



CORE FACILITIES BOOKLET

Cutting-edge technology platforms to enable and support your research

➔ CORE FACILITIES HEAD OFFICE

At Helmholtz Munich, more than 1500 scientists work together to discover personalized medicine solutions for environmentally triggered diseases to promote a healthier society in a rapidly changing world.

We ensure that our world-class researchers are supported by the very best scientific service platforms. Our eight Core Facilities provide a centralized infrastructure for fast, convenient, and affordable access to cutting-edge technologies and services. They are operated by staff with the expertise and skills needed to maximize their utility. Services are open to internal and external academic and industry users on a fee-for-service basis.

Core facilities make complex technology available, so scientist achieve their ambitious research goals quicker. By offering a flexible 'end-to-end' service, from experimental design to data analysis, we support every step of the way. Cross-platform workflows enable state-of-the-art multi-omics approaches bringing together technical expertise from several specialties.

Our services include training courses and expert consultation. Cores are an essential source and repository for techniques and methods and a great exchange forum bringing together scientists across disciplines.

Together we are engaged in keeping our services within strategic focus and at the cutting edge of science. This booklet shows key facts on our cores at a glance.

Please contact us for further questions, we are here to help and look forward to working with you.



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➔ CORE FACILITIES

FLOW CYTOMETRY

MISSION

CF-FLOW provides cutting-edge technical and professional services in cell sorting and advanced analytical flow cytometry. Our services include comprehensive support for experimental planning, such as panel design and data analysis, along with customised training. We cater to both internal and external clients engaged in basic science, discovery, and translational research.

HIGHLIGHTS

Our Core offers a high-end cell sorting and analysis on up to 30 parameters as well as automated high dimensional spatial phenotyping. We are experts in single cell technologies and multicolour flow cytometry. After mandatory training users can use our instrumentation independently, including one of our ARIA cell sorters. We support various cross platform workflows with our other CFs.

FEATURED INSTRUMENTS

- BD Biosciences ARIA III cell sorter (4 laser, 15 parameter)
- BD Biosciences Symphony S6 cell sorter (5 laser, 30 parameter, 6-way sort)
- BD Biosciences Symphony A3 analyser (5 laser, 30 parameter)
- SONY SH800S sorter in BSL2 cabinet (2-laser (co-linear B-R), 8 parameters, up to 2- way bulk sort, plate sort)
- Miltenyi MACSima fully automated spatial biology system



BD Aria III



BD Symphony S6



Miltenyi MACSima

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BD Symphony A3

TEAM AND CONTACT

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Head of CF-FLOW

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SERVICES

- Full service cell sorting on BD ARIA III, BD Symphony S6 and SONY SH800S Cell sorter
- User training for analytical flow and independent cell sorting
- Full tissue imaging MACSima service for automated high-dimensional spatial phenotyping
- Consultation services for experimental planning, panel design and data analysis
- Cross platform method development, e.g single cell multiomics
- Basic and advanced training courses
- Expert data analysis support

➔ CORE FACILITIES

GENOMICS

MISSION

CF-Genomics provides state-of-the-art infrastructure and expert knowledge for Next Generation and Long-Read Sequencing, Genotyping, Spatial Transcriptomics Services and Bioinformatics to enable a wide range of genomic research. Our service supports internal and external customers in basic science, discovery and translational studies.

HIGHLIGHTS

CF-Genomics offers a one-stop-shop for genomics workflows. NGS Sequencing including single-cell applications, Genotyping (Illumina Microarray), Spatial transcriptomics workflow (Xenium and Visium) and Bioinformatics experts work together to provide full service while keeping the flexibility to accept requests at any step of the process. A complementary portfolio of consultation services, assay development, training courses and publication and grant support help our users in achieving their goals.

FEATURED INSTRUMENTS

- Illumina Novaseq XPlus sequencer
- Illumina Nextseq 1000 sequencer
- Oxford Nanopore PromethION 2 ("P2") Solo
- 10x Genomics ChromiumX Cell partitioning instrument
- 10X Genomics Xenium Spatial Transcriptomics Analyzer
- Agilent Bravo Library Prep Robots
- Tecan Fluent 480 liquid handling robot
- Perkin Elmer Chemagic 360 and Qiagen QiaCube extraction robots
- Illumina iScan with Autoloader

TEAM AND CONTACT

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Head of CF-GEN

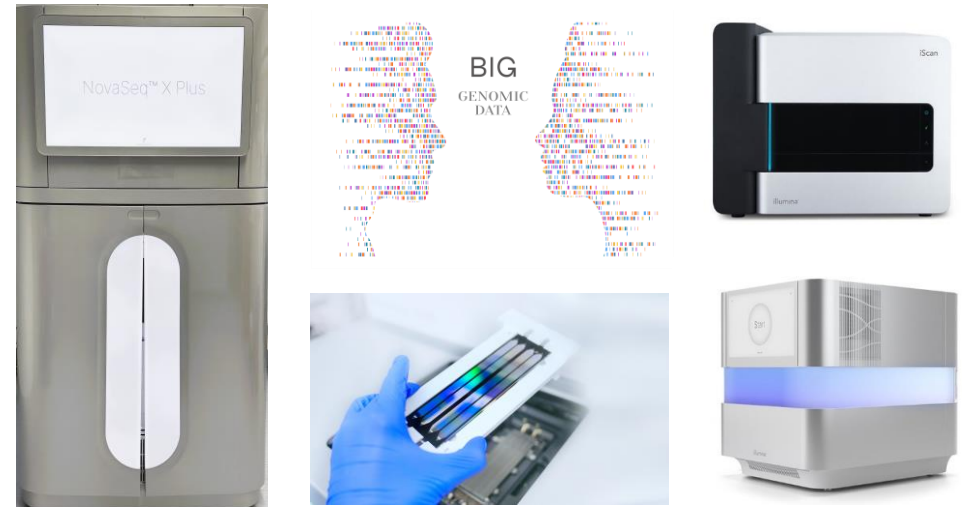
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SERVICES

- Consultation: Experimental design, data analysis, and troubleshooting
- DNA/RNA isolation & QC: Automated extraction from various eukaryotic cell types and tissues, QC portfolio for DNA and RNA
- Library Preparation: Manual and automated for many applications (e.g. WGS, RNA-seq, Exome, Twist, panel library, single-cell library)
- NGS Sequencing: Any Illumina compatible pool for sequencing
- Genotyping: Automated high throughput Illumina arrays
- Spatial Transcriptomics
- Long Read Sequencing

BIOINFORMATICS PORTFOLIO

- Primary processing and data management for the NGS platform
- Development and provision of analysis pipelines for various NGS applications
- Consultation, customized analysis, mentoring, and knowledge transfer projects
- Training to enable users for independent analytics and visualizations

↳ CORE FACILITIES

INDUCED PLURIPOTENT STEM CELLS

MISSION

CF-iPSC offers researchers expertise, training, and practical assistance in working with human pluripotent stem cells (hPSCs). Our primary objective is to assist the scientific community at Helmholtz Munich and our external academic clients in the establishment of high-quality induced pluripotent stem cell (iPSC) disease models. Our three-dimensional organoid models facilitate users in carrying out basic and translational studies with the help of cutting-edge in vitro techniques.

HIGHLIGHTS

Over the past decade, we have developed a comprehensive suite of reprogramming services. Our services include consultancy to advise users on sample acceptance criteria, quality control post reprogramming and experimental strategies for the selected differentiation approach. We can conduct preliminary experiments to assess the suitability of a differentiation protocol for your downstream applications. CF-iPSC's track record demonstrates success in reprogramming more than 90% of submitted patient samples from a range of disease backgrounds, including PURA syndrome, Bohring-Opitz syndrome, pain related neuropathies, etc.

TEAM AND CONTACT

Ejona Rusha
Head of CF-iPSC

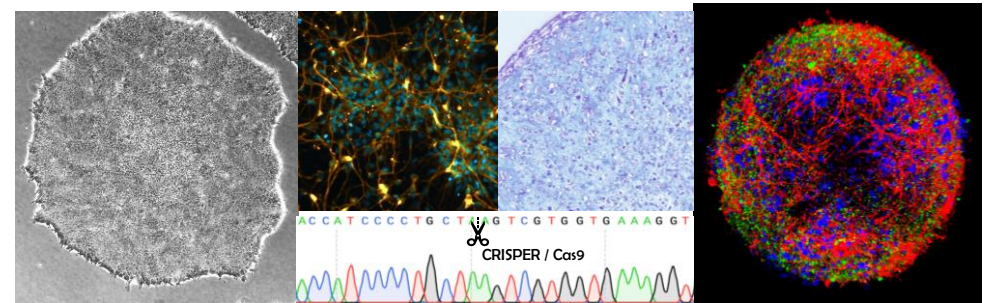
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SERVICES

- Isolation & derivation of primary cells from various tissues (fibroblasts, PBMCs, stromal cells etc.)
- Reprogramming of primary tissue using non-integrating reprogramming methods: Sendai Virus and mRNA
- Basic characterization for hiPSC pluripotency & potency
- Basic characterization of genomic stability via G-banding or digital karyotyping.
- Training for maintenance of hPSC cultures and establishment of 2D/3D differentiation modalities.
- Organoid establishment & maintenance service
- Crispr/Cas editing services

NETWORKS AND COLLABORATION PARTNERS

We work together with researchers at Helmholtz Munich, Technische Universität München (TUM), Max-Delbrück Zentrum (MDC), Charite, and Leiden University. We are part of the PuriCore network.

➔ CORE FACILITIES

LABORATORY ANIMAL SERVICES

MISSION

Core Facility Laboratory Animal Services (CF-LAS) is a central service facility for biomedical research and ensures the breeding and housing of rodents (mouse, rat) and fish (zebrafish). We support users with various services related to animal welfare, training, and experimentation.

HIGHLIGHTS

In collaboration with external partners, CF-LAS has developed and patented new technologies for improving animal husbandry and hygienic monitoring. In partnership with Tecniplast S.p.A., we patented the *Interceptor system*; a simple, cheap and efficient tool to monitor and ensure that laboratory animals stay free of pathogens minimizing the need to utilize animals as sentinels.

State-of-the-art robotics in our newly implemented fully automatic cage processing system represents an ideal synergy between animal caretaker and automation, a better work environment and reduced cost.



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SERVICES

- Maintenance, caretaking, and breeding of laboratory animals
- Veterinary care and hygienic monitoring of animal colonies
- Prescription and supply of veterinary medicines
- Advice and support for planning and conducting animal protocols: advice on the selection and development of animal models as well as on questions of animal welfare and laboratory animal science
- Training courses on laboratory animal science topics
- Ordering and transport of laboratory animals
- AniShare web service for interinstitutional animal sharing (internal)
- Embryo transfer and cryopreservation service
- Administration and training for animal registration in "MausDB" and key interface for reporting to the authorities



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TEAM AND CONTACT

Dr. Markus Brielmeier
Head of CF-LAS

Dr. Angelika Scheideler, Deputy Head CF-LAS

Animal welfare officers:

Dr. Julia Zorn, Dr. Rebecca Erdelen, Dr. Manuel Miller

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NETWORKS

- Clinic and Polyclinic for Internal Medicine I and II of the Technical University of Munich
- Tecniplast S.p.A., Buguggiate, Italy
- Faculty of Veterinary Medicine of the Ludwig Maximilian University of Munich
Central Animal Laboratory, DKFZ, Heidelberg
- GV-SOLAS
- DVG Fachgruppe Versuchstierkunde
- Arbeitskreis der Tierschutzbeauftragten in Oberbayern (ATOBO)

➔ CORE FACILITIES

MONOCLONAL ANTIBODIES

MISSION

CF-MAB provides expert support and service for the production, handling and validation of custom monoclonal antibodies. We are open to internal and external customers from academia and industry, services are delivered on a cost recovery basis.

HIGHLIGHTS

CF-MAB generates high-quality monoclonal antibodies in an automated high-throughput process, even against difficult targets such as cell surface receptors and RNA- and post-translational modifications. Using tumor cell-derived vesicles as immunogen we identify new biomarkers and generate neutralizing antibodies, also for therapeutic applications. In collaboration with an international consortium, we developed highly specific antibodies for microglia characterization. Many of our antibodies have been licensed by commercial partners.

FEATURED INSTRUMENTS

- TECAN Fluent 780 automated liquid handler
- TECAN Spark multimode microplate reader
- Sartorius iQue Screener Plus flow cytometer
- Cytiva ÄKTA Avant 25 protein purification system
- Cytiva ÄKTA Pure 150 protein purification system
- Sartorius Octet R2 protein Analysis System
- KD Bio Hollow Fiber Bioreactor
- Charles River Endosafe® Nexgen-PTS™
- Bio-Techne Jess automated Western Blot system

TEAM AND CONTACT

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Head of CF-MAB

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Andrew Flatley, Lab manager

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SERVICES

- In depth consultation on-target design and antibody validation
- Immunization and automated high-throughput screening
- Generation of custom-made antibodies in rats and mice
- General antibody supply
- Antibody purification (also large-scale)
- Antibody labeling
- Affinity measurements
- Long-term hybridoma cryo-conservation
- Sequencing and recombinant hybridoma cloning
- Antibody licensing to industry partners

NETWORKS

SyNergy – Munich Cluster for Systems Neurology
DZNE – German Center for Neurodegenerative Diseases

➔ CORE FACILITIES

METABOLOMICS AND PROTEOMICS

MISSION

CF-MPC enables state-of-the-art analysis of metabolites and proteins in a broad range of sample matrices. We apply targeted and non-targeted approaches to characterize and quantify the proteome and/ or metabolome of a sample to gain a better understanding of disease processes, drug-target interactions and to identify novel biomarkers.

HIGHLIGHTS – PROTEOMICS

Our team has longstanding expertise with comprehensive support from study design and method development to analysis and interpretation of high-dimensional data sets collected by state-of-the-art quantitative mass spectrometry. CF-MPC is also an early adopter of Olink technology and was the first accredited provider for both Olink® Target96 and Olink® Explore in Germany. We organized the first Munich area clinical proteomic ring trial (ClinspectM). We are partner in national and international proteomic ring trials (MSCoreSys).

FEATURED INSTRUMENTS

- Bruker timsTOF Ultra 2 coupled with EvoSepOne and Vanquish Neo
 - Bruker timsTOF HT coupled with Vanquish Neo
 - Thermo Scientific Q Exactive HF-X coupled with Ultimate3000
 - Olink® Signature 100
 - SPT Biotech Mosquito and Dragonfly Robotics
 - Formulatrix F.A.S.T. robotics
 - Eppendorf EpMotion Robot
- } Olink Platform

TEAM AND CONTACT

Dr. Stefanie Hauck
Head of CF-MPC

Dr. Juliane Merl-Pham - Deep phenotyping, ECM
Dr. Ann-Christine König - Interactomics
Dr. Christine von Törne - Clinical proteomics, PTMs
Dr. Agnese Petrera - Olink platforms

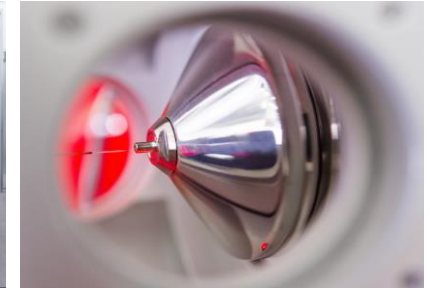


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SERVICES

- Quantitative proteome profiling by LC-MSMS (Data Dependent (DDA) and Data Independent Acquisition (DIA))
- High throughput plasma proteomics with bead-based enrichment of low abundant proteins
- Extracellular matrix analysis with quantification of collagen modifications
- Phospho-Proteomics and other post-translation modification analyses
- Interactomics - Quantitative analyses of protein complexes (with protein/DNA/RNA)
- Profiling of total RNA binding proteome
- Immunopeptidomics (profiling of MHC/HLA-bound peptides)
- Tailored targeted quantification (Parallel Reaction Monitoring - PRM)
- Targeted proteomics profiling: Olink® Target96 and Olink® Explore
- Method development
- QC, QA, quantitative data analysis (Proteome Discoverer, MaxQuant, Perseus, Spectronaut, DIA-NN)

NETWORKS

- Presidency of the Board of Directors, German Proteomics Society
- Member of the Clinical Mass Spectrometry Center Munich (ClinspectM) <https://clinspect-m.mscoresys.de/de>
- Member of the Research cores for mass spectrometry in systems medicine (MSCoreSys)
- Member of the Human Plasma Proteome Project (HPPP), Human Proteome Organisation (HUPO)
- Member of Helmholtz Graduate School (HELENA)
- Shared expertise in the DZHK network (SE216)
- DFG accredited

➔ CORE FACILITIES

METABOLOMICS AND PROTEOMICS

MISSION

CF-MPC enables state-of-the-art analysis of metabolites and proteins in a broad range of sample matrices. We apply targeted and non-targeted approaches to characterize and quantify the proteome or metabolome of a sample to gain a better understanding of disease processes, drug-target interactions and to identify novel biomarkers.

HIGHLIGHTS – METABOLOMICS

Our team has long-standing expertise in analysis of the metabolome, the complement of all small molecules (typically <1500 Da). The highly dynamic read-out of the metabolome is influenced by genetics, diet, and environment and allows the understanding of health and diseases and the development of new diagnostic tools. We use liquid chromatography coupled to mass spectrometry (LC-MS) for the detection of metabolites in different matrices from various species.

FEATURED INSTRUMENTS

- Sciex ZenoTOF 7600 with Sciex ExionLC AD
- Sciex ZenoTOF 7600 with Agilent 1290 Infinity II BioLC
- Sciex QTrap6500+ with SelexION with Sciex ExionLC AD
- Sciex QTrap6500+ with SelexION with Shimadzu LC40 UHPLC
- Sciex QTrap5500 with SelexION with Shimadzu Nexera UHPLC
- Sciex QTrap5550 with Agilent 1290 Infinity II UHPLC
- Sciex API4000 with Agilent 1260 HPLC and CTC pal autosampler
- Hamilton lab robotic systems for sample preparation

TEAM AND CONTACT

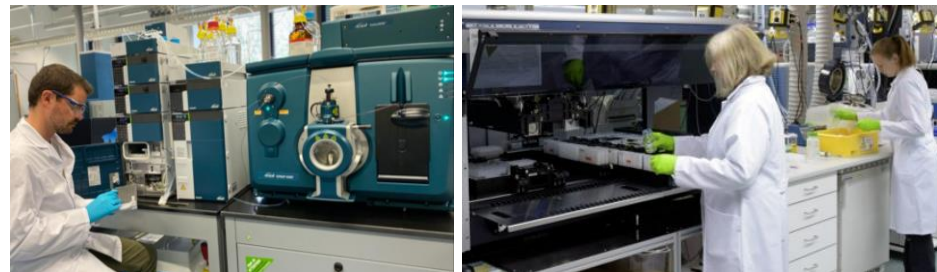
Dr. Michael Witting
Co-Head of CF-MPC

Dr. Cornelia Prehn - Biocrates p180 and Bile Acids
Dr. Jutta Lintelmann - Biocrates MxP Quant 500
Dr. Mark Haid - Lipidyzer and Eicosanoids
Dr. Anna Artati - Non-targeted Metabolomics
Dr. Alex Cecil - Bioinformatics



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SERVICES

- Targeted metabolomics
 - biocrates AbsoluteIDQ p180 kit
 - biocrates AbsoluteIDQ® Bile Acids kits
 - biocrates MxP® Quant 500 kit
 - Central carbon metabolism profiling (quantitation in development)
- Targeted lipidomics
 - Eicosanoid quantification
 - Lipid quantification using Shotgun Lipidomics (DMS-SLA, >1550 individual lipid species)
- Non-targeted metabolomics /lipidomics
 - Using CF-MPC in-house developed metabolite database and accompanying data analysis pipelines for polar metabolites), semi-polar metabolites or lipids
 - Bioinformatics analysis of metabolomics data
- Custom assay development for metabolites not covered by currently existing methods

NETWORKS

- Certified laboratory of Biocrates life sciences AG
- Board of Directors, Metabolomics Society
- Member of Helmholtz Graduate School (HELENA)
- Deutsche Gesellschaft für Metabolom Forschung (DGMet)
- Metabolomics QA & QC Consortium (mQACC)

➔ CORE FACILITIES

PATHOLOGY AND TISSUE ANALYTICS

MISSION

CF-PTA offers state-of-the-art technical and professional services in pathology and microscopy for all aspects of tissue-based research individualized to project needs. Our portfolio includes extensive support in image data analysis and access to tailored training. With many years of experience, we continuously engage in method development and offer assessment of tissue pathology in disease and after drug treatment..

HIGHLIGHTS

Our scientific service offers a full range of histopathological techniques, also for difficult materials such as fatty and neuronal tissue or pancreas. We are experts in digital pathology and qualitative and quantitative image analysis. We have successfully established 3D imaging of whole transparent organs and support spatial transcriptomics approaches together with CF-Genomics.

FEATURED INSTRUMENTS

- Miltenyi Biotec UltraMicroscope II
- Zeiss Upright Confocal Microscope LSM 880 with Airyscan
- Zeiss Cell Discoverer 7 live cell screening platform
- Zeiss AxioScan 7 automated digital slide scanner (BF/FL)
- TMA molmed - 3DHISTECH automated tissue microarray master
- Sakura TissueTekVIP6 & Tec6 embedding & tissue processing station
- Roche Ventana Discovery Ultra automated Immunostainer
- Leica Histocore Spectra automated Multistainer
- 10xGenomics CytAssist Visium Spatial Transcriptomics

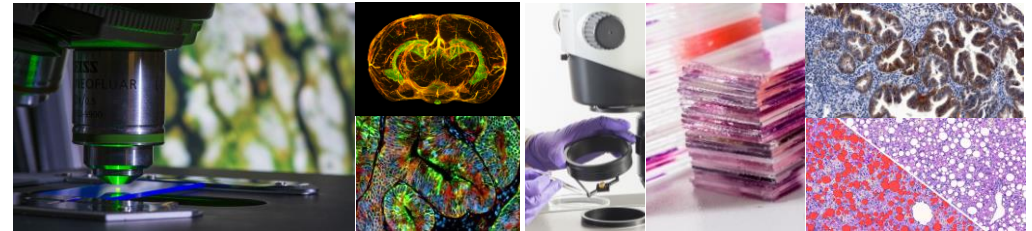
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SERVICES

PATHOLOGY

- Automated, standardized tissue processing (Frozen and FFPE)
- Conventional and special microtome techniques (e.g. transcriptomics, microchips)
- Standard and special staining techniques (Immunohistochemistry, Immunofluorescence, Histochemistry, FISH, Spatial Transcriptomics)
- Construction of Tissue Micro Arrays (TMA)
- Quantification by comprehensive Image Analysis
- Digital Pathology (AI-based Visiopharm)
- Scientific Support (e.g. Study design, structured histology report)

MICROSCOPY

- Lightsheet Fluorescence Microscopy
- Confocal Microscopy
- Fluorescence Microscopy
- Digital Slide Scanner for Brightfield and Fluorescence
- 2D / 3D Image Analysis and Visualization Platform
- Expert data analysis support
- Training in basic and advanced microscopy

NETWORKS

Labs@location Partner of ZEISS

➔ CORE FACILITIES

STATISTICAL CONSULTING

MISSION

Our aim is to bring statistical expertise to science and extend the use and quality of statistics in science and research-oriented companies. Within all our services we promise high scientific standards, state-of-the-art techniques, and a tailored approach. Our services are open to internal and external users.

HIGHLIGHTS

With more than seven years of experience as a consulting unit, we have extensive expertise in various areas of data analysis including omics data, survival analysis, clustering and modelling strategies, among others. We have taught more than two hundred courses and are continuously developing new and exciting material.



@ Helmholtz Munich, Matthias Balk

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SERVICES

Statistical Consulting: We ensure the quality of analyses and apply modern statistical methods in practice. Data analysis, method development, experimental design, proofreading, preparation of publication material and more

Teaching: We train the participants of our courses in the application and understanding of statistical methods. We offer a variety of high-quality statistical and programming courses at different levels, e.g. “Introduction to R/Python” or “Reproducible and Open Research”

Statistical Opinions: We carry out sample size calculations and prepare statistical reports for animal experiment applications

Data Analysis Café: In 15-minute time slots, we answer quick questions about data problems, correct application of statistical methods, analysis code and more

COLLABORATION PARTNERS

We work together with researchers at Helmholtz Munich, HIDA (Helmholtz Information & Data Science Academy), other Helmholtz Centers, external collaborators at universities, hospitals, other public institutions, and private companies.

