Elective and Summary

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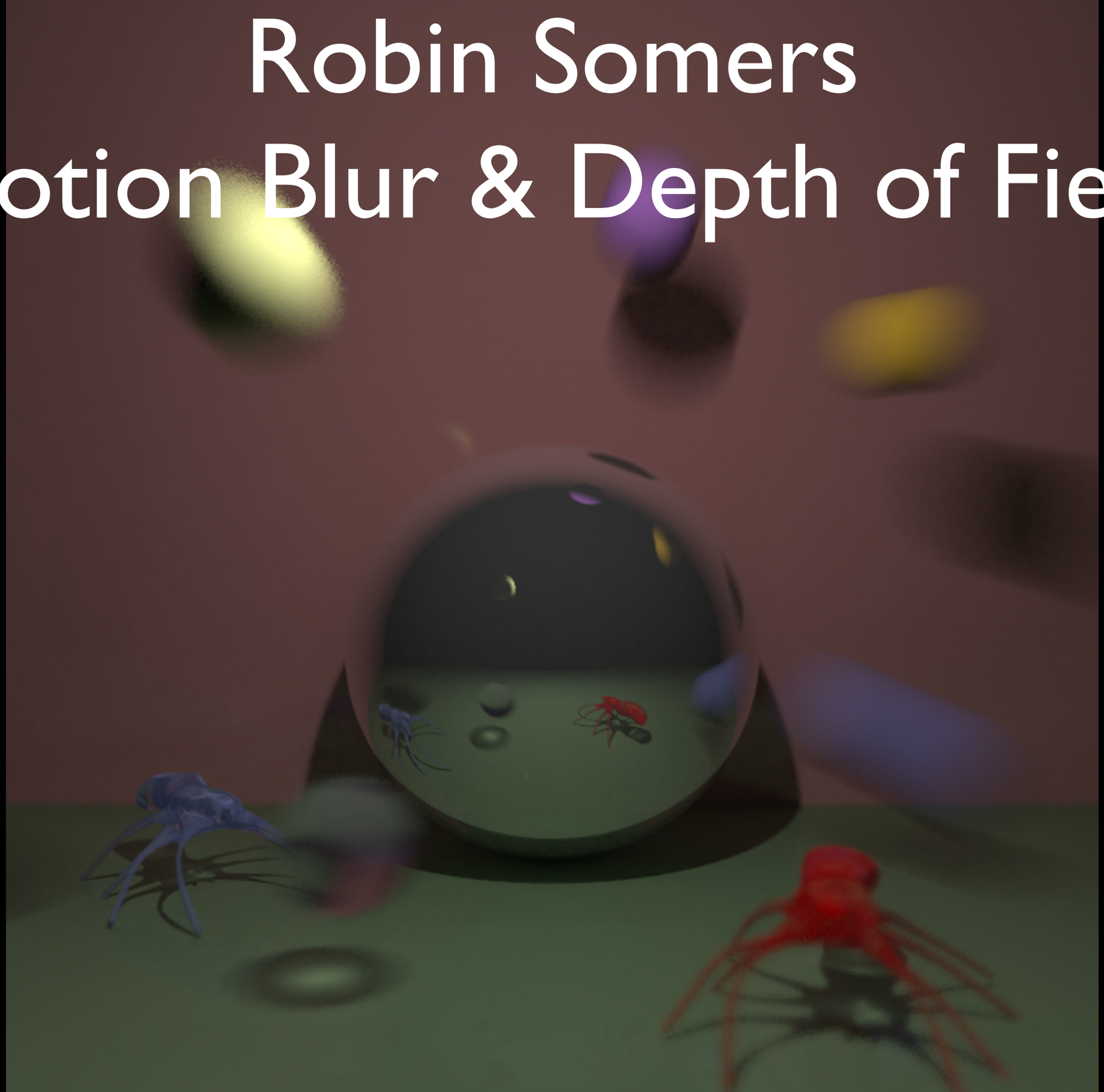
Outline

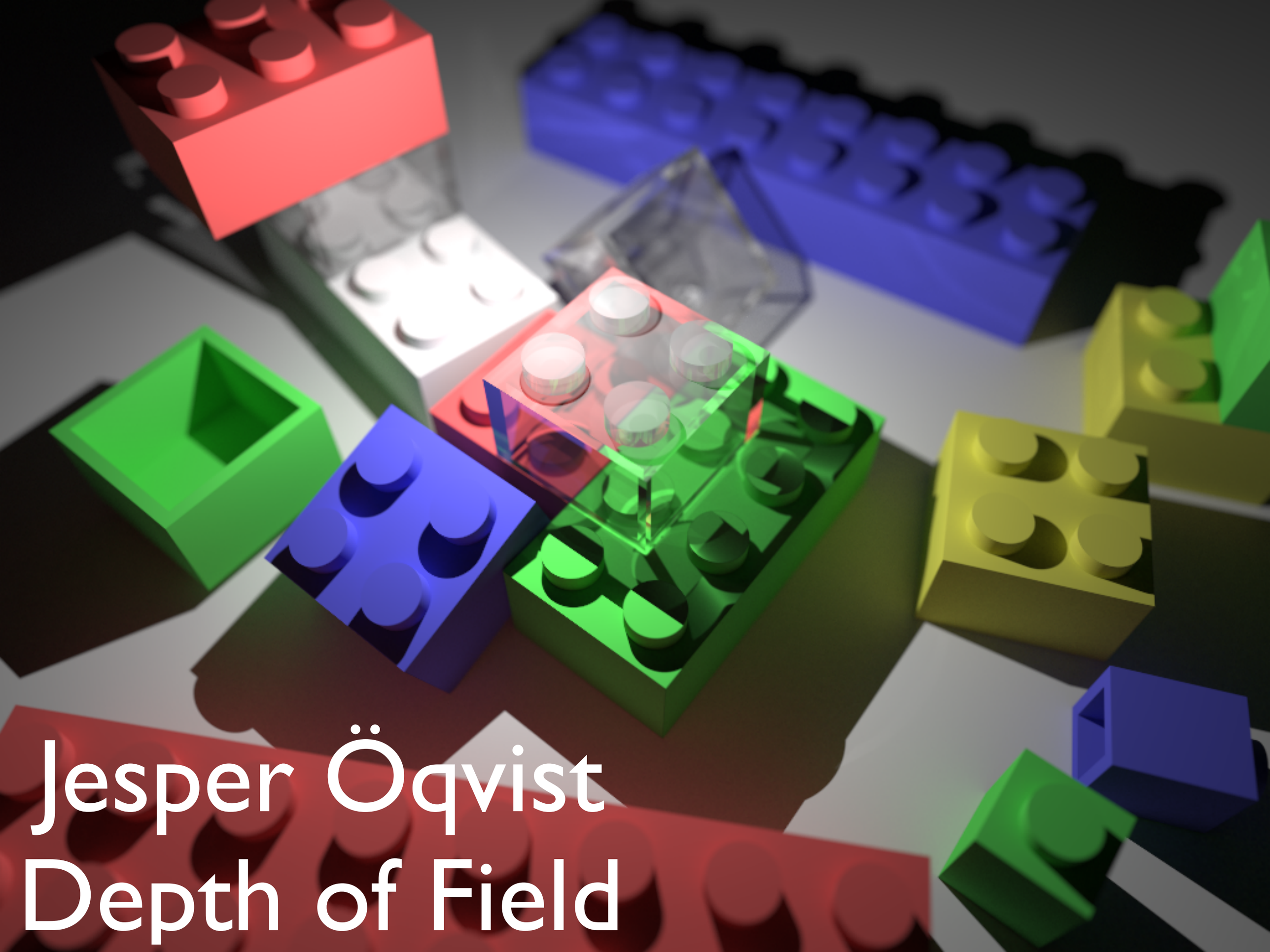
- Elective presentations
- Summary
- Exam

Elective Presentations

- AKA “1-week Rendering Competition”

Robin Somers
Motion Blur & Depth of Field

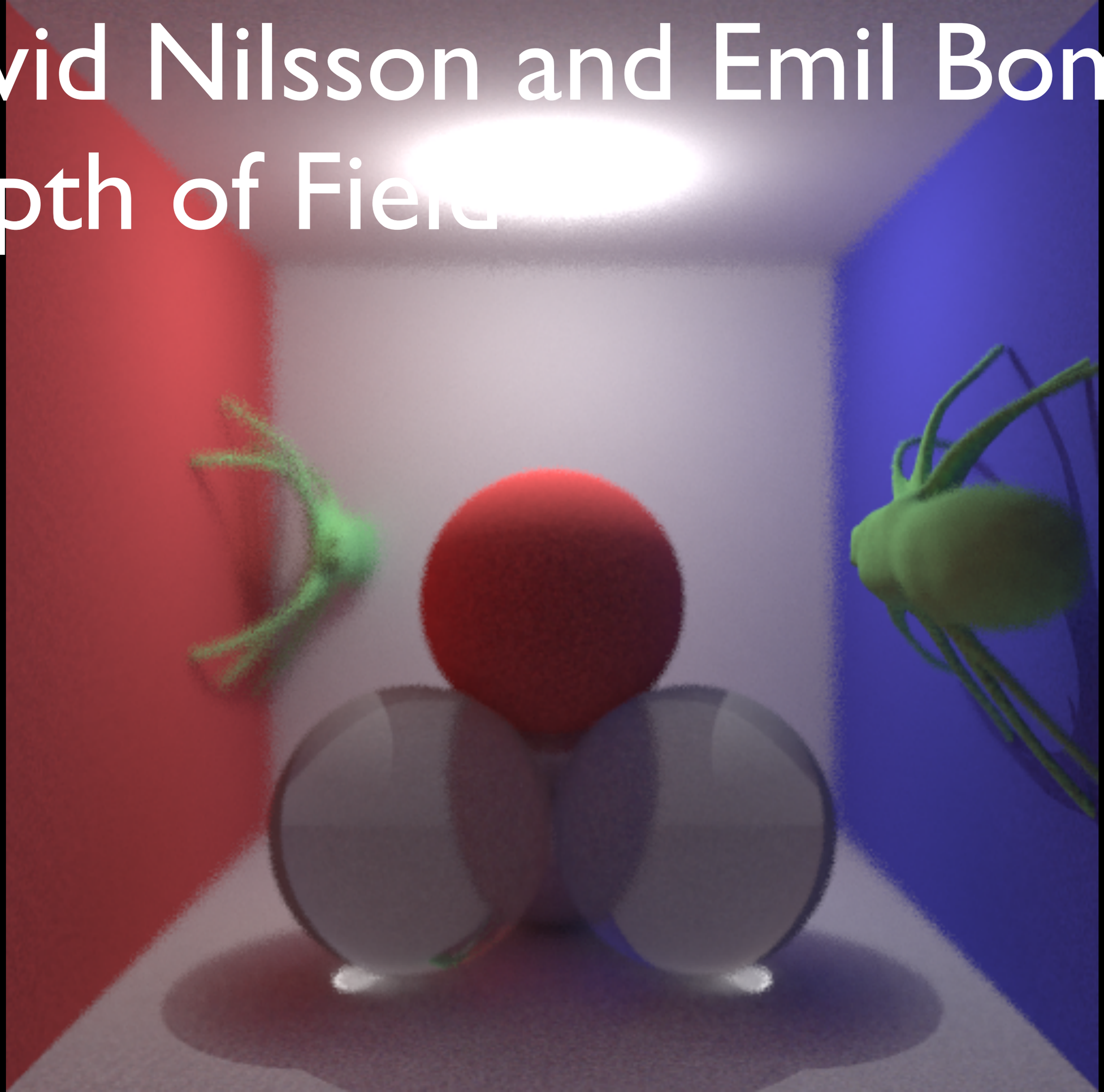




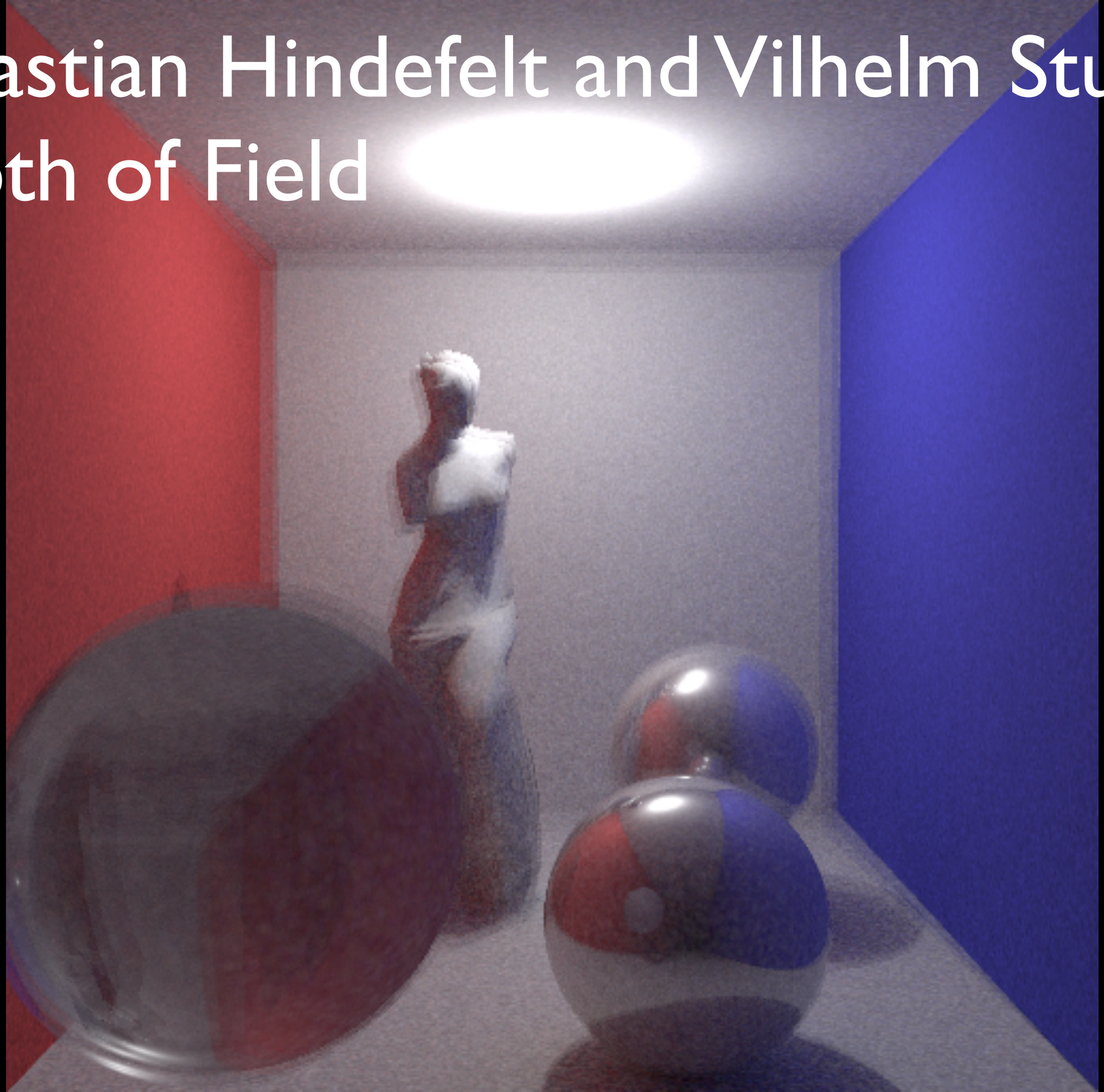
Jesper Öqvist
Depth of Field

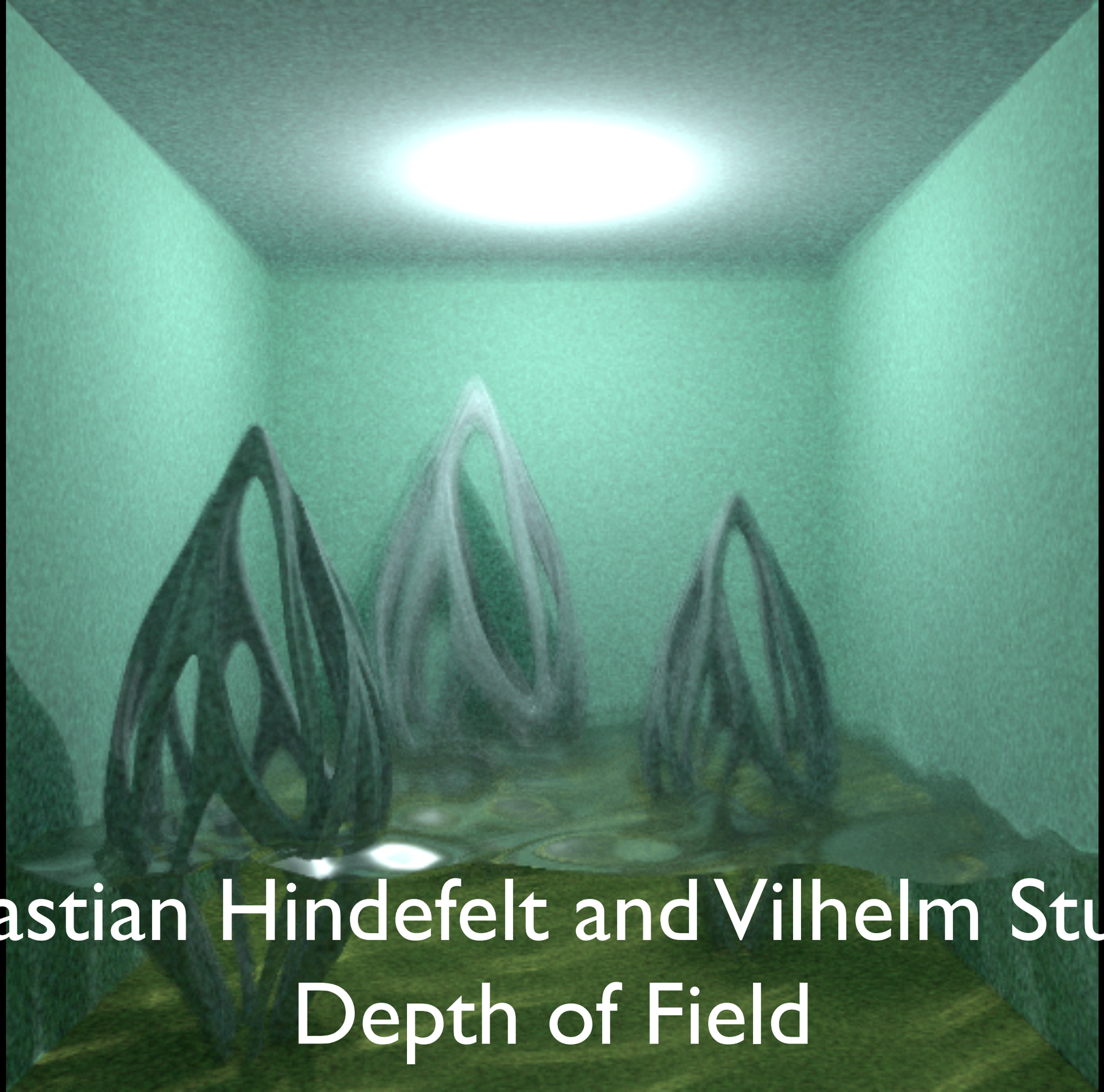
Arvid Nilsson and Emil Boman

Depth of Field



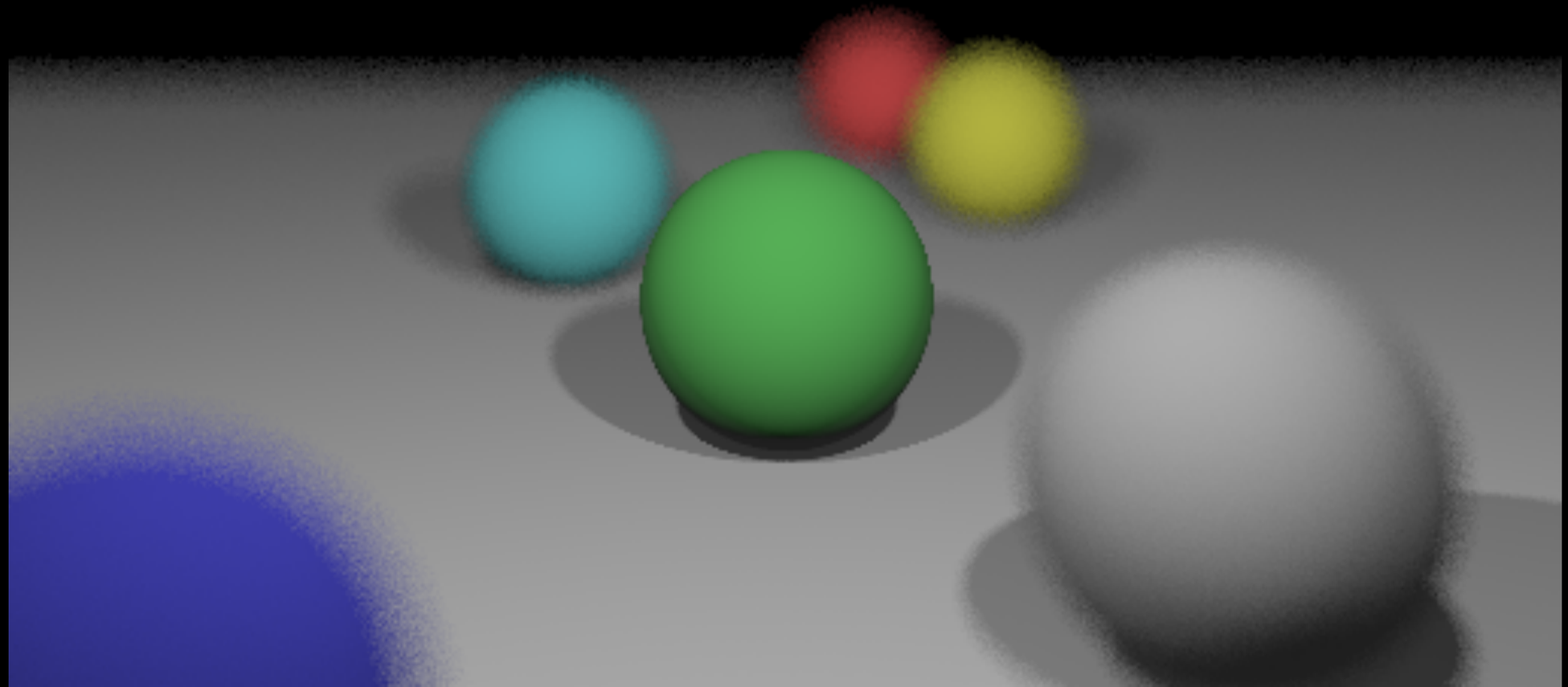
Sebastian Hindefelt and Vilhelm Sturén
Depth of Field



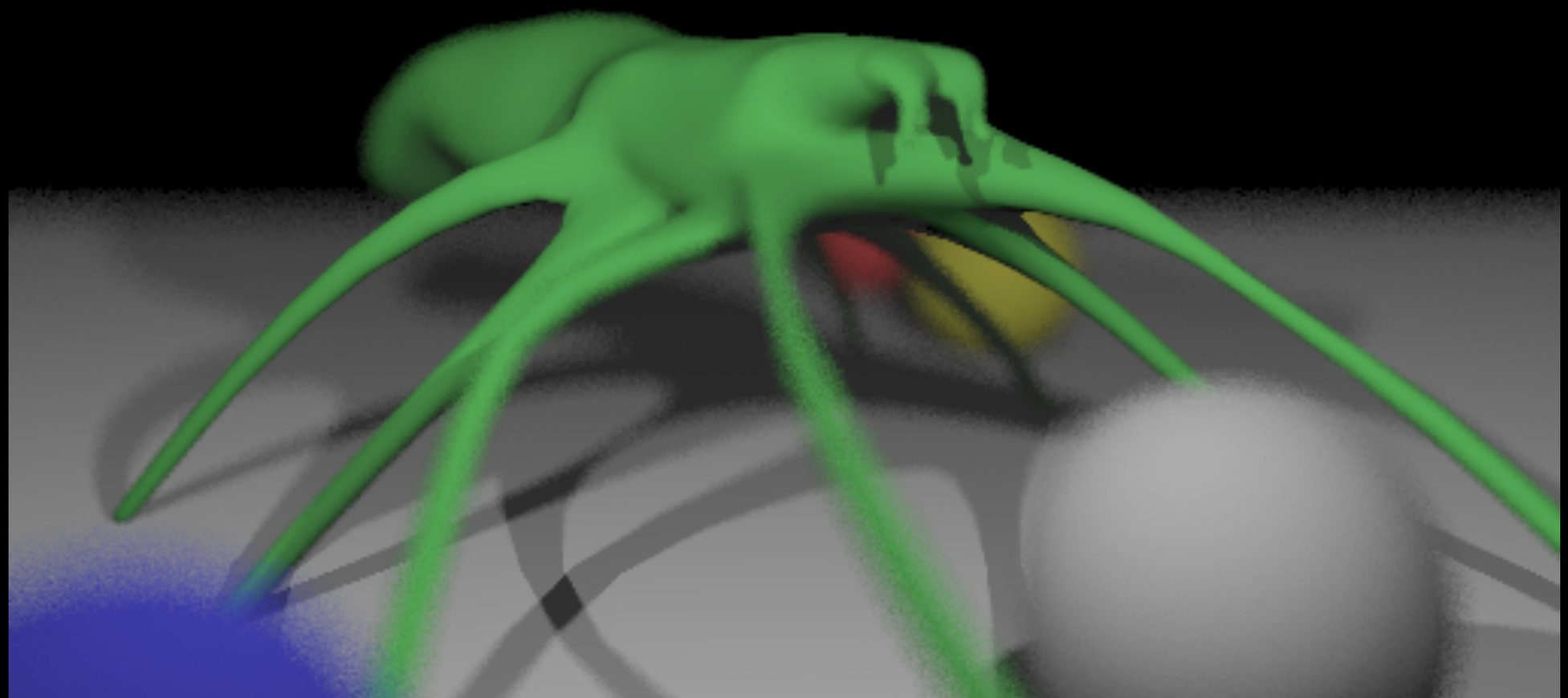


Sebastian Hindefelt and Vilhelm Sturén
Depth of Field

Aron Söderling & Niklas Strandberg
Depth of Field



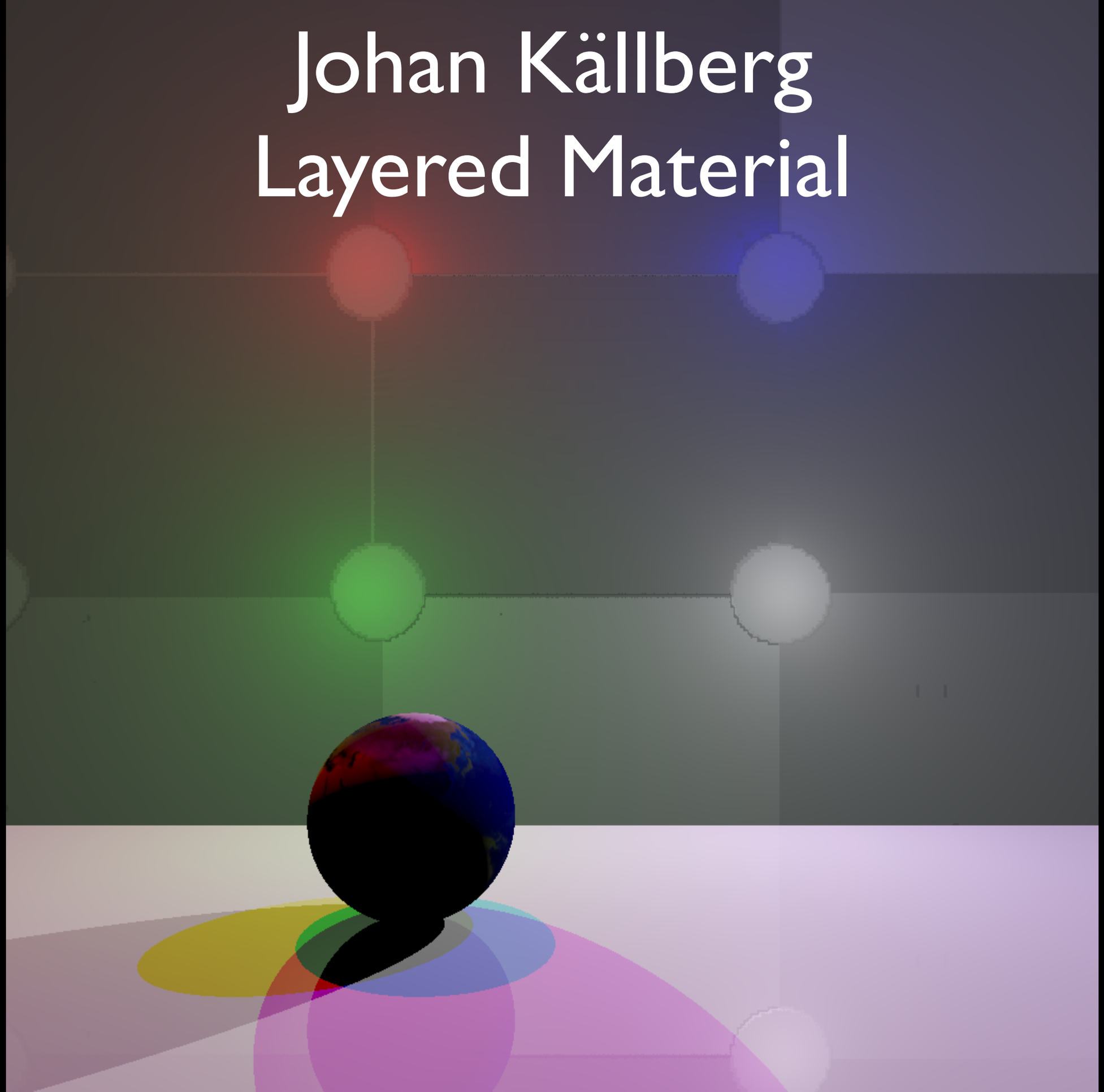
Aron Söderling & Niklas Strandberg
Depth of Field



Mikael Magnusson
Camera Motion Blur

Hanna Källen
Participating Media

Johan Källberg
Layered Material



Summary

- Ray Tracing
- Sampling
- Object Intersections
- Acceleration Data Structures
- Path Tracing
- Image Based Lighting
- Photon Mapping
  - Progressive PM
  - Participating Media
- Depth of Field/Texture Mapping

Ray Tracing

- Recursion
  - Reflection
    - Refraction
- trace() and directillumination() functions
- Assignment 1 - ray tracing

Sampling and Object Intersections

- Filters
- Reconstruction
- Sampling theorem
- Adaptive sampling
- Different Techniques
- Different objects
  - Sphere, Box, Triangle, ...

Acceleration Data Structures

- Uniform Grids
- Bounding Volume Hierarchy (BVH)
- KD-tree
- Octrees
- Construction
- Traversal
- Assignment 2 - BVH

Path Tracing

- Light transport notation
- Radiometry - Measuring light, terminology, concepts
- Illumination - direct vs indirect
    - Rendering Equation
    - Monte Carlo sampling
    - Russian roulette
- Path tracing algorithm
    - Doesn’t create more rays, follows a single path
    - Importance sampling - improving contribution of samples
- Image based lighting, HDR
- Assignment 3 - Path Tracing and IBL

Photon Mapping

- Algorithm
  - Photon Map, storing photons, gathering photons
  - Progressive
    - Read the paper!
  - Participating Media
  - Assignment 4 - Progressive Photon Mapping

Exam

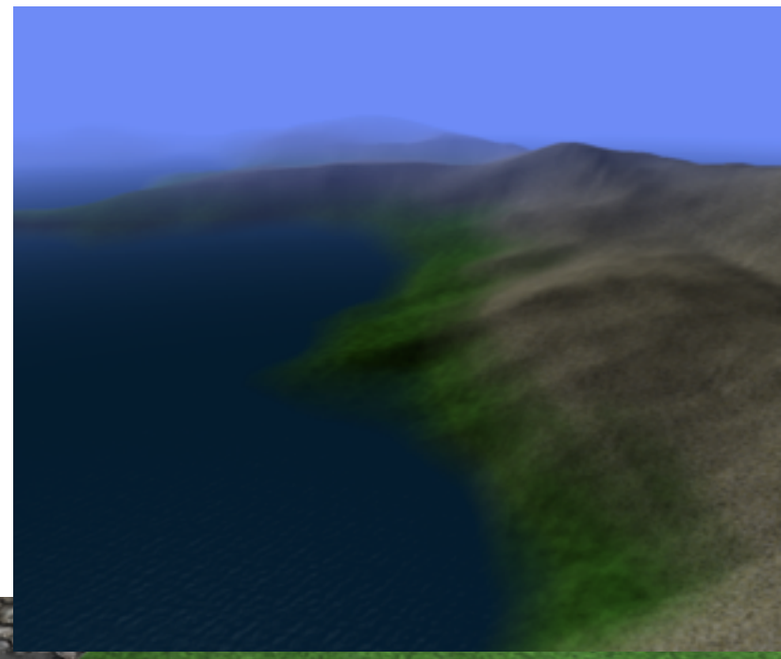
- Tuesday, June 3, 8:00 AM to 1:00 PM in Sparta:D
  - Retake exam is August 22 (if needed)
- Example questions online
  - Real exam will have harder BVH and Photon Mapping questions

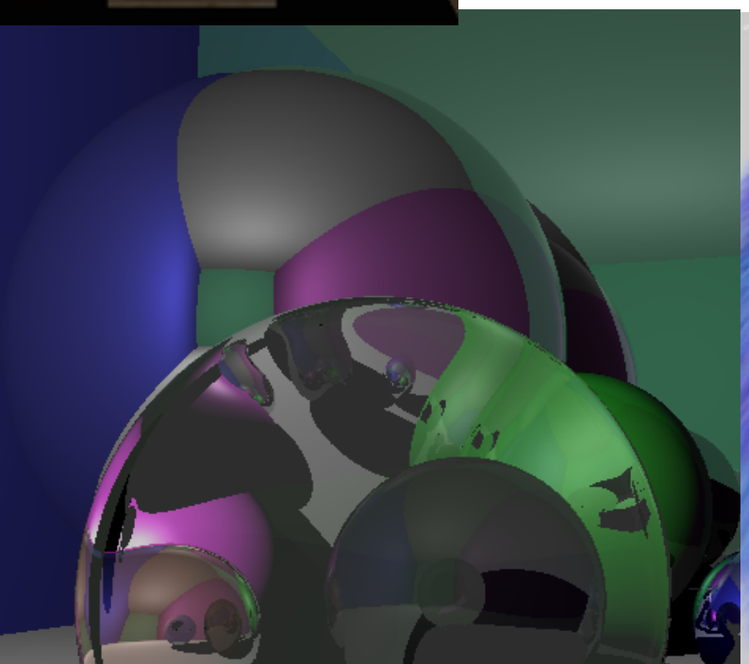
EDAN35 High Performance Computer Graphics

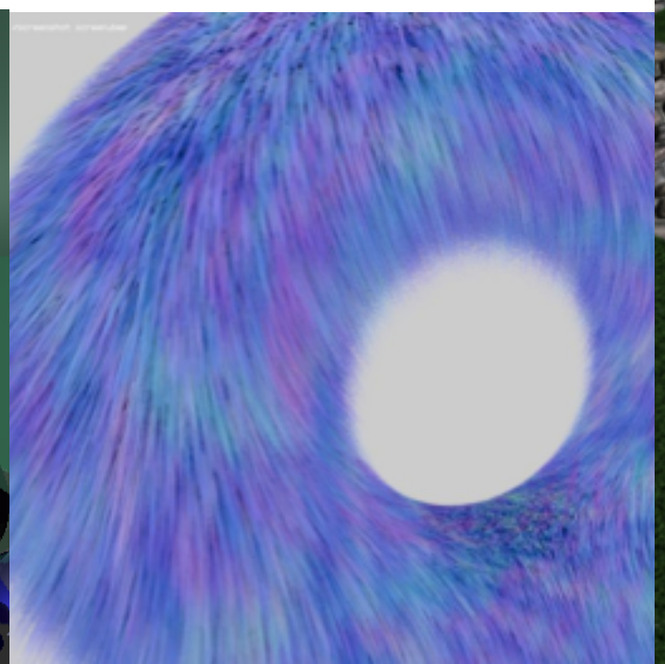
- Fall (HT2) 2014
- Contents:
  - Graphics hardware algorithms
  - GPU programming
    - Using OpenGL and C++ scenegraph
    - Possible to port to iPhone/iPad

EDAN35 High Performance Computer Graphics

- Two programming assignments
  - Simulating graphics hardware
    - Triangle rendering, caches etc
  - Shader programming
- **Project** with non-compulsory competition
- 7.5 points of fun!



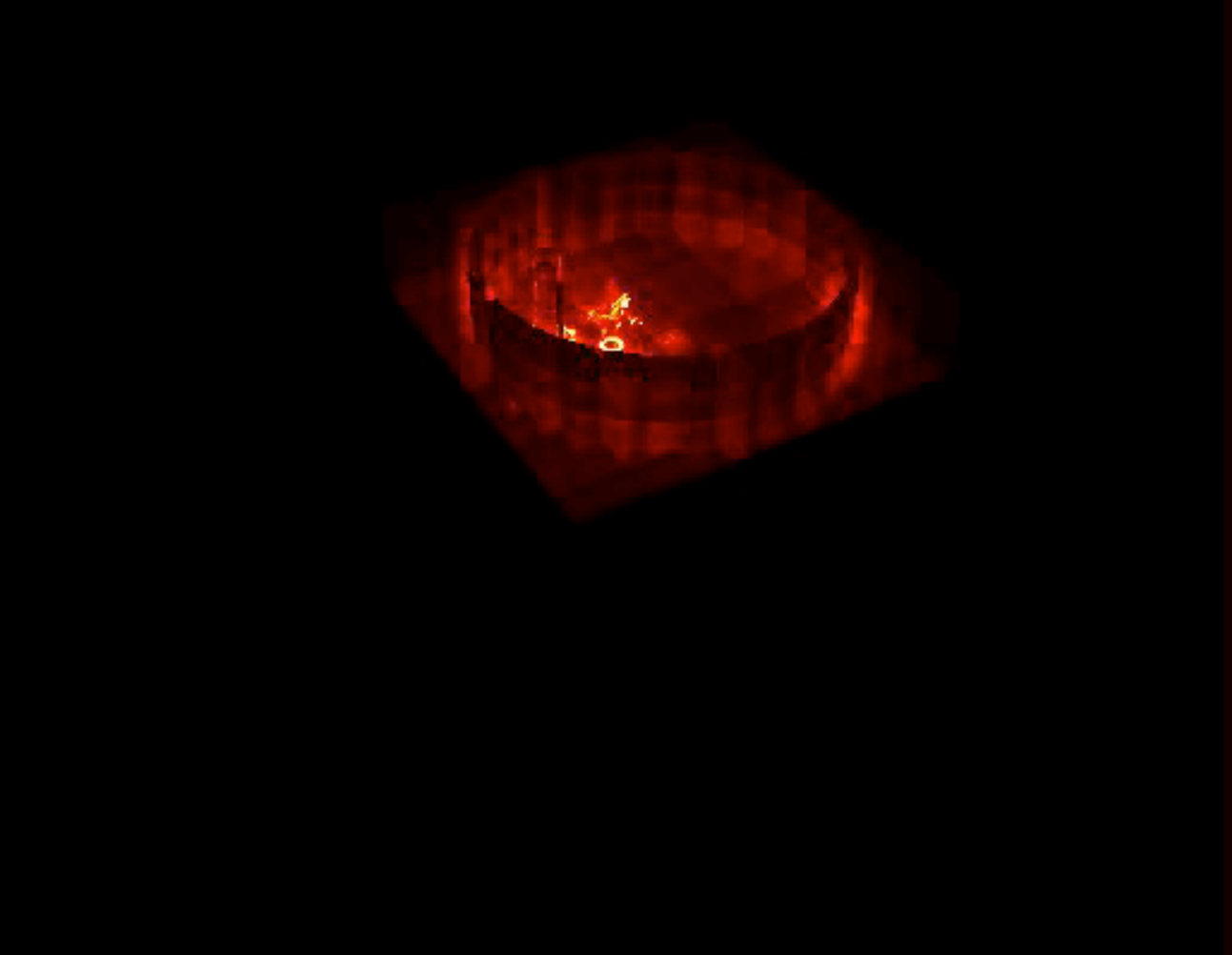


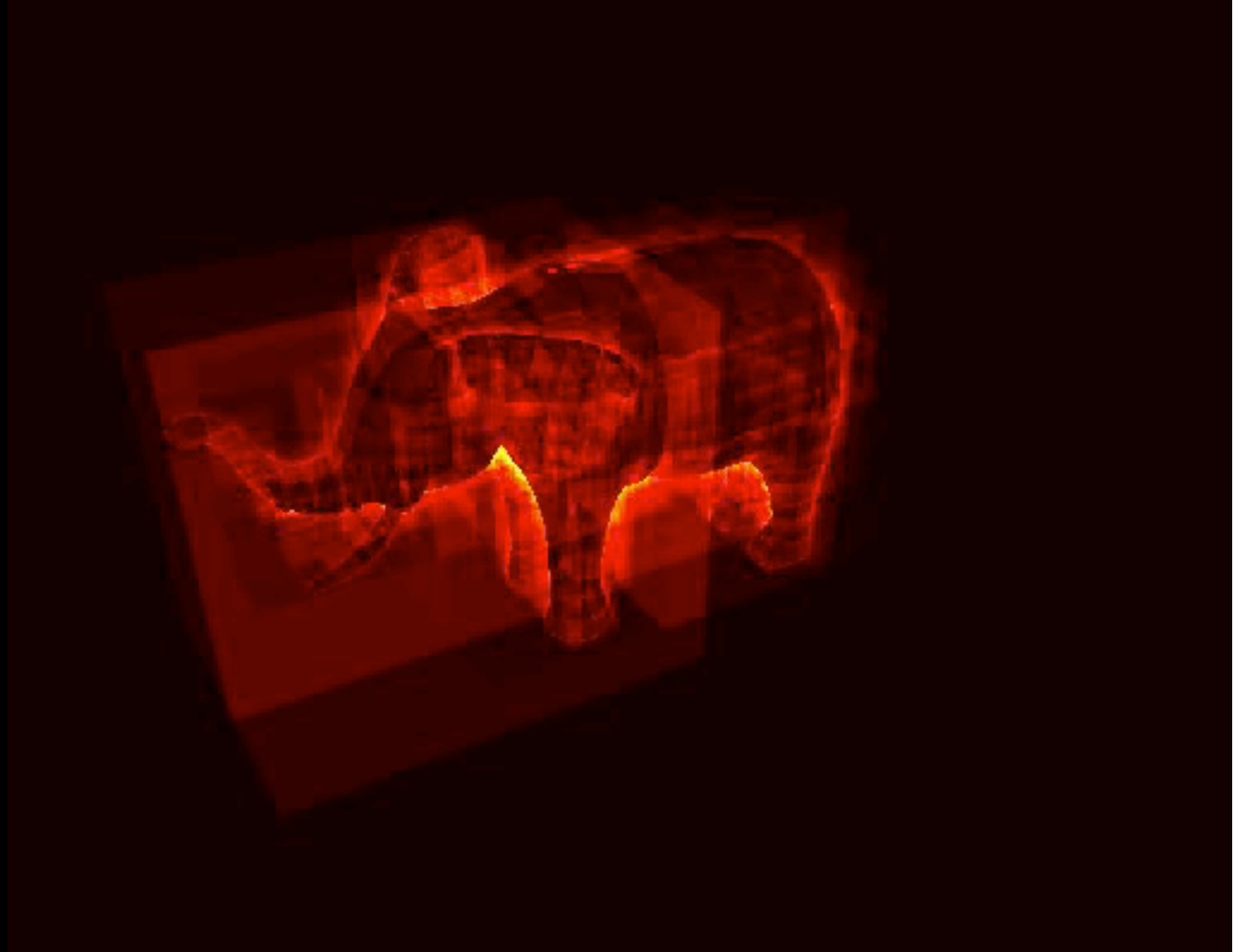


Masters Thesis in Graphics

- Thesis topics aligned with group research
- Group Research
  - Real-time ray tracing
  - Realistic rendering
  - GPU modelling, rendering, architecture
  - Realistic Camera effects, DOF/MB
  - check out graphics.cs.lth.se publications
- Company (when available)
  - Games - DICE, MASSIVE, Illusion Labs
  - AXIS - camera GPU programming

Real-Time BVH construction





The End!