

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

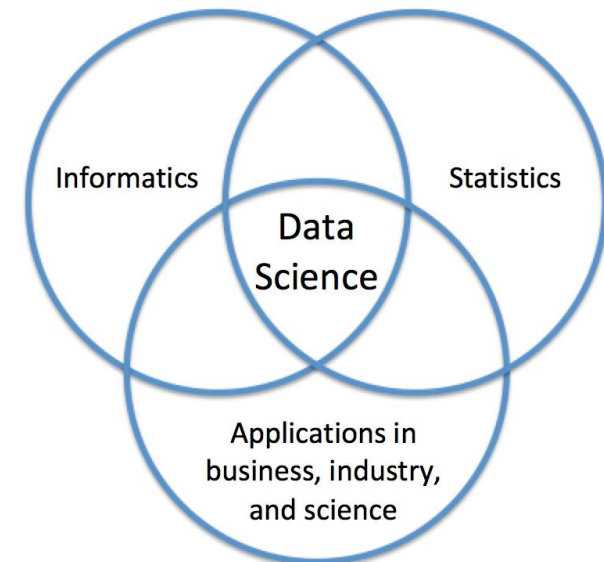
Dr. Constanze H. Schmaling

Data Science: What is it about?

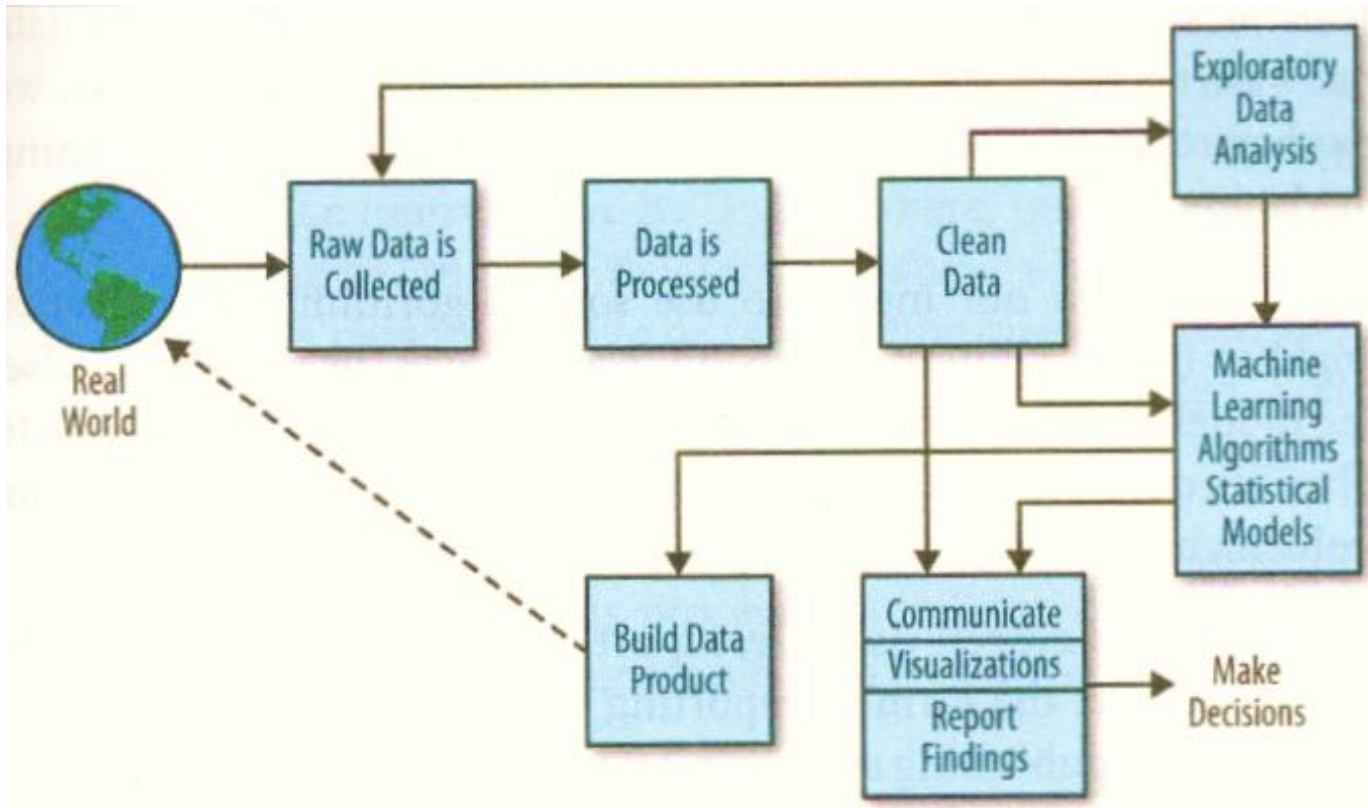
Data Science combines **informatics** and **statistics** in order to extract information from real data.

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

(Mike Driscoll, CEO Metamarket)

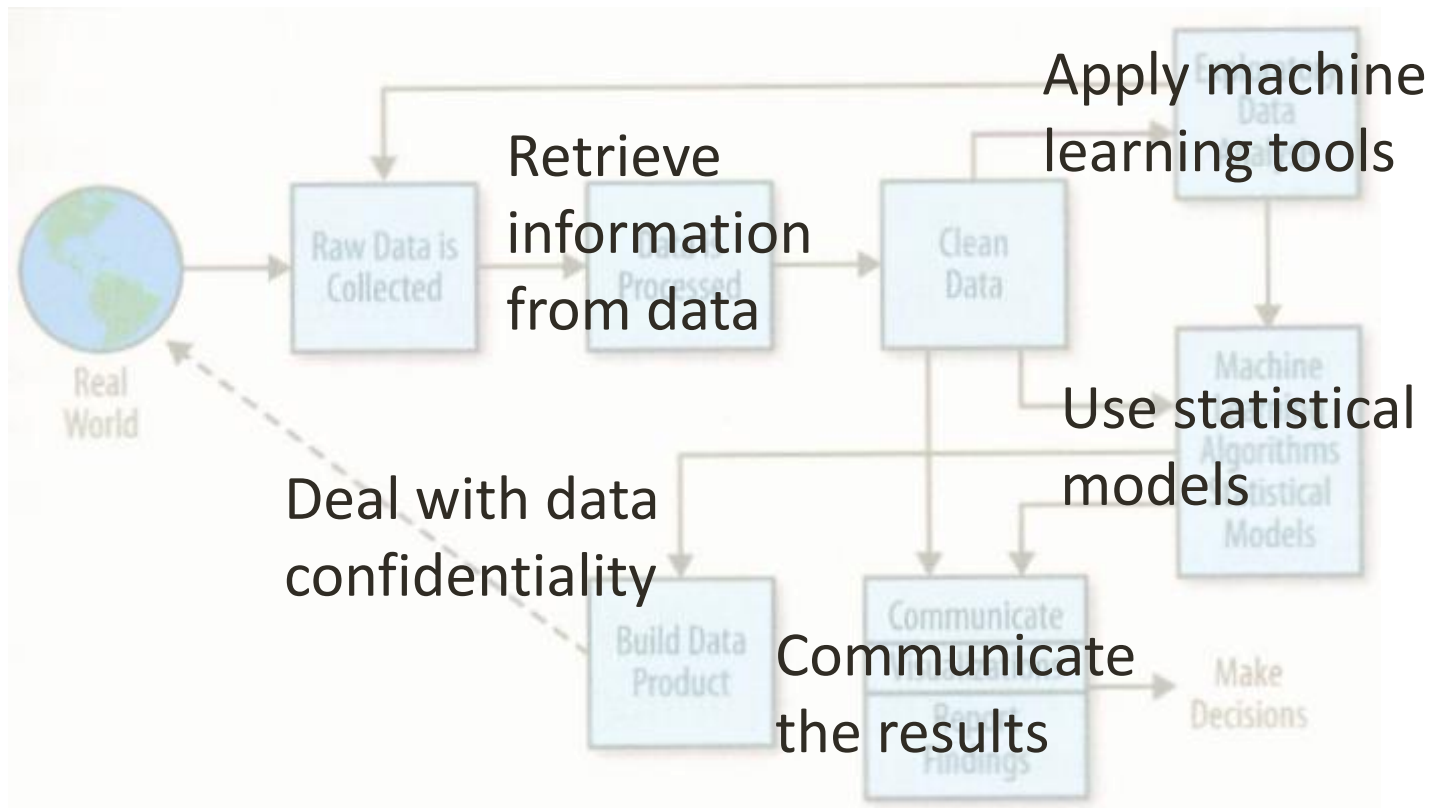


Data Scientists: What do they do?



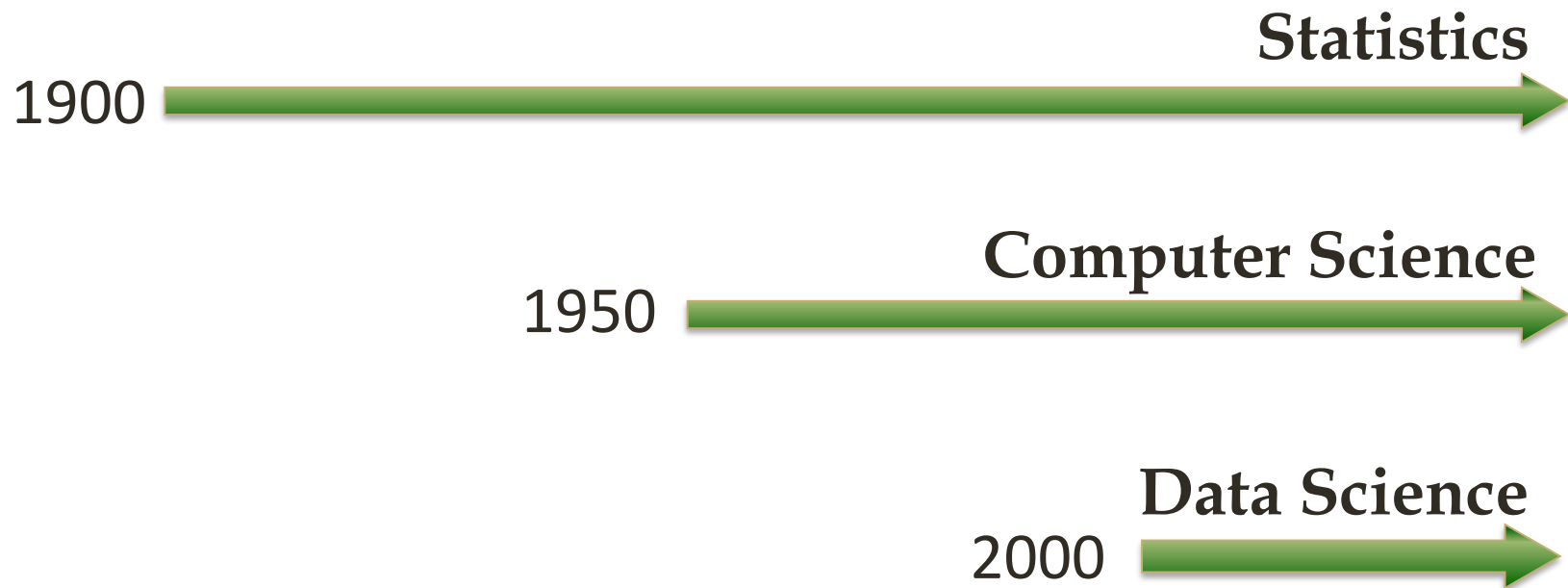
Source: C. O’Neil, R. Schutt (2014), Doing Data Science, O’Reilly Media Inc., USA.

Data Scientists: What do they do?



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Statistics and Data Science



Why Data Science? Why LMU?

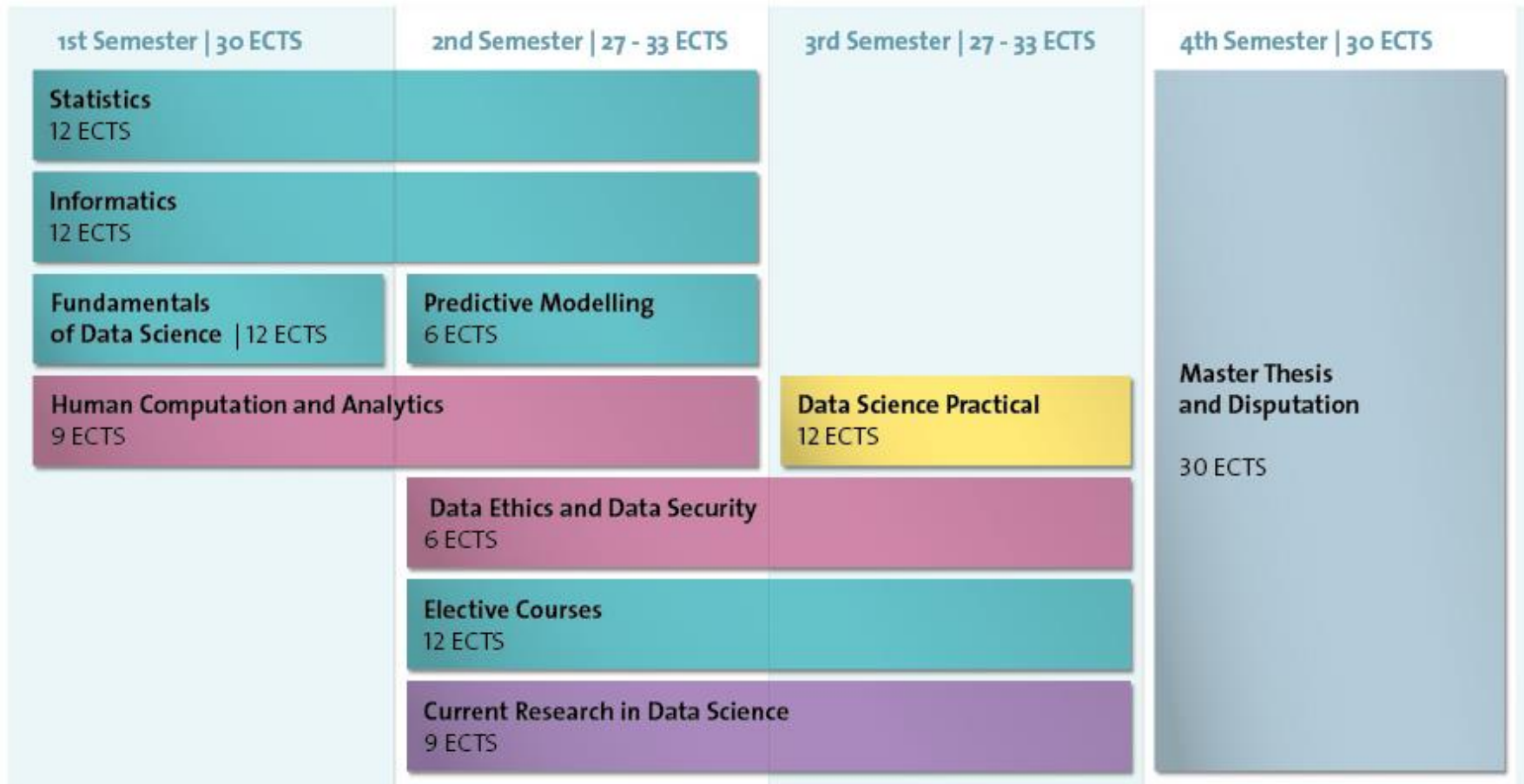
- Data Science is **“data driven problem solving”**
- Data Scientists are needed in **industry, business, and science**
- Data Science requires **computational as well as statistical** knowledge and skills
- At LMU Munich, **Statistics and Informatics** are in the same **faculty**

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

Informatics

Fundamentals
of Data Science

Human Computation and Analytics

Predictive Modelling

Data Science Practical

Data Ethics and Data Security

Elective Courses

Current Research in Data Science

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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Statistics

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**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

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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

- 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

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Elective Courses

Current Research in Data Science

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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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 defense

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



Universität
Augsburg
University



TECHNISCHE
UNIVERSITÄT
MÜNCHEN



Leibniz-Rechenzentrum
der Bayerischen Akademie der Wissenschaften

HelmholtzZentrum münchen
German Research Center for Environmental Health



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 2020
 - **Step 2: Interview**
end of June 2020
- **Letters of acceptance** are sent out by email
in **mid-July 2020**

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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Human-Centered and Analytical
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Data Science Practice
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and Dissertation
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www.datascience-munich.de