

UNIVERSITY OF LJUBLJANA RESEARCH INFRASTRUCTURE CENTERS

The University of Ljubljana (hereinafter UL) provides infrastructural support via the »Network of Research and Infrastructural Centers UL (MRIC UL)« that includes 34 infrastructural centers at 13 member faculties and the rectorate of UL, through ESFRI nodes in Slovenia (ELIXIR, SiMBioN, EATRIS, E-RIHS, CESSDA and ESS) and via research equipment, which is all co-financed by the Slovenian Research Agency. UL also cooperates in the following European infrastructure programmes: CLARIN, LifeWatch, EPOS, PRACE, DARIAH and Instruct-ERIC. Links to UL webpages:

https://www.uni-lj.si/research_and_development/research_infrastructure/network_of_research_and_infrastructural_centres/

https://www.uni-lj.si/research_and_development/research_infrastructure/

https://www.uni-lj.si/research_and_development/research_infrastructure/european_research_infrastructures/

Some of the core and unique research infrastructures:

1. **Infrastructural Center for the Study of Growth and Development of Agricultural Plants**

Head: Associate. Prof. Dr. Jerneja Jakopic

Email address: jerneja.jakopic@bf.uni-lj.si

Telephone number: +386 1 3203 110

Website: <https://www.bf.uni-lj.si/en/research/infrastructure-centres/102/razvojno-raziskovalni-center-za-proucevanje-rasti-in-razvoja-kmetijskih-rastlin>

Facility description:

The key part of the IC is the central research greenhouse, which covers a total area of 332 m². It is equipped with an automatic window opening system, retractable shade curtains - computer controlled via light sensors, lights (assimilation, photoperiodic), rolling benches, bench irrigation (flood or with trolleys), dispenser, fogging system and computer control of each segment. In addition to the central greenhouse, the IC also encompasses 10 acres of protected areas (plastic greenhouses) and 16 ha experimental fields where are production areas, grassland, and permanent crops (orchards). Within the IC, a lysimeter station is installed, equipped with a meteorological station.

Keywords: Greenhouse; experimental field; lysimeter station; agricultural plants; horticultural plants; vegetables; fruits; cultivation practices.



2. **Molecular Interactions**

Head: Asst. Prof. Dr. Matej Butala

Email address: matej.butala@bf.uni-lj.si

Telephone number : +386 1 320 3397

Website : <https://www.bf.uni-lj.si/sl/organiziranost/biologija/raziskave/infrastrukturni-centri/103/>

Social media handles / links

Facility description:

We offer instruments: stopped-flow spectroscopy (Stopped Flow SX-20) and two precise surface plasmon resonance (SPR) systems Biacore X and Biacore T200. We use Biacore X for the complex interactions and initial screening and Biacore T200 to obtain high-quality interaction data. The sensitivity of Biacore T200 allows us to determine the kinetics, affinity, specificity, concentration of molecular interactions, immunogenicity or epitope binding from compounds to viruses. We have 20 years of experience in the study of protein-protein, protein-membrane, protein-DNA, protein-small compound interactions. Such characterization of molecular interactions can be applied in pharmacy, food technology, biotechnology, environmental protection, among others. We also provide training for new users.

Keywords: Surface plasmon resonance, SPR, molecular interactions, protein-protein, protein-membrane, protein-DNA, protein-small compound, kinetics, affinity, specificity



3. **Collection of Industrial Microorganism (ZIM)**

Head: Asst. Prof. Dr. Neza Cadez

Email address: neza.cadez@bf.uni-lj.si

Telephone number : +386 1 3203 750

Website : <https://www.bf.uni-lj.si/en/research/infrastructure-centres/104/zbirka-industrijskih-mikroorganizmov-zim> ; <https://zim-collection.si/>

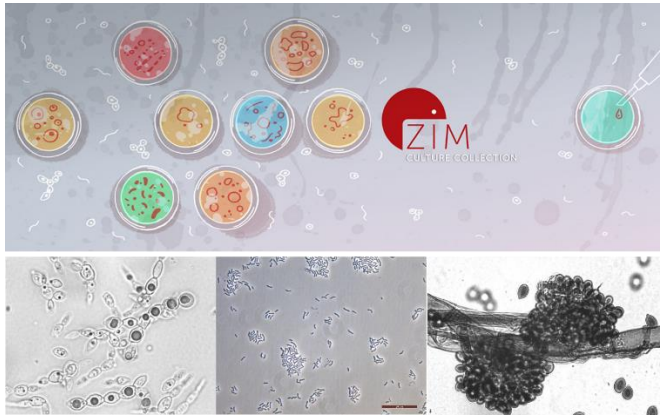
Social media handles / links

Facility description:

Slovenian Collection of Industrial Microorganisms (ZIM) preserve over 4200 microorganisms that have been systematically collected over the last 30 years, mainly from regional foods, beverages and natural habitats. Our R&D activities focus mostly on isolation and characterization of yeasts, lactic acid bacteria, bifidobacteria, food-borne pathogens and wood-inhabiting fungi. The aim of the collection is to distribute microbial strains to support

scientific research; to exploit microbial biodiversity for novel biotechnological applications; and to support the teaching process at different levels of education. A comprehensive database available on-line of microbial resources contains information on isolation source and geographic location, host and substrate.

Keywords: culture collection, biodiversity, yeast, food-borne bacteria, lactic-acid bacteria, probiotic, wood associated fungi



4. **Mycosmo**

Head: Prof. Dr. Nina Gunde – Cimerman

Email address: nina.gunde-cimerman@bf.uni-lj

Telephone number : +386 1 3203 400; +386 1 3203 392

Website : [Mycosmo \(ex-genebank.com\)](http://Mycosmo(ex-genebank.com)), <https://www.ex-genebank.com/index.php/en/>

Social media handles / links:

Twitter hashtag: [#funextremophiles](https://twitter.com/funextremophiles)

<https://twitter.com/extremefungi>

Facility description:

Infrastructure centre Mycosmo supports researchers, project groups and industry with unique infrastructure organised in three tightly interconnected pillars:

1. Storage of isolated and identified microorganisms in the **gene bank Ex**, with the largest collection of fungi from extreme environments in the world (16.600 fungi, 5.900 bacteria, 59 archaea), that originate worldwide from hypersaline environments, extremely cold polar environments, deep sea, hot deserts, nutrient-poor environments and extreme indoor environments.
2. Basic and applied **mycological services and research**, in collaboration with industry and other external stakeholders.
3. Sequencing of **genomes of extremophilic fungi** (at present more than 300), omic analyses, data dissemination and bioinformatic analyses.

Keywords: fungi, yeasts, extremophilic fungi, bacteria, archaea, genomes, mycology, taxonomy, gene bank, adaptations to extreme conditions, isolation, identification, cultivation, bioactivity.



5. University Botanic gardens Ljubljana: IC Botanic Gardens - center of autochthonous and allochthonous flora with seed gene bank

Head: Research councilor and Asst. Prof. Dr. Joze Bavcon

Email address: botanicni.vrt@bf.uni-lj.si

Telephone number : + 386 1 427 12 80

Website : : <http://www.botanic-gardens-ljubljana.com/en/>

Social media handles / links:

[Botanični vrt Univerze v Ljubljani - Domov | Facebook](#)

[Botanical garden Ljubljana \(@botanicnivrul\) • Instagram photos and videos](#)

<https://www.youtube.com/channel/UCBVyNuR9ARi7LbOMDWid8yw>

Facility description:

IC Botanic Gardens is the oldest scientific research and educational institution in Slovenia, founded in 1810, covering 5 ha of surfaces, 2 ha of which is home to a living plant collection with 5729 species and subspecies, as an example of ex-situ conservation. It has 1500 m² of greenhouses with tropical, Mediterranean plant species, cacti and succulents. It has 850 m² cultivation area with covered beds and a watering system for growing protected and endangered plant species for their reintroduction and for native species research. The research collection contains 20000 units. There are 2 ha meadow area for the needs of in-situ protection, while 1 ha is for bog species in-situ protection. There is also an educational beehive for bee research. IC has a permanent and dry seed bank with over 3500 species with 18000 units. Seeds of over 25% of our flora with a known origin are stored in the permanent seed bank. In archive collection there are Index seminum from 1889.

Keywords: Botanic gardens, seed banks, collections, ex-situ conservation, in-situ conservation, native flora, endemic species, endangered flora



6. Infrastructural Centre for Soil and Environmental Science

Head: Asst. Prof. Marko Zupan

Email address: marko.zupan@bf.uni-lj.si

Telephone number : [+386 1 3203 211](tel:+38613203211); [+386 1 3203 202](tel:+38613203202)

Website : <https://www.bf.uni-lj.si/en/research/infrastructure-centres/107/infrastrukturni-center-za-pedologijo-in-varstvo-okolja>

Social media handles / links

Facility description:

The Infrastructural Centre for Soil and Environmental Science (ICSES) provides services in the field of soil and land: planning and carrying out soil sampling, laboratory analyses of soil, plant, wastewater, fertilizer, and biological waste samples, evaluation of the results of analyzes regarding soil fertility, soil pollution, soil vulnerability to various threats and interpretation of soil data. (ICSES) is the leading national institution in National Soil Surveys in Slovenia and has been responsible for Soil pollution assessment and Soil Quality monitoring. ICSES has a laboratory for soil physical-chemical analyses like elemental analyzer CNS (Vario Max), DOC/TNb analyzer, Discrete analyzer for soluble nitrogen and phosphorus fractions, and atomic absorption spectrophotometers (flame and ETAAS).

Keywords: soil sampling, soil analyses, soil mapping, digital soil data base, soil evaluation, soil pollution maps, biowaste recycling, composting



7. Infrastructural Center Microscopy of Biological Samples

Head: Prof. Dr. Rok Kostanjsek

Email address (if different from above): rok.kostanjsek@bf.uni-lj.si

Telephone number : [+386 1 3203 373](tel:+38613203373)

Website : <https://www.bf.uni-lj.si/en/research/infrastructure-centres/108/ic-mikroskopija-bioloskih-vzorcev>

Social media handles / links

Facility description:

The Infrastructural Center Microscopy of Biological Samples provides expertise in sample preparation, visualization methodologies, data interpretation and analysis for a wide spectrum of biological samples on various levels of resolution. The methodologies include:

3D reconstruction of biological samples with microCT (NEOSCAN N80 micro-CT) upgraded by cooling/heating sample stage for observation of frozen samples and analysis of temperature on the sample in situ).

Field-emission scanning electron microscopy of biological samples by cold FEG FESEM microscope JSM 7500F (Jeol).

Visualization of biological samples by light and confocal microscopy by a wide array of classical and fluorescent microscopic techniques including confocal laser scanning microscopy with spatial and timelapse analysis.

Transmission electron microscopy (TEM)

Keywords (histology, anatomy, ultrastructure, morphology, 3D reconstruction, light microscopy, electron microscopy, confocal microscopy, microCT, image analysis)



8. **Infrastructural Center Research Forest**

Head: Asst. Prof. Dr. Matija Klopčič

Email address (if different from above): matija.klopčič@bf.uni-lj.si

Telephone number: +386 1 320 30 05

Website : <https://www.bf.uni-lj.si/en/research/infrastructure-centres/109/ic-raziskovalni-gozd-oddelka-za-gozdarstvo-in-obnovljive-vire>

Facility description:

The infrastructural center Research Forest includes three forest areas of 737 ha in total and infrastructure equipment for monitoring various ecological and physiological processes in forest ecosystem. The basic objectives of the Research Forest are: i) to support research in forest ecology, physiology and management, ii) to support the educational process in forestry and related studies, and iii) to promote science, forests and forestry. The research infrastructure includes meteorological stations for monitoring climatic parameters, sensors for recording forest soil properties, detectors of tree growth, facilities for monitoring forest regeneration (fenced areas), and other.

Keywords: forest ecosystem, forest ecology, regeneration, tree growth, stand growth, climate, soil



9. **Infrastructural Center for preparation, ageing and field testing of wood and lignocellulose materials**

Head: Asst. Prof. Dr. Bostjan Lesar

Email address (if different from above): bostjan.lesar@bf.uni-lj.si

Telephone number : +386 1 3203 639

Website: <https://www.bf.uni-lj.si/en/research/infrastructure-centres/110/ic-za-pripravo,-staranje-in-terensko-testiranje-lesa-ter-lignoceluloznih-materialov-oc-les-pst>

Facility description:

The purpose of this Infrastructure is to provide a platform for preparation, conditioning, artificially accelerated aging - and service life monitoring of wood and lignocellulosic materials under real conditions.

Objectives:

- To offer space, support and equipment for conditioning of wood and lignocellulosic samples and materials for laboratory and field testing.
- To offer space, support, and equipment for field testing of wood above ground and in contact with the ground.
- To provide support for use of model facilities for testing wood and lignocellulosic composites.
- Ensure operation and maintenance of numerous measuring instruments installed in field, model and real facilities.
- Support the study process in the outdoor wood weathering.

Keywords: Wood, artificial ageing, wood service life, field testing, wood moisture content, weathering, model object, lignocellulosic materials



UNIVERSITY OF LJUBLJANA, FACULTY OF ECONOMICS / SCHOOL OF ECONOMICS AND BUSINESS

1. **The Infrastructure Center of the School of Economics and Business (IC SEB)**

Head: Tomaz Ulcakar, Mojca Ogrin

Email address (if different from above): mojca.ogrin@ef.uni-lj.si

Telephone number: +386 1 5892-595

Website: http://www.ef.uni-lj.si/european_documentation_centre

Social media handles / links :

Facility description:

The Infrastructure Center of the School of Economics and Business (IC SEB) brings a significant breakthrough in the development of behavioral economics and finance. In line with our mission, we strive to broaden our horizons and develop our skills for socially responsible management of business and economic challenges.

The IC SEB focuses primarily on the following five activities:

- support and integration of research activities at the School of Economics and Business, and in the national and international environment.
- support for research in the field of European integration and policy within European Union.
- Financial Laboratory.
- Behavioral Research Lab.
- Social impact in economics and business studies.

Keywords: [economics](#), [applied business](#), [EU](#), [finance](#), [neuro science](#), [behaviour economics](#)

Major scientific equipment or sets of instruments:

[Telemetry equipment for measuring sleep parameters \(oura rings, dream bands\);](#)

[Equipment for behaviour research \(facereader, eyetracker, EGG instruments\)](#)

Collections, archives or scientific data: [finance databases: Bloomberg, EIKON, Fitch Connect](#)

UNIVERSITY OF LJUBLJANA, FACULTY OF SOCIAL SCIENCES

1. **ADP - Social Science Data Archives**

Head: Asst. Prof. Dr. Janez Stebe

Email address (if different from above): arhiv.podatkov@fdv.uni-lj.si

Telephone number : +386 1 5805 292, 5805 293

Website : <https://www.adp.fdv.uni-lj.si/eng/spoznaj/adp/>

Social media handles / links

FB: <https://www.facebook.com/Arhiv.Druzboslovnih.Podatkov>

Twitter: https://twitter.com/intent/follow?screen_name=ArhivPodatkov

Youtube: <https://www.youtube.com/user/ArhivPodatkov>

Blog: <https://www.adp.fdv.uni-lj.si/blog/>

Facility description:

Slovenian Social Science Data Archives (ADP) is a national research infrastructure for social sciences, whose main mission is to manage data and data services in the field of social sciences in order to support research, education, and general well-being. Digital curation of high-quality research data that are openly accessible to researchers and other interested public is at the essence of the ADP activities. Within its mission, the ADP establishes itself as a national

infrastructure that collects important data sources from a wide range of social sciences, interesting for analyzing the Slovenian society, deposits, preserves and promotes their further use in scientific, educational and other purposes. ADP is involved in the activities of the Pan-European research infrastructure – [CESSDA ERIC \(Consortium of European Social Science Data Archives\)](#)

Keywords: Social sciences, humanities, behavioural sciences, research data, research methods, research instruments, qualitative data, quantitative data, data sharing, data access, training, digital preservation, research data management, CESSDA

2. **Public Opinion and Mass Communication Research Centre (POMCRC)**

Director: Asst. Prof. Dr. Brina Malnar / Head of Research infrastructure: Asst. Prof. Dr. Slavko Kurdija

Email address (if different from above): cjmmksjm@fdv.uni-lj.si

Telephone number: +386 1 5805 105

Website: <https://www.cjm.si/about-the-centre/>

Social media handles / links

Facility description:

POMCRC is the leading Slovenian social survey research institution in the fields of sociology from cross-national and cross-temporal perspective. Centre has been conducting annual general social surveys, which are the key source of empirical data for the national social science community. Apart from designing and fielding national survey projects, the Centre is a regular partner in a number of widely acclaimed comparative surveys, such as ESS, WVS, EVS, ISSP and CSES. Its principal mission remains monitoring relevant structural characteristics and processes in Slovenian society within the broader European context. Centre also represented the University of Ljubljana in the role of a partner institution in the European Social Survey (ESS-ERIC) managing consortium.

Keywords: Comparative social research, Cross-national surveys, Public opinion, Social research methods, Data analysis.

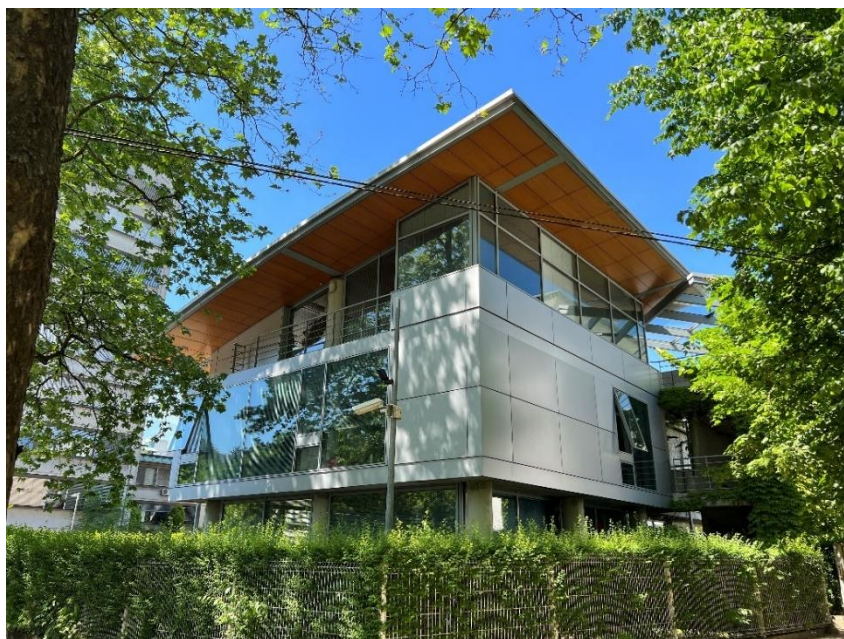


Photo: Public Opinion and Mass Communication Research Centre (POMCRC).

UNIVERSITY OF LJUBLJANA, FACULTY OF SOCIAL SCIENCES / FACULTY OF ARTS

1. East Asia Resource Library

Head: Dr. Zlatko Sabic

Chief Co-ordinator: Mirjam Kotar, MSc

Email address: earl@fdv.uni-lj.si, zlatko.sabic@fdv.uni-lj.si, mirjam.kotar@fdv.uni-lj.si

Telephone number: +386 1 58 05 198

Website: <https://www.fdv.uni-lj.si/en/research/earl>

Social media handles/links <https://www.facebook.com/EARLSlovenia>

Facility description:

The main purpose of the EARL is to facilitate a wider East-Asian network of institutions contributing literature and other teaching resources, with a view to promoting understanding between nations from the region and the local, but also regional interested public, students, and faculty. The EARL assures wide accessibility to the unique collection of digitalized primary sources, data, printed books, and electronic sources available online in languages of the East Asian region, English, and other world languages. To reach out to scholars, practitioners, and the interested public at large, the EARL expands its research activities in both humanities and social sciences. The EARL consists of four sections, to which the Capital Library of China, Taiwan Resource Centre for Chinese Studies, and institutions from Japan and Korea contribute: [China Corner Reading Beijing](#), [Japan Corner](#), [Korea Corner](#), and [Taiwan Resource Centre for Chinese Studies](#).

Keywords:

East Asia, Chinese studies, Japanese Studies, Korean Studies, Taiwan Studies, East Asian Histories, East Asian Philosophies, Synology, Chinese Linguistics, Japanese Linguistics, Korean Linguistics, Comparative Politics, International Relations, Asian Art, Area Studies

UNIVERSITY OF LJUBLJANA, FACULTY OF ELECTRIC ENGINEERING

1. **Infrastructural Centre “Cellular Electrical Engineering”**

Head: Prof. Dr. Tadej Kotnik

Email address (if different from above): tadej.kotnik@fe.uni-lj.si

Telephone number: +386 1 4768 768

Website: <https://lbk.fe.uni-lj.si/ic/en/>

Social media handles / links

Facility description:

The main purpose of this IC is the study of interactions between electromagnetic fields and living organisms. Main parts of IC are the Unit for electric pulse generator development and the Unit for lipid bilayers, biological and microbiological research. Main areas of research supported by infrastructural center are:

- cell and tissue electroporation and its use in electrochemotherapy of tumors and gene electrotransfection,
- development of electrical equipment and electrodes for research and clinical work,
- design of electrodes and chambers that enable application of electric pulses and monitoring of their effects on level of lipid bilayers, lipid vesicles, cells and microorganisms.

Keywords: electroporation, electrotransfection, electric pulse generator, electrochemotherapy, electrodes, gene therapy, DNA vaccines



Major scientific equipment or sets of instruments

- Measuring equipment (oscilloscopes, current probes, differential voltage probes,...)
- Electroporators (Jouan, BTX Gemini X2, Cliniporator Vitae, Intracel TSS20, Electrocell B10, Neon transfection system, Cell FX System, FPG20-1NM4 and various prototype electric pulse generators)
- System for dynamic fluorescence microscopy Zeiss Axiovert
- Thunder Live cell imaging system
- Attune NxT flow cytometer
- Alliance Q9 Advanced Chemiluminescence and spectral fluorescence imaging system
- RT-PCR system QuantStudio 3
- Tecan Infinite 200 Pro plate reader
- Texture analyzer
- Franz cell diffusion apparatus
- Cell culture laboratories (CO₂/O₂ incubators, EVOS XL core microscopes, refrigerated centrifuges, biosafety cabinets and other necessary equipment for cell cultures)
- Microbiological laboratories (Shaker incubators, biosafety cabinets, cell homogenizer, autoclave, refrigerated centrifuge, electrophoresis equipment...)



UNIVERSITY OF LJUBLJANA, FACULTY OF ARTS

2. The Infrastructural Support Centre for the Study of Humanities

Head: assoc. prof. dr. Saso Jerse

Email address (if different from above): saso.jerse@ff.uni-lj.si

Telephone number: +386 1 2411 006

Website: <https://www.ff.uni-lj.si/en/research/infrastructural-centre>

Facility description:

The center supports research and educational work in the fields of the humanities and social sciences. In the center are included the specialized centers as a specific support for research work in various fields of humanities:

- CIRA, Center for Interdisciplinary Research in Archaeology
- ICCHS, International Center for Comparative Historical Research
- Cognitive Science Laboratory
- Center for Public History

Keywords: Humanities, social sciences, digital humanities, cognitive science, public history, spatial archaeology

Research and innovation infrastructure open to external users:

- Website: <https://www.ff.uni-lj.si/raziskovanje/raziskovalna-oprema>

Major scientific equipment or sets of instruments at Faculty of Arts:

– **The line for the preparation and analysis of grindings:**

The line for the preparation and analysis of samples of archaeological materials consists of a Buehler Petrothin cutting and grinding apparatus, which enables cutting and thinning of various types of materials, a Buehler Ecomet 250 metallographic sample grinding and polishing apparatus, a Buehler UF 75 Z forced-ventilation dryer and an optical polarizing microscope Zeiss Axio Scope, which enables the observation of samples in transmitted and reflected light; it is equipped with a digital camera. The equipment thus constitutes a complete line that enables the preparation and analysis of archaeological samples (shears) from various materials (mainly pottery and bone).

- Key Contact Name [asist. dr. Manca Vinazza](#)

Key words: archeology, samples analysis, grindinga

– **Multichannel EEG system:**

Capture of EEG and psychophysiological measurements at rest or during the performance of cognitive and/or other tasks.

- Key Contact Name [prof. dr. Grega Repovs](#)

Key words: psychophysiological measurements, cognitive tasks

- **Philips MultiVane XD and Philips MultiBand SENSE software for the PHILIPS ACHIEVA 3TX tomographcomputing systems and communication networks:**

The upgrade of MiltiVane XD enables the automatic change of spatial parameters according to the possible movement of the participant in the tomograph. The entire acquisition of a structural MR image of the brain takes between 5 and 10 minutes.

- Key Contact Name [prof. dr. Grega Repovs](#)

Key words: tomographcomputing, spatial parameters, brains

UNIVERSITY OF LJUBLJANA, FACULTY OF PHARMACY

1. **Infrastructural Center for Drug Analysis**

Head: Prof. Dr. Anamarija Zega

Email address (if different from above): anamarija.zega@ffa.uni-lj.si

Telephone number: +386 1 47 69 673

Website: <https://www.ffa.uni-lj.si/en/research/research-equipment/0/infrastructural-center-for-drug-analysis>

Social media handles / links:



<https://www.facebook.com/ffa.unilj>



https://twitter.com/UL_FFA



https://www.instagram.com/ul_ffa/



<https://www.youtube.com/channel/UCA6twYocvPRnLPBItaEeZcA>

Facility description:

The Infrastructural Center (IC) for drug analysis is intended to support research and teaching work in the field of pharmacy. IC provides primary expert and instrumental support to research programs and groups at the Faculty of Pharmacy and to other research and educational institutions within and outside UL. We possess specific knowledge in the field of planning, synthesis and biological evaluation of new compounds as potential new agents, formulation of active ingredients into therapeutically effective and high-quality pharmaceutical forms, studying the processes in the human body after the application of the drug. Analytical methods represent an essential part of research in all the mentioned fields.

Keywords: faculty, pharmacy, infrastructural, drug, analysis, synthesis, biological, evaluation, compound, agent, ingredient, therapeutical, form, analytical, method

Major scientific equipment or sets of instruments

400 MHz NMR high resolution spectrometer

NMR (nuclear magnetic resonance) is a spectroscopic technique that gives us insight into the structure of compounds. Based on the measured spectra, the chemical structure and conformation of compounds can be determined, the rate of chemical transformations can be measured and intermolecular interactions can be observed.



Picture 5: 400 MHz NMR high resolution spectrometer

Leistritz ZSE 12 HP-PH twin screw hot melt extruder for hot melt extrusion (HME) and twin screw granulation (TSG) with supporting equipment for material feed, cooling and processing of extrudates

The device is capable of continuous and controlled delivery of the powder mixture of materials into the device itself and the following continuous production of solid dispersions of the active ingredients in the polymeric matrix. On exit from the die the filaments are continuous cooled on the conveyor belt and then cut into pellets of defined lengths (from 1.0 to 2.0 mm). Conversion of the device enables the process of continuous wet granulation of powder materials with controlled addition of granulation fluid to control the ratio of liquid to solids in a continuous granulation process.



Picture 6: Leistritz ZSE 12 HP-PH twin screw hot melt extruder for hot melt extrusion (HME) and twinscrew granulation (TSG)

Reometer - Anton Paar

To determine the viscosity of the liquid and semi-solid delivery systems and with this associated stability testing. It is also possible to determine the plastic and elastic properties

of those systems through Oscillatory rheometry and thus explain their behavior (for example, during application of creams, ointments).

GMPC Mini-Coater

Process equipment is intended for coating of pharmaceutical tablets. Coating can be performed with water based coating dispersions, while when low spraying rate is used also usage of organic dispersions is permitted. Coating operation can be performed in a 0,8 L or 1,6 L perforated drum. Equipment includes system for recording of process parameters.

Liquid chromatograph Agilent 1290 II coupled to triple quadrupole-linear ion trap Sciex Qtrap 5500+

Liquid chromatograph is used for analysis of drugs, their metabolites and transformation products in complex biological and environmental samples.



Picture 7: Liquid chromatograf

Laser diffractometer

Equipment is intended for measurements of particle size and particle size distributions roughly in range of 0.1 to 2000 μm . The measurements can be done with dry cell (dispersion solid/gas) or wet cell (dispersions solid/liquid or liquid/liquid), including use of organic solvents.



Picture 8: Laser diffractometer

1. **EATRIS Slovenia**

National director: Prof. Dr. Irena Mlinaric Rascan

Email address (if different from above): irena.mlinaric@ffa.uni-lj.si

Telephone number: +386 1 4769 501

Website: <https://www.ffa.uni-lj.si/en/faculty/organization/Infrastructural-centres/eatris-slovenia>

Social media handles / links:

Please, use #EATRIS_SI



<https://www.facebook.com/ffa.unilj>



https://twitter.com/UL_FFA



https://www.instagram.com/ul_ffa/



<https://www.youtube.com/channel/UCA6twYocvPRnLPBItaEeZcA>

Facility description:

EATRIS Slovenia is a national node of EATRIS ERIC, a non-profit organization that brings together European centres of excellence for translational research in medicine and diagnostics. The coordinator of the Slovenian node is University of Ljubljana, Faculty of Pharmacy. The capacities of IC include advanced equipment that enables

synthesis and evaluation of new drugs, development of new formulations, and discovery of new biomarkers. IC provides access to various LC-MS and HPLC systems, flow cytometers, next-generation sequencer, confocal Raman microscope, several different readers, fully equipped chemistry and cell laboratories, and other instruments that facilitate scientists' participation in national and international research projects.

Keywords: EATRIS, university, Ljubljana, pharmacy, advance, biomarkers, molecules, translational, research, therapies, infrastructure, diagnostics, drugs, personalized, medicine

Research and innovation infrastructure open to external users:

Major scientific equipment or sets of instruments

Liquid chromatograph coupled with a high-resolution mass detector at the time of flight

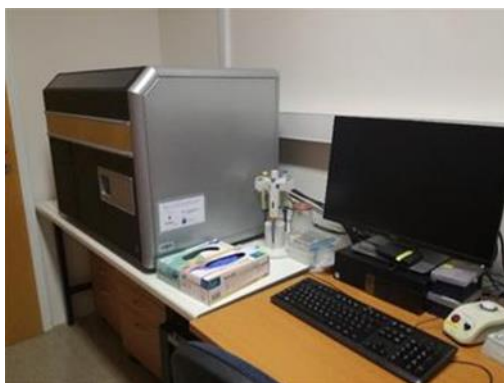
An ultra-high resolution liquid chromatography system (UHPLC Agilent 1290 Infinity II) coupled with a mass spectrometer with accurate mass (Agilent 6545XT AdvanceBio Q-TOF) enables the identification and quantification of small and especially large molecules (e.g. proteins) in various samples.



Picture 1: Liquid chromatograph coupled with a high-resolution mass detector at the time of flight

Imaging flow cytometer Amnis ImageStreamX Mk II

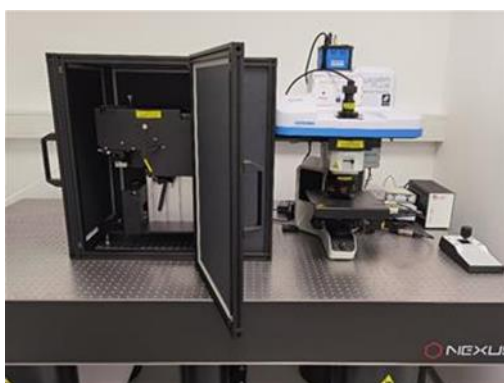
The Amnis ImageStreamX Mk II is an imaging flow cytometer that combines modern flow cytometry with microscopy. It allows simultaneous capture of up to 12 images/event in 3 different imaging modes: bright field, dark field and fluorescence. It is characterized by high resolution and high sensitivity. The added value of recording patterns is in visualization of captured events, based on which, using default and additional masks in the IDEAS® program, suitable events are selected for further analysis. Morphological changes, cellular processes and the expression, localization and colocalization of cell markers can be qualitatively and quantitatively evaluated.



Picture 2: Imaging flow cytometer Amnis ImageStreamX Mk II

Raman Spectrometer - Confocal Raman Microscope XploRA PLUS-OmegaScope

The integrated system of the confocal Raman microscope and the atomic force microscope allows various methods of microscopic analysis of the sample to be performed. It enables the observation and capture of a visible microscopic image. The laser light sources (532 nm, 785 nm), the associated optical elements and the backscattered Raman light detector enable point measurements of properties based on the principle of Raman spectroscopy and photoluminescence spectroscopy in 2 and 3 dimensions, which enables microscopic Raman mapping of the surface and volume of samples in air (surfaces and cross-sections of bulk free particles, granules, pellets, tablets, capsules, films, laminates, extrudates, etc.) and in a liquid medium (fibers, particles, cells, tissues, etc.).



Picture 3: Raman Spectrometer

Collections, archives or scientific data

Biobanks of cells and biological samples:

At UL FFA we keep a biobank of vectors, LCL cell lysates and samples from clinical studies in the field of CLL, OFC and a biobank of samples for the detection of the SARS-CoV-2 virus:

The biobank of chronic lymphocytic leukemia (CLL) is important for the evaluation of the cytotoxicity of anti-tumor medicinal agents and the phenotypic profiling of patients, which is carried out at UL FFA.

In addition to CLL samples, the biobank system also contains LCL cells from different individuals. The use of such cell models enables a personalized approach in the discovery and evaluation of new biological markers and the determination of inter-individual differences in the response to selected compounds.

The biobank of patients with orofacial schiza OFC (orofacial cleft) contains biological material of non-syndromic schiza and family history of three generations. The purpose of this biobank is to search for genetic factors that are important for the development of pathology.

The LCL lymphoblastoid cell line biobank. Human LCLs are considered reliable, inexpensive, and convenient cell models derived from individuals for in vitro research. They originate from B-lymphocytes infected in vitro with the Epstein-Barr virus (EBV). EBV causes immortalization of cells (B lymphocytes) and as a result an immortal cell line is obtained. Because of the genetic variability within the population, individual responses to drugs vary, so LCL cell lines are a valuable tool in translational drug development research and in personalized medicine, which focuses on evaluating individual responses.

The biobank of samples for COVID-19 disease research enables the identification of new biological markers for the diagnosis and determination of the course of the COVID-19 disease. The bank was established as part of a clinical study in which we investigated the possibilities of detecting the SARS-CoV-2 virus on saliva samples. The results of the research were published in the international journal Molecules with an impact factor (IF 4.4). The mentioned study will also leave an impression on the wider society, as it addresses simpler and more patient-friendly testing for the disease COVID-19.



UNIVERSITY OF LJUBLJANA, FACULTY OF CIVIL AND GEODETIC ENGINEERING

1. Infrastructural Centre Built Environment (Slovene language)

Head: Prof. Dr. Joze Korelc

Email address (if different from above): joze.korelc@fgg.uni-lj.si

Telephone number: +386 1 4768 627

Website: : <https://www.en.fgg.uni-lj.si/research/research-equipment/>

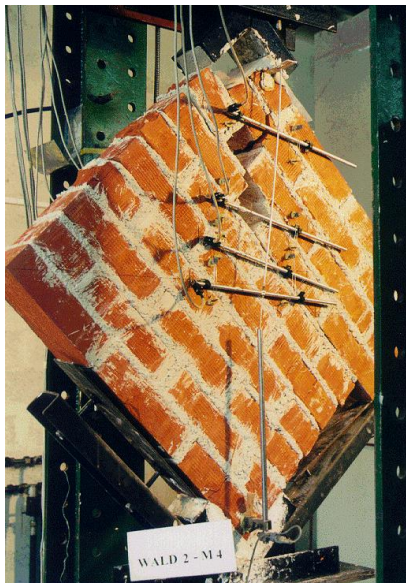
Social media handles / links

Facility description:

The basic purpose of the IC Built Environment is to connect infrastructure facilities at the Faculty of Civil and Geodetic Engineering in the field of constructions and traffic engineering. The main areas of research covered by the IC Built Environment are: experimental research for the development of new structural solutions in the field of concrete, steel, composite and timber structures, experimental research in the field of earthquake engineering, geotechnics and traffic engineering, the introduction of new innovative materials in construction and improvements in traditional materials such as concrete, steel and wood, experimental

support for theoretical research in the field of mechanics and numerical modeling. For this purpose, the IC connects teaching and research units with laboratories.

Keywords (15 maximum): built environment, structures, geotechnics, experimental research



UNIVERSITY OF LJUBLJANA, FACULTY OF CHEMISTRY AND CHEMICAL TECHNOLOGY

1. Centre for Research Infrastructure at UL FCCT

Head: Assoc. prof. dr. Marko Novinec

Email address (if different from above): marko.novinec@fkkt.uni-lj.si;

Telephone number: +386 1 479 8547

Website: <https://www.fkkt.uni-lj.si/en/research-infrastructure/>

Social media handles / links

Facility description:

The Centre for Research Infrastructure at FCCT is designed to support research in the fields of chemistry, biochemistry, pharmacy, chemical technology, and chemical engineering. It consists of three units that provide services to UL researchers, teaching staff, and students, as well as external users: (1) The Unit for Analysis of Small Molecules contains equipment for the characterization of crystalline and powder materials as well as polymers (e.g., diffractometers, SEM), (2) the Unit for Analysis of Organic Molecules contains equipment for the characterization of synthetic organic molecules (e.g., NMR), and (3) the Unit for Analysis of Macromolecules contains equipment for mass spectrometry of small molecules and macromolecules (e.g., LC/MS) and equipment for the analysis of biomacromolecules and biological samples (e.g., confocal microscopy).

Keywords: nuclear magnetic resonance, mass spectrometry, crystal diffraction, powder diffraction, liquid chromatography, scanning electron microscopy, thermal analysis, gas chromatography, materials, polymers, organic synthesis, metal complexes, biomolecules

MAJOR SCIENTIFIC EQUIPMENT OF THE CENTRE FOR RESEARCH INFRASTRUCTURE:

UNIT FOR ANALYSIS OF ORGANIC MOLECULES

- Bruker Advance Neo 600 MHz NMR spectrometer,

- Bruker Advance III 500 MHz NMR spectrometer,
- Agilent 6224 Accurate Mass TOF LC/MS system,
- Perkin Elmer CHNS/O Analyzer 2400 Series II

UNIT FOR ANALYSIS OF SMALL MOLECULES

- Scanning field emission electron microscope Zeiss ULTRA plus,
- Single Crystal X-Ray Diffractometer Nonius Kappa CCD,
- Single Crystal X-Ray Diffractometer Agilent SuperNova,
- High-resolution X-Ray Powder Diffractometer PANalytical X'Pert PRO MPD,
- Coupled system for thermal analysis: thermogravimetry – gas storage,
- Qrourum Q150T ES – turbo pumped high resolution sputter coater for FEG-SEM,

UNIT FOR ANALYSIS OF MACROMOLECULES

- ICP/MS Perkin Elmer SCIEX-Elan DRC,
- Jasco J1500 High Performance CD spectrometer,
- Multi-detector GPC system,
- Leica DMI8 confocal fluorescence microscope,
- MALVERN OMNISEC multi-detector GPC/SEC system,
- Litesizer™ 500 Laser system for characterisation of nanoparticles in solution and suspension.



2. The Heritage Science research infrastructure center E-RIHS.SI

Head: Prof. Dr. Matija Strlic

Email address: matija.strlic@fkkt.uni-lj.si

Telephone number: +386 40 636 941

Website: <https://www.fkkt.uni-lj.si/en/research-infrastructure/enota-za-dediscinsko-znanost-e-rihssi/> and <https://www.e-rihs.si/>

Social media handles / links

Facility description:

The Heritage Science research infrastructure center E-RIHS.SI provides researchers and experts from various domains (natural and other sciences, engineering and technology, arts and humanities) an interdisciplinary approach to solving problems in the field of heritage science. The unit has been established in accordance with the Agreement on the Establishment of the Consortium E-RIHS.SI between the University of Ljubljana and the Institute for the Protection of Cultural Heritage of Slovenia, Jožef Stefan Institute, National Institute of Chemistry, National and University Library, University of Maribor and the Slovenian national Building and Civil Engineering Institute, and thus represents a large, distributed infrastructure. E-RIHS.SI is part of the European Research Infrastructure for Heritage Science ([E-RIHS](#)).

Keywords: cultural heritage, heritage science, environmental monitoring, material characterisation and degradation, separation techniques, spectroscopy, microscopy, imaging, online scientific data and tools, databases

MAJOR SCIENTIFIC EQUIPMENT OF THE CENTRE FOR E-RIHS RESEARCH INFRASTRUCTURE:

- Thermo Desorbition Autosampler TDS A2 (Gerstel)
- Microplate Spectrophotometer Multiskan Sky (Thermo Scientific)
- Two Climate chambers ClimeEvent C/180/0 (Vötsch Technik)
- Microfademeter (Fotonow)
- Ion Chromatograph Integrion (Dionex)
- Micro-Chamber with T and RH control (Markes)
- Olfactory Detector Phaser (GL Science)

Further facilities are available at E-RIHS partner sites, accessible upon application.

Collections, archives or scientific data at FCCT

FCCT Compound library

The FKKTLib Compound Library (<https://knjiznica-spojini.fkkt.uni-lj.si/>) is a growing collection of compounds synthesized at UL FCCT. It currently contains 3,428 unique synthesized compounds. The majority are heterocyclic compounds documented in the scientific literature. Most of the samples are in solid form and are stored in cryogenic vials, which are marked with a QR code that allows us to trace the samples. To ensure the stability of the samples, they are stored under argon at -25°C. Information about the compounds in the library is stored in a web-based, fully retrievable molecular structure database available at the above link.

Computing systems and communication networks

FCCT Computing cluster

Computer simulations have a long history at the FCCT and require a modern hardware. In the 2022 FCCT obtained a new computing cluster which consists of 6 nodes, each with 48/96 processor cores/threads and 128 gigabytes of memory. Total storage capacity is 50 terabytes. Two nodes are equipped with graphic cards to accelerate certain types of calculations. Software stack includes Gromacs, Gaussian, and LAMMPS packages. The new equipment will allow researchers and students to conduct various types of computing tasks, including quantum calculations, molecular dynamics, and fluid dynamics simulations.

UNIVERSITY OF LJUBLJANA, FACULTY OF MATHEMATICS AND PHYSICS

1. **Infrastructural center for mathematics and physics**

Head: Prof. Dr. Miha Ravnik

Email address (if different from above): miha.ravnik@fmf.uni-lj.si

Telephone number: +386 1 4766 709

Website: <https://www.fmf.uni-lj.si/en/research/>
<https://www.fmf.uni-lj.si/sl/o-fakulteti/infrastrukturni-center-fmf/>

Social media handles / links:

Twitter: [@FMF_UL](https://twitter.com/FMF_UL)

Facebook: <https://www.facebook.com/fmf.ul>

Facility description:

The research infrastructure supported by the Infrastructural center for mathematics and physics includes the following facilities:

- 1) Computer clusters (Olimp, Asgard, NovaValhala, Xaos); total cca 2000 CPU cores
- 2) Central disc capacities of Department of Physics; 500TB + 300TB
- 3) Computer infrastructure of server room; network, virtual systems, 80kW UPS, central cooling systems
- 4) Systems of Laboratory for Experimental soft matter physics; optical and magnetic tweezers, microscopes, lasers, systems for cell surgery and manipulation
- 5) Systems of Laboratory for Quantum optical communications; tunable diode laser system, electronic control, optical tables,

Keywords: computer clusters, computer infrastructure, experimental soft matter, quantum optical communications



Picture: Computer clusters

Research and innovation infrastructure open to external users:

Major scientific equipment or sets of instruments

- 6) Systems of Laboratory for Experimental soft matter physics; optical and magnetic tweezers, microscopes, lasers, systems for cell surgery and manipulation
- 7) Systems of Laboratory for Quantum optical communications; tunable diode laser system, electronic control, optical tables,

Computing systems and communication networks

- 1) Computer clusters (Olimp, Asgard, NovaValhala, Xaos); total cca 2000 CPU cores
- 2) Central disc capacities of Department Physics; 500TB + 300TB
- 3) Computer infrastructure of server room; network, virtual systems, 80kW UPS, central cooling systems

UNIVERSITY OF LJUBLJANA, FACULTY OF MECHANICAL ENGINEERING

1. **Infrastructural Centre for Advances in Mechanical Engineering**

Head: Asst. Prof. Dr. Janko Slavic

Email address (if different from above): Janko.slavic@fs.uni-lj.si

Telephone number: +386 1 4771 226

Website: <https://www.fs.uni-lj.si/raziskovanje/ostalo-raziskovanje/infrastrukturni-center-in-oprema/infrastrukturni-center/>

Social media handles / links

Facility description:

The Infrastructure Centre for Advances in Mechanical Engineering with its various research equipment enables better quality of work, infrastructural support, cutting-edge knowledge and mutual cooperation between research groups within research institutions, Slovenian industry and broadly internationally in these areas: Sustainable energy, Green and safe mobility, Health, and Factories of the future.

Keywords: Tribological research, advanced material modelling, component-based development research, rapid thermal runaway detection, metallographic sample analysis, research on dynamic properties of pressure gauges, additive technologies and industry 4.0



Major research and innovation infrastructure open to external users:

Confocal nano-point profilometer

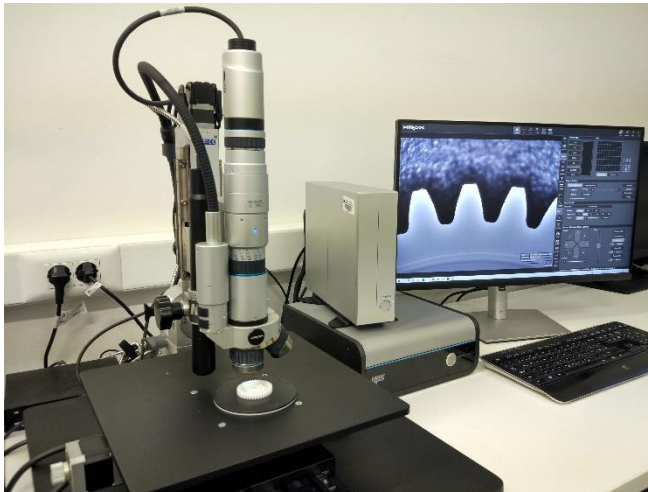


Figure 1: Confocal nano-point profilometer (Photo: TINT)

3-5 % of GDP in industrialised countries is consumed in industry and transport by excessive wear and tear, premature failure and replacement of components, machinery and whole plants, and the resulting unnecessary investment and maintenance. Understanding the mechanisms of deformation and wear and surface films at the nanoscale plays a key role. This type of tribological research is therefore carried out under laboratory conditions in model test benches, on real components or by analysing components in industry. A confocal nano-point profilometer with high-resolution 3D digital microscopy for submicron analysis of tribological surfaces on real components now

allows us to extend our scientific research to the field of machine elements and components, which is very important in the short term for the analysis of industrial applications and in the long term for scientific research to understand wear mechanisms on real components. We did not have the infrastructure in Slovenia to do this before. This has expanded the possible cooperation with a larger number of companies in Slovenia and the level of scientific research in the field of wear mechanisms.

Multiaxial static and dynamic test rig



Figure 2: Multiaxial static and dynamic test rig (Photo: IFP, d.o.o.)

Accurate experimental characterisation of the material as a function of external loads is crucial for the development of advanced material models. The acquisition of a new test rig allows for more complex multiaxial (tensile, compressive and torsional) loading of test subjects as a function of time. The test rig has an integrated electrodynamic actuator with linear (up to 1 m/s and ± 20 kN) and torsional actuators (up to 400 rpm and 140 Nm) that allow synchronous operation with loading frequencies up to 100 Hz. The test rig's advanced control system allows for standardised tests as well as any non-standardised measurement protocols required for research tasks. The ability to simultaneously control the test stand over force, moment, displacement, rotation and deflection during a single measurement is critical. Adequate real-time acquisition and processing of data during measurements must be ensured. The test rig will also be directly and actively involved in the areas of specialised structural capabilities where the group is actively involved in research on shape memory materials, polymers and composites.

Advanced fuel cell fabrication and testing system

The Advanced Fuel Cell Fabrication and Testing System is designed to systematically explore the development of components (fabrication and testing) of electrochemical energy converters (fuel cells, batteries and electrolyzers). These represent one of the EU's strategic priorities in implementing policies for the decarbonisation of society, the circular economy and sectoral convergence, as well as strengthening its leadership in renewable energy and innovative solutions at global level.

The fuel cell manufacturing and testing system consists of five components: A dynamic cold gas sputtering metal and metal coating system, a Real3D measurement system with clamped turntable, lenses and software for the Alicona InfiniteFocusSL 3D confocal microscope; fuel cell test stations with extended EIS (electro-impedance spectroscopy) capability; the fuel cell test bench with enhanced electro-impedance spectroscopy (EIS), the system to perform stable EIS measurements and the membrane electrode unit measurement device with surface segmented measurement system, which together represent enhanced knowledge and laboratory integration capabilities for the Faculty.



Figure 3: The four components of an advanced fuel cell manufacturing and testing system (Photo: IFP, d.o.o.)

High-speed thermal imaging camera

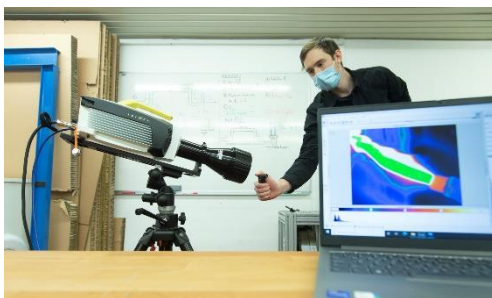


Figure 4: High-speed thermal imaging camera (Photo: IFP, d.o.o.)

The new research equipment includes a high-speed thermal imaging camera that can detect rapid thermal events. It differs from competing high-speed cameras in its excellent resolution, high acquisition speed and temperature sensitivity. Of particular importance are the extremely short integration time (less than 300ns), the fast storage of a large amount of data and the mobility of the device. With reduced resolution, the number of images per second can be significantly increased, which is crucial for monitoring dynamic and fast-moving phenomena. Due to the outstanding features of the camera, we can expect to

be more successful in addressing the problems of the Slovenian high-tech industry, with which we actively cooperate. We also plan to use the fast thermal imaging camera in the areas of cavitation, vibration damage, advanced laser technologies, microfluidics and manufacturing processes.

ZEISS Axioscope 5 metallurgical optical microscope with accessories



Figure 5: ZEISS Axioscope 5 metallurgical optical microscope with accessories (Photo: IFP, d.o.o.)

The Axioscope 5 metallurgical microscope is an optical microscope for the metallographic analysis of samples. The microscope takes images of the surface of a material to determine the metallographic properties of a particular microstructure, which determines the mechanical properties of the material such as hardness, strength and toughness. The new microscope is used to examine and characterise materials such as steel, cast iron, aluminium, magnesium, and others. The microscope can be used to study current areas of surface hardening such as impact hardening, laser

impact hardening, laser remelting, alloying and surface coating, extinction hardening... The microscope enables scientific research on a wide range of materials and samples using brightfield, darkfield and polarisation reflector modules. Software in the form of modules for image analysis, grain size analysis and multiphase analysis also provide high added value for research.

Pulse dynamic liquid pressure generator



Figure 6: Pulse dynamic liquid pressure generator (Photo: IFP, d.o.o.)

Dynamic pressure generators are a central component of systems for the experimental investigation of the dynamic properties of pressure gauges and other pressure devices. Their role is to determine the desired pressure change path to excite the device under test and, based on the analysis of the excitation and response signals, to further evaluate the time and frequency dynamic characteristics of the device under test. The increasing need for accurate monitoring of rapidly changing pressures in a wide range of industrial and scientific applications requires the use of pressure measurement devices with suitable dynamic characteristics. In the automotive industry, improved dynamic pressure measurements in combustion chambers and exhaust systems enable more economical fuel consumption and lower emissions. In many safety-critical applications, such as vehicle crash testing, explosion protection and dynamic mechanical testing of materials, improved dynamic pressure measurements can reduce current safety margins, ensuring user safety in a cost-effective manner.

Advanced robotic 3D metal printer and robotic winding system



Figure 7: Advanced robotic 3D metal printer and robotic winding system (Photo: IFP, d.o.o.)

Additive technologies and Industry 4.0 are a very current topic both in the world and in Slovenia. Additive technologies enable the manufacturing of products on a local level, i.e. in companies, regions, countries,... One example is the manufacturing of products in space or on the international space station. This is crucial when it comes to sending and storing spare parts in space, as this can save lives and makes the flight into space cheaper and more environmentally friendly. The benefits of additive technologies are also seen in the potential to

optimise product manufacturing and critical raw material and energy consumption, which also has a positive impact on human health and environmental protection. All the equipment enables research in additive manufacturing of large and tall products, research and development in winding, analysis of material properties, research in process control and monitoring, and distributed control of advanced manufacturing systems, which did not previously exist in Slovenia. The equipment consists of a welding power source for TIG welding, which has been upgraded to a plasma welding system. The system enables the addition of cold or hot wire and thus has a significant influence on the degree of material mixing. The robotic system is used for research and development of welding or 3D printing of various metallic materials as well as to produce multi-material products and products with functionally distributed properties.

UNIVERSITY OF LJUBLJANA, FACULTY OF MEDICINE

1. **Centre for Functional Genomics and Bio-Chips (CFGBC)**

Head: prof. dr. Damjana Rozman, Assist. Prof. Tadeja Rezen

Email address (if different from above): cfgbc@mf.uni-lj.si

Telephone number: +386-1-543-7590

Website : <http://cfgbc.mf.uni-lj.si/about-us/>

Social media handles / links:

Facility description:

The Centre for Functional Genomics and Bio-Chips (CFGBC) is a national platform that integrates the infrastructure for high-performance transcriptome and genome investigations.

The Centre provides equipment, consultations and implementation of:

- transcriptome, genome and proteome analyses using microarrays, from vendors Affymetrix/Clariom, Agilent and any other glass slide arrays;
 - targeted next-generation sequencing (NGS) on Illumina;
 - statistical and bioinformatical analyses, including experimental design;
 - RNA/DNA isolation and analysis from any tissue or sample type;
 - sample preparation for genome/transcriptome analyses;
 - studies in circadian rhythm in humans and cell lines;
- sterol metabolites on LC-MS/MS on any type of sample.

Keywords: transcriptome, genome, RNA, DNA, microarrays, NGS, circadian rhythm, targeted metabolomics

2. **Carl Zeiss Reference Centre for Confocal Microscopy**

Head: Prof. Dr. Robert Zorec

Email address (if different from above): neuroendo@mf.uni-lj.si

Telephone number: +386 1 543 70 80

Website: <http://lnmcp.mf.uni-lj.si/Neuroendo/Confocal.html>

Social media handles / links

Facility description:

IC offers quantitative advanced microscopy imaging services for which the customers receive calibration certificates for the twodimensional measuring image system. IC also offers the international support for interlaboratory quality/validation of laser scanning confocal microscopes for external users, which is based on a special certified sample and an algorithm to perform the measurements which are then compared with those from the international lab database. Each lab receives a feedback on their results of how their results compare with the ones from the database. This is an important service for the laboratories providing their R&D services to credible industrial partners.

Keywords: exocytosis, cell physiology, astrocytes, neuroglia, pituitary cells, cancer cells, second messengers, cyclic AMP, calcium, cytosolic glucose, cytosolic lactate, cancer, neurodegeneration, neurodevelopment, subcellular traffic.

3. **Centre for bibliometrics, knowledge discovery and scientific communication**

Head: Assist. Prof. Dr. Brane Leskosek

Email address: ibmi@mf.uni-lj.si

Telephone number: +386 1 543-77-70

Website: <https://ibmi.mf.uni-lj.si/en>, <https://ibmi.mf.uni-lj.si/sl/storitve/ic-za-bibliometrijo> (Slovene)

Facility description:

IC provides national data management, bioinformatics analysis and biostatistics services for life sciences research groups. Services include the development and management of clinical (research) registries. In the field of infrastructure, we work closely with the Centre ELIXIR-SI group and its research infrastructure. Special mention should be made here of cooperation in the acquisition and analysis of data related to COVID-19. The research infrastructure includes servers and databases accessible directly or via web interfaces.

Keywords: data management, medical informatics, bioinformatics, biostatistics

4. **Infrastructure Centre for Research of Biosafety Level 3 Pathogenic Microorganisms**

Head: Prof. Dr. Tatjana Avsic Zupanc/ doc. dr. Misa Korva

Email address (if different from above): tatjana.avsic@mf.uni-lj.si / misa.korva@mf.uni-lj.si

Telephone number: +386 1 543 74 50

Website: <https://imi.si/project/infrastrukturni-center-za-raziskave-patogenih-mikroorganizmov-3-stopnje-bioloske-varnosti/>

Social media handles / links

Facility description:

IC BSL -3+ is an integrative high-tech solution for research and development activities involving high-risk pathogens classified as biosafety level 3. It supports interdisciplinary scientific research projects in the field of highly pathogenic agents that pose a threat to humans, animals or the environment. We support isolation of pathogens from diverse samples, multidisciplinary research on immunopathogenesis, antimicrobial resistance, host-pathogen interaction, development of new diagnostic methods, and testing of novel therapeutic and preventive measures. Epidemiological and epizootic research and surveillance, critical to the development of predictive maps, are also an important focus of the infrastructure.

Keywords: high-risk pathogens; BSL-3; biosafety; microorganisms; infectivity; virus; pathogenesis; biobank; host-pathogen interactions

5. **Biomedical Centre for Microscopy**

Head: Prof. Dr. Peter Vranic; Co-leader: Prof. Dr. Robert Frangez

Email address: peter.vranic@mf.uni-lj.si

Telephone number: +386 1 543 7680

Website: <http://www.mf.uni-lj.si/cem> Spletna stran je v prenovi in bo vključena na novo stran Inštituta za biologijo celice oziroma mesto kjer bodo na fakultetni strani vsi MRICi MF. (rok izvedbe 30.9.2022) in https://www.mf.uni-lj.si/application/files/4015/7622/6294/Biomedicinski_center_za_mikroskopijo.pdf

Social media handles / links

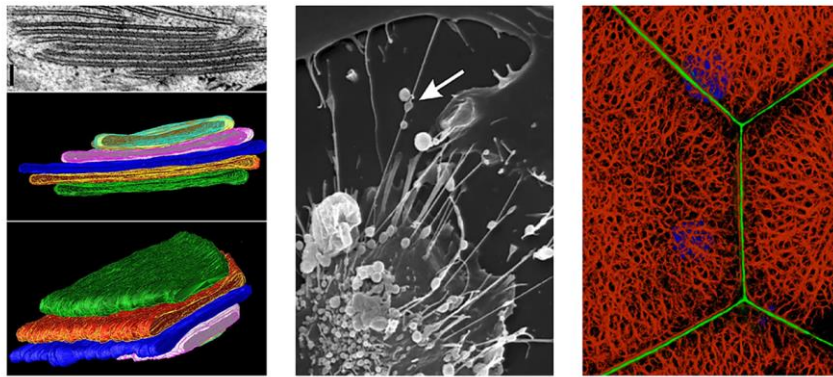
Facility description:

The main equipment of the Biomedical Center for Microscopy consists of transmission and scanning electron microscopes together with laboratories for the implementation of the latest methods of immune-labeling of cell molecules, of negative contrast, cryomethods, correlative microscopy, FRIL method and electron tomography. Classical light and fluorescence microscopy are indispensable methods in every molecular cell biology research work and are often necessary in diagnostics. Their upgrade is confocal microscopy and TIRF microscopy, which enable optical sectioning of fluorescently labeled samples and quantitative analysis in biophysics and cell biology.

Additionally there is the possibility of optical manipulation of cells with optical tweezers and treatment in microfluidic systems.

Keywords: Transmission electron microscopy, Scanning electron microscopy, Immunolabeling for electron microscopy, Freeze-fracture replica immunolabeling FRIL, Immunofluorescence microscopy (confocal microscopy, TIRF), Microscopy of living cells, Correlative microscopy, Growing cells in cell cultures, Microfluidics, Fabrication of nanoparticles

Biomedical Center of Microscopy



6. Infrastructural Centre for Experimental Dental Medicine

Head: Assoc. Prof. Dr. Boris Gaspirc

Email address: boris.gaspirc@mf.uni-lj.si

Telephone number: +386 1 522 4262

Website: /

Facility description:

The IC for Experimental Dental Medicine comprises research on four separate dental fields: maxillofacial surgery, periodontology, dental and maxillofacial orthopedics, and dental prosthetics. The Centre provides equipment, consultations and implementation of: A database on three-dimensional characteristics of the Slovenian face by gender and age, data of facial changes after surgical changes of facial bones. Analysis of the volumetric accuracy and physical, mechanical and microstructural properties of metal and polymer prosthetic objects. Study new treatment modalities for periodontal disease and connections of periodontitis with systemic health. Diagnose, evaluate and study morphological and functional abnormalities of the orofacial area.

Keywords: 3D face analysis, prosthetic structures, periodontitis, lasers, malocclusion

7. Centre of Imaging and Spectroscopy based on Magnetic Resonance

Head: Prof. Dr. Dusan Suput

Email address: dusan.suput@mf.uni-lj.si

Telephone number: 01 543 78 24

Website : <https://www.mf.uni-lj.si/ckf>

English website is in the making.

Facility description:

Centre for MR imaging and spectroscopy offers a 3T Philips Achieva 3TX system upgraded with dStream technology so that the digitalization occurs in the coils, further increasing the signal-to-noise ratio. All available software for acquisition is present, and the group has expertise in MRI and MRS data analysis. The primary research focuses on nervous system imaging and spectroscopy, functional imaging, DTI/DKI, SWI, QSM and many others. In addition, 32 channel head coil is used for neuroimaging, and several coils enabling cardiac, musculoskeletal and genito-urinary systems are also available.

Keywords: MRI, MRS, DKI, DTI, fMRI, QSM (if not applicable: magnetic resonance, imaging, spectroscopy, diffusion, tractography, function)

8. Centre ELIXIR-SI

Head: Assist. Prof. Dr. Brane Leskosek

Email address: elixir@mf.uni-lj.si

Telephone number: +386 1 543-77-70

Website: <https://elixir-slovenia.org/>

Social media handles / links: https://twitter.com/elixir_si (Twitter),

https://instagram.com/elixir_slovenia (Instagram)

Facility description:

ELIXIR Slovenia is a national hub of the European research infrastructure for life science information ELIXIR, coordinated by University of Ljubljana. Infrastructure of Centre ELIXIR-SI consists of (1) data science / dry lab serving as a national life sciences data node for long-term data management, archiving, analysis, integration, interoperability, stewardship and includes high-performance computing (HPC) cluster with CPU and GPU nodes, (2) wet lab with single cell analysis and central NGS laboratories, and (3) training centre with the e-learning platform (<https://elixir.mf.uni-lj.si>) providing training in various life sciences topics. Overall, ELIXIR-SI plays a crucial role in advancing research in life sciences and provides state-of-the-art infrastructure and training to researchers in the field.

Keywords: ELIXIR Slovenia, life science information, data management, data analysis, bioinformatics, high-performance computing (HPC) cluster, e-learning platform, wet lab infrastructure, single-cell analysis, NGS laboratory



Figure : ELIXIR-SI infrastructure: A) dry lab in Ljubljana, B) dry lab in Maribor, C) wet lab in Maribor, D) wet lab in Ljubljana

9. Slovenian Multimodal Bioimaging Node - SiMBioN

Head: Prof. Dr. Peter Veranic

Email address: simbion@mf.uni-lj.si

Telephone number: 01 543 78 00

Website: <https://simbion.mf.uni-lj.si/en/home-2/>

Facility description:

The SiMBioN is the Slovenian node of the European research infrastructure centers Euro-BioImaging and it is composed of infrastructure centres and research teams dealing with imaging analysis of biological samples. The consortium's main mission is to provide access to state-of-the-art biological, biochemical and medical imaging technology to users in Slovenia and elsewhere coming from both research institutes and industry, and to human and veterinary medicine departments.

Keywords: High resolution confocal microscopy, Transmission electron microscopy, Scanning electron microscopy, FIB SEM, PIXE, laser ablation LA-ICP-MS , NMR

UNIVERSITY OF LJUBLJANA, FACULTY OF NATURAL SCIENCES AND ENGINEERING

1. **Research Infrastructural Centre of the Faculty of Natural Sciences and Engineering (RIC UL-NTF)**

Head: Dr. Barbara Golja

Email address (if different from above): barbara.golja@ntf.uni-lj.si

Telephone number: +386 1 200 32 30

Website: <https://www.ntf.uni-lj.si/ntf/en/research/ric-ul-ntf/>

Social media handles / links

Social media links of the faculty (Faculty of Natural Sciences and Engineering):

- Facebook: <https://www.facebook.com/ulntf/>
- Instagram: <https://www.instagram.com/ulntf/>

RIC UL-NTF alone does not have social media links.

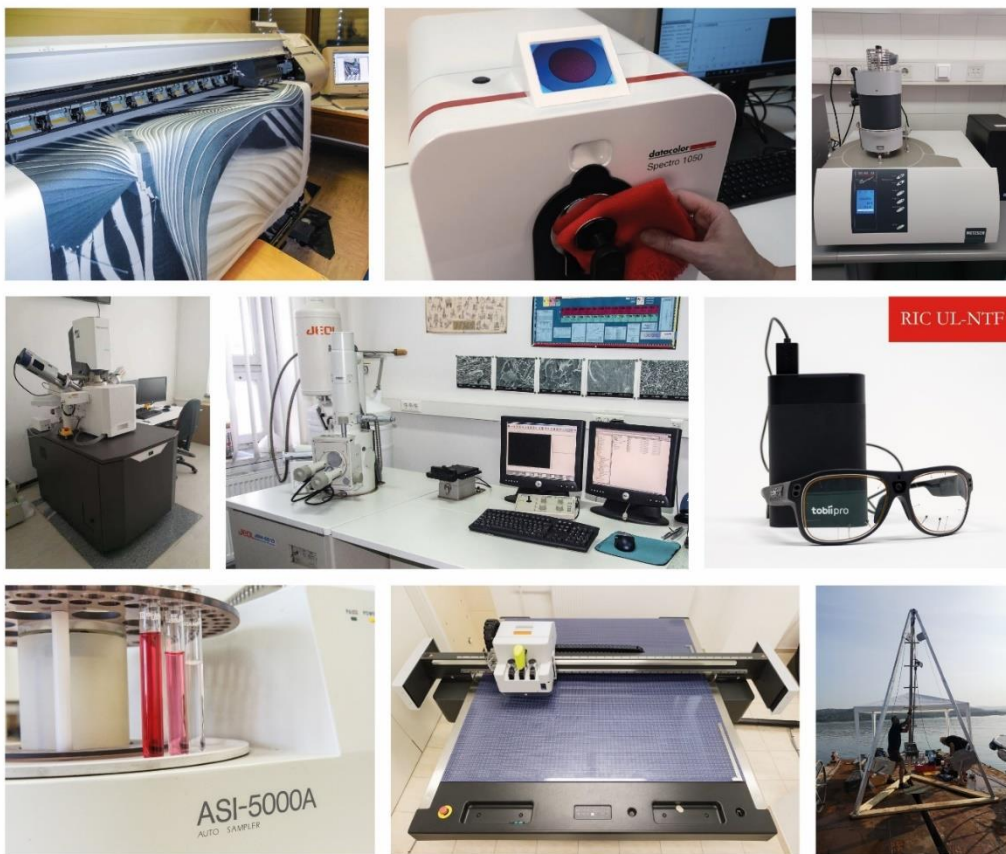
Facility description:

RIC UL-NTF supports scientific research, teaching and professional work in areas of production, functionalization and characterization of organic and inorganic materials, with an emphasis on fiber forming and other polymeric, metallic, non-metallic and composite materials, metallurgy, textile and graphic production technologies, geotechnology, mining and geoengineering, geology and environmental protection. The equipment enables numerical modeling and design of ecofriendly materials, products, processes and technologies. It allows the simulation of physical processes.

RIC UL-NTF combines all the great equipment of the Faculty of Natural Sciences and Engineering, known by its high quality in terms of performance accuracy, ongoing maintenance and high professionalism of staff.

Keywords:

RIC UL-NTF, Infrastructural centre, scientific research, teaching, professional work, organic and inorganic materials, fiber forming technologies, polymeric production technologies, functionalization of materials, characterization of materials, high quality research equipment of UL NTF, processing and analytical equipment, infrastructural support



Major research and innovation equipment open to external users at Faculty of Natural Sciences and Engineering:

- Scanning electron microscope FEG-SEM Thermofischer Scientific Quattro S (Thermofischer Scientific, USA)**
 FEG SEM is equipped for imaging with secondary electrons (SEI), backscatter electrons (BEI) and transmission electrons (STEM). It also possesses detector for (micro)chemical analysis (EDXS), cooling stage (to -60 °C) and heating stage (to 1000 °C) for in situ dynamic testing
- UV-VIS spectrophotometer Lambda 850+ (Perkin Elmer, Great Britain)**
 The Lambda 850 UV / Vis spectrometer is a high-performance system for measurements in the UV and visual range of spectra, from 190 – 900 nm with a resolution of 0,05 nm – 5 nm. It is immediately usable for transmission, absorption and kinetic measurements and has a built-in reflection module – 150 mm integration sphere. The sphere is coated with Spectralon high-reflectivity material and has an 8 ° reflective door for sample and reference. It also has a transmission door at an angle of 0 ° and a removable light layer at an angle of 8 °
- Scanning electron microscope with EDS, JSM 5610 (Jeol, Japan)**
 SEM JEOL-5610 is intended for the surface analysis of solids in vacuo 10⁻⁵ to 10⁻⁶ mbar. It is equipped with an energy dispersive X-ray spectrometer that allows for a qualitative and quantitative chemical microanalysis, a sensor for back scattered electrons (enable phase analysis) and a sensor for secondary electrons (indicates a relief surface and thereby detects

the microstructure of the analysed material). It is used in the development and testing of materials, supporting technologies, analysis of injuries and forensic research.

- **Scanning electron microscope (SEM) JSM-6060 LV (Jeol, Japan)**

The instrument is designed for surface, morphology, and topography studies as well as for determination of particle size. SEM image is made by secondary electrons, which are bit out of the sample by the primary beam that is scanning the surface point by point. Non-conductive materials are to be preliminarily coated with gold, which prevents static charge on the surface. It includes electrical gun, magnification unit, image generator, condensation and objective lenses, electron collector and vacuum system. Samples of great value can be observed without coating in a low vacuum mode.

- **Tensile testing machine - Instron 5567 (Instron, USA)**

The tensile testing machine enables the measurements of tensile properties of different materials (textiles, paper, board, polymeric materials). Measurements can be analyzed with a computer program BlueHill, which is designed for such measurements and enables us indirect insight into inner changes and occurrences in material structures because of tensile testing. With this program, it is also possible to interpret measured results later. Besides tensile tests, it is possible to perform tests of compression, bending, etc. The machine includes a climate chamber with temperature range between 20°C and 80°C and relative humidity between 30 % and 80 % and a chamber with a temperature range between -70 °C and +250°C.

- **DMA Q800 Dynamic Mechanical Analyzer (TA Instruments, USA)**

The dynamic mechanical analyser or DMA has equipment that mechanically causes deformation of the sample made of various materials and measures its response. The so caused deformation may be sinusoid, constant, graduated or with constant speed. Twenty different parameters as measurements of responses can be monitored as a function of temperature and time. The DMA experimental technique provides measurements of mechanical viscoelastic properties of various materials. Many materials including fibres and other polymers respond as elastic solid matters and viscous liquids and that is why they have viscoelastic properties. Practical examples: measurements of Tg and secondary transitions, effect on frequency of modulus and Tg, effect of fillings, additives and adhesives, influence of technological processes, stabilities of dimensions, creep, relaxation tension, thermal mechanics, prediction of material response in a wide frequency range and time.

- **Simultaneous thermal analysis, STA 449 Jupiter (Netzsch, Germany)**

Simultaneous thermal analysis (STA) is a method of thermal analysis that makes it possible to investigate a variety of samples by two or three thermal-analytical methods. Usually those are thermogravimetry (TG), differential thermal analysis (DTA) and differential scanning calorimetry (DSC). Simultaneously, the investigation can be done on processes based on energy difference (absorbing and relaxing heat under reaction) and investigation of mass change (oxidation, degradation, etc.). STA measurement is a complex measurement that is recommended for determining the physical – chemical properties of materials, especially new ones. Simultaneously, the modelling of technological processes can be done. STA analysis makes it possible to determine characteristic temperatures (melting point, boiling point, allotropic modifications, etc.), thermal effect (melting / solidification enthalpy, combustion heat, etc.), specific heat Cp, loss or increment of mass, etc.

- **Xenotest Alpha (Atlas, ZDA)**

The Xenotest Alpha is an instrument for finding out the effect of light and other weather conditions on the material. The samples are exposed to exact conditions (temperature, relative

humidity, illumination, with or without rain). With such accelerated simulation of these parameters, the properties of the material after a longer period of time can be predicted. With the use of different filters, exposure to direct sunlight, behind window glass or behind car glass can be simulated. These test methods can be driven according to international standards used for textiles, papers, and plastics

- **Simulator of thermomechanical metallurgical states GLEEBLE 1500D**
Simulator of thermomechanical metallurgical states enables the following investigations of materials: tensile test, compression test, flow curves, activation energy, microstructure development during hot forming, high temperature fatigue testing, solidification simulation, welding simulation, heat treatment, multistage forming test, wear testing.
- **Vacuum induction casting furnace**
All processes including preparation, melting, purring, and cooling are made in a vacuum or in a controlled atmosphere.
- **Compact Vacuum Arc Melting System SP-MSM208 (MTI Corporation, USA)**
The arc melting system is designed for melting up to 10 g of metallic materials with a melting point up to tungsten (above 3000 °C) under a tiny positive or low vacuum atmosphere (usually Ar). In addition, the system is equipped with a copper mould for vacuum suction casting of rods with a diameter of 6 mm.
- **Microscope Nikon Eclipse (Nikon)**
Polarizing microscope for optic microscopy and determining the optical properties of minerals in transmissive and reflective light.
- **Cutting machine Wohlenberg 76 (Wohlenberg, Germany)**
The Wohlenberg 76 is a professional cutting machine for cutting paper, boards and other sheet materials both in stacks and single units. The cutting width is 760 mm, and the maximum possible feed is 110 mm.
- **Thermal Constant Analyser Instrument Hot Disk TPS 2200**
Determining calorific values of metal materials, polymers, ceramics, composites, thin layers, fluids, with high precision of measurements and repeatability of results in the temperature range -50 °C to +750 °C.
- **Laboratory drying, condensation and fixation apparatus Type KTF-500 (Mathis, Switzerland)**
Laboratory apparatus KTF-500 is intended for drying, condensation and fixation of different materials. It can be used independently, or it can be included into continuous line with 2-roll foulard, on which the most modern padding procedures of finishing of textiles are implemented. The apparatus also includes the coating device intended for one sided coating of the paper or flat textiles and for printing of paper (head and flexo printing).
- **ANALYSETTE 22 NanoTec (FRITSCH) laser particle and image (DIA) sizer (FRITSCH, Germany)**
Particle size determination (suspension and dry particles):
wet particle size determination-use of different liquids (0.01 – 2100 µm)
dry particle size determination (0.1 – 2100 µm)
particle image analysis
- **Spectrophotometer Datacolor Spectro 1050 (Datacolor, USA)**

Datacolor Spectro 1050 table spectrophotometer enables quality control of various colored samples in the field of textiles, plastics, paints, coatings, etc. In addition to measuring the reflection and transmission in the visible range of the spectrum (360-700 nm in 10 nm increments), it also allows measuring of the temperature with an accuracy of ± 0.5 ° C. The instrument is equipped with an integration sphere with a diameter of 152 mm, which provides a standard lighting geometry d / 8. The light source is a flashing xenon lamp, which with appropriate filters allows illumination with standard light D65 and UV-cut filters at 400, 420 and 460 nm. By selecting the appropriate measuring aperture, the instrument allows measurements of larger (LAV, 2r = 26 mm), smaller (SAV, 2r = 5 mm) and very small (USAV, 2r = 2.5 mm) colored areas. The repeatability of the instrument is 0,01 ΔE CIELAB (for the white standard) and the accuracy is within 0,15 ΔE CIELAB.

- **Portable handheld X-ray fluorescence (XRF) analyser NITON (Thermo Fischer Scientific, USA)**

Geochemical elemental analyses of different samples:

- analyses of major and minor elements in sedimentary, igneous and metamorphic rocks
- analyses of heavy metals in soils
- analyses of alloys
- analyses of precious metals (gold and silver purity)
- analyses of toxic elements in food and plastic
- field analyses (monitoring)

- **T-RDI Stream Pro Flow meter**

The equipment is intended for measuring flows in watercourses.

- **LIMBO high temperature and high-pressure reactor (Buchiglasuster, Švica)**

The high-pressure reactor (autoclave) is designed for a variety of chemical reactions where high pressure (up to 300 bar) and temperature (up to 350 ° C) are required. It is suitable for the synthesis and modification of polymers, composites, and other organic and inorganic structures.

- **FT-IR spectrometer Spectrum 3 (Perkin Elmer, Great Britain)**

Infrared spectroscopy is a non-destructive analytical technique that enables us to identify the chemical and partially the physical structure of substances (identification of functional groups in molecules). With the FT-IR spectrometer, qualitative and to some extent quantitative analyses of unknown materials can be made; various modifications made by treatments can be monitored. It is appropriate for analysis of mainly organic materials, such as liquids, solutions, pastes, powders, thin films, coatings, fibres, papers, prints, colours, etc... It enables use of ATR and transmission methods of IR scanning in a range of 7800–350 cm⁻¹. Operation of the apparatus is controlled through Spectrum software.

- **Differential scanning calorimetry DSC 404 F3 Pegasus® (Netzsch, Germany)**

The device enables measurements with differential scanning calorimetry, which is used to determine the thermodynamic properties of materials (metals, ceramics, etc.), such as: characteristic temperatures, enthalpies, specific heat, etc. This is the latest instrument from the above-mentioned manufacturer, namely the DSC 404 F3 Pegasus®, a high-temperature differential scanning calorimeter designed to accurately determine the specific heat of high-performance materials at high temperatures. It allows several different types of furnaces (silver, copper, steel, platinum, SiC, rhodium and graphite), on which the temperature range of the investigation (-150–2000 °C) also depends. We currently have a steel furnace that allows

measurement temperatures from -100 °C to 1000 °C. As you can see from the temperature ranges, the instrument allows cooling with liquid nitrogen using the cooling system CC 300.

- **Differential scanning calorimetry DSC 204 F1 Phoenix® (Netzsch, Germany)**
The instrument enables measurements with differential scanning calorimetry, which is used to determine the thermodynamic properties of materials (metals, ceramics, etc.), such as: characteristic temperatures, enthalpies, specific heat, etc. The DSC 204 F1 Phoenix® has a unique concept in which all essential operating components are integrated into the device itself. The calorimeter is used in the temperature range from -180 °C to 700 °C. As can be seen from the temperature ranges, the instrument can be cooled with liquid nitrogen, using the cooling system CC 300.
- **PISTON CORER core catcher for hard sediment (UWITEC, Austria)**
Sampling of unconsolidated lake and sea sediments up to a depth of 140 m. Sampling with a piston core is performed from a raft. PVC pipes 2 m long and 9 cm in diameter are used for sampling, which allows to capture a core up to 2 m long with one maneuver.
- **TOBII X120 - Flexible eye tracking (Tobii Technology AB, Sweden)**
Tobii X120 Eye Trackers is stand-alone eye tracking unit designed for eye tracking studies of real-world flat surfaces or scenes such as physical objects, projections and video screens. Tobii X120 enable studies requiring specific stimuli setups, such as studies of shopping shelves, typography, webpages, newspapers, or television.
- **TOBII Pro Glasses 3 - Eye tracking glasses (Tobii Technology AB, Sweden)**
Tobii Pro Glasses 3 are designed for eye-tracking studies of real-time world or scenes such as physical objects, projections, and video screens. The glasses Tobii Pro Glasses 3 enable studies which require specific stimuli setups, such as studies of traffic movement, sportspeople, product sales (shop shelves), typography, webpages, printed materials and packaging, or television, mobile devices, and phones.
- **Elotest M2 V3 (Rohmann GmbH, Germany)**
NDT eddy current discovers changes in materials such as: cracks, lunkers and other errors
- **Calorimeter 200C (IKA, Germany)**
Determining gross calorific values of solid and liquid samples.
- **Georadar Proex system KIT optical (Mala, Sweden)**
This type of ground penetrating radar is designed to measure the geological structures in the dry and low conductive rocks, low conductive water, ice, etc.. Depth depends on the type of antenna; the current setup can reach depths of up to 50 meters.
- **Light microscope Zeiss, Axio Imager A1m**
Light microscope enables observation of microstructure of properly prepared materialographic samples of different materials. Microscope enables imaging of samples using different examination modes like bright field, dark filed, differential interference contrast and polarized light. Light microscope is equipped with digital camera AxioCam ICc 3 (3,3 million pixels) and AxioVision software for image analysis (grain size, phase fractions etc.).
- **Computer program Thermo-calc software**
Thermo – calc software is meaning for calculation of phase diagrams and thermodynamic properties with different data bases for all different metal materials and alloys.

UNIVERSITY OF LJUBLJANA, VETERINARY FACULTY

1. Exsperimental Center for domestic and laboratory animals

Head: Assoc. Prof. Dr. Marina Stukelj

Email address: marina.strukelj@vf.uni-lj.si

Telephone number: +386 (0)1 47 79 206

Website: <https://www.vf.uni-lj.si/en/area/csr-vremscica>

Social media handles / links

Facility description:

The Center carries out physiological, pharmacological, toxicological, toxinological and other research on animals or organs in order to define the effects and mechanisms of action of biologically active substances. The Center is crucial for practical training for EU functions A-D and is therefore extremely important for the smooth conduct of research with laboratory animals throughout the Republic of Slovenia. This is also a Demonstration centre for the coexistence of domestic and wild animals. The Center also carries out activities in the field of recultivation of abandoned karst areas using sustainable technologies. It is also known for its organic production of sheep's milk and cheese. Part of the center is located at the south-west of Slovenia, in the Karst area, near the village of Divaca on the Vremscica plateau. The centre acts as a research and learning centre and a visitor centre and also represents a learning facility for students of veterinary medicine and biotechnology.

Keywords: Karst area, recultivation, meadows and pastures, autochthonous and traditional animal breeds, learning center, demonstration center, preservation of nature, experimental animals, research projects



Major scientific equipment or sets of instruments at Veterinary Faculty

Covaris M220 Focused-ultrasonicator

Computet tomography SIEMENS SOMATOM SCOPE

System for mikrofluide analyses LABCHIP GX TOUCH, 24

CLEARVUE 100-240V (Thermo Scientific)

Mass spectrometric detector with gas chromatograph Agilent 7010B TQ MS

TriStar² LB 942 Multimode Microplate Reader

MILKOSCANTM 7 RM

Automated biochemical analyse RX Daytona+

HPLC system with UV/VIS and fluorescence detector Pomnoževalnik QuantStudio 5 Real-Time PCR System

More info available at: <https://www.vf.uni-lj.si/en/podrocje/raziskovalna-oprema>

Collections, archives or scientific data

[In situ Gen bank](#)

Any other research and innovation infrastructure of a unique nature which is open to external users

[Facilities for laboratory animals \(Laboratory of genomics, Institute of Preclinical Sciences\)\)](#)

UNIVERSITY OF LJUBLJANA / FACULTY OF COMPUTER AND INFORMATION SCIENCE

1. Virtualization Infrastructure for Research Applications

Contact: Dr. Gasper Fele Zorz

Email address: gasper.felezorz@fri.uni-lj.si

Telephone number: +386 1 479 82 11

Website: <https://www.fri.uni-lj.si/en>

Social media handles: <https://www.facebook.com/ulfri>

Facility description:

The computing department at UL FRI offers virtual-machine (VM) hosting and support to our laboratories and external partners. Our cluster runs on 13 blades with a total of 376 cores, over 3.5TB of RAM, and over 160TB of disk space

Keywords: [virtualization](#), [virtual machine](#), [web server](#), [computing infrastructure](#)



Major scientific equipment or sets of instruments

[NVIDIA DGX A100 - World's Fastest Deep-Learning GPUs for Artificial Intelligence and Machine Learning Research](#)

Contact: [Dr. Iztok Lebar Bajec](#)

Email address: ilb@fri.uni-lj.si

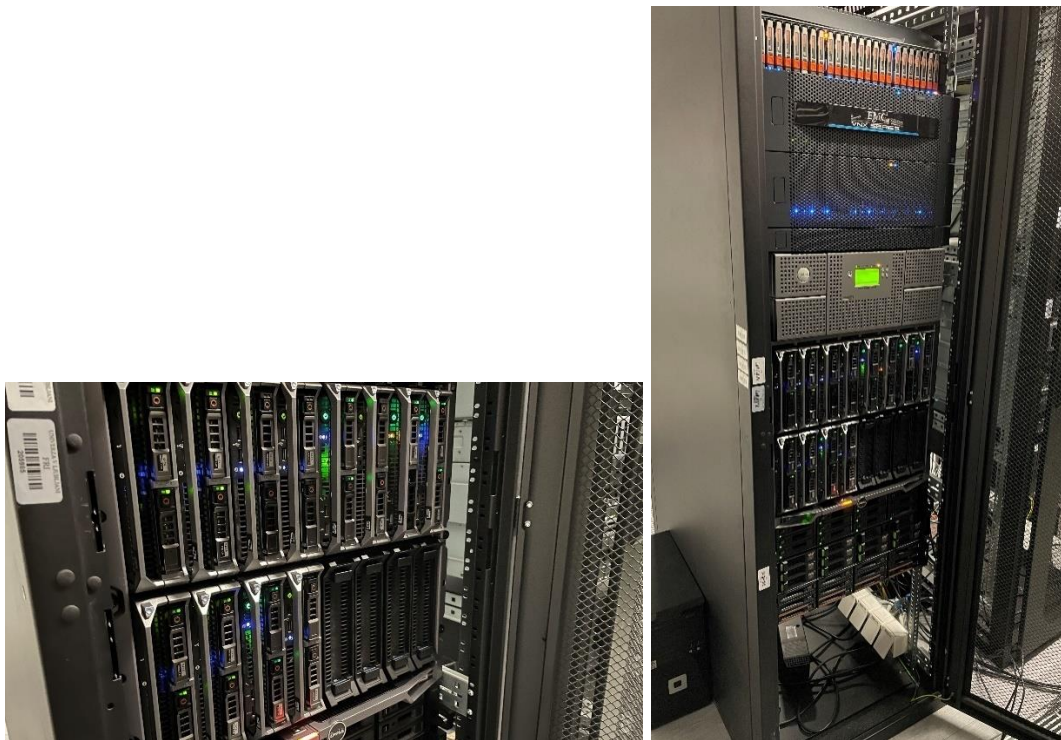
Telephone number: +386 1 479 82 17

Website: <https://www.fri.uni-lj.si/en/about-faculty/employees/iztok-lebar-bajec>

Facility description (maximum 750 characters including spaces):

The Nvidia A100 is a universal system for AI workloads, featuring 8 NVIDIA A100 Tensor Core GPUs with 320GB of GPU memory total, 2 AMD Rome processors with 128 cores total, 2TB of RAM, and 30TB of fast NVMe storage. Our institution has it integrated into a SLURM cluster that is mostly dedicated to running deep neural network machine learning jobs (spanning from computer vision to speech and natural language recognition tasks).

Keywords (15 maximum): deep learning, artificial intelligence, computing infrastructure, GPU, HPC, machine learning, computer vision, speech processing, natural language processing



UNIVERSITY OF LJUBLJANA / FACULTY OF COMPUTER AND INFORMATION
SCIENCE/ FACULTY OF SOCIAL SCIENCES/ FACULTY OF ARTS/ FACULTY OF
ELECTRICAL ENGINEERING/FACULTY OF EDUCATION / FACULTY OF PUBLIC
ADMINISTRATION

2. Centre for Language Resources and Technologies at the University of Ljubljana

Head: Dr. Simon Krek (simon.krek@cjvt.si)

Email address: info@cjvt.si

Telephone number: +386 1 479 82 99

Website: <https://www.cjvt.si/en/>

Social media handles:

<https://www.facebook.com/centerzajezikovnevineintehnologije>

<https://twitter.com/CJVTUL>

Facility description:

CJVT UL focuses on scientific research and the development and maintenance of key digital language resources and language technology applications for contemporary Slovene. The developed resources and applications have practical value and are accessible to all the Slovene language users around the world. CJVT's infrastructure offers researchers various services: language resources and tools for Slovene, online platforms (crowdsourcing, gamification), and website hosting for research projects and programmes in linguistics.

Keywords: [language technologies](#), [terminology](#), [multilingualism](#), [dictionaries](#) and [lexicons](#), [text corpora](#), [natural language processing](#), [lexicography](#)

