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Christoph Anneser

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Research Interests

I am a database systems researcher with a focus on adaptive runtime optimizations. I have a strong background in computer science and experience in building high-efficient main-memory database systems, with a proven track record of impactful publications and industrial experience at leading tech companies.

Education

2024 June – 2024 August TU Munich – Postdoctoral Researcher — Munich
- Developing a hybrid query engine using vectorization and compilation.

2019 October – 2024 May TU Munich – Dr. rer. nat. (Ph.D.) in database systems — Munich
- Thesis: "Adaptive Optimizations for Database Systems"
- Advisors: Prof. Alfons Kemper and Prof. Thomas Neumann
- Publications at top-tier conferences (VLDB, SIGMOD, HotOS, EDBT, DaMoN).

2017 August – 2019 September TU Munich – M.Sc. with honours in Software Engineering — Munich
- Elite Graduate Program – GPA: 4.0/4.0
- Thesis: "Evaluation of Succinct Trie Data Structures for Prefix Lookups"

2014 September – 2017 August TU Munich – B.Sc. in Information Systems — Munich
- GPA: 3.8/4.0 (Valedictorian)
- Thesis: "Generating Refactoring Proposals to Remove Clones from Automated System Tests Considering Reuse Capabilities"

2006 September – 2014 June Kurfürst-Maximilian Gymnasium (High School) – Abitur — Burghausen
- GPA: 4.0/4.0 (Valedictorian)
- Thesis: "The Diffie-Hellman Key Exchange"

Industrial Experience

2024 September – today Firebolt – Software Developer — Munich
- Working on Firebolt's query engine

2021 October – 2023 January Database Researcher & Software Optimization Engineer – Intel — Munich
- Adaptive query optimization for distributed data warehouses.
- Implemented AutoSteer (refer to publications), achieving up to 40% reduction in query execution times in PrestoDB.
- Collaborated closely with data engineering teams at Meta.

[1] S/MIME certificate [SHA1: 8D:AB:35:80:D6:B0]

2018 August – 2018 September **Software Engineer & Data Scientist – Maiborn Wolff** Munich
- Developed a platform for the automated deployment of neural networks
- Set up and maintain the project AWS infrastructure

2016 October – 2018 May **Software Engineer – Qualicen GmbH** Munich
- Full-stack developer for the .Net framework (C# & WPF)
- Wrote the Quality Inspector Plugin for Ranorex
- Implemented a clone detection that creates refactoring proposals for automated system tests

Teaching Experience

2021 – 2023 3x Teaching Assistant for **Introduction to Informatics II** TU Munich

2022 1x Teaching Assistant for **Implementation of Compiling Databases** TU Munich

2019 – 2023 3x Teaching Assistant for **Database Systems** TU Munich

2020 1x Teaching Assistant for **Algorithms and Data Structures** TU Munich

Selected Publications

2024 Jan – 2024 June **Heterogeneous Intra-Pipeline Device-Parallel Aggregations**
Artem Kroviakov, *Petr Kurapov*, *Christoph Anneser* and *Jana Giceva*. Enable cross-device morsel-driven pipeline aggregations in HDK – DaMoN 2024.

2023 Jul – 2024 Mar **Adaptive Compression for Databases**
Leon Windheuser, *Christoph Anneser*, *Huanchen Zhang*, *Thomas Neumann* and *Alfons Kemper*. Adaptive compression for DuckDB reduces the memory footprint and improves performance – EDBT 2024.

2022 Nov – 2023 Aug **QO-Insight: Inspecting Steered Query Optimizers**
Christoph Anneser, *Mario Petruccelli*, *Nesime Tatbul*, *David Cohen*, *Xhenggang Xu*, *Prithviraj Pandian*, *Nikolay Laptev*, *Ryan Marcus* and *Alfons Kemper*. A frontend that enables database admins and query optimization experts to inspect steered query optimizers – VLDB 2023.

2021 Oct – 2023 Aug **AutoSteer: Learned Query Optimization for Any SQL Database**
Christoph Anneser, *Nesime Tatbul*, *David Cohen*, *Xhenggang Xu*, *Prithviraj Pandian*, *Nikolay Laptev* and *Ryan Marcus*. Propose a new framework that enables learned query optimization for almost any SQL database – VLDB 2023.

2022 Nov – 2023 June **Programming Fully Disaggregated Systems**
Christoph Anneser, *Lukas Vogel*, *Ferdinand Gruber*, *Maximilian Bandle* and *Jana Giceva*. Designed a new programming model for future data center hardware – HotOS 2023.

2020 Aug – 2022 Mar **Adaptive Hybrid Indexes**
Christoph Anneser, *Andreas Kipf*, *Huanchen Zhang*, *Thomas Neumann* and *Alfons Kemper*. Build hybrid index structures that take advantage of different encodings under skewed workloads – SIGMOD 2022.

2019 June – 2020 Feb **GeoBlocks**

Christian Winter, *Andreas Kipf*, *Christoph Anneser*, *Thomas Neumann* and *Alfons Kemper*. Enable fast analytical real-time spatial aggregations over arbitrarily shaped polygons – EDBT 2021

2019 June – 2020 March **The Case for Hybrid Succinct Data Structures**

Christoph Anneser, *Andreas Kipf*, *Harald Lang*, *Thomas Neumann* and *Alfons Kemper*. Explore combinations of state-of-the-art trie indexes (Adaptive Radix Tree) with succinct indexes (Fast Succinct Trie). – EDBT 2020

2019 June – 2020 March **Adaptive Main-Memory Indexing for High-Performance Point-Polygon Joins**

Andreas Kipf, *Harald Lang*, [...], *Christoph Anneser*, *Thomas Neumann* and *Alfons Kemper*. Built an adaptive polygon index that allows joining points and arbitrarily shaped polygons. Our approach leverages true hit filtering to avoid expensive geometric computations in most cases. Multiple orders of magnitude faster than all yet existing approaches – EDBT 2020

Technical Skills

Professional	C++, Python, SQL, LaTex, Shell
Familiar	OCaml, Rust, VimScript, R, Flex & GNU Bison, Javascript, C#
Miscellaneous	Linux, Vim, DevOps

Awards

2020	Teaching Award	For the Best Undergraduate Informatics Course
2019	$1^{st}/17$	Best Graduate of M.Sc. Software Engineering
2017	$1^{st}/200$ – Valedictorian	Best Undergraduate of B.Sc. Information Systems
2016	Max Weber Program Fellow	Elite Network of Bavaria
2015	best.in.tum	Program Aiming the Top 2% Students
2014	$1^{st}/45$ – Valedictorian	Best Student at High School

Links

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github.com/christophanneser

linkedin.com/christoph-anneser

Google Scholar