The Data Driven Decisions (D³) Group at the University of Würzburg is dedicated to the development and application of new methods that exploit large amounts of empirical data to arrive at better decisions in various fields of management, e.g., in Retail, Supply Chain and Operations Management, Healthcare, Smart Cities, Energy and Mobility.

Our research builds on methods in Data Science and Machine Learning (Deep Learning, Reinforcement Learning), Operations Research (Optimization), and Statistics. It is innovative and challenging from a theoretical viewpoint and, at the same time, very relevant to practice — we work with leading industry partners on a number of exciting projects.

The group is currently expanding and seeking motivated and highly skilled individuals to become part of our young and ambitious team. We offer

MULTIPLE DOCTORAL STUDENT POSITIONS (TV-L 13)

starting March 2024 or later. In accordance with your interests and skills, you can conduct your dissertation in one of the following research projects / areas:

- **AI for Regional Value Chains**
- **AI-based Management of Personalized Energy Services**
- **Big Data Supply Chain Analytics for Multi-Channel Retailers**
- **AI-based Operations & Supply Chain Management**
- **Managing Customer Relationships & Services with AI**
- **Integration of AI with Information Systems and the Cloud**
- **Your own topic / initiative (within the methodological scope of the D3 research)**

More detailed information about these research topics can be found below. For more general information about our research, please consult the websites of our individual research groups.

The D³ group currently consists of about 15 researchers and is composed of the chairs for

- **Information Systems and Business Analytics** (Prof.Flath),
- **Information Systems Engineering** (Prof.Thiesse),
- **Logistics and Quantitative Methods** (Prof.Pibernik), and
- **Enterprise Artificial Intelligence** (Prof.Gust).

Additionally, the group is affiliated with the newly created cross-faculty [Center for Artificial Intelligence and Data Science (CAIDAS)](https://www.univie.ac.at/caidas) and has a strong international focus.

Our job offering is not focused on specific academic disciplines. Currently, our team members have very diverse skill sets and backgrounds, such as Computer Science, Management, Mathematics, and Engineering. Candidates should be eager to solve analytical tasks and should ideally have at least intermediate programming skills (e.g., in Python).

You will actively participate in the research of our group, including projects with partners from academia and industry. Most importantly, you will contribute to publications in scientific journals and thereby work on your doctoral dissertation (ideally, within a three-year period). We also expect you to support some of our teaching activities.
The D³ Group offers a highly flexible working environment within an ambitious team with entrepreneurial spirit. We encourage doctoral students to visit leading international research institutions in the course of their dissertation. The group is based in the city of Würzburg with its lovely culture and countryside.

Interested candidates should apply to d3@uni-wuerzburg.de, including all usual documents (cover letter, CV, certificates of recent grades etc.). Questions can be directed to the same email address or to the professors heading the D³ group.

The University of Würzburg is an equal opportunity employer. As such, we explicitly encourage applications from qualified women. Handicapped applicants will be given preferential consideration when equally qualified.

Project descriptions:

**AI for Regional Value Chains**
The aim of the project is to make new digital technologies (especially the use of extensive regional data with AI) tangible and usable within a pilot network of small and medium-sized enterprises (SME) in the Würzburg region. The goal is to strengthen and enhance the competitiveness of regional value chains. The D³ group will conceptually develop AI applications and transform them into prototypes, which can be evaluated and further developed in operational use in practice. We thereby aim to generalize potential uses of AI in small- & medium-sized businesses, in collaboration with the involved SMEs of the pilot network. The project offers unique data sets and use cases and you will design and develop solutions tailored to the specific needs of regional value chains, characterized by their simple and intuitive use.

**AI-based Management of Personalized Energy Services**
In this research project, we aim to analyze the possibilities of using AI-supported algorithms for sustainable energy management in smart home environments. Specifically, you will examine how different user groups react to individualized dynamic electricity tariffs and how the integration of smart energy services (such as charging electric vehicles, usage of heat pumps and other flexible devices) and user-specific behavior can be harmonized. Among other outcomes, we aim to develop and test a novel set of dynamic and highly personalized electricity tariffs and/or services.

**Big Data Supply Chain Analytics for Multi-Channel Retailers**
In their online shops, companies provide extensive data pertaining to their supply chains and logistics networks. Based on this data, we can reverse engineer the supply chains of these companies, gain a deep understanding of their operating policies and derive insights regarding good and bad supply chain practices. We have been collecting very extensive online data of multiple industry leaders on a very granular level. In a new research initiative we want to leverage this unique data basis to develop new theoretical and practical results and insights that provide substantial value to the supply chain management community. The results of our initial analyses have produced a number of exciting results and extremely promising research avenues that we now want to translate into a coherent multi-year research agenda.

**AI-based Operations & Supply Chain Management.**
In Operations and Supply Chain Management, there is a huge potential for employing Machine Learning techniques that leverage (“big”) company data to arrive at better decisions in an automated fashion. During the last years, our team has successfully developed and analyzed several new approaches that are very attractive from a scientific viewpoint and are deployed by companies in real-
world applications. In this very dynamic and quickly evolving field, we are developing and studying new approaches and algorithms that will – in future – shape how companies take better data-driven decisions under uncertainty in an automated fashion. Currently, our focus lies on approaches that employ Deep Reinforcement Learning as well as other ML-approaches that enable companies to leverage data to obtain better operational decisions in inventory and capacity management. In our work, we balance both the theoretical validity of our approaches and their applicability to real-world problems. We collaborate with various companies and utilize their extensive data sets to test and validate our approaches.

**Your own topic / initiative**

In case you have your research idea that you would like to pursue, or you are interested in another research area of the D³ group (such as data-driven methods in Retail, Healthcare, Smart Cities, Energy, and Mobility), we are also looking forward to your application. Please also consult and refer to the websites and publications of the research groups.