

# Fabian Meyer

## Curriculum Vitae

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✉ [fabian.meyer1337@web.de](mailto:fabian.meyer1337@web.de)  
[github.com/MeyerFabian](https://github.com/MeyerFabian)  
Date of Birth: 1992-12-05  
Marital status: single

### Education

- 04/2019– **Self Education**, [coursera.org](https://www.coursera.org): Machine/Deep Learning(Stanford University); Physically Based Rendering([pbrt.org](https://pbrt.org)); Complex Analysis(MIT); Numerical Algorithms(Dahmen & Reusken: RWTH Aachen, Higham: University of Manchester, Strang: MIT).
- 04/2015– **Master of Science in Computational Visualistics**, *Universität Koblenz-Landau*,  
02/2019 Koblenz, (GPA (German): 1.4).
  - Thesis: “GPU Acceleration of the Material Point Method” (Grade: 1.1).
- 10/2011– **Bachelor of Science in Computational Visualistics**, *Universität Koblenz-Landau*,  
03/2015 Koblenz, (GPA: 1.6).
  - Thesis: “Simulation of Snow” (Grade: 1.0).
- 08/2003– **A-levels**, *Liebfrauenschule Cloppenburg*, Cloppenburg, (GPA: 2.1).  
06/2011
- Programming Algorithms & Data Structures, Real-Time Rendering, Computer Graphics, Com-  
Coursework puter Vision & Image Processing, Machine Learning, Animation & Simulation,  
Object-Oriented Programming, Software Engineering, Computer Architecture, Med-  
ical Computational Visualistics, Functional Programming, Theoretical Computer  
Science, Computer Networks, Basics of IT Security, Media Technology, Software  
Ergonomics
- Math/Physics Linear Algebra, Calculus, Multivariable Calculus, Mechanics & Thermodynamics,  
Coursework Stochastic, Topological Spaces, Algebraic structures
- Design Drawing, Psychology of the Visual System, Visual Culture Studies, Picture Design  
Coursework

### Work Experience

- 11/2015 **Blue Byte (Ubisoft) Coding Workshop**.
  - Simple physics simulation in Unity with C# utilizing DirectCompute
- 06/2010– **Artharia, Graphic Design & php Programming**.  
03/2014 Hobby Project, <http://artharia.de>
  - Development of an RPG Browser Game with php, HTML & CSS.
  - Designed header, maps and more than 250 icons.

### Software Projects

- Material Point Method(MPM)**, [github.com/MeyerFabian/snow](https://github.com/MeyerFabian/snow), [github.com/mpm-msc/snow](https://github.com/mpm-msc/snow)
- Implemented the MPM using OpenGL Compute for physically based simulations of continuum material.
  - Designed a shader generator for OpenGL to allow for various permutations of GPGPU compute programs.
  - Enforced Test-driven development to monitor numerical precision and performance metrics.

- Applied preprocessing of data layout(SoA), binning & counting sort to increase coalescing & caching behaviors and stream compaction of active cell regions.
- Accelerated governing transfers by fusing threads and utilizing the shared memory architecture leading to order-independence of data and up to 10x speedup over a naive GPU implementation.
- **Acquired Knowledge:** OpenGL Compute, C++17, CMake, NVIDIA Nsight, SymPy/Mathematica, GPU Caching + Coalescing & Memory Architecture, Data-Oriented Design, Test-Driven Development, Physical & Particle Simulation, Continuum Mechanics, Partial Differential Equations, Numerics, Finite Element Methods, Shader Generator, Elasticity & Plasticity Theory, Reflection

#### **Voxel Cone Tracing**, [github.com/MeyerFabian/VoxelConeTracingAO](https://github.com/MeyerFabian/VoxelConeTracingAO)

- Produced deferred shading by rendering to G-buffer and applying shadow/light mapping
- Finalized building and 3D-filtering + mip-mapping of the sparse voxel octree(SPVO)
- Created Ambient Occlusion & simplified Global Illumination shaders cone tracing the SPVO
- **Acquired Knowledge:** OpenGL, CUDA, C++, Ambient Occlusion, 3D-Filtering, Sparse Voxel Octree

#### **Visualization of Molecule Simulation**

- Designed & maintained system architecture between three task groups as well as interfacing between C++-Application and Unreal Engine
- Tasked as Integration Manager which includes maintaining and supplying a blessed repository
- Allocating/deallocating memory in MDTraj & Unreal Engine on creation & deletion of molecules
- **Acquired Knowledge:** Git, C++, Unreal Build Tool, Unreal Engine, MDTraj, Memory Allocation

#### **Rust Ray**, [github.com/MeyerFabian/rust-ray](https://github.com/MeyerFabian/rust-ray)

- Created simple CPU ray tracer with multiple bounces in Rust featuring multi-threading with Rayon.
- **Acquired Knowledge:** Rust, Rayon, Cargo, Mutability & Borrow Checking

#### **Neural Nets**, [github.com/MeyerFabian/neural\\_nets](https://github.com/MeyerFabian/neural_nets)

- Action recognition via images and NLP for toxic comments with the `fast.ai` library.
- **Acquired Knowledge:** `fast.ai`, Python, Google Colab, Deep Learning

#### **Fiber**, [github.com/MeyerFabian/fiber](https://github.com/MeyerFabian/fiber)

- Visualized DTI-data in Visualization Toolkit(VTK) & Qt with file managing and different view options.
- **Acquired Knowledge:** CMake, VTK, Qt, C++, Git

#### **Effects of G8/G9 schooling system**, <http://193.175.238.89/datasci/index.php/author/fmeyer>

- Preprocessed and visualized schooling system data with D3.js
- **Acquired Knowledge:** Javascript, D3.js, Data Science & Visualization

## --- Skills

Software	OpenGL, C++, Windows, Vim, Git ( <i>proficient</i> ) Rust, Python, Matlab, CUDA, OpenCL, Unix, Haskell ( <i>familiar</i> )
Language	German ( <i>native</i> ) English ( <i>fluent</i> ), M.Sc.-Thesis written in English
Math/Physics	Modeling & Simulation, Fluid mechanics, Optics, Complex analysis, Electrodynamics

## --- Hobbies & Interests

Hobbies	Computer Games, Concept Art, Tabletop Role-Playing Games, Inline skating
Interests	Simulation, Game Design, Tactics(Sports), Live-Streaming