# CHRISTIAN ENGELS, PHD.

DBLP

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### **INTRO**

A well-published software engineer with a PhD in Computer Science focusing on Algorithms, Data Structures and Linear Algebra, with 10 years academic and research experience. Academia, side projects and open source contributions have given me both a broad and deep understanding of software design, development, and architecture. Ten years of teamwork in a fast paced international work environment has taught me communication skills, problem solving and time management.

### EXPERIENCE

Postdoctoral Researcher — Data Structures and National Institute of Informatics (Big Data Mathem	l Algorithms in the Context of Big Data. <b>natics Project)</b>
<b>i</b> 2019.10 -	🗣 Tokyo, Japan
Postdoctoral Researcher — Polynomials using L Indian Institute of Technology Bombay	inear Algebra, Automata Theory and Algebra.
<ul> <li>2017.08 - 2019.09</li> <li>Postdoctoral Researcher — Boolean Circuits usi</li> <li>Kyoto University</li> </ul>	ing Probability Theory and Proof Theory.
<ul> <li>2017.04 - 2017.09</li> <li>Postdoctoral Researcher — Formal Proof Comp</li> </ul>	Kyoto, Japan lexity and Verification Methods.
Tokyo Institute of Technology (Exploring the Limit 2015.11 - 2017.03	s of Computation Project) Tokyo, Japan

# SELECTED PUBLICATIONS

#### Journal Articles

- Engels, C., Garg, M., Makino, K., Rao, A., "On Expressing Majority as a Majority of Majorities". In: SIAM J. Discret. Math. 34.1 (2020), pp. 730-741. DOI: 10.1137/18M1223599. URL: https://doi.org/10.1137/18M1223599.
- Engels, C., Rao, B. V. R., "On hard instances of non-commutative permanent". In: Discret. Appl. Math. 277 (2020), pp. 127-138. DOI: 10.1016/j.dam.2019.09.003. URL: https://doi.org/10.1016/j.dam.2019.09.003.
- Engels, C. "Dichotomy Theorems for Homomorphism Polynomials of Graph Classes". In: J. Graph Algorithms Appl. 20.1 (2016), pp. 3–22. DOI: 10.7155/jgaa.00382. URL: https://doi.org/10.7155/jgaa.00382.
- Bringmann, K., Engels, C., Manthey, B., Rao, B. V. R., "Random Shortest Paths: Non-Euclidean Instances for Metric • Optimization Problems". In: Algorithmica 73.1 (2015), pp. 42–62. DOI: 10.1007/s00453-014-9901-9. URL: https: //doi.org/10.1007/s00453-014-9901-9.
- Engels, C., Manthey, B., "Average-case approximation ratio of the 2-opt algorithm for the TSP". in: Oper. Res. Lett. 37.2 (2009), pp. 83-84. DOI: 10.1016/j.orl.2008.12.002. URL: https://doi.org/10.1016/j.orl.2008.12.002.

# SELECTED PROJECTS

- **Toukakoukan:** A way to split bills by automatically calculating who pays how much. Uses Rust, TypeScript, JavaScript, Svelte, daisyUI, Tailwind CSS and is a PWA.
- Viola: A music player written in Rust with a front-end in GTK. It supports playlists, smart playlists, library view, tabs and much more. Over time, I altered the front-end to React and TypeScript. Recently, I changed the front-end to Rust with Seed-rs, Yew and Web Assembly using RESTful API.
- Serieviewer: A way to store and remember which episodes were watched with a way to directly play them. Using C++, Qt, XML.

- Student Course System: A system used to register to courses by the students, sending announcements and grades. Used by 500+ students and professors for multiple years improving security and usability of the old system. Written in Python and Django.
- Open Source Contributions: Contributions to Open Source projects such as Jellyfin (C#), Jellyfin Web (JavaScript) and Clementine (C++)

### **EDUCATION**

PhD. in Computer Science Thesis: Why are certain polynomials hard? Advisor: Prof. Markus Blaeser

#### Saarland University

2010.07 - 2015.11

Saarbruecken, Germany

Master in Computer Science (MSc.) Thesis: Randomness Efficient Identity Testing of Sparse Black Box Identities. Advisor: Prof. Blaeser

#### Saarland University

2008 - 2010

Saarbruecken, Germany

Bachelor in Computer Science (BSc.) Thesis: Probabilistic Analysis of Algorithms for the TSP. Advisor: Dr. Manthey

#### Saarland University

2005 - 2008

Saarbruecken, Germany

# LANGUAGES

- German (native)
- English (fluent)

### SKILLS

- **Programming Languages:** Rust (5 years), C++ (3 years), Python (3 years), TypeScript, JavaScript, C, Haskell, OCaml, Common Lisp.
- **Technologies:** Linux, Git, Bash, Shell scripting, Docker, GitHub, SQL, home server administration, cloud computing (Google Cloud, Backblaze).
- Soft Skills: teamwork, communication, time management, problem solving, fast learner, self-reliant.