Markus **Pawellek**

Curriculum Vitae

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lyrahgames

Born on May 7th, 1995 in Meiningen, Germany

Education

Public High School »Goetheschule Ilmenau«, Special Class for Mathematics and Natural Sciences

Sep. 2009 - Jun. 2013

General University Entrance Qualification (Abitur, grade 1.2)

- Graduation with best scores in advanced courses maths, physics, and computer science
- Writing of two term papers on ray tracing and compiler construction using C++
- Winning of several prizes in mathematical and physical olympiads

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

Oct. 2017 - May 2020

M.Sc. Physics (1.1)

- Specialization on quantum and gravitational theory
- Master thesis »Design and Implementation of Vectorized Pseudorandom Number Generators and their Application to Simulations of Photon Propagation« (1.1) 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

University of Bergen, Norway

since Jun. 2022

Master Thesis for M.Sc. Mathematics

- Current working title »Design and Implementation of a High-Performance, Adaptive, and Robust Curve Smoothing Algorithm on Surface Meshes and its Application to Medical Visualization«
- In cooperation with the Mohn Medical Imaging and Visualization Centre (MMIV)

Skills

Computer Software Tools

C++ — *Advanced* — 13 years experience

- Specialized in graphics programming, numerical mathematics, and computational physics (Visualization, Computational Fluid Dynamics, Path Tracing, Pseudorandom Number Generators)
- Deeply experienced in build system, low-level, and template meta programming for CPU and GPU
- Well-educated concerning the modern standards C++11, C++14, C++17, C++20, and C++23

Further Languages | **C, NASM, JavaScript, Python** *Operating Systems* | **Linux, Windows**

Further Tools | **Git, LaTeX, Gnuplot, Blender** *Web Design* | **HTML5, CSS3**

Languages

German | *Native* **French** | *Beginner* **Norwegian** | *Beginner*

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 analyzation tool for seismic data by implementing histograms, kernel density estimators and color tables in C++ by using Qt

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)

ORISA Software GmbH Jena

Apr. 2020 - Sep. 2022

Software Developer

Research project concerning the multi-objective optimization of laser systems and the visualization of respective Pareto frontiers by using multi-dimensional Delaunay tessellations

Further Interests and Activities

Music

Guitar, E-Guitar

- Intensively playing for 15 years in multiple groups with additional studying of Jazz
- Former member of semi-professional band »headedge« with official studio album

Sports

Tricking, Kung Fu, Breakdance, Acrobatics, Juggling

Open-Source

build2, build2-packaging

- Voluntarily educating people, providing tools, and packaging third-party libraries for »build2«

Jan. 2016 - Oct. 2018

Latin Tournament Dancing

- Ballroom Dancing in D and C Class

Oct. 2018 - Oct. 2021

Voluntary Leader of Weekly C++ Working Group

Jan. 2020 - Nov. 2020

Voluntary C++ Course Instructor

Aug. 2020 - May 2022

Voluntary Jam Session Leader