



Hayat Lab is seeking a:

PhD Student / Postdoctoral Researcher  
(m/f/d)

**Mechanism-Informed Multimodal Generative AI for Biomedical Discovery: Shape the future of AI-driven biomedical research:** We are seeking an outstanding **PhD student or Postdoctoral Researcher** for an EU Horizon funded project to develop next-generation **mechanism-informed multimodal AI systems** for hypothesis generation, causal reasoning, and dynamical modelling using **single-cell and spatial omics data**. The project lies at the intersection of **artificial intelligence, systems biology, and precision medicine**, with the goal of building explainable AI systems that can integrate biological knowledge, multimodal data, and scientific literature to generate novel and testable biomedical hypotheses.

**Research Focus:** You will contribute to the development of a new AI framework that combines:

Single-cell and spatial transcriptomics, large language models and multimodal foundation models, Multi-agent AI systems for scientific discovery, Causal and dynamical models of biological systems

The project aims to move beyond black-box prediction towards **explainable, mechanism-aware AI** capable of supporting scientific reasoning and experimental design.

#### **Key Responsibilities:**

- Develop multi-agent AI systems for biomedical hypothesis generation and study design
- Design algorithms to assess the plausibility, novelty, and explainability of AI-generated hypotheses
- Integrate multimodal biological data with mechanistic knowledge and foundation models
- Develop rigorous evaluation frameworks and open benchmarks for AI-assisted scientific discovery
- Publish results in leading AI, computational biology, and biomedical journals and conferences

**Candidate Profile: PhD Applicants:** MSc in Computer Science, AI, Bioinformatics, Computational Biology, Statistics, or a related field. **Postdoctoral Applicants:** PhD in AI, Machine Learning, Computational Biology, Bioinformatics, Systems Biology, or related disciplines

**Desired Skills:** Strong programming skills (Python), Machine learning and deep learning (generative AI, causal modelling, or multimodal learning), Experience with single-cell, spatial omics, systems biology, or biomedical data analysis is advantageous

**We Offer:** A highly interdisciplinary and collaborative research environment, Access to state-of-the-art single-cell and spatial omics datasets, Opportunities to work at the forefront of AI for scientific discovery, international collaborations and Competitive salary and benefits according to institutional guidelines

**Apply:** Please submit a CV, brief motivation letter, and relevant supporting documents to [shayat@ukaachen.de](mailto:shayat@ukaachen.de)

**Join us in building explainable AI systems that accelerate biomedical discovery and transform our understanding of human disease.**