

Proseminar
Ausgewählte Themen der Computergraphik

Matthias Teschner



Contact

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<https://cg.informatik.uni-freiburg.de/teaching.htm>

Registration

- Choose a topic today or
- 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

- Modeling / geometry processing
- Animation / simulation
- Rendering
 - Rasterization
 - Ray tracing

Modeling - Animation - Rendering

- <https://www.youtube.com/watch?v=Flz5euIlMQo>



Introduction to Computer Graphics

- Rendering
 - Homogeneous coordinates
 - Rasterization (rendering pipeline, Bresenham line algorithm, Phong illumination model, Williams shadow mapping)
 - Ray tracing (Appel ray tracing)
- Geometry processing
 - Marching Cubes
 - Mesh simplification
- Animation / simulation
 - Particle systems

Course Information

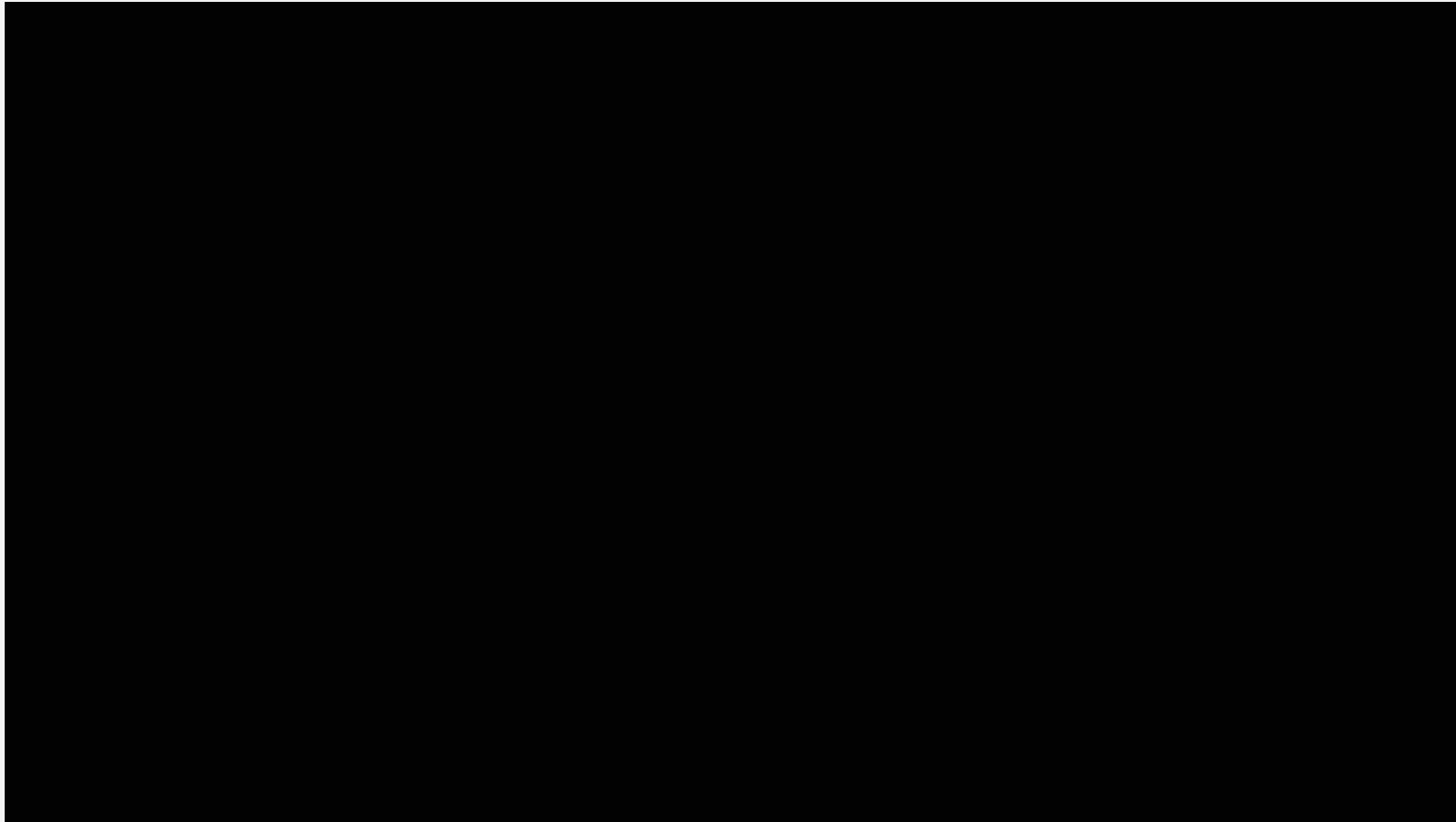
- Key course
 - Pattern recognition and computer graphics (rasterization)
- Specialization courses
 - Advanced computer graphics (ray tracing)
 - Simulation in computer graphics (e.g., fluids)
- Master project, lab course, Master thesis
 - Simulation track
 - Rendering track

Seminars / Projects / Theses

Semester	Simulation Track	Rendering Track
Winter	Rasterization Course Simulation Course	Rasterization Course
Summer	Lab Course - Simple fluid solver Simulation Seminar	Ray Tracing Course Lab Course - Simple ray tracer
Winter	Master Project - PPE fluid solver	Master Project - Monte Carlo ray tracer 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)



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- Introduction
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Organization

- Oral presentation of a topic
 - Presentations are given at the same time and in the same room as the introduction (announced in the course catalog and on our web page stated below)
- Written report (approx. 10 pages)
 - To be submitted until the last day of lectures of the semester
- Attendance of all presentations is mandatory
- Recent information on <https://cg.informatik.uni-freiburg.de/teaching.htm>

Mandatory Submissions

- Presentation slides and written report in two separate files
- Per email to Prof. Teschner
- In PDF format
- Until the last day of lectures of the semester

Consultations

- Two voluntary consultations
- Requested per email
- First consultation
 - General discussion of the outline
 - Content questions
- Second consultation
 - Discussion of the fully prepared presentation
 - Not later than one week prior the presentation

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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:

- https://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
 - 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
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Summary

- Preparation of an oral presentation
- Presentation (20 min – 25 min)
- Written report (approx. 10 pages)
- Start preparation in time
- Employ various sources
- Rehearse your talk

Summary

- Presentations take place at the same time and in the same room as the introduction
 - Announced in the course catalog and on our web page <https://cg.informatik.uni-freiburg.de/teaching.htm>
- Attendance of all presentations is mandatory

Summary

- Mandatory submissions
 - Per email to Prof. Teschner
 - In PDF format
 - Presentation slides and written report in two separate files
 - Until the last day of lectures of the semester

Summary

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