Zurich University
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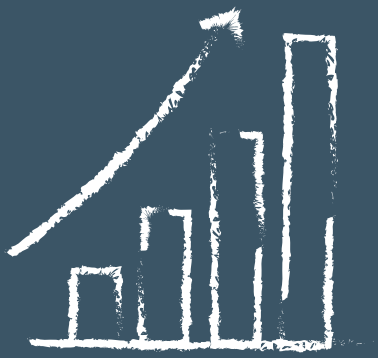
Datalab – the ZHAW Data Science Laboratory



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Datalab – the ZHAW Data Science Laboratory 3
What is Data Science? 4
What we Offer 6
- Focus Areas 6
- Research and Development 7
- Education 8

Community 9
ZHAW Zurich University of Applied Sciences 10

Datalab – the ZHAW Data Science Laboratory

The data science revolution has arrived right at the heart of society. From health care to public transport, from politics to agriculture most aspects of our life are impacted. At the Data Science Laboratory (Datalab) of the ZHAW Zurich University of Applied Sciences, we are convinced that data science is not only highly relevant at the present moment, but in all its aspects also the most exciting career to pursue. We have a passion for our subject and are committed to:

- transforming data into business value through innovative research projects, aiming mainly (but not exclusively) at Swiss small and medium-sized enterprises
- teaching aspiring data scientists the foundations as well as more advanced topics in the field and bringing them to generate new ideas
- educating our students towards being researchers with a strong focus on practical application or professionals with a research mindset

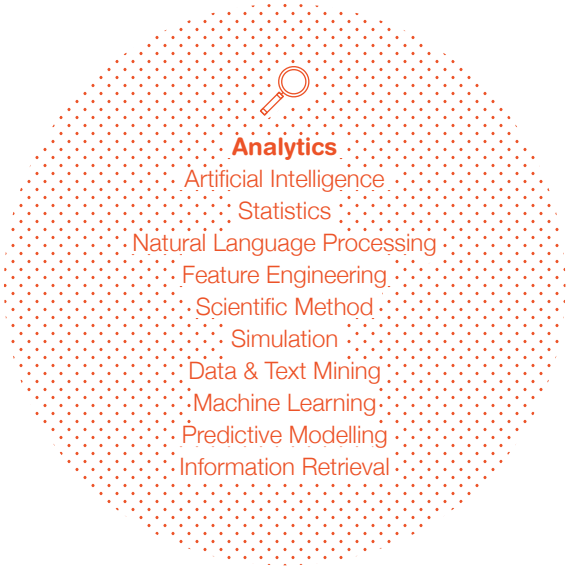
We are a leading national and internationally recognized centre of excellence for research, teaching and services in the area of data science. ZHAW Datalab closely cooperates with the industry, thus enabling innovation and transfer of technology.

In order to reach these goals, we foster interdisciplinary collaboration and exchange of ideas among our members and associates. For example, we founded the “Swiss Conference on Data Science”, a series of industrial-academic conferences, and play an active role in the “Swiss Alliance for Data-Intensive Services”.

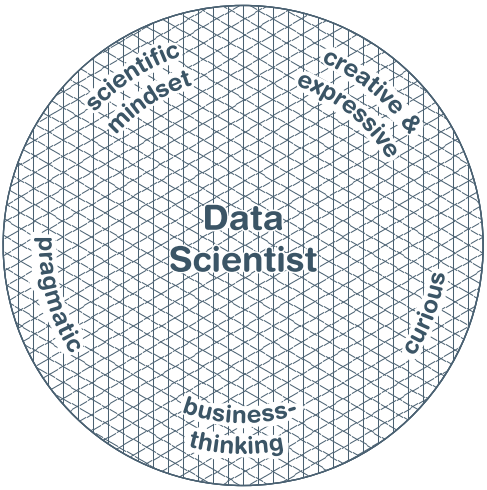
Data comes in many forms: structured, unstructured, static, streaming, open and hidden. The art of application-oriented data science is the mediation between the underlying business case and this “raw” data. How can we discover, process, augment, aggregate and analyse data in order to gain insight and add value? Both research and teaching at ZHAW Datalab are therefore firmly rooted in our collaboration with industry partners.

What is Data Science?

We define data science as the "unique blend of skills from analytics, engineering and communication aiming at generating value from the data itself [...]" *



* Stadelmann, Stockinger, Braschler, Cieliebak, Baudinot, Dürr and Ruckstuhl (2013). Applied Data Science in Europe. ECSS 2013, Amsterdam



A data scientist strikes a balance between a comprehensive knowledge of the topics in this landscape and a deep understanding of selected sub-disciplines. With more than 60 researchers from five institutes in the School of Engineering, School of Management and Law and the School of Life Sciences and Facility Management, ZHAW Datalab offers abundant resources to help business partners and students to find their data science profile.

What we Offer

Datalab transforms data science know how into innovative research projects and inspiring university classes.

Focus Areas

Datalab was founded in 2013 as a collaboration between computer science and statistics. Today it comprises the following Institutes at the ZHAW: IDP Institute of Data Analysis and Process Design, InIT Institute of Applied Information Technology, ZSR Center for Social Law, IAS Institute of Applied Simulation, IAMP Institute of Applied Mathematics and Physics.

Our research agenda covers the following areas and is conducted within the confines of projects with industry partners:

- database and big data technology
- data mining, statistics and predictive modelling
- machine learning, in particular deep learning
- graph analytics and network science
- information retrieval and natural language processing
- simulation and signal analysis
- business intelligence and visual analytics
- data warehousing and decision support
- communication and visualisation of results
- privacy, security and ethics
- entrepreneurship and data product design

“Presently, we observe how physics leaves the lab. Thanks to data science, concepts from mathematics and the natural sciences can be made fruitful for the analysis of complex systems also under other than the standard laboratory conditions.”
Rudolf M. Füchslin, Co-director of the European Centre for Living Technology and member of the Datalab board

Research and Development
Datalab connects several departments and institutes at the ZHAW, creating an internal collaboration network for researchers and also an interface for external partners and organisations.

Datalab researchers are internationally recognised experts with proven track records of academic and applied research excellence in domains such as: engineering and communications, logistics and process simulation, business and economical sciences, life sciences, biotech and medtech.

Datalab associates collaborate with numerous external partners and organisations. Depending on the nature of the project and the needs of our partner, we offer various forms of collaboration, ranging from direct research mandates to research funded by third parties such as the Swiss Commission for Technology and Innovation (CTI), the Swiss National Science Foundation (SNSF) and the European Union (Horizon2020, Eurostars). For an overview of successful projects please visit → www.zhaw.ch/datalab.

In the first three years of its existence the total volume of research and development projects with external partners at Datalab has exceeded 2.5 millions of Swiss francs per year. We are always keen on engaging in new collaborations. Please get in touch with us for further questions.

"NoSQL or stream processing systems are based on complex technologies that are rapidly changing. Hence, choosing the appropriate big data technology for use cases in data management and data warehousing is non-trivial and requires careful analysis and deep understanding of the respective use cases."
Kurt Stockinger, Director of Studies in Data Science and member of the Datalab board

Education

According to the “Harvard Business Review” data scientist is the “sexiest job” of the twenty-first century. And data science skills are in very high demand within the industry. However, there are not enough data scientists with the required skill set on the market. Hence, one of the main goals of ZHAW Datalab is to provide high-quality data science education at various academic and professional levels.

Professional Education

The flagship education program provided by ZHAW Datalab is geared towards professionals in business and industry: Our Master (MAS, new in 2017) and Diploma of Advanced Studies (DAS) in Data Science are pioneers in the Swiss technical-oriented data science education. They consist of the following five Certificate of Advanced Studies (CAS) courses:

- CAS Information Engineering and CAS Machine Intelligence
- CAS Datenanalyse (data analytics) and CAS Statistical Modelling
- CAS Data Product Design

Participants learn to master the following tasks:

- Store, retrieve and analyse enterprise data
- Provide the basis for data-driven decision support based on web-applications
- Analyse customer or industrial data
- Analyse scientific or multimedia data
- Integrate heterogeneous data sets into an enterprise data warehouse

Graduate and Post-Graduate Education

In its master program, ZHAW Datalab provides education in the areas of machine learning, predictive modelling and statistical data analysis as well as advanced algorithms. In addition, we offer joint Ph.D. programs with partner universities.

Undergraduate Education

In its bachelor program, ZHAW Datalab provides education in areas such as scripting, artificial intelligence, information retrieval, data warehousing and big data, statistical data analysis and time series analysis.

More Information

→ www.zhaw.ch/datalab/teaching

“Through ethical considerations of entrepreneurial behaviour we shape the data future of our society. In what kind of world do we want to live?”

Brigitte Blum-Schneider, research associate in Law and member of the Datalab board

Community

One of our main goals is to bring together researchers, opinion-leaders, professionals and decision-makers with an interest in data science.

A newly founded discipline like data science needs networking to generate impact. ZHAW Datalab and its members are at the centre of various activities in the national and international research communities. They shape the current and future state of the art in the field through scientific publications, talks and keynotes, as well as high-impact events. In the first three years since the inception of Datalab, members have published more than 40 scientific papers and book chapters as well as shared their insights through more than 60 talks and keynotes at scientific and application-oriented conferences, such as IBM Business Connect, the SwissICT Award, ISC Big Data, TDWI Data Warehousing and Business Intelligence, the Swiss Social Media Conference and the SAS Forum.

The research community meets at several events that are co-organised by ZHAW Datalab:

- Zurich Machine Learning Meetup, the largest technology meetup in Switzerland with over 2000 members
- Swiss Conference on Data Science (SDS), which started as a workshop in 2014 and now is an established conference with international keynote speakers
- Swiss Text Analytics Conference (SwissText), a series of conferences which already in its first year attracted over 170 experts

In addition, ZHAW Datalab has co-founded the “Swiss Alliance for Data-Intensive Services” – a nation-wide network of universities, research associations and high-profile companies such as Google, Zühlke, Zürcher Kantonalbank, SwissRe, PwC, Georg Fischer and many more.

More Information

→ www.data-service-alliance.ch

“The methodology of deep learning has applications beyond image recognition in almost all industry sectors and modalities. Speech, sensor signals or texts are just a beginning.”

Oliver Dürr, Senior Researcher on deep learning and Deputy Head of the Datalab board

ZHAW Zurich University of Applied Sciences

Through research and close cooperation with business and industry, the ZHAW stays on track with current technological and socio-economic trends.

The ZHAW is one of the leading universities of applied sciences in Switzerland. Teaching, research, continuing education and other services are both scientifically-based and practice-oriented. ZHAW graduates are able to apply their knowledge responsibly in demanding professional fields. With locations in Winterthur, Zurich and Wädenswil, the ZHAW is firmly integrated in the local region whilst also cooperating with international partners.

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