Content:

All research lines at the LMU have a strong methodological focus

1. Research Line 1:
Genetic Epidemiology and Statistical Genetics in Complex Diseases
2. General Description of the Research Line:
This research line focuses on association and linkage analysis aiming at the genetic mapping of complex traits as well as at the integration of 'omics data.
3. Specific Subtopics within the Research Line:
Genetic epidemiology deals with the identification and characterization of genes responsible for diseases in humans. The two paradigms of statistical analysis in genetic epidemiology are linkage and association analysis. Linkage analysis investigates co-segregation between genetic markers (with known position in the genome) and an unknown disease locus within families, and association analysis looks at the correlation between alleles at marker and disease locus on the population level. Whereas linkage analysis has led to the successful mapping of many Mendelian diseases, genome-wide association studies (GWAS) with chip-based genotyping using common genetic variants have resulted in the identification of numerous genes that are responsible for a variety of common complex traits. The advancement of molecular genetic technology has made genome-wide sequencing possible, at least for small to moderate sample sizes, which allows for analyzing rare genetic variants. Furthermore, it has recently become possible to measure other molecular markers such as DNA methylation, gene expression, and metabolites in human serum, so-called 'omics data, on a large scale. These developments give rise to a variety of research questions and topics regarding the application and further development of statistical methods in genetic epidemiology: • Combination of population-based and family information with the goal to identify previously unknown disease genes with moderate effects • Modeling gene-gene and gene-environment interactions and the effect of mitochondrial DNA in the context of complex traits • Integration of genetic, epigenetic, and metabolomic data and their joint analysis for disease risk • Development and implementation of new statistical methods to adequately model complex modes of inheritance (e.g. imprinting, sex-specific effects, overdominance) • Optimization of algorithms for linkage and association analysis • Establishment and validation of prediction models with genetic and other molecular markers as a prerequisite for an individualized prevention
4. Contact Person for Interested Students/Teaching Staff:
Prof. Dr. Konstantin Strauch (strauch@helmholtz-muenchen.de)
5. Field of Research (for Example: Epidemiology, Public Health, Statistics, Medicine):
Epidemiology, Statistics, Informatics, Mathematics
6. For which Levels the Research Line is Applicable (Undergraduate, Master, Doctorate, Post-Doctorate/Teaching Staff)
Master, Doctorate, Post-Doctorate

1. Research Line 2:
Molecular Epidemiology of Complex Phenotypes
2. General Description of the Research Line:
This research area focuses on the aetiology of complex diseases including type 2 diabetes, myocardial infarction, asthma and atopic dermatitis. The research emphasizes the role of intermediate factors (e.g. metabolomics, transcriptomics, epigenomics, inflammation factors) in the aetiology of these diseases. Infrastructural issues like biobanking, -omics technologies

and genetic statistics are further key aspects. The research unit of molecular epidemiology comprises three working groups: molecular epidemiology of complex diseases/ of type 2 diabetes and related traits / of metabolism. All groups have access to the -omics facilities in the genome analysis center and contributed to the -omics data generation in KORA as well as other studies. Management of the KORA biobank with more than 50.000 genomic DNA samples consisting of population-based and case-specific cohorts is a further task of the research unit. Please contact Dr. Harald Grallert, head of the diabetes group, for further information.

3. Specific Subtopics within the Research Line:

- type 2 diabetes
- myocardial infarction
- asthma
- genome wide association studies
- transcriptomics
- methylation profiling
- atopic dermatitis
- Metabolomics
- -omics Data integration

4. Contact Person for Interested Students/Teaching Staff:

Dr. Harald Grallert (harald.grallert@helmholtz-muenchen.de)

5. Field of Research (for Example: Epidemiology, Public Health, Statistics, Medicine):

Epidemiology, Genomics

6. For which Levels the Research Line is Applicable (Undergraduate, Master, Doctorate, Post-Doctorate/Teaching Staff)

Master, Doctorate, Post-Doctorate

1. Research Line 3:

Clinical Trials and Translational Medicine

2. General Description of the Research Line:

This research line covers a wide spectrum of problems in clinical epidemiology with a strong link to molecular medicine. Recent results concern methodology for diagnostic and prognostic research. The focus of this line is on clinical trials and their use in translational medicine. The group takes part in many clinical research studies and is partner in the Munich cluster for development of personalized treatment strategies.

3. Specific Subtopics within the Research Line:

- prognostic studies
- diagnostic studies
- instruments and strategies of quality assurance in the clinic
- …

4. Contact Person for Interested Students/Teaching Staff:

Prof. Dr. Ulrich Mansmann (mansmann@ibe.med.uni-muenchen.de)

5. Field of Research (for Example: Epidemiology, Public Health, Statistics, Medicine):

Epidemiology, Statistics

6. For which Levels the Research Line is Applicable (Undergraduate, Master, Doctorate, Post-Doctorate/Teaching Staff)

Master, Doctorate, Post-Doctorate

1. Research Line 4:

Clinical Epidemiology and Prevention
2. General Description of the Research Line:
This research line focuses on the analysis of routine databases in secondary (e.g. screening colonoscopies for early detection of colorectal cancer, mammography screening for the early detection of breast cancer) and tertiary prevention (e.g. home-parenteral nutrition in cancer patients).
3. Specific Subtopics within the Research Line:
4. Contact Person for Interested Students/Teaching Staff:
Dr. Alexander Crispin (cri@ibe.med.uni-muenchen.de)
5. Field of Research (for Example: Epidemiology, Public Health, Statistics, Medicine):
Epidemiology
6. For which Levels the Research Line is Applicable (Undergraduate, Master, Doctorate, Post-Doctorate/Teaching Staff)
Master, Doctorate, Post-Doctorate

1. Research Line 5:
Analysis and Modelling of Complex Systems in Biology and Molecular Medicine
2. General Description of the Research Line:
The general aim is to develop novel methodology emerging from challenging substantive problems in such complex systems and to apply it in collaboration with colleagues from biology and medicine. The centre will constitute the computational, mathematical and statistical backbone for interdisciplinary research in biology and medicine, in particular in molecular life sciences at the LMU. It provides high-performance resources from computer science, statistics, mathematics and physics to collaborators in natural sciences, initiating a core facility for a Centre of Quantitative Methods in a School of Science. In close interaction with experimental life sciences this will contribute to novel concepts for investigating complex biological and medical systems with a high potential to revolutionise our view and practice of biomedical research and its applications.
3. Specific Subtopics within the Research Line:
Investigation of complex biological and cellular systems
4. Contact Person for Interested Students/Teaching Staff:
Prof. Dr. Ulrich Mansmann (mansmann@ibe.med.uni-muenchen.de)
5. Field of Research (for Example: Epidemiology, Public Health, Statistics, Medicine):
(Biology, Medicine, Bio-Informatics, Mathematics, Biostatistics)
6. For which Levels the Research Line is Applicable (Undergraduate, Master, Doctorate, Post-Doctorate/Teaching Staff)
Master, Doctorate, Post-Doctorate

1. Research Line 6:
Health Services Research
2. General Description of the Research Line:
Special aspects of economic evaluations are analysed.
3. Specific Subtopics within the Research Line:
• health economic research projects including analysis of cohort studies in the fields of diabetes, obesity, COPD and others chronic diseases. • methods of measurement and analysis of resource utilization, cost, and quality of life.
4. Contact Person for Interested Students/Teaching Staff:

Prof. Dr. Rolf Holle (holle@helmholtz-muenchen.de)
5. Field of Research (for Example: Epidemiology, Public Health, Statistics, Medicine):
Public Health, Health Economics
6. For which Levels the Research Line is Applicable (Undergraduate, Master, Doctorate, Post-Doctorate/Teaching Staff)
Master, Doctorate, Post-Doctorate

1. Research Line 7:
Routine Data for Health Services Research
2. General Description of the Research Line:
Routine data are a rich source for health care research. The use of routine data should be based on a deep understanding of the health care processes and the relationship of the health care processes to data recording. The project focuses on the understanding of the documentation processes, the development of best practice models for data recording and data usage and recommendations on implementation strategies to enhance the usability of routine data beyond the individual context. The methodological focus is complemented by exemplary studies that make use of routine data, in particular routine data from acute care hospitals. The studies‘ application fields are different aspects of health services research as patient safety, reimbursement systems or registers.
3. Specific Subtopics within the Research Line:
• methodological focus (eg. particular routine data from acute care hospitals) • application focus (patient safety, reimbursement systems or registers)
4. Contact Person for Interested Students/Teaching Staff:
Professor Jürgen Stausberg (juergen.stausberg@ibe.med.uni-muenchen.de)
5. Field of Research (for Example: Epidemiology, Public Health, Statistics, Medicine):
Medical Informatics, Quality Management
6. For which Levels the Research Line is Applicable (Undergraduate, Master, Doctorate, Post-Doctorate/Teaching Staff)
Master, Doctorate, Post-Doctorate

1. Research Line 8:
Pharmacoepidemiology
2. General Description of the Research Line:
This research focuses on adverse events leading to hospitalisation and pharmaceutical treatment during pregnancy.
3. Specific Subtopics within the Research Line:
EUropean Treatment Outcome Study (EUTOS)/Chronic myelogenous (or myeloid) leukemia (CML)
4. Contact Person for Interested Students/Teaching Staff:
Professor Dr Joerg Hasford (has@ibe.med.uni-muenchen.de)
5. Field of Research (for Example: Epidemiology, Public Health, Statistics, Medicine):
Pharmacoepidemiology
6. For which Levels the Research Line is Applicable (Undergraduate, Master, Doctorate, Post-Doctorate/Teaching Staff)
Master, Doctorate, Post-Doctorate

1. Research Line 9:
General Health Projects
2. General Description of the Research Line:

We have two main lines of social oriented projects: One is the field of prevention/health promotion, the other is the field of global public health

3. Specific Subtopics within the Research Line:

Prevention:

- Infectiology/Vaccinations
- Obesity

Global Public Health:

- Child and mental health
- Environment and health

4. Contact Person for Interested Students/Teaching Staff:

Prevention: Prof. Dr. Rüdiger von Kries, MSc. (ruediger.kries@med.uni-muenchen.de)
Global Public Health: Dr. Eva Rehfuess (rehfuess@ibe.med.uni-muenchen.de)

5. Field of Research (for Example: Epidemiology, Public Health, Statistics, Medicine):

Public Health

6. For which Levels the Research Line is Applicable (Undergraduate, Master, Doctorate, Post-Doctorate/Teaching Staff)

Master, Doctorate, Post-Doctorate

1. Research Line 10:

Evidence-Based Prevention and Modelling of Chronic Diseases

2. General Description of the Research Line:

The project addresses the modelling and analysis of complex chronic diseases. Various diseases will be analysed, but the main focus is on the application-oriented, interdisciplinary development of methods.
Using the example of colorectal cancer, it will be shown how relevant information may be merged. There are extensive data collections concerning this disease (Munich Cancer Registry, cohort studies in process, data from health insurance and hospital data). The course of the disease, the effects of colonoscopy, the disease's impact on functional health and the implementation of the programme will be studied, modelled and evaluated based on data collected. From this arises a methodological framework that enables the description of typical health biographies and the balancing of alternatives in disease management. A standardized body of tools is then extracted, which permits precise and realistic modelling of chronic disease under the specific conditions of the German health care system. In the analysis of the course of the disease, further aspects should be taken into account, such as differences in the functioning of patients and the acceptance of prevention programmes resulting from adequate risk communication and perception.

3. Specific Subtopics within the Research Line:

- modelling and analysis of the history of complex chronic diseases
- differences in the functioning of patients
- acceptance of prevention programmes resulting from adequate risk communication and perception

4. Contact Person for Interested Students/Teaching Staff:

Prof. Dr. Ulrich Mansmann (mansmann@ibe.med.uni-muenchen.de)

5. Field of Research (for Example: Epidemiology, Public Health, Statistics, Medicine):

(Epidemiology, Public Health, Statistics)

6. For which Levels the Research Line is Applicable (Undergraduate, Master, Doctorate, Post-Doctorate/Teaching Staff)

Master, Doctorate, Post-Doctorate

1. Research Line 11:
Systematic Reviews in the Field of Public Health
2. General Description of the Research Line:
This research focusses on methodological development for systematic reviews in the field of public health.
3. Specific Subtopics within the Research Line:
• Vaccinations • Obesity
4. Contact Person for Interested Students/Teaching Staff:
Prof. Dr. Rüdiger von Kries, MSc. (ruediger.kries@med.uni-muenchen.de) Dr. Eva Rehfuess (rehfuess@ibe.med.uni-muenchen.de)
5. Field of Research (for Example: Epidemiology, Public Health, Statistics, Medicine):
Public Health
6. For which Levels the Research Line is Applicable (Undergraduate, Master, Doctorate, Post-Doctorate/Teaching Staff)
Master, Doctorate, Post-Doctorate

Further Information
A list of the professors of the medical faculty of the LMU can be found here:
http://www.en.uni-muenchen.de/about_lmu/introducing-lmu/people/professors_list/index.html
Scroll down to “Faculty of Medicine”.