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SCIENCE CAMPUS
CLUJ-NAPOCA
DESIGN COMPETITION

ANNEX 1.1.
COMPETITION BRIEF

TABLE OF CONTENTS

1. General data

1.1. PURPOSE OF THE COMPETITION

The purpose of this competition is to select, in order to award the design contract, the best solution for **Science Campus Cluj** — an urban complex intended for research, education and entrepreneurship that contributes to the development of knowledge and innovation, which will consist of the following objectives and sub-objectives:

OBJECTIVE no. 1 / Cluj-Napoca City Hall as Contracting Authority

- Center for Life, Art, and Science (CLAS) — a science center/museum designed as a living lab that puts the citizen in the middle of the processes of research, innovation and technology transfer in the STEAM (Science, Technology, Engineering, Arts, Mathematics) fields. The science center/museum will be an institution subordinated to the Cluj-Napoca City Hall, meant to explore and explain life systems and related phenomena and to attract the general public to scientific knowledge and development;
- Urban square — public space supporting the development of an urban life comparable to that of the squares in the historic city, urban room that holds together the various functions of the designed complex and mediates its connection with the transport system and the city's infrastructure;
- Small sports base — intended for the public but also accessible to UBB students for the physical education classes provided in the university curriculum;

OBJECTIVE no. 2 / Babeș-Bolyai University as Contracting Authority

- InfoBioNano4Health — JR&IC (Joint Research & Innovation Center) / joint research-development-innovation center of Babeș-Bolyai University (UBB), bidirectional integrated with the regional social & economic environment in the open innovation/science formula, by means of which the University will direct its research in the fields of computer science-mathematics / cognitive sciences / artificial intelligence / bio-nanosciences / sciences of life & health towards innovative developments in the field of health;
- Faculty of Mathematics & Computer Science (FMI) of Babeș-Bolyai University;
- and student dormitory (500 places).

Located in the Lomb area of Cluj-Napoca, near the two buildings of Cluj Innovation Park (CREIC and TEAM), the complex is part of the strategy of Cluj Napoca to develop an extensive and strong infrastructure for education, research, innovation and technology transfer bringing together actors from the education and research system, the economic and entrepreneurial environment, civil society and local administration. Thus, Science Campus Cluj is a significant pillar, and this competition is an important step on the city’s road to fulfil its vision of becoming a regional hub of technology, research and development, creative industries, culture and art.

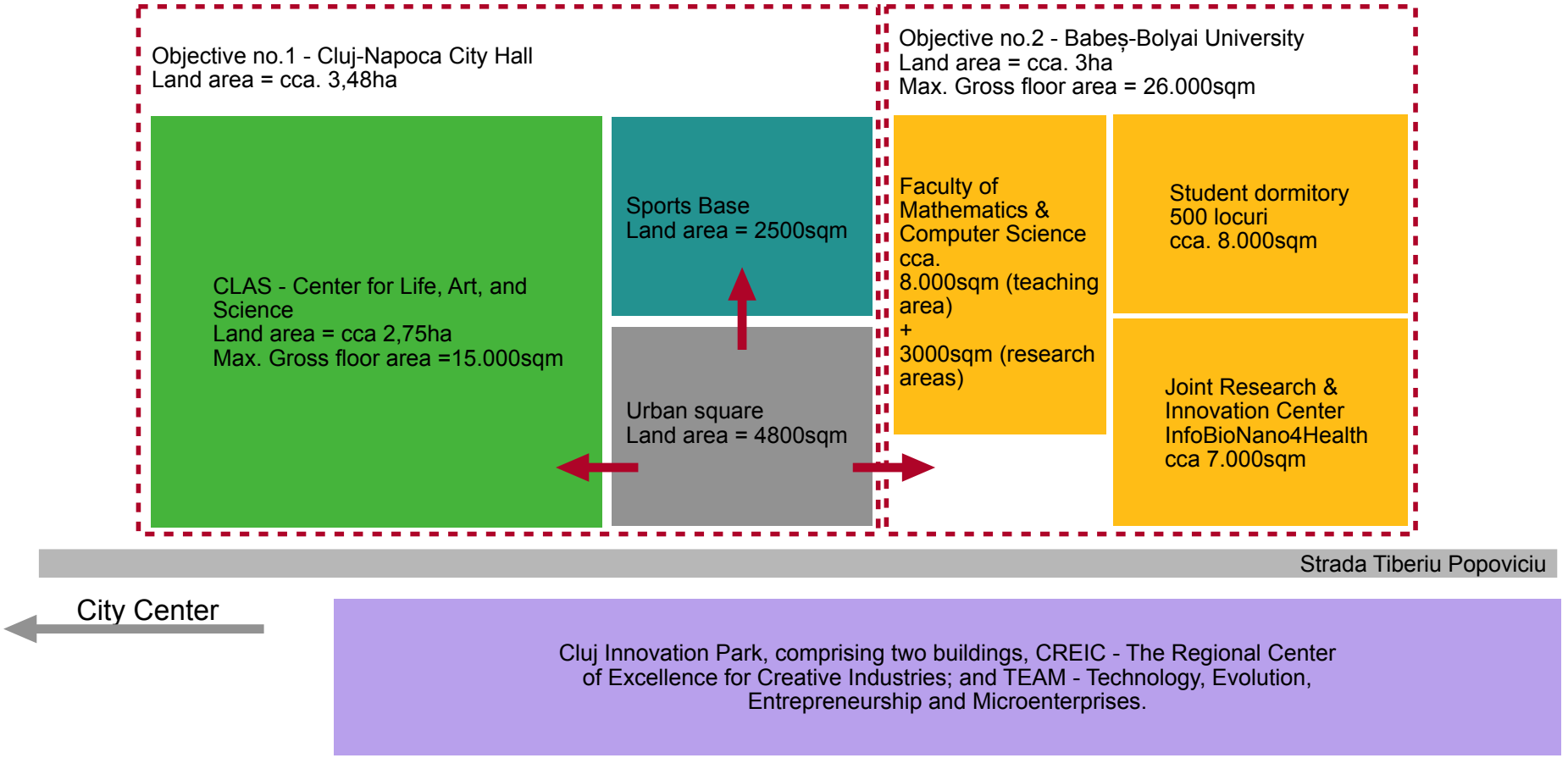

Figure 1. Objectives and sub-objectives of the complex

1.2. CONTRACTING AUTHORITY OF THE COMPETITION

The competition is organized as a public procurement procedure, a design competition completed by negotiation without prior publication of a contract notice for the award of the design services contract for the Zonal Urban Plan (PUZ), Feasibility Study (SF), Technical Project (PT) and Technical assistance for the urban complex “Science Campus Cluj”.

The contracting authorities of the competition are the City Hall of Cluj-Napoca and Babeș-Bolyai University, which have entered a partnership in order to jointly conduct the public procurement procedure and jointly carry out the contract to be awarded. Based on the Partnership Agreement annexed to Resolution no. 764/2021 of the Local Council of Cluj-Napoca (Annex 2.3.1. to this documentation) and, respectively, to Resolution no. 167/2021 of the Senate of Babeș-Bolyai University (Annex 2.3.2. to this documentation), Cluj-Napoca City Hall conducts public procurement procedures for contracting design services in the PUZ, SF, PT and Technical Assistance phases for the urban complex “Science Campus Cluj”, both in its own name and in the name and on behalf of Babeș-Bolyai University.

1.3. NEED AND OPPORTUNITY FOR INVESTMENT

In 2020, Cluj-Napoca was one of the six finalist cities in the competition for the title of European Capital of Innovation, won in the end by the city of Leuven. Funded by Horizon 2020, the EU's research and innovation program, the award recognizes European cities that develop dynamic innovation ecosystems in the fields of major global problems and challenges and to improve people's lives. The competition jury appreciated the municipality's efforts to transform a conservative system of public administration into an open system of government, based on trust, participation and support for the initiatives of citizens, organizations, institutions and businesses in the city. **Science Campus Cluj** ranges among these efforts, which brings together the initiative of the Scientific Association to build a Science Center/Museum and the efforts of Babeș-Bolyai University to develop its research and education infrastructure by building a new headquarters of the Faculty of Mathematics and Computer Science and by setting up a joint inter-/trans- and multidisciplinary research center capable of contributing to the development of areas of intelligent specialization defined at regional, national and European level. Aiming to become both a new urban core and the foundation of an innovation ecosystem, with participants from administration, civil society, entrepreneurship, research and education, Science Campus Cluj responds to complex and multiply-determined needs, bringing a series of **benefits**:

1.3.1. FOR THE CITY

- an island of urbanity that stands respectfully towards the hilly landscape around historic Cluj;
- a pole of research infrastructure at national and regional level, a core of research-innovation as a connecting platform between society, education, research and entrepreneurship;
- a memorable destination, an exemplary physical presence for a scientific campus: open, accessible, dynamic, diverse, oriented towards growth and entrepreneurship.

1.3.2. FOR THE BENEFICIARY INSTITUTIONAL STRUCTURES

- for CLAS: the first Science Center/Museum established in the last five decades in Romania; a dynamic, stimulating and welcoming space, with room for growth and adaptation to scientific and technological progress and methods of attracting and involving the general public;
- for JR&IC: development and operationalization of a structure and Knowledge and Innovation Community, in the logic and spirit of intelligent specialization, in a space adapted to the requirements of contemporary research;
- for FMI: bringing together the five current venues into a headquarters that is suitable for contemporary research and education in mathematics and computer science, recognizing the key role of mathematics for STEM+ domains and providing the opportunity for spatial experiences to support students' learning and research experiences of academic staff.

1.3.3. FOR INHABITANTS

It is the wish of the competition promoter for the whole area to become a public space of a very good quality, a preferred place for events and outdoor activities, a representative place that should naturally be included among the public spaces of great interest in the city, used to the fullest by all categories of visitors, while working at the same time with the landscape and the natural atmosphere of the hill and its surroundings.

1.3.4. FOR THE EDUCATIONAL ENVIRONMENT

The adjoining of the Science Center (CLAS) and the two structures of the UBB responds to the priority of EU policies to promote science in society, with the aim of generalizing scientific and technological literacy and increasing the appetite of children and young people for careers in the STEM+ fields (science, technology, engineering, mathematics + art, social sciences, medicine, etc.). To support this goal, the architecture project must propose an environment conducive to meetings between multiple categories of public:

- pupils and students at different levels of the education system, from kindergarten to postgraduate;
- professors and teachers;
- funding bodies and organizations supporting research and innovation;
- organizations of the civil society, associations and foundations;
- entrepreneurs, businessmen, industry and service leaders;
- political decision-makers at local, regional and national level.

The designed spaces must also support innovative teaching methods aimed at active citizens and scientifically literate people, working with the means of formal education (at the academic level but also with schools), non-formal (workshops) and informal ones that reduce the distances between STEM + fields and the general public.

1.3.5. FOR THE LOCAL ECONOMY

- educating, attracting and retaining a workforce tailored to the development requirements of the STEM+ fields;
- attracting and supporting entrepreneurship and investments;

- attracting tourists;
- strengthening the image of Cluj as a future-oriented city, connected to the culture and global issues of the 21st century.

1.3.6. ECOLOGICAL DIMENSION

In addition to building knowledge on the sustainability of buildings through architectural and engineering solutions that incorporate green technologies where possible, the complex will be an example of respect for nature, emphasizing the idea that nature is not an optional good in our lives, but the condition of our existence. In addition, CLAS will contribute - through both indoor and outdoor spaces - to building and disseminating the ethics of responsibility and concern for the restoration of ecosystems and nature conservation in the Anthropocene epoch. The JR&IC platform will be equipped and open to future development to monitor the environment and to develop technologies based on advanced nanomaterials and nanostructures to solve environmental problems (use of CO2, photovoltaic cells, water purification techniques, etc.).

1.4. PROJECT OBJECTIVES

Cluj-Napoca City Hall and Babeș-Bolyai University aim to develop a coherent set of buildings and open spaces that equally support scientific education, research and innovation, as well as their proximity to the general public, with the participation of public sector actors, civil society, from the private sector, from research and education. Thus, the project aims to provide an example of good practice both in terms of the architecture of a complex dedicated to scientific research and innovation and raising public awareness of STEM+ education, and in terms of creating a pole of urbanity in close connection with nature. Through their solutions, competitors are invited to propose new interpretations of “iconic architecture”, which goes beyond brand images and contributes directly to the quality of life of all residents of the city.

1.5. ORGANIZER OF THE COMPETITION

The competition is organized by the Romanian Order of Architects, in accordance with the Competition Regulations of the International Union of Architects - UIA - and the provisions of the International Recommendations for Architectural and Urbanism Competitions adopted at the UNESCO General Conference of 1956, revised on 27 November 1978, in compliance with the provisions of the legislation in force regarding the award of public procurement contracts.

2. Site information

2.1. BRIEF DESCRIPTION OF THE LAND

The land is located in the built-up area of Cluj-Napoca, outside the perimeter for the protection of historical and architectural-urban values.

The total area of the land, privately owned by the municipality of Cluj-Napoca, is 64,797.65 sqm, of which an approximate area of 34,800 sqm (3.48 ha) belongs to the municipality of Cluj-Napoca for the achievement of Objective 1, consisting of the Science Center - CLAS, urban square and sports fields, and for an estimated area of 30,000 sqm (3 ha) it will be proposed to establish a surface right in favour of Babeș-Bolyai University for the achievement of Objective no. 2 of the Joint Research Center - InfoBioNano4Health Platform, Faculty of Mathematics-Computer Science and Student Dormitory.

Competitors will establish the position and contour of the plots according to the architectural solution, keeping the approximate areas allocated to each partner institution.

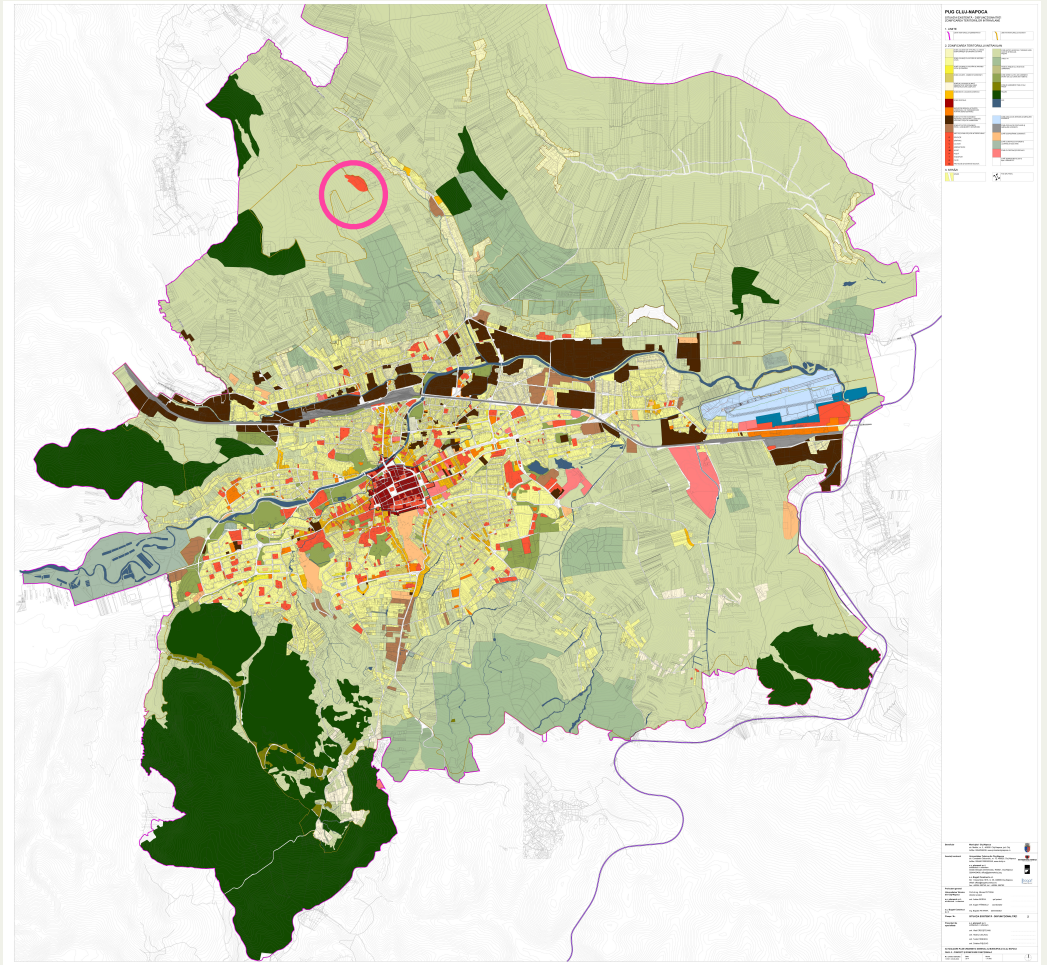

Figure 1.
sheet 2_Existing situation_10000.jpeg (Annex 3)

2.2. ACCESSIBILITY AND URBAN MOBILITY

The site is located adjacent to Tiberiu Popoviciu Street, profile type II G - 25m according to PUG, respectively: with four lanes, being provided with a roadway of 13m (4x3.25m), side parking lots, bike lanes, and sidewalks with a width of 2x2.5m.

The cross-sectional profile of this road reflects Cluj-Napoca City Hall's adherence to EU policies to promote sustainable, inclusive and equitable urban mobility, ensuring good connectivity through public transport systems and increasing the attractiveness of public space for active means of mobility such as walking or bicycling.

Therefore, the Campus will be accessible:

- by means of public transport, by extending the public transport system on Tiberiu Popoviciu Street;
- by bus, especially for CLAS visitors;
- by personal car;
- on foot, by bicycle or other non-motorized means of transport.

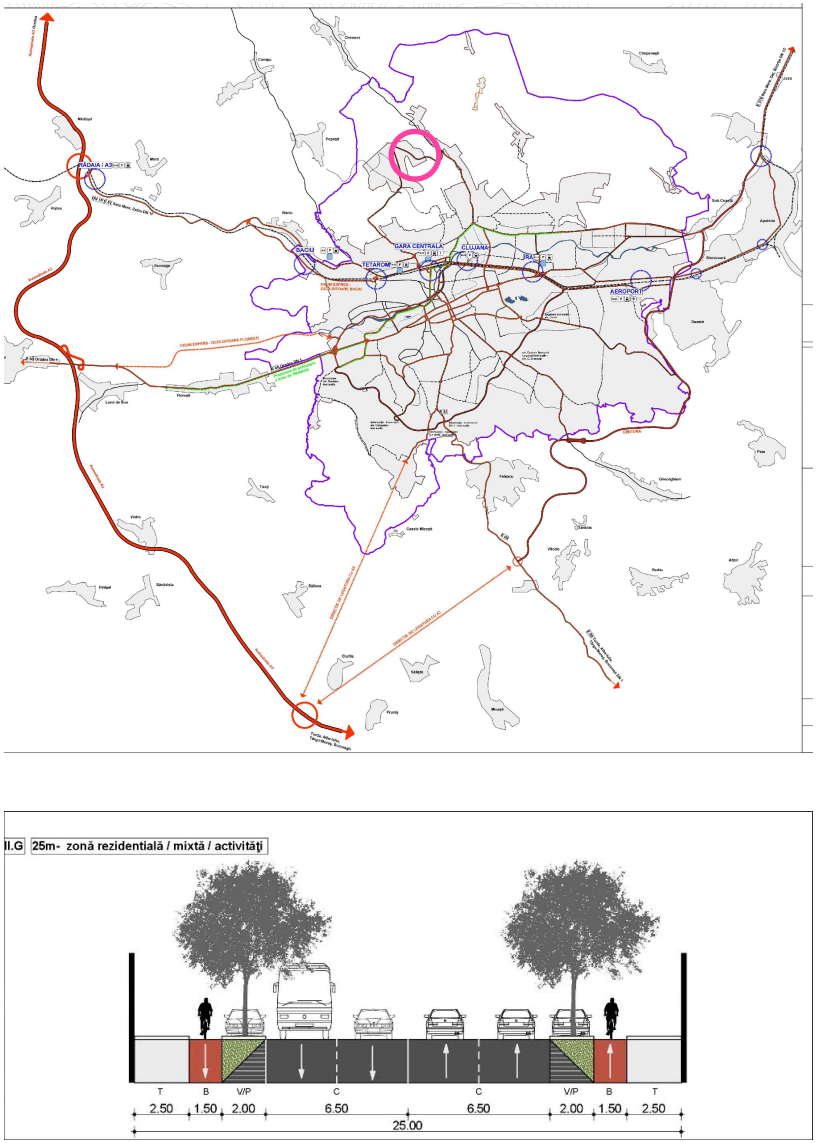

Figure 2. Extracts from the sheet 3_2_1_Regulation_Zoning_10000.jpeg (Annex 3)

2.4. UTILITY SERVICE PROVISION

The plot that makes the object of the competition benefits from direct access to the technical municipal networks in the area (water-sewerage, electricity, natural gas, telecommunications and optical fibre). The calibration between the investment demand and the capacity of the networks will be done in the later design phases. The plot is not encumbered by easements in terms of technical and municipal networks. The evacuation of rainwater can be done through closed gutters in the sewerage network, but alternative solutions will also be sought for their capture and reuse in situ.

2.3. FUNCTIONAL STRUCTURE OF THE AREA

The area is now undergoing urbanization, the built density is low, and the functions, specific to a peri-urban area, which mixes individual housing with rural activities (agriculture and animal husbandry) with small production or repair shops. According to the local urban planning regulations in force, approved by HCL 579/06.07.2018, currently agricultural constructions are prohibited - annexes for animal husbandry, for production or subsistence. This has direct implications for the site, which is currently bordered on the east side by a pig farm to be decommissioned/ relocated.

Opposite to the field for Science Campus Cluj is Cluj Innovation Park, consisting of two buildings, CREIC - Regional Center of Excellence for Creative Industries and TEAM - Technology, Evolution, Entrepreneurship and Microenterprises. The two buildings are promoted as similar in concept, but specialized in different purposes. CREIC proposes dynamic spaces, some even atypical, for communities of creatives, freelancers, for start-ups and even corporations, conducting activities in the cultural and creative industries. TEAM focuses on micro-production activities in various fields and offers spaces where innovative solutions can be developed - land plots, micro-production halls and office spaces

Figure 3. Site photo, overlooking CREIC

2.5. URBAN PLANNING DOCUMENTATIONS

According to PUG, the land is included in the S-UVa area (green subarea - square, garden, public park).
The provisions of the Local Urban Planning Regulation related to the General Urban Plan for this territorial reference unit (UVa) can be consulted online, accessing the following address:
https://primariaclujnapoca.ro/urbanism/unitate-teritoriala/uva/

Currently, the land is included in an area intended for single-family homes (L3a1) - it has been divided into plots and regulated in this regard by the PUZ approved by HCL no. 167/2014 amended by HCL no. 464/2014.

Thus, the land currently consists of 73 plots intended for single-family homes.

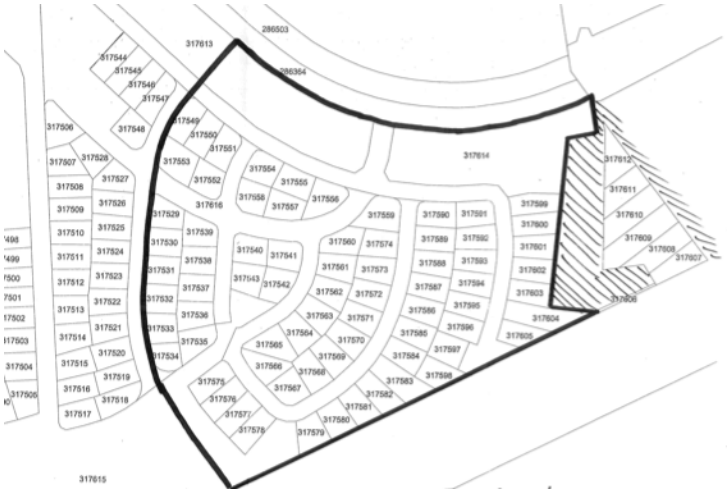

Figure 4. Plot plan for single-family homes

According to the provisions of the Urban Planning Certificate no. 3527/25.11.2021 (**Annex 3.1**), for the change of destination and the detailed regulation of the entire plot according to the new functions, it will be necessary to start a procedure for updating the urban regulations by elaborating a PUZ (Zonal Urban Plan). This stage is part of the services that will be contracted after the competition with the winning team.

2.6. NATURE OF THE LAND. GEOTECHNICAL INVESTIGATIONS

The geotechnical investigation carried out (Annex 4.2.) on the basis of four boreholes, of which two (F2 and F4) on the plot that makes the object of the competition and other two (F1 and F3) on the neighbouring plots, recommends:

- general screed type foundation system, specifying the foundation depth for F2> -5.70m compared to the natural terrain - the good foundation layer for F2 is marly clay, grey-bluish, hard, and for F4, dusty sandy clay, brown-yellow, plastic stiff, with limestone insertions;
- execution of retaining walls with piles embedded in the Marne or Sandstone layers;
- paying special attention to the management of rainwater and that coming from the deterioration of municipal networks.

The same investigation places the site in the category of "moderate geotechnical risk", but competitors will take into account the fact that in the immediate vicinity, during the execution works, landslides were triggered both in the area of the main road (in the area of the embankment slope, subsequently affecting the embankment of the road and endangering the completion of the works at the TEAM building), as well as in the area of the CREIC building. Thus, in May 2016, a technical expertise was prepared for "consolidation of the area subject to landslides - Lomb F.N." (having as beneficiary Cluj-Napoca City Hall), which states that following the consolidation works, "the upstream site will require the preparation of a project to rehabilitate the entire slope".[1] The geotechnical investigation carried out for this technical expertise classifies the road in the category of “moderate-major geotechnical risk” (according to the norm NP 074/2014).

In the view of this background, the Urban Planning Certificate no. 3527/25.11.2021 (**Annex 3.1**) locates the land envisaged by the competition in the area with high/very high risk of landslides.

In conclusion, **the competitors will consider the remake of the geotechnical study with inclinometers, depending on the solution.** If the investigation results in the need for land stabilization works, the competitors will estimate the design value of these works according to the offer received by Cluj-Napoca City Hall on 23 June 2021 (**Annex 2.3.5)**, for the elaboration services of the technical & economic documentations – Geotechnical investigation and stability investigation, including the Af verification; Specialized consultancy provided to the company that will elaborate the PUZ with a view to systematization; Technical expertise in the Af+A4B2D field with a proposal for foundation and vertical systematization solutions.

[1] Technical expertise “Consolidation of the area subject to landslides - LOMB F.N., elaborated SC CONSTRUCT CDP SRL, having Cluj-Napoca Municipality as beneficiary, May 2016, p.7.

3. Design brief

3.1. DESIGN PRINCIPLES

Given its location in relation to the city and its development prospects, the stake of the complex subject to this competition is to become a representative pole of urbanity for the ideas, research and needs of the new millennium, reconciling lifestyle and the way of building the human habitat with the formations and life systems of the Planet. The final beneficiaries of the complex will be people committed to developing and promoting scientific knowledge and its ability to serve for reducing the negative impact of human activities on nature, and this should be reflected in the design in several forms:

- The campus becomes a core of urbanity, carefully built around the urban square and laying the foundations of a dynamic and creative life;
- The overall picture is attractive and friendly to the general public, and thus facilitates the coming close to scientific knowledge;
- Buildings and facilities are judiciously and carefully designed for the quality of the space experience, taking into account the longest possible lifespan and the possibility of adapting over time;
- The carbon footprint of the assembly tends to zero;
- The ensemble proposes an interpretation of iconic architecture that is meaningful (in the first place) for the place and inhabitants.

3.2. ARCHITECTURAL AND URBAN STAKE

Thus, the architectural-urban stake consists of the reflection around some key concepts such as:

- integrated approach to architectural objects and urban-landscape space;
- resource saving and land reserve for further densification;
- fairness and diversity in use: permeability, accessibility, readability, orientation, safety, attractiveness, aesthetic experience;
- resilience - flexibility and adaptability over time;
- respect - for humans and biotic environmental factors alike.

3.3. SPATIAL-FUNCTIONAL AND TECHNICAL REQUIREMENTS: GENERAL CONSIDERATIONS

The following sections detail each functional group in terms of usable areas, functional relationships and activity descriptions, specifying the number of users, as well as information on specific equipment requirements and utility requirements where applicable. Some details - especially those related to the interior design of the spaces, equipment or precise technological solutions - are included primarily to provide a clear picture of: (1) how the designed spaces are to be used; and (2) the specialties to be involved in the technical design process.

Competitors are free to modify the estimated usable areas or to propose the supplementation of the minimum usable areas indicated by the design brief and its annexes, as long as these additions contribute to the increase of the architectural and relational quality. At the same time, to the extent deemed necessary / possible, competitors may complete the list of minimum spaces defined by the design brief and its annexes with other complementary spaces / functions that may contribute to a result that integrates architecture, interior and product design, as well as landscape architecture in a possible response to current global issues and European initiatives such as the New European Bauhaus. At the same time, competitors will take into account the maximum developed built-up areas approved by the Contracting Authorities (CAs) and specified for each objective and sub-objective separately. These thresholds derive from the CA's ability to support design and implementation costs, according to the cost estimate (**Annex 2.6**).

Competitors may propose to exceed the maximum gross floor areas by up to 10%, which can accommodate the possible variety of design solutions. At the same time, competitors must take into account that the maximum design fee limit is firm and does not change. This means that a possible increase in the gross floor area will not lead to an increase in the design fee.

3.4. SPATIAL-FUNCTIONAL AND TECHNICAL REQUIREMENTS: OBJECTIVE NO. 1

3.4.1. URBAN SQUARE AND SPORTS BASE

Designed to become a new landmark on the scale of the city, the ensemble contains a public nucleus made up of two important elements for the quality of life in Cluj-Napoca, respectively:

- **an urban square of approx. 4800sqm**, which will be able to host terraces, cafes or other - permanent or temporary - functions that support the effervescence of university life and attract the general public. This space can also be used by CLAS or UBB for the organization of events or fairs for the dissemination of scientific knowledge. The square can remain pedestrian (occasionally by car) or can be thought of as a *shared space* through which access can be made to the parking lots of adjacent buildings.

- **a small sports base of max. 2500sqm** with controlled access directly from the square and intended for the general public, but also open to UBB students for sports classes in the university program. The sports base will contain a tennis court (max. 18.3x37=677sqm) and a basketball court (max. 19x32=608sqm), along with other possible badminton courts (6.1x13.4=81.74mp), streetball / basketball 3x3 (304sqm) or other urban sports and a supervised playground for children; it will also be planned to build a small reception structure, which will contain the reception desk, locker rooms and toilets.

3.4.2. CENTER FOR LIFE, ART, AND SCIENCE (CLAS)

CLAS falls into the institutional category of science centers, meeting places between science and society, buildings that facilitate the approach to science of people of all ages and socio-demographic categories, democratizing access to information and promoting participation in research processes in fields such as astronomy, astrophysics, genetics, biodiversity, climate change, medicine, biomechanics, neuroscience, bioengineering, sustainability, robotics, artificial intelligence, etc. They can also provide an opportunity for all of these to meet with the contemporary arts, which in their turn can help to create natural connections between everyday life and the latest research and developments in the fields of science.

Due to their forming role they play in relation to society, science centers are not far from contemporary museums, which in turn are increasingly expanding their mission to become complex cultural platforms (see **Annex 4.1.**) But unlike science and technology museums, built around collections of specimens or artifacts that tell the story of a field of life or nature, science centers are more fluid environments that build learning experiences through direct involvement in experiments or research processes. Thus, compared to a museum that builds its strategies for exhibition, research and cultural mediation based on the collection it owns or manages, science and research centers have a much broader purpose of communicating and supporting the latest developments from all areas of sciences, techniques and technologies.

Thus, CLAS aims to create a research program that will explore, explain and support the natural world, working in partnership with schools, companies, research centers and civil society to change the way the public relates to science. The Center's mission will be pursued through scientific research, public engagement and scientific literacy programs, prototyping solutions, the creation of digital environments and education for sustainability. Like Science Centers / Museums around the world, it will provide a visiting experience guided by the possibility of interacting with exhibits rather than passive observation, and will promote learning through processes that involve the intellect and body alike.

Through these programs, CLAS will aim to attract a larger and more diverse audience, being mandatory accessible to all categories of visitors, from children to the elderly, including people with disabilities. The main categories of public considered are:

- The general public: Romanian and foreign visitors, individually or in groups, who must find all the conditions to admire the exhibitions, but also easy access to general information;
- Young audiences: young visitors, school groups (high school, general school, even kindergarten), who will be addressed with friendly, interactive and playful educational programs, adapted to their age;
- Families: who must find the opportunity to spend a pleasant day in the ambience offered by the center, visiting exhibitions of their choice, having lunch, participating in various programs or meeting friends;
- Specialist / scientific public: which must find in the center a relevant resource for the scientific community.

In conclusion, CLAS is a new institution, designed as an innovation ecosystem with participants from public institutions, civil society, private enterprises, research and education, as a multifunctional environment that aims to:

- become an active nucleus and an activist for collaborative, experiential learning, for nurturing creativity and the willingness to make sustainable choices in everyday life;
- support both research, dialogue and collaboration for innovation and the transfer of knowledge in order to support the curiosity and interest of the general public in science and its potential to understand and preserve life systems;
- enable citizens to explore and learn new knowledge about life systems, related phenomena and participating at the same time in their conservation.

3.4.2.1. Spatial-functional requirements

Designed to support several programs, the **CLAS Building will have a total built area of maximum 15,000sqm** and will contain: a permanent exhibition and a temporary gallery, a captivating digital space, an area dedicated to health and well-being, a special area for young children, meeting rooms, state-of-the-art laboratories, prototyping areas, residential spaces, an incubator and resource center, staff offices, technical and workshop area for employees, a shop, a cafe, a restaurant and an outdoor area freely dedicated to learning and activities in nature.

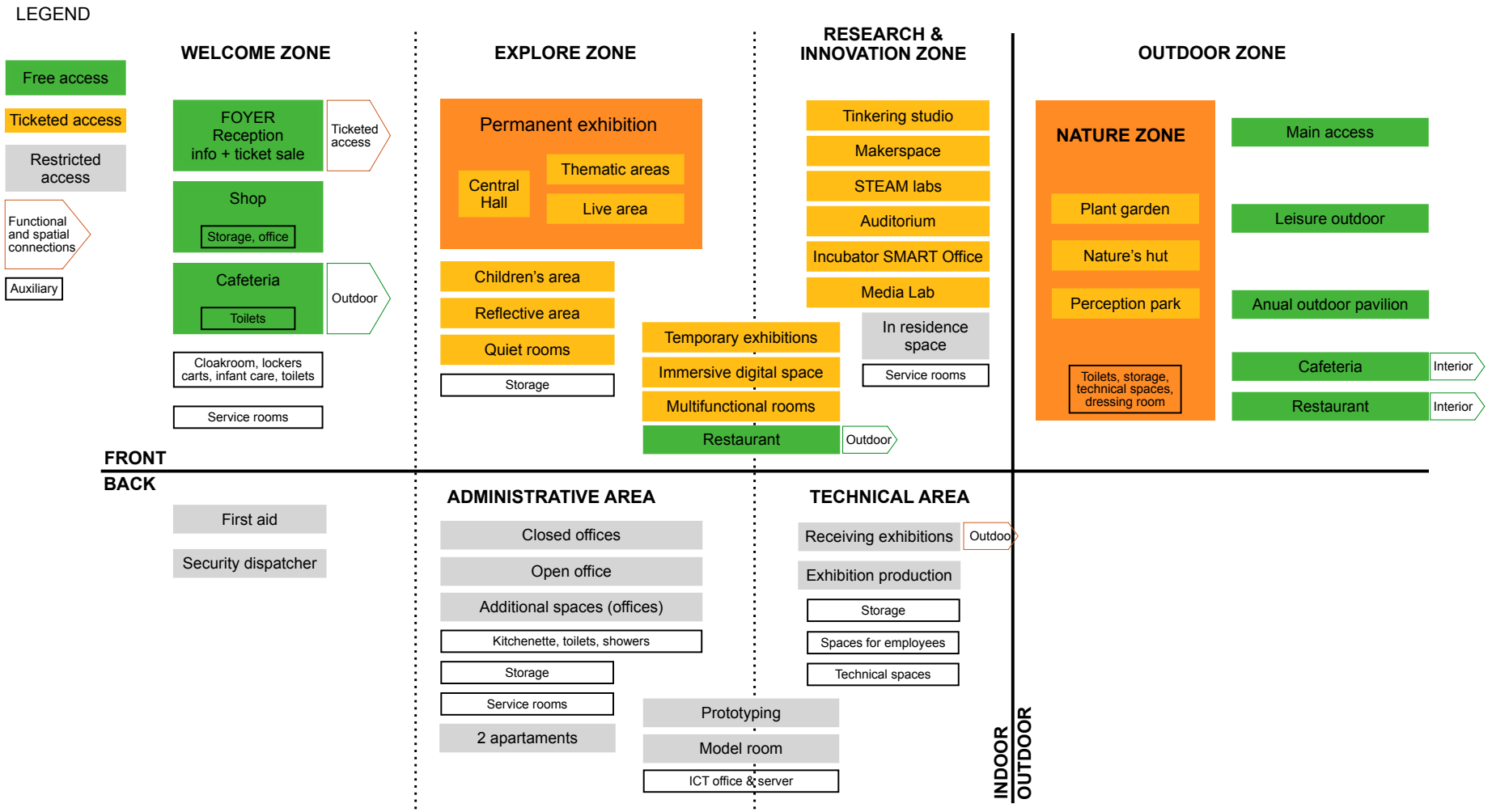

Diagram 2: Functional diagram of CLAS

The following tables detail the spaces and usable areas required by the Contracting Authority to ensure the performance of the basic activity, as follows:

- A. Reception area = 1,050sqm
- B. Exploration area = 3,820sqm
- C. Research and innovation area = 1,170sqm
- D. Administrative area + technical area (back of the building) = 922sqm +1,850sqm = 2,772sqm

Total usable area (UA) = 8,812sqm

The horizontal and vertical circulations, the surface occupied by partitions, the technical spaces necessary for the operation of the building, the **local anti-aircraft shelter (ALA)**[2] (if a basement will be provided) and the parking lots will be added to this area.

According to the Local Urban Planning Regulation Cluj _ Annex 2 _ the necessary **parking** for CLAS will be calculated as follows:

- Car parking: 1 parking space for every 50sqm UA + 1 parking space for every 15 people (for staff)
- bicycle parking - 1 place for every 50sqm UA
- In addition, 5-7 buses will be provided simultaneously, which will leave visitors in front of the entrance and wait in the parking lot.

Each competitor will calculate the required parking spaces for cars and bicycles, respectively, depending on the usable area (UA) of the proposed project. In addition, 6 parking spaces will be provided for the staff (min. 80 employees).

Car parking spaces will preferably be arranged (as far as possible) in the basement of the building, and bicycle parking lots and other non-motorized means will preferably be on the ground. To the extent permitted by the space, the number of parking spaces may be supplemented to serve other categories of the public in addition to CLAS visitors.

Maximum gross floor area = 15,000sqm (with the specification from point 3.3.)

According to the specifications under point 3.3., competitors may modify the areas given in the tables below, depending on the architectural solution, having the freedom to add spaces they deem necessary or appropriate in relation to the proper functioning of the science center/museum.

[2] see Decision no. 862/2016 for the approval of the categories of constructions for which the construction of civil protection shelters is mandatory, as well as for those for which civil protection command points are arranged.
See also the technical norms regarding the design and execution of civil protection shelters.
If the solution includes ALA, it will NOT be detailed in the competition phase, but only indicated in the plan as position and area.

A. Welcome Zone

Primary functions: receiving visitors, selling tickets, information point, rest, meeting point, leaving clothes and bags in the wardrobe, lockers for individual visitors and collective lockers for school groups.
Secondary functions: souvenir shop (with a small storage space), cafeteria (with the necessary annexes), toilets, infant care and feeding room, first aid, security, service spaces (staff toilets, additional storage spaces e.g. storage for cleaning materials).

The foyer is the main space for access, information, ticketing, transition and orientation. It is a welcoming space easy to comprehend. It is also an impactful space - in terms of scale, design and quality of finishes - as it offers the first contact and the first experience with the center. The space is comfortable, but not a place where to linger long, so as not to create blockages. It must serve several groups of visitors at the same time, for example school groups arriving by bus (more than 30 children in each bus), or groups of adults participating in certain events.
The foyer should also serve the Main Exhibition Hall, and access to other publicly accessible spaces should be clear and intuitive, without the need for excessive signage.

General considerations:
- Overall impression of friendly, welcoming space, in which visitors can easily navigate;
- Flexibility: this area contributes to the overall visitor experience and should be able to host occasional events, from scientific events to shows;
- The surface may vary depending on the solution, but the height will be generous;
- Light: it is preferable to benefit as much as possible from natural light, without an unjustified contribution of heating; natural light will be complemented by a flexible lighting system;
- Sound: sound system for events hosted in this space; an announcement console will be installed at the reception that will be able to connect all the exhibition areas through multiple speakers;
- Specific finishes: the possibility of a display system (placing, hanging) for objects weighing more than 500 kg will be provided.

Table 1.		RECEPTION AREA, total usable area (sqm) =	1050
	Accesses, forced connections, restrictions	Description	S (sqm) Estimated
Foyer	General access to all spaces of the center	Large enough to accommodate a school class + visitors, about 80-100 people at a time. If the program includes an event in the Auditorium (research and learning area), it will take into account over 200 people that are present simultaneously in the space for 20'. Friendly, welcoming, contains meeting space for groups (30+ children), comfortable space for rest. It will be able to host small science busking or performance events.	300
Reception, information	In the foyer, visible and accessible directly from the entrance	Point of information and ticket sales. Counter monitoring system showing "What's going on", prices, etc. Reception desk and information for 3-4 employees.	30
Shop	Free access from the foyer, but controlled anti-theft. Access to the storage of the shop should be suitable for the transport of large goods, by elevator / automatic door, etc. Direct links to loading, garbage/recycling and goods reception and storage areas.	Attractive, affordable. Includes a shopping area and a storage room. Adjacent private office for handling cash and storing valuables; lighting fixtures suitable for display and arranged in such a way as to give a certain flexibility to the space; in-store storage for items that need to be replaced frequently, as well as storage for bags, receipt paper and packaging materials; security systems for protection against loss and theft.	100
Cafeteria	Free access from the reception area, both indoors and outdoors, connected to the outdoor natural area. Dedicated access for delivery and disposal of waste.	Flexible dining hall for max. 2 school groups simultaneously (70 places), possibly closed during school visits (for noise isolation and child safety); includes sinks and trash cans so that school groups can clean after themselves. A free area where visitors can have a quick lunch (20 seats indoors + 50 seats on the terrace) Refreshment station. It could also host small events.	350
Wardrobe and luggage lockers	Free access from the foyer	for about 300 people classic locker room (~ 20sqm) (can also be used for corporate events), lockers for individual visitors and collective lockers for school groups (~ 40sqm), strollers storage. Lockable Wheelie Bins for schools, self-service locker systems.	80
Infant care and feeding room	Free access from the foyer Preferably self-contained and not connected to the toilets, much less in the women's bathroom.	It is a universal infant care/feeding room for men and women, which is also accessible in a wheelchair, has adjustable light and a sink.	10

Table 1.		RECEPTION AREA, total usable area (sqm) =	1050
	Accesses, forced connections, restrictions	Description	S (sqm) Estimated
Public toilets	Free access from the foyer	Toilets for men, women, people with disabilities Changing room for children and family toilet (allowing one parent to take several children to the toilet at the same time) - accessible by wheelchair	100
Service spaces	Restricted access	Cleaning room, toilet for employees and storage for operations: all printed materials that are used in the operations in front of the house - stock of tickets, season tickets, brochures, maps of the museum, catalogues with public programs; wheelchairs, strollers, walking frames or other devices that the museum can lend to visitors. The space can accommodate up to 50 strollers and buggies	50
First aid point	Restricted access	It is a room with a sink and drinking water, a consultation bed, first aid kit and supplies	15
Security dispatcher	Restricted access	Security space / gatekeeper cabin. Includes the central control system	15

B. Explore Zone

Primary functions: exploring and experimenting with interactive/hands-on exhibitions in the central exhibition hall. It has the following elements: central exhibition hall, five thematic hands-on exhibition areas, including a living area, temporary exhibition, children's exhibition, digital immersive space, reflective area and quiet rooms.
Secondary functions: multifunctional rooms - lecture halls for groups visiting the exhibition, for special events or simple workshops (side events) connected to the auditorium, toilets, service rooms (cleaning, toilets, etc.), access to the restaurant.

Table 2.		EXPLORATION AREA, total usable area (sqm) =	3820
	Accesses, forced connections, restrictions	Description	S (sqm) Estimated
Permanent exhibition	Direct connection with the outdoor area, creating a reference core for the Center Foyer access, ticket based; Public access to other spaces: - free to thematic exhibition areas, - Ticketed to the children's area; - Ticketed to the temporary exhibition area, the immersive digital space and the multifunctional rooms; - ticketed to the laboratories and the DIY workshop in the research and innovation area; - Ticketed from the restaurant with terrace in the garden; Restricted access, for employees only, to other spaces: - to the central storage, the workshop and the loading area, which allows the transport of exhibits with the help of the forklift; - to the Smart Office; The loading and unloading of exhibits will be done through a separate access route, protected from the public.	It will host hands-on interactive exhibitions, thematic facilitations and drop-in activities, business presentations and testing opportunities. The hands-on exhibition is a stand alone exploration station, which allows the visitor to conduct him/herself an experiment, usually within the field of natural sciences, to better understand the physical phenomena, as well as how science/technology works. **Central Hall:** - will host an emblematic object such as an airplane, a pendulum, a piece of kinetic art, a tree, etc. - the possibility of placing them or suspending them or from a single point will be considered - some of the loading requirements for the exhibition areas will be up to 20 KN/ m2; - free height min. 13 m; - the ability to control the light is essential, but a black box is not required. **Thematic areas** Five thematic exhibition galleries, on one or two levels - free height min. 5m with the possibility of suspending heavy objects. They include flexible and adaptable black box spaces in the sense of being able to display an extremely varied range of materials and media. The permanent and practical thematic galleries focus on various interdisciplinary topics, offering a broad exploration of ideas and stories in the field of science. The current proposal includes: - Stellar life: the life cycle of stars, galaxies and the universe. The role of stars in the production of elements of life, supernovae, black holes. Our sun. Life on other planets. - Unseen life: The chemistry of life, the cells, the DNA. Bacteria, viruses, fungi and other microscopic organisms. Germ theory about diseases, epidemics, pharmaceuticals, vaccination. Bacteria in us and for us. Extremophiles. Photosynthesis. - Life Evolving: The origins of life. Natural selection. Genetics. Ecosystems. Biodiversity. Extinctions. Climatic changes. Feedback. Sensory organs. - Human life: The human body. Biomechanics and sports science. Nutrition. Getting older. Neuroscience. Engineering and science. Health. - Future life: Artificial Intelligence. Algorithms. Robotics. 3D printing. Synthetic Biology. Future drugs and therapies. Climate change and environmental challenges. Sustainability. **Living area** - from showcasing living cells or living species (for example, ants) to various ways of making 3D printing using support gel printing, magnetic bacteria, or various natural wonders such as bioluminescence, mycelium roots, etc. - It can combine engineering, art, science and technology to explore new materials. It raises questions such as: What kind of structures and biomaterials can be created? How does nature make its way? This topic can be explored in various ways and is a basis for incubators as well as creatives and researchers.	2250

Table 2.		EXPLORATION AREA, total usable area (sqm) =	3820
	Accesses, forced connections, restrictions	Description	S (sqm) Estimated
Temporary exhibitions	Ticketed access from the welcome zone and (optionally) from the central exhibition hall; access to toilets; restricted access to the loading area, the central storage and the workshop;	A space that reflects the latest developments in science and technology; It can host either a blockbuster exhibition, or company or research exhibition, or it can serve as a rotating venue for travelling modules, or it can host large-scale events (drone competitions, cultural or business events, etc.); It could include an outdoor area; It includes a technical space, a transit storage and a repository for digital media equipment; Free height of min. 5 m, with the possibility of suspending heavy objects; can be higher and bigger (to host dinosaurs or drone competitions). It must be able to be completely isolated from natural light.	750
Children's area	Ticketed access from the central exhibition hall; restricted access to the loading area, the central storage and the workshop;	Learning area through play, dedicated to toddlers and pre-schoolers. Free height of min. 5 m, with the possibility of suspending heavy objects; It includes a space dedicated to group activities. It has access to toddlers toilets and infant care rooms. Natural light. Acoustic treatments for sound absorption.	250
Immersive digital space (with projection box and equipment storage)	Ticketed access from the welcome zone	multimedia room, gallery type; it incorporates future technologies for immersive experiences, in-gallery digital interactivity, innate in-gallery ICT: immersive, intuitive, seamless. It also uses technology to open art to the general public or to inspire collaboration between the academia, the creative sector and the research sector. It involves all five senses to provide sensational, multi-sensory, informative and memorable experiences. Activities: planetarium projection, virtual reality, AR, Kinect, 3D projections, 3D drawing, tracking systems with sensors and lasers. The programs range from education, performances, promotion, entertainment, cultural and research mission, to branding events and presentations. Capacity for up to 100 visitors, offering a 3D/4D experience - immersive projection space, min. 11m height (ideal), closed, black box (total light control). Components: Projection space (16x9m), server room of approximately 12sqm (distance to the optimal projection space 25m, maximum 50m), special air conditioning system.	150
Multifunctional rooms (with equipment storage)	free access from the central exhibition hall and thematic exhibitions, optional controlled access from the research and innovation area, optional controlled access from the auditorium	a flexible and adaptable space, possible to be subdivided into four smaller spaces, with acoustic separation between them, used for: information for groups of visitors (min. 35 people each), research and observation projects, workshops, rental for events etc. Dynamic and welcoming, with natural light, it offers the possibility of spatial arrangements through the use of mobile chairs. Ideally, the spaces can be directly connected to the outside, making it easier to move summer activities in and out. Includes storage for consumables and equipment for activities and storage for tables and chairs - about 200, which can be used anywhere in the center.	200

Table 2.		EXPLORATION AREA, total usable area (sqm) =	3820
	Accesses, forced connections, restrictions	Description	S (sqm) Estimated
Reflective area	free access (from the central exhibition hall - or free, depending on the solution). As it has its own drop-in activities, it should be easily accessible to various types of audiences and can be reserved for private events or conferences.	Space for pause, reflection and relaxation. It supports the CLAS practice, which places well-being within an ecological and future-facing frame, rethinking the role that cultural spaces can play in creating more resilient people and places. If the exhibition spaces facilitate feelings of contemplation, pure joy and amazement associated with the discoveries, this space supports the parasympathetic state of the autonomic nervous system, associated with relaxation, regeneration and recovery. It can host events, concerts, conferences, a space for "museum night" events, a potential venue for a unique art event or installation of objects. It can accommodate up to 50 people. Generous height, good natural light and acoustics.	170
Quiet room		space dedicated primarily to children who may be sensory or socially overstimulated, especially children on the autism spectrum, who may need a break before resuming their visit.	30
Deposit		cleaning materials for exhibition spaces and exhibits	20
Restaurant	Indoor and outdoor (terrace) access to toilets for the public; Dedicated access for supply and disposal.	100 people Kitchen (storage, preparation), locker rooms, showers and toilets for staff; Refreshments station	250

Special requirements for exhibition spaces:

Electrical: boxes with electrical sources in the floor, 3m grid;
Sound: In general, good acoustics should be considered in all areas, but in these areas in particular, noise can be a problem: sound-absorbing treatments are required.
Microclimate requirements: As it is a cultural space that accepts and hosts a number of traveling and international exhibitions, temperature and humidity control must be ensured within restricted parameters for its high-volume exhibition spaces.
Vibration sensitivity: Installations (especially HVAC) that produce vibration will be isolated from the elements on which the projection equipment can be hung, in order to avoid the micro-vibrations of these elements, and implicitly of the projected images.

C. Research and Innovation Zone

Primary functions: STEM+ laboratories, manufacturing laboratories, tinkering and maker-space (or fab-lab), area of flexible offices (smart office) and innovation gallery, media lab, auditorium and study / residence space. These facilities will be accessed by professors, university students, researchers and innovators, enabling inquiry based learning, research projects, rapid prototyping, technology transfer and start-up incubation.
Secondary functions: storage, laboratory preparation rooms, toilets, kitchenette, staff locker rooms, showers.

Table 3.		**RESEARCH AND INNOVATION AREA, total usable area (sqm) =**	**1170**
	Accesses, forced connections, restrictions	Description	S (sqm) Estimated
Tinkering Studio (DIY and creative workshop)	ticketed access from the reception area, the two areas should be connected (visually and/or from the access point of view), a prior information meeting of the groups in a multifunctional room or similar is required, restricted access to the workshop and storage - DIY workshop: activities without programming - Makerspace: access based on reservation	They are two connected spaces that can merge, they should be connected visually or physically (transparency and/or direct access between the two). There are two associated facilities that provide both an educational basis for solving construction problems and the possibility of digital manufacturing and rapid prototyping (especially additive manufacturing) for projects in the fields of science, education, human-centred design and sustainable development. **Tinkering Studio:** DIY and digital production workshops - With the help of less complicated tools than those offered by the makerspace / fablab, the Tinkering studio shows how manufacturing and "making" give the creator the opportunity to imagine new possibilities, to build, test and reflect on them, and then to revise their ideas based on these reflections. It is an 80sqm space, dedicated to beginner or intermediate level producers over the age of 6, for 30-35 people working around collaborative banks or islands. It hosts water activities, has a sink for sanitation. Includes a storage room and a space for technicians. Ideally, it can be combined with the outdoor area, making it easier to move summer activities outdoors. **Makerspace:** consists of a collection of design and modelling tools (e.g. 3D printers/scanners), prototyping and manufacturing (CNC milling machines, laser cutting machines, etc.), instrumentation and testing, and documentation for a wide range of applications in formal and informal education, in the field of health and environmental monitoring, as well as in economic and social development. Conditions: Natural light, adequate noise cancellation and ventilation system, as some machines create a dusty and noisy environment.	80
Makerspace (manufacturing laboratory)			130

Table 3.		RESEARCH AND INNOVATION AREA, total usable area (sqm) =	1170
	Accesses, forced connections, restrictions	Description	S (sqm) Estimated
STEAM laboratories	Ticketed access from the reception area and the exploration area /// Open Community Lab - restricted access for the general public. It could become accessible for project-based activities for small groups of audiences	3 pairs of laboratories of 60-70 sqm for 25-30 people each, with a preparation, technical and storage room of 50 sqm for 2 laboratories (per couple), it is desired that each pair of laboratories can be merged. The laboratories come in pairs, because the range of equipment and programs varies from the level of primary schools to the level of university expertise and research. Equipped with modern equipment, mainly aligned with the national curriculum for STEM (Science, Technology, Engineering and Mathematics) and research accessories. The whole concept emphasizes the principle of education for all, providing access to STEM disciplines and careers regardless of identity, social status or academic level. Conditions: natural light, adequate ventilation system; Wet and dry preparation between each coupled laboratory requires a high level of safety and adequate ventilation. Natural light and acoustic separation between spaces.	350
Auditorium	access from the reception area, optional from the exploration area (for large-scale events, science popularization shows), with or without a ticket. Possible access to multifunctional rooms in the exploration area.	max. 200 people AV screen and equipment, minimal VIP backstage makeup room Storage, toilets, self-service locker room.	250
Incubator SMART Office	restricted access for the general public. The space is intended for researchers, students, the business community, the creative industries and teachers. It could become accessible for project-based activities for small groups of audiences.	a common work area with about 25 individual workstations, a discussion / workshop area and a kitchenette. The space also houses a comfortable reading space and a mini-resource center with magazines, key reading materials, a gallery showcasing innovative prototypes produced in CLAS, and educational kits for teachers.	150
Media Lab	for the most part, this space has restricted access for visitors. It could become accessible for project-based activities, for small groups of the public, in the reception area and in the central exhibition hall.	media production studio for content development, recording and broadcasting. The ideal size would be to accommodate at least 5 people in the space with equipment. Conditions: Natural light with the possibility of creating a dark, soundproof box.	40

Table 3.		RESEARCH AND INNOVATION AREA, total usable area (sqm) =	1170
	Accesses, forced connections, restrictions	Description	S (sqm) Estimated
In Residence space	For the most part, this space has restricted access for visitors, being a space for scientific and artistic residencies. However, there may be exceptions to the program when receiving public visitors.	Accommodation for one to three people.	70
Service spaces		Toilets, kitchenette, staff locker rooms, showers	100

D. Back of the House

Primary functions: exhibit development and design, creation and restoration, prototyping, transport of exhibits (freight elevator, corridors, etc.), loading bay, storage, garage, offices and technical spaces.

Table 4.		ADMINISTRATIVE AREA, total usable area (sqm) =	922
	Accesses, forced connections, restrictions	Description	S (sqm) Estimated
Office space / CLAS area administration for at least 80 employees	separate external access through a reception room, restricted access from the welcome zone / explore zone, connection to the technical and workshop area; desired eye contact with the exhibition hall, without interfering with staff activity. The education office is preferably connected to the welcome zone / exhibition area	General manager's office + secterariat	25
		Human resources office	15
		Project / Grants Office (2 persons)	15
		Accounting and Finance Office (2 persons)	15
		Communication office (3 persons)	25
		Education Office (8 persons)	45
		Open office (41 persons)	300

Table 4.		ADMINISTRATIVE AREA, total usable area (sqm) =	922
	Accesses, forced connections, restrictions	Description	S (sqm) Estimated
Additional spaces		Conference room	60
		Training rooms for large groups	40
		Silent room for phone calls	12
		Break and social spaces	50
		Prototyping room and model room (used in conjunction with the technical area)	80
Secondary functions		Changing rooms; kitchenette / office; toilets; rest room	110
		Storage for disaster response equipment; Copy Room / Resource Room / Storage Space / Archives; recycling room: storage of cleaning materials	50
Apartments		2 apartments for residents (2x40sqm)	80

Table 5.		TECHNICAL AREA, total usable area (sqm) =		1,850
	Accesses, forced connections, restrictions		Description	Usable area (sqm) Estimated
Receiving exhibitions	- access from the loading bay and workshop, access to the freight elevator - restricted access from the public area, connection of the Technical-Workshop area (mainly), the storage and the loading bay to the Explore Area, easy access for cleaning	shipping / reception bay for exhibitions, delivery and packaging. Preferably, it will have 2 loading platforms / compartments: - a compartment and a parking space for a museum van, which can also be used by small delivery vehicles; - and a large loading compartment, suitable for tractor with large trailer.	Platforms + loading space	150
			Packing / Unpacking / storage of packaging (crates)	100
			Temporary sorting and storage area	50
			Exhibit handling equipment	50
		allows the segregation of any object or transport that shows signs of possible contamination with pests or chemicals	Quarantine room	25

Table 5.		TECHNICAL AREA, total usable area (sqm) =		1,850
	Accesses, forced connections, restrictions		Description	Usable area (sqm) Estimated
Exhibition production	separate (restricted) access to the building, access to the staff locker room and kitchenette, access to the storage and loading bay, proposal to connect to the Smart office / Administration area through the creative-prototype room, access to the freight elevator	The engine room, the electronics room, the assembly room, where the carpentry, metal and plexiglass work, are painted and other processes that produce dust or vapours that could affect the museum environment are carried out.	Tool storage, workshops / assembly	200
Storages	access from the loading area and workshop, access to the freight elevator	Storage of consumables, tools and equipment. Storage of raw materials and tools. An important additional feature of exhibition support facilities is the storage of numerous exhibition items (showcases, panels, baseboards, kiosks, etc.) that are not currently in use.	Storage of materials for exhibitions	500
			Transit storage for itinerant works (arrivals, departures)	20
			Storage of furniture, materials	150
			Recyclable / separate waste disposal by type	20
Spaces for employees			Security / surveillance camera of the charging process	15
		space for meetings and discussions between staff members in the workshop space; break-out space	Meeting and rest area	20
		The showers will be used mainly by mediators, volunteers, and the maintenance team.	Kitchenette, locker rooms, toilets, showers	50
Technical spaces			server rooms; HVAC; technical space for exhibition areas, etc. more	500

E. Nature Zone (outdoors)

Table 6.		
	Accesses, forced connections, restrictions	Description
The plant garden	Free access from the outdoor	vegetable beds, herbs, support plants and shrubs; composting / recycling area of food and other items that can be included in plant growth and insect life; Hydroponic cultivation area; Shed for tools and equipment for plant cultivation and garden care; Technical requirements: water for spraying / water and pond filtration / water and greenhouse air conditioning / hydroponic system Extra: storage, water for gardening and sanitation, toilets, showers and changing rooms for staff
Nature's hut	separate ticket, purchased from the reception area (inside)	Pergola /hobbit house (provides shelter / informal study opportunities for up to 30 children)
Annual pavilion	Free access from outdoor	outdoor space for temporary installations and events
Perception Park	separate ticket, purchased from the reception area (inside)	a terraformed and specially designed site that stimulates perceptions

3.4.2.2. General data, design directions

Competitors are invited to design a "bio-integrated", "iconic", inclusive, flexible and adaptable architectural solution that takes into account the following:

- Self-regulation: similar to natural systems, the building should respond and adapt to internal and external conditions, be resilient and efficient in the use of energy and water.
- Minimum consumption of utilities from the urban network - taking into account the climate of Cluj, the geology of Cluj and the specific location of CLAS, the possibility of providing solar, wind and even geothermal energy, heat and water will be explored. Cooperation with natural phenomena will be pursued, as, in the end, all science, technology and engineering will be based on their study and understanding. Innovative solutions in ventilation, heat distribution, lighting and so on, which use natural processes, can be demonstrations of the principles on which the institutional program is based.

- Interconnection - a healthy organism is integrated with living systems both inside and outside. Imagine a building with a "bio-integrated architecture", in which life enhances the architecture, for example, through vertical gardens or walls favourable to algae, moss and lichens, which suck in pollutants and pump oxygen.
- The connection between the interior and the exterior will be explored so that the visitor's path can directly meet natural environments.
- Particular attention will be paid to the experience of the building - above all, the building must be used by many people, of all categories - with respect for inclusion as a central principle. Attention will be paid to the use of different sensory environments, especially visual and acoustic ones, and to their role in shaping the visit. In addition, the impact on health and well-being will be considered, a need further highlighted in the context of the current pandemic - for example, "contactless paths" through the building, the way spaces are organized in terms of access, sanitation, space, airflow. The design of architecture and the integration of good airflow and eco-design can also support the health of the human microbiome.
- The visit will be fluent and flexible, allowing reconfigurations of the visit, crossings or interruptions of the circuits, to be able to resume them or after spending time in other areas (reflection room, cafeteria, shop, garden, etc.) or on another occasion. In order to prevent the installation of the well-known “museum fatigue”, the museum circuits will integrate relaxation spaces, equipped with appropriate furniture and will offer the possibility of interruption and return.
- The building will be "smart" – it will integrate multiple environments and interactivity, including smart lighting, multimedia guides, voice recognition and control, virtual and augmented spaces.
- The building must meet the basic accessibility requirements (including emergency exits should be adapted for use by people with reduced mobility); safety and security (minimizing the risk of accidents and injuries without restricting children's learning; preventing unauthorized access and exit of unaccompanied children; flexibility and adaptability (allowing for future adaptations), sensory awareness - the environment has an impact on the sensory experience of children, so it should be soothing, with low levels of stimuli, good quality acoustics, adequate levels of controllable lighting and no glare.
- Integration of solutions related to maintaining health conditions (e.g. in a pandemic context). New technologies can help monitor congestion and access, limit staffing, and help manage crowds and flows. This way you can indicate which areas are less crowded. At the same time, waiting areas may be required for certain sections, where people may wait before being admitted to the next section.
- Integration - outdoor spaces and those for public catering can be used to animate and increase the attractiveness of the building, as well as for its integration into the pedestrian circuit of the area - possibly in relation to the urban square.

Flexibility

In order to allow adaptation over time to the dynamics of certain activities or to changes in the conception and practices of education, research and innovation, the projects will allow a certain degree of flexibility, through non-radical transformations such as additions, modifications or removals of compartmentalization elements of the exhibition and complementary infrastructure, interpretation and presentation infrastructure, etc.

Accessibility

a) Physical accessibility
The provisions adopted to ensure the accessibility of people with disabilities cover the entire campus space, both the outdoor and indoor spaces. Measures to ensure the physical accessibility of the CLAS function system and public spaces should not be limited to persons with reduced mobility. These measures must also include the tactile and audible communication systems required to enable the guidance of persons with visual and hearing impairments. A person with motor or sensory limitations must be able to walk the same public route as other users.

b) Intellectual accessibility
Projects should include measures for better intellectual accessibility of CLAS. These include information complementary to the exhibition, the information infrastructure and its stratification, so that it is addressed to both the uninformed and the specialist visitor, both the occasional visitor and the loyal visitor, regardless of age. All necessary measures will be taken to achieve a campus free of physical and intellectual barriers to the experimentation of spaces and the conduct of all research, education, collaboration, etc.
The inclusion of people with disabilities in all sectors of society is not only a European concern, but global, being constantly on the political agenda of the UN and the World Health Organization, and in the alternative of the European institutions.

3.5. SPATIAL-FUNCTIONAL AND TECHNICAL REQUIREMENTS:OBJECTIVE NO. 2

Babeș-Bolyai University aims to develop an open and engaging learning environment that encourages interaction and enhances scientific progress through the following sub-objectives:

- InfoBioNano4Health — JR&IC (Joint Research & Innovation Center) / joint research-development-innovation center of Babeș-Bolyai University (UBB), bidirectionally integrated with the regional socio-economic environment in the open innovation / science formula, through which the University will direct its research in the fields of informatics-mathematics / cognitive sciences / artificial intelligence / bio-nanosciences / life sciences-health towards innovative developments in the field of health;
- Faculty of Mathematics and Computer Science (FMI) of Babeș-Bolyai University; and
- Student dormitory (500 places) for the students of this faculty.

The three sub-objectives will be funded from multiple sources and implemented in stages. Research infrastructure is more easily eligible for funding from European funds, as opposed to education and housing infrastructure. Therefore, the configuration of the complex will have to allow the autonomy of the research areas of the Faculty of Mathematics & Computer Science (planetarium + astronomical observatory, research-development-innovation area and documentation center) and even the possible "conceptual and functional attachment" to the InfoBioNano4Health center, depending on funding opportunities. This flexibility of implementation does not in any way condition the number of buildings / building bodies for each objective, but invites the complex thinking of the relationships between the functional areas detailed below. In the cost estimate, the research area (3000sqm) was calculated together with InfoBioNano4Health (7000sqm), resulting in the indicative area of 10,000sqm used to estimate the investment and design fee. In this document, the research area will be detailed in Chapter 3.4.2. Faculty of Mathematics and Computer Science.

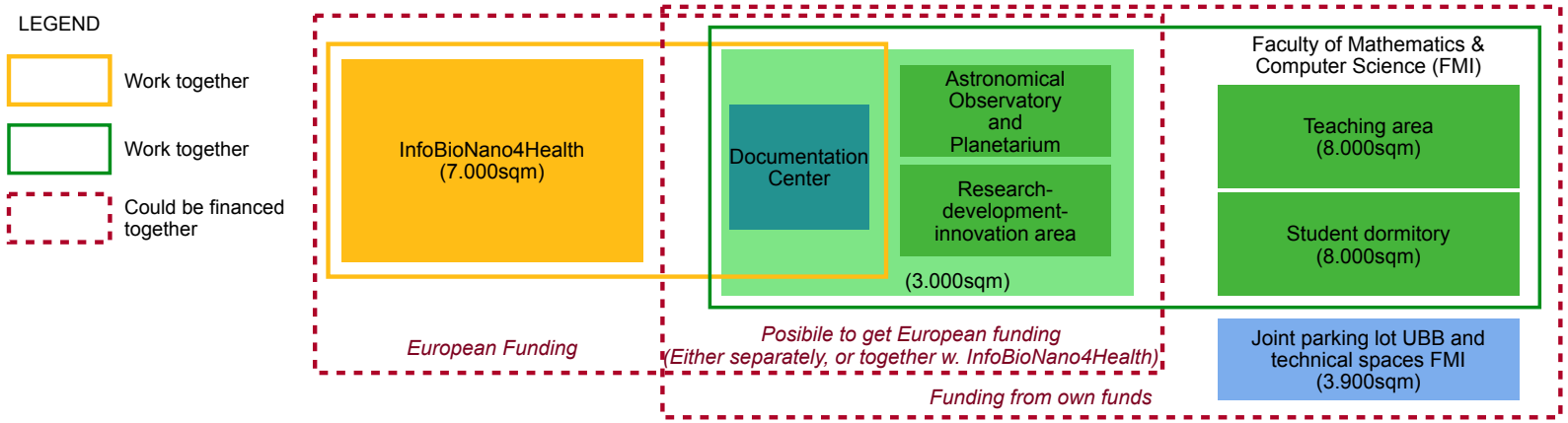

Diagram 3. Sub-objectives of UBB

3.5.1. INFOBIONANO4HEALTH

InfoBioNano4Health will be a Joint Research & Innovation Center developed in connection with regional areas of smart specialization, in a Quintuple Helix innovation paradigm, which involves the interaction and exchange of knowledge between five subsystems: (1) research and education system, (2) economic system, (3) environment, (4) civil society and (5) political / administrative system. Such an approach creates a favourable environment for creative thinking and innovation, an environment in which enterprises (especially SMEs, but also start-ups, spin-offs), universities, research centers and civil society actors can co-generate innovative products (goods and services) and processes and where other activities can be carried out throughout the innovation chain - including training and education programs and a range of innovation support activities - as well as related, complementary services - incubation and acceleration business - strengthening the path from research to market, and generating sustainable innovation projects with a market impact.

InfoBioNano4Health (JR&IC) will play the role of:
- Joint Research & Innovation Center (JR&IC) focused on demand-driven research and innovation, respectively on open, modern technology transfer services with possibilities for co-creation, prototyping and micro-production,
- Innovative business technology incubator,
- Provider of complementary services/support for SMEs with emphasis on education, training, respectively on consulting services in business development, scaling / internationalization, market and marketing studies, identification and attraction of non-reimbursable financing sources and financial tools, etc.

3.5.1.1. Spatial-functional requirements

InfoBioNano4Health will be organized into functional groups comprising laboratories, offices and related spaces, to which a business technology incubator is added, as well as shared and publicly accessible spaces and functions:

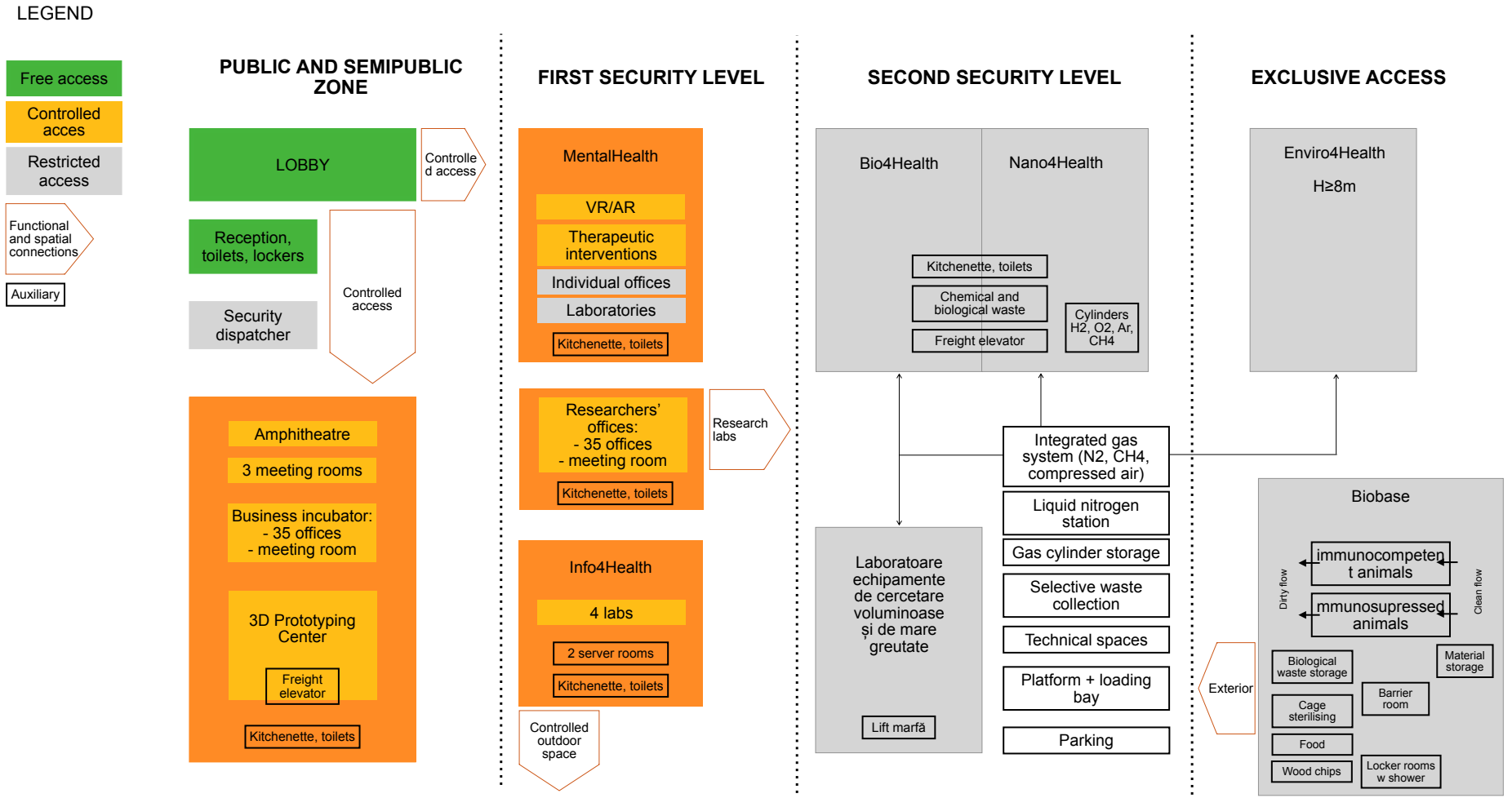

Diagram 4. Functional diagram of InfoBioNano4Health

The following tables detail the spaces and usable areas required by the Contracting Authority to ensure the performance of the basic activity, as follows:

- I. Public and semi-public area = 1,320sqm
- II. MentalHealth = 420sqm
- III. Offices for researchers = 420sqm
- IV. Info4Health = 420sqm
- V. Bio4Health = 540sqm, of which 65sqm in common with Nano4Health (toilets + office, chemical landfill)
- VI. Nano4Health = 505sqm (of which 50sqm gas cylinder storage, which will be located on the ground, well insulated from the rest of the spaces)
- VII. Laboratories with bulky and heavy research equipment = 640sqm
- VIII. Bio base = 400sqm
- IX. Enviro4Health = 300sqm

Total usable area (UA) = 4,965sqm

The horizontal and vertical circulations, the area occupied by partitions and the technical spaces necessary for the operation of the building/buildings will be added to this area.[3]

Maximum gross floor area = 7,000sqm (with the specification under point 3.3.)

According to the specifications under point 3.3., competitors may modify the areas given in the tables below, depending on the architectural solution, having the freedom to add spaces they deem necessary or appropriate in relation to the proper functioning of the science center/museum.

According to the Cluj Local Urban Planning Regulation _ Annex 2 _ the parking needs for the research center will be calculated as follows:

- Car parking: 1 parking space for every 80sqm UA
- bicycle parking - 1 place for every 80sqm UA

Each competitor will calculate the required parking spaces for cars and bicycles, respectively, depending on the usable area (UA) of the proposed project. Parking spaces required for all UBB sub-objectives will be treated in an integrated manner.

[3] Parking lots were not calculated in the 7,000sqm. The University has allocated a maximum built area of 3,900sqm for the technical spaces of the Faculty of Mathematics and Computer Science (FMI) and for a parking space common to the three sub-objectives (InfoBioNano4Health, FMI and the dormitory). The rest of the parking spaces will be arranged on the ground.

I. Public and semi-public area

The InfoBioNano4health platform is built on the paradigm of open innovation / open science / open access, which implies the *free circulation of ideas and the co-creation of products and services with a flexible intellectual property regime*. This paradigm also includes the involvement of all relevant members of civil society in research-development-innovation (RDI) activities such as: *co-design activities* (workshops, target groups, roadmaps and policies) including in-depth discussions on implications, ethics, benefits and challenges of RDI, technology development, *co-creation activities* (involving citizens and/or end-users directly in the development of new knowledge and innovation, for example through citizen-science), and *co-assessment activities* (such as in monitoring, evaluation and feedback in an iterative or even continuous way).

Table 7.			**Public area, total usable area (sqm) =**	**1320**
	Spaces	Accesses, forced connection, restrictions	Description, equipment	S (sqm) Minimum
Reception area	Lobby + reception + toilets + wardrobe	Free access from outside, orientation center to all areas of the building	Welcoming space, facilitates orientation. It can host events to disseminate the results of scientific research. It can also act as a foyer for the amphitheatre and meeting rooms, in which case the area can increase.	300
	3 modular meeting rooms, 3x50mp = 3x2x25mp	Controlled access from the lobby	in connection with the lobby area, they can work together; modular (each room can be divided into two)	150
	Amphitheatre	Controlled access from the lobby	In connection with the lobby area, they can work together	250
Business incubator	35 offices x10sqm	Controlled access from the lobby; Possibly connected to a controlled outdoor space	Offices - business technology incubator / support for SMEs and start-ups - development together with JR&IC; Individual offices for SMEs, start-ups / modular – to be able to host larger companies Depending on the solution and within the maximum area, the kitchenette will be enlarged and thought of as a place to rest and socialize, exchange ideas, conversations	350
	1 modular meeting room, 40sqm = 2x20sqm			40
	Kitchenette + toilets			30

Table 7.			Public area, total usable area (sqm) =	1320
	Spaces	Accesses, forced connection, restrictions	Description, equipment	S (sqm) Minimum
Prototyping Center	Among the services to be provided by the InfoBioNano4health Platform are access services to FAB LABS consisting in the use of the facilities offered by the Prototyping Center (digital equipment - printers, 3D scanners, CNCs, 3D design software, etc. and RDI staff) for the development of product prototypes.	direct access controlled from the lobby; access to the outside, loading / unloading platform and freight elevator	Equipment: — 3D bioprinters of soft and cartilaginous tissues based on polymers, CNC machine, industrial laser engraving and cutting machines, which will allow bioprinting in medicine / health: - making prostheses, implants with a porous surface with the ability to integrate more easily, - creation of 3D artificial organs, - biocompatible fabrics, leather substitutes, - porous tablets with gradual elimination of the bioactive compound, - making orthotic implants and devices, electronic enclosures for monitoring devices, research equipment, electrical parts, custom packaging to maintain sterility, parts made of plastic at high temperatures, medical instruments; — metal powder-based metal 3D printers, 3D printers for composite materials, carbon fibre, high temperature 3D printers for prototypes and high precision finished products, usable for PEI (ULTEM™), PEEK, PLA, ABS type materials , Nylon (PA6/69) and Polycarbonate, industrial laser engraving and cutting machines: Titan express, Laser Towel XP, etc., CNC machine: DMG Mori, Okuma Genos L2000-E, STM1325-R1, ST7090-2F, etc. for precise cutting of metal, plastic, composite materials, wood, etc.	200

First security level

Here are: MentalHealth - with spaces accessible (in a controlled manner) to the public and spaces intended exclusively for researchers; offices for Bio4Health, Nano4Health and Enviro4Health researchers - who will have easy access (through an indoor space) to the laboratories in the respective areas, where they will be assisted by the permanent staff of these laboratories; and the Info4Health area - similar in size and organization to the business incubator, but intended for the center's researchers.

II. MentalHealth:

Development of innovative psycho-social interventions and personalized prevention programs that can reduce the negative impact of stress and mental health problems, interventions that are tested according to the evidence-based personalized medicine model; research aimed at investigating the neurobiological substrate underlying mental disorders (e.g. functional neuroimaging or EEG studies) in order to develop new explanatory models and diagnostic methods, respectively objective means of testing and early identification of mental health problems (e.g. neural markers that precede the onset of chronic problems such as depression); the

use of emerging technologies such as virtual and augmented reality, social robots and mobile devices/online environments to increase the efficiency and accessibility of scientifically validated psycho-scholastic interventions, specialized services offered remotely, through electronic media, according to the eHealth model.
- 1 room for Virtual/Augmented Reality and Online Interventions training, Individual offices, 3 laboratories, 1 meeting room modular format, 1 room of therapeutic interventions;

Table 8.			**MentalHealth, total usable area (sqm) =**	**420**
	Spaces	Accesses, forced connections, restrictions	Description, equipment	S (sqm) Estimated
HEALTH	1 room for Virtual/Augmented Reality and Online Interventions training	Controlled access from the lobby	- it can occasionally accommodate groups of max. 50 persons - CAVE EON Reality ICube VR system with four projection walls	70
	1 therapeutic intervention room	Controlled access from the lobby	- it can occasionally accommodate groups of max. 10 persons	20
	A modular meeting room	Controlled access from the lobby	40sqm=2x20sqm	40
	Individual offices	Restricted access	15x10sqm	150
	laboratory	Restricted access	3x40sqm	120
	Kitchenette + toilets	Controlled / restricted access		20

III. Offices for researchers

Table 9.		**Offices for researchers, total usable area (mp) =**	**420**
	Accesses, forced connections, restrictions	Spaces	S (sqm) Minimum
Offices for researchers	Controlled access from the lobby; Possible connection with a controlled outdoor space (terrace, garden, etc. with seats, meetings, collaboration) Proximity / easy access (inside) to the laboratory area	Individual offices, each with a workstation with cloud access: 35 x 10sqm	350
		1 modular meeting room, 40sqm = 2x20sqm	40
		Kitchenette + toilets Depending on the solution and within the maximum area, the office will be enlarged and thought of as a place to rest and socialize, exchange ideas, conversations	30

IV. Info4Health:

Development of IT solutions that use the most advanced computing techniques and Artificial Intelligence (AI) to address health issues. Research and development activities focus on solutions based on AI models, data analysis methods and machine learning techniques to address the problems of prediction, classification, diagnosis, monitoring, personalized intervention and prevention in the fields of biomedical, environmental protection and mental health.
- 4 computer labs, 2 server rooms; robotics, blockchain, data analysis, community IT services, bioinformatics;

Table 10.			**Info4Health, total usable area (sqm) =**	**420**
	Spaces	Accesses, forced connections, restrictions	Description, equipment	S (sqm) Estimated
INFO	4 computer labs, 30 workstations each, 4x75sqm	Controlled access from the lobby; possibly access to a controlled outdoor space	Computing equipment for the analysis of complex health data and the execution of high-performance computing techniques Coworking / open space / 21st century office space	300
	2 server rooms	Restricted access	2x50sqm	100
	Kitchenette + toilets		Depending on the solution and within the maximum area, the kitchenette will be enlarged and thought of as a place to rest and socialize, exchange ideas, conversations	20

Second security level

Here are the research laboratories for Bio4Health and Nano4Health, which will work together and share the auxiliary functions, namely the chemical and biological waste landfill (with access to the outside for disposal) and the spaces for employees - the office and the toilets. The two research structures will also have access (preferably direct) to joint research laboratories with bulky and heavy research equipment.

V. Bio4Health:

In order to support the transfer of the results of biomedical research to the community, the aim is to develop and accredit a medical laboratory to conduct investigations for the molecular diagnosis of rare genetic diseases and various chronic diseases (autoimmune diseases, cancer, infectious diseases). It will also ensure the development of rapid detection and analysis systems for pathogens

(approved kits) for the identification and screening of diseases such as cancer or emerging infectious diseases (at risk of pandemic spread), thus supporting local clinical laboratories and increase in early diagnostic capacity.
— 3 rooms with biosecurity conditions, 1 room dedicated to distilled water and ultrapure water installations, in which there will also be glass washing and drying machines, 1 room for sterilization, 2 day reagent depots, 1 cold room, 1 freezing room, 1 sterile room for protein crystallization, 1 room for protein purification and isolation, 1 room for protein and genetic material analysis, 2 centrifuge rooms, 3 science laboratories, 1 room for medium preparation and anaerobic cultivation, 1 room for plant growth.
— restricted access, through lobby; higher level of security, selective access.

Table 11.		**Bio4Health, total usable area (sqm) =**	**540**
	Spaces	Description, equipment	S (sqm) Minimum
BIO	3 rooms with biosecurity conditions, 2x20sqm + 1x10sqm 15sqm antechamber	- Antechamber (work equipment, day storage) - a mammalian cell culture chamber (20 sqm) equipped with CO2 and N2 cylinder incubators and bioreactors for lipid nano formulations, wall-mounted HEPA filters, air conditioning, security level - BSL-2 (EN 12469, IEST ISO 14644-1); - a room for cultures of pathogenic / non-pathogenic bacterial cells (20 sqm) equipped with incubators coupled to the gas pipeline, hood with laminar flow, air conditioning, security level-BSL-3 (EN 12469, IEST ISO 14644-1). - a room for handling fungal and plant crops (10sqm) equipped with sterile niches with laminar flow class II, security level - BSL-2 (EN 12469, IEST ISO 14644-1) - Three-phase power sources in each room; - Methane gas source (CH4).	65
	Water installations	A room dedicated to distilled water and ultrapure water installations + glass washing and drying machines	20
	sterilization	A sterilization chamber; three-phase current source; methane gas source (CH4).	20
	2-day reagent deposits, 2x15sqm	One of the storages with secure metal cabinet, anticorrosive and flame retardant for storage of organic solvents, flammable compounds, acids, bases, according to EN 61010-1, EN 14727, EN 14470-1, DIN 4844, ISO 3864	30
	A cold room	modular chamber with 100 mm thick metal panels (steel, aluminium), with temperature, humidity control, according to ISO 13485, ISO 9001 (https://www.vdwcoolchainers.nl/site/media/PDF_laboratoria_producten/Koel-en%20vriescellen/Arctiko/Arctiko.pdf)	20
	A freezing room	modular room with the possibility of refrigeration (-18°C/-30°C), according to ISO 13485, ISO 9001 (https://www.arctikoengineering.com/media/1286/engineering.pdf)	15

Table 11.		Bio4Health, total usable area (sqm) =	540
	Spaces	Description, equipment	S (sqm) Minimum
	A sterile room for protein crystallization	- 3-4 persons - HEPA filters, air conditioning, sterilization with UV lamps (overnight) normal device weight, it does not require special resistance structures - Equipment: mosquito® crystal Nanolitre Protein Crystallization Robot	50
	A room for protein purification and isolation	- 3-4 persons - HEPA filters, air conditioning, sterilization with UV lamps (overnight) normal device weight, does not require special resistance structures - Equipment: sterile hoods, fermenters, bioreactors, centrifuges, FPLC, electrophoresis, NanoTemperTeh equipment, multiplate reader	60
	1 room for protein and genetic material analysis	- 2-3 persons - chemical niche (according to: EN 14175; EN 61010-1; EN 14470-1), with dedicated / marked space for working with toxic / volatile chemical agents (acrylamide, ethidium bromide) HEPA filters on the wall, security level - BSL- 2 (EN 12469, IEST ISO 14644-1), for sample preparation for qRT-PCR + flow cytometer with integrated / built-in FACS cabinet Class II Type A2 (BSL-2 A2), ELISA Reader, spectrophotometers, spectrofluorometers; - Three-phase current source; methane gas source (CH4)	40
	spinning rooms, 1x20sqm, 1x15sqm	a room for ultracentrifugation, high speed (100,000xg) (preferably in the basement, heavy / massive equipment, protected from volatile organic solvents, for ventilation and safety, it is recommended to distance furniture / equipment at least 0.5m (in all directions) , ambient temperature 10-35 ° C, specific requirements for connection to the power supply, according to the manufacturer); Three-phase current source;	35
	3 science laboratories, 2x30sqm and 1x20sqm	- 2-3 persons - N2 gas sources, compressed air, CH4 - Three-phase power supply	80
	Medium preparation and anaerobic cultivation room	- chemical hood, connection with exhaust system from the chemical hood; - work table (for various mini-equipment) - incubators/stirrers; - gas cylinders; - anoxic medium preparation station (near the sink); - anaerobic enclosure (glovebox). - No biosecurity conditions are required, to work with environmental, non-pathogenic strains; - Three-phase current source; - Methane gas source (CH4).	30

Table 11.		Bio4Health, total usable area (sqm) =	540
	Spaces	Description, equipment	S (sqm) Minimum
	Plant growing room	thermostatic and ventilated (air conditioning), to allow the setting of a certain temperature and its constant maintenance (in the temperature range 12-26°C), equipped with metal shelves, stainless steel, with adjustable and movable heights, equipped with LED lighting fixtures at each individual shelf (height-adjustable) to provide adjustable lighting between 400 - 850 µmols/m²/S1) on each shelf, the electrical installation that supports the lighting system so that it works independently for each shelf	10
NANO+BIO	Toilets + kitchenette	They will be shared with Bio4Health labs	55
	Deposit	Chemical and biological waste (to be shared with Bio4Health laboratories)	10

All spaces containing equipment will be connected to an electric generator.

VI. Nano4Health:

Intelligent Nanomaterials Laboratory (laboratory for the production, testing and validation of products / goods based on intelligent nanomaterials / nanostructures). The product validation process involves 3 directions: obtaining, rapid investigation (evaluation of structural, morphological, surface, optical, thermal, mechanical, electrical properties) and performance improvement (detailed evaluation of material properties) of nanomaterials. The laboratory will be equipped with equipment for obtaining nanomaterials (high-performance chemical niches, autoclaves (for obtaining by hydrothermal / solvothermal method), lyophilizer, supercritical dryer, centrifuges, ovens, controlled atmosphere furnaces, reactors, analytical balances, agitators, work tables, etc.) and with the necessary equipment for the detailed evaluation of the properties of nanomaterials
— 1 clean room / controlled atmosphere, 3 science laboratories (Photocatalysis Laboratory, Graphene Structures Laboratory, Biomaterials Laboratory), Spectroscopy Laboratory, Basic Morpho-Structural Assessment Laboratory + Surface Characterization - Electrical Properties and Mechanical Properties
— controlled access from the lobby;

Table 12.		Nano4Health, minimum total usable area (sqm) =	505
	Spaces	Description, equipment	S (sqm) Min.
NANO	1 clean room	1-2 persons (clean room) /controlled atmosphere - Three-phase power supply, at least ten 230V sockets; - Gas sources: N2, Ar, H2, O2, compressed air and CH4; - Water source 10sqm antechamber / contamination protection; staff must wear sterilized coveralls, mask and cap, special shoes and disposable gloves	55
	Science labs, 4x40sqm:	- 4 laboratories, 3 pers / laboratory: Lab environment (photocatalysis); Lab graphene structures; Biomaterials Lab; Nanobiophotonic Lab - 2 niches 2m long / laboratory; anti-corrosion laboratory furniture with 20 sqm work surface / laboratory; a balance table / laboratory; - Gas sources: N2, Ar, H2, O2, compressed air and CH4; - Water source in each laboratory; - three-phase power supply in each laboratory, at least ten 230V sockets in each laboratory - Natural light and artificial lighting / each lab; water source / each lab, 1 three-phase current source / each lab.	160
NANO	Spectroscopy laboratory	- 3 persons - FT-IR spectrometer (approx. 100 kg; 3m x 1m x 0.5m), Raman (approx. 100 kg; 3m x 1m x 0.5m), UV-Vis (approx. 100 kg kg; 2m x 1m x 0.5m), Fluorescence (approx. 100 kg kg; 2m x 1m x 0.5m), hydraulic press, balance, pneumatic mass (vibration isolation, 1 ton); - No natural light; water source, 1 three-phase current source, 230 V sockets, at least 18 - gas sources: N2, Ar, H2, O2, compressed air and CH4; - constant indoor temperature, humidity control;	70
	Basic morpho-structural assessment + surface characterization	- 3 persons - 2 BET devices (1 complex + 1 fast; 150 kg, 3m x 1m x 1m), Porosimeter with Hg (100 kg, 2m x 1m x 0.5m), non-metal analyzer (100 kg, 1m x 1m x 0, 5m), heavy weight / anti-vibration balance (approx. 100 kg); Small / portable XRD, SEM banchtop (150 kg, 2m x 1m x1m), DTA-TG / DSC (100 kg, 2m x 1m x1m); potential-Zeta equipment for assessing the electric charge of the surface of materials / structures + DLS equipment for assessing dimensions / size distribution (100 kg, 2m x 1m x1m) - Water source, 1 three-phase current source, 230 V sockets, at least 18 - gas sources: N2, Ar, H2, O2, compressed air and CH4; - constant indoor temperature, humidity control;	70

Table 12.		Nano4Health, minimum total usable area (sqm) =	505
	Spaces	Description, equipment	S (sqm) Min.
	Electrical properties	- 1 person - 4-point electrical properties measurement system (50 kg, 2m x 1m x1m) + autolab system for evaluating electrochemical / sensory properties - water source, 1 three-phase current source, 230 V sockets, at least 8 - gas sources: N2, Ar, H2; compressed air - constant indoor temperature, humidity control;	20
	Mechanical properties	- 1 person - Equipment for measuring mechanical properties (compression, stretching, bending); (150 kg, 2m x 1m x1m); hardness assessment equipment (150 kg, 2m x 1m x1m) - Water source, three-phase current source, 230 V sockets, at least 10; - Gas sources: N2, compressed air - constant indoor temperature, humidity control;	40
	Calcination and drying room	- 2 persons - 2 2 tubular ovens (approx. 2m long x 1m wide each, 2x150 kg) with controlled atmosphere (N2, Ar, H2); - 2 classic ovens (approx. 1 m3-volume, 1m x 1m each, 2x150 kg) with ambient atmosphere; - 3 drying chambers (approx. 1.3 m3, 1m x 1m each, 3x150 kg) - hood/s in the oven area; water source, three-phase current source; at least 10 230V sockets; - gas sources: N2, Ar, H2, O2, compressed air and CH4.	40
	Gas cylinder storage	It will be placed on the ground, in a space isolated from the other functions; special fire safety conditions	50

All spaces containing equipment will be connected to an electric generator.

VII. Laboratories with bulky and heavy research equipment

— High resolution imaging laboratories consisting of: 3 antechambers (1 antechamber of min. 8sqm for every 2 equipment), 2 distinct HR-TEM equipment, dedicated to biological sampling investigations and nanostructures, 1 high resolution SEM equipment, 1 Scanning Probe platform Microscopy (with AFM and STM modules included), 1 high / super resolution confocal microscope for biological samples, 1 MRI-Magnetic Resonance Imaging laboratory (animal bio-medical imaging)
— Laboratory for precision chemical and thermal analysis composed of: 1 antechamber (min. 10 sqm for the 3 equipment): 1 X-Ray Photoelectron Spectroscopy (XPS) equipment + 1 LC-MS, GC-IRMS, GC-FID equipment + 1 Inductively coupled plasma atomic emission spectroscopy equipment (ICP-OES)
— High spectral and spatial resolution spectroscopic analysis laboratory consisting of: 3 antechambers (1 antechamber of 8sqm for every 2 equipment) + intelligent confocal Raman equipment (with integrated multimodal microscope and laser lines in the visible field and NIR/IR) for

fast 3D imaging and photoluminescent + 1 high-precision IR imaging equipment + 1 high-performance fluorescence measuring equipment + 1 intelligent multifunctional equipment (X-Ray Diffraction- XRD and Small-angle X-ray scattering - SAXS) + 2 XYZ equipment
— restricted direct access from outside, loading/unloading platform and freight elevator; restricted access from the lobby.
— these laboratories require electrostatic and electromagnetic shielding (Faraday cage).

Table 13.		**Research laboratories, minimum total usable area (sqm)=**	**640**
	Description, equipment	Spaces	S (sqm) Minimum
High resolution imaging laboratories, precision analysis devices	- every 2-3 rooms - one antechamber for robes / boots and dust insulation; - water pump with dedicated cooling, "clean" sample preparation table, sample checking table with stereomicroscope / binocular microscope - Floor strength - 2600 kg / m2 (main equipment weight is 2300 kg, the footprint is about 4 m2 that is, 2.1 x 1.8 m; other accessories, about 2000 kg, their footprint is about 4 sqm). Cement platform with anti-vibration protection (maximum vibrations allowed vertical amplitude below 2 µm, between 0.5 - 2.5 Hz) - Air filtration and air conditioning without temperature fluctuations; - Necessary specifications as for high precision analytical laboratories: Constant temperature 18-23 oC (with fluctuations +/- 0,1 oC); Humidity: less than 75%; Door: 2 m wide (the instrument is 1.8 m wide), 2.2 m high; 230 V sockets, at least 24 sockets; three-phase socket; - Windows with locking system; - Compressed air valves/installation; - equipment, each with its own desk and PC, space for sample preparation, space for refrigerators-storage of samples and reagents, space for pressure cylinders) - Gases required for operation: He (main), N2, air, O2, CO2, Ar	2 common antechambers	16
		HR-TEM 1 for bio	40
		HRTEM 2 for nano	40
		3-SEM high resolution camera	40
		4-SPM camera (AFM and STM)	40
		camera 5- MRI (bio-medical imaging on animals)	75
Laboratory for precision chemical and thermal analysis:		1 common antechamber	9
		6-XPS camera	60
		camera 7-LC-MS, GC-IRMS, GC-FID	50
		8-ICP-OES camera	30
High spectral and spatial resolution spectroscopic analysis laboratory, precision analysis apparatus		2 common anterooms for two rooms each	15
		Smart confocal Raman equipment for fast 3D imaging and photoluminescence	40
		high precision IR imaging equipment	20
		high-performance fluorescence measurement equipment	20
		intelligent multifunctional equipment (X-Ray Diffraction- XRD and Small-angle X-ray scattering - SAXS)	65
		rooms 13 and 14: 2 XYZ equipment, with common antechamber	80

All spaces containing equipment will be connected to an electric generator.
The laboratories will allow the introduction of equipment of min. 2.5-3m on two sides.

Third security level (exclusive access)

Biobase (live animal research) and Enviro4Health (Multifunctional Carbon Capture Laboratory and Pilot).
Only people certified to work with animals will enter the biobase, and the whole system must be very well studied from the point of view of the internal circuits, separated on the clean flow and the dirty flow. The environmental laboratory (Enviro4Health) will operate independently of the rest of the functions, the only thing it could share is the integrated nitrogen and compressed air circulation system.

VIII. Biobase:

Animal research and in vivo testing.
It is a system of extremely well-insulated and bio-secure spaces, in which the architecture, equipment and working methods of the staff aim - each at its level - to maintain a stable environment, free of pathogens or other (micro) organisms which could affect the animals studied.
It consists of two spaces similar in surface area and configuration, but different in equipment: 1 space for immunocompetent animals (Animal Biosafety level 1) and 1 space for immunosuppressed animals (Animal Biosafety level 2), plus the spaces and equipment that serve them.
— access is allowed exclusively for persons qualified to work with animals;
— separate circuits: clean flow and dirty flow;
— dirty flow with direct access to the outside.

Table 14.			**Biobase, total usable area (sqm) =**	**420**
	Spaces	Accesses, forced connections, restrictions	Description, equipment	S (sqm) Estimated
Biobase	Locker room with shower, toilets	Separation of clean flow from dirty flow	Mandatory shower, exit to clean room, where staff must dress in sterilized coveralls, mask and cap, special shoes and disposable gloves before access to the barrier / clean flow chamber Return here from the dirty circuit	40
	Barrier room	clean access to food storage, wood chips, water, cage washing / disinfection	two-door autoclave system	20

Table 14.			Biobase, total usable area (sqm) =	420
	Spaces	Accesses, forced connections, restrictions	Description, equipment	S (sqm) Estimated
	Space for immunocompetent animals (Animal Biosafety level 1, ABSL-1)	one-way traffic / flow: clean stream input, dirty stream output	Quarantine of (immunocompetent) animals with ventilation, thermostatic heating, humidity control and timed lighting	25
			maternity, with ventilation, thermostatic heating, humidity control and timed lighting, without windows	30
			dormitory, ventilation system, thermostatic heating, humidity control and timed lighting, no windows	30
			a room for procedures (experiment room) with CO2 cylinder, for euthanasia, anaesthesia plant (isoflurane), equipment for immobilizing mice, metal laboratory / dissection tables, chairs, cabinets, ventilation system, UV lamps, air conditioning, without Windows - the air will be exhausted directly to the outside, separate from the ventilation system;	40
	Space for immunosuppressed animals (Animal Biosafety level 2, ABSL-2):	one-way traffic / flow: clean stream input, dirty stream output	animal quarantine (compromised), with ventilation system, thermostatic heating, humidity control and timed lighting, with HEPA filter, IVC ventilated cabinet (with POSITIVE pressure) + polycarbonate cages, autoclavable (ISO 9001, ISO 14001)	25
			maternity with ventilation system (air is removed outside, not recirculated), with HEPA filter, without windows, equipped with BSL-2 cabinet, thermostatic heating, humidity control and timed lighting, IVC ventilated cabinet (with POSITIVE pressure) + polycarbonate cages, autoclavable (ISO 9001, ISO 14001)	30
			dormitory, ventilation system (air is removed outside, not recirculated), with HEPA filter, no windows, thermostatic heating, humidity control and timed lighting, IVC ventilated cabinet (with POSITIVE pressure) + polycarbonate cages, autoclavable (ISO 9001, ISO 14001)	30
			a room for procedures (experiment room) equipped with BSL-2 cabinet, with CO2 cylinder for euthanasia, anaesthesia plant (isoflurane), equipment for immobilizing mice, metal laboratory / dissection tables, chairs, cabinets, without windows, system ventilation (air is removed outside, not recirculated) with HEPA filter, UV lamps, air conditioning. - the air will be exhausted directly to the outside, separate from the ventilation system;	40
	Common rooms for the two spaces	clean access from the barrier room; Outside supply, dirty flow	food storage, air conditioning, humidity control system	20
			a room for wood chips with air conditioning, humidity control system	20

Table 14.			Biobase, total usable area (sqm) =	420
	Spaces	Accesses, forced connections, restrictions	Description, equipment	S (sqm) Estimated
		clean access from the barrier room; Cages are introduced from the dirty stream	a room for washing / disinfecting cages, sterilizing, etc. autoclaved or gamma-irradiated	30
		Dirty flow	material storage (cages, dissection tools, consumables, cleaning products), air conditioning	20
		Dirty flow	landfill (with freezer for corpses)	20

IX. Enviro4Health:

Table 15.		Enviro4Health, (free) H ≥8m, total usable area (sqm) =	300
		Description, equipment	S (sqm) Estimated
ENVIRO Tech4HealtyEnvironment Low-carbon Laboratory	— controlled access from the lobby; optional, can be autonomous (volumetric, spatial and functional) — could be visited occasionally, outside the working hours, in a possible joint circuit with CLAS;	Multifunctional Laboratory and Pilot for the development of innovative carbon capture methods / technologies applicable to various polluting industrial processes and the use of renewable energy sources (with the possibility of operating from atmospheric pressure to overpressure, 10-20 bar, in fixed layer with cyclic operation option for catalytic and non-catalytic processes, and for chemical looping processes); - online gas analyser with IR and TCD detection systems for the main chemical species that may occur in thermochemical processes (CH4, CO, CO2, H2, O2, N2, etc.). The analyser will also be equipped with a sample conditioning system (cooling and condensation separation); - thermobalance with differential calorimeter (TGA-DSC) provided with the possibility of analysis of gaseous species resulting from the process (possibility of monitoring chemical reactions) and the ability of cyclic operation with controlled atmosphere (oxidizing - inert - reducing) above the solid sample; - high-performance computing system with 2-3 workstations. **Technological utilities:** electricity (220 V and 380 V), hot and cold water, sewerage, compressed and instrumental air, technical gases (e.g. nitrogen, carbon dioxide, argon, helium, hydrogen, methane gas, etc.) with the supply cylinders outside the workspace, steam generator, toxic and flammable gas detector, fire prevention and extinguishing system, lighting, high-performance ventilation system with air intake / exhaust and the possibility of local exhaust evacuation from the installation; **Pilot work surface:** min. 150 sqm, possibly with the possibility of further partitioning with light walls (plasterboard); pilot height: about 8 m.	300

3.5.1.2. General data

Flexibility: Given the speed with which innovation in science and technology is taking place, flexible spaces are needed that are easy to reconfigure and adapt to changing research equipment and processes. This requirement has implications for both the architecture and the design and sizing of the structure and installations, but solutions are encouraged that do not significantly increase implementation costs. Overhead service carriers (OSC) that incorporate distribution systems and provide easy and flexible access (plug-and-play) to laboratory services may be considered, such as electrical, plumbing, and power supply, gas, HVAC piping, lighting, data and telephone connections. The inclusion of smart objects can also be considered - either in the initial phase or later, depending on the developments of the “Internet of Things” (IoT).

Collaboration: Keeping the minimum areas required by the brief (Tables 7-15) and with the maximum gross floor area (7000sqm + max 10%), the importance of interaction between researchers will be taken into account, not only in the formalized framework of meeting rooms, but also informally, in small, open spaces and precise destinations (such as niches, interstitial spaces, etc. - both indoors and outdoors).

Accessibility: The provisions adopted to ensure the accessibility of people with disabilities cover the entire campus space, as well as the outdoor and indoor spaces. Measures to ensure the physical accessibility of the InfoBioNano4Health operating system should not be limited to persons with reduced mobility. These measures must also include the tactile and audible communication systems required to enable the guidance of persons with visual and hearing impairments. A person with motor or sensory limitations must be able to walk the same public route as other users.

Finishes: All laboratories will have PVC carpet floor (Tarkett), antibacterial, non-slip, resistant to traffic and cleaning / disinfection solutions. It is mandatory to install the floor finish with lifting on the wall. The joints between the walls and the floor must be concave; the walls will be finished with washable paint with antibacterial, antifungal and biocidal properties. It is forbidden to use finishing materials that, by their composition or by the way they are put in place, can favour the development of parasitic organisms (arthropods, mites, moulds) or of harmful substances that can endanger the integrity of the research processes. In offices, work spaces and public spaces, finishes will pursue both aesthetic quality and easy maintenance.

Research equipment considered for the endowment of laboratories:[4]

I. High Resolution Imaging Laboratory

[4] to be taken into account for the preparation of the financial offer and to have an image of the specialties required in setting up the design team (according to point 3.3.).

- 2 separate HR-TEM equipment, dedicated to biological sample investigations and nanostructures
- 1 high resolution SEM equipment
- 1 Scanning Probe Microscopy platform (with AFM and STM modules included)
- 1 high/super resolution confocal microscope for biological samples
- 1 X-Ray Photoelectron Spectroscopy (XPS)
- 1 LC-MS, GC-IRMS, GC-FID equipment
- 1 Inductively coupled plasma atomic emission spectroscopy (ICP-OES) equipment

II. **High spectral and spatial resolution spectroscopic analysis laboratory**
- intelligent confocal Raman equipment (with integrated multimodal microscope and visible and NIR / IR laser lines) for fast 3D imaging and photoluminescence
- 1 high precision IR imaging equipment
- 1 equipment for high-performance fluorescence measurements
- 1 intelligent multifunctional equipment (X-Ray Diffraction- XRD and Small-angle X-ray scattering - SAXS)
- 2 XYZ equipment - further equipment

III. **Prototyping center with 3D printers**
- 1 DG Mori CNC machine; 3 Semi-industrial 3D printers for biomaterials, metal, plastic

IV. **Info4Health lab and modern coworking spaces**
- Servers, Cloud

V. **Bio4Health Laboratory**
- small laboratory equipment

VI. **Nano4Health Laboratory**
- small laboratory equipment - The laboratory will be equipped with equipment for obtaining nanomaterials (high-performance chemical niches, autoclaves (for obtaining by hydrothermal / solvothermal method), lyophilizer, supercritical dryer, centrifuges, ovens, controlled atmosphere furnaces, reactors, analytical balances agitators, workbenches, etc.) and with the necessary equipment for the detailed assessment of the properties of nanomaterials

VII. **Mental Health Laboratory**
- 1 room for Virtual / Augmented Reality and Online Interventions training

VIII. **Multifunctional pilot station for the development of innovative carbon capture methods/technologies applicable to various polluting industrial processes and the use of renewable energy sources** (with the possibility of operating from atmospheric pressure to overpressure, 10 - 20 bar, fixed layer with option operating cycle for catalytic and non-catalytic processes, and for chemical looping processes) consisting of:
- online gas analyser with IR and TCD detection systems for the main chemical species that may occur in thermochemical processes (CH4, CO, CO2, H2, O2, N2, etc.). The analyser will also be equipped with a sample conditioning system (cooling and condensation separation);

- thermobalance with differential calorimeter (TGA-DSC) provided with the possibility of analysis of gaseous species resulting from the process (possibility of monitoring chemical reactions) and the ability of cyclic operation with controlled atmosphere (oxidizing - inert - reducing) above the solid sample;
- high-performance computing system with 2-3 workstations for mathematical modelling, simulation and optimization of the analysed processes together with the related software packages (ChemCAD, Aspen, Matlab / Simulink, Comsol, etc.).

IX. Station for liquid nitrogen and for other gases

X. Integrated system for circulating compressed air, nitrogen and methane

3.5.2. FACULTY OF MATHEMATICS AND COMPUTER SCIENCE (FMI)

The new headquarters of the Faculty of Mathematics and Computer Science will bring together the program-specific classrooms and research rooms, but will focus on common areas for collaboration between students, teachers and researchers, and open to students, entrepreneurs and civil society. The Faculty as a whole, which will include a five-hundred-seat student dormitory, will reflect the essential role of mathematics in the education and development of STEM+ fields and will propose a model of academic daily life experience that will attract and support research and innovation.

The astronomical observatory and the planetarium will be the main spaces open also to the general public and will illustrate the perennial interest in deciphering the universe, proposing ways in which architecture can actively participate in learning about astronomy - not only providing shelter for technology and projection surfaces, but also offering complex experiences of space, at the intersection of the physical environment (form, light, tectonics, materiality) with the new media (virtual space, augmented reality).

3.5.2.1. Number of students and teaching and support staff

In the academic year 2021/2022, the FMI statistics are as follows:

Number of approved teaching and research positions: 242
Number of teaching and research posts held (tenured professors): 134
Number of associate professors: 66
Auxiliary teaching staff: 20
Total number of students: 3399

- Bachelor’s Degree: 2535
- Master’s Degree: 685
- Postgraduate/conversion: 93
- Doctoral Degree: 86

3.5.2.2. Spatial-functional requirements

The spaces of FMI are divided into four different areas in terms of permissiveness and use: the teaching area and the Astronomical Observatory + Planetarium will be the most open spaces, partially and occasionally, including for the general public (for events); the research-development-innovation area, which will be primarily intended for academic staff and IMF-affiliated researchers; and the Documentation Center (with online resources and library), which will also be used by InfoBioNano4Health researchers. These functional relationships are valid regardless of the financial arrangement described on page 32.

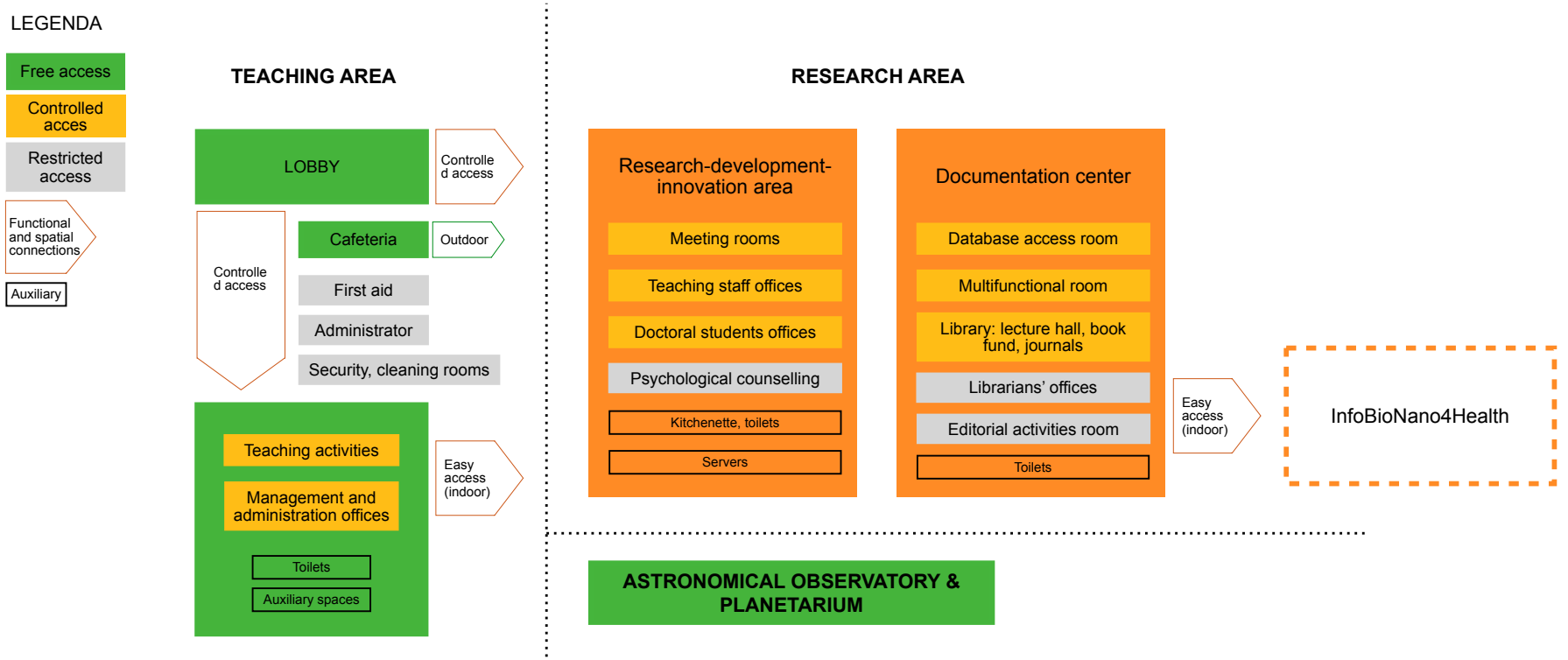

Diagram 5. Functional diagram of FMI

The following tables detail the spaces and usable areas required by the Contracting Authority to ensure the performance of the basic activity, as follows:

- X. Teaching area = 5,064sqm
- XI. Research, development, innovation area = 1,227sqm
- XII. Documentation center = 519sqm
- XIII. Astronomical Observatory and Planetarium = 390sqm

Total usable area (UA) = 7,200sqm

The horizontal and vertical circulations and the surface occupied by partitions will be added to this area.[5]

Maximum gross floor area = 11,000sqm (with the specification under point 3.3.)
As specified in point 3.3., competitors may modify the areas given in the tables below, depending on the architectural solution, as well as add spaces that they consider necessary or appropriate in relation to the proper operation of the faculty.

According to the Local Urban Planning Regulation Cluj _ Annex 2 _ the necessary parking spaces for higher education will be calculated as follows:

- Car parking: 1 parking space for every 40sqm UA
- bicycle parking - 1 place for every 20sqm UA

Each competitor will calculate the required parking spaces for cars and bicycles, respectively, depending on the usable area (UA) of the proposed project. Car parking spaces will be arranged as far as possible in a common car park with the InfoBioNano4Health Center but with separate, controlled and/or restricted access to buildings, and bicycle parking lots and other non-motorized means will preferably be on the ground. Parking spaces required for all UBB sub-objectives will be treated in an integrated manner.

[5] The University approves a maximum built area of 3,900sqm for the technical spaces of the Faculty of Mathematics and Computer Science and for a parking lot common to the three sub-objectives (InfoBioNano4Health, IMF and student housing). The rest of the parking spaces will be arranged on the ground.
If the solution will include a basement, the **local anti-aircraft shelter (ALA)** will be sized for 2/3 of the total number of students + teachers and auxiliary staff (1sqm/person): see Decision no. 862/2016 for the approval of the categories of constructions for which the construction of civil protection shelters is mandatory, as well as for those for which civil protection command points are arranged; see also the technical rules regarding the design and execution of civil protection shelters. If the solution includes ALA, it will NOT be detailed in the competition phase, but only indicated in the plan as position and area.

X. Teaching area

Table 16.		TEACHING AREA, total usable area (sqm) =			5064
	Circulations, flows, accesses	Description	No. of users	Minimum S / space	S (sqm) minimum
Lobby / access area	Access and orientation space - Cafeteria - point of sale for coffee products, pastries, confectionery; - Refreshment station; - First aid point (a room with sink and drinking water, a consultation bed, kit and first aid supplies); - Administrator's space; - Storage room for cleaning equipment and materials; - Security space (security room, dispatcher / central control system)		The surface of 200sqm is a functional minimum. Preferably, the foyer will be connected with other traffic spaces necessary for the evacuation of rooms for teaching activities, in order to obtain a major space that can be used as a place of sitting and socialization for students, or for organizing various events or student competitions.		200
Teaching activities	These rooms must open to traffic spaces of min. 50% of the usable area of the rooms, in order to ensure the evacuation of people. Preferably, some of these spaces will be directly connected to the access hall, to make up for its extremely small size.	3 amphitheatres with 250 seats each	3x250	3x300sqm	900
		4 classrooms with 100 seats each	4x100	4x130sqm	520
		5 lecture / seminar rooms with 50 seats each	5x50	5x75sqm	375
		12 seminar rooms with 35 seats each	12x35	12x60sqm	720
		20 air-conditioned laboratory rooms of 20 stations each	20x20	20x50sqm	1000
		10 laboratory rooms of 25 stations each	10x25	10x60sqm	600
		Toilets (M, W, people with disabilities);			100
Management and administration offices	Easy access, preferably through the inside, to and from: - teaching activity rooms; - research, development, innovation area..	Dean's office: antechamber, chief secretary's office, dean's office with sitting table, individual dean's office	2		60
		Vice-dean's offices	4	4x12.5sqm	50
		Department director offices	4	4x12.5sqm	50
		Office of the Secretary of the Department	4	1x25sqm	25
		Student Chancellor's Office	1	1x12sqm	12
		Kitchenette/s + toilets			50

Table 16.		TEACHING AREA, total usable area (sqm) =			5064
	Circulations, flows, accesses	Description	No. of users	Minimum S / space	S (sqm) minimum
		6 administrative staff offices - 3 persons/office	18 employees (6x3)	6x20sqm	120
Auxiliary spaces		Archive space			100
		Technical spaces (including selective waste collection)			100
		Telephone exchange			12
		Hardware workshop			20
		Toilets			50

XI. Research-development-innovation area

Table 17.		RESEARCH, DEVELOPMENT, INNOVATION AREA, total usable area (sqm) =			1227
	Circulations, flows, accesses	Description	No. of users	Minimum S / space	S (sqm) minimum
Research, development, innovation area	Easy access, preferably through the inside, to and from: - teaching area; - Documentation center	7 multifunctional rooms / meetings / research activities		7x40sqm	280
		Teaching staff offices	30x2 pers.	30x14sqm	420
		Teaching staff offices	25x3 pers.	25x15sqm	375
		Doctoral student offices		2x30sqm	60
		Psychological Counselling Office			12
		Air-conditioned server rooms (2 rooms)		2x15sqm	30
		Kitchenette + Toilets			50

All FMI premises will be air-conditioned (possibly passive air-conditioning systems with ventilation units with heat and humidity recovery).

XII. Documentation center

Table 18.		DOCUMENTATION CENTER, total usable area (sqm) =			519
	Circulations, flows, accesses	Description	No. of users	Minimum S / space	S (sqm) minimum
Documentation center	Easy access, preferably through the inside, to and from: - teaching area - research, development, innovation area It will also be used by InfoBioNano4Health researchers	Access database research room, etc.… (fixed workstations)			50
		Multifunctional room / video conferencing system, online conferences	100		150
		Lecture hall	60		100
		Book fund room			100
		Journals area			50
		Library offices	3	3x10sqm	30
		Room for editorial activities		2x12sqm	24
		toilets			15

XIII. Astronomical Observatory and Planetarium

Table 19.		ASTRONOMICAL OBSERVATORY AND PLANETARIUM, total usable area (sqm) =		390
		Description	No. of users	S (sqm) minimum
Astronomical Observatory and Planetarium	Open visibility all around Must be the highest point overall, unobstructed visibility (neither now nor in the future)	Planetarium with panoramic terrace; the diameter of the dome will be determined by the number of users (the main sizing factor)	100	150
		Astronomical observatory - automated circular dome and chairs arranged in the amphitheater; the diameter of the dome will be determined by the number of users (the main sizing factor))	100	150
		2 Offices, 15sqm each	2	30
		Astronomical instruments storage, technical room		15
		Toilets		45

All FMI premises will be air-conditioned (possibly passive air-conditioning systems with ventilation units with heat and humidity recovery).

3.5.3. STUDENT DORMITORY

The university wants to build a dormitory with 500 seats in the first stage, and will later double its accommodation capacity. Thus, the project will have to provide for the possibility of expansion by maintaining an adequate land reserve, possibly suggesting scenarios for this expansion. The dormitory will propose a co-housing model that will complete the learning experience of students with a living experience that will allow them to withdraw in their private space but also to facilitate interaction with others - both indoors and outdoors. Thus, the rooms will be minimally sized, with private bathroom and a small kitchenette equipped with electric hob and refrigerator; and will be complemented by common areas - kitchens, dining rooms or simple meeting rooms, with group study rooms, etc.

3.5.3.1. Spatial-functional requirements

Either gathered in a single building or spread out in smaller units, the student dormitory will negotiate between the criteria of economy and quality of housing in a community, along with others, with respect for diversity and common spaces and goods.

Table 20.	**STUDENT DORMITORY, total usable area (sqm) =**				**5600**
Spaces	Description	No. of users	Usable area/ unit	S (sqm) Estimated	
Accommodation units: Rooms with private bathroom and a small kitchenette with electric hob and fridge	160 Rooms of 3 places each	480	27	4320	4720
	5 Rooms of 2 places each	10	25	125	
	10 Individual rooms (for teaching staff)	10	20	200	
	3 guest rooms	3	25	75	
Common areas for students	- kitchens, dining rooms or simple meeting rooms; workspaces / group study; laundry / dryer; refreshment stations; etc..	500			380
Administrative and technical spaces	- Administrator's office; - First aid point (a room with sink and drinking water, a consultation bed, kit and first aid supplies); - Security space (gatekeeper room, dispatcher / central control system) - Storage room for cleaning equipment and materials;	5			

Table 20.	STUDENT DORMITORY, total usable area (sqm) =			5600	
Spaces	Description	No. of users	Usable area/ unit	S (sqm) Estimated	
University restaurant / canteen	- Dining room for minimum 200 people / Serving in the dining room and for take-away; - Kitchen (storage, preparation), changing rooms, showers and toilets for staff; - Toilets for the public; - It will operate as a canteen for students, teachers and researchers.	200		500	500

3.5.3.2. General data

All the surfaces in Table 21 can be modified in order to optimize the spaces and uses proposed by the living scenario. The only figures covered by the brief are the accommodation capacity (500 seats) and the maximum gross floor area of 8,000sqm (with the mention in point 3.3.).

- The allocation of a minimum living space in favour of common areas may be envisaged, but without compromising the quality of their use.
- It can also be considered to reduce (by max. 5%) the accommodation capacity, in favour of a housing model that can be replicated later. In this situation, it will be indicated how it will be possible to reach an accommodation capacity of 1000 students in the future.
- It may also be proposed to increase the capacity of the restaurant, in a judicious distribution of areas with respect to accommodation capacity and the maximum built-up area.

We hereby remind the University's intention to double the accommodation capacity in the future, for which the competitors have to keep a reserve of land (and, possibly, to propose an extension scenario).

Parking lots:
According to the Local Urban Planning Regulation Cluj _ Annex 2 _ the necessary parking for student dormitories will be calculated as follows:

- Car parking: 1 parking space for every 80sqm UA
- bicycle parking - 1 place for every 35sqm UA

Parking spaces for cars will be partially arranged in the common parking lot of the IMF and InfoBioNano4Health, and parking lots for bicycles and other non-motorized means will be preferably on the ground. Parking spaces required for all UBB sub-objectives will be treated in an integrated manner.

If the solution includes basement, the local anti-aircraft shelter (ALA) will be sized at 1sqm / person (+ attached spaces).

3.6. GENERAL PROVISIONS

3.6.1. Compliance with applicable regulations

The rules that must be observed are those provided by the European legislation, which are integrated in the Romanian legislation. They are not listed in the Brief, their knowledge and observance rests with the competitors. In case of any discrepancies between the requirements of the Brief and the content of some rules, competitors must comply with the rules in force.

3.6.2. Circulations

The areas proposed by the design brief **do NOT include** the areas allocated to vertical and horizontal movements. They will be judiciously sized and grouped, reducing as much as possible their weight in relation to the total area of the building.
The vertical circulations will be grouped in traffic nodes, dimensioned according to the norms and legislation in force (including the evacuation in case of fire).
Horizontal circulations will be at least 2.20m wide. Unless otherwise specified, the minimum height shall be 2.60 m.
The main networks of installations will be located along the horizontal traffic routes. If they do not have natural ventilation, they will be equipped with a smoke extraction system.

3.6.3. Global economy of the project

One of the objectives of the competition is to provide solutions for the realization of the complex in an efficient manner, within the limits of the financial cost estimate established by the competition documentation.
Projects must be able to optimize subsequent operation and maintenance. This requirement is expressed as a minimum by the following parameters:

- good choice of materials, technical solutions and equipment - robust, durable, easy to maintain and replace;
- easy access to technical installations.
- good anticipation of future needs for space, utilities and facilities, leading to a solution capable of taking over increased functional demands over time, without this entailing major architectural changes.

3.6.4. Resource consumption and energy efficiency. NZEB

Participants will need to propose design solutions that are as sustainable and forward-looking as possible, ensuring cost-effectiveness and maximum architectural quality, with low energy and resource consumption.
According to European and national legislation, all new buildings must be buildings with very high energy performance, i.e. with a primary energy consumption close to zero (NZEB). Of this energy requirement, a significant amount (min. 30%) should be provided from renewable sources of energy on site or at a distance of no more than 30 km from the site of the building. The energy performance of buildings will be calculated according to the methodology for calculating the energy performance of buildings developed at national level, which adapts the comparative methodological framework developed by the European Commission and sets out the general conditions expressed in national parameters.

The following will be considered in the main:
- the thermo-technical characteristics of the elements that make up the building envelope, namely thermal capacity, thermal insulation, passive heating, cooling elements and thermal bridges, interior partitioning and airtightness;
- space heating and domestic hot water supply installations, including their thermal insulation characteristics;
- air conditioning installation;
- mechanical ventilation and/or natural ventilation installation, as appropriate;
- lighting installation integrated in the building;
- the location of the building, including the orientation, the external climatic parameters and the influence of the landscape context;
- passive solar and sun protection systems;
- indoor climate conditions, including those provided for in the project;
- internal heat input.

Other factors that may be relevant to the energy performance of buildings may also be considered, such as:
- active solar systems and other heating and/or cooling systems, including electrical, based on renewable energy sources;
- electricity produced by cogeneration or trigeneration;
- district or block heating and/or cooling plants;
- use of natural light;
- local conditions of exposure to solar radiation.

3.6.5. Security and safety

The degree of fire resistance and the category of importance of the buildings will be established in the subsequent stages of the solution competition, according to the regulations in force.

a) Fire safety: The European and Romanian provisions in force will be observed.

b) Safety in operation: The safety of persons during the use of the building will be ensured by the way of designing the spaces, the choice of materials and the choice of equipment. The current rules will be followed.

c) Burglary security

Burglary security measures must be integrated into the overall design of the projects and must be complemented by general architectural compliance. Areas and sections with special protection requirements should preferably be grouped and/or arranged in such a way that they can be easily supervised. Protection will be passive or active, consisting of surveillance devices and physical barriers. The established security levels will have to be ensured outside working hours, both for areas with prolonged public operation and for other spaces, given the possibility of hosting special public events and renting spaces for external events.

4. Required parts

4.1. WRITTEN PARTS

4.1.1. FINANCIAL OFFER FOR DESIGN

Each project will include an estimated cost of the design services, filled in according to Annex 2.3 - Financial proposal. The financial proposal will have the values expressed in lei and will not exceed the maximum cost estimate for design costs.
The financial proposal will be part of the negotiation basis for concluding the design services contract with the winner of the competition.

4.1.2. BRIEF DESCRIPTION OF THE CONCEPT OF THE ARCHITECTURAL & URBAN INTERVENTION

The conceptual bases of the proposed solution will be explained and the decisions for the presented solution will be motivated. The explanatory texts, other than the captions and titles of the images, will be arranged on the sheets next to the drawn pieces.

4.2. DRAWN PARTS

There will be 6 sheets of 900x1300mm in format, on white paper, without rigid support, paged horizontally, indicating the north and the scale of the representations, as well as the name of each piece.

The general elements present on each sheet will be:

- Top left: title: **SCIENCE CAMPUS CLUJ-NAPOCA - DESIGN COMPETITION**.
- Top right: an alphanumeric identity symbol, consisting of 2 letters followed by 4 digits, at the competitor's choice
- They will be numbered in the lower right corner on the format: page number/total pages.

The sheets will contain **at least** the following parts:

4.2.1. Sheet 1: Highlighting the general concept

a) an overview (aerial perspective) showing all the bodies of the proposed ensemble and suggesting the arrangements of the urban and landscape space;
b) the site layout plan of the complex, including the land division of the land and all the proposed buildings, as well as the adjacent road and the Cluj Innovation Park ensemble (CREIC and TEAM buildings) - scale 1:2500;
c) relevant layouts for substantiating the proposed land division;
d) territorial balance according to the model:

The area of land allocated		**Built-up area (footprint of buildings on the ground)**	
Urban square		Urban square	
Sports fields		Sports fields	
CLAS		CLAS	
UBB		UBB (total)	
		— InfoBioNano4Health	
		— FMI	
		— Student dormitory	

4.2.2. Sheet 2: Detailing the general concept

a) the layout plan of the complex, with the highlighting of the way of covering the buildings (roofing plan), of the accesses on each plot and in each body of the building, and of the way of landscaping (specifying the elevations of the natural and landscaped land) - scale 1:500;
b) at least two characteristic sections of the complex, which highlight the relations between the external spaces - public and semi-public and the access elevations in buildings compared to the elevations of the natural and arranged land - 1:500 scale;
c) an image (perspective at eye level) from Tiberiu Popoviciu Street, which would illustrate the overall picture coming from the city (from the east);
d) a text of 500-1000 words explaining the general concept (urban and architectural) of the ensemble and the principles for defining the relationships between functions, volumes and spaces.

4.2.3. Sheets 3 and 4: Detailing Objective no. 1

a) an image (perspective at eye level) from the street to the square, illustrating the concept of configuring the space on the contour (treatment of the alignment/fronts from the square) and in the basic plan and suggesting a proposed use and atmosphere;
b) an image (aerial perspective or descending isometric axonometry) showing the relationship of the market with the sports fields;
c) an image (aerial perspective or isometric axonometry descending from the market) showing the occupation, arrangement and use of the CLAS plot;
d) plans of all CLAS levels, specifying the functions and surfaces of the spaces - 1:200 scale. The ground floor plan will also include the external access area (buses, pedestrian) and the connections with the proposed square and with Tiberiu Popoviciu street;
e) 1-2 Characteristic sections through the building with the marking of the access elevations and of the arranged land;
f) an interior image with the access area and one from the main exhibition hall.

4.2.4. Sheets 5 and 6: Detailing Objective no. 2

a) an image (aerial perspective or isometric axonometry descending from the market) showing the occupation, arrangement and use of the CLAS plot;
b) plans of all levels of the FMI buildings (without the dormitory) and InfoBioNano4Health, specifying the functions and surfaces of the spaces - 1:200 scale. The ground floor plan will also include the external access areas and (possibly) the connections between the buildings;
c) 1-2 characteristic sections through buildings with the marking of the access quotas and of the arranged land;
d) the volume of the dormitory and schemes of organization and possibilities of extension;
e) 3 representative interior images for the proposed solution.

Note: Competitors may integrate images, sketches, diagrams in addition to the pieces requested above.

5. Criteria for evaluating the solution

A	**Satisfaction of spatial, functional and technical requirements - minimum requirements**	**65 points**
A1	**Viability of urban and landscape intervention**	**20 points**
	Given the context of the site and its relationship with the city and the territory, the solution cannot be evaluated outside of a viable proposal for the systematization of the entire land in the implementation area. Thus, the following aspects will be evaluated in particular:	
	- The viability of the general way of building and arranging the entire Science Campus Cluj complex, its correlation with the landscape and with the infrastructure and pre-existent buildings.	10 points
	- The viability of the specific way of building and arranging the market as the center of this new urban nucleus;	5 points
	- The viability of the specific way of occupying and arranging the plots destined for CLAS and, respectively, UBB, from the perspective of the relations with the market and the sports base, the relations between the functions on each plot, the permeability and the graded transitions from public space to restricted access.	5 points
A2	**Functionality of the proposed solution**	**40 points**
	The project aims at a set of complex education and research functions, burdened by different constraints depending on the program. In order to lay the groundwork for a feasible approach, it is essential that the proposed solution meets all the spatial and functional requirements imposed by the design brief. Therefore, the evaluation of the projects will take into account the following sub-criteria:	
	- Integration of all functions required by the competition brief and judicious use of space;	10 points
	- Correct solving and optimizing the functions and connections between them;	10 points
	- Volumetric and functional adaptation of the solution to the specific requirements resulting from the use of spaces according to the program: accessibility, flexibility, and adaptability of the proposed spaces, in ways appropriate to each program;	20 points

A3	**Financial offer for design services**	**5 points**
	a) The lowest price (Pricemin) will be awarded 5 points. b) Other prices (Price(n)), will be awarded points proportionally, calculated as it follows: P(n) = [Price(min) / Price(n)] x 5 pct **Failure to meet the maximum estimated ceiling will result in the disqualification of the project.**	
B	**The expressive-environmental attributes of the intervention - the added value of the proposal**	**35 points**
B1	**The urban quality of the complex**	**10 points**
	The project has the chance to create a pole of urbanity in close connection with nature and relevant to the spatial and social fabric of the city, and the proposed architectural and urban forms will have an essential impact on how the whole area could later develop. Therefore, their quality plays an important role in how the urbanization process will continue. Therefore, the following issues will be assessed: - The potential of the complex to become an urban landmark for the inhabitants of Cluj-Napoca and its surroundings (the quality of the proposed spatial, volumetric and functional relations); - The potential of the solution to establish a model of good practices regarding the capacity of a contemporary campus to generate a core of research-innovation as a link between society, education, research and entrepreneurship.	
B2	**The plastic expressiveness of the proposed volumes**	**15 points**
	The architectural quality of the proposed volumes adds value to the project, as a whole, but also to the local community. In addition, it can enter the global landscape of cultural-educational and research ensembles dedicated to science. Thus, the following aspects will be evaluated: - The potential of the solution to establish a model of good practices regarding the iconic architecture and its relations with the environment in which it is inserted; - The representative / contemporary nature of the proposed complex.	

B3	**Quality and atmosphere of the proposed spaces**	**10 points**
	The criterion assesses the project's ability to generate a memorable destination, an exemplary physical presence for a scientific campus: open, accessible and inclusive, dynamic, diverse, growth-oriented and entrepreneurial. Thus, the following will be pursued: - The quality of the proposed spaces and of the generated sensory relations, as well as the relationship with the natural environment; - Adaptation of details and finishes to the specific needs of each program.	

The calculation algorithm used for the final evaluation of the projects is the following:

Final score (maximum 100 points) = Score for Criterion A + Score for Criterion B
Score for Criterion A (maximum 65 points) = A1 + A2 + A3
Score for Criterion B (maximum 35 points) = B1 + B2 + B3

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Arch. Adrian Hagiu, professional advisor

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The brief was developed on the basis of the institutional project elaborated by the Scientifica Association (May 2020) and made available by the Cluj-Napoca City Hall for CLAS and, respectively, through collaboration with UBB representatives for the university spaces.