

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

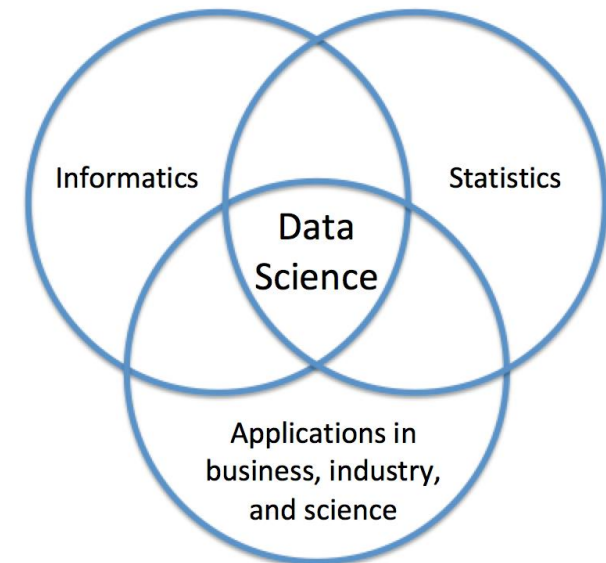
Dr. Constanze H. Schmaling

Data Science: What is it about?

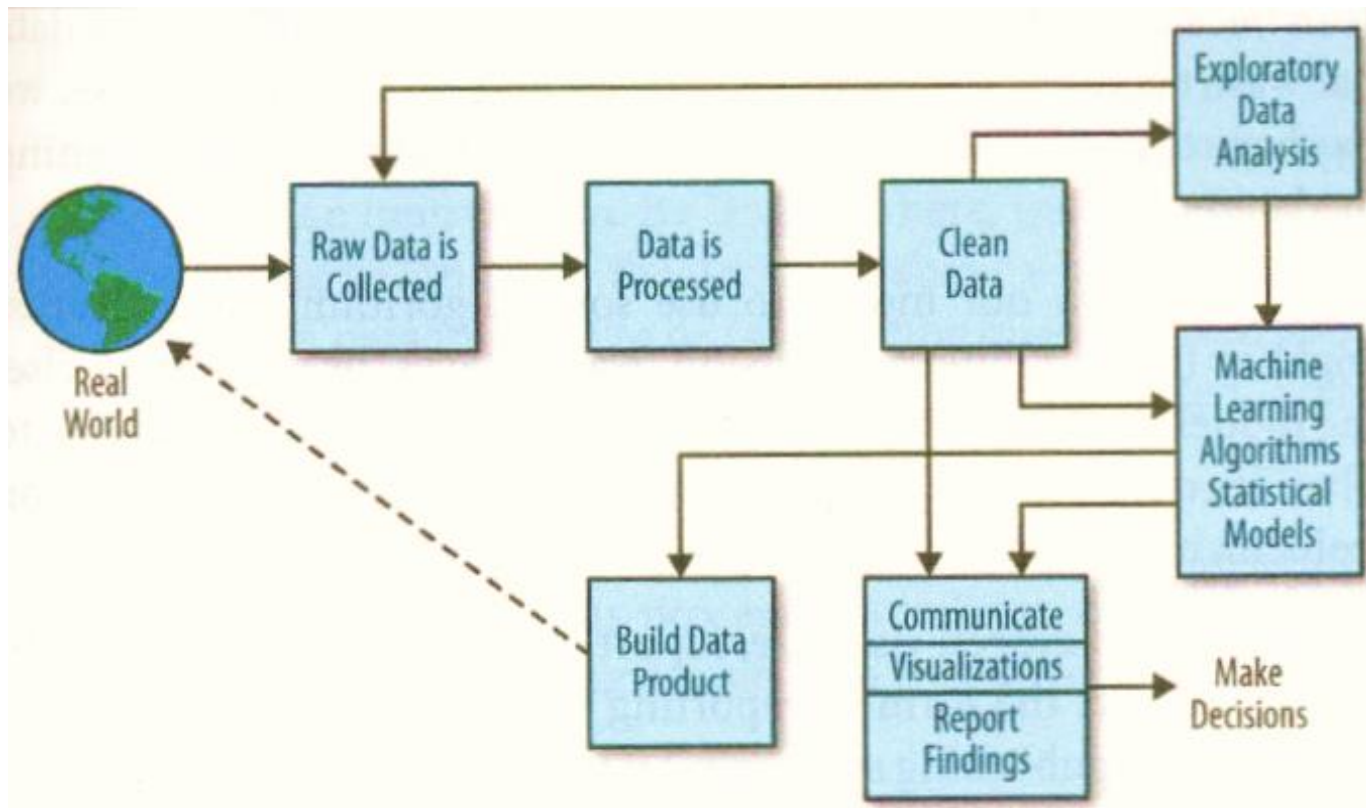
Data Science combines **informatics** and **statistics** in order to extract information from real data.

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

(Mike Driscoll, CEO Metamarket)

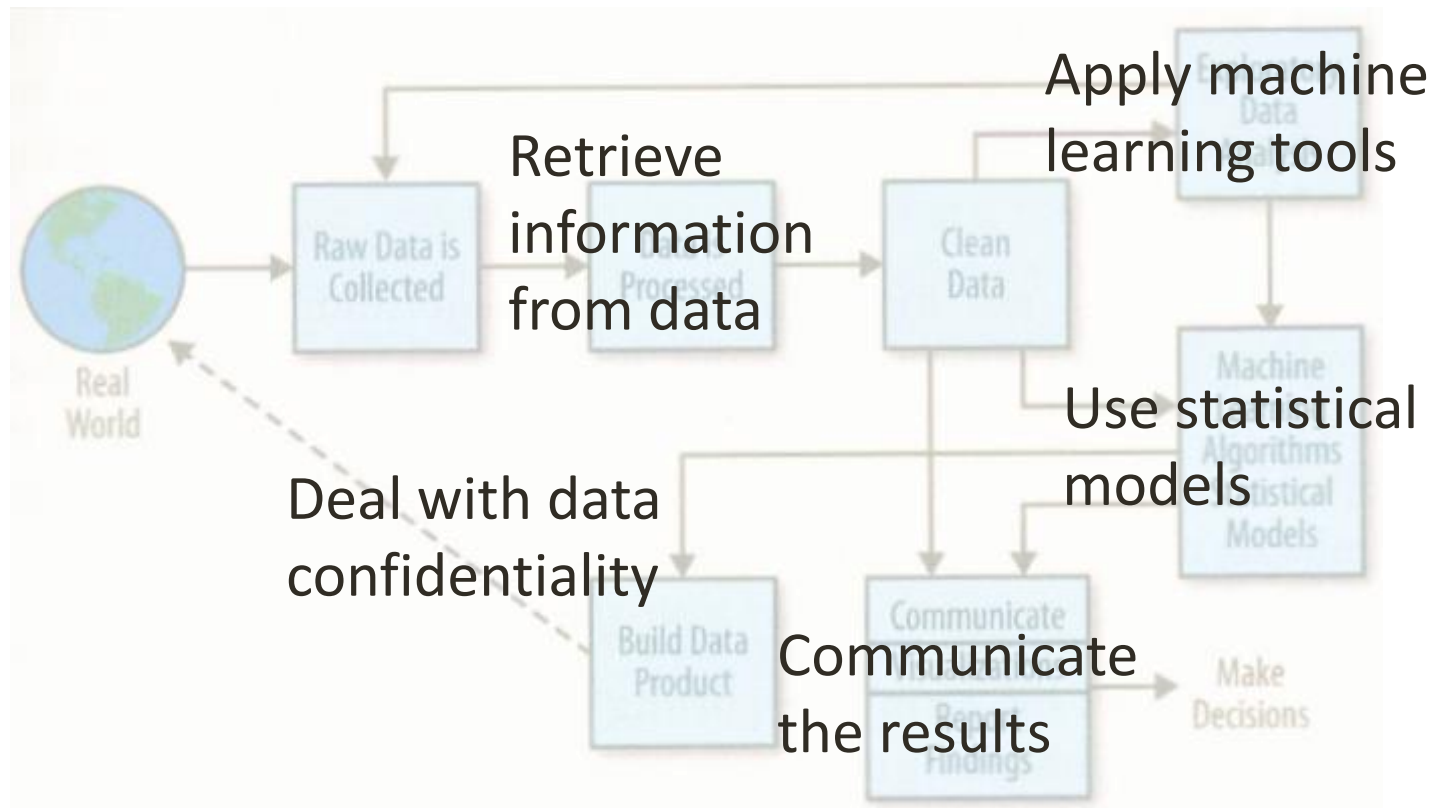


Data Scientists: What do they do?



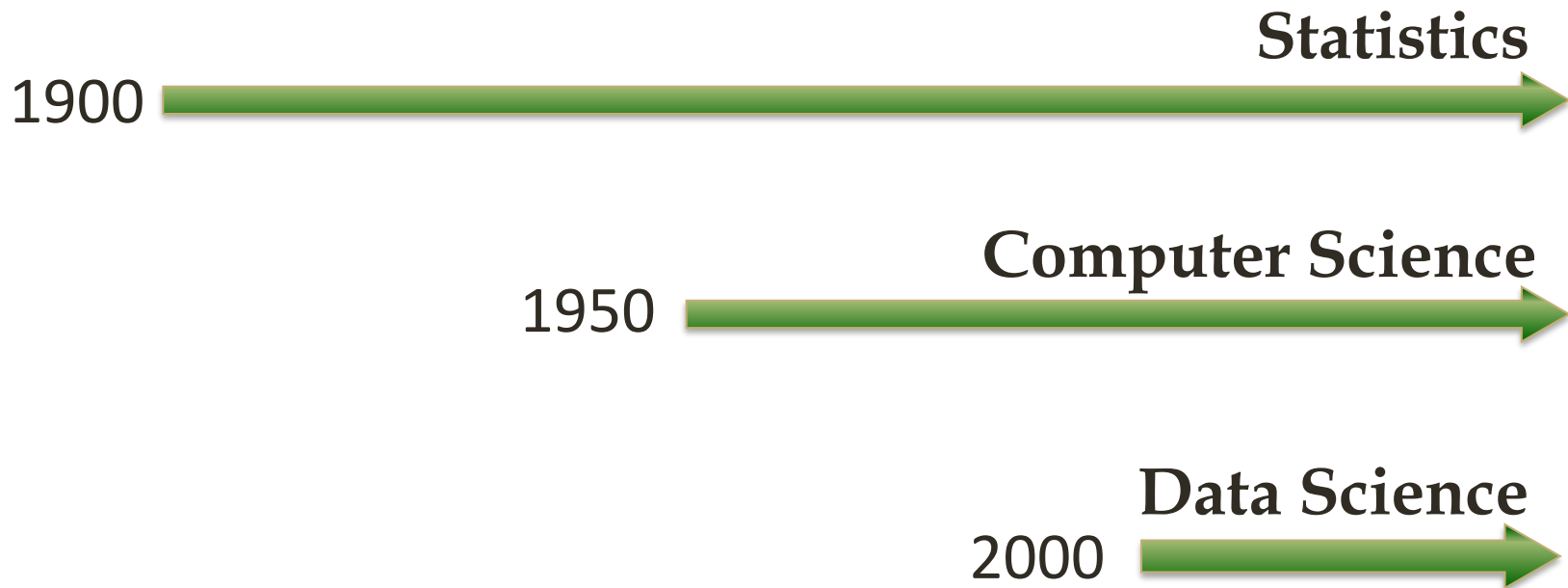
Source: C. O'Neil, R. Schutt (2014), Doing Data Science, O'Reilly Media Inc., USA.

Data Scientists: What do they do?



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Statistics and 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	2nd Semester 27 - 33 ECTS	3rd Semester 27 - 33 ECTS	4th Semester 30 ECTS
Statistics 12 ECTS			
Informatics 12 ECTS			
Fundamentals of Data Science 12 ECTS	Predictive Modelling 6 ECTS		
Human Computation and Analytics 9 ECTS		Data Science Practical 12 ECTS	Master Thesis and Disputation 30 ECTS
	Data Ethics and Data Security 6 ECTS		
	Elective Courses 12 ECTS		
	Current Research in Data Science 9 ECTS		

1st Semester | 30 ECTS

Statistics

Informatics

Fundamentals
of Data Science

Human Computation and Analytics

2nd Semester | 27 - 33 ECTS

Predictive Modelling

Data Ethics and Data Security

Elective Courses

Current Research in Data Science

3rd Semester | 27 - 33 ECTS

Data Science Practical

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

1st Semester | 30 ECTS

Statistics

Informatics

Fundamentals
of Data Science

Human Computation and Analytics

2nd Semester | 27 - 33 ECTS

Predictive Modelling

Data Ethics and Data Security

Elective Courses

Current Research in Data Science

3rd Semester | 27 - 33 ECTS

Data Science Practical

4th Semester | 30 ECTS

Master Thesis
and Disputation

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

1st Semester | 30 ECTS

Statistics

Informatics

Fundamentals
of Data Science

Human Computation and Analytics

2nd Semester | 27 - 33 ECTS

Predictive Modelling

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Elective Courses

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3rd Semester | 27 - 33 ECTS

Data Science Practical

4th Semester | 30 ECTS

Master Thesis
and Disputation

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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Predictive Modelling

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3rd Semester | 27 - 33 ECTS

Data Science Practical

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

1st Semester | 30 ECTS

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Fundamentals
of Data Science

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2nd Semester | 27 - 33 ECTS

Predictive Modelling

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Elective Courses

Current Research in Data Science

3rd Semester | 27 - 33 ECTS

Data Science Practical

4th Semester | 30 ECTS

Master Thesis
and Disputation

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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Human Computation and Analytics

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Elective Courses

Current Research in Data Science

3rd Semester | 27 - 33 ECTS

Data Science Practical

4th Semester | 30 ECTS

Master Thesis
and Disputation

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

1st Semester | 30 ECTS

Statistics

Informatics

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of Data Science

Human Computation and Analytics

2nd Semester | 27 - 33 ECTS

Predictive Modelling

Data Ethics and Data Security

Elective Courses

Current Research in Data Science

3rd Semester | 27 - 33 ECTS

Data Science Practical

4th Semester | 30 ECTS

Master Thesis
and Disputation

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

Data Ethics and Data Security
 6 ECTS

Elective Courses
 12 ECTS

Current Research in Data Science
 9 ECTS

3rd Semester | 27 - 33 ECTS

Data Science Practical
 12 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



Volkswagen



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](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](https://www.en.uni-muenchen.de/students/exchange/incomings/austausch_engl/living/accommodation/index.html)

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4th Semester | 30 ECTS

Statistics
12 ECTSInformatics
12 ECTSFundamentals
of Data Science | 12 ECTSPredictive Modelling
6 ECTSHomeworks, Simulations and Analytics
9 ECTSwww.datascience-munich.deData Science Practice
12 ECTSMaster Thesis
and Dissertation
30 ECTSData Ethics and Data Security
6 ECTSElective Courses
12 ECTSCurrent Research in Data Science
9 ECTS