Bremen





# VR CoralReef





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#### Bremen

## Motivation: Endangered Coral Reef

#### Nearly 3/4 of the world's reefs are gone or threatened

[Ocean Conservancy: "Coral Reefs: Critically Endangered", 2008, http://act.oceanconservancy.org/site/DocServer/Coral\_final.pdf?docID=4501 ]













Bremen

- Cooperation with the Center for Tropic Marine Ecology Bremen (ZMT)
- VR environment for showing simulation provided by ZMT to lay people (decision-makers, NGO's, farmers, ...)





- This project is right for you, if
  - You study computer science, you know C++ and want to gain some practice in computer graphics programming
  - You study design/media and you are a creative mind with skills in 3D design & modelling (and/or 2D)



### Main Goal of the Project



#### • Create a highly immersive underwater simulation of a coral reef



[Image Source]







- Realistic visualisation of the effects of climate change on coral reefs
- Bring the virtual reef to life with fishes and special effects
- Design of a complete and unique immersive user experience
  - Stereo rendering in Oculus
  - User interaction with VE using Kinect and/or other devices



[Image Source]



### Project Base Point

- Complete, existing framework (implementing SW infrastructure):
  - Integration of ZMT simulation
  - Interaction using Kinect
  - Random fish movement and plant spawning
  - Procedural generation of 4 species of corals
  - Based on the Ogre 3D graphics engine (in C++)



- Introduction to:
  - Coral growth and fish interaction (by ZMT)
  - Computer graphics and/or C++ (on demand)

### Project Tasks



- Programming of the VE logic:
  - Generic coral generation
  - Porting to Unreal engine (TBD)
  - Interaction with VE & simulation
  - Design and implementation of Al's for behaviour of fish (e.g., flocking, eating)
  - Interaction between fish & corals
  - Procedural generation of terrain



[Image Source]

- Modelling of VE:
  - 3D modelling and animation of realistic animals, plants, artifacts, and other environmental objects using tools like 3DSMax, Blender, Photoshop
  - Texturing (creating textures, uv mapping, ..)
  - Sound



[Image Source]



### Project Infos

- One-semester project (with regular work in our lab)
- Winter semester 16/17
- Prerequisites:
  - My course "Advanced computer graphics" in SS16
    - Is the preparation course for DM students
    - Is the "Projekt-begleitender Kurs" for CS students
  - Programming skills in C/C++ and/or modelling skills
- Nice-to-have:
  - My course "Virtual Reality and Physically-Based Simulation"
- The envisioned project team: mix of CS & DM students
- Further info (Schnuppertermin): TBD, Linzerstr. 9A, 3rd floor, CGVR lab
- Great opportunities for bachelor and master theses







### Ready to dive into another world with us?



[Image Source]

#### Meet us <<TBD>> at Linzer Str. 9A, 3rd floor

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Motivation

Project Targets