

ProtoLAB: Design & Build workshop

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Citation: Łątka, J. (2023). "ProtoLAB: Design & Build workshop" UOU scientific journal #06, 154-163.

ISSN: 2697-1518. <https://doi.org/10.14198/UOU.2023.6.16>

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ProtoLAB design & build workshop is an annual international event that takes place in Wroclaw, Poland. The unique character of the workshop lies in the process, where students of architecture and related studies prepare a whole project from the first idea and sketch until the prototyping and final realisation of the design. The workshop is divided into a one-week online design element and 8 days of onsite manufacturing process.

The 2023 edition was entitled LOADING...

As in video games, one needs to be patient before starting to play, the same is true of the ProtoLAB workshops. One needs to take time to create a great concept, prepare building drawings and plan the construction before the whole fun starts at the building site.

Therefore, LOADING... refers to the whole process of the creation of an architectural object from the first sketch, discussions, and modelling, to the final production of a real object.

Since 2022 ProtoLAB has been organised under the umbrella of the UNIVERSITY of Universities initiative and

since 2023 it has been organised in cooperation with partners from UNITE! University alliance.

68 students from 12 universities under the supervision of 12 tutors from 5 countries worked on 8 projects. First, the teams prepared an initial design, which was discussed with tutors. Next, the detailed drawings, budget and construction process of each design were worked up. The second phase of the workshop began with an introduction to the use of tools and health and safety training.

It is always surprising to see students who start working tentatively with the materials, only to feel confident and comfortable building their own projects three days later.

The biggest lesson that students take away from ProtoLAB, apart from learning how to work with materials, and how to operate professional tools, is to develop their ability to work as a team, fit into an assigned role and try to solve technical problems on the fly that arise during construction. Such problems always arise. Often, it turns out that what was drawn in reality does not work and a new solution has to be developed. And this drives real creative technical problem-solving.



1. Participants of the ProtoLAB 2023 LOADING....



2. Work in progress at the ProtoLAB 2023 LOADING....

TECH 5.0 Transportable Emergency Cardboard House

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1. Preparation of the building components of TECH 05.



2. Presentation of the first prototype of TECH 05.



3. Assembly of the final prototype of the TECH 05.

Students: Małgorzata Lewoniuk, Artur Jörgen, Lidia Kosztołowicz, Daria Pawłosik, Justyna Szygulska, Kinga Wasilewska, Natalia Cichoń, Paulina Sołowiej, Patrycja Burda, Helena Waclawiec, Sebastian Dobroliński

Tutors: Jerzy Łątka, Agata Jasiołek

TECH 5.0 (Transportable Emergency Cardboard House) is a housing unit designed for temporary housing for people in a crisis of deprivation. Owing to the modularity and lightweight of the prefabricated assembly elements, transportation and implementation of the building remains relatively quick, and, as well, the use of specialised equipment is not necessary. In the realisation of the prototype, 80% of the unit's materials were assumed to be of natural, recyclable origin.

The unit, measuring 5.40x2.7m in plan and 2.20m min height is covered by a flat roof with a slope angle of 12 degrees. The unit's 90cm-wide repetitive panels, which create the main structure, are made of eco-friendly materials such as corrugated cardboard, timber, plywood or OSB. Insulation is made of cellulose fibres installed between the wall, roof and floor panels, as well as glued corrugated cardboard. This solution is designed to effectively prevent thermal bridges at critical points in the building. The prefabricated elements are protected with a vapour-permeable membrane at the manufacturing stage, and the roof covering is a 1.5 mm thick EPDM membrane. The façade of the unit is provided as splinter-cement panels on a timber frame. When realising the prototype, care was taken to ensure that it was favourably positioned in relation to the world's orientation, thus allowing a solar panel installation to be connected in the future. After the ProtoLAB workshops, the project was continued in order to assemble the full-size testing unit.

Eco House Pavilion

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1. Production of the Eco House Pavilion.



2. Eco House Pavilion authors.



3. Eco House Pavilion in front of the Granary by Walter Gropius.

Students: Emilia Studnicka, Cizek Aleksandra, Jakub Romanik, Julia Bauer, Elif Kir, Joana Conceicao, Kacper Kowalczyk, Piotr Tymcio

Tutor: Joaquín Alvado

The Eco House Pavilion is a project which initially was supposed to create the site for the Eco-Houses exposition where eco houses would be presented and displayed on panels.

In time, the structure joined with the "Together for the Heritage" project which is helping the Warsaw Bauhaus Foundation to collect funding for the restoration of the very first building designed by Walter Gropius. The Granary in Jankowo Pomorskie became the symbol to which our international team was referred throughout the whole design process.

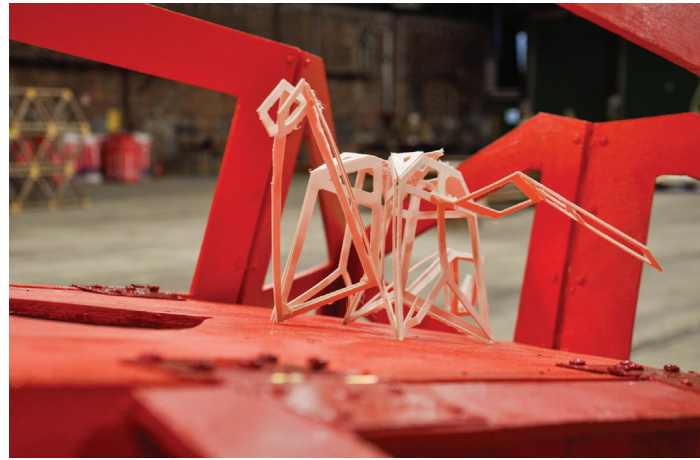
The pavilion, with its scale, recalls a small eco-house and was inspired by the elements of the structures of The Granary. Additional panels were created in order to hold the posters and information about ongoing events. The system was designed to be folded down and stored easily. The 'cherry on top of the cake' was the small trolleys to which the blocks of hay could be attached, to remind us of the local and rural spirit of the place. The whole structure was made out of sustainable materials – cardboard tubes and timber wood – with its very own joint systems.

Now the pavilion serves as a "Memorial Pavilion" and supports the Warsaw Bauhaus Foundation in their next initiatives. The pavilion was set on-site in Jankowo Pomorskie in September 2023 during the "Together for the Heritage" event.

Lelegon

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1. The scaled mock-up of the Lelegon.



2. Lelegon design and production team.



3. Final project of the Lelegon at the Festival for children Lelefant.

Students: Dominik Gromek, Anna Faltyn, Urszula Litwiniuk, Celia Castaño Marín, Diker Zeynep, Luísa Lisboa, Natalia Opołczyńska

Tutor: Javier Sánchez Merina

The project "Lelegon" was created for the international artistic and educational festival for children Lelenfant 2023. The construction and design of the pavilion were based on a series of workshops conducted with children from the festival. The workshop results were later presented and used as a starting point in the design phase of the international ProtoLAB workshops. A team of 7 architecture students from across Europe and the Middle East collaborated during the workshops on this year's Lelenfant pavilion. The outcome of two weeks of work was a project that combined children's imagination with a technical approach from students.

The result was a large wooden dragon, mimicking a child's toy, which served during the festival as part of the stage set piece but also had another purpose. It acted as a brave defender of the castle in Leśnica, where the festival took place. The dragon not only intimidates wrongdoers but also teaches children about the importance of the trees from which it was constructed. The project used plywood, with a small number of metal elements connecting movable parts.

The dragon's most important value, beyond its entertainment aspect for children, lies in teaching the capabilities of wood as a building material. Its versatility allowed it to create both the mechanical elements of the project and the entire structure of the dragon.

Green Gaya Pavilion

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1. Timbre joints and paper tube truss of the Green Gaya Pavilion.



2. Design and production team together with the founder of the Green Gaya Foundation.



3. Green Gaya Pavilion during the Event for the Earth.

Students: Julia Kudła, Małgorzata Tutaj, Loyal Alish, Dimana Ivova Ivanova, Ece Hepmutlu, Sofia Santos Ferreira, Aleksander Górczyński, Stefanie Appelgrün, Joshua Schäfer

Tutors: Samim Mehdizadeh, Alexander Wolf

The temporary outdoor expo pavilion for the 'Event for the Earth' activities, organised under the initiative of the Green Gaya Foundation, is a mobile and multifunctional structure. Its form derives from an implemented system inspired, from among other ideas, by Konrad Wachsmann's modular truss structures. With simple principles of joinery and configuration, numerous arrangements can be obtained.

A modular pavilion consisting of a number of identical components allows for a change of form for each edition of the event, adapting it to the needs of users. The dimensions of the modules have been adjusted according to ergonomic principles, optimising their function and enabling the construction of a canopy, table or bench. This solution also facilitates transport, assembly and storage.

The main building materials are paper and wood. The preserved paper tubes together with the wooden joints constitute a three-dimensional truss module. Furthermore, the individual components of a single module may be disassembled and reused, following the principles of circular economy. Despite the lightweight construction, the applied truss system guarantees the stability of the entire structure.

Digital augmented reality tools were used at both the design and execution stages. The technology used not only facilitated the detection of potential issues but also indicated a sequence for the effective assembly of the composition. In this way, with the support of the app, the structure will be able to be built and reassembled without the designers' supervision. The pavilion represents an example of education through play and makes the participants of the event aware of the possibilities of using sustainable bio-based materials in the field of architecture.

Warm Backrest

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1. The warm backrest design team with the mock-up of the bench and landscape design.



2. Final prototype of the Warm Backrest with authors and future user.

Students: Wiktoria Gocałek, Julia Martyka, Aleksandra Chmielińska, Julia Gawron, Justyna Horbowy, Justyna Kaźmierska, Julia Lupa, Agnieszka Mielczarek, Julia Radomska, Joanna Iwasieczko, Sylwia Sliwa, Iwo Szenk, Natalia Szewczyk, Marcin Weron, Aleksandra Matuszak, Karolina Pusiewicz

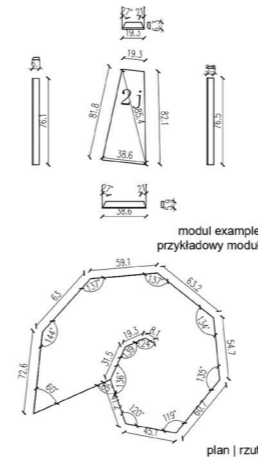
Tutors: Małgorzata Pawlak Kubasek, Piotr Jędrzejewski, Krzysztof Kubasek, Małgorzata Świątek, Jerzy Łątka

As part of the Wrocław Academic Task Teams, an interdisciplinary group of students and mentors from the scientific circles of three Wrocław universities - the Academy of Fine Arts, the Wrocław University of Science and Technology and the Wrocław University of Environmental and Life Science worked on the concept of land development for the Day Care Home at Ciepła (Warm) Street in Wrocław, whose main residents are senior citizens. After the inventory of the area, numerous observations, lectures by specialists and conversations with future users, the students created a comprehensive design for the arrangement of the space around the Day Care Home. They responded to the main needs of the centre's residents and designed the space to be as friendly, functional and adapted to the elderly and people with disabilities as possible. During the ProtoLAB workshops, which were part of a several-month-long design process, students, with the support of mentors, focused on a project involving a central element of the garden—a multi-person bench connected to a pergola and planters for flowers. A particular feature of the designed small architectural object is its adaptation to the needs of the elderly, who often face mobility issues due to their age. It was also important to consider the context of the location and design the bench in a way that makes it resistant to damage, durable, and with aesthetic qualities that enhance the outdoor experience for older individuals. The designed bench is a combination of many ideas that the students wanted to implement. It serves not only as a place to rest or spend leisure time but perhaps also as a future venue for activities within the community centre. The students' social project did not end with the ProtoLAB workshops, and thanks to the involvement of the city council, further stages of its implementation took place. Its goal was to address an important social project in the city's space and an attempt to tackle challenging design issues.

Wrocław Silence Shell

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1. Wrocław Silence Shell, exemplary wall module and plan.



2. Prototyping the Wrocław Silence Shell.



3. Final prototype of the Wrocław Silence Shell.

Students: Emilia Rogowiec, Agnieszka Sieczek, Julia Myslińska, Kamil Charkiewicz, Sebastian Dobrolinski, Weronika Dzik, Mateusz Kucharz, Wiktoria Lasek, Magdalena Mioskowska, Karolina Szewczyk

Tutors: Mauricio Morales-Beltran, Jerzy Łątka

The main goal of constructing the pavilion was to foster interdisciplinary collaboration – a simulation of cooperation in real life, followed by conducting research on the finished structure and gathering feedback from the users.

The project aimed to create a place of tranquillity for students and city residents. The structure has to isolate individuals inside from the surrounding environment. Users can find peace and relaxation - despite being in the city centre - so the object is isolated from the noise of cars or the chatter of conversations. A moment of relaxation occurs. The project was a collaboration among students from the Faculties of Architecture, Civil Engineering, Electronics, Photonics and Microsystems. In the designed pavilion, the wooden structure blends with a design inspired by sound waves, with acoustic insulation protecting the user from external noise. The 12-degree incline of the roof resulted in the unique shape of every element. As a result, the structure is distinctive but also time-consuming to design and build. The wall modules were made of plywood and wooden beams, insulated with mineral wool, and covered with a waterproof material. While the external "shell" of the pavilion appears hard and inaccessible, the interior creates a sense of cosiness – users can lean against soft walls. The pavilion, inspired by the sea, twists like a shell to enclose its user in a comfy interior.

Interdisciplinary collaboration posed challenges but proved valuable for project's participants, preparing them for professional realities. Despite the initial difficulties, the project was successful and is enthusiastically visited by residents of Wrocław. Ongoing work includes acoustic research and gathering user feedback to better understand their experiences and expectations.

Reception Desk

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1. Preparation of the Reception Desk.

Students: Michał Grądowy, Szymon Jankowski, Sebastian Kawalec, Michał Kogut, Wiktoria Kuśmierz, Jagoda Sabaj, Angelika Śliwińska

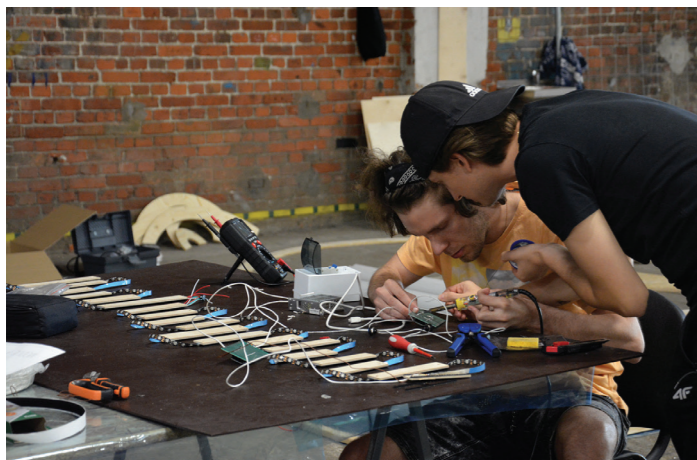
Tutors: Jerzy Łątka, Romuald Tarczewski

The aim of the project was to design a reception desk for the Recruitment Department. The designed piece of furniture was to meet the need for serving university candidates during recruitment, and also to be used during educational fairs.

The main guidelines related to the stand were mobility, accessibility, ergonomic use, multivariate use and a lightweight design to enable transport. The stand was dedicated to the work of 2 to 6 people for events and fairs, while also having a utilitarian and aesthetic function - as a form of representation of the university.

The guiding idea behind the creation of the recruitment stand for Wrocław Tech was the gravitational wave, which was first observed only in 2015. This discovery continues to be one of the main driving forces in speculating on the development of mankind and helps us to believe that shaping the next generation of young scientists will result in further advances in our understanding of the world and in everyday life.

Based on the idea and guidelines, a segmented counter was designed and realised as the formal and usable part and an eye-catching representative wall that could serve as a backdrop for photos for newly recruited students. The whole was designed in the shape of smooth transitions from chaotic oscillations to an ordered graph of the gravitational wave highlighted at the back of the counter. The counter is formed from 6 parts of a circle, allowing multiple layouts to be created. The first 4 elements form a standard counter with shelves for equipment, a single module with both sides elevated to break the simple circular layout of the structure, a lower element for people with disabilities, and a half module as a usable solution for freedom of movement for employees.



2. Electronic installation of the Reception Desk.



3. Final prototype of the Reception Desk.

Espresso

Korzyńska, Sara¹

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1. Tram chassis of the Espresso café.

Students: Sara Korzyńska, Alina Ewertowska, Leen Alish, Anais Asensio Cifuentes, Teresa Padrão, Katarzyna Kuriata, Aleksandra Czyżewska

Tutors: Doina Carter, Peter Eigenraam, Jerzy Łątka

Espresso is an extraordinary café that seamlessly combines a unique design with an eco-friendly approach to architecture. Its name not only refers to the excellent coffee it serves but also emphasises the "fast" character of the place. Located on a long-unused tram chassis, Espresso is an example of the creative use of materials, giving new life to objects.

Created for the needs of the Academic Culture Centre and Local Initiatives "Czasoprzestrzeń," (Eng. Timespace) the café is designed for the solo work of one person inside. The order pickup area is lowered, ensuring comfort for both baristas and customers. The cuts in two walls, facing the corner with the coffee pickup point, add dynamism to the structure while intuitively guiding customers.

The café's side elements have been elongated, providing space to stop and enjoy coffee. The structure of the café, heavier at the base and lighter upwards, pays homage to the tram chassis, highlighting the beauty of the construction. The main elements are paper tubes, which, after impregnation, become a durable and resilient material. The colour scheme and subtle shading add lightness to the place, creating an association with a leisurely atmosphere.

This unique combination of the past with modernity makes "Espresso" not only a haven for coffee enthusiasts but also an attractive spot for discovering unconventional architectural solutions.



2. Espresso design and production team.