Campus Science Support Facilities
The Campus Science Support Facilities GmbH (CSF) is a publicly funded non-profit research institute, situated at the Vienna Biocenter. We offer access to state of the art research infrastructure and scientific services. Our customers are academic research institutions and companies in the field of Life Sciences. CSF is open for all forms of scientific collaborations.

CSF is organized in ten scientific core facilities equipped with cutting edge instruments and highly skilled technical and scientific personnel:

- Electron Microscopy
- Advanced Microscopy
- Next Generation Sequencing
- Bioinformatics and Scientific Computing
- Protein Technologies
- Mass Spectrometry
- Preclinical Imaging
- Preclinical Phenotyping
- Plant Sciences
- Vienna Drosophila Resource Center
- Internal support and social infrastructure

For further information and contacts please visit our website [www.csf.ac.at](http://www.csf.ac.at)
Electron Microscopy

The Electron Microscopy Facility offers a large range of instruments, techniques and expertise to visualize the ultrastructure of diverse biological samples. Whether you are interested in quick sample screening or high resolution 2D or 3D imaging, we can help. Our instruments include scanning (SEM) and transmission electron microscopes (TEM) as well as various types of auxiliary equipment (high pressure freezer, freeze substitution, coaters, sputters, etc.). We analyse diverse biological samples, from molecules, such as RNA, DNA or protein, to organelles to entire prokaryotic or eukaryotic cells and tissues, and use numerous techniques from classical negative staining to cutting edge cryo-electron microscopy and tomography.

Services
We offer two types of services to our customers:

- Infrastructure users are trained on the equipment and in the techniques they wish to use to visualize their samples: all of our instruments, from basic sample preparation equipment to our most sophisticated electron microscopes, are available to users.
- Alternatively, we are also able to perform all steps for our Service users, from sample fixation and preparation to visualization by electron microscopy to image analysis.

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Optical Microscopy has always played an indispensable role in biomedical research. With increasingly rapid microscopy developments it is now possible to image at resolutions, speeds, and with sensitivities that would have seemed unfathomable less than a decade ago. Unfortunately, due to such rapid developments there is a significant lag in the commercial availability of cutting-edge techniques. Furthermore, techniques increasingly require custom optical &/or geometric modifications to be suitable for addressing today’s demanding research questions.

In order for biomedical research at the VBC to remain cutting edge and competitive, it is clear that easy local access to and corresponding professional assistance in the development, optimization and implementation of an array of the latest imaging technologies is essential. It is this “void” – bringing the very latest developments to fruitful applications – that the Advanced Microscopy Facility fills.

**Services:**
The Advanced Microscopy facility offers the custom development of, and one-on-one user assistance with, cutting edge and novel optical microscopy techniques. In addition it also offers imaging/microscopy consulting, and several outreach projects (including organizing microscopy workshops, lecture series, and the development of educational optics kits).

The continuously expanding inventory of techniques available at the facility currently include:

- 3d Structured Illumination Microscopy
- Fluorescence Lifetime Imaging (time domain)
- Time resolved & steady state Fluorescence Anisotropy measurement
- Fluorescence Correlation and Fluorescence Cross-Correlation Spectroscopy
- Confocal Scanning Brillouin Scattering Microscopy
- Light Sheet Microscopy

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The goal of the Next Generation Sequencing Core Facility is to provide cutting edge next generation sequencing technology to its users. Next Generation Sequencing has become a key analysis method for biological research. The capacity to expand analysis from more or less defined genomic regions to genome wide studies has boosted the pace of research discovery and enabled researchers to obtain a global view on biological processes. Advice and guidance of sequencing projects are offered by our team that relies on years of experience with sequencing systems and sequencing data analysis. All common sequencing applications are supported and the development of novel methods and protocols encouraged.

**Services:**
- Selected library preparation protocols
- Sequencing on Illumina sequencing platforms
- First level Bioinformatic support

**We Provide:**
- Expertise on project strategy and analysis
- Access to state-of-the-art technology
- High quality and cost effective service with short turnaround times

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The Bioinformatics & Scientific Computing Facility offers data analysis services and scientific software development for academic research groups and industrial research laboratories. Our wide range of services provides help to understand and exploit the large-scale data sets generated in modern biological and biomedical research. As a "knowledge hub" our facility also offers training, consultation and help-desk for all Vienna Biocenter (VBC) researchers in the fields of biostatistics, programming and bioinformatics.

Services:
- Advanced data analysis tools using machine learning and data mining approaches
- Downstream level bioinformatics support for NGS data
- Software solutions for biomedical image and video analysis
- Hardware-related programming for experimental assays
- Custom-made laboratory data management tools and processing (LIMS)
- Training and consultation in bioinformatics, statistics and programming

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The mission of the Protein Technologies Facility is to further research in cell biology, molecular biology, biochemistry, and structural biology by overcoming two major bottlenecks surrounding protein-based experiments: protein production and purification. In addition we offer services upstream and downstream of these areas, including molecular cloning and protein characterization, and can provide expertise in most protein-related technologies.

**Services**

**Molecular cloning**
- Constructs for E. coli, insect cells, mammalian systems
- Constructs for CRISPR/Cas9 genome engineering

**Protein production in the following expression systems:**
- E. coli
- insect cells
- future plans: Nicotiana benthamiana (in collaboration with Plant Sciences)

**Protein purification**
- Automated small-scale screening of purification conditions
- Large-scale purification

**Protein characterization including:**
- Circular Dichroism
- Differential Scanning Calorimetry
- Dynamic Light Scattering
- Microscale Thermophoresis
- Simple Western (automated Western blotting and isoelectric focusing)
- Thermofluor (Differential Scanning Fluorimetry)

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Liquid chromatography-mass spectrometry (LC-MS) has emerged as the dominating technology for the characterization and quantification of proteins. However, the high price of LC-MS instrumentation makes it difficult for individual laboratories or even institutes to keep pace with the progress in state-of-the-art technology in protein analysis. CSF supports research groups by providing access to a broad range of latest generation MS technologies.

A pool of 12 advanced mass spectrometers coupled to nanoHPLC systems are at the disposal of the customers. CSF coordinates instrument usage and provides maintenance and quality control of the diverse LC-MS set-ups.

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The Preclinical Imaging Facility (pcIMAG) provides comprehensive anatomical and functional phenotyping of (transgenic) models by multimodal imaging. pcIMAG is mainly focused on mouse imaging but can also work with other models such as Drosophila, Zebrafish, plants or cell constructs. Special emphasis is placed on the development of automated image analysis tools to achieve a reliable qualitative and quantitative data analysis.

**Services**

- Ultra-high resolution MR data acquisition (state of the art 15.2 T Bruker Biospin)
- $^1$H Magnetic Resonance Spectroscopy (state of the art 15.2 T Bruker Biospin)
- Image analysis and data processing

**Applications**

- Anatomical characterization of organ systems (from development to adulthood)
- Axonal tract tracing & Myelin imaging (diffusion tensor, HARDI and magnetization transfer)
- Preclinical disease models (stroke, neurodegenerative and metabolic disorders, tumors)
- Quantitative perfusion/MTT/Blood Volume and Angiography (arterial spin labeling, DSC, DCE)
- Cardiac imaging (intraGate FLASH)
- Functional MRI (fMRI), using BOLD or blood volume changes
- Cell labeling and tracking (iron oxide and $^{19}$F perfluorocarbon nano emulsions)

pcIMAG is member of the MRI Platform Vienna, a research network of MRI expert centers with the goal to exchange knowledge, granting mutual access to different imaging modalities and stimulate translational research.

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Preclinical Phenotyping

The study of rodents offers a powerful tool for understanding the development, physiological function and pathophysiology of organ systems and the whole organism. The Preclinical Phenotyping facility (pcPHENO) provides expertise and resources with a comprehensive panel of phenotyping tests in whole mouse associated with genetic manipulations that are available on a fee-for-service basis.

We provide a state of the art facility – fully equipped and covering a broad range of basic and high-throughput phenotypic analysis from metabolic, motor, behaviour and physiological function to pain. For researchers who wish to outsource mouse phenotyping screening in any part of the process, we offer in addition consultation to design protocols/projects, training, assistance, support and access to our infrastructure.

Services

- Metabolic analysis (feeding/drinking behavior, running wheel, calorimetric tests in climate chamber)
- Motor function assays (grip strength, rotarod, motorater (automated analysis of rodent kinematics)
- Behavioral tests (anxiety, depression, cognitive tests)
- Sensory tests
- Nociception assays (thermal (preference) plates, dynamic plantar test)
- Neuro-physiology studies (EEG, ECG and blood pressure using telemetry)
- Surgery (simple and complex)

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The Vienna Drosophila Resource Center, established in 2007, is a professionally organized bio-resource center whose main goal is to maintain and distribute transgenic Drosophila melanogaster strains and resources for research. With over 2000 registered customers, of which more than 95% are based abroad, VDRC is an Austrian bio-resource of international significance.

**VDRC aims to:**
- promote scientific discoveries by facilitating analysis of gene function in *Drosophila*, primarily using *in vivo* transgenic RNAi technology
- further develop and expand its resources according to emerging new technologies and community needs
- distribute *Drosophila* resources to academic and industry researchers both locally and worldwide.

**Resources**
More than 40,000 different transgenic fly stocks, including:
- almost genome-wide collection of *Drosophila* transgenic RNAi lines and their DNA constructs
- stocks to temporally and/or spatially restrict gene function

**Services**
- Maintenance and worldwide distribution of stock collections
- Online web-shop for stock ordering
- Generation of new transgenic lines on request

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The Plant Sciences Facility operates 22 high quality and state-of-the-art plant growth chambers. Several chambers are capable of providing exceptional environmental conditions allowing precise environmental simulation across different climate zones. In addition, one of these chambers is equipped with an automated, chamber integrated, non-destructive plant screening system for objective, reproducible and high-throughput assessment of plant phenotypic traits.

Services

Basic Plant Growth
- 170m² net plant growth space & 90m² lab space
- Automated watering system
- Pest monitoring & pest control
- Documentation & graphing of environmental parameters

Environmental Simulation
- Temperature range: -15°C to +50°C
- Adjustable spectral composition of light (LED)
- Adjustable air composition (e.g. CO₂)

High Throughput Screening
- Capacity: 1260 plants
- Image analysis parameters inter alia: Leaf surface area (growth rates), convex hull area & perimeter, count of leaves, etc..

Plant-Based Protein Production
- Small- and large-scale production of plant-derived recombinant proteins:
  Cloning → Expression → Purification → Analytics
- In collaboration with Protein Technologies Facility

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Internal support and social infrastructure

**Strategic Information Management** (SIM)
The Strategic Information Management Facility is responsible for a common IT strategy and centralized IT services at the CSF. Our goal is to concentrate, merge and plan all IT requirements of the CSF and to design and implement a service oriented IT architecture.

**Services**
- IT Controlling
- IT Strategy & Project Management
- Design & Development of Information Management Systems
- Consulting of Data Management & Software Solutions

**Child Care Center** (CCC)
Research is anything but a nine-to-five job. We help scientists with small children to juggle a scientific career and child-rearing. Dagmar Mirek and her highly motivated team care with love for more than 110 children in the Child Care Center of the Campus Vienna Biocenter that is tailored to the special needs of researchers.

**Admin**
The mission of the CSF administration team is to support staff members and customers in a non-bureaucratic way in their day-to-day work. Services include personnel management, accounting, billing, controlling and reporting and helping Core Facility heads to cope with the administrative chores behind scientific services.

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