Hendrik Schwanekamp

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Education

2018 - now **M.Sc Computational Visualistics**, University of Koblenz
Thesis: *Performance analysis and optimization of highly diverging algorithms on GPUs*

2014 - 2018 **B.Sc. Computational Visualistics**, University of Koblenz
Thesis: *Simulating star formation* (GraSPH)

Professional Experience

07/2020 - 03/2021 NVIDIA Corporation
Intern in HPC computing and visualization.
Performance optimization of the IceCube photon propagation simulation code, a highly divergent CUDA code, resulting in a 3x speedup of day-to-day production simulation.

05/2018 - 02/2020 Max-Planck-Institute for Astronomy
Research assistant, research software engineer.
Development of visualization tools for astrophysical simulation data. Development of GPU-based interactive simulation code for planet formation (GraSPH2).

01/2016 - 03/2017 wizAI solutions GmbH
Working student, software development.
Extension and maintenance of digital signage software based on OpenGL and a custom client-server-model. Installation and administration of Linux-systems deployed at the customer.

08/2013 - 12/2015 action concept Film- und Stuntproduktion GmbH
Nine month post production intern. Then remote working, Junior VFX Artist.
Graphics design, fictional UI design, 2D compositing and other post production work. One month helping on the film set.

2011 - 2016 Redstone Entertainment
Founding member.
Producing commercials and image films for local businesses. Creating doumentaries on behalf of the local goverment. Making short movies for competetions and festivals.

08/2012 and 04/2011 Fraunhofer IMS / inHaus-Center
Two holiday internships, four weeks total.
Development of control software for an animated RGB-LED hotel ceiling. Concept development and implementation for the intelligent control of a Recirculating Air Cooling Unit

Publications and Talks

2021 Accelerating Ray Tracing for the IceCube Neutrino Observatory with CUDA
Benedikt Riedel, Hendrik Schwanekamp, Ramona Hohl
GTC 2021

2020 GPU accelerated fluid simulation for planet formation
PPP2020: Pebbles, Planetesimals and Protoplanets

2020 Introduction to OpenGL for astrophysical visualization
PPP2020: Pebbles, Planetesimals and Protoplanets

Scholorships and Awards

2019 scholorship to participate in the International High Performance Computing Summer School in Kobe

2018 2nd place for the best student project at University Koblenz with GraSPH

2013 DPG recognition for very good performance in physics

Projects

selection, see more projects on my website

GraSPH and GraSPH2

Perform simulations of star and planet formation on the GPU, while watching the interactive 3D visualization at the same time. Simulations of different scale and accuracy can be performed on local workstations or supercomputing systems. It allows for rapid testing of different initial conditions and simulation settings before more time consuming and expansive simulaitons are performed.

mpUtils

A modern C++ library with utility functions and STL extensions. It also provides a framework for graphical applications based on OpenGL and Dear ImGui, as well as CUDA support and utilities for GPU computing.

PyParticleVis

A python based visualization tool for particle and point cloud datasets. All settings and input data can be controled from python, while OpenGL is used internally to draw the point cloud. It allows everyone who analyzes data with python to explore their dataset interactively in 3D.

Techical Skills

Programming: C/C++, Python, OpenGL, CUDA
Have also used: Javascript, PHP, HTML/CSS, BASH, R, Lua
Software: LaTeX, Photoshop, Premiere, After Effects
Operating Systems: GNU/Linux, Windows

Languages

German: native
Englisch: fluent

Hobbies and Interests

Cooking, electronics, photography, reading, writing, games, art and sailing.