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)

Coordinators & Contact

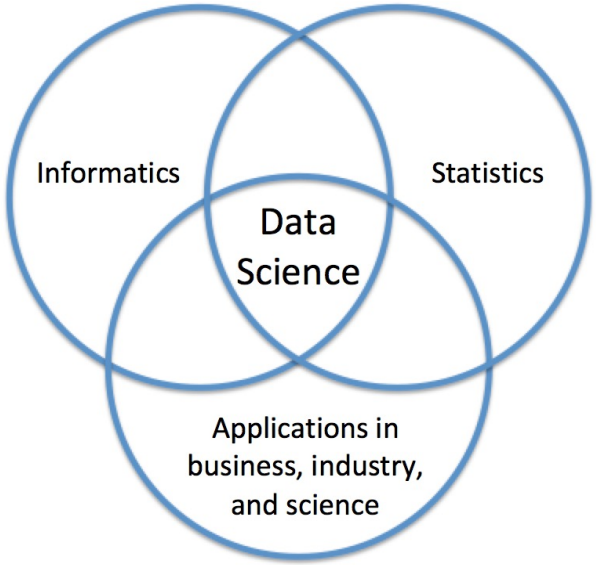
Dr. Constanze H. Schmaling / Dr. Michael Windmann

Data Science: What is it about?

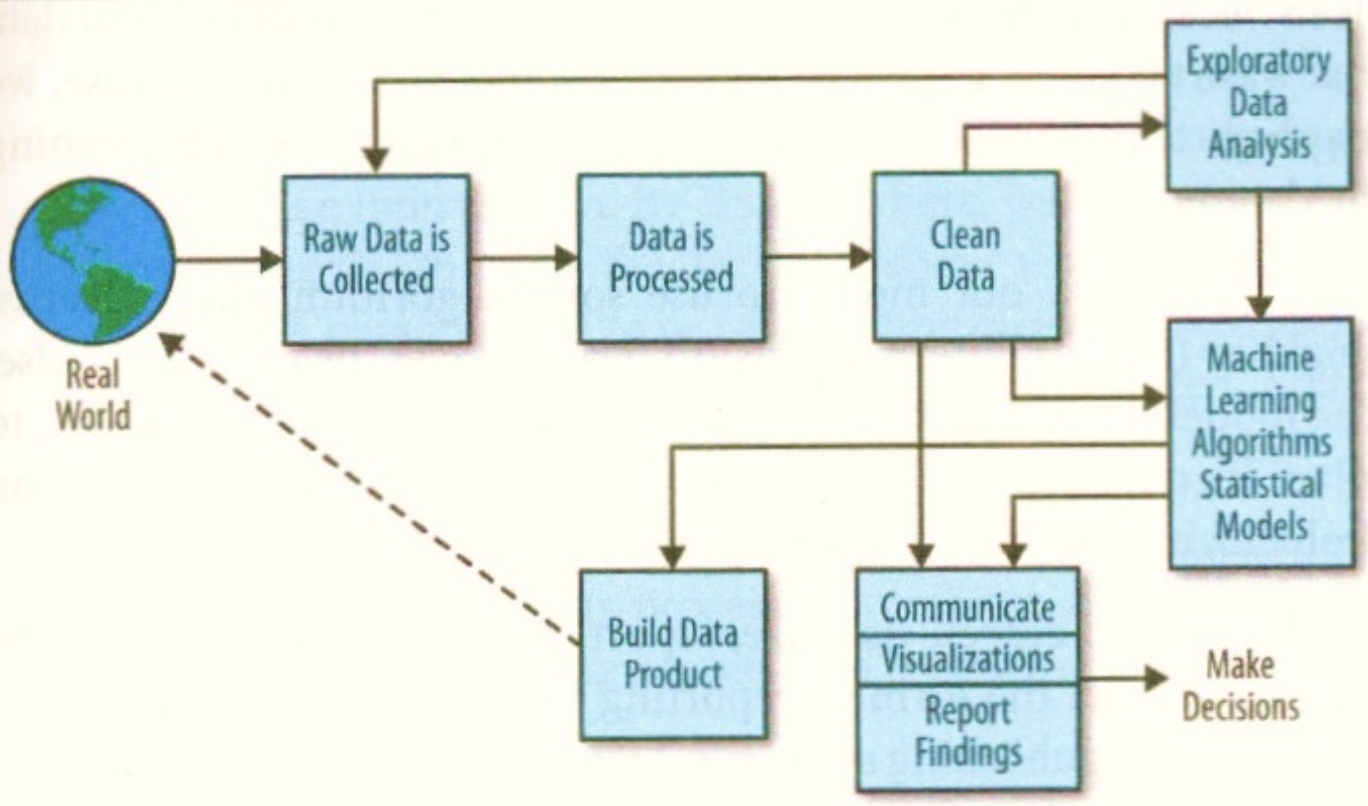
Data Science combines **informatics** and **statistics** in order to extract information from real data.

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

(Mike Driscoll, CEO Metamarket)

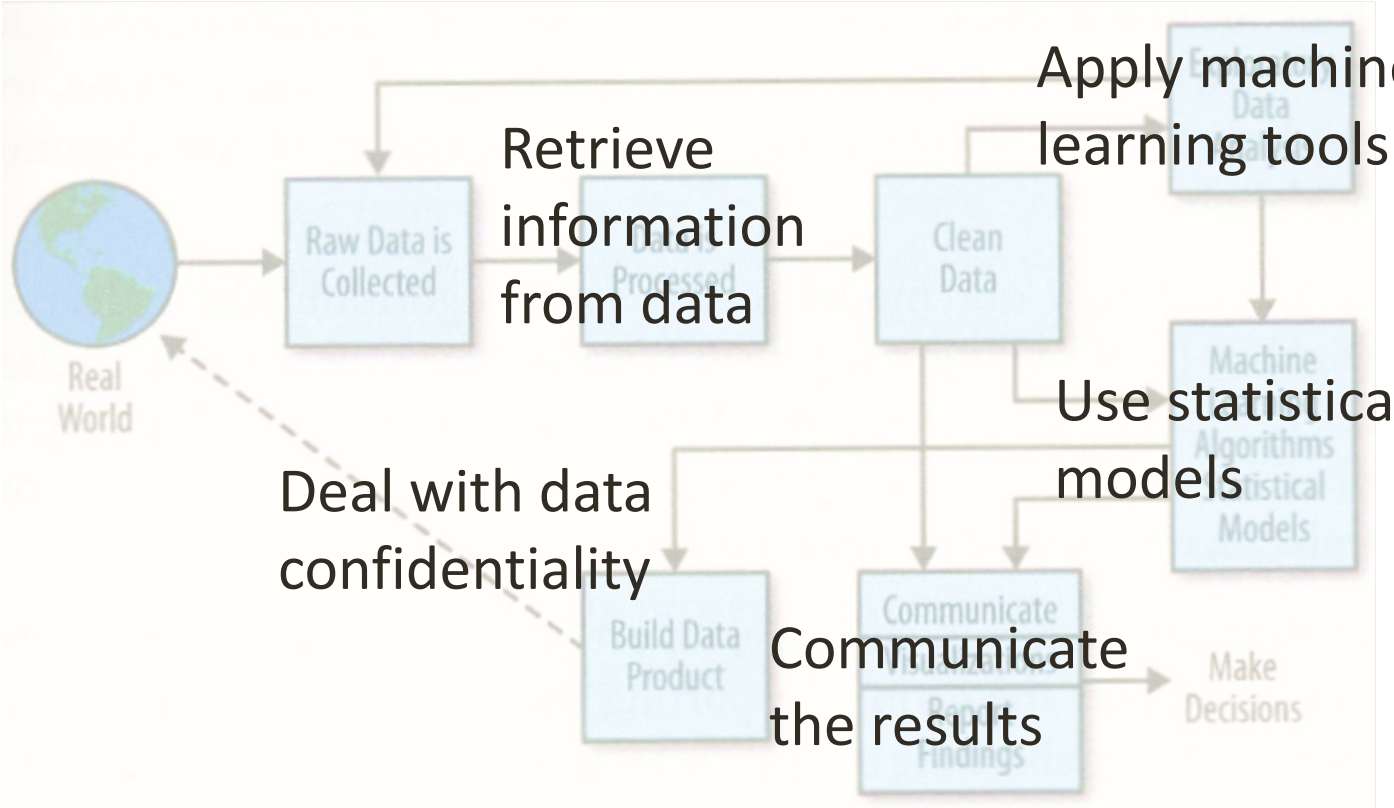


Data Scientists: What do they do?



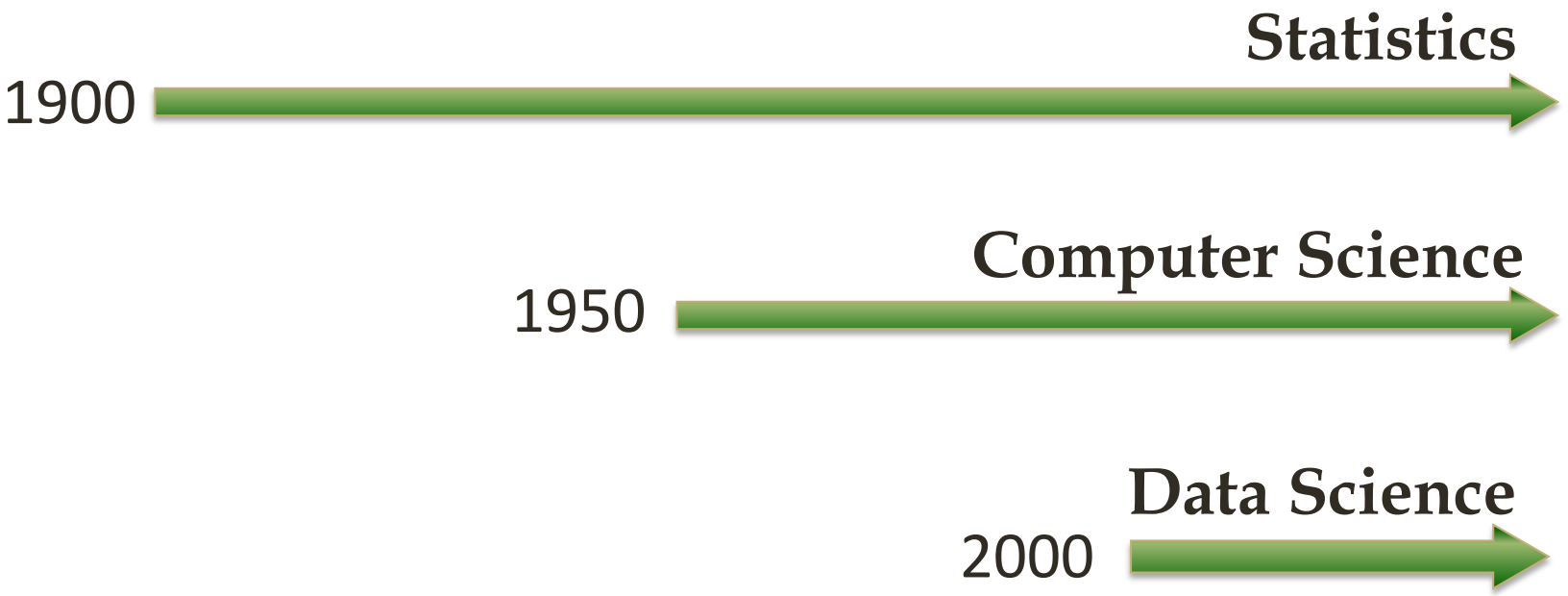
Source: C. O'Neil, R. Schutt (2014), Doing Data Science, O'Reilly Media Inc., USA.

Data Scientists: What do they do?



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

Statistics and Data Science

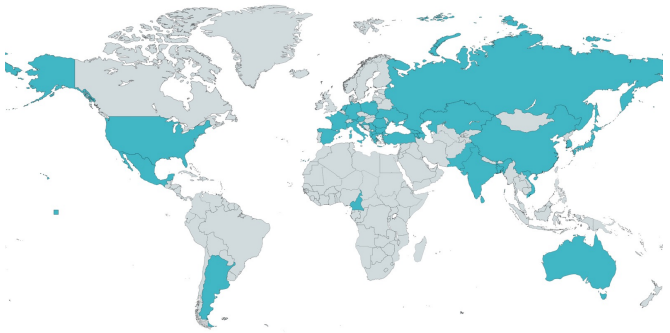


Why Data Science? Why LMU?

- 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**

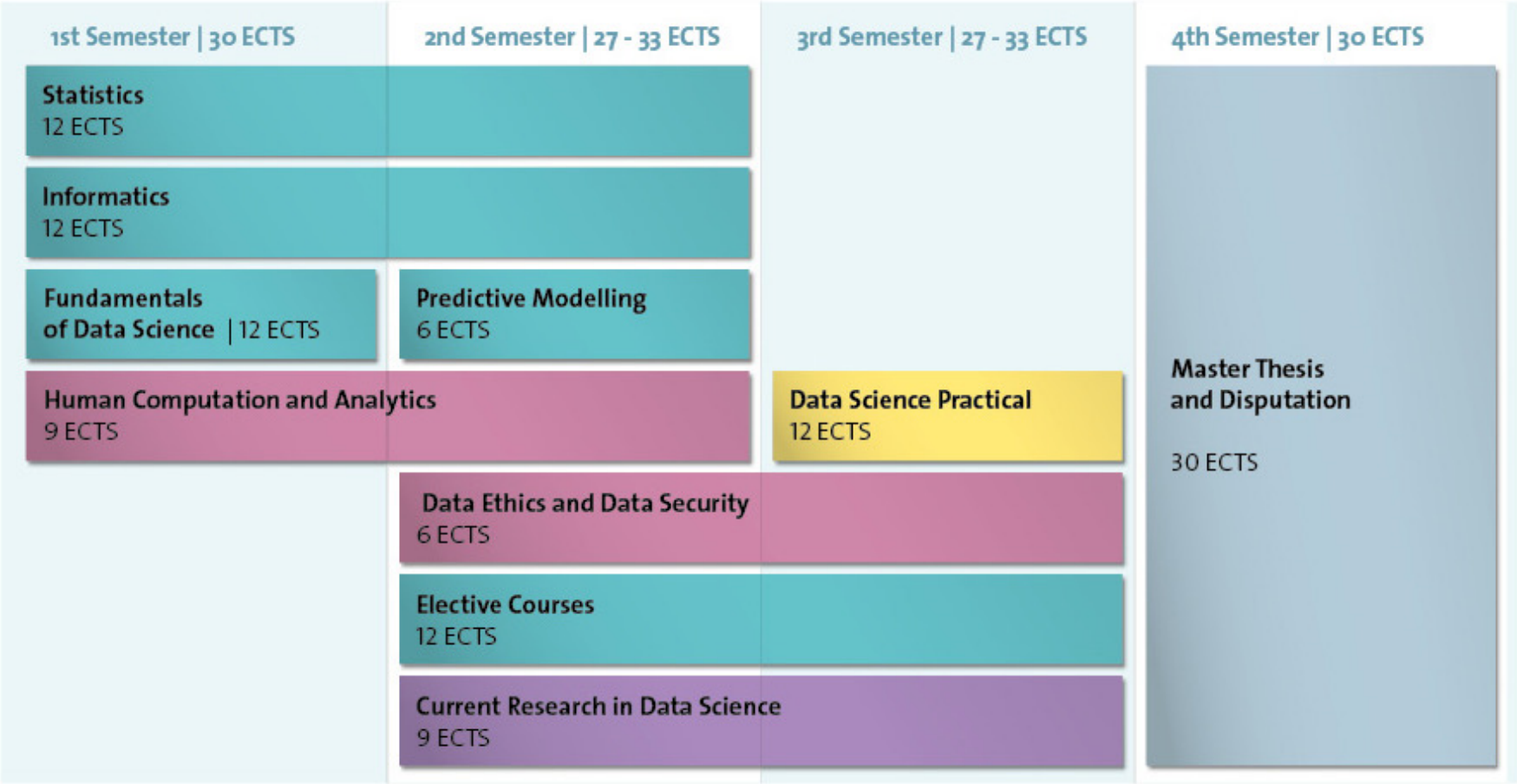
MSc Data Science@LMU

- Since winter semester 2016/17
- One of the first international Data Science programs
- Supported by the Elite Network of Bavaria
- Small cohorts – individual support



Elite Network of Bavaria

Curriculum

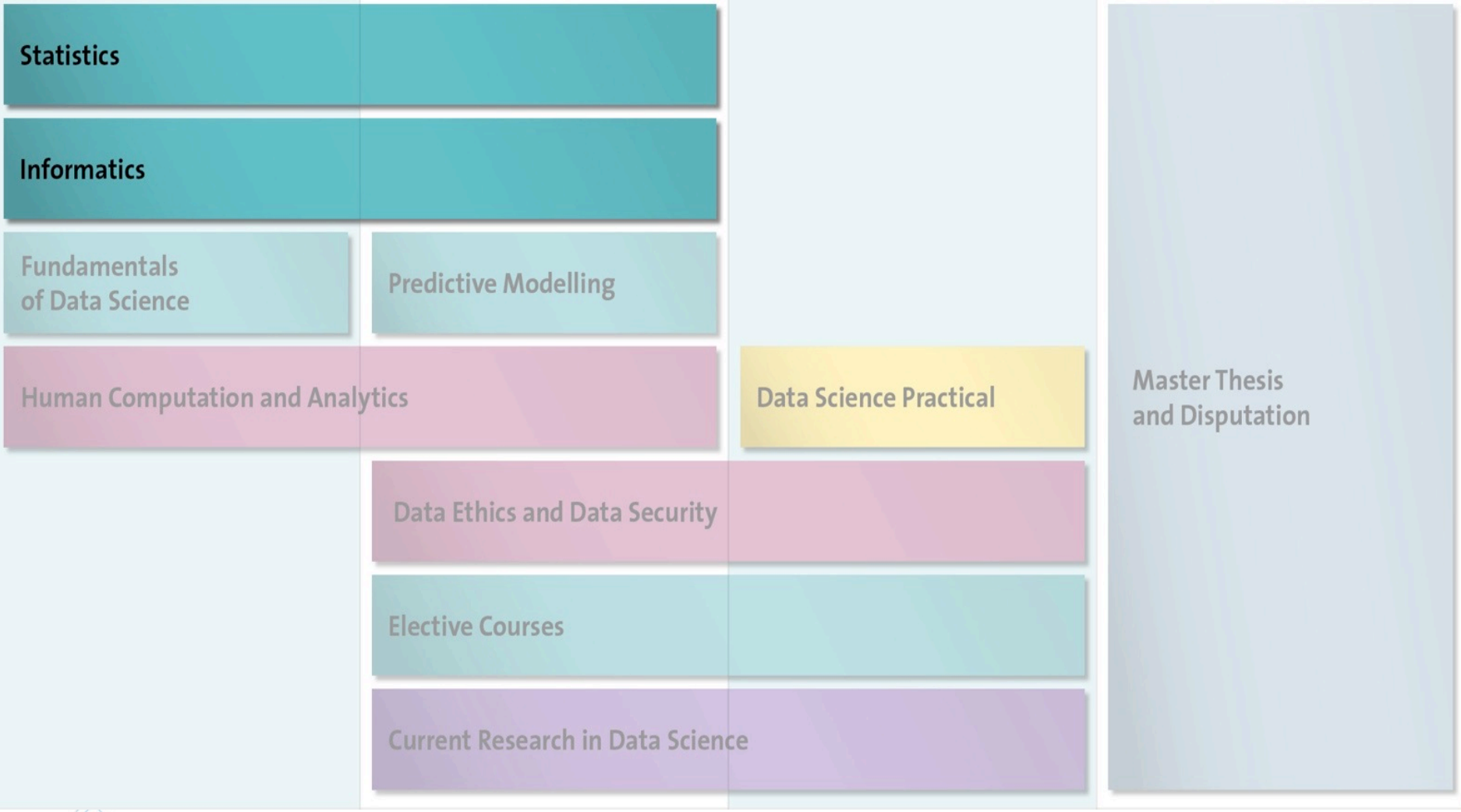

1st Semester | 30 ECTS
2nd Semester | 27 - 33 ECTS
3rd Semester | 27 - 33 ECTS
4th Semester | 30 ECTS
Statistics
12 ECTS
Informatics
12 ECTS
Fundamentals of Data Science | 12 ECTS
Predictive Modelling
6 ECTS
Human Computation and Analytics
9 ECTS
Data Science Practical
12 ECTS
Master Thesis and Disputation
30 ECTS
Data Ethics and Data Security
6 ECTS
Elective Courses
12 ECTS
Current Research in Data Science
9 ECTS

LMU LUDWIG-MAXIMILIANS-UNIVERSITÄT MÜNCHEN

FACULTY OF MATHEMATICS, COMPUTER SCIENCE AND STATISTICS

ELITE MASTER PROGRAM

DATA SCIENCE @ LMU
STATISTICS + INFORMATICS



Core Module: Statistics

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

Core Module: Informatics

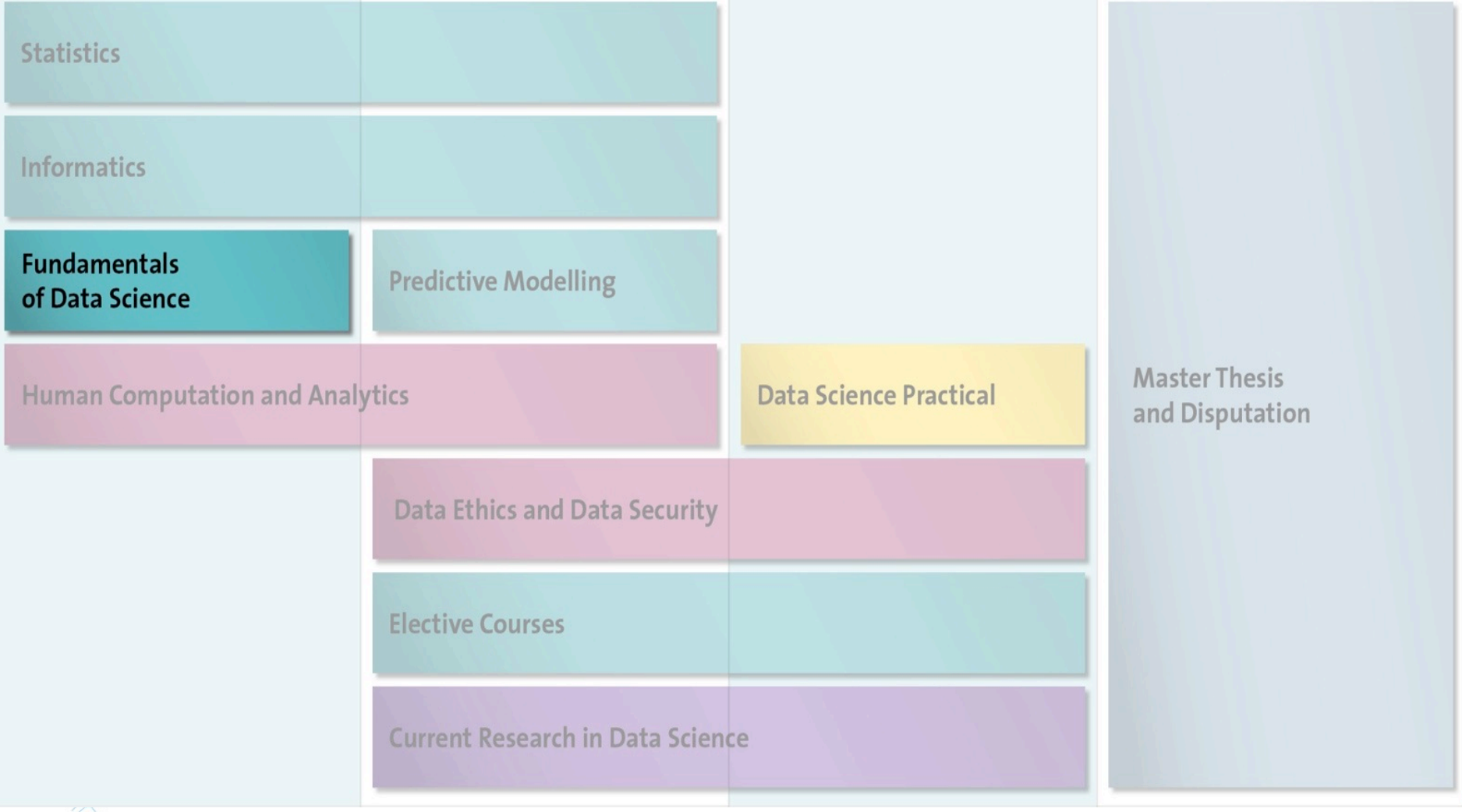
- Knowledge Discovery and Data Mining
- Big Data Management

LMU LUDWIG-MAXIMILIANS-UNIVERSITÄT MÜNCHEN

FACULTY OF MATHEMATICS, COMPUTER SCIENCE AND STATISTICS

ELITE MASTER PROGRAM

DATA SCIENCE @ LMU
STATISTICS + INFORMATICS



Fundamentals of Data Science (Individual Module)

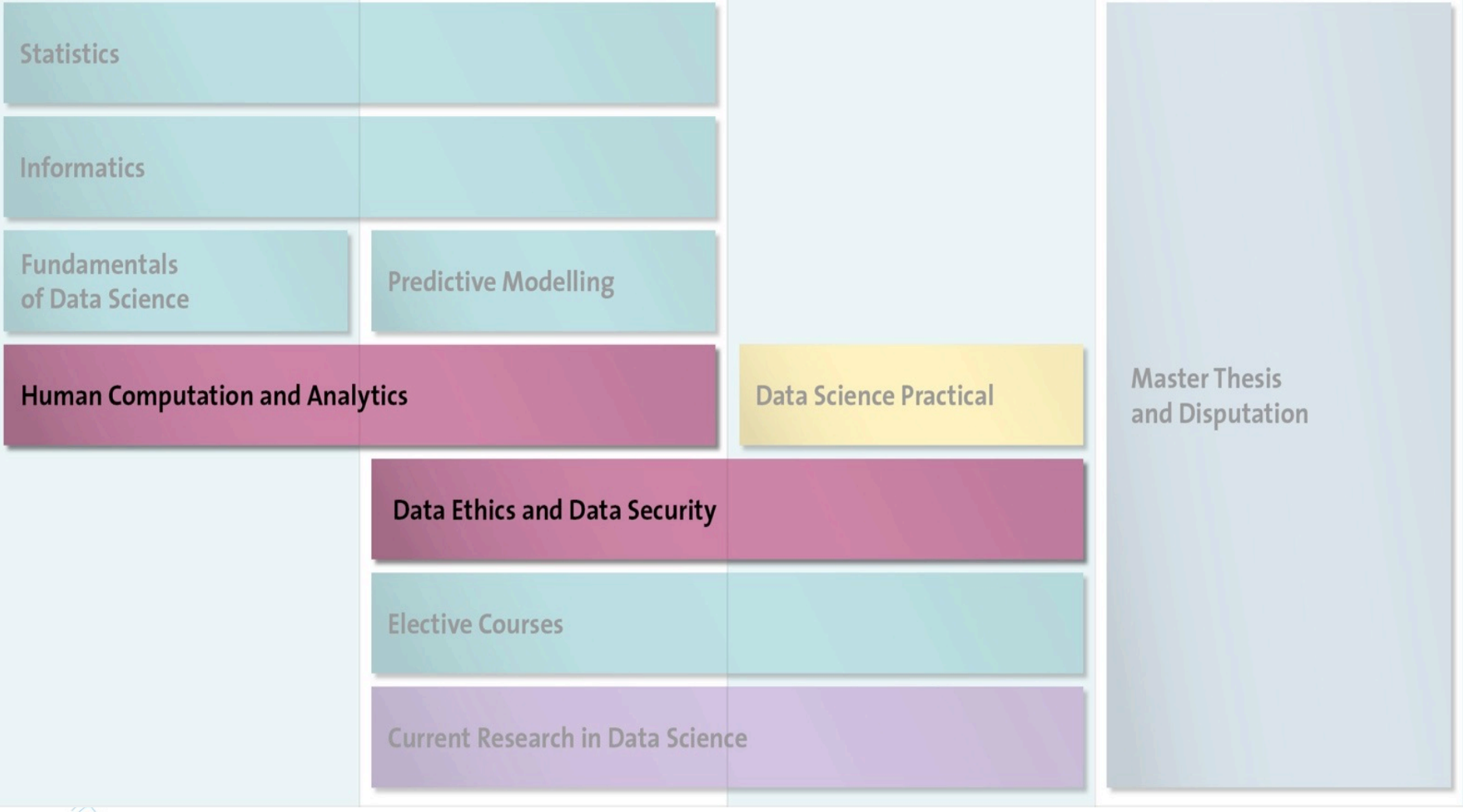
- Heterogeneous level of expertise of incoming students
- Personalised assignment to courses in statistics and informatics to suit individual student's needs
- Result: homogeneous level of expertise after first semester

LMU LUDWIG-MAXIMILIANS-UNIVERSITÄT MÜNCHEN

FACULTY OF MATHEMATICS, COMPUTER SCIENCE AND STATISTICS

ELITE MASTER PROGRAM

DATA SCIENCE @ LMU
STATISTICS + INFORMATICS



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

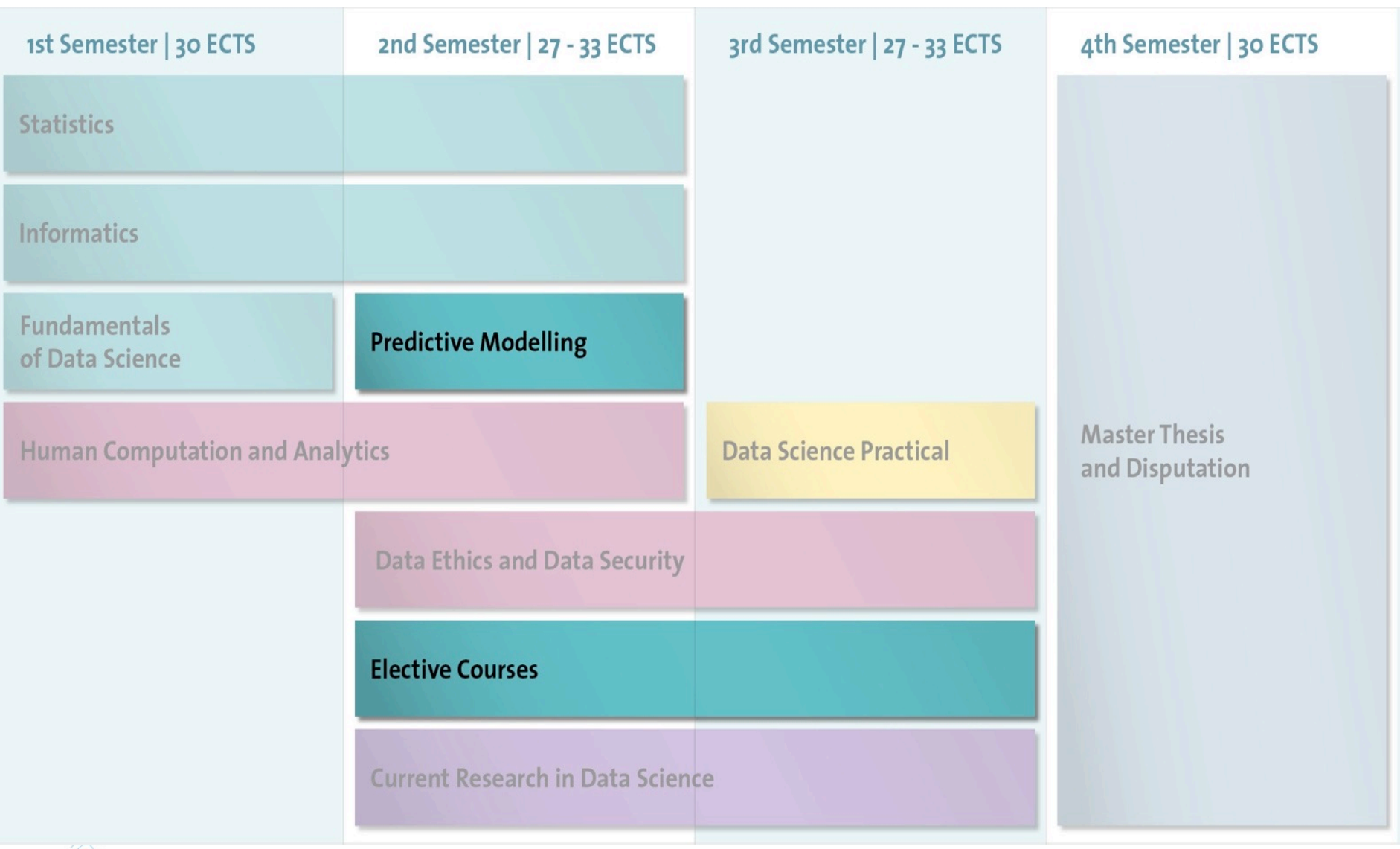
- Methodological questions of data anonymisation
- Lecture series with (invited) talks on technical, ethical, and legal aspects of data security

LMU LUDWIG-MAXIMILIANS-UNIVERSITÄT MÜNCHEN

FACULTY OF MATHEMATICS, COMPUTER SCIENCE AND STATISTICS

ELITE MASTER PROGRAM

DATA SCIENCE @ LMU
STATISTICS + INFORMATICS



Predictive Modelling

- Theory and algorithms of supervised statistical learning

Elective Modules

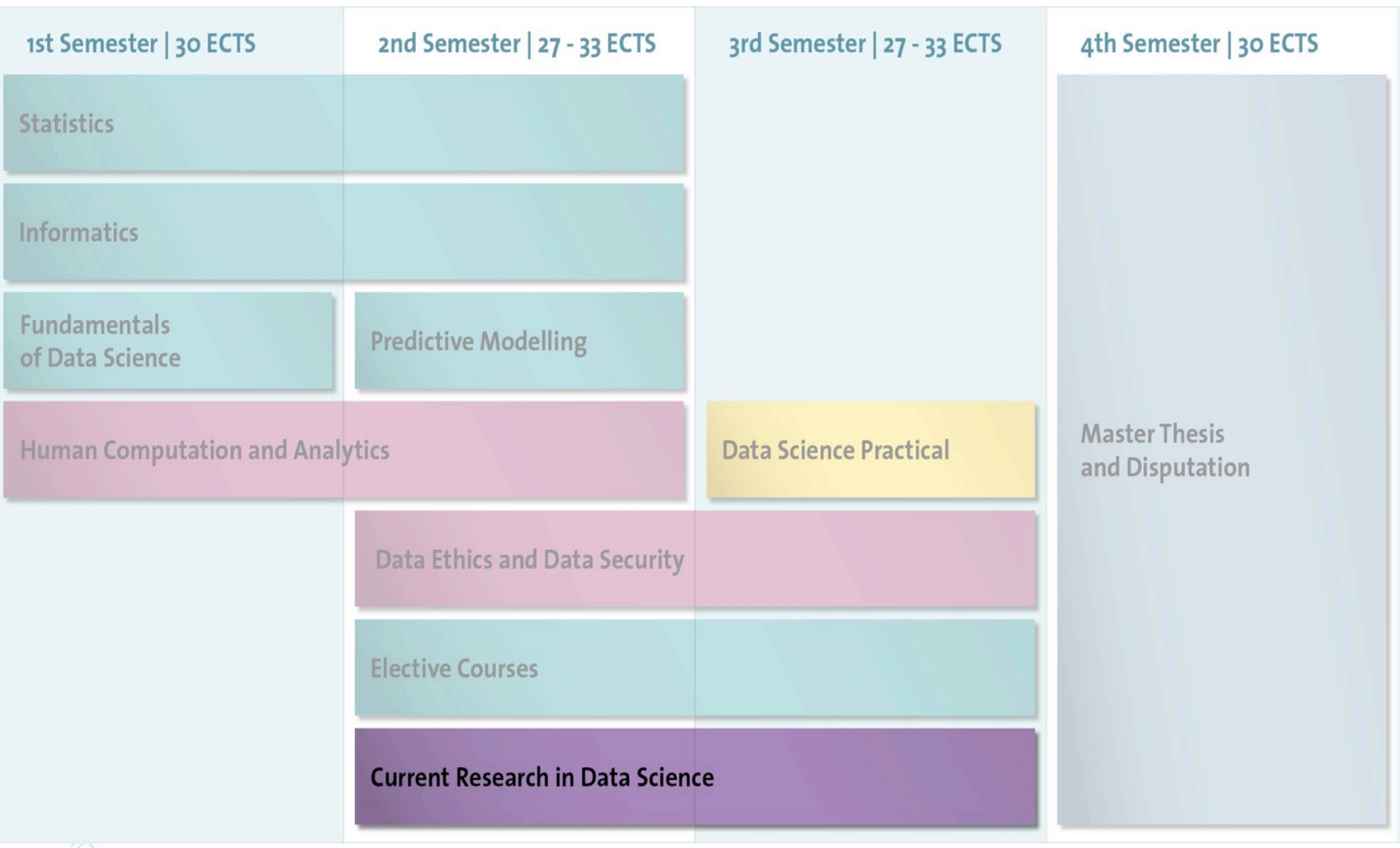
- Regular master courses from statistics, informatics, and computer linguistics
- Selected master courses from other departments
- Selected master courses from partner universities, e.g. image processing at TUM

LMU LUDWIG-MAXIMILIANS-UNIVERSITÄT MÜNCHEN

FACULTY OF MATHEMATICS, COMPUTER SCIENCE AND STATISTICS

ELITE MASTER PROGRAM

DATA SCIENCE@LMU
STATISTICS + INFORMATICS



Current Research in Data Science

- Data Science Summer School

  data security and data confidentiality, ethical and legal topics

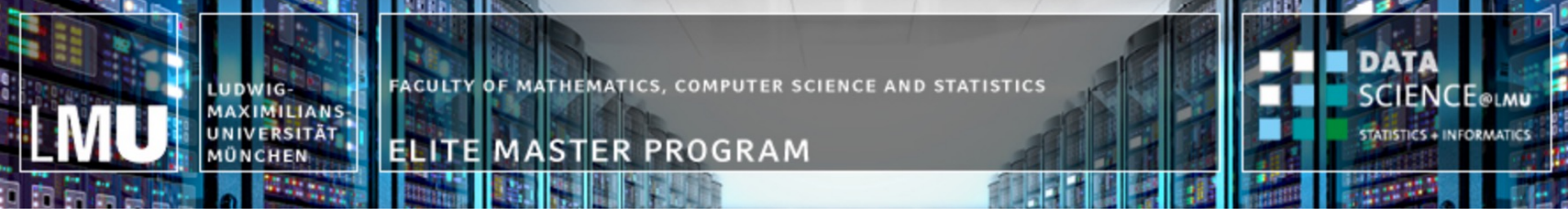
- Data Science Focused Tutorials

  biosciences, e-commerce, networks etc

- Data Science meets Data Practice

  lecture series with experts from industry and business

- Field trips



1st Semester | 30 ECTS	2nd Semester | 27 - 33 ECTS	3rd Semester | 27 - 33 ECTS	4th Semester | 30 ECTS
Statistics			Master Thesis and Disputation
Informatics			
Fundamentals of Data Science	Predictive Modelling		
Human Computation and Analytics		Data Science Practical	
	Data Ethics and Data Security		
	Elective Courses		
	Current Research in Data Science		

Data Science Practical

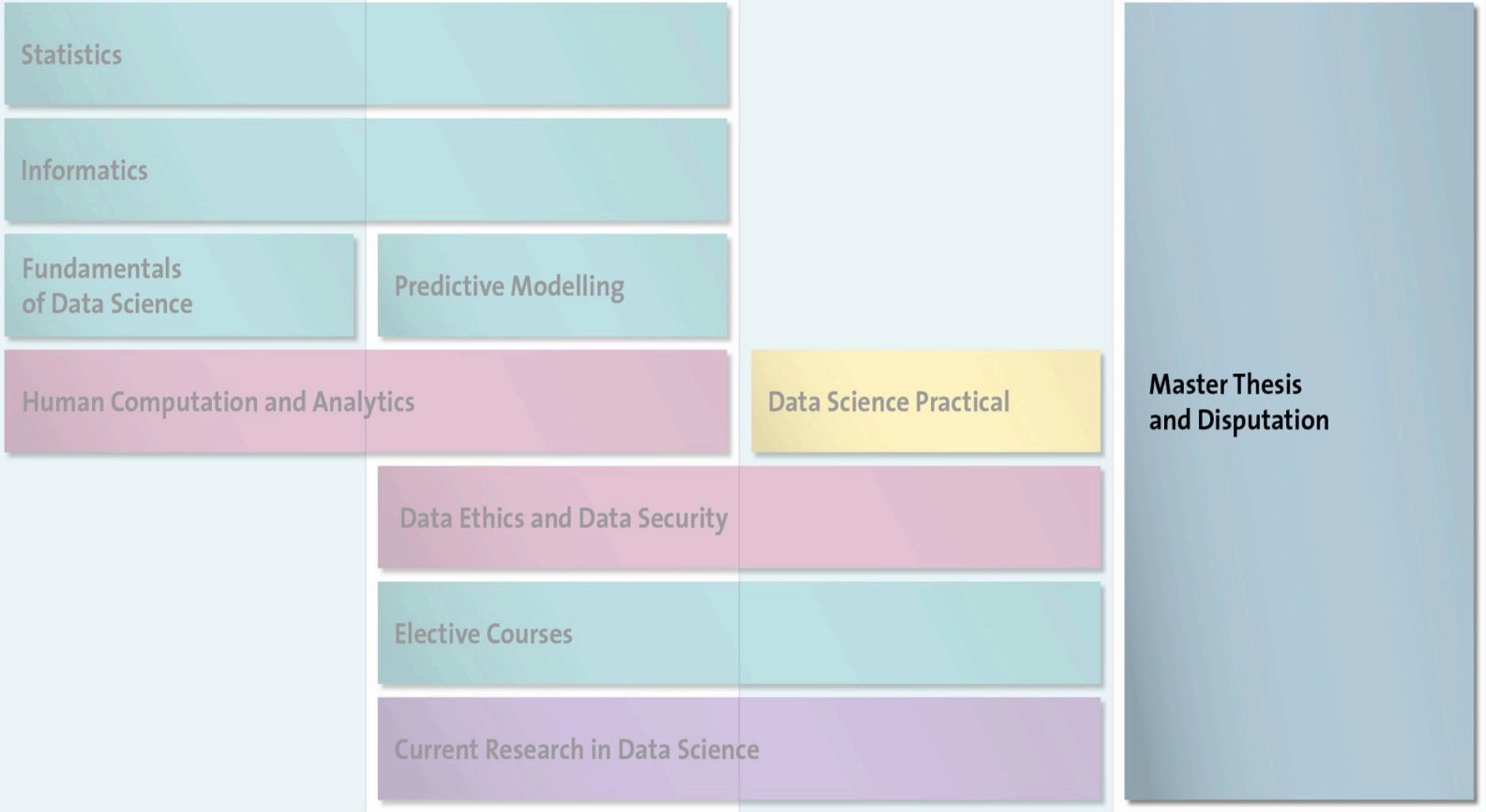
- Supervised practical in the 3rd semester, ca. 2-3 months
- Students work on practical problems in the field of Data Science
- Close cooperation with industry and business partners
- Focus on communicating results and findings to the clients

LMU LUDWIG-MAXIMILIANS-UNIVERSITÄT MÜNCHEN

FACULTY OF MATHEMATICS, COMPUTER SCIENCE AND STATISTICS

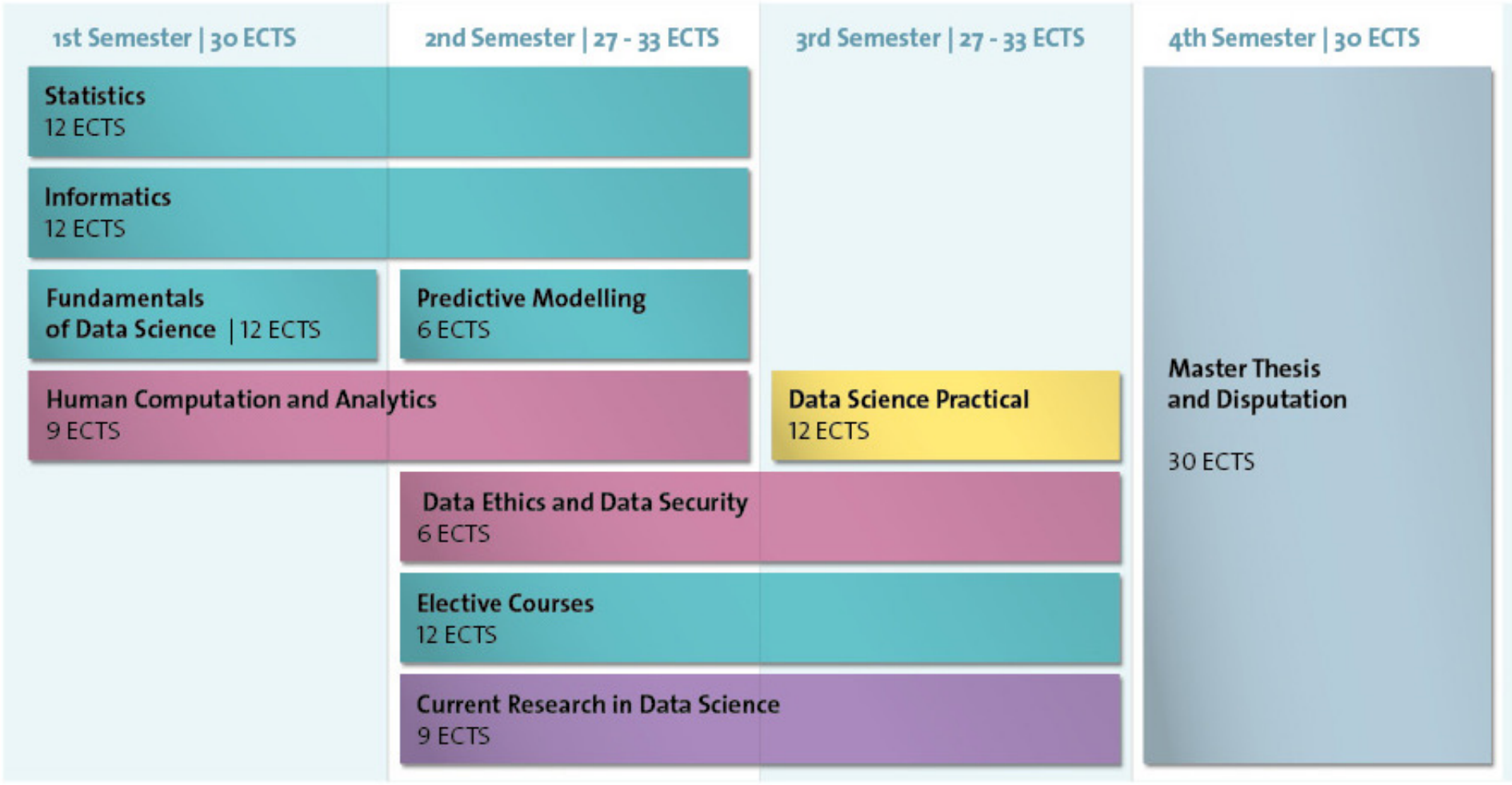
ELITE MASTER PROGRAM

DATA SCIENCE @ LMU
STATISTICS + INFORMATICS



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
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

Curriculum – Summary

- Modules **exclusively** for Data Science students
- **Individual Modules** tailored to suit individual student's needs
- 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
- Konrad Zuse School of Excellence in Reliable AI
- AIM@LMU
- Zentrum Digitalisierung Bayern

Local Academic Ties

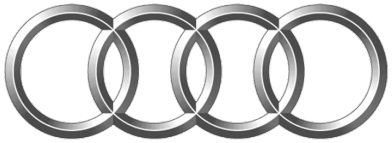
Universities

- 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 2023

- **Step 2: Interview**

  end of June 2023

→ **Letters of acceptance** are sent out by email in **mid-July 2023**

General information (for international students) on LMU Munich / Munich

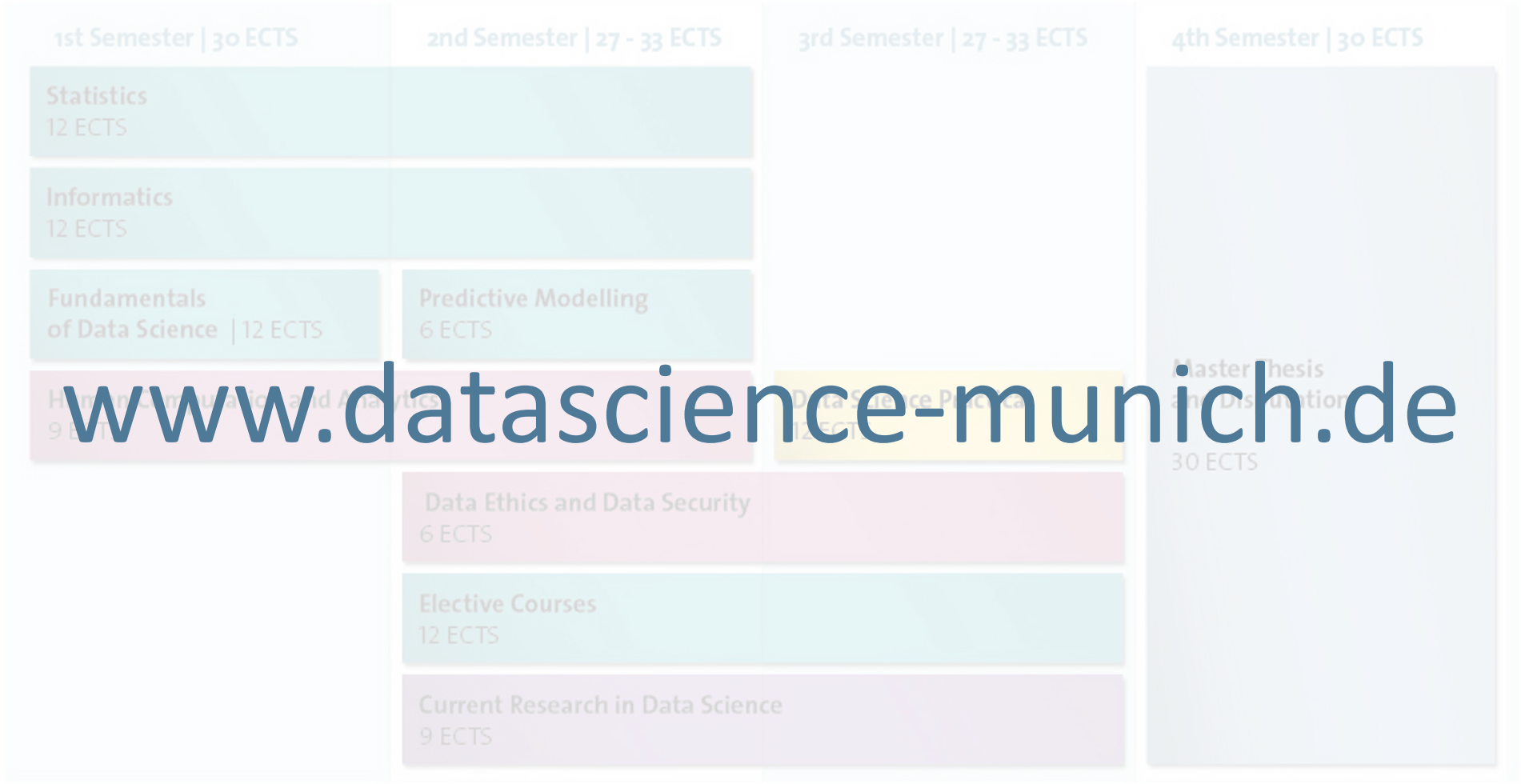
…on the LMU homepage, e.g.

- **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



www.datascience-munich.de