

# Dr. Jochen Görtler

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## > Profile

I am a consulting senior software engineer and research scientist. I design and develop hand-tailored data exploration systems that help users better understand machine learning algorithms and steer their performance through interactive visualizations. Typically, these systems leverage the full web stack: I have more than five years of experience in *Rust*, writing efficient and performant systems code that can also compile to *WASM*, while I use *TypeScript* together with frontend frameworks such as *Svelte*, *React*, and *Vue* to provide robust and rich user interactions that are intuitive to grasp for all stakeholders. I love working closely with clients to fully understand the requirements of their business domain—and helping them integrate my work by refactoring or modernizing legacy systems.

## > Experience

### **Apple (Video Engineering, Seattle – Remote)**

02/2023–08/2024

*Freelance – Machine Learning Research Engineer*

Researching interactive visualizations to improve the on-device inference efficiency of deployed machine learning models. Implemented a system that uses genetic algorithms to automatically find and explore Pareto-optimal improvements to neural network architectures in *Rust*, *WASM*, and *TypeScript*. Design and implementation of an interactive graph viewer in *TypeScript* using *Svelte*, which is used by multiple internal teams to visualize deep neural networks and Transformer architectures. Refactor and modernization of a large frontend research prototype written in *JavaScript* and *Vue* using *TypeScript*. Setting up *Kubernetes* deployments and CI/CD workflows.

### **IOTA Foundation (Berlin – Remote)**

04/2022–02/2023

*Team Lead – Senior Software Engineer (Rust)*

~11 months

Leading the development of the IOTA's permanode and indexation solutions. Using *gRPC* and *MongoDB* to store and efficiently query large amounts of block and transaction data. Design and implementation of microservices and REST APIs based on *Tokio* and *Axum*. Providing advanced DLT analytics using *InfluxDB* and *Grafana*. Orchestration and deployment using *Docker* and *GitHub Actions*.

### **IOTA Foundation (Berlin – Remote)**

11/2021–03/2022

*Senior Software Engineer (Rust)*

5 months

Writing open-source *Rust* code for the backend of the decentralized *Bee* node software. My work encompasses developing a robust, modular, and performant implementation of IOTA's core Layer-1 distributed ledger protocol using *Tokio*'s asynchronous runtime. Improving CI workflows in *GitHub Actions*.

### **Apple (AIML, Seattle – Remote)**

06/2020–09/2020

*Human Computer Interaction + Machine Learning Intern*

3+ months

I developed a domain-specific language together with a query-based visualization system for exploring the performance of machine learning methods on hierarchical and multi-output predictions (*Received Best Paper Award at ACM CHI '22*). The implementation is based on *TypeScript*, *Svelte*, and *D3* to enable rich user interactions.

### **Visualization Design Lab (SCI, University of Utah) – Prof. Lex**

06/2019–08/2019

*Visiting Researcher*

3 months

I co-developed a system that predicts the user's intent when interacting with visualization systems by comparing the user's selection to the output of various machine learning methods. For this, I designed a client-

server architecture using *Python* and *Flask* to decouple the frontend visualization from the ML backend based on *SciKit-Learn* and *Numpy*.

## KUKA Laboratories GmbH

02/2014–07/2014

Voluntary Internship

6 months

I implemented an efficient RANSAC-based algorithm for object recognition and pose estimation in point clouds from a *Kinect* camera using *PCL* and *OpenCV*. I also automated the entire build process for external libraries of a large codebase in a cross-platform environment using *CMake*.

### > Skills and Qualifications

**Languages** German (native), English (C2), French (B1), Spanish (A1)

**Programming** Rust (5+ years), TypeScript (3+ years), Python, WebAssembly, C++, OpenGL/WGPU

**Frameworks** Tokio, Axum, D3.js, Svelte, React, NextJS, Vue 2 + 3, Qt, OpenCV

**Technologies** MongoDB, Docker, Kubernetes, CI/CD pipelines

### > Education

#### Ph.D. in Computer Science (Dr. rer. nat)

2016–2021

*Visual Computing Group – Prof. Deussen, University of Konstanz*

Quantitative methods for uncertainty visualization

#### M.Sc. in Computer Science (Awarded with distinction)

2012–2015

*Karlsruhe Institute of Technology*

Superpixels for identifying structures in laparoscopic surgery

#### B.Sc. in Computer Science

2008–2012

*Karlsruhe Institute of Technology*

Visualization concept for laparoscopy using augmented reality

### > Publications

The following are my research highlights—you can find all of my publications on [Google Scholar](#).

#### Talaria: Interactively Optimizing Machine Learning Models for Efficient Inference

*ACM Conference on Human Factors in Computing Systems – CHI (2024)*

F Hohman, C Wang, J Lee, J Görtler, D Moritz, J P Bigham, Z Ren, C Foret, Q Shan, X Zhang

**ACM CHI 2022 Honorable Mention**

#### Neo: Generalizing Confusion Matrix Visualization to Hierarchical and Multi-Output Labels

*ACM Conference on Human Factors in Computing Systems – CHI (2022)*

J Görtler, F Hohman, D Moritz, K Wongsuphasawat, D Ren, R Nair, M Kirchner, K Patel

**ACM CHI 2022 Best Paper**

#### spEuler: Semantics-preserving Euler diagrams

*IEEE Transactions on Visualization and Computer Graphics (2022)*

R Kehlbeck, J Görtler, Y Wang, O Deussen

**IEEE VIS 2021 Honorable Mention**

#### Predicting intent behind selections in scatterplot visualizations

*SAGE Information Visualization (2021)*

K Gadhav, J Görtler, Z Cutler, C Nobre, O Deussen, M Meyer, J Phillips, A Lex

#### Uncertainty-aware principal component analysis

*IEEE Transactions on Visualization and Computer Graphics (2020)*

J Görtler, T Spinner, D Streeb, D Weiskopf, O Deussen

### **A visual exploration of Gaussian processes**

*Distill.pub (2019)*

J Görtler, R Kehlbeck, O Deussen

**VISxAI 2018 Best Submission**

### **Stippling of 2D scalar fields**

*IEEE Transactions on Visualization and Computer Graphics (2019)*

J Görtler, M Spicker, C Schulz, D Weiskopf, O Deussen

**PacificVis 2019 Best Paper**

### **Bubble treemaps for uncertainty visualization**

*IEEE Transactions on Visualization and Computer Graphics (2018)*

J Görtler, C Schulz, D Weiskopf, O Deussen