery, combining project-based learning with historical and cultural context. The class will introduce students to a variety of subjects including interactive 3D environments, stereoscopy, hardware shaders, and Augmented Reality.

In addition to project-based assignments and technical instruction, students will be looking at prior art, experimental installations, critical texts, and the history of how the current idea of digital "3-Dimensional" imagery has evolved. Many of the assignments are to introduce alternative or less well-known methods of representing space and volume in a digital context.

The first part of the semester will cover an eclectic set of techniques involving 3D modeling and imagery, with several smaller assignments. The second part of the semester will have the students focus on a larger project, using what they have learned while encouraging them to expand their learning and focus.

Schedule:

Week 1: Introductions, Overview
Assignment: Having looked through the syllabus and schedule, please email me with any notes, ideas, or particular interests you have for the class and the subjects covered.

Week 2: Stereography/Stereoscopy, The Original "3D"
Assignment: Present 6 Stereographic images, or 1 short (less than 1 minute) animation. You can try a variety of techniques from those discussed in class.

Week 3-4: Data-driven 3D, Terrains
Assignment: Grab a section of real-world terrain from the US Geological Survey and do something with it!

Week 5-6: Shaders and Materials
Assignment: Use or create a 3D space that takes advantage of real-time shaders and materials. Outline how a given shader changes the 3D scene

Week 7-8: Scanning, Photogrammetry
Assignment: Scan 3 different objects in your immediate surroundings. Compare the scan to a photograph of the same object. We might be using these assets for a future assignment...

Week 9-10: Projection mapping and "Prototyping" an installation space
Assignment: Present a project mapped installation using Unity3D [+other software] that we can look around in remotely. You can try, for instance, to project onto an object you scanned in the last assignment.
Week 11-12: Augmented Reality, Part 1, Vuforia, ARKit/ARCore, etc.
Assignment: Decorate your room with some virtual objects
Assignment: Final Project. This has a lot of leeway, but combining topics you’ve learned from the class, put together an experience or installation, keeping in mind we’ll be viewing it remotely.

Week 13~15: Augmented Reality, Part 2, Final Projects
Progress checks for final project, discussions.