

Dominik Wüst

M.Sc. Computer Science – Machine Learning & Rendering Engineer

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PROFILE

Computer Science graduate specializing in real-time computer graphics, GPU programming and machine learning. Experienced in C++, Vulkan and Python through research at KIT and Fraunhofer IOSB. Interested in neural rendering, differentiable graphics and computer vision.

EXPERIENCE

Oct 2021
Mar 2026

Research Assistant | Fraunhofer IOSB
Karlsruhe, Germany

- Applied pretrained computer vision models for object detection, segmentation, image retrieval, and vision-language embeddings to accelerate Structure-from-Motion pipelines
- Deployed deep learning models in C++ using ONNX Runtime and clip.cpp, converting models to ONNX and modifying computation graphs to support dynamic batch sizes and image resolutions
- Developed and shipped cross-platform software and maintained CI/CD pipelines using GitLab and Docker

C++QtOpenCVONNX Runtime

May 2025
Aug 2025

Research Assistant | Karlsruhe Institute of Technology (IVD)
Karlsruhe, Germany

- Contributed to a LLM-based shader optimization pipeline by integrating the Falcor renderer and adding support for cooperative vector acceleration
- Designed related LLM prompts and analyzed proposed optimizations automatically
- Co-author on related paper under submission

PythonC++Slang

Nov 2020
Jul 2021

Student Assistant | Karlsruhe Institute of Technology (CAPP)
Karlsruhe, Germany

- Tutored a group of students in computer engineering
- Courses in fundamentals of microelectronics, design and construction of logic circuits

LaTeXCPresentations

EDUCATION

2023
Present

M.Sc. Computer Science | Karlsruhe Institute of Technology (KIT)
Thesis: Automatic Shader Function Level of Detail using Neural Networks and Symbolic Regression – Current Grade 1.2

Computer GraphicsAnthropomatics and Cognitive Systems

2018
2023

B.Sc. Computer Science | Karlsruhe Institute of Technology (KIT)
Thesis: Real-Time Neural Path-Guiding – Minor: Electrical Engineering – Grade 2.1

2015
2018

Allgemeine Hochschulreife | Technisches Gymnasium Schwäbisch Hall
Specialization: Computer Science – Grade 1.2

SKILLS

Programming

C++
professional

Python
professional

C#
personal projects

Rust
personal projects

Graphics & GPU

VulkanSlang

GLSLCUDA

Machine Learning

PyTorch

ONNX Runtime

tiny-cuda-nn

Computer Vision

OpenCV

OpenMMLab

clip.cpp

Frameworks & UI

QtHTML/CSS

ImGuiReact

Tooling

DockerCMake

GitLab CI/CD

LANGUAGES

German

native

English

fluent

INTERESTS

Weight Lifting

Hiking

PC Modding

Spaceflight

2026

Automatic Shader Function Level of Detail using Neural Networks and Symbolic Regression

Code will be published after grading

Master's thesis: a data-driven approach to shader level of detail. Tiny MLPs and symbolic expressions are fitted automatically to approximate shader functions. The pipeline collects training data, fits the models, optimizes hyperparameters and evaluates candidates by rendering the shader end-to-end. It also explores fitting the models with respect to the final image using differentiable rendering.

Machine Learning

Python

Slang

2023

2D Fluid Simulation on the GPU

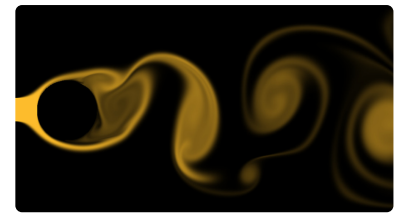
github.com/dom-wuest/FluidSim2D

An incompressible fluid simulation built on Vulkan compute shaders. It operates on a two-dimensional grid and supports solid and fluid cells with various initial conditions. Performance bottlenecks were analyzed with NVIDIA Nsight Graphics and optimized through ghost zoning, kernel decomposition and loop unrolling.

C++

Vulkan

CFD



2023

Real-Time Neural Path-Guiding

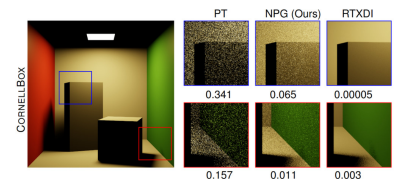
github.com/dom-wuest/NeuralPathGuiding

Bachelor's thesis: a compact MLP predicts the incident illumination at surfaces and guides subsequent rays. Training data is collected while rendering and the network is trained online to predict vMF distributions. In the next frame these steer the rays at the first visible surface towards bright regions.

Path-Tracing

Machine Learning

CUDA



2021

Present

Intelligent Video Sampler 3D

github.com/iVS3D/iVS3D

Preprocessing of image sequences for Structure-from-Motion using computer vision algorithms and deep learning models. The open-source project has been developed actively for over five years and runs on Windows and Linux. A plugin architecture selects frames by camera movement, deep visual similarity and GPS position, and masks dynamic objects such as vehicles automatically before a configurable SfM workflow starts.

C++

Qt

OpenCV

