

As part of an industry-driven research collaboration, a PhD position is available at the high-tech startup lifespın GmbH in Regensburg. The doctoral degree will be officially supervised and conferred by the Technical University of Munich (TUM), Chair of Optimization and Sustainable Decision Making, with additional academic mentorship provided by the Weihenstephan-Triesdorf University of Applied Sciences (HSWT). The position is embedded in a research project funded by the Bavarian Research Foundation, which officially launches on September 1, 2025.

PhD Position (Research Associate)

AI-Based Health Assessment: Transformer Foundation Models Applied to NMR Spectra of Human Blood Code Number M827-BI

The position is limited until August 31, 2028.

Project Overview

Metabolism plays a central role in human health, as nearly every disease leaves detectable traces in an individual's metabolic profile. Nuclear Magnetic Resonance (NMR) spectroscopy of blood offers deep insights into an individual's metabolic state. Despite its rich information content, conventional analysis methods have not yet fully realized its potential.

This research project aims to develop a robust AI foundation model based on modern Transformer architectures, capable of capturing the structure of complex, high-resolution NMR spectra – analogous to how language models such as ChatGPT learn the structure of human language. One of the primary goals is to enable the model to infer health-related information directly from NMR spectra of human blood. To this end, the model will be pre-trained using self-supervised learning on large-scale, partly synthetic, unlabeled spectral data, and subsequently fine-tuned on labeled datasets for specific applications such as disease diagnosis and metabolic health assessment. With this approach, the project seeks to establish new standards in computational metabolomics – facilitating biomarker discovery, advancing personalized health monitoring, and improving clinical decision-making.

The work will be carried out under close supervision by AI and metabolomics experts at lifespın, as well as by participating professors from the TUM and HSWT.

Key Responsibilities

- Simulating synthetic NMR spectra based on biophysical principles and generating a high-quality training dataset to support the development of the AI foundation model
- Contributing to the design and implementation of advanced deep learning architectures (e.g., Transformers, CNNs) tailored to the structure and properties of NMR spectral data
- Supporting the development and application of a self-supervised learning framework for pretraining the foundation model
- Assisting in the large-scale training of a high-performance foundation model using a dedicated GPU cluster
- Fine-tuning the pretrained model on real-world health data from lifespın's proprietary database
- Collaborating closely with domain experts in AI, NMR spectroscopy, and medicine
- Publishing research findings in peer-reviewed journals and presenting results at national and international conferences in fields such as AI, metabolomics, and precision health

Your Profile

- Strong interest in interdisciplinary research at the interface of Artificial Intelligence, Data Science, and Life Sciences
- Excellent programming skills, ideally in Python, with demonstrated experience in applying them in complex research or development projects
- Basic knowledge in Machine Learning, ideally supported by initial hands-on experience
- Experience with deep learning frameworks such as PyTorch or TensorFlow is an advantage
- Familiarity with NMR spectroscopy and/or metabolomics is welcome, though not required; what counts is the willingness to build deep expertise in these areas
- Strong written and verbal communication skills in both English and German
- Ability to present complex scientific content clearly and effectively to both expert and non-specialist audiences

Requirements:

You have completed a university degree (university diploma or master's degree) in a technical field such as physics, biotechnology, bioinformatics, mathematics, statistics, data science, or a closely related discipline.

What We Offer

- The opportunity to acquire in-depth expertise in economically and scientifically highly relevant fields such as Artificial Intelligence (especially Deep Learning) and Data Science
- Hands-on work experience in an innovative high-tech startup operating at the intersection of AI, healthcare, life sciences, data science, and software development
- The chance to actively contribute to the advancement of AI in healthcare – working at the forefront of research
- A doctoral degree from the Technical University of Munich, with the opportunity to present research at international conferences
- Interdisciplinary research with high societal relevance and visibility
- A modern working environment with flexible working hours
- A collaborative and supportive team culture, with ample opportunities for professional exchange
- Support for individual professional development and continuing education
- Remuneration according to the collective agreement for the public service of the federal states
- Social benefits in accordance with the provisions of the collective agreement for the public service of the federal states (TV-L), in particular additional retirement benefits and annual bonuses
- Attractive fringe benefits such as a job ticket for public transport, capital-forming benefits and childcare facilities
- A growing range of services within the framework of official health management

Hinweise:

The position is paid according to salary group 13 TV-L (75%).

People with severe disabilities will be given preference if their aptitude, qualifications and professional performance are otherwise essentially equal. Applications from women are expressly welcomed.

Would you like to become part of our team?

If you meet the requirements, we look forward to receiving your application via our online form below. Please apply with a cover letter, a tabular CV, professional or academic qualifications and qualified references. Please note that we only fill our positions according to suitability, performance and aptitude; we can therefore only consider you in the further process if you provide us with proof of this. Please apply exclusively via the "APPLY NOW" button (online form) by 18.07.2025 at the latest. Applications by post or e-mail will not be considered.

For further information or technical questions please contact:

Prof. Dr. Andreas Krumpel, andreas.krumpel@hswt.de

for questions regarding the application process or recruitment:

e-mail: stellenausschreibung@hswt.de

for issues relating to severely disabled persons and persons with equivalent status:

e-mail: schwerbehindertenvertretung@hswt.de



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