

Elite Master Program

MSc Data Science

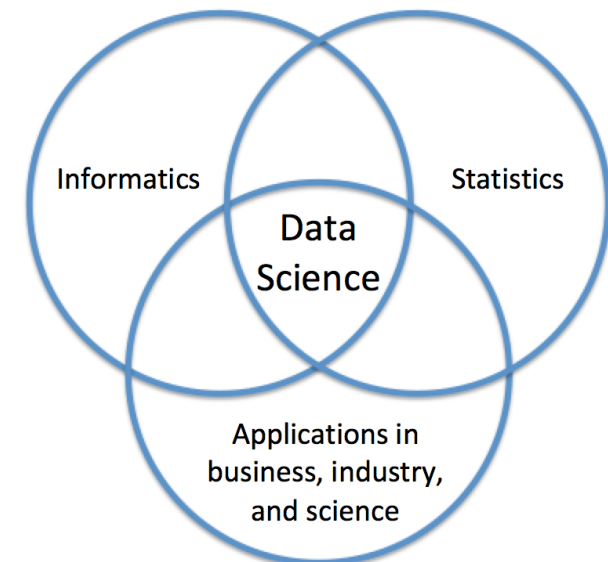
LMU Munich

Data Science – What is it about ?

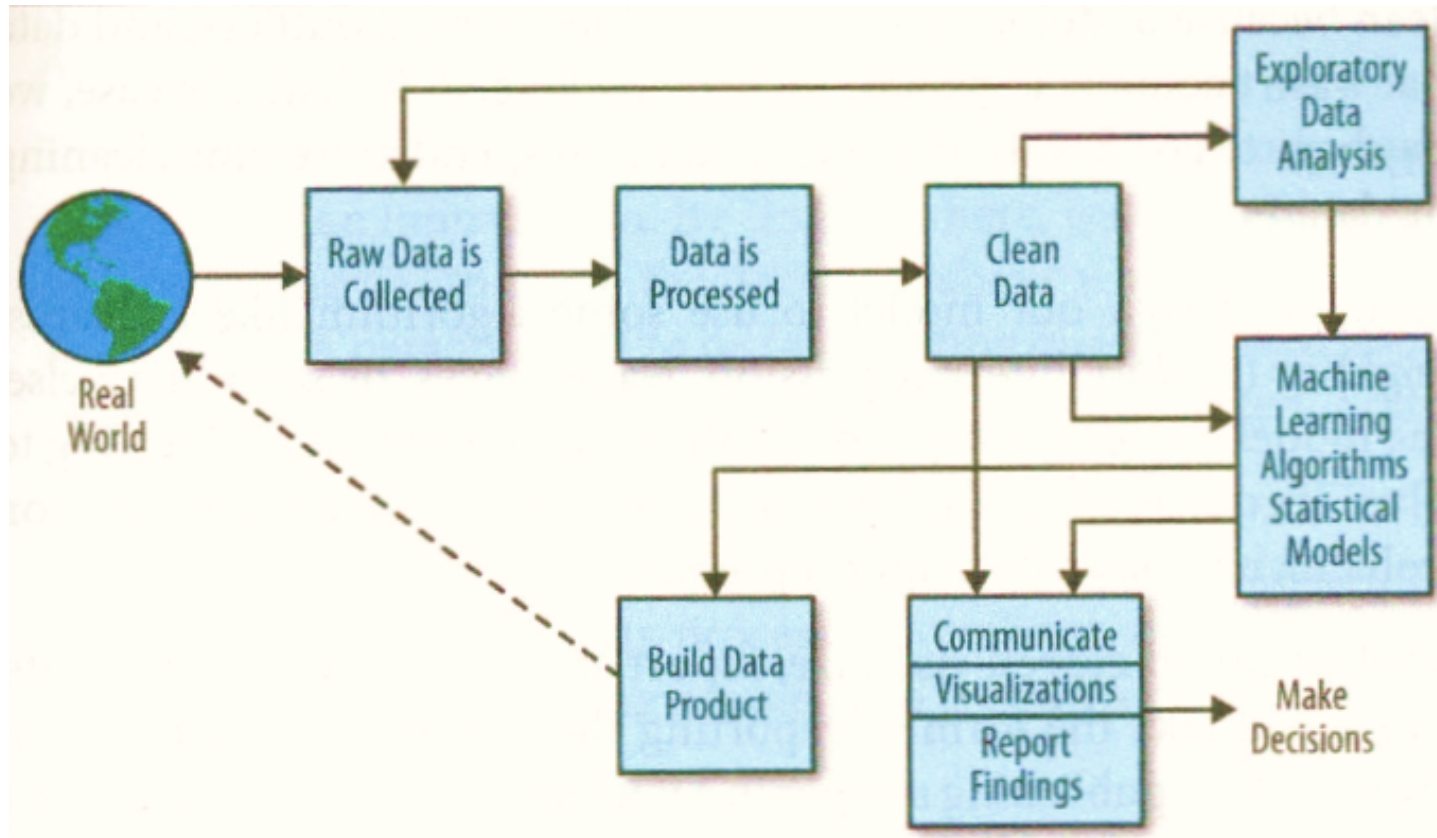
Data Science combines **informatics** and **statistics** in order to extract information from real data.

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

(Mike Driscoll, CEO Metamarket)

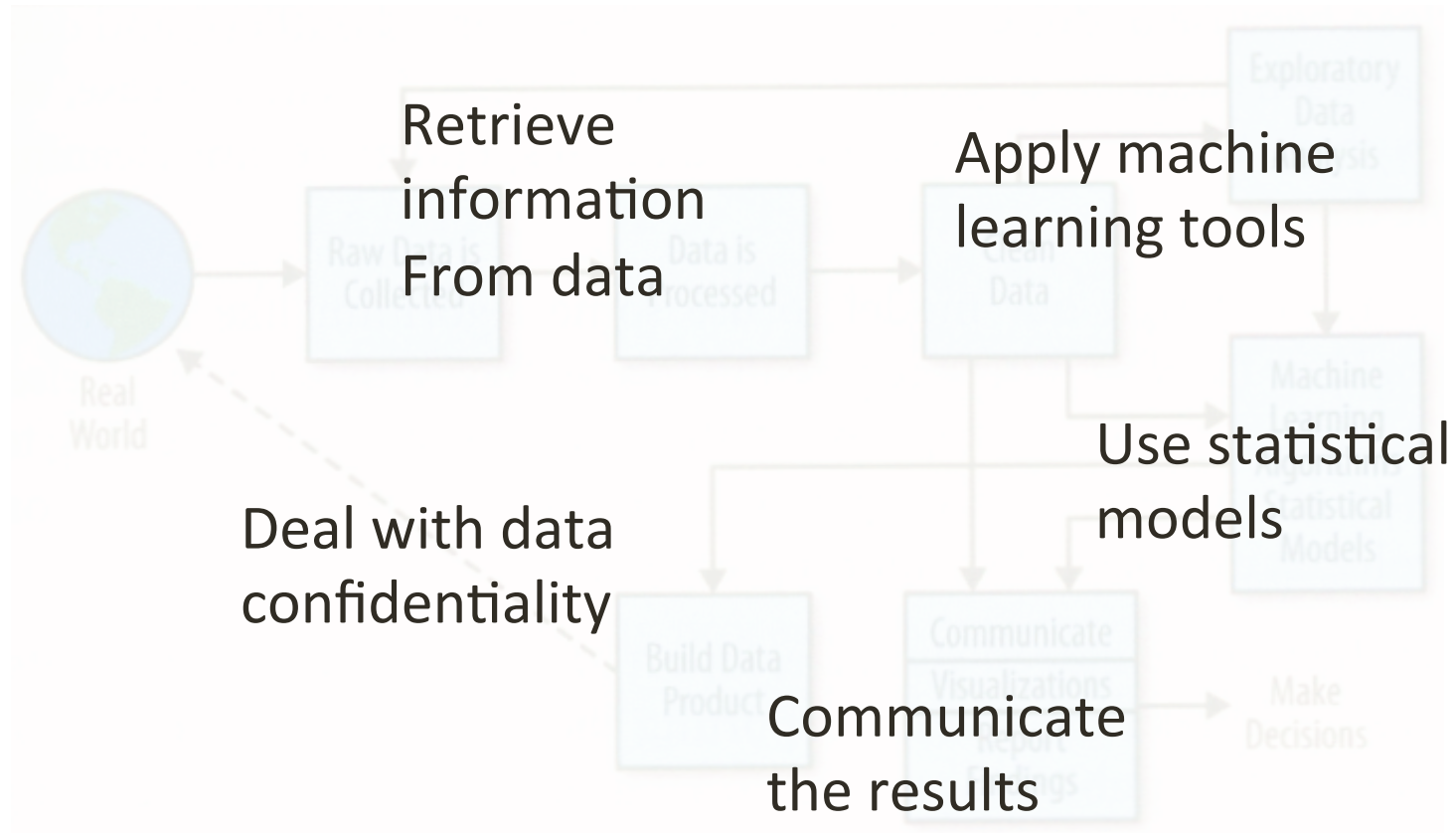


Data Scientists – What do they do?



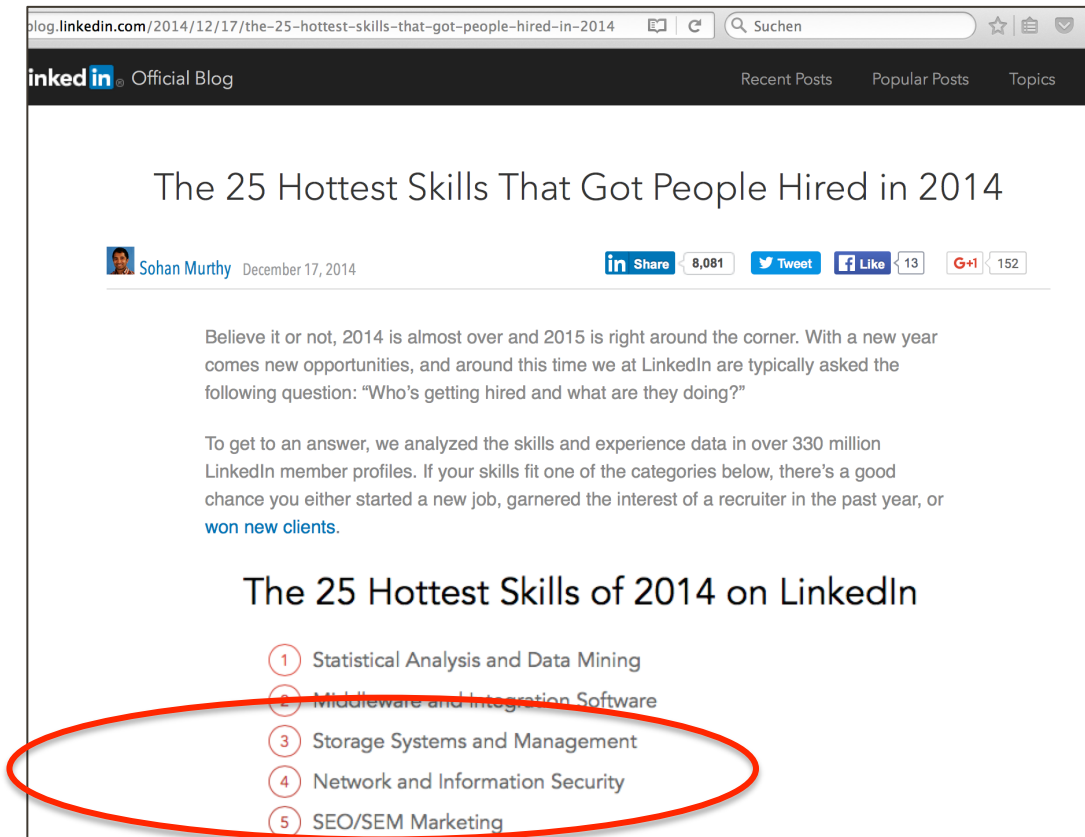
Source: C. O'Neil, R. Schutt (2014), Doing Data Science, O'Reilly Media Inc., USA.

Data Scientists – What do they do?



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

Data Scientists – Why are they needed by the industry?




blog.linkedin.com/2014/12/17/the-25-hottest-skills-that-got-people-hired-in-2014

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LinkedIn Official Blog

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The 25 Hottest Skills That Got People Hired in 2014

 Sohan Murthy December 17, 2014

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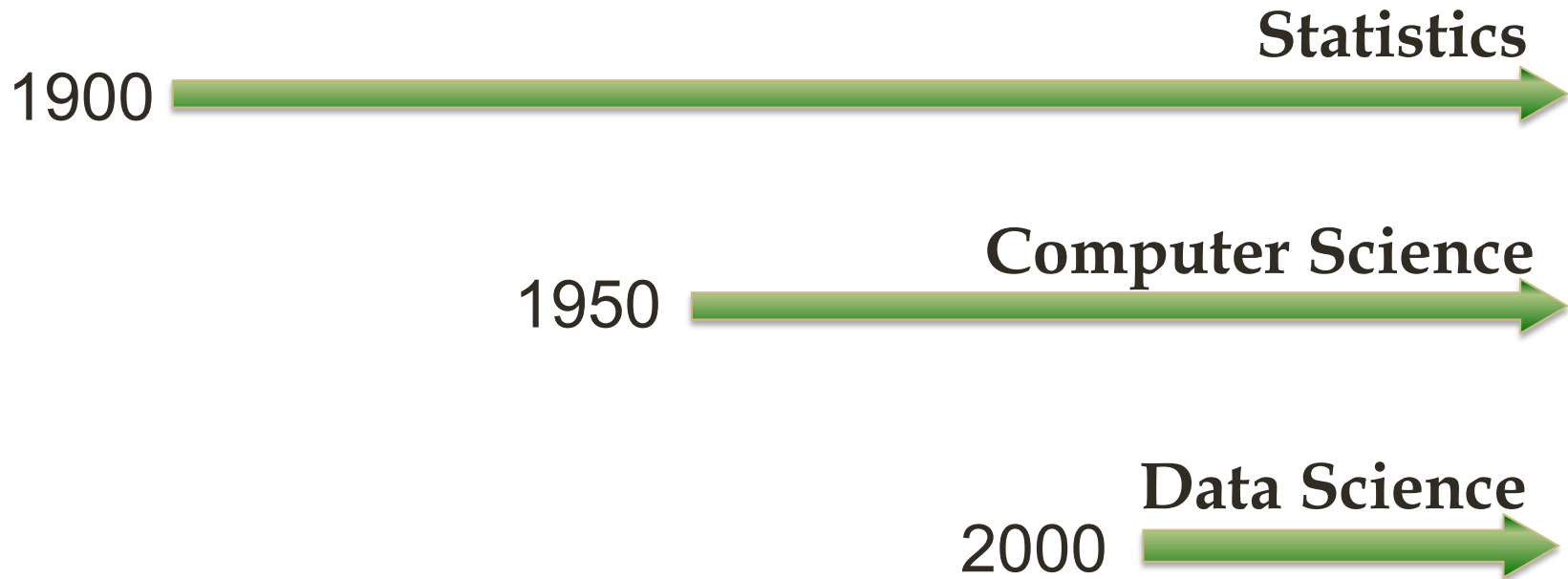
Believe it or not, 2014 is almost over and 2015 is right around the corner. With a new year comes new opportunities, and around this time we at LinkedIn are typically asked the following question: "Who's getting hired and what are they doing?"

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



Data Scientists – Why are they needed?

- Increasing data accessibility and availability
- Big Data requires Big Data Analytics
- Requires new action plans in order to **extract information from data**
- Data analysts with **computational and statistical skills** are needed by industry, business, and science

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

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

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

Core Module: Statistics

- Statistical Reasoning and Inference
- Sampling and Experimental Design

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 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

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

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

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

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
- Master level courses at the partner universities, e.g. image processing and mathematical statistics at TUM, computational finance at Augsburg University

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

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

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

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

Master Thesis and Disputation

- Thesis may be either research-orientated or stimulated through a practical problem
- After submission → oral examination

1st Semester | 30 ECTS

2nd Semester | 27 - 33 ECTS

3rd Semester | 27 - 33 ECTS

4th Semester | 30 ECTS

Statistics

Informatics

Fundamentals
of Data Science

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Master Thesis
and Disputation

Data Ethics and Data Security

Elective Courses

Current Research in Data Science

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 Festival “DataFest”**
In cooperation with Universität Mannheim
- **Data Science meets Practice**
Invited professionals and consulting “on the spot”
- **Data Science Talks**
Cutting edge of research

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**
- Training of **transferable skills**
- **Practicals** – close cooperation with partners in industry and business
- Tutorials, Workshops, Summer Schools, ...

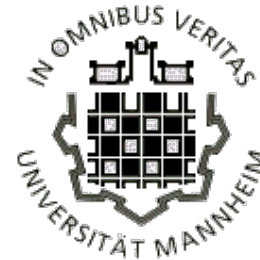
Local Academic Ties

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

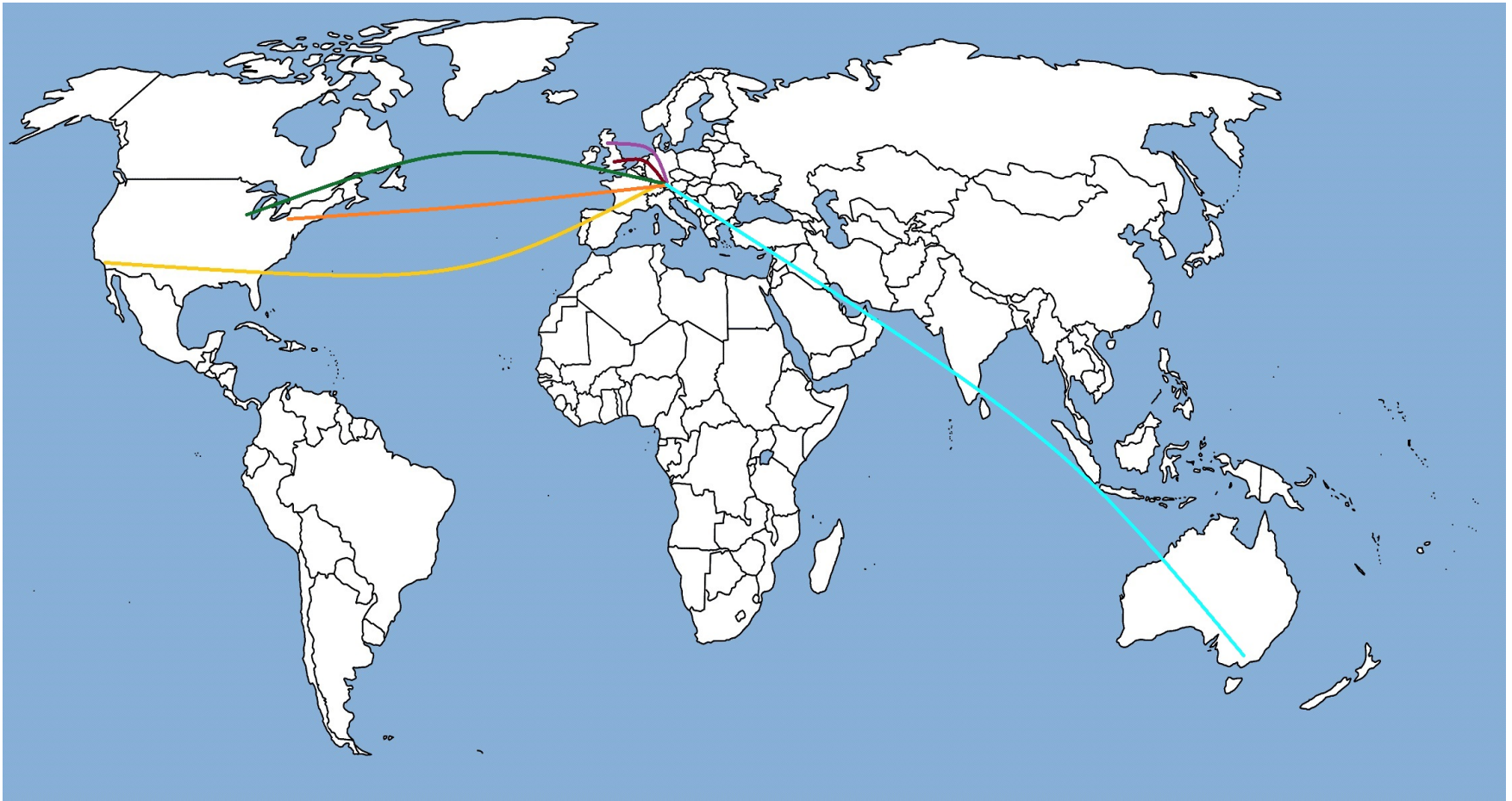


Volkswagen

SIEMENS



International Cooperations



Exchange Programs

- University of Glasgow (Prof. Bowman)
- University of Warwick (Prof. Firth)
- University of Southern California (Prof. Shahabi)
- University of Melbourne (Prof. Smith)
- Northwestern University (Prof. Trajcevski)



University
of Glasgow



NORTHWESTERN
UNIVERSITY



USC University of
Southern California

Requirements and application

Prospective students & Requirements for application

- 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**

Application process – Dates and Deadlines

- **Step 1: Online application**

18 April – 1 June 2017

- **Step 2: Interview**

end of June 2017

Invitations to interview will be sent out by email at least one week before the interview date

- **Information on successful application**

mid-July 2017

Application– Step 1: Online application (1/3)

1. **Transcript of records** (→ next slide)

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. **Proficiency in English**

- at least **B2** (Common European Framework of Reference for Languages); or
- an English university entrance qualification; or
- first degree in English

Application– Step 1: Online application (2/3)

Transcript of records

from which an **average grade from the best performance** (equivalent to **150 ECTS**) is **calculated** → **Average Grade 1 (AvGr 1)**

The transcript must include

- **at least 30 ECTS in Computational Methods** (this includes, for example, informatics, database-oriented methods, computational statistics, optimisation): **average grade calculated from the best performance** in this area (equivalent to **30 ECTS**) → **Average Grade 2 (AvGr 2)**
- **at least 30 ECTS in Data-based Modelling** (this includes, for example, statistics, data mining, probability theory, machine learning): **average grade calculated from the best performance** in this area (equivalent to **30 ECTS**) → **Average Grade 3 (AvGr 3)**

Application – Step 1: Online application (3/3)

Step 1 = successful if

- application is submitted before the deadline
- application documents are complete
- **overall average grade** (composed of **AvGr 1** + **AvGr 2** + **AvGr 3**) **better than 1.5**
- **essay** is approved by committee

→ **Invitation to interview (Step 2)**

Application – Step 2: Interview

30 minutes interview

- in English
- two professors
- Discussion will focus on: programming methods, database systems, algorithms and data structures, test and estimation procedures, linear statistical modelling

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

Successful application

If Step 2 = successful

→ **Letters of acceptance**
will be sent out by email in
mid-July 2017

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**

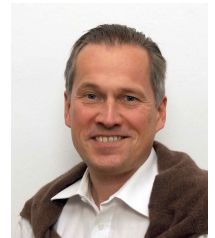
https://www.en.uni-muenchen.de/students/exchange/incomings/austausch_engl/living/accommodation/index.html

Spokespersons

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