Seminar Wissenschaftliches Arbeiten
180.765, SS 2017, 2.0h (3 ECTS)

Stefan Ohrhallinger
Institute of Computer Graphics and Algorithms (E186)
Vienna University of Technology
http://www.cg.tuwien.ac.at/staff/StefanOhrhallinger.html
Important!

There is a **common first part** – this is second part

**Register** to course in TISS: to get news & updates

These slides will on the website after this meeting

Official registration: by **submitting** the literature list

Topics are presented and **assigned** here today
Seminar Goals

Practice selecting, reading and understanding

- Search and select papers relevant to your topic
- Summarize them as a state-of-the-art report
- Prepare a talk about your topic in the seminar

This permits in-depth familiarization with the topic
Tasks

• Submit a literature list (chosen with supervisor)
• Attendance of 3 lectures
• Meetings with supervisor: paper selection, discussion of papers, preparing talk slides
• Alternative: evaluate and compare algorithms
• Final talk in seminar
Literature List

- Analyze recent papers (select with supervisor)
- Study secondary literature to understand topic
- How to find relevant papers:
  - SIGGRAPH Proceedings
  - Google Scholar: find the right key words
  - Survey papers, often-referenced papers
- Submits a list of 10+ papers per email to supervisor & me → official registration
State-of-the-Art Report (STAR)

- 8 pages per student, preferably in English
- Format in the style of a scientific paper
- Use LaTeX template on course website
- LaTeX tools and guides also on the website
- Submit the draft in PDF format, per email to supervisor+organizer
Scientific Review

- You will get a draft of another student to review
- Typical conference review form (Eurographics)
- This helps author to improve the manuscript
- Guides on review writing on course website
- You will receive 2 reviews (student, supervisor)
- Improve final report according to reviews
Seminar Talk

- Prepare slides in advance, using template
- Each student talks for 15 minutes, pref. English
- 5 minutes discussion after each talk
- Focus is on overview/comparison of methods
- Present so that other students will understand it
- Active discussion is mandatory and is graded
- Submitted slides are presented on seminar PC
Grading

- First part: 17%, second part: 83%, thereof:
- Lecture attendance 5%
- Review: 20%
- Seminar slides+talk: 30%, discussion 5%
- Final report: 40%

- Late submission: 15% off per day, max. 1 week
Important Dates

- 27.03. 23:59 Submit literature list (per email)
- 05.04. 11:00 – 13:00 Lecture Prof. Wimmer
- 26.04. 15:15 – 16:45 Lecture Prof. Gröller
- 08.05. 23:59 Submit report draft
- 16.05. 15:15 – 16:45 Lecture Prof. Purgathofer
- 27.06. 23:59 Submit slides (per email)
- 28.06. 10:00 – 18:00 Seminar talks (in groups)
- 28.06. 23:59 Submit final report (per email)
Now 18 topics will be presented
After the presentation, please mark down at least 3 in order of preference (1, 2, 3, …)
I will try to make a fair assignment of topics
Grammar-based modeling = programming. How to change it?

- Handles
- Node editors
- VPLs
2 Layouts Generation for Cities

- Multi-scale
- Constraints
- Optimization
3 Fractal Image Compression

- Fractal Geometry
- State-of-the-art methods to improve speed
- Comparison with other image compression techniques
4 Offshoots of KinectFusion

- Initially developed by Microsoft for surface reconstruction with Kinect
- There have recently been many efforts to build on this functionality
- Evaluate pros and cons of different approaches

KinectFusion reconstruction of my desk!
Reinforcement learning is an amazing tool for optimizing the behavior of an agent in an environment. It is capable of playing computer games at a high level and also has applications in computer graphics. Check this out.
Neural networks are universal function approximators that are used to solve difficult problems in image and speech recognition, image synthesis, and many more. Check this out and see for yourself!
Conduct a survey of convex decomposition methods.

Pocket cuts [Lien et al 2007]

Lines of sight [Kaick et al 2014]

Concavity aware fields [Au et al 2012]
Interactive Mesh Segmentation

Review the different techniques for segmenting meshes, aided by user input.

- Naive algorithm
- Intelligent scissors

- Stroke along boundary
- Stroke across boundary
- Select similar components

Intelligent scissors find the optimal cut
9 Light Painting for Lighting Design

- Solve the Inverse Lighting Problem for 3D Scenes
- Light Painting
- Sketch Based Lighting


Katharina Krösl
10 Foveated Rendering

- Perceptually-Based
- Gaze-Based
- Eye Tracking
- Virtual Reality
11 Hardware Algorithms for Rendering

- Investigate how GPUs perform rasterization
- Tile-Based Rasterization
- Efficient Memory Patterns

Bernhard Steiner
Survey about Bending Active Structures

- Design Methods
- Form Finding
Conduct a survey of recent advances in real-time global illumination
Conduct a survey of recent advances in real-time motion synthesis for character animation.
• Detailed 3D models require a lot of space
• Investigate 3D model compression techniques and their advantages (disk usage, load times, ...)

Markus Schütz

26
• Some models are too large to be loaded and rendered as a whole
• LOD structures allow you to load and render only the essential parts of a model (or map)
• investigate **physically based rendering** techniques that consider the **global importance** in the sampling domain
• investigate **physically based rendering** techniques that combine samples in path space
• Please mark at least 3 topics in order of preference (1, 2, 3, …), with:
  Name, student number and email
• Hand in the sheet
• Then I will assign the topics on the spot
Questions?

- Get in contact with your supervisor ASAP
- Discuss literature list with your supervisor
- Submit the list (to supervisor and me) by 27.3.