

PhD Student (f/m/d) in Privacy-Preserving Rare Disease Analysis

Location: University of Tübingen, Computer Science, Tübingen, Germany

Duration: 3 years (with possible extension)

Start Date: [01.09.2025]

About the Project

We are looking for a highly motivated PhD candidate to join our DFG-funded project on **privacy-preserving rare disease analysis**. This interdisciplinary research initiative focuses on developing secure and efficient methods for variant filtering, prioritization, and rare-variant association studies. By advancing federated collaboration across multiple institutions—while strictly protecting patient privacy—our work aims to make significant contributions to both the research community and clinical applications for rare diseases.

Responsibilities

- Conduct research on secure algorithms and protocols for privacy-preserving analysis of genomic and clinical data.
- Develop and integrate methods for variant filtering, prioritization, and rare-variant association studies in a federated environment.
- Collaborate closely with colleagues in cryptography, machine learning, and bioinformatics to create innovative approaches that ensure data confidentiality and scalability.
- Implement and evaluate the developed methods as part of an open-source software framework for privacy-preserving rare variant analyses.
- Present findings in peer-reviewed publications and international conferences.

Requirements

- Master's degree (or equivalent) in Computer Science, Bioinformatics, Mathematics, or a related field.
- Background or interest in (some of) the following areas:
 - Cryptography (e.g., secure multi-party computation, homomorphic encryption)
 - Machine Learning (e.g., federated learning, data privacy)
 - Bioinformatics (e.g., variant analysis, genetic data)
- Solid programming skills in at least one language commonly used in research (Python, C/C++, Java, etc.).
- Strong analytical and problem-solving capabilities.

- Willingness to work in a highly interdisciplinary environment, collaborating with cryptographers, ML researchers, and bioinformaticians.
- Excellent communication and teamwork skills.
- Proficiency in English (spoken and written).

What We Offer

- The opportunity to pursue cutting-edge research in secure and privacy-preserving algorithms for healthcare.
- A dynamic, interdisciplinary work environment, with close collaboration across cryptography, machine learning, and bioinformatics.
- Access to state-of-the-art computing facilities and relevant datasets for rare disease research.
- Mentoring and support for publishing in top-tier scientific venues.
- The chance to contribute to an open-source framework, enabling real-world adoption of your research outcomes.

How to Apply

Interested candidates are invited to submit the following documents in a single PDF file via email to mete.akguen@uni-tuebingen.de:

1. Cover Letter outlining your motivation, research interests, and relevant experience.
2. Curriculum Vitae (CV) detailing your academic background, technical skills, and any publications or conference presentations.
3. Transcript(s) of records (BSc and MSc or equivalent).
4. Contact information for references (e.g., academic advisors or supervisors).

Application Deadline: [30.04.2025]

For any questions or additional information, feel free to contact Mete Akgün at mete.akguen@uni-tuebingen.de.