

Proseminar
Ausgewählte Themen
der Computergraphik

Matthias Teschner

Computer Science Department
University of Freiburg

Albert-Ludwigs-Universität Freiburg

Contact

- Matthias Teschner

052 / 01-005

teschner@informatik.uni-freiburg.de

<https://cg.informatik.unifreiburg.de/teaching.htm>

Registration

1. choose a topic today
2. check the web page for available topics
 - choose a topic
 - send an email with
name, matriculation number, topic
 - web page is updated and a confirmation is sent

Outline

- introduction
- organization
- presentation
- summary

Introduction to Computer Graphics

- rendering
 - rasterization
 - raytracing
- geometry processing
- animation / simulation

Introduction to Computer Graphics

- rendering
 - homogeneous coordinates
 - rasterization
 - rendering pipeline
 - Bresenham line algorithm
 - Williams shadow mapping
 - raytracing
 - Appel raytracing
- geometry processing
 - Marching Cubes
 - mesh simplification
- animation / simulation
 - particle systems

Course Information

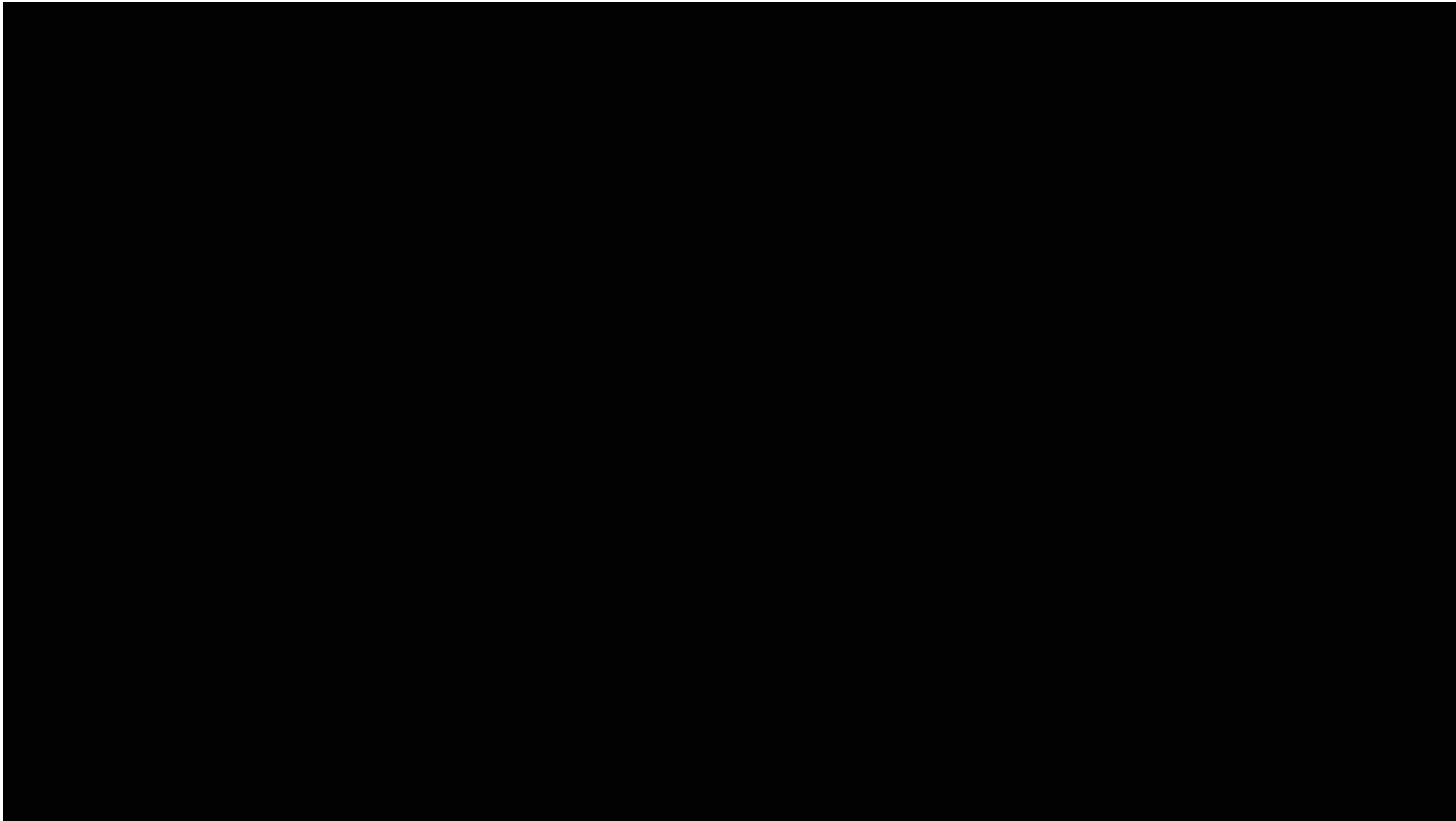
- key course
 - pattern recognition and computer graphics (rasterization-based rendering)
- specialization courses
 - advanced computer graphics (ray tracing)
 - simulation in computer graphics (e.g., fluids)
- master project, lab course, Master thesis
 - two tracks: simulation, rendering

Seminars / Projects / Theses in Graphics

Semester	Simulation Track	Rendering Track
Winter	Rasterization Course Simulation Course	Rasterization Course
Summer	Lab Course - simple fluid solver Simulation Seminar	Raytracing Course Lab Course - simple raytracer
Winter	Master Project - PPE fluid solver	Master Project - Monte Carlo raytracer Rendering Seminar
Summer	Master Thesis - research-oriented topic	Master Thesis - research-oriented topic

Animation and Rendering

- 500 M particles (with Fifty2 Technology)



Simulation and Rendering

- automotive industry (with Fifty2 Technology)



Outline

- introduction
- organization
- presentation
- summary

Organization

- oral presentation of a topic
- written report (10 pages)
- attendance of all presentations is mandatory
- recent information on
<https://cg.informatik.uni-freiburg.de/teaching.htm>

Outline

- introduction
- organization
- presentation
- summary

Presentation

- 20 min – 25 min per presentation
- 5 min – 10 min discussion
 - technical questions
 - form of the presentation

Topics - Example

Homogeneous coordinates

Die homogene Notation ist eine in der Graphik häufig verwendete Repräsentation von Positionen und Richtungen, die eine einheitliche Realisierung vielfältiger Transformationen von Positionen und Richtungen durch ein einfaches Matrix-Vektor-Produkt ermöglicht.

Quellen:

- http://cg.informatik.uni-freiburg.de/course_notes/graphics_02_transformations.pdf
- https://de.wikipedia.org/wiki/Homogene_Koordinaten
- <http://www.tomdalling.com/blog/modern-opengl/explaining-homogenous-coordinates-and-projective-geometry/>

Preparation

- know your topic
 - examine relevant material thoroughly
 - do not try to circumvent problems
- prepare slides
 - allow 1 to 2 minutes per slide
 - slides should be uniform and not too dense
 - incorporate illustrations
 - slide titles should be helpful
- rehearse your presentation
 - gather feedback
 - adapt your presentation accordingly

Presentation

- introduction
 - introduce yourself and the title of your presentation
- overview
 - give an idea, but not too detailed
- motivation
 - illustrate the principle and / or applications
 - explain the goal of your presentation
 - the audience should be eager to listen your presentation

Presentation

- main part
 - should consist of distinguished parts
 - separate different parts of the presentation explicitly
 - each part should be introduced and summarized
- summary
 - tell the audience what you have told them
 - ask for questions

Presentation - Summary

- introduce the title and yourself
- motivate and introduce your topic thoroughly
 - it is essential to arouse the interest of the audience right at the beginning
- give a brief overview
 - avoid too many details
- structure your presentation
 - introduce and summarize parts of your presentation
- summarize the entire presentation
- clearly mark the end of your presentation
 - e.g. “Thank you for your attention.”

Presentation

- check the presentation environment prior to the presentation
- do not occlude the projection
- avoid idiosyncrasies
- stay in time

Presentation

- do not learn your talk by heart
- do not read your talk
- do not read slides,
but explain every item on your slide
- do not be shy or quiet
- communicate self-confidence

Outline

- introduction
- organization
- presentation
- summary

Summary

- preparation of an oral presentation
- presentation (20 min – 25 min)
- written report (10 pages)
- start preparation in time
- employ various sources
- rehearse your talk