

## 186.828 Wissenschaftliches Arbeiten 186.046 Seminar aus Visualisierung WS 2011

**Organizer:** Martin Haidacher

**Teaching staff:** Artem Armikhanov, Andrej Varchola,  
Gabriel Mistelbauer, Peter Mindek, Eduard Gröller

Institute of Computer Graphics and Algorithms  
Vienna University of Technology

### Seminar

- Get an idea how scientific work is carried out (in CG)
  - ◆ Practice to review literature and get familiar with a particular scientific topic
    - Selecting, reading and understanding
    - Summarizing and explaining (orally and written)
    - Comparing and discussing
  - ◆ Practice to give a talk
  - ◆ Experience critical scientific discussion

Martin Haidacher

1

### Seminar

- Submit initial literature list
- 3 Lectures:
  - ◆ „Wie halte ich einen Vortrag“ (Prof. Purgathofer)
  - ◆ „Forschung und wie sie funktioniert“ (Prof. Gröller)
  - ◆ „How to write a scientific paper“ (Prof. Wimmer)
- Write report of selected topic
- Give a presentation
- Active discussion participation

Martin Haidacher

2

### Talk

- Use institute's PowerPoint template for presentations (find it on webpage)
- 20 + 5 minutes talk
- Preferable in English
- Active discussion participation is mandatory and will be graded

Martin Haidacher

3

### Report

- State-of-the-Art report
- 8-12 pages per student
- In English
- Format reports in the style of a scientific paper
  - ◆ Use LaTeX (template is on the webpage)
- Students can work in groups of two
- The final version will be reviewed and graded by the supervisor

Martin Haidacher

4

### Important Dates

- **Mon, 24.10.**, Deadline list of literature
- Attend 3 lectures :
  - ◆ **Wed 9.11., 17:00**, „Forschung und wie sie funktioniert“
  - ◆ **Wed 16.11., 17:00**, „Wie halte ich einen Vortrag“
  - ◆ **Mon, 21.11., 10:30**, „Wie schreibt man eine wissenschaftliche Arbeit“
- **Mon, 5.12.**, Deadline final version of your report
- **Mon, 19.12., 9:00 - 17:00**: Presentations

Martin Haidacher

5

## Grading

- It is necessary to attend the 3 lectures to get a positive grade!
- Grading criteria:
  - ◆ 50% written report
  - ◆ 40% presentation
  - ◆ 5% attendance during the presentations
  - ◆ 5% active discussion after the presentations

Muhammad Muddassir Malik 6

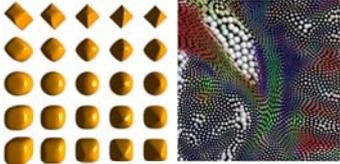
## Important Dates

# Topics 2011

Martin Haidacher 7

## Glyph-based Visualization

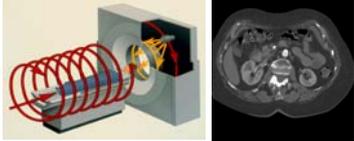
- Types of glyphs
  - ◆ Arrows
  - ◆ Ellipsoids
  - ◆ Superquadrics
  - ◆ ...
- How do glyphs convey information?
- How are parameters mapped to different glyph properties (color, size, shape, ...)?
- Which properties are perceived faster (pre-attentive stimuli vs. attentive stimuli)



Gabriel Mistelbauer 8

## Data Acquisition Modalities

- Computed Tomography (CT)
- Magnet Resonance Imaging (MRI)
- Ultrasound, CTA, MRA, PET, SPECT, fMRI



- How is the data acquired?
- What are their application areas?

Gabriel Mistelbauer 9

## From the Smallest to the Biggest

- Visualization of natural phenomena at different scales
- Organize visualizations by size and distance
- From scale of nano-objects to scale of stars
- Describe capturing of data and visual mapping method



Bubble Chamber Trails      Hubble Deep Field

Andrej Varchola

## Intangible Human-Computer Interfaces in Vis.

- Explore alternative control interfaces used in visualization
- Find different applications of non-standard ways for HCI
- E.g. Microsoft Kinect



Andrej Varchola

### Uncertainty Visualization

- Positional uncertainty
- Data uncertainty (errors)
- Uncertainty representations
  - ◆ Volume rendering
  - ◆ Noise
  - ◆ Animations
  - ◆ Points with offset
  - ◆ ...

Artem Armikhonov 12

### Parameter Visualization

- Parameter exploration
- Stability analysis (with respect to parameters)
- Multi-dimensional data
  - ◆ Hyper slice
  - ◆ Parallel coordinates
  - ◆ Projecting parameter space
  - ◆ ...

Artem Armikhonov 13

### Computer Graphics on Mobile Devices

- Graphics hardware get better on mobile devices
  - ◆ More complex scenes can be rendered
- Survey about graphics capabilities for recent devices (mobile phones, tablets)
  - ◆ How does the hardware look like?
  - ◆ Existing APIs for the graphics pipeline

Martin Haidacher 14

### Graph Visualization

- Various tree and graph drawing algorithms
- Focus+context in graph visualization
- Layout algorithms

Peter Mindek 15

### Procedural Content Generation

- 3D models
- Landscapes
- Textures

Peter Mindek 16

### A very short introduction to LaTeX

# LaTeX

Martin Haidacher 17

## A very short introduction to LaTeX



- „Programming“ a text document
- Similarities to HTML
- No WYSIWYG
- Most convenient to use a LaTeX distribution and a LaTeX IDE (integrated development environment)

Martin Haidacher

18



## A very short introduction to LaTeX



- First install a LaTeX Distribution
  - ◆ MiKTeX (for Windows)
- Then a LaTeX IDE
  - ◆ TeXnicCenter
  - ◆ Texmaker
  - ◆ LEd

Martin Haidacher

19



## A very short introduction to LaTeX



- MiKTeX
  - ◆ "Basic MiKTeX" Installer
  - ◆ Adds the MiKTeX \bin directory to the PATH

Martin Haidacher

20



## A very short introduction to LaTeX



- Extract the archive *acmsiggraph.zip*
- Open a command line window
  - ◆ Go to the directory where *template.tex* is
  - ◆ On command line type: `epstopdf sample.eps`
- In LaTeX IDE open *template.tex*
  - ◆ Change all *sample.eps* to *sample.pdf*
  - ◆ Produce PDF document
- In TeXnicCenter open *template.tex*
  - ◆ Select LaTeX=>PS *output profile*
  - ◆ Produce a PS document
  - ◆ Convert PS to PDF using Adobe Distiller

Martin Haidacher

21



## A very short introduction to LaTeX



- Work with 2 files:
  - ◆ A *.tex* file for the text
  - ◆ A *.bib* file for the bibliography which is used by the citations command `\cite`

Martin Haidacher

22



## Seminar



# Questions?

<http://www.cg.tuwien.ac.at/courses/WissArbeiten>

Martin Haidacher

23

