



Univerza v Mariboru

Fakulteta za gradbeništvo,
prometno inženirstvo in arhitekturo

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The Senate of the University of Maribor has on its 14th regular session on 24 November 2020 adopted a decision No. 030/2020/78/515-MP confirming the Open Access Policy for Research Infrastructure at the University of Maribor.

Open Access Policy for Research Infrastructure at the University of Maribor

1. Definition

Research infrastructure¹ of the Faculty of Civil Engineering, Transportation Engineering and Architecture, University of Maribor (hereinafter referred to as RI UM FGPA) denotes the whole of multi-purpose and multi-dimensional facilities, laboratory environments, research equipment, complex digital research systems and databases used for research purposes as well as dedicated research groups. RI UM FGPA is a prerequisite for research work and, at the same time, essential for achieving both excellence in research as well as wider social development.

RI UM FGPA may comprise fundamental RI (buildings, equipment, etc.) and RI for knowledge transfer (researchers, laboratories, databases, etc.). RI UM FGPA is organized across various entity members (research groups and institutes). In certain cases, it can also be defined as a virtual infrastructure or a virtual research environment, where the service is provided electronically. The list of equipment of RI UM FGPA is in Appendix 1. The list is updated continuously.

Research entities at UM FGPA:

- Research group for structural mechanics
Leader: Matjaž Skrinar
- Research group for applied natural sciences
Leader: Dean Korošak
- Research group for materials
Leader: Samo Lubej
- Research group for organization, technology, and economics of construction
Leader: Andrej Štrukelj
- Institute of geotechnics
Leader: Bojan Žlender
- Research group for structural analysis
Leader: Miroslav Premrov
- Center for construction informatics
Leader: Nenad Čuš Babič
- Research group for architecture and spatial planning
Leader: Peter Šenk

¹ According to the definition of the European Strategy Forum for Research Infrastructures (ESFRI), research infrastructures (RI) are facilities, resources or services that represent larger equipment or set of instruments and represent or complement knowledge sources such as collections, archives and databases. Examples of RI according to the ESFRI definition: large research installations, collections, libraries, databases, biological archives and collections, high-performance or broadband communication networks, research vessels, telescopes, satellite and aircraft observation capacities, high performance computing networks (HPC), clean rooms, coastal observation stations, synchrotrons and accelerators, etc.

- Research group for hydraulic engineering
Leader: Renata Jecl
- Research group for mathematics
Leader: Borut Zalar
- Research group for transportation
Leader: Tomaž Tollazzi

RI UM FGPA is managed by UM as the legal entity.

2. Users

RI UM FGPA is publicly accessible to researchers, research groups or research organizations within the framework of UM research activities (employees, including researchers of different stages, postdoctoral researchers, technicians and Doctors of Philosophy) and research activities outside UM (external users, such as researchers of various research organizations, commercial or other). Within the framework of research, users are involved in designing or creating new knowledge, products, processes, methods and systems.

The RI UM FGPA may require from external users that they demonstrate they have the knowledge and skills required to use the RI. Where external the user does not have the required knowledge and skills for professional operation of the equipment, the entity can provide complete service by employing its internal staff. The entity may also offer and provide training for new external users. The cost of such training is borne by the external user.

Users need to abide by relevant principles, strategies, directives and other regulatory UM FGPA documents in their collaboration or when using RI UM FGPA.

3. Access

Access means a legitimate and authorized admission to interactions and use of RI UM FGPA and the services provided by RI UM FGPA to users. Access can be physical, remote or virtual (allowing access through communication channels, usually online network facilities).

RI UM FGPA access modes comprise the **excellence-driven** access mode and **market-driven** access mode. The excellence-driven access mode is dependent on the scientific excellence, originality, quality, technical and ethical feasibility of the work. The market-driven access mode is possible in case of an agreement between the user and the RI UM FGPA which will lead to a fee for access. This mode is also possible when there is a market need demanding technical or scientific solutions that can be achieved through access to RI. Both modes are granted based on application, evaluated internally or through peer review.

Individual RI UM FGPA entities are responsible for determining the scope of their own RI which is to be accessible to external users, under clear, transparent and fair terms and conditions. They also have the right to propose internal RI UM FGPA access policies which are approved at the UM FGPA level.

RI UM FGPA offers users a certain amount of access, which is measured in access units defined by individual entities. Access units may vary depending on different types of RI. Some access units are precise values, e.g., hours of infrastructure operation, gigabytes generated and stored while conducting complex experiments, etc.

The processes and interactions involved in the access to RI UM FGPA may vary according to different types of RI within individual entities (e.g., application, negotiation, evaluation, etc.) but the decisions on the access requests have to be clear and justified.

4. Costs and fees

Access to RI UM FGPA may be provided free of charge or may require payment. All terms and conditions associated with the use of RI have to be transparent and publicly available. In the case of paid access, the user is charged a fee which has to be clearly linked to the actual use of RI itself. Access fees may vary for different types of RI, but all have to abide by the following principles:

- auditability,
- traceability to the work done on the RI UM FGPA item, including maintaining appropriate records outlining access requests (successful and unsuccessful), reasons for declining access (if relevant), usage data, etc.,
- prohibition of duplicate funding,
- compliance with all relevant national and EU funding terms and conditions and with competition legislation.

Market-driven access costs should be recovered at full commercial rates. Unit of cost depends on the amount of use of a particular access unit.

5. Training and Education

The RI UM FGPA open access policy encourages collaboration with other institutions and organizations that benefit from RI UM FGPA for their research, education and training.

6. Restrictions

Access to RI UM FGPA can be limited by the national security and defence, privacy and confidentiality, commercial sensitivity, intellectual property rights, and ethical consideration following applicable laws and regulations.

7. Ethical conduct, research integrity, and non-discrimination

RI UM FGPA open access policy follows the Code of Ethical Conduct of the University of Maribor as well as the eight principles laid down in The European Code of Conduct for Research Integrity drafted by the European Science Foundation (ESF) and the European Federation of National Academies of Sciences and Humanities (ALLEA). The eight principles that researchers need to abide by are honesty in communication, reliability in performing research, objectivity, impartiality and independence, openness and accessibility, duty of care, fairness in providing references and giving credit, and responsibility towards the scientists and researchers of the future.

When considering granting RI UM FGPA access to a user, the user should not be discriminated on any personal grounds.

8. Quality Assurance

Quality of the RI UM FGPA open access will be ensured by establishing quality assessing mechanisms for RI access within individual entities. The mechanisms will follow the general principles defined by the European Commission. These principles are denoted in English by the acronym "RACER" (*Relevant, Accepted, Credible, Easy, Robust*):

- **Relevant** and closely linked to the objectives to be reached. They should not be overambitious and should measure the right thing.
- **Accepted** by the RI and the stakeholders. The role and responsibilities for the indicator need to be well-defined.

- **Credible** for non-experts, unambiguous, and easy to interpret. Indicators should be as simple and robust as possible.
- **Easy** to monitor at low cost and effort.
- **Robust** against manipulation.

The set mechanisms should include following metrics:

- user metrics (e.g., user access, user base and relevance to users),
- RI operational metrics (e.g., access provision, service, central management, reliability, visibility, user community size and evolution),
- strategic indicators (e.g., publications and other products, cross-disciplinarity, economic impact) and
- financial metrics (e. g. service, resources, cost, returns).

9. Research data management

The data management policy provides clear guidance on how and where to store the generated data for a reasonable period and on how the user should provide this data for reuse. Instructions may vary depending on the type of RI within each individual entity. The data should follow the FAIR principles (findability, accessibility, interoperability and reusability). Research data management is laid out in a separate regulatory document.

10. Transparency

The Department for Research and Art of the University of Maribor (ORUD UM) provides information on the RI UM open access policy, general information on RI UM and RI UM entities' contacts. The coordinator of the faculty for open access provides information on the Open Access Policy of RI UM FGPA, general information about RI UM FGPA, and contacts of research entities at UM FGPA.

11. Sources

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Vice-Dean for research activity
Full Professor Dr. Stojan Kravanja.

Contact person at UM FGPA for open access to research infrastructure:

Assistant Professor Dr. Žiga Unuk.

Appendix 1

Internal equipment code (automatic entry)	The UM member	Name of the equipment	Equipment purpose	Equipment keeper	Purchase year	Purchase value	Source of (co)financing
FGPA.2003.1.	FGPA	ZWICK ELECTRONIC APPARATUS FOR DETERMINING MECHANICAL PROPERTIES OF MATERIALS	Measurements of mechanical properties of materials.	Lubej Samo	2003	81.781,74 €	1
FGPA.2003.2.	FGPA	HBM MGCPLUS MEASURING SYSTEM	Measurements of displacements using inductive displacemet transducers (4 channels), measurements with voltage sensors (8 channels), strain measurements -1/4, 1/2 and full Wheatston Bridge (32 channels), maximum sampling frequency 2400Hz.	Štrukelj Andrej	2003	24.859,90 €	6
FGPA.2005.1.	FGPA	CHAMBER FOR TESTING CONSTRUCTION SAMPLES WITH AIR CONDITIONING	Testing concrete samples on frostiness.	Lubej Samo	2005	41.295,98 €	6
FGPA.2005.2.	FGPA	CONTROL SYSTEM FOR HYDRAULIC CYLINDER 100 KN	Mechanical testing of structures.	Lubej Samo	2005	27.176,41 €	6
FGPA.2005.3.	FGPA	UNIAXIAL DEVICE WITH ACCESSORIES 7KN	A "Uniaxial test" of the soil sample is carried out with the apparatus. The test serves to determine the compressive strength of the soil sample.	Žlender Bojan	2005	8.136,65 €	6
FGPA.2005.4.	FGPA	LCR HITESTER UEI	The equipment is used to measure dielectric spectra of materials.	Korošak Dean	2005	6.184,64 €	6
FGPA.2006.1.	FGPA	PNEUMATIC SPEED AND TRAFFIC METER METROCOUNT 5600 PLUS, WITH CASE - 6 PCS.	The MetroCount Vehicle Classifier System combines state-of-the-art traffic logging hardware with powerful, yet easy-to-use software. MetroCount offers a comprehensive solution to all traffic monitoring issues, from routine statistics to the most complex traffic management problems. We have 4 sets of equipment.	Renčelj Marko	2006	8.932,01 €	6
FGPA.2006.2.	FGPA	HYPER PRO-GEODETIC EQUIPMENT	Equipment for GNSS measurements with high accuracy. With this set a base-rover method can be used.	Kamnik Rok	2006	8.391,88 €	6
FGPA.2006.3.	FGPA	HYDRAULIC POWER PACK "TELEM"	Mechanical testing of structures	Lubej Samo	2006	7.647,30 €	6
FGPA.2007.1.	FGPA	ULTRASONIC FLOW METER ADCP WH RIO GRANDE 1200KHZ	Device for measuring the river flows and suspended sediments concentrations in the river stream. Workhorse Rio Grande is an accurate, rapid discharge measurement system designed to operate from a moving boat. The Rio Grande can be used for a wide range of river conditions, from as shallow as 30 cm streams to large rivers and tidal estuaries. Frequency: 1200kHz Profiling Range: 0.3m - 21m	Nekrep Perc Matjaž	2007	33.866,32 €	6
FGPA.2007.2.	FGPA	GPS GLONASS L1+L2 LEGASCY-E PLUS	Receiver for GNSS measurements with high accuracy with the use of CR-3 choke ring antenna. Used for 3D measurements of the point position.	Kamnik Rok	2007	18.634,82 €	6
FGPA.2007.3.	FGPA	UNIVERSAL PROCTOR 10,15,25	The "Proctor test" of the soil sample is carried out with the apparatus. The test serves to determine the optimum moisture content of the soil sample.	Žlender Bojan	2007	15.163,43 €	6
FGPA.2007.4.	FGPA	APPARATUS FOR MEASURMENTS ACCORDING TO EN 12617/4 WITH DIGITAL READOUT	Measuring the shrinkage and swelling of concrete.	Lubej Samo	2007	7.092,36 €	6
FGPA.2008.1.	FGPA	SEISMOGRAPH MINIMAT PLUS	Vibration measurements.	Lubej Samo	2008	9.226,72 €	6
FGPA.2008.2.	FGPA	SEISMOGRAPH MINIMAT PLUS - 4 CHANNEL	Vibration measurements.	Lubej Samo	2008	5.935,09 €	6
FGPA.2008.3.	FGPA	MEASURING DEVICE KEI 2611	The equipment is used to measure dielectric spectra of materials.	Korošak Dean	2008	5.379,26 €	6
FGPA.2009.1.	FGPA	CAMERA FOR OLYMPUS MICROSCOPE	Structure control of materials	Ivanič Andrej	2009	17.610,13 €	6
FGPA.2009.2.	FGPA	OLYMPUS SZX 16 MICROSCOPE	Structure control of materials.	Ivanič Andrej	2009	11.326,52 €	6
FGPA.2009.3.	FGPA	WATER SORPTION METER WP4-T	Determination of water sorption in soil samples.	Žlender Bojan	2009	6.171,66 €	6
FGPA.2009.4.	FGPA	MOTORIZED FOCUS UNIT SZX-FOA 2 FOR OLYMPUS SZX 16 MICROSCOPE	Structure control of materials.	Ivanič Andrej	2009	5.897,98 €	6
FGPA.2011.1.	FGPA	CAMERA FLIR SYSTEM AB T335	Thermography.	Lubej Samo	2011	7.442,82 €	6
FGPA.2013.1.	FGPA	DIRECT SHEAR APPARATUS, BS 1377	A "Direct shear test" of the soil sample is carried out with the apparatus. The test serves to determine the shear strength of the soil sample.	Žlender Bojan	2013	8.841,49 €	6
FGPA.2013.2.	FGPA	COUNTER QTT NC 200TM - TRAFFIC ANALYZER (MAGNETIC) - 2PCS.	Traffic analyzer QTT NC.	Renčelj Marko	2013	5.948,50 €	6

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FGPA.2013.3.	FGPA	TRAFFIC ANALYZER QTT NC 200TM, WITH INTERFACE, HDM PROGRAMME, ASPHALT PACKAGE	Traffic analyzer QTT NC.	Renčelj Marko	2013	5.313,28 €	6
FGPA.2014.1.	FGPA	TOTAL STATION TS50, 05" R1000, EDU SET_INSTRUMENT IN A CASE	Total station for angle and distance measurements used in surveying measurements.	Kamnik Rok	2014	19.676,87 €	6
FGPA.2014.2.	FGPA	TOTAL STATION TS50, 05" R1000, EDU SET_ACCESSORIES AND SOFTWARE	Prism, tripod and prism pole are used in classic geodetic works in angle and distance measurements. The GeoOffice software is intended for post-processing of data.	Kamnik Rok	2014	10.613,81 €	6
FGPA.2014.3.	FGPA	TOPCON GNSS HIPER V-EPP-SET (DEVICE) FOR EDUCATION, WITH ACCESSORIES	Equipment for GNSS measurements with high accuracy as an upgrade of the Hiper PRO set. With this set, a base-rover method can be used.	Kamnik Rok	2014	10.016,44 €	6
FGPA.2014.4.	FGPA	DELTA RETROSIGN GR1 (SN:1-236), DEVICE FOR MEASURING THE REFLECTIVITY OF VERTICAL TRAFFIC SIGNS	Retroreflectometer Delta RetroSign GR1 is a portable instrument for measuring the retro-reflectivity of traffic signs. It measures the main observation angle stated in the ASTM or CEN standards. GR1 is based upon an accurate point measurement geometry offering superior performance in measuring retroreflective sheeting material. In measuring microprismatic sheeting materials, its point geometry replicates real-world driving conditions and outperforms.	Renčelj Marko	2014	9.630,26 €	6
FGPA.2014.5.	FGPA	ALMEMO MEASURING EQUIPMENT FOR MEASURING HEAT FLUX WITH RELATED EQUIPMENT (ALMEMO 5690-2M + CARD WITH 10 PORTS ES5690UA10, SERIAL INTERFACE ZA1919DKU-05, HEAT FLUX SENSOR FQA018C/FQA017C, THERMAL WIRE LT01900, HYGROMETER FLIR MR77, THERMALLY CONDUCTIVE PASTE ZB9000WP, TEMPERATURE AND HUMIDITY DATALOGGER VELLEMAN DEM105, SOFTWARE WIN-CONTROL AND FLIR TOOLS+, CASE)	The device and added sensors are used for heat flux measurements in building elements. The set is composed of a multifunctional device (data logger), several sensors (thermo-wires for temperature measurements and heat flux plates) and supporting equipment (thermal conductive paste, software, etc.).	Žegarac Leskovar Ves	2014	8.572,57 €	6
FGPA.2015.1.	FGPA	DIGITAL VIBROMETER, PDV-100 (LAB. EQUIPMENT)	The PDV-100 contactlessly measures vibrational velocities and provides digital signal processing with both analog and digital signal outputs. When combined with the high vibrational velocity resolution, the high level of linearity across the entire frequency range provides you with a sturdy and reliable mobile vibration analysis tool.	Toplak Sebastian	2015	24.120,55 €	6
FGPA.2015.2.	FGPA	DELTA RETROREFLECTOMETER LTLXL (LAB. EQUIPMENT) - DEVICE FOR MEASURING THE REFLECTION OF HORIZONTAL MARKINGS	Delta LTL-XL handheld retroreflectometer for road markings. No adjustments are called upon when measuring white and yellow markings. In addition, the retroreflectometer shows and stores day, time, humidity and temperature, as well as road ID, marking type and user ID.	Renčelj Marko	2015	21.300,02 €	6
FGPA.2015.3.	FGPA	MICROGRIP TESTER WITH RELATED EQUIPMENT - FRICTION MEASURING EQUIPMENT	The Micro GripTester is a three-wheel manually pushed device that measures friction by the braked wheel, fixed slip principle. The device is known as a "Continuous" friction measuring equipment (CFME) as it measures continuously along the test path, rather than just taking a single spot reading.	Renčelj Marko	2015	16.050,44 €	6
FGPA.2015.4.	FGPA	LAB. EQUIPMENT: PNEUMATIC CONSOLIDATION APPARATUS WITH ACCESSORIES	A "consolidation test" of the soil sample is carried out with the apparatus. The test serves to determine the soil consolidation parameters.	Žlender Bojan	2015	12.239,14 €	6
FGPA.2015.5.	FGPA	DEVICE: P-72 SEDIMENT SAMPLER WITH EQUIPMENT	Point-integrating suspended-sediment sampler(USGS - US P-72). This is a 19 kg electrically operated sampler for collection of suspended sediment samples at any point beneath the surface of a stream, or for taking a sample continuously over a range of depth. The sampler is made of cast aluminum and is 71 cm long. The sampler head is hinged to provide access for a 0.95-liter sample container.	Nekrep Perc Matjaž	2015	9.952,74 €	6
FGPA.2015.6.	FGPA	DUCTILOMETER 1500 MM WITH INTEGRATED COOLING SYSTEM AND ACCESSORIES	Determining the ductility of bitumen.	Ivanič Andrej	2015	9.094,56 €	6
FGPA.2015.7.	FGPA	DIGITAL VISCOMETER BROOKFIELD TYPE RVDV2T WITH THERMOSEL CHAMBER	Viscosity measurements.	Ivanič Andrej	2015	8.447,60 €	6

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FGPA.2015.8.	FGPA	MEASUREMENT AMPLIFIER HBM: QUANTUMX, MX840A 8-CHANNEL	Universal measurement amplifier with 8 independent channels, each with 0 to 19.2kHz sampling frequency. Each channel allows a connection of all types of sensors with analog output. One channel is able to use CAN2.0 communication protocol.	Štrukelj Andrej	2015	7.940,17 €	6
FGPA.2015.9.	FGPA	MEASUREMENT AMPLIFIER QUANTUMX, MX1615 16-CHANNEL	Measurement amplifier for strain measurements using strain gages (1/4, 1/2 or full Wheatstone bridge) and for measurements with strain gage based sensors. It has 16 independent channels with a sampling frequency of 0 to 19.2kHz each.	Štrukelj Andrej	2015	6.629,29 €	6
FGPA.2016.1.	FGPA	DIRECT SHEAR APPARATUS - ELE	A "Direct shear test" of the soil sample is carried out with the apparatus. The test serves to determine the shear strength of the soil sample.	Žlender Bojan	2016	5.440,50 €	6
FGPA.2017.1.	FGPA	CONCRETE STRENGTH MEASURING SYSTEM (RENEWAL, UPGRADE)	Equipment for concrete strength measurement.	Lubej Samo	2017	23.566,53 €	6
FGPA.2018.1.	FGPA	MEASURING SYSTEM, 16-CHANNEL, WITH CLOCKS FOR MEASURING SLIDE MOVEMENT (14 CLOCKS)	The measuring system serves as a support for carrying out an investigation, for recording measurement data.	Žlender Bojan	2018	7.037,07 €	6
FGPA.2019.1.	FGPA	TOBII PRO GLASSES 2 -TOBII PRO EYE TRACKER - EYE VIEW TRACKER	Tobii Pro Glasses 2 is a lightweight mobile eye tracking system with four eye tracking cameras, for human behavior studies in real-world environments. Special software processes the views, the results of which are the fixation points and the duration of the fixation.	Šraml Matjaž	2019	24.769,32 €	6
FGPA.2019.2.	FGPA	HBM-CX22B-W QUANTUMX DATA RECORDER	The equipment is intended for the control of HBM manufacturer's measuring amplifiers and for automatic recording of measurement results, as well as for performing mathematical operations from measured data on an ongoing basis.	Štrukelj Andrej	2019	5.715,76 €	12
FGPA.2019.3.	FGPA	HBM-MX840B AMPLIFIER	The equipment is a universal measuring amplifier that allows measurements using all types of standard sensors. It has 8 independent analogue input channels, the first of which can also be configured as a digital one, and in this form allows the connection of a CAN-BUS line with a maximum of 128 sensors. In analogue mode, each independent channel can measure with a sampling	Štrukelj Andrej	2019	6.132,56 €	12
FGPA.2019.4.	FGPA	KIO RTLS STARTER WITH EQUIPMENT	The equipment is intended for positioning (recording the traveled path of the observed object) within a range of 50m x 50m without GPS signal with an accuracy of 1cm to 3cm.	Štrukelj Andrej	2019	7.012,85 €	12
FGPA.2019.5.	FGPA	ARBORSONIC3D TOMOGRAPH (WITH ACOUSTIC ROOT DETECTOR EXTENSION)	Arborsonic3D tomography is a device for acoustic tomography of trees and timber elements. With the help of 20 SD02 Piezo transducers, the velocity of sound through different parts of the wooden cross section is measured. Possible wood decay can be detected on the basis of the measured velocity. The device offers the possibility to display a 3D map of the sound velocity in the studied tree/timber element.	Premrov Miroslav	2019	14.771,80 €	6
FGPA.2020.1.	FGPA	PRECISION SOUND ANALYSER	Measurement and analysis of sound and vibration	Pinterič Marko	2020	13.023,42 €	6
FGPA.2020.2.	FGPA	3D SCANNER, LEICA RTC 360 LT, laser	The Leica RTC360 LT laser scanner captures spatial data with laser scanning technology at 106 points/s. It digitizes the surrounding area into a photorealistic point cloud in the 360° (horizontal) x 300° (vertical) range and also combines scans from different scanning positions. Measuring range: 0.5 m – 130 m; Length measurement accuracy: 1 mm + 10 ppm.	Štrukelj Andrej / Pučk	2020	50.356,10 €	6
FGPA.2020.3.	FGPA	HELMET WITH HOLOLENS 2 (TRIMBLE XR10)	Implementation of mixed reality in constructio	Pučko Zoran	2020	5.514,90 €	6
FGPA.2022.1.	FGPA	tachymeter GEOMAX ZOOM 75 with equipment (prism, tablet),		Kamnik Rok	2022	14.865,79 €	6
FGPA.2022.2.	FGPA	driving SIMULATOR with equipment		Gruden Chiara	2022	69.867,57 €	6