

Seminar
Advanced Topics in Rendering

Matthias Teschner



Contact

– Matthias Teschner

052 / 01-005

teschner@informatik.uni-freiburg.de

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

Outline

- Introduction
- Presentation
- Organization
- Topics

Course Information

- Key course
 - Pattern recognition and computer graphics (modeling, rendering, animation)
- Specialization courses
 - Advanced computer graphics (global illumination)
 - Simulation in computer graphics (deformable and rigid solids, fluids)
- Master project, lab course, Master thesis
 - Simulation track, rendering track

Seminars / Projects / Theses

Semester	Simulation Track	Rendering Track
Winter	Key Course Simulation Course	Key Course
Summer	Lab Course - Simple fluid solver Simulation Seminar	Rendering Course Lab Course - Simple raytracer Simulation Seminar
Winter	Master Project - PPE fluid solver Rendering Seminar	Master Project - Monte Carlo raytracer Rendering Seminar
Summer	Master Thesis - Research-oriented topic	Master Thesis - Research-oriented topic

Topics in Graphics

- Modeling / geometry processing
 - Mesh simplification, surface reconstruction
- Animation
 - Rigid objects
 - Deformable objects
 - Fluids
 - Collision handling
- Rendering
 - Ray tracing, volume rendering, rasterization

Simulation and Rendering

- 500 M particles (with FIFTY2 Technology)



Simulation and Rendering

- Automotive Industry (with FIFTY2 Technology)



Goals

- Familiarize yourself with a topic
 - Based on scientific publications
 - Using information from the authors' web pages
 - Using additional sources (internet, books)
- Prepare a comprehensible presentation
- Do not just reproduce the paper
- Adapt the organization and the focus of the paper in order to get a comprehensible presentation
 - You can skip some content
 - You can add content from additional sources

Outline

- Introduction
- Presentation
- Organization
- Topics

Presentation

- 30 ± 5 min per presentation
- 10 min discussion
 - Technical questions
 - Form of the presentation

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

- Check the presentation environment prior to the presentation
- Do not occlude the projection
- Avoid idiosyncrasies
- Stay in time

Outline

- Introduction
- Presentation
- Organization
- Topics

Requirements

- Presentation of a topic, 30 min, (English or German)
- Discussion (technical aspects, form), 10 min
- Written documentation (English or German)
- Attendance of all presentations is mandatory
- Information on <https://cg.informatik.uni-freiburg.de/teaching.htm>
- Submission deadline for presentation (PDF) and report (PDF): Last day of lectures of the semester

Registration

- Obtain the papers from <https://cg.informatik.uni-freiburg.de/intern/seminar/>
- Check for available topics, papers and dates
- Choose a paper / topic, choose a date
- Send an email to Matthias Teschner teschner@informatik.uni-freiburg.de with your registration request stating name, topic, date
- Register for the seminar in the campus management system

Goals

- Familiarize yourself with a computer graphics topic
 - Based on scientific publications
 - Using information from the authors' web pages
 - Using additional sources (internet, books)
- Prepare a comprehensible presentation
- Do not just reproduce the paper
- Adapt the organization and the focus of the paper in order to get a comprehensible presentation
 - You can skip some content
 - You can add content from additional sources








Outline

- Introduction
- Presentation
- Organization
- Topics

Overview

- Raytracing
- Radiosity
- Rasterization
- Volume rendering
- Surface reconstruction
- ...
- All animation topics

Publications

 dataStructures_2005_CGF_collisionDetection.pdf	04-Apr-2013 16:55 2.7M
 dataStructures_2011_CGF_dataStructuresSPH.pdf	04-Apr-2013 16:56 3.1M
 dataStructures_Lagae_Grids_-_2008.pdf	17-Dec-2009 15:44 3.2M
 dataStructures_Onderik_Efficient_Neighbor_Search_for_Particle-based_Fluids.pdf	09-Oct-2008 09:54 4.2M
 gridFluids_StableFluids.pdf	27-Aug-2013 10:22 1.3M
 gridFluids_StableFluidsImplementation.pdf	29-Apr-2014 12:33 1.0M
 gridFluids_fluid-EulerParticle.pdf	10-Apr-2013 10:17 1.0M
 gridFluids_fluid_flow_for_the_rest_of_us.pdf	10-Apr-2013 10:18 553K
 gridFluids_particleFluids_2007_SIGGRAPH_course.pdf	29-Apr-2014 12:57 5.5M
 particleFluids_2007_SCA_SPH.pdf	19-Nov-2007 16:34 629K
 particleFluids_2014_StateOfTheArt.pdf	07-Mar-2014 17:00 46M
 particleFluids_Monaghan_-_SPH_-_2005.pdf	04-Jul-2006 13:54 2.6M
 particleFluids_Solenthaler-pcisph.pdf	08-Feb-2012 10:52 6.5M
 positionBasedDynamics_2013_EG_positionBased.pdf	04-Apr-2013 16:56 17M
 positionBasedFluids_2014_SIGGRAPH.pdf	31-Aug-2013 16:41 5.6M
 rigidFluidCoupling_2009_TVCG_rigidFluidCoupling.pdf	04-Apr-2013 16:57 1.5M
 rigidFluidCoupling_2010_VRIPHYS_boundaryHandling.pdf	04-Apr-2013 16:56 1.8M
 rigidFluidCoupling_2012_SIGGRAPH_rigidFluidCoupling.pdf	04-Apr-2013 16:56 23M
 surfaceReconstruction_2012_VRIPHYS_surfacePipeline.pdf	04-Apr-2013 16:56 22M
 surfaceReconstruction_sol_cavw07.pdf	04-Apr-2013 16:57 1.9M
 surfaceReconstruction_survey_of_marching_cubes.pdf	04-Apr-2013 16:59 527K
 surfaceReconstruction_zhu-siggraph05-sandfluid.pdf	04-Apr-2013 16:58 1.7M
 surfaceTracking_siggraph2011.pdf	04-Apr-2013 17:03 33M
 volumeRenderingInVisualEffects2010.pdf	10-Apr-2013 10:12 65M
 volumeRenderingProductionFundamentals2011.pdf	10-Apr-2013 10:13 20M
 volumeRenderingProductionSystems2011.pdf	10-Apr-2013 10:13 82M