

Markus Pawellek

Curriculum Vitae

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Born on May 7th, 1995 in Meiningen, Germany

Education

Public High School »Goetheschule Ilmenau«

Sep. 2009 - Jun. 2013

GENERAL UNIVERSITY ENTRANCE QUALIFICATION (ABITUR, GRADE 1.2)

- Taking additional advanced courses in mathematics and natural sciences
- Graduation with best scores in advanced courses maths, physics, and informatics
- Writing of two term papers on ray tracing and compiler construction using C++
- Winning of several prizes in mathematical and physical olympiads
- Enthusiastic participation in the school's electronics club

Technical University Ilmenau

Oct. 2011 - Sep. 2012

EARLY STUDIES: EXPERIMENTAL PHYSICS (1.0)

Friedrich Schiller University Jena

Oct. 2013 - Sep. 2017

B.Sc. PHYSICS (1.7)

Bachelor thesis »Generation of Irradiance Maps« (1.3) on caching the diffuse light distribution of a scene to enable real-time rendering using a ray tracer implemented in C++

Oct. 2015 - Sep. 2018

B.Sc. MATHEMATICS (1.4)

- Specialization on theoretical informatics
- Bachelor thesis »Implementation of a Finite Element Method on a GPU« (1.0) on numerical solutions to the ideal wave equation on two-dimensional manifolds and its implementation in C++ on modern graphics processors using CUDA

since Oct. 2017

M.Sc. PHYSICS

- Specialization on quantum and gravitational theory
- Master thesis »Design and Implementation of Vectorized Pseudorandom Number Generators and their Application to Simulations of Photon Propagation« on exploiting SIMD-capabilities of modern processors in C++ to speed up random number generation while providing a well-designed interface

since Oct. 2019

M.Sc. MATHEMATICS

Skills

Computer Software Tools

C++

Advanced

9 years experience

Primarily specialized in graphics programming, numerical mathematics, and computational physics (N-Body Simulation, Computational Fluid Dynamics, Path Tracing, Pseudorandom Number Generators)

Development Environments:

- Standards: C++98, C++11, C++14, C++17
- Libraries: Boost, Doctest, Qt, SFML, OpenGL
- Concurrency: Threads, OpenMP, CUDA, SSE, AVX
- Compiler: GCC, Clang, Intel C++ Compiler
- Build Systems: CMake, Make, qmake, build2
- Operating Systems: Linux, Windows

Teaching Experience:

- University Courses for Students
- Weekly C++ Workshop for Students
- Private Tutor for Single Persons

Involvement in Open Source Projects:

- build2
- build2-packaging

Further Languages | **C, PYTHON, GO, RUST, JAVA**

Operating Systems | **LINUX, WINDOWS**

Further Tools | **GIT, LATEX, GNUPLOT, BLENDER**

Web Design | **HTML, JEKYLL**

DevOps | **DOCKER, CIRCLECI**

Languages

GERMAN | Native

ENGLISH | Fluent

RUSSIAN | Beginner

Work Experience

Fraunhofer ITWM Kaiserslautern: Competence Center High Performance Computing (CC HPC)

Sep. 2012

INTERNSHIP

Implementation of a ray tracer in C++ accelerated by a BVH, created using Morton codes

Oct. 2013 - Jun. 2017

RESEARCH ASSISTANT

- Improving knowledge and experience concerning program optimization in C++ and C, as well as compiler construction, computer hardware, parallel computing, and computer graphics
- Implementation of real-time ray tracers on CPU and GPU in C++ while using state-of-the-art procedures and professional tools, such as OpenGL, Qt, and CUDA
- Support of the development of a statistics-based analysis tool for seismic data by implementing histograms, kernel density estimators and color tables in C++ by using Qt
- Implementation of a serialization and deserialization process in C++ to read and write the Wavefront OBJ file format
- Editing and revising of various scene models using Blender

Friedrich Schiller University Jena

Oct. 2017 - Apr. 2018

RESEARCH/TEACHING ASSISTANT

- Seminar teacher »Mathematical Methods in Physics«
- Creation of exercise sheets and sample solutions with LaTeX
- Setting up an automatically compiling, LaTeX-based database for exercise sheets

Sep. 2018 and Oct. 2019

COURSE INSTRUCTOR

- Elective introductory course for university students on C++ (6 hours a day for two weeks)
- Elective introductory course for university students on LaTeX (6 hours a day for one week)

Further Interests and Activities

Music

GUITAR, E-GUITAR

- Playing for 12 years
- Participating multiple jam sessions
- Taking lessons every two weeks
- Giving private lessons
- Former member of semi-professional band »headedge« with official studio album

Sports

KUNG FU, ACROBATICS, JUGGLING