Welcome at Munich,

and thank you for your interest in the **German Collaborative Summer School in Epidemiology.**

This new summer school is organised under the auspices of the **German Society for Epidemiology** (**Deutsche Gesellschaft für Epidemiologie - DGEpi**) and is based on a collaboration of the five universities in Münster, Greifswald, Bremen, Munich, and Bielefeld.

The new school concept incorporates the long-term summer school and bachelor and master level teaching experiences in epidemiology of these five partners and is oriented towards a preparation for the challenges to epidemiology in a changing world.

The new summer school has a clear structure: The school will rotate between the partners every year and will provide introductory and advanced courses including recent trends in epidemiological research and methods. Courses will be organised and located at the hosting university. Thus, for those who have graduated a long time ago, returning to academia for a short summer week will be a rewarding and enjoyable event. Fees are moderate to enable participation, especially of young scientists.

The 2015 topic is **The challenge of complexity in epidemiology – understanding health by building better models.**

The summer school focuses on methods and modern applications of epidemiology and will communicate theoretical and practical experiences in epidemiological research - from study design to statistical analysis.

Come and spend a sunny summer week in beautiful München, learning and enjoying academic life!

The IBE Summer School Team

COLLABORATIVE SUMMER SCHOOLS IN EPIDEMIOLOGY

2012 University of Münster
2013 University of Greifswald
2014 BIPS Bremen
2015 University of Munich
2016 University of Bielefeld

GERMAN SOCIETY FOR EPIDEMIOLOGY (DGEpi)

Course outline

The German Collaborative Summer School in Epidemiology offers both introductory and advanced courses and therefore will meet the needs of health professionals, scientists and students interested in epidemiology, prevention, and public health.

The working language of the courses will be English.

Fee

Participants from companies and for-profit organisations
€ 150 per day, € 400 for all days

Participants from academic and research institutions
€ 75 per day, € 200 for all days

DGEpi members
€ 75 per day, € 150 for all days

Fulltime students
€ 75 per day, € 100 for all days

ECTS

3 ECTS points can be obtained

Location

University Hospital München
Klinikum der Universität
Hall G12 (12th floor)
Marchioninistr. 15
81377 München

Registration

Please use the registration form on
www.med.uni-muenchen.de/studium/master/application_summer_school

Deadline for registration is May 15, 2015.

The number of participants is limited.
Registration is definite upon receipt of payment.

More information

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LMU LUDWIG-MAXIMILIANS-UNIVERSITÄT MÜNCHEN

Under the auspices of the
German Society for Epidemiology (DGEpi)

4th German Collaborative
Summer School in Epidemiology

COMPLEXITY

July 20–24 2015
in Munich

The challenge of complexity in epidemiology – Understanding health by building better models

Institute for Medical Information Processing, Biometry and Epidemiology (IBE)

Munich, Germany

MONDAY July 20

Causal Inference from Overlapping Variable Sets

Conor Mayo-Wilson (University of Washington)

Thanks to the work of Pearl (2000) and Spirtes, Glymour, and Scheines (1993), there has been an explosion of research in causal inference over the last two decades. Current research is both theoretical and practical: new algorithms are being developed under increasing weak assumptions about causation, and automated causal discovery procedures, which infer causal structure (as represented by graphical structure) from statistical data, have been successfully applied in medical research and the social sciences. This course is an introduction to traditional "constraint-based" algorithms, which infer causal structure from patterns of conditional independence among the variables. We will then discuss how these algorithms are being extended to data sets with large numbers of variables. Topics will include:

- Assumptions of causal inference (e.g., the causal Markov condition, minimality, faithfulness, etc.)
- Types of graphical models (e.g., directed acyclic graphs, Markov ancestral graphs, etc.)
- Constraint-based algorithms and their extension to overlapping variable sets

Prerequisites: No mathematical background is assumed except basic knowledge of probability theory.

TUESDAY July 21

Complex data settings: Regression and prediction methods and good research practice

Anne-Laure-Bouleisteix (Ludwig-Maximilians-Universität Munich)

This course focuses on alternatives to conventional regression or prediction methods in high-dimensional and complex data (i.e. data sets with many variables and relatively few observations).

The first part gives a brief introduction into:

- penalized regression
- data-driven approaches from machine learning
- variable selection and dimension reduction
- procedures to evaluate the performance and stability of the derived models: cross-validation, resampling-based stability investigations

The second part discusses modern ideas on good research practice in complex data settings ("beyond Bonferroni"):

- How to avoid fishing for significance
- How to validate findings and assure computational reproducibility
- How to report findings

Prerequisites: Some background in statistics.

WEDNESDAY July 22

Mathematical Modelling and Data Analysis in Neuroscience

Stefan Glasauer (Ludwig-Maximilians-Universität Munich)

Methodological advances in neuroscience in the last decades have led to novel techniques for measuring brain activity, e.g., functional magnetic resonance imaging or multi-electrode recordings, which yield high-dimensional time series as resulting data. At the same time, advances in computational power allow modelling and simulation of such data.

The course will give an introduction to current topics in modelling, data analysis, and experimental techniques in neuroscience and neurobiology with examples from own work and from the literature.

- The "simple" case: modelling a single neuron
- Analysis of neural data
- Modelling neural networks
- Basic analysis of brain imaging data
- Correlation and causality
- Functional connectivity, similarity, etc.

Prerequisites: Some background in math.

THURSDAY & FRIDAY July 23–24

Unravelling Academic English Complexity I

Dr. Joseph G. Mallia, D.V.M., M.Sc., Ph.D.*, Ph.D., DELTA (Camb.),**
English for Academic Purposes Visiting Lecturer, University of Loughborough, U.K
*** Epidemiology; ** English**

The course examines and gives indications and solutions for major and also more subtle uses of language for successful use in scientific academia. It will use real-life examples from the literature.

Participants will be solicited to embed points of discussion within the range of their own professional experience and produce examples of academic writing during the course. Topic focuses include a selection from the following:

- Report and publication titles understanding and formulating them accurately
- Paragraph organisation and topic sentences
- Introductions, conclusions and definitions
- Argument and discussions
- Paraphrasing, coherence

Prerequisites: Basic level in reading, writing and discussing scientific articles in English.