

## **Final project 572 – Winter 2011**

You must complete a substantial final programming project of your own choice (with instructor approval). This is the ideal time to start your Master's research thesis or explore a research idea that interests you. In general final projects should relate to the course topic of geometric modeling, rendering or scientific visualization (exceptions are allowed). Projects based on any of the papers are appropriate and projects related to the general problem of acquiring, editing, displaying, remeshing, improving, rendering, manipulating surfaces or volumes are appropriate. Consider looking at the previous years final projects for inspiration. In addition, please look at the paper topics (and papers) from recent siggraph conferences to ideas/inspiration. In addition, you may speak with me for other ideas.

### **Dates to watch out for:**

- Submit three project ideas by 2/3/11 (instructor will approve/assign approved project)
- Submit a 1-2 page project description and start project by 2/17/11
- Weekly project check-in: 3/1/11 and 3/8/11 (should be able to demonstrate significant progress on the project)
- Final project presentations to class on 3/10/11

### **Examples of project ideas (there are many other possibilities!!!):**

- Visualization of scientific data
- Non-photo realistic rendering of acquired data
- Uncertainty visualization of acquired data
- Data fitting (2D and 3D problems)
- Surface reconstruction from scattered data (i.e. compute tangent planes for point data)
- Projects related to range data acquisition
- View dependent texture mapping (data)
- Compute distance contours on meshes
- Compute normal map for mesh
- Explore polynomial texture maps
- Alignment tool for range data
- Compare alignment results on scanned data
- Hole filling tools for scanned data
- Shortest paths across large terrain data
- Dual contouring with normal maps for games
- Point cloud visualization
- Projective texture maps
- Texture synthesis
- Polygonal model repair tools
- Shape from shading projects

- Photon mapping – especially caustics
- Real-time shadows
- Terrain and bathymetry visualizations
- Fluid simulations and rendering

### **Project Description**

For the project description, you need to submit a 1-2 page written description of your project. You will need to include an overview of the project and a concrete list of the project's goals. Be sure to think about and include information on such topics as, what kind of data is necessary for your project (what is the input data type and output data type), where you will be getting any data you may need, what resources/references you will use or may need, how the user will interact with your program and what you will ultimately display/render. Please include any references you have already found and please do look for related work and include those in your write up. You should know how others have tried to tackle similar problems to what you are taking on. It is fine if you are implementing exactly what someone else has done before, I just want you to know what others have done.

In general, the format of your project description should include:

- Introduction: Problem statement, brief background, general algorithm
- Goals: concrete list of what your project will accomplish (you do not need to include a timeline, but I encourage you to think about a timeline and include it if you'd like).
- Related work
- Detailed design information (i.e. data types and sources and user interaction/display information).

Feel free to include any figures that will help illustrate your project if relevant. We will be meeting together that day to discuss your proposal.

### **Final presentation and submission**

Please note that you will need to submit the source code, executable, and relevant data related to your final project. In addition, you will need to submit a webpage documenting your project. The webpage will need to include: project description, results images and video (both images and video are required!), and references on the webpage. All of these will be due the day of the final project presentations and will be turned in via handin. You will be doing an in class presentation of your project – demonstrating to your peers and the professor the accomplishments of your project.