
CoLab
Dear Plastic,
we need to talk
WiSe 25/26 | FG Borrego
Collaborative Design Laboratory
Architekturdarstellung und Gestaltung

We are

CoLab is a Collaborative Design Laboratory.

The Department of Architectural Representation and Design of the Institute of Architecture at the Technical University of Berlin, known as CoLab, identifies as a Collaborative Design Laboratory.

CoLab Berlin is part of a wider network which includes a team in Madrid, where it emerged in 2009. Our primary interest lies in the interface between design strategies and sustainable manufacturing techniques in contemporary practice. The derived insights are applied in design practice as well as architectural representation that take form in a collectively produced working model.

Collaborative Design Laboratory
info@colab.tu-berlin.de
www.colab.tu-berlin.de

Technische Universität Berlin
Fak. VI - Institut für Architektur
FG Architekturdarstellung und Gestaltung

Sekr. A28, Raum A812
T: +49 [0] 30-314-72730
Straße des 17. Juni 152, 10623 Berlin

Leitung	*Prof. Dr. Ignacio Borrego*	*borrego@tu-berlin.de*
Mitarbeiter	Dr. Gaizka Altuna	*altunacharterina@tu-berlin.de*
	Andreas Woyke	*andreas.woyke@tu-berlin.de*
	Mirza Vranjakovic	*m.vranjakovic@tu-berlin.de*
Tutor*innen	Leonhard Dähndel	*l.daehndel@campus.tu-berlin.de*
	Emma Peschke	*mera.peschke@campus.tu-berlinde*
	Matteo Rauer	*m.rauer@campus.tu-berlin.de*
Sekretariat	Claudia Steinhäuser	*claudia.steinhaeuser@tu-berlin.de*

Dear Plastic,

we need to talk...

I am writing to you because for years we have shared an intense relationship, almost perfect at times, but I can no longer pretend that everything is fine between us.

I loved you for how you saved lives: in hospitals, you were the difference between risk and safety—disposable syringes, gloves, catheters, and PVC blood bags that replaced fragile glass. You gave me peace of mind in the form of sterility, you allowed transfusions, dialysis, and prosthetics that restore movement and quality of life. During the pandemic, you were, once again, my shield: masks, visors, and protective equipment...

I loved you for making life lighter: you were part of cars, planes, and trains that consume less fuel because you are light. I think of composite materials and shells, of how reducing weight means saving energy and emissions. You made mobility easier for me.

I loved you because you democratized access: glasses, toys, utensils, appliances; products that were once expensive and are now affordable thanks to your low cost. You made it possible for more people to have access to goods that improve everyday life.

I loved you because you made the technology I carry in my pocket possible: casings, cables, insulators, encapsulations that allow devices to be small, durable, and reliable.

But Plastic, I must also look at you honestly. It hurts me to say this because you hurt me and those around me.

You have been part of the best stage of my life and I love you, but our relationship hurts me, hurts my loved ones, and hurts my environment.

Every year, hundreds of millions of tons of you are produced worldwide; much of it does not return to a useful cycle: it ends up in landfills, incinerated, or scattered in nature. Millions of tons reach the sea every year and form islands of trash that float where once there were only waves and wildlife. I have seen them with my own eyes: beaches covered in trash, animals entangled, the stomachs of birds and turtles filled with fragments of you. That breaks my heart.

You are durable to the point of unbearability. It takes decades—

sometimes centuries—to disappear; you fragment, you become micro and nano, and you cease to be visible, turning into something we breathe, drink, and eat: microplastics in drinking water, salt, fish; particles that have been detected in human blood. Studies estimate that we ingest tens of thousands of your particles every year.

You always told me you could be recycled; that if I treated you well you would be useful again, that you wouldn't leave me surrounded by trash. But it was a false promise. Yes, you can be recycled, but only a few times. After that, you lose your properties: you become brittle, you lose strength, transparency, and usefulness. You go from being a shiny bottle to becoming an opaque fiber for carpets or stuffing, and from there, to nothing. And the truth is, only nine percent of everything we've produced from you has ever been recycled. The rest is out there, piling up like the memories of a broken relationship.

How can I trust someone who promises me eternity, but in reality only leaves me with more burdens and guilt?

You have fostered a throwaway culture that I am ashamed of. Bags, bottles, disposable packaging: you got me used to disposables and made me ignore repairing, reducing, and thinking. This frivolous consumption has social consequences: countries and communities are burdened with waste that is not theirs, and inequality manifests itself in garbage dumps that suffocate entire neighborhoods.

I try, Plastic, but every time I see you on the beach, in the countryside, on the street, in an animal's stomach, or mixed in with the sand, I feel that our history has left scars that I cannot ignore.

I want to leave you, forget you, erase you from my memory, I don't want to live with you anymore...

... but I can't live without you either.

Although it hurts me, we share too much,

too much past,

too much present,

for me to simply turn my back on you now.

Our only option is to rethink our relationship...

... so that someday, perhaps we can say "goodbye forever" to each other.

Introduction

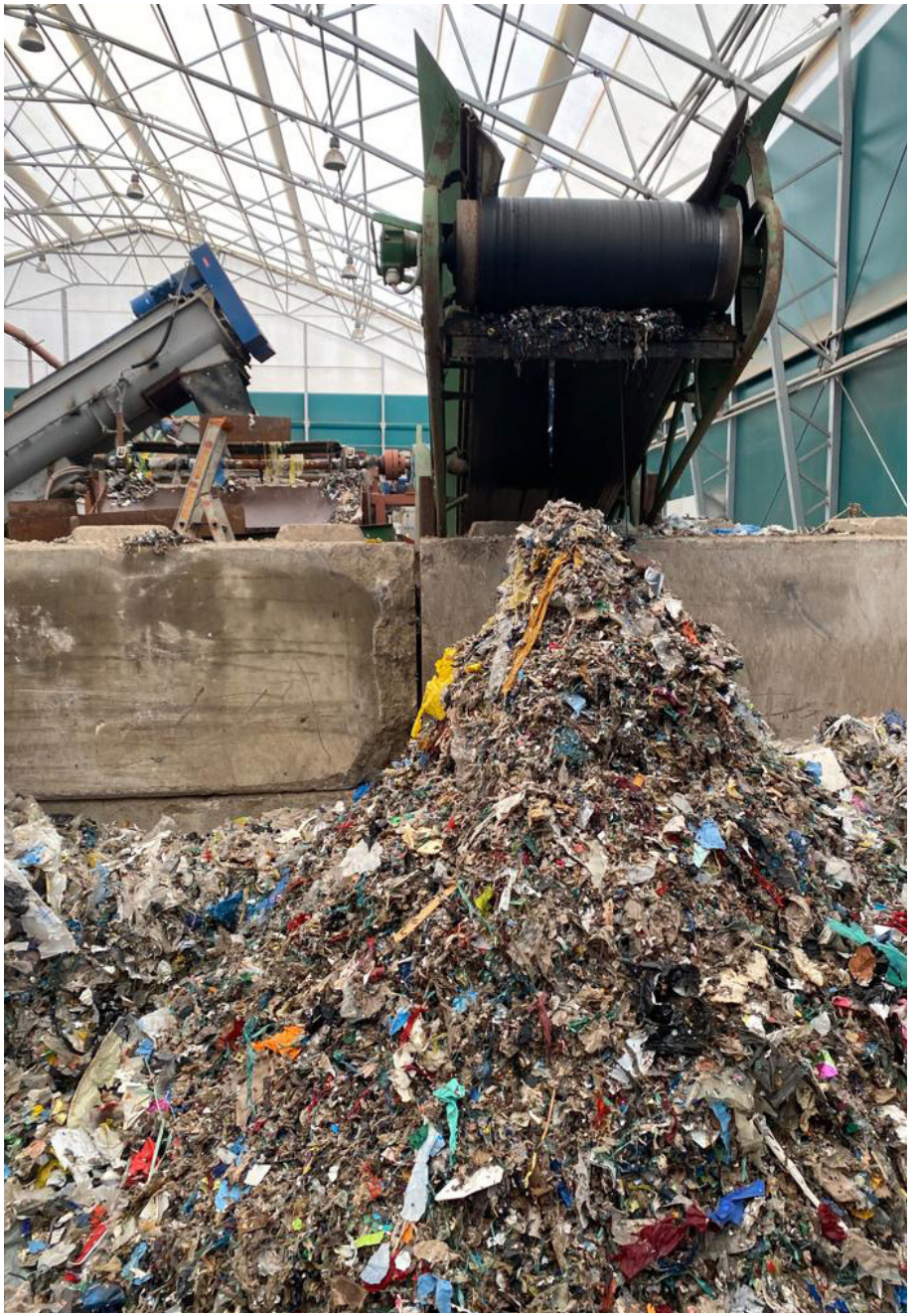
HOW TO REPURPOSE ALL THE PLASTIC WASTE AROUND THE EARTH?

Plastic pollution is a pressing environmental issue that threatens wildlife and ecosystems worldwide. Its non-biodegradable nature leads to massive waste accumulation, harming marine life and landscapes.

The generation of new plastic must be restricted but meanwhile we must deal with the problem that represents all the existing plastic waste. Nowadays only 9% of the produced plastic is being recycled and there is around the world more than 8 million tons of plastic waste. **If we could collect all that plastic waste, what could we do with it?** Use it for landfills? Burn it? Maybe the most immediate answer to this problem could be to recycle it for everyday use, trusting that this time, it will be controlled and will not end up in nature again. However, plastic, after a few recycling cycles, begins to degrade and lose its properties. Since normally plastic products have extremely short lifetimes compared to their biodegradation period, if we systematically transform all that plastic waste into products with short lifetimes, we will soon have a lot of useless non-biodegradable material. Our proposal is to repurpose plastic waste for long-lasting uses such as architecture.

This way the problem could turn into an opportunity. Innovatively repurposing plastic waste into architectural structures presents a promising solution to all that waste. This approach not only gives plastic waste a long-lasting life but prevents the unnecessary waste of new raw materials. We consider architecture as a storage for those damaging wastes, where we can keep them away from the natural environments, protecting wildlife and ecosystems, until science finds out a better way of getting rid of it.

During the "Dear Plastic," seminar we will work on designing and prototyping industrializable construction systems for building housing from plastic waste. The ultimate goal is to find a way for architecture to become a means of absorbing, containing, and storing all the plastic waste scattered around the world until we achieve a technological framework that allows us to dispose of it in a sustainable manner.



Visit to AVEBA GmbH . Photo by Anna Hartung

Background

CHALLENGE 1 (2022): CRUSH UP! - RECYCLING OUR OWN WASTE AT IFA (TU BERLIN)

Building from recycled materials is not a new topic in our department. We have been researching and organizing seminars on the subject for several years.

Our latest milestone was the Crush Up! pavilion, a 6.00m diameter hemispherical construction that was made from the waste generated by TU Berlin's own Institut für Architektur.

This pavilion was designed and fabricated over the course of three seminars and finally built in July 2022. A total of almost one hundred students participated in this collaborative project. More than half a ton of waste was recycled, where it was possible to find materials of all kinds such as: student models, packaging, plans, scraps of wood and cardboard, old prototypes, sawdust produced by the workshop's cutting machines... To process all this waste into a building material, less than 5 kilos of paste were used. Around 280 components were made from this material.

The construction of the Crush Up pavillion was an acchieved goal and the motivation to undertake new challenges.

Crush UP Pavilion built for IFA Ausstellung 2022. Photo by Andreas Woyke

Background

CHALLENGE 2 (2023): DESIGN MATTER – PLAYGROUND IN AARHUS OUT OF URBAN WASTE

In this second adventure we faced a similar task on a different scale. We started working with the municipality of Aarhus to build playgrounds using their urban waste.

During the first phase, which took place during the winter semester 22-23, we carried out an exhaustive analysis of the waste produced by the Aarhus city population and its potential as a construction material. A total of eight proposals were made that explored the use of waste materials of all kinds, from wood to plastic, textiles to bicycles.

After this first phase it was determined that the most challenging urban waste to work with was undoubtedly plastic. Not only because of its difficult biodegradability, but also because of its large quantity and presence throughout the world's cities. Because of this, it was decided to limit the range of the research project to plastic waste.

To continue with the second phase, we purchased from the recycling plant of Aveba GmbH in Beeskow (Brandenburg) 400 kg of LDPE, with which to start producing prototypes. LDPE is a widely used type of plastic, especially for packaging and bags.

During the following phases of the project, various types of construction systems were developed together with the students that could be used to build self-supporting spherical structures made of plastic.

Throughout the SoSe25 semester, the final design for the construction of a 10-meter diameter dome was completed, and the molds and tools necessary for its construction were produced.

By summer 2026, it is expected that the dome will be assembled on campus.

The beginning of a new journey

RECONSIDERING OUR RELATIONSHIP WITH PLASTIC

As we mentioned earlier, the Plastic! project is in its final stages, about to conclude. Over the nearly three years we have been working with plastic waste, we have learned about the huge problem that plastic waste poses for the entire world. We must definitely reduce our use of plastic, especially when it comes to single-use items, where plastic becomes waste after a short period of use, such as packaging. But even if we manage to significantly reduce our use of plastic, there are many sectors where its use is essential and no feasible substitute has yet been found, such as in the medical sector. Even so, there are already billions of tons of plastic scattered across the oceans and land all over the world. What do we do with all that plastic scattered around the world? What do we do with all the plastic waste we continue to produce today?

We must definitely rethink our relationship with plastic waste.

LONG LIVE THE PLASTIC!

Although plastic has become an indispensable material due to its low cost and versatility, much of its use is for short-term, disposable applications, such as single-use containers or packaging. This “use and throw away” logic generates mountains of waste that, due to the nature of the material, remain in the environment for centuries. Unlike other materials, plastic cannot be recycled indefinitely: with each transformation cycle, it loses quality and properties, which limits its reuse.

However, architecture offers a promising field for giving this material a more sustainable destination. By integrating it into buildings, recycled plastic becomes part of structures and components that have a much longer life cycle, lasting decades or even centuries. In this way, architecture not only extends the usefulness of plastic, but also turns it into a localized resource. Building material records allow us to know precisely where this plastic is located, opening up the possibility of recovering it in the future when more sustainable and environmentally friendly technologies for its disposal or transformation exist. Until that time comes, buildings can play a key role as “storage facilities” for plastic waste, transforming it into valuable construction elements and reducing its immediate environmental impact.

Plastic brick develop by Precious Plastic. Source: https://www.preciousplastic.com/starterkits/buy/bricks

Building components made from plastic waste

AS A WAY TO REPURPOSE PLASTIC WASTE INTO ITEMS WITH A LONG USEFUL LIFE

In the contemporary technological context, it is difficult to consider plastic as a circular material. If its quality deteriorates significantly each time it is recycled, the best option we have, after reducing its use, of course, is to try to slow down its circulation. That is why we propose producing construction components from plastic waste, so that they can form part of architecture as inert elements, minimizing their movement and circulation.

Throughout this seminar, we will design and prototype different types of construction elements, which will be mainly intended for housing construction, made from post-consumer plastic waste. The elements designed must not only be made from plastic waste, but must also meet a series of requirements that enhance their reuse. Therefore, these elements must be:

- Easy to assemble and disassemble. Non-destructive disassembly is imperative. However, while the components are assembled, they must have flawless mechanical performance.
- The construction system should be as flexible as possible, allowing the components to provide solutions for a wide range of scenarios.

- Components should be as compatible with each other as possible, as well as compatible with other commercial construction systems, to facilitate their implementation in real constructions.
- Components should not be simple "alternatives made from recycled plastic" of existing products. Plastic waste has its own unique qualities and genuine manufacturing methods. Newly designed construction systems should make the most of these qualities.

Mock up made by ByFusionBlocker. Source: https://easyreadernews.com/recycled-plastic-lifeguard-tower-in-manhattan-beach/

Phases and deliverables

Throughout the course, we will work in teams. The different teams will be responsible for developing solutions for different scenarios (load-bearing walls, lightweight facades, load-bearing floors, lightweight roofs, etc.).

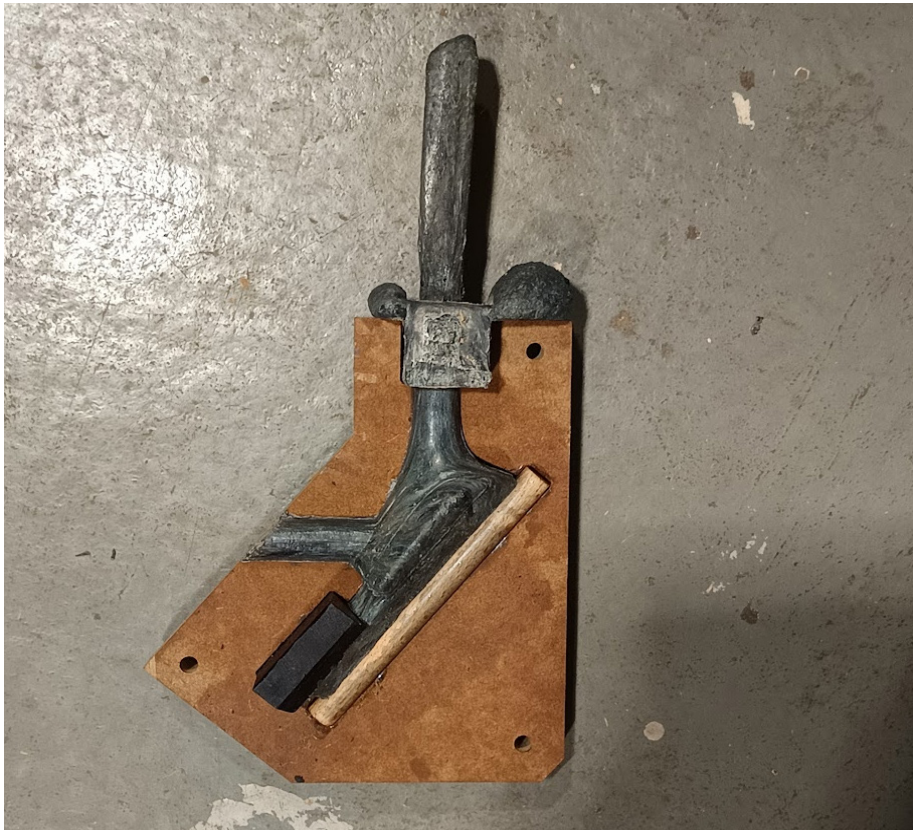
The seminar will be divided into different phases in which the teams must achieve certain objectives.

Phase 1: Research
The teams will have to carry out a critical review of the current situation from two perspectives. On the one hand, they will have to investigate what designs have been developed from plastic waste for their application scenario. On the other hand, they will have to look for other types of solutions for their application scenario that they can adapt and integrate into their designs.
Deliverable*:15-minute presentation.

Phase 2: Development
During this phase, each team will develop their construction system, paying special attention to the manufacturing methods that will be used. The flow of information between the different groups will also be important in order to ensure compatibility between the designed components.
Deliverable*: Detailed 3D model, 3D printed mock-up, detailed drawings with dimensions (1/1 definition), manufacturing process diagram, description of different implementation scenarios.

Phase 3: Implementation
In this final phase, the groups will share the various solutions they have developed with each other. Each group will develop a small dwelling using the various solutions previously defined by each of the groups.
Deliverable*: 3D model, axonometric projections, mock-up, floor plans, section and elevation drawings at a scale of 1:50, visualizations, explanation of the assembly process.

**Deliverables are subject to change depending on the pace and interim results of the seminar.*



Elemento contructivo desarrollado durante "Plastic!!"

Calendar

WS 25-26

	DATE	INFO
	Tuesday 13:00 -15:00	
KW 42	**14.10.25** Hello!	First meeting / short introduction / presentation excercise 0
KW 43	**21.10.25**	Introduction of “Dear Plastic,” / organization of the groups / registration instructions
KW 44	**28.10.25**	**Submission Phase 1** + Supervision
KW 45	**04.11.25**	Lecture by Daniel Jaramillo (Alico SAS) +Supervision
KW 46	**11.11.25**	Supervision
KW 47	**18.11.25**	Supervision
KW 48	**25.11.25**	Supervision
KW 49	**02.12.25**	Supervision
KW 50	**09.12.25**	**Submission Phase 2** + Supervision

	DATE	INFO
KW 03	**14.01.26 10h-14h (Wednesday!)**	**FINAL PRESENTATION + final submission (Phase 2 + Phase 3)**

The sessions **will be presential** and will take place in room **A 204B**.

Exceptionally, they can be held online in the CoLab Zoom Room.

***CoLab Zoom-Room**
Link:https://tu-berlin.zoom.us/j/92884189565?pwd=cFB4UFljRlJBbmRpc3JwNytWZmt-kZz09
ID: 92884189565
Password: 20202020

Recommended Bibliography

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Hebel, Dirk E, Marta H Wisniewska, and Felix Heisel. Building from Waste: Recovered Materials in Architecture and Construction. Birkhäuser, 2014.

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