Profile of the study program

- Extra-occupational study program/Advanced training
- 8 block sessions (Thursday to Saturday) including exam
- Duration of two semesters, including project report

Fees

The fees for the entire study program amounts to Euro 6,000. -.

See the following link for more information:

http://www.biometrie.uni-heidelberg.de/datascience

Early bird registration until 30th of April!

Reduced fee: Euro 4,995. -.

Application

The study program takes place every year. Applications for the upcoming semester (Start: October 2021) can be handed in till the **15th of June 2021**. Accreditation is possible for all applicants of medically and statistically related subjects (e.g., biostatistics, mathematics, psychology).

More information about the application process and deadlines can be found on our homepage:
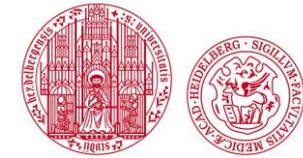**http://www.biometrie.uni-heidelberg.de/datascience**

Contact

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MEDIZINISCHE FAKULTÄT HEIDELBERG

Certificate

Medical Data Science

Professional study program

imbi Heidelberg
Institut für Medizinische Biometrie und Informatik

MEDICAL DATA SCIENCE

Medical Data Science

Our present days have seen a tremendous increase of virtually all kinds of data. For many fields the availability of Big Data holds the promise to answer questions that would have been out of reach just a couple of years ago. The analysis of Big Data, however, requires expert knowledge and skills, which is why data science is becoming an increasingly important topic. This is especially true for data evaluation in medicine, where statistical methods for data analysis need to be applied to an already complex and heterogeneous field. While there are many trainings available that explain the basics of data science, teaching the relevant techniques with real-life application to medical data is currently still a niche topic. To fill this gap, the Institute of Medical Biometry and Informatics at the University of Heidelberg offers a study program that introduces and deepens the essentials of medical data science. The program is structured into four different modules, which will teach different aspects of medical data science.

Aim of the study program

After completing the medical data science training, participants will be able to:

- Analyse complex medical data
- Use state-of-the art statistical tools
- Visualize the results
- Handle Big Data

Topics:

- Mathematical background of statistical methods
- Applying methods in practice
- Challenges, chances and limitations of data analysis
- Use of appropriate software

Curriculum

Module Data Scientist's Toolbox

> *Courses: Introduction to Data Science; Data processing, Visualization, reproducibility and presentation*

- Relevance of data science in the clinical research
- Fields of application
- Baseline techniques
- Handling and processing of data
- Visualization
- Reproducibility of analyses
- Interactive analysis tools

Module Statististical Modelling

> *Courses: Regression models; Generalized additive models; Bayesian statistics;*

- General modelling techniques
- Regression models
- Linear models
- Variable selection
- Generalized additive models
- Polynomial functions
- Splines and non-parametric approaches
- Bayesian tools
- Clinically relevant examples
- Programming in R and JAGS

Module Machine Learning

> *Courses: Unsupervised / Supervised Learning*

- Clustering- and dimensionality reduction techniques
- Deep learning
- Generative models
- Regularized models
- Neural networks
- Decision trees
- Random forests
- Bagging and boosting
- Application in R

Module Practical Application

> *Courses: Applied Data Science; Project Work*

- Data science in practice

Independent project work including presentation and discussion

More information …

… to the certificate profiles, application documents, admission, curriculum, etc. can be found on the homepage:

http://www.biometrie.uni-heidelberg.de/datascience