HARALD REINGRUBER

Medical 3D Visualization Expert · Rust & WebAssembly

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SUMMARY

Specialist in medical 3D visualization, real-time graphics, and augmented reality, with 15+ years spanning medical imaging, AR/VR SDKs, and web-based 3D streaming – currently leading a Rust/WebAssembly modernization of a legacy C++ visualization engine. Pragmatic about trade-offs, balancing product delivery with long-term quality and maintainability through clean code, TDD, and continuous improvement.

EXPERIENCE

Medical 3D Visualization Expert

Dedalus HealthCare DACH

11/2020 – Present · Scharnstein, Austria (Remote)

- Led the technical transformation of Dedalus' medical 3D visualization module: evaluated technology options and migrated a legacy C++/DirectX 9 codebase to Rust + WebAssembly + WebGL/OpenGL and TypeScript
- Repackaged the module as a framework-agnostic Web Component, now shipping in production in two host products (Angular- and React-based)
- Engineered a side-by-side comparison system enabling precise performance and visual validation during the migration
- Established a component-level E2E testing layer with Storybook and Playwright, replacing cumbersome end-to-end tests in host applications

Pair & Mob-Programming Tour (Apprenticeship)

Self-employed

11/2019 – 05/2020 · Remote (Worldwide)

- Practiced TDD and pair/mob programming with 9 teams across 4 countries (USA, France, Austria, Romania) – fully remote due to COVID-19 – in a wide range of languages and environments
- Co-organized the Mob-Programming on Open Source Software meetup in Austria

Software Engineer – Unity 3D/Node.js/React/TypeScript

three10

09/2016 – 10/2019 · Vienna, Austria

- One of two principal engineers (team of 6); owned secure communication and file transfer between the Unity 3D application and the on-premise backend, plus the Docker/TypeScript/React/Node.js backend architecture
- Built a JavaScript library for real-time streaming of server-side Unity 3D graphics to an HTML5 browser via a low-latency video codec
- Implemented HTML5 Server-Sent-Events for backend-to-client data updates (C# client, Node.js server)
- Built the Docker deployment pipeline for the on-premise backend and implemented network screen capture/streaming

TECHNICAL SKILLS

Languages

Rust · TypeScript/JavaScript · C++ · C# · Java

Graphics & 3D

WebGL/OpenGL · WebAssembly/Emscripten · Unity 3D

Imaging & Vision

OpenCV · SIMD (SSE/AVX/Neon) · Image Processing

Web & Tooling

Node.js · Web Components · Playwright · Storybook · Docker

ENGINEERING PRACTICES

- Unit Testing
- E2E Testing
- Test-driven Development (TDD)
- Pair-/Mob-Programming
- Clean Code
- Scrum
- Kanban
- AI-Driven Development (Copilot, Claude Code, OpenSpec)

EDUCATION

MSc Computer Science, Visual Computing

Vienna University of Technology

2007 – 2011 · Vienna, Austria

Image processing, real-time graphics, machine learning, pattern recognition, computer vision, augmented reality.

Software Engineer, Augmented Reality (C++/Objective-C/JavaScript)

ViewAR

04/2015 – 08/2016 Vienna, Austria

- Principal engineer on the C++ team; extended the ViewAR core module and integrated third-party AR/VR SDKs
- Computed watertight 3D triangle meshes from depth-sensor scans and an algorithm to derive scanned object volume (used in a Lufthansa Cargo pallet-volume system)
- Cross-compiled the ViewAR C++ core to JavaScript/WebGL using Emscripten/WebAssembly
- Added video texture decoding support

3D Volume Rendering Engineer (C++)

Agfa HealthCare

10/2013 – 04/2015 Vienna, Austria

- Main engineer for Agfa's GPU/CPU volume rendering engine (team of 8 across Austria, Belgium, Canada), with SIMD-optimized CPU rendering
- Implemented bi-cubic filtering to improve WebGL low-resolution image resampling quality
- Built a CMake build system, replacing separate per-platform build scripts

Software Engineer, 3D Visualization (Java)

Agfa HealthCare

09/2010 – 09/2013 Vienna, Austria

- Implemented and maintained 3D visualization and volume image data loading features (team of 22)
- Implemented progressive loading of volume image data (patent granted)
- Built normal-plane visualization for the unfolded blood vessel view and improved 2D annotation intersection rendering

SELECTED PROJECTS & RESEARCH

Master's Thesis – Austrian Institute of Technology

10/2009 – 07/2010 Vienna, Austria

"An Asynchronous Data Interface for Event-based Stereo Vision Systems" – improved 3D reconstruction accuracy through event density-based pixel retention adjustment.

Final Year Project – Computer Vision Center

02/2009 – 07/2009 Barcelona, Spain

"Intestinal Content Detection in Capsule Endoscopy using Robust Features" – developed an SVM detector achieving 71% accuracy for clinical image analysis.

Exchange Program

Universitat Autònoma de Barcelona

2009 Barcelona, Spain

Feature detection (SIFT/SURF), machine learning.

BSc Computer Science, Medical Software Engineering

Upper Austria University of Applied Sciences

2005 – 2007 Hagenberg, Austria

LANGUAGES

German (Native) English (Fluent) Spanish (Conversational)