RESEARCH PROFILE

- Semantic integration of medical data
- Privacy-preserving distributed analysis of medical data
- Applications of novel artificial intelligence methods in medicine and healthcare
- Generation of synthetic data for medicine and healthcare applications
- Current application domains:
  - Leukodystrophies (rare diseases)
  - Ophthalmology
  - Diabetes

We are open to new projects, topics, and ideas in the field of medical data science. Please do not hesitate to contact us for more information if you are interested in collaborating with us or have any questions.

MEDICAL INFORMATICS CENTER

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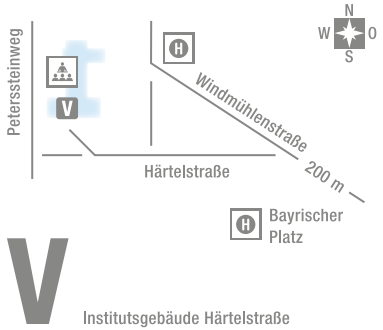
TRAVEL DIRECTIONS (BUILDING V)

Public Transport:
Ⓗ (Station ÖPNV):
- Münzgasse, LVZ: Tram 10, 11, 16

by Car:
- Härtelstraße 16-18, 04107 Leipzig

Car Parking:
- Gaudigplatz



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Imprint

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Universitätsklinikum Leipzig
Medizin ist unsere Berufung.

MDS
Medical Data Science

MEDICAL INFORMATICS CENTER

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UNIVERSITÄT LEIPZIG
Faculty of Medicine

WE INTRODUCE OURSELVES

We are an interdisciplinary team of Medical Data Science at Leipzig University Medical Informatics Center. We conduct innovative research at the intersection of medical informatics and patient care using artificial intelligence and medical data science to increase benefits for patients, the healthcare system, and medical research. Our focus is twofold: First, we develop a secure computing infrastructure for the preparation, processing and analysis of medical data. This improves the accessibility of such data for research purposes, as medical data are often available from multiple locations, for example in distributed computing. Second, we perform medical data analysis and modeling to advance medical research and also support clinicians. For this, we employ both classical statistical methods and state-of-the-art machine and deep learning techniques.

FAIR DATA

Knowledge derived from captured and collected data has become increasingly important in research and development. In order to reduce difficulties in data sharing in this respect and maximize the value from data, data and metadata should comply with the FAIR principles - Findable, Accessible, Interoperable, and Reusable. To this end, we develop data structures and standardize the process for accessing the data to ensure that the basic requirements for reproducibility are met. We are part of the National Research Data Infrastructure (NFDI4Health), which is an initiative in this context.

Findable Accessible Interoperable Reusable

nfdi 4 health

INFRASTRUCTURES AND ALGORITHMS FOR DISTRIBUTED ANALYTICS

Personal medical data are often collected and available in multiple locations. Due to privacy concerns and the potentially large volume of medical records, the pooling concept for centralized analysis may not work. As part of the international Personal Health Train (PHT) network, we are working with our collaborators to develop an infrastructure for secure distributed computing. Such PHT infrastructure adheres to the principle of "bring-the-analysis-to-the-data". We have successfully implemented this infrastructure in several research projects within the medical field.

PERSONAL HEALTH TRAIN

PADME

AI-BASED MODELING OF LEUKODYSTROPHIES

Leukodystrophies are a family of rare diseases with an estimated incidence of less than 1:40,000 worldwide. Patients with leukodystrophy typically experience an Odyssey and undergo a challenging, expensive and time-consuming journey. An important issue is that the disease is commonly misdiagnosed and therefore incorrectly treated. Furthermore, since only a few cases are known, there is a lack of validated treatment guidelines. In close collaboration with the Myelin Center at the Leipzig University Medical Center and other interdisciplinary international consortia, we frequently make use of a variety of artificial intelligence methods and analyze data from leukodystrophy patients to support earlier diagnosis, for example.

LEUKO Expert

ABOUT TORALF KIRSTEN

Prof. Toralf Kirsten heads the Medical Data Science department. With his broad computer science background, which ranges from the conception and implementation of IT infrastructures to methods and algorithms of data analysis, he is involved with the department in various national and international research projects. He is actively involved in the Medical Informatics Initiative (MII), the Network University Medicine (NUM), the National Research Data Infrastructure (NFDI) and the international GOFAIR Initiative, which interacts closely with the European Open Science Cloud (EOSC).