# TU Clausthal

Virtual Aquarium

## Computer Graphics Group, Clausthal University of Technology

Setup of the Powerwall

The Powerwall consists of an array of 10 screens arranged in an angle of 180°. Each screen is illuminated by a video projector. The system is supported by a Dolby Digital 5.1 surround sound system. User input can be controlled with the *Flock of Birds*. This device tracks the input and the user position in the scene.
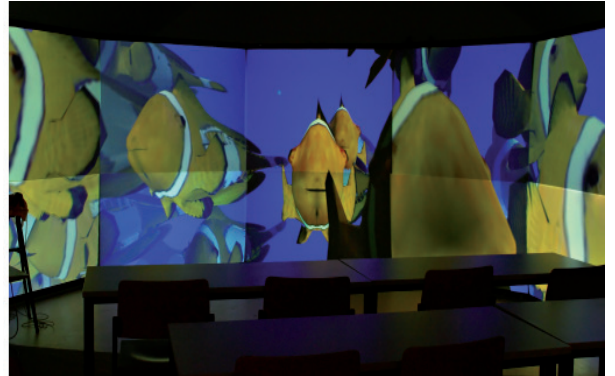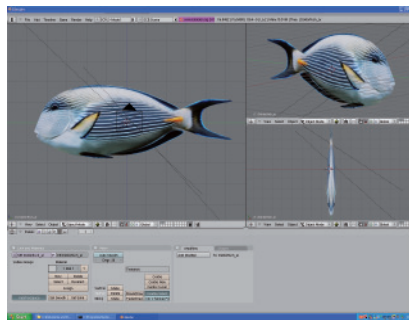
Goals

The virtual impression of a deep sea landscape should be modelled as closely as possible with the given system. As a student project the goal is accomplished by three workgroups.
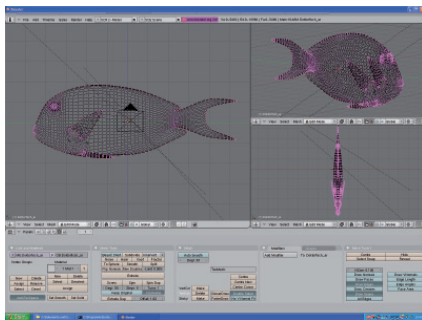
1.1) wireframe of a fish

1.2) solid fish with texture

1) Modelling

- Modelling & Texturing done with Blender (www.blender.org)
- Different resolutions of the fish, depending on the distance (level of detail)
- Different kinds of fish models (clownfish, surgeonfish, sharks, ...)
- Different environment objects (water plants, stones,...)

2) Artificial Intelligence

- Basic swarm rules defined
  - *Cohension*, each fish aims for the center of the swarm, the center of the swarm is the center of all position vectors
  - *Seperation*, move away from your nearest neighbour which is too close
  - *Direction*, swim in the same direction as your neighbours, direction of the swarm is the mean value of all fish vectors
- Intelligent avoidance of surrounding borders and items (collision detection)
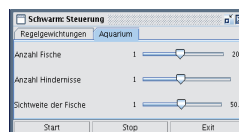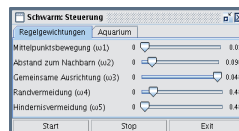
2.1) controlling of swarm parameters
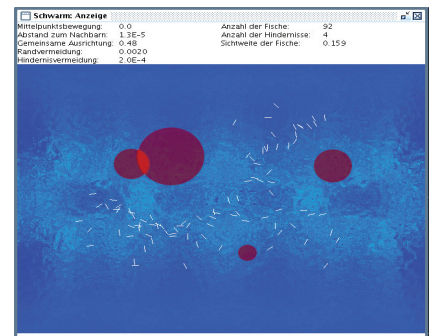
2.2) collision detection

3) Rendering

- Developed with an Open Source Scene Graph System (OpenSG)
- Describes the scene with an objectoriented datastructure
- Animation computed on the graphics card (GPU)
- Intensive usage of vertex- and fragmentshader

3.1) solid fish with 1510 triangles

3.2) solid fish with 452 triangles

3.3) solid fish with 98 triangles

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