

N.B. Reminder about Assignment 3: Game Tech Talk

Schedule of talks will be sent out later today

Game Tech Talks

15% of Module Assessment

1. **Choose** a video game or commercial interactive application (of any era) which excelled in its use of 3D graphics
2. **Research** the game. Find related screenshots, presentations, technical articles
3. **Prepare a 10-minute presentation** (With Slides)
 - a. Introduction to the game: *history, details of platforms, developer etc.*
 - b. Reason for choosing the game: *what aspect of 3d did it excel in*
 - c. Technical overview: *overview of the tech behind the 3d features*
 - d. Examples of the technology: *movies, pictures*
 - e. Conclusion: *impact, did future games improve upon it, could you improve on it*
4. **Present** your work. Strict 15 mins for presentation & 5 mins for Q&A.

Schedule of Talks

- Note that this schedule (including games chosen) is up on the module webpage:

- <https://www.scss.tcd.ie/Michael.Manzke/index.php/mm-teaching/msc-taught/cs7055>

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Assignment 4

Research Paper Study

Submission

- Note that this is worth 50% of the module and is the equivalent of an exam. It is expected that you will spend approx. 45 hours of work on this assignment.
- Demo due on **Thursday 2nd April**
- Submit youtube video and 1 paragraph abstract
- Also submit presentation materials (e.g. slides) and zip file with source code for the record
- You should pick a paper or topic by 6th **March**
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Main Objectives

1. Pick a theme: one of realism, stylisation or complexity
2. Pick a research paper from SIGGRAPH, EGSR, EG, SIGGRAPH-ASIA, I3D, GDC or SCA (see next slide)
3. Create an interactive demo inspired by this (n.b. the point is not to implement the whole paper but some aspects of it). Some marks for making something interesting
4. Prepare a presentation:
 - Overview of paper
 - Demo (how well does it fit the theme)
 - Technical content: in the form of a lecture to the class on how to implement that part of the demo inspired by the paper
 - Limitations of the approach, of your implementation
5. Submit
 - Upto 5 minute video (you-tube link)
 - Source code
 - A 1-para summary with relevant acknowledgements
 - Slides from your presentation

Realism



Painting by Richard Estes, a Photorealist



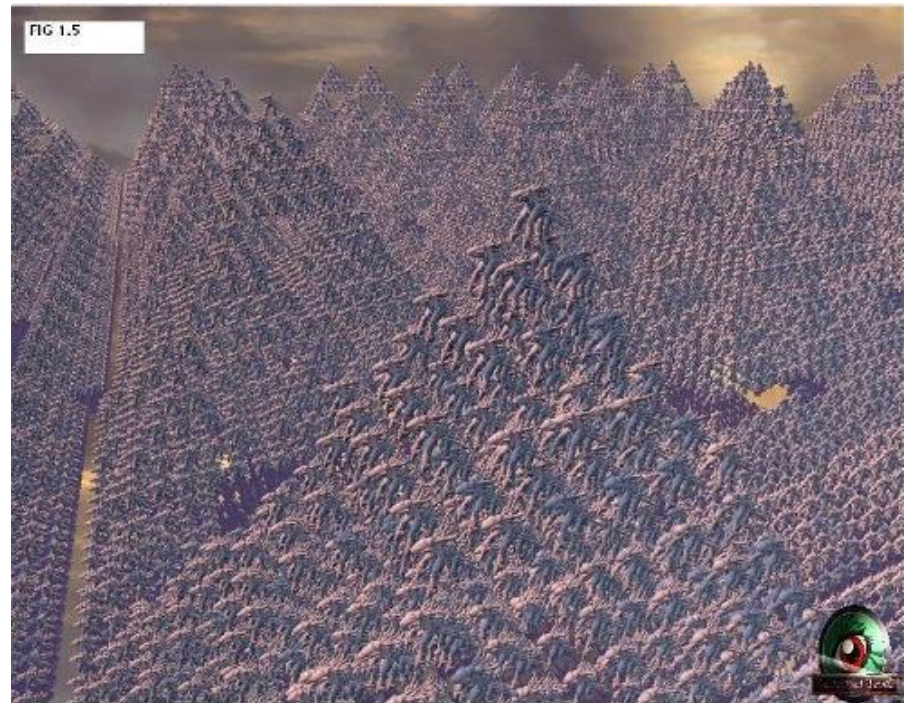
Offline Rendered Photorealism, Image
Rendered in POVray

For the purposes of this project define realism as using as perceptually accurate an approximation of the Rendering Equation as possible; i.e. better illumination/shading models as opposed to better data

Complexity



200 dragons with 202k polygons
rendering using Geometry Shaders



Screenshot from Unlimited Detail
Technologies showing “unlimited” object
instantiation

The focus here is on creating/rendering large numbers of display primitives rather than more realistic lighting models: i.e. better more detailed inputs rather than more detailed lighting/shading model

Stylisation



ATI Demo



Madworld

Intentionally not optimising for realism or detail; possibly exploiting human perception, rules of art and aesthetics, human styles, pen and ink etc. see papers on Non-photorealistic Rendering and Computational Aesthetics for examples

Major Publications in Rendering

- You may pick your own choice of a rendering paper from:
 - ACM SIGGRAPH Annual Conference
 - ACM Transaction on Graphics [journal],
 - IEEE Transaction on Visualisation and Computer graphics [journal],
 - Symposium on Interactive 3D Graphics and Games,
 - Eurographics Rendering Symposium (a.k.a. Rendering Techniques),
 - Eurographics Annual Conference
 - Symposium on Computer Animation,
 - Siggraph Asia - Annual Conference



Assessment

Note that this is worth 50% of the module and is the equivalent of an exam.

- Completed Implementation 30%
 - Demo shows some aspects of theme: Realism, Stylisation or Complexity
- Presentation 20%
 - Explains what you have done, motivates the technique
 - Explains how to do it in sufficient detail
- Video (you will get marks for a good video here) 10%
 - Brief summary of demo/presentation
 - Self explanatory
- Top-level marks 40%
 - Very Real? Very Stylistic? Very Complex?
 - Originality
 - Technical-difficulty
- There will be a penalty of 20% for each day late (strictly enforced)

Suggested Papers (1)

■ Caustics

- Musawir A. Shah, Jaakko Konttinen, Sumanta Pattanaik
“Caustics Mapping: An Image-space Technique for Real-time Caustics” IEEE Transactions on Visualization and Computer Graphics

■ Refraction (at two surfaces)

- Chris Wyman “An Approximate Image-Space Approach for Interactive Refraction” in SIGGRAPH 2005
<http://www.cs.uiowa.edu/~cwyman/pubs.html>

■ Sub surface scattering

- Rui Wang, John Tran, David Luebke "All-Frequency Interactive Relighting of Translucent Objects with Single and Multiple Scattering" Sigraph 2005
<http://www.cs.virginia.edu/~rw2p/s2005/>



Suggested Papers (2)

■ Ambient occlusion

- Perumaal Shanmugam and Okan Arikan "Hardware Accelerated Ambient Occlusion Techniques on GPUs" in I3D 2007 <http://sites.google.com/site/perumaal/>

■ Translucent objects with depth-peeling

- Louis Bavoil, Steven P. Callahan, Aaron Lefohn, Joao L. D. Comba, Claudio T. Silva "Multi-Fragment Effects on the GPU using the k-Buffer" in I3D 2007
<http://www.sci.utah.edu/~bavoil/research/kbuffer/>

■ Relief mapping

- Oliveira, Manuel M., Gary Bishop, David McAllister. Relief Texture Mapping. Proceedings of SIGGRAPH 2000 . (see: <http://www.inf.ufrgs.br/~oliveira/RTM.html>)



Suggested Papers (3)

■ Non-Photorealistic Rendering

- T. Saito and T. Takahashi, "Comprehensible rendering of 3-D shapes", SIGGRAPH 1990

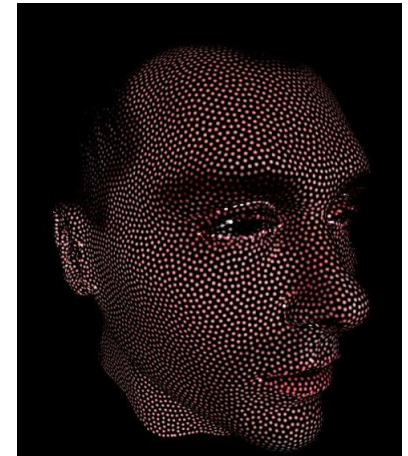
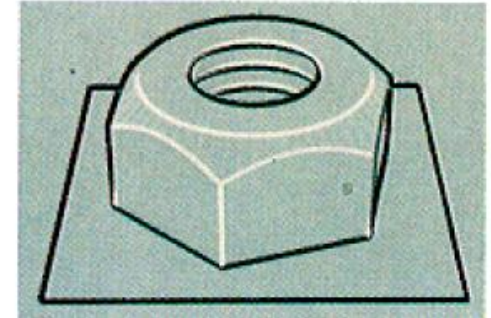
■ Impostors/Billboards

- S. Dobbyn, J. Hamill, K. O'Connor, C. O'Sullivan
"Geopostors: A Real-Time Geometry/Impostor Crowd Rendering System" - i3d 2005.

<http://isg.cs.tcd.ie/dobbyns/VirtualDublinProject.html>

■ Point Based Rendering / Splatting

- J.P. Grossman, "Point sample rendering" In
Rendering Techniques (Eurographics Symposium on
Rendering) 1998



Other Inspirations (on what kind of demo to create)

- Some coursework from previous years (note slightly different project spec)
 - <http://www.youtube.com/watch?v=IdHIROC9PXw>
 - <http://www.youtube.com/watch?v=5gorm90TXJM>
 - <http://www.youtube.com/watch?v=1Q639I7gHtg>
- Some older Nvidia/ATI tech demos
 - http://www.youtube.com/watch?v=Cx8NiEnz5_o
 - <http://www.youtube.com/watch?v=NAsoXHHcQWM>