Elite Master Program
MSc Data Science
LMU München
Data Science@LMU

Spokespersons
Prof. Dr. Göran Kauermann (Statistics)
Prof. Dr. Thomas Seidl (Informatics)

Vice-Spokesperson
Prof. Dr. Matthias Schubert (Informatics)

Contact – Coordinator
Dr. Constanze H. Schmaling
Data Science: What is it about?

Data Science combines **informatics** and **statistics** in order to extract information from real data.

“Data Science is a blend of Red-Bull-fuelled hacking and espresso-inspired statistics”

*(Mike Driscoll, CEO Metamarket)*
Data Scientists: What do they do?

Data Scientists: What do they do?

- Retrieve information from data
- Deal with data confidentiality
- Use statistical models
- Apply machine learning tools
- Communicate the results

Statistics and Data Science

1900

1950

2000

Statistics

Computer Science

Data Science
Why Data Science? Why LMU?

- Data Science is "data driven problem solving"
- Data Scientists are needed in industry, business, and science
- Data Science requires computational as well as statistical knowledge and skills
- At LMU Munich, Statistics and Informatics are in the same faculty
MSc Data Science@LMU

• Since winter semester 2016/17
• One of the first international Data Science programs
• Supported by the Elite Network of Bavaria
• Small cohorts – individual support
Curriculum
1st Semester | 30 ECTS
Statistics
Informatics
Fundamentals of Data Science
Human Computation and Analytics

2nd Semester | 27 - 33 ECTS
Predictive Modelling

3rd Semester | 27 - 33 ECTS
Data Science Practical
Data Ethics and Data Security
Elective Courses
Current Research in Data Science

4th Semester | 30 ECTS
Master Thesis and Disputation
Core Module: Statistics

• Statistical Reasoning and Inference (Foundations)
• Statistical Reasoning and Inference (Advanced level)

Core Module: Informatics

• Knowledge Discovery and Data Mining
• Big Data Management
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Fundamentals of Data Science (Individual Module)

- Heterogeneous level of expertise of incoming students
- Personalised assignment to courses in statistics and informatics to suit individual student’s needs
- Result: homogeneous level of expertise after first semester
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Informatics
Fundamentals of Data Science
Human Computation and Analytics

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Predictive Modelling

3rd Semester | 27 - 33 ECTS

Data Science Practical

4th Semester | 30 ECTS

Master Thesis and Disputation

Data Ethics and Data Security
Elective Courses
Current Research in Data Science
Human Computation and Analytics

- Includes a practical in which students will implement their own concepts for HC/VA systems in the form of a working prototype

Data Ethics and Data Security

- Methodological questions of data anonymisation
- Lecture series with (invited) talks on technical, ethical, and legal aspects of data security
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- Human Computation and Analytics

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3rd Semester | 27 - 33 ECTS
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- Current Research in Data Science

4th Semester | 30 ECTS
- Master Thesis and Disputation
Predictive Modelling

• Theory and algorithms of supervised statistical learning

Elective Modules

• Regular master courses from statistics, informatics, and computer linguistics
• Selected master courses from other departments
• Selected master courses from partner universities, e.g. image processing at TUM
ELITE MASTER PROGRAM

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Current Research in Data Science

• Data Science Summer School
  data security and confidentiality, ethical and legal topics

• Data Science Focused Tutorials
  biosciences, e-commerce, networks etc

• Data Science meets Data Practice
  lecture series with experts from industry and business

• Field trips
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Data Science Practical

- Supervised practical in the 3rd semester, ca. 2-3 months
- Students work on practical problems in the field of Data Science
- Close cooperation with industry and business partners
- Focus on communicating results and findings to the clients
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Master Thesis and Disputation

- Thesis may be either research-oriented or stimulated through a practical problem
- After submission and assessment → oral defence
1st Semester | 30 ECTS

- Statistics 12 ECTS
- Informatics 12 ECTS
- Fundamentals of Data Science | 12 ECTS
- Human Computation and Analytics 9 ECTS

2nd Semester | 27 - 33 ECTS

- Predictive Modelling 6 ECTS

3rd Semester | 27 - 33 ECTS

- Data Science Practical 12 ECTS
- Data Ethics and Data Security 6 ECTS
- Elective Courses 12 ECTS
- Current Research in Data Science 9 ECTS

4th Semester | 30 ECTS

- Master Thesis and Disputation 30 ECTS
Curriculum – Summary

• Modules **exclusively** for Data Science students

• **Individual Modules** tailored to suit individual student’s need

• Courses on **data ethics, data confidentiality, and data security**

• Close cooperation with partners in **industry and business** (DS Practicals, Lecture series, ...)

• **Tutorials, Workshops, Summer Schools**
Data Science@LMU Activities and Cooperations

• MSc Data Science
• Data Science Professional Certificate Program
• German Data Science Days
• Data Science Lab
• Munich Center for Machine Learning
• MUDS
• Zentrum Digitalisierung Bayern
Local Academic Ties

Universities
- TU München
- Universität Augsburg
- Universität Mannheim

Research Institutes
- Leibniz-Rechenzentrum
- HelmholtzZentrum München
- IAB Nürnberg
- MPI for Innovation and Competition
- Bayerisches Finanz Zentrum
Close Cooperation with Industry and Business
Requirements and Application
Requirements for Application (1/2)

• Students with **excellent knowledge in informatics and statistics**

• Students not interested in specialising in **either statistics or informatics**

• **Bachelor of Science** (or equivalent) in Statistics or Informatics or related disciplines → **at least 180 ECTS** (or equivalent)

• Proficiency in **English**
Requirements for Application (2/2)

• **Statistical Science and Data-Based Modelling**
  statistics, data mining, probability theory, and machine learning
  at least 30 ECTS or equivalent

• **Computer Science and Computational Methods**
  data structures and algorithms, database systems, programming
  principles and practice, software engineering
  at least 30 ECTS or equivalent
Application – Step 1: Online Application

Step 1 is successful if

– application is submitted before the deadline
– application documents are complete
– all requirements are fulfilled
– essay is approved by committee

→ Invitation to interview (Step 2)
Application – Step 2: Interview

• 30 minutes, in English
• In person or by video-chat
• Two professors
• Discussion topics see website

→ Assessment of specialised knowledge, mode of expression, conclusiveness of arguments
Application Process – Dates and Deadlines

• Step 1: Online application
  mid-April – 1 June 2021

• Step 2: Interview
  end of June 2021

→ Letters of acceptance are sent out by email in mid-July 2021
General information (for international students) on LMU Munich / Munich

...on the LMU homepage, e.g.

• Costs/scholarships

https://www.en.uni-muenchen.de/students/int_student_guide/before_you_arrive/budgeting/index.html

• Housing

https://www.en.uni-muenchen.de/students/exchange/incomings/austausch_engl/living/accommodation/index.html
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www.datascience-munich.de