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 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.

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

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

Topics:
- Mathematical background of statistical methods
- Applying methods in practice
- Challenges, chances and limitations of data analysis in the context of big data
- Use of appropriate software
- Programming techniques

### SCHEDULE & LECTURERS*

- **21.10. - 22.10.2022 (M1)**
  Introduction into data Science
  Course instructor: Dr. Marietta Kirchner, IMBI Heidelberg

- **10.11. - 12.11.2022**
  Working with Data, Plotting, Reproducibility and Presentation (M1)
  Course instructor: Johannes Vey, IMBI Heidelberg

- **24.11. - 26.11.2022**
  Regression Methods (M2)
  Course instructor: Dr. Maximilian Pilz, IMBI Heidelberg

- **12.01. - 14.01.2023**
  Bayesian Statistics (M2)
  Course instructor: Dr. Lorenz Uhlmann, Novartis Basel
02.02. - 04.02.2023
Supervised Learning (M3)
Course instructor: Dr. Katharina Hees, Paul-Ehrlich Institut, Langen

02.03. - 04.03.2023
Unsupervised Learning (M3)
Course instructor: Prof. Dr. Harald Binder, Institut für Medizinische Biometrie und Statistik, Freiburg

30.03. - 01.04.2023
Generalized Additive Models (M2)
Course instructor: Prof. Dr. Jan Gertheiss, Helmut Schmidt Universität Hamburg

20.04. - 22.04.2023
Data science in Practice
Course instructor: Johannes Vey, IMBI Heidelberg (M4)

**PRE-REQUISITE**
- Knowledge of mathematical principles including basic knowledge of probability theory and of the statistical programming software R is needed

**REGISTRATION**
- Application until 30.06.2022 possible: [www.biometrie.uni-heidelberg.de/datascience](http://www.biometrie.uni-heidelberg.de/datascience)
- Tuition fee:
  - 4995 EUR (early bookers until 15.05.22)
  - 6000 EUR (registration from 16.5.22, regular rate)
  - 5400 EUR (registration from 16.5.22, discounted rate for affiliated with a university)
- The courses may take place in parts or as a whole online (virtual conferences) if in-classroom teaching is not possible.

*subject to change*