Elite Master Program
MSc Data Science
LMU Munich
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
- Apply machine learning tools
- Use statistical models
- Communicate the results
- Deal with data confidentiality

Data Scientists – Why are they needed by the industry?

The 25 Hottest Skills That Got People Hired in 2014

Believe it or not, 2014 is almost over and 2015 is right around the corner. With a new year comes new opportunities, and around this time we at LinkedIn are typically asked the following question: “Who’s getting hired and what are they doing?”

To get to an answer, we analyzed the skills and experience data in over 330 million LinkedIn member profiles. If your skills fit one of the categories below, there’s a good chance you either started a new job, garnered the interest of a recruiter in the past year, or won new clients.

The 25 Hottest Skills of 2014 on LinkedIn

1. Statistical Analysis and Data Mining
2. Middleware and Integration Software
3. Storage Systems and Management
4. Network and Information Security
5. SEO/SEM Marketing
Statistics and Data Science

1900 - 1950: Statistics
1950 - 2000: Computer Science
2000: Data Science
Data Scientists – Why are they needed?

• Increasing data accessibility and availability
• Big Data requires Big Data Analytics
• New action plans required in order to extract information from data
• Data analysts with computational and statistical skills are needed by industry, business, and science
MSc Data Science@LMU

• The program is run jointly and interdisciplinarily by the Institutes of Statistics and Informatics.

• There is no other international Data Science master program that combines both fields in Germany.

• This is the first Data Science program in English in Germany.
MSc Data Science@LMU – Elite Program

• Part of the Elite Network of Bavaria (ENB)
• LMU is a “hot spot” in Statistics and Informatics
• Statistics and Informatics are in one faculty
• DataScience@LMU attracts high-potential students
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
• Sampling and Experimental Design

Core Module: Informatics

• Knowledge Discovery and Data Mining
• Big Data Management
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4th Semester | 30 ECTS
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Fundamentals of Data Science (Individual Modules)

• Tailored to suit individual student’s needs

• Students can choose courses from a variety of courses in advanced methods of statistics and informatics

→ Homogeneous level of expertise in both statistics and informatics even though students have different educational backgrounds
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
Predictive Modelling

• Training of theoretical and practical skills in non-linear and non-parametric methods

Elective Modules

• Courses from the regularly offered master courses in specialized fields in statistics, informatics, and computer linguistics, as well as master level courses at the partner universities, e.g. image processing and mathematical statistics at the Technical University Munich.
Data Science Practical

• Students work on practical problems in the field of Data Science
• Close cooperation with industry partners
• Focus on communicating results and findings to the client
Master Thesis and Disputation

• Thesis may be either research-orientated or stimulated through a practical problem
• After submission → oral examination
Curriculum – Special Features

• Data Science Summer School
  Retreat with focus on data ethics and data confidentiality

• Data Science Tutorials
  Biosciences, E-commerce, networks, genomics etc.

• Data Science meets Data Practice
  Lecture series with professionals from industry and business

• Data Science Festival “DataFest”
  in cooperation with Universität Mannheim
Curriculum – Summary

- Modules **exclusively** for Data Science students
- **Individual Module** tailored to suit individual student’s needs
- Courses on **data ethics, data confidentiality, and data security**
- **Data Science Practicals** – close cooperation with partners in industry and business
- Tutorials, Workshops, Summer Schools, …
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
Strong Industry Ties

[Logos of various companies]
Requirements and Application
Requirements for Application (1/4)

• 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 (2/4)

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

- **Statistical Science and Data-Based Modelling:**
  This includes, in particular, statistics and topics such as data mining, probability theory, and machine learning (at least 30 ECTS or equivalent).

- **Computer Science and Computational Methods:**
  This includes, in particular, data structures and algorithms, database systems, programming principles and practice, software engineering (at least 30 ECTS or equivalent).

→ see also the **detailed list of topics for the interviews**
Requirements for Application (3/4)

• 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 (4/4)
Proficiency in English

• at least **B2 CEFR** (Common European Framework of Reference for Languages; or equivalent); or
• an English university entrance qualification; or
• first degree in English
Application Process – Dates and Deadlines

• **Step 1: Online application**
  mid-April – 1 June 2018

• **Step 2: Interview (in person or video-chat)**
  end of June 2018

Invitations to the interview will be sent out by email at least one week before the interview date
Application– Step 1: Online Application (1/2)

1. **Transcript of records** (details see website)

2. **Copy of diploma** (may be submitted later)

3. **Essay “Data Science”**
   
in which the student looks at the developments and perspectives of Data Science as well as his/her planned area of specialisation, and his/her previous experience (max. 1,000 words)

4. **Proof of proficiency in English**

   You must fulfill all requirements if you want to apply.
Application – Step 1: Online Application (2/2)

Step 1 is successful if

– application is submitted before the deadline
– application documents are complete
– overall average grade better than 1.5
– requirements are fulfilled
– essay is approved by committee

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

• 30 minutes, in English
• two professors
• Discussion will focus on:
  
  (1) **Statistics**: probability theory, standard distributions, maximum likelihood theory, Bayesian statistics, linear regression models
  
  (2) **Informatics**: data structures and algorithms, database systems, programming and software engineering

  (details see website)

  → Assessment of specialised knowledge, mode of expression, conclusiveness of arguments
Successful Application

Your application is successful if Step 2 is successful

→ Letters of acceptance will be sent out by email in mid-July 2018
Interested
– but not sure about your qualifications?

• Individual consulting possible
• Remember: You may also apply next year
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/incoming/austausch_engl/living/accommodation/index.html
Spokespersons

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