

Uni_Versum - Projektbüro "Pavilion and Knowledge Paths"

This paper presents the building project for the future museum pavilion and knowledge paths at the southern campus of the Technical University Berlin, a project set to become a groundbreaking model for sustainable and climate-friendly planning and building practices throughout its entire duration. In choosing this project for the SBE Conference, this paper aims at explaining its current design proposal and showcase the process of its conception.

As a member of the student project office consisting of students from the departments of architecture and landscape architecture, I developed the initial design for the project together with actors from the university, the city, and civil society. In the past various plans and visions for the project were developed in different courses with different thematic focuses. The participatory process from within the university culminated in the winter semester of 21/22.

Through this project, the Technical University Berlin plans to strengthen the tourist positioning of its campus. For this purpose, a network of knowledge paths will be spanned across campus, the center of which will be the newly built museum pavilion. Part of the university's mineralogical collection as well as the Science Gallery Berlin will be located inside the pavilion.

Our final design proposal is a temporary building with flexible usage requirements. Material efficiency in structural and landscape design, as well as energy efficiency in cubature, floor plan, and façade design were integral parts of our planning process. In order to continue using the materials in the future, we developed exclusively reversible, circular connections with regrowing and recycled resources.

While working on this project, we faced two challenges: On the one hand, to design a building that met all the benchmarks regarding sustainable, climate-friendly planning, and on the other hand, to organize the process as an interdisciplinary team of fifteen planners within a transdisciplinary process with up to fifty stakeholders.

Collaborative Design Studio and Project Process

For a public building of this size, it is the norm to select a design through a public tender and competition process. This is primarily a competition of ideas: 'who is the most convincing?', 'which idea is the most realistic?', or even 'which design has the most prestige?'. The design process of *our* project is of collective nature. An interdisciplinary, heterogeneous team came together and developed a design not against each other, as in a competition context, but together. One part of facilitating this was to form focus groups: Different partial aspects, e.g. façade or construction, are examined in small groups and combined in weekly fusion rounds. Instead of a jury, as in a conventional competition, the instance of expert opinions was organized in the form of an advisory board. The most significant difference is that they did not determine the result of the competition process in a decisive role, but participated directly in the design process through monthly workshop formats.

The unique, integrative development process, the permanent anchoring in courses, and the resulting new intersections between teaching and practice make the project socially sustainable. In this way, we seek to establish new standards in construction, content, and processes while creating innovative teaching and learning formats that enable students to act sustainably. The users of the knowledge paths and exhibition areas in the museum pavilion also act in accordance with this intention.

Location and Concept

The south campus of the TU Berlin is significantly characterized by the Hertzallee. This straight axis connects the train station *Bahnhof Zoo* with the *Ernst-Reuther-Platz*. It forms the backbone of the campus and provides orientation on the campus through clear visual relationships. The Hertzallee is a functional and leisure space, direct pedestrian and bicycle infrastructure. At the same time, with its lush tree population, recreational and green space. It thus forms an attractive research, teaching and learning environment on the university campus for the urban community, students, teachers as well as employees and tourists. Pockets with different functions of urban campus life are located along the length of the Hertzallee. These pockets include multifunctional seating elements, bicycle parking, and marked areas that allow for flexible uses such as exhibitions and research as part of the knowledge paths on campus. They are versatile and can be used in multifunctional ways. Thus, their use can adapt to the desired planning.

The university as a place, as well as the academic formats in which science is communicated are not equally accessible to everyone. Under the aspect of discovery and research, our aim was to make access to the university as low-threshold as possible for all interested parties. The stations of the knowledge paths across campus, the Mineralogical Collection of the TU Berlin and the Science Gallery Berlin inside the pavilion, intend to make knowledge tangible for visitors through interactive and information-rich formats and exhibits. New topics of progress should not only be shown in and around the building, but should also be experienced on the building itself.

The Building itself

Therefore, the actual building is understood as a stage and platform for science communication and exchange. Its rational building structure takes a step back in its volume to foreground the values of sustainability, research, and innovation inscribed in the project. The lowest possible soil sealing and a small and compact footprint were essential principles of our planning. In addition, the space program provides large, flexibly usable exhibition spaces for the planning task. The result of a long series of cubature studies is the planning of the building as a 43m x 12m slender block. In front of the building, a south-facing clearing is created through which the rest of the park can be explored. The connection to the landscape can be experienced by the visitors in a special way; the transparent ground floor continues the flow of movement across the clearing.

In order to meet the complex requirements in the long term, we created versatile and specific spatial situations that also offer maximum flexibility of use. Two exhibition halls stacked on top of

each other differ in orientation and transparency: in contrast to the very transparent space on the ground floor, the space on the upper floor is introverted and provided with a deliberate opening into the green space. Vertical circulation takes place via a striking staircase sculpture, which is both movement and exhibition space. The smaller utility rooms are compactly organized in the western part of the building and serve the exhibition areas with various functions and different interfaces.

Structure - Foundation - Facade

In the 19th century, William Howe developed a beam composed of wooden compression elements and metal tension elements. This system is found again in the 12m wide beam of the pavilion. The diagonals are placed in a material-optimized manner in accordance with the course of the forces. The result is a wooden girder that is compressed and reinforced at the sides. The pressure load is absorbed by the short reclaimed wood pieces. Steel poles serve as tension rods and at the same time as binders. The milled grooves and the tension of the metal connectors hold the wooden elements together without the need for further steel joints. In this way, the use of steel can be reduced and a reversible structure can be thought of and implemented from the outset.

In order not to base the reversible structure on a concrete slab and to seal as little soil as possible, a "flying foundation" is formed. For this purpose, the building is elevated on reused IPE steel beams. A top plate transfers the load of the columns into the girder, and another transfers it point-wise into the ground. Recycled concrete as well as natural stone blocks embed the beams. This way, a retention area is created underneath the building instead of sealing it.

A movable, folded textile facade closes off the building. In contrast to the massive stone facades of the surrounding buildings, our goal was to create a light facade that could also serve as a projection surface. Summer cinema or the content of the exhibition taking place inside are possibilities. In the current discourse on sustainable development of urban spaces, the roof surface as a fifth facade holds great potential. Between energetic, ecological and resource-related uses, the design shows a possible scenario. The roof becomes a research space and contains recreational areas, green spaces for the environment and building climate, as well as experimental areas, for example PV systems, aquaponic tanks or biodiversity areas.

Building of a post-fossil age

We followed the principles of sustainable design already in the conception phase of this project. Through the open planning process, users and experts were strongly involved in the work of our planning collective. In the choice of materials, we focused on the use of renewable, even recycled, building materials. Through deconstruction, such as roof trusses, short timbers can usually be salvaged. By simply processing them, they can be reused. Based on these parameters, we developed a reclaimed wood beam with completely reversible connections, without adhesives or nails. A simple screw connection and minimal use of steel make this beam not only easy to transport in its individual parts, but also easy to assemble. Using clay we ensure a good indoor

climate inside the building and continue to avoid the use of substances that are hazardous to the environment and health.

Museum buildings are not a low-energy building type. By placing ventilated utility spaces on the sides of the facade, we achieve that technical ventilation of the building is not necessary. In an urban context, the many retention and green spaces around and on the building provide a good urban climate. We avoid the burden of soil sealing with the elevated foundation. By not using an in-situ concrete floor slab, construction debris and soil pollution are avoided after the building is deconstructed.

The process intends to empower and challenge students to act sustainably through innovative teaching and learning formats. The project office, together with the NBL department, wanted to establish new standards with this project in terms of construction, content and processes. Following this intention, the later operation of the museum pavilion will also be designed in this way. The future tenant, the Science Gallery Berlin, is aimed primarily at a young audience and intends to make knowledge accessible and tangible for the visitors of the pavilion through interactive and information-rich formats and to enter into a dialogue with them. Sustainability issues in research and building practice should be visible and tangible for visitors as part of the knowledge paths not only *in* but also *on* our building. This is realized through the legibility of the design and construction method described above.

Conclusion and Outlook

The special feature of this building project lies in its innovative, collaborative and transdisciplinary planning process. The unique development process from within the university, with the involvement of various actors, makes this integrative, joint project process an alternative planning practice. The boundaries between teaching and practice were dissolved and new intersections created.

Due to its model character, the project itself becomes a research topic and a laboratory for innovation in the building sector. It questions common standards in all areas and formulates innovative approaches to solutions that can be tested in practice. For the building itself, it was important to us that its idea and appearance focused on establishing new innovation potential and making it tangible. The commitment within the design process to the use of natural and recycled materials is evident throughout the building.

After completing the first two phases of this project, we handed the design over to various general planners.

During our time as students at TU Berlin, there were several opportunities to participate in collaborative and hands-on processes. We are thrilled to have had the opportunity to participate in this forward-thinking, innovative and sustainable project at all levels. It feels like a culmination of all the themes and focuses that have accompanied us throughout our university career. We look forward to seeing it completed on the TU Berlin campus in 2026!

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