# CURRICULUM VITAE

February 2026


## Johannes Unterguggenberger

Titles: **Dr. techn.**, Dipl.-Ing., B.Sc.

https://johannesugb.github.io


## CONTACT


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Google Scholar

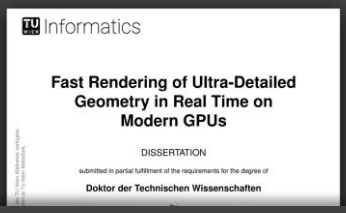

## SKILLS, EXPERIENCE

- C++
- C#
- GPU programming
- Vulkan
- OpenGL
- CUDA
- Shader optimization
- GLSL
- HLSL
- Unity engine
- O3DE
- Unreal engine

- Presentation skills
- Teaching
- LaTeX
- Teamwork
- Project leadership
- Video editing

- German
- English
- Italian

## SELECTED HIGHLIGHTS




PhD thesis/dissertation
Thesis


Master/diploma thesis: "Realistic Rendering in Mobile Augmented Reality"
Thesis | Poster


"Fast Rendering of Parametric Objects on Modern GPUs"
Paper (diglib) | Teaser Video

## EDUCATION

| | |
|---|---|
| 2017—2024 | **Ph.D. Computer Science**, Research Unit of Computer Graphics, TU Wien, Austria \| Defended on April 10th, 2025 with distinction |
| 2011—2016 | **Master's programme** Visual Computing, TU Wien, Austria Completed on November 15th, 2016 |
| 2008—2011 | **Bachelor's programme** Media Informatics, TU Wien, Austria Completed on September 14th, 2011 |
| 2007—2008 | **Bachelor's programme**, Computer Sciences, University of Salzburg, Austria |
| 2005—2006 | **Bachelor's programme,** Information Technology and Systems Management, Salzburg University of Applied Sciences, Austria |
| 1999—2004 | **Secondary education,** Electronic Data Processing and Organization, Higher Technical Education Institute Villach, Austria Completed (Matura) on June 14th, 2004 |
| 1991—1999 | **Primary education**, Carinthia, Austria |

## Doctoral Thesis

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|---|---|
| Title | *Fast Rendering of Ultra-Detailed Geometry in Real Time on Modern GPUs* |
| Supervisor | Univ.Prof. Dipl.-Ing. Dipl.-Ing. Dr.techn. Michael Wimmer |
| Referees | Prof. Dr.-Ing. Marc Stamminger, Prof. Ing. Jiří Bittner Ph.D. |

## Master Thesis

| | |
|---|---|
| Title | *Realistic Rendering in Mobile Augmented Reality* |
| Supervisor | Univ.Prof. Mag.rer.nat. Dr.techn. Hannes Kaufmann, Mag. Dr. Peter Kán |

## Bachelor Thesis

| | |
|---|---|
| Title | *Normal Map Filtering* |
| Supervisor | Univ.Prof. Dipl.-Ing. Dipl.-Ing. Dr.techn. Michael Wimmer, Dipl.-Phys. Dr.techn. Ralf Habel |

## Publications

**Johannes Unterguggenberger**, Lukas Lipp, Michael Wimmer, Markus Steinberger, Bernhard Kerbl, Markus Schütz. *Real-Time Rendering Methods with Adaptive Levels of Detail for Fast Rendering of Parametric Objects on Modern GPUs*. To be published in IEEE Transactions on Visualization and Computer Graphics. Accepted on 24-Nov-2025. Article DOI: 10.1109/TVCG.2025.3638697

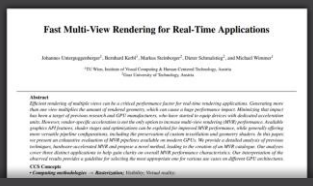
**Johannes Unterguggenberger**, Lukas Lipp, Michael Wimmer, Bernhard Kerbl, Markus Schütz. *Fast Rendering of Parametric Objects on Modern GPUs*. In EGPGV24: Eurographics Symposium on Parallel Graphics and Visualization. May 2024.

**Johannes Unterguggenberger**, Bernhard Kerbl, Michael Wimmer. *Vulkan all the way: Transitioning to a modern low-level graphics API in academia*. Computers and Graphics, 111:155-165. April 2023

**Johannes Unterguggenberger**, Bernhard Kerbl, Michael Wimmer. *The Road to Vulkan: Teaching Modern Low-Level APIs in Introductory Graphics Courses*. In Eurographics 2022 - Education Papers, pages 31-39. April 2022.

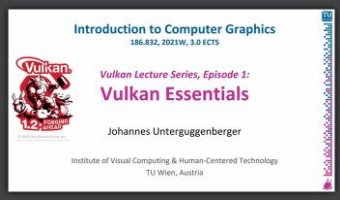
## SELECTED HIGHLIGHTS


"Conservative Meshlet Bounds for Robust Culling of Skinned Meshes" by Unterguggenberger et al., 2021
Paper (diglib) | Talk

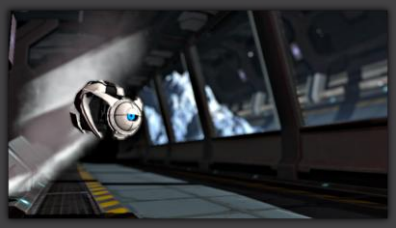



"Fast Multi-View Rendering for Real-Time Applications" by Unterguggenberger et al., 2020
Paper (diglib) | Talk (starts at 38:22)


Web-based prototype for a funding application: Interactive online showcase




Vulkan Lecture Series YouTube Playlist
Linked on vulkan.org: Learn -> Tutorials



"JAM Nightmare", Best demo in course "Real-Time Rendering", 2012
Hall of Fame | YouTube

"TowerdefendAR", 1st place in course "Augmented Reality on Mobile Devices"
Course site | YouTube



Stefan Stappen, **Johannes Unterguggenberger**, Bernhard Kerbl, Michael Wimmer. *Temporally Stable Content-Adaptive and Spatio-Temporal Shading Rate Assignment for Real-Time Applications*. In Pacific Graphics Short Papers, Posters, and Work-in-Progress Papers, pages 65-66. October 2021.

**Johannes Unterguggenberger**, Bernhard Kerbl, Jakob Pernsteiner, Michael Wimmer. *Conservative Meshlet Bounds for Robust Culling of Skinned Meshes*. Computer Graphics Forum, 40(7):57-69. October 2021.

**Johannes Unterguggenberger**, Bernhard Kerbl, Markus Steinberger, Dieter Schmalstieg, Michael Wimmer. *Fast Multi-View Rendering for Real-Time Applications*. In Eurographics Symposium on Parallel Graphics and Visualization, pages 13-23. May 2020.

## Current Position

2024—2026 **Senior Computer Graphics Architect,** Huawei Technologies Austria GmbH | C++, shader programming, HLSL, O3DE, Massively parallel algorithms, GPU performance optimization

## Previous Work Experiences

2023—2024 **Pre-Doctoral Researcher and Project Assistant,** Vienna University of Technology (TU Wien) | C++, Vulkan, CUDA, point-based rendering, GPU algorithms, GPU performance optimization, teaching, research

2022—2023 **Senior Rendering Algorithm Engineer**, Huawei Technologies Austria GmbH | C++, O3DE, graphics programming, geometry, research

2017—2022 **Pre-Doctoral Researcher and University Assistant**, TU Wien C++, Vulkan, OpenGL, graphics programming, teaching, research

2016—2017 **Freelancer: Web Development,** Comvexx Software-Entwicklungs GmbH | C#, ASP.NET, web backend development, SQL, web services

2007—2016 **Freelancer: Windows and Network Development**, Intergraph GmbH, later Hexagon Safety & Infrastructure C#, .NET, network programming

2011—2016 **Freelancer: Augmented Reality (AR) and Game Development,** Imagination Computer Services GmbH, later Humai Technologies GmbH (today Partium Technologies GmbH) | C#, C++, Unity game engine, AR product development, image tracking, SLAM

2010—2016 **Freelancer: Mobile App Development,** Tailored Media GmbH C#, .NET, Windows Store apps, Windows Phone apps, game development, Unity game engine, mobile AR development, image tracking, SLAM

2015 **Freelancer: Software Engineer,** PSPDFKit GmbH | C++11, library dev.

2010—2011 **Freelancer: Software Engineer,** Tools on Air - Broadcast Engineering GmbH | C, Cocoa, Objective-C, MacOS X development, audio programming, network programming

2006—2007 **Web Developer,** Sony DADC Austria AG | PHP, web design, HTML, CSS

2003—2007 **Freelancer: Software Engineer,** GISquadrat AG C++, Windows development, MS Access, Visual Basic for Applications

2005—2006 **Freelancer: Web Developer,** Interline Webdesign Solutions Full stack developer, PHP, HTML, CSS

2002 **Intern: Software Developer,** Sun Microsystems GmbH | Java

## Awards & Achievements

2019—2025 The **top four repositories** (in terms of stars) on the Research Unit of Computer Graphics' GitHub account are repositories where I have been maintainer and main contributor (3) or supervisor (1).

2020—2025 I've created the **five most-viewed lectures** on the Research Unit of Computer Graphics' YouTube channel. Top video has over 45k views.

2024 **Best Paper** at *Eurographics Symposium on Parallel Graphics and Visualization* for "Fast Rendering of Parametric Objects on Modern GPUs"

2023 Successfully applied for **public funding** of a web-based parametric modelling tool with the institution netidee. | JavaScript, WebGL, Babylon.js

2012 **Best Demo** in Real-Time Rendering course

2011 **Best AR Game** in Augmented Reality on Mobile Devices course

## SELECTED HIGHLIGHTS


Screenshot of exercises for the course "Algorithms for Real-Time Rendering" (See also Hall of Fame)

"Math2Model" web-based modeling tool
Project Page | Online Modeling Tool


Technical reviewer for:
GLSL Book (Packt) | Unity Book


"Fairy Tale Memories"
Mobile game for iOS and Android
YouTube

Oculus Mobile VR Jam 2015.
Game "Red Riding Hunt"
Jam site | YouTube

"Volumetric Lines" Unity asset
Asset Store | GitHub



## Teaching Activities

TU Wien *Master level*

**Algorithms for Real-Time Rendering**, *10—20 students*, lectures and exercises, 2018—2024 | Vulkan, algorithms, shader programming, C++

**Real-Time Rendering**, *20—30 students*, some lectures and exercises, 2017—2023 | OpenGL, Vulkan, algorithms, shader programming, C++

TU Wien *Bachelor level*

**Introduction to Computer Graphics**, *110—160 students*, transitioned the exercises to Vulkan, 2021—2023 | OpenGL, Vulkan, GLSL, C++

**Introduction to Visual Computing**, *>500 students*, exercises, 2017—2022 | Linear Algebra, Matlab, Computer Vision, Rendering

## Student Supervision

Master theses

**Wolfgang Rumpler,** "Real-Time Distortion Correction Methods for Curved Monitors"

**Lukas Geyer,** "Adaptive Sampling in position-based fluids"

**Stefan Stappen,** "Improving Real-Time Rendering Quality and Efficiency using Variable Rate Shading on Modern Hardware"

Bachelor theses

**Gerald Kimmersdorfer,** "Vertex Compression with Mesh Shaders for Skinned Meshes"

**Alexander Heinz,** "High-Quality Rendering of Interactive Particle Systems for Real-Time Applications"

**Nicolas Themmer,** Definition of a Workflow to Import FBX Models in Unity3D While Retaining Material Properties for Various Shader Types

Student projects

**Stefan Brandmair, Leo Halbritter, Ferris Schwarz,** supervised a funded project called "Math2Model", a tool for web-based 3D modelling with parametric functions in real time. | TypeScript, WebGPU, Rust, GitHub

**Stefan Brandmair,** Rust Tutorial

**Andreas Wiesinger,** CMake support and build system for a programming framework used in a foundational graphics course

**Alexander Cech,** Temporal Anti-Aliasing State of the Art, GitHub

**Hamed Jafari,** Improvements and Additional Features for a Modern C++/Vulkan Rendering Framework

**Elias Kristmann,** Components for Vulkan Launchpad: A framework for Vulkan beginners and introductory graphics courses

**Viktoria Pogrzebacz,** CMake support for Vulkan Launchpad: A framework for Vulkan beginners and introductory graphics courses

**Stefan Fiedler, Martin Rumpelnik, Lukas Herzberger** Improvements, Additional Features, CMake and Linux support for a Modern C++/Vulkan Rendering Framework

**Jakob Pernsteiner,** Improvements and Additional Features for a Mesh Shader-Based Research Project

**Simon Maximilian Fraiss,** "Focus": Using Real-Time Ray Tracing Innovatively for Gameplay in a Puzzle Game, GitHub

**Nikole Leopold,** Adding Voxelization using the Hardware Rasterizer to a Cross-Platform C++/OpenGL Engine

## Miscellaneous

2024 Gave a **Vulkan Tutorial** at the *Central European Seminar on Computer Graphics (CESCG)*, 20—30 participants, Smolenice Castle, Slovakia

2023 Gave a **Vulkan Tutorial** at the *Khronos Vulkanised Conference*, 50—70 participants, Munich, Germany | C++, Vulkan

2018—2019 **Technical reviewer** of 2 books: *OpenGL 4 Shading Language Cookbook*, and *Hands-On Game Development Patterns with Unity 2019*, for Packt

2016 Released **Fairy Tale Memories,** a *mobile game* on iOS and Android mobile app stores. | C#, Unity, Game Design, UX, Mobile Game

2016 Released **Volumetrc Lines** Unity asset, 5 stars, >200 ratings | C#, Unity

2015 Participated in the **Oculus Mobile VR Jam** | C#, Unity, Virtual Reality