

# 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 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

### Languages

German | **NATIVE**

English | **FLUENT**

### Programming Languages

C++

**ADVANCED**

9 years Experience

Graphics Programming and Numerical Simulations

- 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

Python

**NOVICE**

Novice

2 years experience

LaTeX

**ADVANCED**

Advanced

8 years experience

Usage for scientific reports and presentations

## Operating Systems, DevOps, Webdesign and others

Linux

**ADVANCED**

Advanced

8 years experience

Jekyll

**NOVICE**

Novice

Windows

**INTERMEDIATE**

Intermediate

HTML

**FORTGESCHRITTENER EINSTEIGER**

Intermediate

4 Jahre Erfahrung

Docker

**INTERMEDIATE**

Intermediate

1 year experience

Gnuplot

**FORTGESCHRITTENER EINSTEIGER**

Intermediate

6 Jahre Erfahrung

CircleCI

**INTERMEDIATE**

Intermediate

1 year experience

## 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
- 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

since 2008

### **GUITAR, E-GITARRE**

- Unterricht zwei- bis viermal im Monat
- Diverse Soloauftritte

Jan. 2016 -  
Oct. 2018

### **LATEIN-TUNIERTANZ**

seit  
Oct. 2018

### **WÖCHENTLICHES C++-MEETING: LEITER**

Jan. 2014 -  
Dez. 2018

### **BAND HEADEDGE: LEAD-GITARRE**

- Musikrichtung: Eclectic Rock
- Monatliche Auftritte innerhalb und außerhalb von Jena
- Sieger des Jenaer Nachwuchsbandwettbewerbes
- Veröffentlichung eines eigenen Studioalbums

seit  
Mrz. 2019

### **UNISPORT: KUNG FU, AKROBATIK**