UNIVERSITÄT ZU LÜBECK

The University of Lübeck is known for its excellent research and excellent teaching. We are a modern foundation university with thematically focused courses. Under the motto "Focus on life", we as a life science university offer a spectrum from medicine, health sciences and psychology to mathematics, computer science, natural sciences and technology.

There is a position at the Institute of Information Systems (Director: Prof. Dr. R. Möller; Research group of Prof. Dr. S. Groppe) of the University of Lübeck as soon as possible to be filled as

PhD Student (m/f/d)

for a limited period until 31.12.2024 in full time (38,7 hours per week). The position is funded by the Federal Ministry of Education and Research (BMBF). The opportunity for academic qualification for retrieving the Doctor title is given.

The position is part of a joint research project with Quantum Brilliance GmbH. The employee at the University of Lübeck will mainly deal with the optimization of databases with and without the support of quantum computers.

Almost all applications in the digital world depend on fast approaches to data management. Relational database management systems (RDBMS) are the most widespread type of database management systems. Certain time-consuming tasks can be accelerated by using quantum computers in order to promise a smooth experience for users by lower latencies and faster execution.

Two problems are examined in more detail in the project. On the one hand, RDBMS translate queries into expressions of relational algebra. Typically, there is a large number of equivalent expressions. In many RDBMS, the best estimated query execution plan is exhaustively searched for among all possible. Second, optimizing transaction schedules determines the optimal order of parallel execution of transactions for the best performance. Both problems, the optimization of inquiries as well as transaction plans, can be reduced to the application of basic mathematical optimization approaches and accelerated by quantum computers. In the project we research on replacing classical routines by their quantum computing counterparts promising huge accelerations.

Main areas of activity:

- Research in the field of database optimization (of queries and transaction schedules) with and without quantum computers
- Integration of the researched procedures into an existing, widespread open source database management system
- Experimental comparison of the developed procedures
- Publication of the research results

Requirements:

- Very good degree (master's degree or comparable) in computer science or a comparable course of study
- Good knowledge of English, communicative and reliable
- Experience in software development
- Knowledge of databases and their optimization are an advantage

The grouping takes place in accordance with the automatic tariff if the tariff requirements are fulfilled up to pay group 13 TV-L. A final job evaluation is reserved.

The University of Lübeck sees itself as a modern and cosmopolitan employer. We welcome your application regardless of your age, gender, cultural and social origin, religion, worldview, disability or sexual identity. We promote gender equality. Women will be given priority if they have equal suitability, ability and professional performance. As an applicant with severe disabilities or an equivalent person, we will give you priority if you are suitable.

If you have any further questions about the job position, please contact Prof. Dr. Sven Groppe (groppe@ifis.uni-luebeck.de, phone +49 451 3101 5706), who will be happy to help.

Please send written applications with the usual documents (cover letter with research interests, curriculum vitae, certificates) stating the reference number **1005/22** in a PDF document by **January 31, 2022** (date of receipt) at the latest to bewerbung@uni-luebeck.de or by post to:

Universität zu Lübeck – Die Präsidentin – Referat Personal
Ratzeburger Allee 160, 23562 Lübeck