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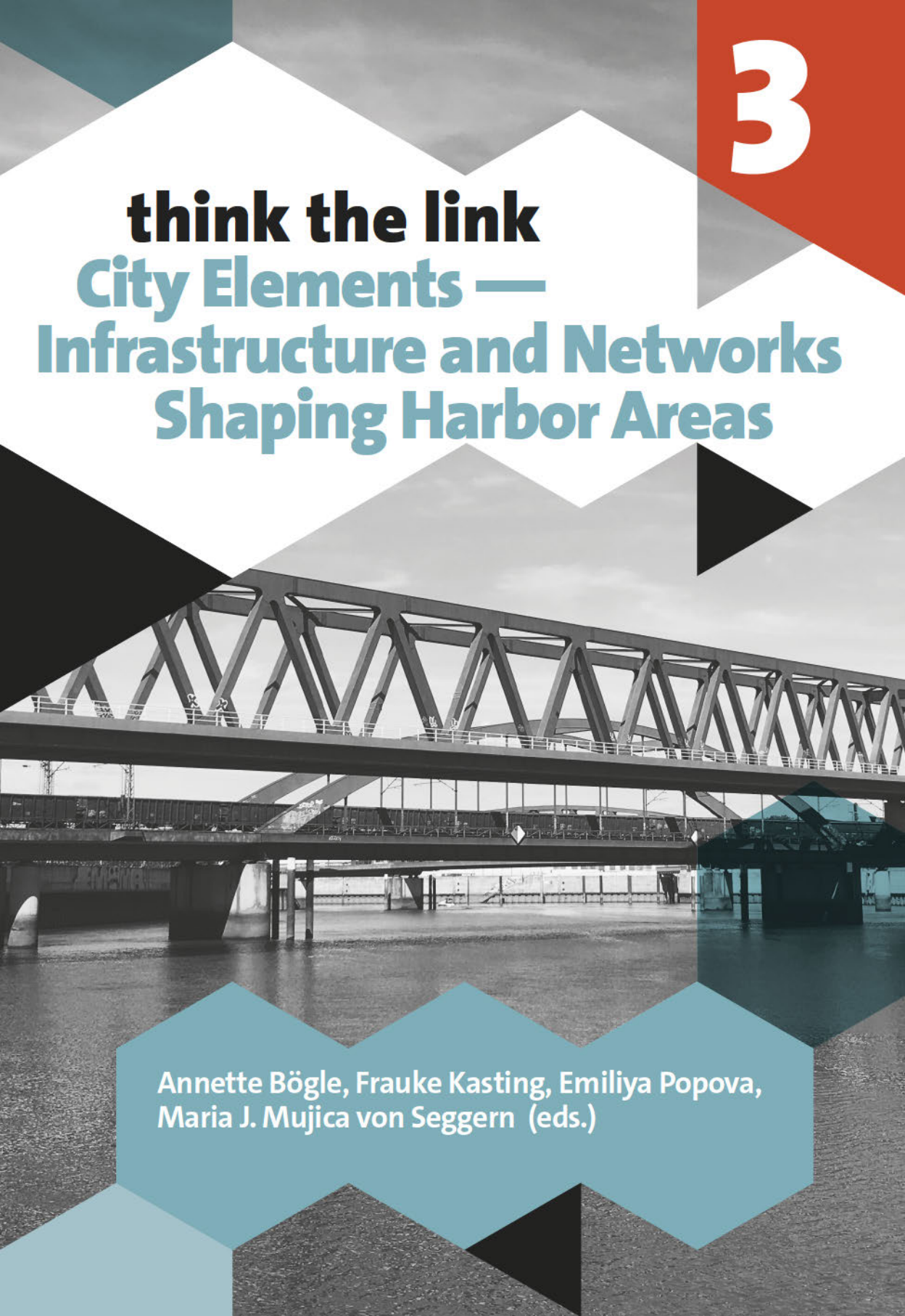
think the link

City Elements — Infrastructure and Networks Shaping Harbor Areas



Annette Bögle, Frauke Kasting, Emiliya Popova,
Maria J. Mujica von Seggern (eds.)

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City Elements—Infrastructure and Networks Shaping Harbor Areas

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think the link City Elements — Infrastructure and Networks Shaping Harbor Areas

Reflections on urban regeneration processes and documentation of the third Baltic International Summer School 2017 at HafenCity University Hamburg

Annette Bögle, Frauke Kasting,
Emiliya Popova, Maria J. Mujica von Seggern (eds.)

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Foreword

With the B.I.S.S., HCU brings together more than 70 scientists and young researchers from renowned universities of the Baltic Sea Region each year, who work in interdisciplinary and intercultural teams on recent challenges of Hamburg's urban development.

Personally, the ten days in August have become a very special time for me in our academic year. It is this certain spirit of open-mindedness and ambition that fills the halls of HCU during our Baltic International Summer School. It is a time when we have alert students from all around the Baltic Sea, inspiring keynote speakers, important members of the jury, experts from renowned offices and universities as our guests; and we bring them together with Hamburg's municipality. In this sense, we were very proud to have had the Senator for Housing and Living, Dr. Dorothee Stapelfeldt, as the 2017 patroness for HCU's flagship event of its strategic international activities.

As such, B.I.S.S. has developed as a booster for the extension and strengthening of our greater Baltic Sea network, where the members of our partner universities have taken up vivid exchange over all institutional layers, resulting in even more research projects and in some cases in personal friendships.

Due to the visibility and consistent structure of B.I.S.S., collaboration has evolved in many other fields of HCU's disciplines—e.g. the infrastructural engineering with our new partner of 2017, the Riga Technical University, or the exchange of HCU's City Science Lab, which is collaborating with our partner universities on Smart Regions in the "Baltic Region Cruise" or the bilateral cooperation between the Technical University of Gdańsk and HCU on harbor areas of Hamburg and Gdańsk. Today, HCU has become a sought-after partner for political and scientific actors in the Baltic Sea Region—whether as a project partner in teaching and research collaborations or as a venue partner, e.g. as host to the Fehmarnbelt Days 2016 with more than 700 visitors of the region.

We hope that all the B.I.S.S. participants had interesting workshops, presentations and discussions that helped them to create cherished memories and knowledge, strengthening the Baltic Sea professional network and its knowledge.

Dr.-Ing. Walter Pelka
President of HafenCity University of Hamburg

Reflections on Urban Regeneration Processes

Interdisciplinary suggestions for creative interventions in the “Elbbrücken” infrastructural joint in Hamburg

The Professional Reality is Interdisciplinary!

Third Baltic International Summer School

Annette Bögle

Infrastructure and networks are significant city elements which play an essential role in the shaping of the urban built environment. The third Baltic International Summer School faces the creative potential of exactly these elements as a basis for innovative space production. The 2017 topic allows developing new approaches for the urban development area east of Hamburg, which also serves as a gateway to the city. Here, the newly developed HafenCity meets the old working-class area Rothenburgsort. In addition, this interface is one of two points where high-speed road traffic crosses the Elbe river. Thus, this is a traditional traffic route that includes historic building heritage and historic infrastructural elements, e.g. the Elbe Bridges.

The projects of the B.I.S.S. 2017 pick up this fascinating and at the same time challenging place; they are about giving the site presence during times of transformation as a "No(t/d)e of Transformation." The place is a "Sustainable Link—(with) the Haze of the Past in the Future." More precisely, one of the projects looks into "Water Engineering: about Machines and Organisms." The last two projects deal with "(Un)plugged" infrastructure and "Public (Net)works." All these subtopics of the main topic "City Elements—Infrastructure and Networks Shaping Harbor Areas" offered a thematic framework for the development of the group projects. Each of them dealt with the site-specific waterfront situation from the conceptual to the more detailed object level.

These complex themes require cooperation and understanding among the disciplines as well as different competencies to interact successfully. It is the universities' task to lay the foundations in academic education to overcome the difficult barriers that arise from a lack of understanding. The universities need to proactively frame and address the complexity of interdisciplinary practice.

The initial idea of the B.I.S.S. is based on this understanding. It is an innovative workshop, which aims to develop, test and implement new ways of interdisciplinary teaching, learning and designing. After the sustained success of the first and second B.I.S.S. that took place in 2015 and 2016, the same partner universities from Poland, Estonia, Sweden, Denmark, Finland, Russia and Germany launched the third summer school. The B.I.S.S. 2017 is part of the ERASMUS+ project BeInterBaltic, just as the previous two ones and the upcoming B.I.S.S. 2018 are. It took place from August 11 till August 19, 2017 under the patronage of the Senator for Urban Development and Housing in Hamburg, Dr. Dorothee Stapelfeldt.

Working interdisciplinary and internationally

The B.I.S.S. as well as the project BeInterBaltic seek to spotlight the impact on the disciplines in an interdisciplinary context. Having this in mind, we aimed to create an atmosphere in which every discipline was equally challenged and appreciated at the same time.

Each discipline challenge was achieved by a solid group structure, which sought to include one discipline (and nation) in one group—meaning one or two participants maximum representing their discipline within their group—just as is the case in our professional working environment. A positive, respectful and cooperative atmosphere was achieved by a smart group-finding process in which—given the solid structure—the students could choose with whom they wanted to work with on a personal basis. This group-finding process combined individual personal experience—preparing a meal together—with intellectual input in form of a subject-related presentation by each participant, drawn up in advance of the B.I.S.S. Additionally, this process included the choice of the subtopic, which was represented by a team of mentors. In order to agree on a project and on a mentors' team and to find new ways and solutions for their challenges, each participant had to leave his or her comfort zone and ideally

find new solutions in his or her own discipline in order to cooperate successfully with the others.

This concept as well as the already tested and consolidated structure of the summer school could be successfully implemented in the B.I.S.S. 2017, too.

Mentors' team

In the 2017 edition, the backbone of the B.I.S.S. were again the mentors; young teachers, researchers or practicing planners from the participating universities. Like the students, they represent the different disciplines of the build environment, such as Urban Planning, Urban Design and Architecture as well as Civil and Structural Engineering or Environmental Engineering. During a preparation workshop and based on their own research topics and methods, they matched into pairs and worked out their subtopics. Each mentors' team supervised two or three groups of students. The students could thus not only choose experts in different topics but also experiment with different research methods. This very individual mentoring enabled an atmosphere of understanding and appreciation of the other disciplines, of creative work and sustainable reflection.

Scientific input and social interactions

The nine days of the B.I.S.S. were special, the excitement tangible. To allow this sense of excitement to unfold, social interactive tasks and excursions were part of the scientific program. These included ice-breaking activities on the first day as well as the farewell party on the last day. The scientific approaches of the B.I.S.S. participants were stimulated by the creative input of three outstanding public keynote lectures: Sheila Kennedy (from KVA Matx, MIT Architecture), Nina Rappaport (Vertical Urban Factory) and Bastian Wibranek (Digital Design Unit, Technical University Darmstadt). Additionally, the participants met every morning for the so-called "Food for the day" lectures by participating professors or invited lecturers for further thematic input.

I would like to sincerely thank all the participants, mentors, experts, lecturers and supporters of the B.I.S.S. 2017 and look forward to seeing you and new young professionals at B.I.S.S. 2018!

No(t/d)e of Transformation

How Can Design Thinking Help to think the link?

Kai Schramme, Imke Wies van Mil and Veronika Ignataviciute

Introduction

The bigger cities in northern Europe have to provide more and more housing. Hamburg is no exception here. This development is caused by two factors: first, employment of locals and people from abroad at companies that are situated in urban centers, and second, the number of residents in each housing unit. The number of residents per flat is decreasing, such that requests for single occupancy apartments in cities are higher than ever. To satisfy the demand, new districts are erected at the outskirts and former industrial areas are transformed to living quarters. The HafenCity in Hamburg is an example of the latter. At B.I.S.S., the geographical area of focus is the eastern end of the HafenCity. This quarter begins in Rothenburgsort where the Elbe Bridges are located and moves east towards southern Veddel.

The Elbe Bridges channel the stream of railroads, subways, cars, bikes and people that enter and leave the city. The area north of the bridges—and the site of interest during this summer school—is presently experienced "in passing" or in transit. Not yet an active urban hotspot of Hamburg, this location has been in question to be redevloped for several years, and ultimately, will face *improvement* during the upcoming years, including the construction of different typologies together with a new public transport hub, essentially creating a new *node*, or hub, within the travel system in Hamburg.

No(t/d)e of Transformation was a workshop created by the authors to engage students and designers to interact with the space of the site, in order to schematically design an interim "element" that lends the site and users presence during the time of transformation. Whether the element itself should transform during the process was open for exploration, but spatially notable with radiating presence during the day and the night, the *element* was required to become a *node* to note.

The various methods tested within the workshop included ways to investigate the site to develop ideas about noting the node and how this approach can allow people to do that. The design process of the workshop revolved around the future element and its dialog with transformation and perception, borrowing traditional design approaches of Design Thinking. Ultimately, the central focus was on designs and their performance, and the exploration of iterative ideas through the use of analog and digital tools being simple models, mockups or visualizations.

This article will describe the workshop by outlining a process that incorporates Design Thinking and will emphasize the implementation and methods used during these envisaged steps. The workshop's interim results as well as feedback from discussions with participants are used to evaluate the application.

Design thinking

Design thinking is a strategy for solution-based design focusing on the development of new ideas by integrating the users into the design process. It relies heavily on diverging strategies and iterative actions.

The key to design thinking is to allow user involvement within design and to open up the design team to others, be it customers, clients, neighbors, politicians or companies. Unlike the conventional approach (where the users can usually only vote between the proposed finalized options that were designed by architects or other designers), the users *do* participate in the creative process of a project. Developing this idea further, design thinking has the ability to become a collective and participatory process which generates holistic solutions for problems.

The application of design thinking is seemingly strongest in product and software design but continuously, it is spreading to other areas of design too. *Who are the future users? And how are they integrated properly?*—these are the usual enquiries. Therefore predictions have to be made about the community: who will be using the space, what are their natural or individual patterns, which might depend on their wishes and needs.

For future developments, architecturally and on an urban scale, the method of design thinking does not start with a predefined question, but relies on a collaborative development of the question, which may result from preceding solution-based thinking, that is, after the right users and their integration into the design process have been identified. At this stage of the project, the role of the designer is to moderate and to create an environment that facilitates the generation and evaluation of ideas.

The tools that are used during this stage of the design are brainstorming, "bodystorming," storytelling, rapid prototyping and more, and the aim is to produce many different ideas, diverging as much as possible. In a collaborative and iterative process, the promising ideas and concepts are chosen for further exploration. Since many different disciplines are part of the design team, drafts and prototypes are produced to serve as communication devices that illustrate the ideas for a common understanding. The role of the expert designer, such as architect or engineer, is to develop these feasible prototypes and possible solutions and then feed them back into the holistic design process.

The steps of design thinking are to empathize (with the users), define (the scope for

a solution), develop ideas (as much as possible), prototype (to evaluate) and test (for implementation). The process itself is not always a linear one but uses loops to continuously iterate, open for input. Similar schematics can be found in other definitions yet they all share a common mantra: design is redesign.

The strategy of design thinking is considered, by the authors, to be essential to the development of the built environment. This is because every project generated through Design Thinking is unique and can only be carried out once. In this respect, there is no allowance for failure, hence it is best to thoroughly investigate possible solutions and to iterate virtually before actual construction. The strategy of integrated design also follows a similar concept to design thinking, but it does not demand such a user-centric point of view, is less open-ended and therefore more biased. Interdisciplinary design approaches are a common denominator to handle the more and more complex projects in the built environment. To make sustainable proposals that serve generations, the design process must be collaborative not only between experts but also by truly thinking about the future users. For these reasons, the method of design thinking was to be tested during the interdisciplinary workshop of the B.I.S.S.

Workshop

The hosted workshop *No(t/d)e of Transformation* was imbedded in the organizational structure of the B.I.S.S. which can be found at the beginning of Part B in this book. In preparation of the activities, the topics and fixed dates of the corporate events (keynotes, "food for the day"-input, critics) were minded and they harmonized well with the intended structure.

The authors were mentoring three groups of students who studied at different universities around the Baltic: two groups of four students and one of three. Two-thirds of the students study in architectural programs, the others in similar programs like architectural engineering, real estate or urban informatics.

Each day of the workshop had its own topic in relation to the process of design thinking (see figure 1). The kickoff was a site visit followed by a focus on the user groups who were predicted to activate the site. After that, a city element was to be iteratively developed and be presented to the board. The following chapters show the focus of each day.

The day before the workshop opening, students engaged in a number of ice breaker challenges to find group members. Different activities helped to form interdisciplinary and harmonizing teams. The morning of the first day, the mentors and students introduced themselves and the method of "speed dating" worked well to meet everybody on a more personal level. A presentation of the students' homework later, where each student had to present a city element and his or her (disciplinary) working method, offered a good possibility for insight into the students' professional skills.

Figure 1: Schedule of the workshop

Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7	Day 8
Site	Users	Element	Explore	Implement	Finalize	Produce	Present
Introduction	Brainstorm about Users	Analysis	One Concept Mentors' Consultation	Stucture Detail	Review Mentors' Consultation	Produce	Prepare Presentation
Lunch	Lunch	Lunch	Lunch	Lunch	Lunch	Lunch	Lunch
Site Visit	Formulation of Vision	Three Concepts Critique by Experts	Multiple Variants Project Definition	One Variant Critique by Experts	Finalize Produce	Produce	Jury

Figure 2: Looking southwards to the site

Figure 3: Planning area (Source: OpenStreetMap)

Figure 4: Bus stop in the middle of the state road

Site

The second half of the first day was spent with a site visit to introduce the participants to the planning area. To experience *the invisibility* of the site when passing through, the group took a commuter train ride across the Elbe Bridges and a bus back to exit at a stop in the middle of the state road. From there, the area was explored by foot. It became obvious that this area was made for vehicles and walking through it with a human perspective was an unpleasant experience, though the area did reveal its potential.

User

The topic of the second day was the potential users who will activate the space and the patterns of their routines. Unfortunately, no actual users (people of the community) who could be involved or could supply sufficient information of the neighborhood were involved. To work around this obstacle, the students were asked multiple questions to consider potential user groups and to identify themselves with the demands as future users. Questions ranged from "What's your perfect Thursday night out?", "How does transportation influence this site?" to "What could businesspeople do here?". After each question, the answers were written on post-its and pinned to a wall without any link to the question (see figure 5 on next page). In this way, students were taken on the pathway of design thinking.

Next, the answers were grouped by a matching theme and a headline was as-

signed (see figure 6). The goal was to identify common denominators and to work out features that the future city element should have or which problems it should solve. This activity was followed by the creation of an inspiration board that connected the site with the most promising features (see figure 7 on next page). At the end of the day, a shared vision was formulated that was to serve as a reference to the human centric view for checking up on later as there were no real users to ask later on.

Element
The third day was given to the investigation of the actual city element. Key elements from the inspiration board were analyzed and following lunch, three concepts developed that matched the user with the element. The focus was on this design question: *which aspects is the design trying to solve?* At the end of the day these concepts were presented to guest critics.

Explore
The task of the *exploration* day was to opt for one concept and to explore multiple variants of that concept. The idea until now was to diverge as much as possible and to create choices. After consultation of others mentors over lunch, the most promising idea had to be chosen and presented to the others in the room. From now on, it was time to make choices and to converge, yet each decision had to be taken iteratively and not taken as the first best option. After the presentations, each group had to write down their concept idea and proposal in not more than five sentences in order to have a guideline during implementation.

Implement
The fifth day was meant for implementation of the design solution. The groups had to work out the details of their proposal, to think of the structure and integration into the landscape. After another expert critique in the afternoon, the groups had to raise questions about their concepts, to identify whether the shared vision from the second day was still visible or if any adjustments in the design proposal were necessary.

Finalize
The last chance to make any changes was on the sixth day, which was meant for finalization of the design and for emphasis

Figure 5: Grouping of attributes

Figure 6: Inspiration board to identify promising features

on the production of presentation material to be exhibited and presented. Different layouts and physical model options were discussed. From this point on, the group members could focus separately on their individual pieces of the design yet addressing the project as a team.

Produce
The *production* day was reserved for continuing the creation of the presentation. Because of the limited time, the students had to reflect on which way was most suitable to exhibit their ideas, to tell their design story best by means of the presentation. The visitors were meant to be able to understand their idea, their reasoning, their findings and how the analysis had led to the proposed design with all its features: the method.

Present
After seven hard working days, every group was well-prepared on the day of the finnisage. Their produced output had to stand to a jury of experts that went from project to project. There was no oral presentation by the students which meant that each idea had to be delivered by the shown presentation itself. This meant that afterwards, the jury addressed projects individually and at random to give the students feedback. The projects that were produced within this workshop can be found on pages 118 to 135.

Conclusion
In summary it can be said that the method of design thinking worked very well within the architectural approach of this workshop. The output that was presented to the jury received positive feedback and the story of each design proposal was clearly delivered in the presentations. The results satisfy and show that the structure of the workshop helped the participants to keep their objective in view and remain on track.

Nevertheless, some critical aspects have to be mentioned as well. The lack of any real users who could be involved within the design process made it difficult to make the user-centric view compelling. The feedback indicated that rising presumptions felt like an additional force that was holding the process back from the actual

Figure 7: Critique by experts

design development. As an approach, when many projects in the architectural education do not proceed to define the users specifically enough but choose to generalize solely from studying nearby building masses and axis of reference, the method of design thinking is recommended, since it aligns the project framework and opens up towards the users and their perspectives, placing the user at the top of the hierarchy. If no actual user can be involved, at least an intensive study of user data should be integrated.

Another aspect that became apparent was the difficulty to allow a sufficient amount of iterations to extensively investigate the design space. This was not due to the method of design thinking but the limited time of the workshop. A feasible solution tends to be stuck with and not explored further. Other methods that rely on iterations have this challenge as well. The designer has to force himself/herself to continuously question the design and to loop back for better solutions. Only equivalent options can provide a sophisticated base for deciding on a solution.

To conclude, design thinking can be recommended for hosting favorable educational projects. The challenge of real user involvement must be noted but can be solved by drawing on user data census or looking at the position from other people's perspectives. Design thinking is especially valuable for interdisciplinary design because, methodologically, as an approach, it involves participating designers and non-designers who offer a diverse palette of skills.

The Sustainable Link—the Haze of the Past in the Future

Mathilde Landgren and Michał Kwasek

General introduction

The aim of the topic is to explore the site by focusing on historical elements and life cycle thinking. The history and sustainability will thereby be the core approach and method during the ongoing design process. These themes will encourage the interdisciplinary and iterative design process.

The groups will be introduced to the architectural and technical history of the site as well as the master plan for the future, which is already rapidly developing. At the same time, the site will give the groups the tools and inspiration for the materials and waste, which will be the resources for their projects. The materials will be the inspiration for investigating recycling and upcycling in a life cycle approach. Tools for Life Cycle Assessment (LCA), the environmental footprint, and Life Cycle Costing (LCC), the economic footprint, will be used to make design decisions with a life cycle perspective and ensure sustainability in the entire design process of the summer school. Emerging projects will highlight the original nature of the area that is going to be developed. This will allow increased public awareness of the past through the use of material and architectural solutions referring to the harbor character of the area. While mixing the interdisciplinary groups, all disciplines will be valuable to the common project and to ensure a holistic design.

Sustainability is difficult to reach if the process is not included and if the different professionals do not communicate all the way through the process. The current summer school therefore takes up the very important key element of interdisciplinary cooperation. The mentors give focus and continuous guidance in the process for the different groups and also when the members develop the process individually.

The workshop will prove that historical architecture and sustainable engineering approaches can support each other in a design process. The design will hereby be a comprehensive final product maximizing the benefit of both architecture and engineering.

Workshop process

The area was established as a topic for the students to work in as it is crucial for the

city of Hamburg. It seems that the local government noticed it while a transport interchange was being planned in that location. Today, the building process is underway. The area is located on a border of a few parts of the city that differ from each other. HafenCity (rising modern residential and office quarter) from one side, Rothenburg (low-density habitable district) and Hamburg Mitte from the other sides. The lurid inequalities of the characteristics of these areas make it easy to see that development of it should be destined to hold something in common.

The site is an intersection, a node of traffic. Highway, trains and regular car traffic cross the area. Furthermore, the site contains a bus stop and a new S-Bahn stop is in process. All this traffic leaves only fragmented areas behind. A site full of possibilities and ideas for the students to spin. It seems that since a long time now that it has been an area cut through by many routes. It is also unrealistic to think about the spot without them. Groups had to accept that fact and deal with this problem instead of theoretically wiping it out. They had to deal with life-like projects.

When student groups visited the site, it was quite a disappointing experience for them. It was not only the rainy weather. During the walk, students were able to feel the spot and surroundings. The large amount of transport that goes through this area makes people feel uncomfortable. The large-scale transport (both train and highway) infrastructure seems to be the most important element of the site. It creates a lot of noise. It is not pedestrian-friendly and feels slightly dangerous. Possible ways of passing the area by foot or by bike are limited and unappealing. Water, seemingly so close, is not accessible at all. The area in the middle of the city, with many drawbacks, at the same time tends to have unused potential and is without supervision.

The main topic of the workshop was taken into account by mentors of the groups in a historic and sustainable way. The starting point was to create projects that would be like a haze of the past in the future. In that way there could be conceived objects that could resemble the origins of that part of the city. They were also to be accomplished in a sustainable way. Students were told to analyze the history of the spot. The previous functions or types of the buildings and the technical equipment that were situated there before or were still present could be a source of inspiration. It was difficult to find it because of the fact that so few original elements were left, since it is now already a construction site, but also because the area was never developed with high density.

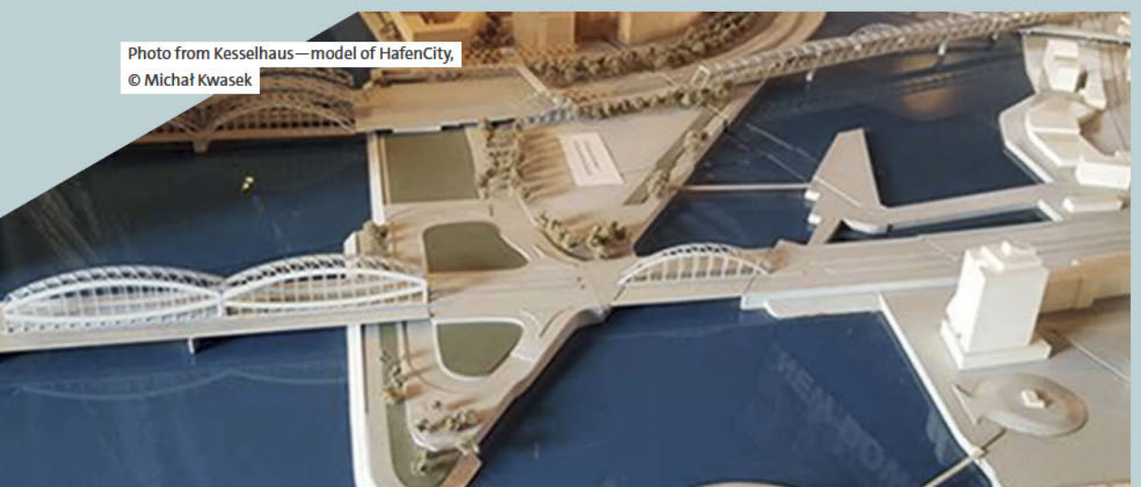

Photo from Kesselhaus—model of HafenCity, © Michał Kwasek

Project HafEndSoul: Day 6—first critiques, © Mathilde Landgren

The first task in the plenum within the mentors group: mapping elements in the area and describing the historical perspective as well as the sustainable possibilities. During the first site visit, students were asked to take pictures, sketches and notes, illustrating their first impressions about the site, which is now an area in development and parts of it a construction site. Through this mapping, the students gained a better understanding of the elements in the place. Furthermore, these elements were supplemented with more knowledge about the history of the area and a sustainable approach. This mapping created the common basic ground for the rest of the workshop.

Creating something in both a historical and sustainable context was not about, for example, rebuilding historical gates that were standing before at the entrances of the Elbbrücken Bridge. It was not about creating an outstanding design as a dominant feature in the city either. The sustainable approach was not only about using natural material, but also about making projects suitable and adaptable to the surroundings. Proposals were to be made for people and in an accessible way for them. To help all the groups to understand the process of changes of the area, we visited the HafenCity Information Center "Kesselhaus." The mock-up of the HafenCity with the peninsula that we were supposed to work on helped to understand the scale and connections between other parts of the city. This model clearly showed the high complexity of the site despite the size in relation to the overall master plan of HafenCity. The site contains high density in different traffic lines and nodes. The museum also showed boards of the analyses made by city planners to provide a full understanding of the thoughts geared towards the future HafenCity.

Due to taking into account the important issue of life cycle thinking in designing process, the groups visited the OSAKA 9 HafenCity sustainability pavilion. It was a lesson showing simple actions for gaining efficient designing solutions. Here, all the different actual cases implemented in the entire HafenCity were shown, which inspired the students to look into the variety

of sustainability. Taking the big overall terms down to very practical elements and projects—to understand and handle the small site, there is a need to know the bigger picture, also for understanding the historical elements and putting them into a more sustainable future context.

Working in one common group during the first days, the smaller groups then started working on their own. The key aspects here were to find the limitations, issues and questioning for the site, always taking the base within the history and looking at the development, process and output from a sustainable point of view. Within a few days, the room developed to a proper workshop space with drawings, printed reference photos, models and keywords on the walls and windows. All three groups developed their own way and had their own methods. Minor frustration was felt in the groups, but their themes seemed to come together bit by bit. The expert critiques in the late afternoon led to more frustration, which we had to handle in smaller discussions afterwards.

The different approaches within the teams were based on the interdisciplinary team setting. One group consisted only of one profession, which was very clear in its work process and lacked input and discussions from people with completely different approaches. However, another group really managed to team up interdisciplinarily, which resulted in both frustration, miscommunication and change of mindset. From the interdisciplinary group, new perspectives opened up for all of the participants. Ways of communicating to make sure all understood and looking at how each discipline could contribute to the common process were part of the experience.

Social sustainability was a great focus for all three projects as well as looking at existing elements and how to include these in future development without demolishing and rebuilding; a notion for upcycling.

Project The Social Link: Final project works, © Mathilde Landgren

Project HafEndSoul: Final project works, © Mathilde Landgren

Safety and access were key factors for all three projects. They were distinguished by focusing on light in the dark tunnels, acting as new recreation spaces in the noisy site or a community project on water connecting the site with the surroundings. Yet again, the workshop showed how difficult and broad sustainability is to grasp and that much more input from us mentors is needed to provide a full understanding on how to implement it. However, time pressure was an issue—the topic of sustainability should be included for another workshop.

The final products were very different but each with high quality. One team ended up third place in the final ranking—very nice work!

Water Engineering: about Machines and Organisms

Martin Kohler and Jan Suchorzewski

The main concept of the cyborg manifesto[1] is a rejection of rigid boundaries, notably those separating "human" from "animal" and "human" from "machine." The cyborg is a fusion of machine and organism with no clear demarcation where organism ends and machine starts. While Donna Haraway introduced this idea to attack and undermine marginalizing distinction like gender or races as culturally constructed boundaries, she also opened the door to a different mindset to approach every machine-enhanced environment as a cyber-physical system.

On the human individual level, the cyborgs are a topic of dystopian science fiction and a lived and accepted fact of contemporary life; especially in the field of human health. A person with a pacemaker can be considered as something close to a cyborg at least. Nevertheless we would not consider it somehow dystopic or sci-fi anymore. But doing so could help to tackle further discussions on how far we should be allowed to enhance human bodies. Are prostheses OK? What about special glasses for the blind? X-ray lenses for the wealthy? Digital processors under your skin? Soon enough we will find ourselves in a discussion about what a human is to determine which enhancements are permittable. At the moment the consensus is reached mostly for devices that can restore a person's capabilities to the normal human limit. But what is "normal," what "human"? Wouldn't it be much more helpful to think in terms of needs? A person with a heart disorder needs a device to control his or her heartbeat. A pilot needs perfect eyesight. The question is not so much how to achieve this capability (training or technological enhancements), but what should be done. It is just a different frame of mind rendering the same machine/human system either as a person with some helping device or as a machine-enhanced organism. These enhancements simultaneously extend as well as threaten our understanding of what it means to be human. The advantage of this later perspective is that the question of what and how far we should act, change, enhance and design with our technological knowledge and devices shifts from finding the line between natural/artificial or human/machine as the crucial criteria to a question of helpfulness and relevance. Looking at the man or the city or the landscape as a cyborgian structure, we can as designers consider all technological possibilities analysing the impact and assess the interactions and relations with the surrounding environment and base our concepts, proposals and evaluations on the actual impacts and effects rather than finding a constructed line which demarks nature from something else. In the face of climate change and the social problems of our world, we have to consider all options available to design environmental systems that are the most reliable, resilient and sustainable possible. Thinking in terms of cyborgs can help us to achieve this goal. The cyborg is an image thrown at the city and the urban many times. A notable publication on the cyborg/city complex was Matthew Gandy's "Cyborg urbanization" in which he writes:

"The emphasis of the cyborg on the material interface between the body and the city is perhaps most strikingly manifested in the physical infrastructure that links the human body to vast technological networks. If we understand the cyborg to be a cybernetic creation, a hybrid of machine and organism, then urban infrastructures can be conceptualized as a series of interconnecting life-support systems."[2]

Infrastructure here is not simply an engineering project. In this line of thinking it becomes a tool to structure new relationships and spatial qualities. Conceptualizing environments as cyber-physical systems understands them as results of complex interactions between anthropogenic forces and biophysical systems. Gandy presents the cyborg thinking as an ontological strategy for extending the limits to human knowledge and as means of describing those phenomena that appear to reside outside conventional frameworks of understanding. The same thinking can be taken to landscapes or waterscapes. The landscape architect Kees Lokman[3] proposed the cyborg as a landscape-making practice with a strong focus on feedback loops and agency. Humans, technical devices, animals, plants, inorganic matter and biosphere processes can be accessed as a complex network of actors that are mutually dependent and constantly changing.

Transferring the idea of cyborg to the water edge of Hamburg, we wanted the workshop participants to consider water as a synthetic body connecting city elements from a "shrimp" to a "ship." The system of rivers and canals in Hamburg (and other cities we come from) is a vital part of the city organism. Water in its mass has great power of shaping or destroying. Rivers might create sandbanks, deltas and islands that host various species of fauna and flora or may bring the ruthless power of floods destroying built structures, harming the city and their inhabitants. For centuries human had worked on taming the water's power. It was made to be useful in industry or act as a defence for cities and agriculture. The scientific knowledge was necessary to subjugate water. In ancient times, people like Archimedes[4] discovered essential laws of fluid mechanics. He designed one of the first water engineering structures later called "the Archimedes screw" for transporting water to different levels. Some historians postulate that this invention was used in the watering system for the Hanging Gardens of Babylon, one of the Ancient Wonders of the World. Even though ancient knowledge about fluid mechanics was very basic, it could already be used to create beauty, support farming and industry. In the case of the Netherlands, a country that always struggled with floods, simple hydro-mechanical structures were built to prevent flooding the fields below sea level (polders) in the 13th century. In Kinderdijk a group of 150 windmills supplying the Archimedes screws pumped water from polders up to the retaining reservoir and then to the river. The system protected the land, cultivated and inhabited by people for almost 800 years. Only 15 of the mills survived until today, yet they remain an image of the merging natural powers of wind and water with the human mind (fig. 1). Later studies of Bernoulli,[5] Prandtl[6] and most importantly Navier and Stokes[7] enabled people to design not only the water level, but also the water flow. Using advanced

numerical tools enhancing the theoretical laws of fluid mechanics, engineers are able to predict and shape the water flows with simple engineering objects.

Man-made changes to the Elbe river system have created an artificial system of channels, basins, quays and landfills. The natural dynamics of the river estuary have changed dramatically as a consequence. Due to the deepening of the tidal Elbe river for container ships, water flows in quickly, amplifying the tidal variance and pumping sediments into the harbor. At the same time, various artificial flood defenses have reduced the permeability of the water edge, removing spaces for water retention and excess sediment in the case of flooding. As a result, the maintenance of the current water depths is a costly and arduous undertaking which places considerable strain on the financial infrastructure of the city of Hamburg. Day by day, tons of sand are transported from the main canal into smaller harbor basins. The river mud emerges every six hours due to tidal water level changes. To add to the problem, the sediments from the harbor are polluted by the intensive industrial activity in the 19th century and large areas to store and dump the sediments are required. The natural sedimentation in the harbor is treated by the continuous dredging, generates huge costs and can't solve the problem as it is, targeting the symptoms of a heavily transformed water landscape. Applying the cyborg perspective on the sedimentation process is meant to revert a problem-seeking phenomenon to a designed transformation creating solutions for the urban system by working with the natural powers and shaping them according to a design intention.

Figure 1: Kinderdijk polders windmill system, © Piotr Żelaznowski

What would happen if we stopped dredging?

The natural flow of water would deposit more and more sediments in the basins. Over time, open water spaces would become muddy beaches with occasional flooding. New plants would appear, enriching the landscape in order to enable further species to thrive. After decades this would develop into a wetland forest landscape such as the Heuckenlock on the southern tip of the Elbe island. Such an occurrence could become a vital element for Hamburg's ecological identity.

The participants were given two tools from the engineering side: experiments and numerical simulations. The physical experiments are the base of every innovative design. To understand the water behavior, participants of all disciplines (architecture, civil engineering and urban planners) were asked to prepare, run and document experiments in the urban scale (field measurements or observations) or laboratory tests in the flow channel. In the field observations, the participants focused on the tide changes in time and connecting water flow with sedimentation on the actual site. The documentation tool was photography and time lapsed videos. The laboratory tests were performed with obstacles of various shapes and sizes designed by the workshop participants. The arrangement of obstacles in the horizontal and longitudinal dimension of the canal was also tested. The influence on the water flow was analyzed. The observations were documented on video. The numerical simulations were performed with educational version of ANSYS 12.0[8] software and the computational fluid dynamics (CFD) method was used in 3D numerical calculations of the harbor canals with its realistic shape and cross-section. The results were compared with field observations of vortices on water surface and sedimentation processes. Then participants introduced the obstacles one by one into a model in the harbor basin of the main design. Due to obstacles, water speed was reduced in areas designed to become sandbanks and increased in the main channel part increasing its depth. With this knowledge, we used speculative design methods[9] to develop possible paths to a completely new water landscape in the harbor of Hamburg working with the water and responding to the needs of the city and its inhabitants.

By designing the water flow with engineering technologies and hydro-technical structures, the workshop wanted to upgrade natural water systems to better serve the citizens. The work contained a deep analysis of the hydraulics of the river and canal system including the water flow and sedimentation processes by experiments in various scales (from laboratory to urban scale) and numerical simulations. The designs are based on real current hydro-graphic data, field measurements (including water flow, fauna and flora, river bed, etc.), simple computational fluid dynamics and speculative design proposals. The main point was to enhance and use the natural water power and to create an amphibious landscape working with natural processes creating a new landscape. There is no way back in history. There is no restoration of nature. The harbor exists as do the new water dynamics. At the southern side of the Oberhafen basin, the HafenCity develops a creative quarter, on the opposite northern side the Großmarkt area is planned to be developed for events and cultural uses. At the end of this development path a new urban core will emerge with the Oberhafen basin in its center, split in two halves by the Oberhafen.

By modifying the water flows and the resulting sedimentation, and by bringing in plants and birds from the Heuckenlock, this proposal would influence the natural succession, creating a landscape which is neither land nor water and could bridge the water gap between the southern and northern side. This new type of park reproduces ecological functions of some of the most valuable ecological ecosystems of the Elbe estuary, the tide-influenced forest wetlands, but in a conscious design process responding to the urban needs of city and ecology for one of the most urban parts of Hamburg, the HafenCity.

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Game Design as an Interdisciplinary Teaching Tool in Built Environment Studies

Viktorija Prilenska and Maksims Feofilovs

Abstract

Interdisciplinary work is a usual practice in the field of designed environment. A modern design object results from the synergy of a multidisciplinary expert team, rather than from a mental effort of a single architect or an engineer. the BeInterBaltic project aims to foster the interdisciplinarity in a conservative setting of the academia, where the disciplines are still often taught in their silos.

Designed environment integrates the knowledge of diverse disciplines like architecture, civil engineering and urban anthropology. Research subjects and methods vary dramatically across disciplines. The challenge is to find common interests and a common language for productive collaboration. To do so, it is desirable for the representatives of certain disciplines to have a basic understanding of other disciplines, which can potentially contribute to the design project.

The number of the disciplines grows and the gap in research subjects and methods within a single discipline, too, increases. Therefore, there is a demand for a simple, yet efficient tool to quickly introduce a discipline to layman when needed. Serious games could serve the purpose, encouraging learning in a simple and engaging way.

To test the hypothesis, the authors developed a game prototype, aimed at educating students about utility infrastructure resilience and its planning-related implications. The game was tested during the Baltic International Summer School 2017 (B.I.S.S. 2017). The authors conclude that the game concept has high education potential. However, the game prototype needs substantial improvements to be playable.

Keywords

designed environment, edutainment, interdisciplinarity, serious games, infrastructure resilience.

1. Introduction

1.1 Interdisciplinarity

Interdisciplinarity is a common practice in creating the built environment. Design objects result from the synergy of multiple experts, representing various disciplines, rather than from a mental effort of a single designer, architect or engineer. Following the trend, the BeInterBaltic project aims to foster interdisciplinarity in a conservative setting of the academia, where the disciplines are still often taught in isolation.

At universities, students from the built environment-related disciplines, such as architecture, planning, civil engineering, urban anthropology and alike, are encouraged to collaborate on a project at least once per curricula. However, the outreach efforts are often limited, resulting in collaborations of adjacent fields, such as architecture—civil engineering or planning—urban anthropology. The design disciplines like architecture or planning tend to overwhelm other disciplines and, hence, engineering solutions or anthropological research are used to support and justify design solutions, rather than to create synergies.

Modern sustainability requirements set high standards for design projects, urging to compliment aesthetic qualities with efficient use of resources. New neighborhoods and buildings should not only be resource-efficient in themselves, they should be designed, built and recycled in a resource-efficient way. Thus, technological solutions do not follow the design problems anymore, but rather the technology paves the way for the design or, as in best practices, design and technology create a symbiosis.

To meet modern professional requirements, students aspiring a career in the field of designed environment must master the skills of interdisciplinary collaboration. The challenge of working across the disciplines is to overcome the differences in research subjects and methods employed by every discipline, and even within one discipline, and to find common interests and a common language to foster efficient collaboration. Therefore, the associates should have a basic understanding of the disciplines involved, their research subjects, methods and limitations. As the disciplines diverge and their number increases, it is impossible and unnecessary to master them all. Thus, there is demand for a tool, which allows the introduction of a discipline to laymen in a quick and easy way, preparing the associates for collaboration. Serious games can potentially serve the purpose, providing a favorable learning environment.

During the B.I.S.S., the workshop group titled "(un)plugging," led by the mentors Maksims and Viktorija, sought to blend design and environmental engineering via serious game, aimed at introducing infrastructure resilience to architecture students from the utility service perspective. The authors limited utility infrastructure to electricity, water, sewage, natural gas and district heating for simplicity of experiment and calculations. The experiment showed that concept of the game has high potential in interdisciplinary education. However, the prototype of the game must be significantly improved.

1.2 Infrastructure Resilience

With growing urban population (World Bank, 2017), safe city environment is becoming more real. Population density in cities is higher than in rural areas and in time of natural hazards there are more people and assets exposed to threats of disaster. The disaster damage costs are high for built infrastructure (energy supply, water supply/sewage, transportation). Disaster threats escalate even more in the light of growing numbers of yearly natural disasters in the world (CRED, 2015). Now, more than ever, disaster management and mitigation are top priority question for officials, scientists, researchers, engineers and experts of other fields.

The situation calls for administrative and academic action. Research on the topic of disaster management and risk reduction is more important than ever and requires a set of definitions, methods and frameworks. In this case, the term resilience is one of the most popular ones for describing system performance in relation to its disturbance. The use of this term is adopted from the natural science field of physics, where it is defined as the power or ability to return to the original form or position after being bent, compressed or stretched (fig. 1).

This definition has been transformed and used in many different fields of research, like ecology, where it is defined as "the capacity of a system to absorb disturbance and reorganize while undergoing change and to still retain essentially the same function, structure, identity, and feedbacks" (Holling, 2004, p. 6) or social sciences, defining ability to recover rapidly from illness, depression, adversity. In case of community disaster resilience, the term describes "the ability of a system, community or society exposed to hazards to resist, absorb, accommodate, adapt to, transform and recover from the effects of a hazard in a timely and efficient manner, including through the preservation and restoration of its essential basic structures and functions through risk management" (UNISDR, 2017). According to this definition, frameworks to measure community disaster resilience are emerging (Schipper and Langston, 2014). Appropriate framework captures all the aspects of community disaster resilience including the functionality level of built infrastructure.

B.I.S.S. 2017 projects are dedicated to improving a certain part of Hamburg and infrastructure resilience must be taken into account here according to its topicality. Aspects of disaster mitigation, preparation, response and recovering from disruptions of energy supply, water supply/sewage, transportation must be considered during development of projects. To make it possible for B.I.S.S. 2017 participants to learn about infrastructure resilience and embed it in their projects, a teaching approach

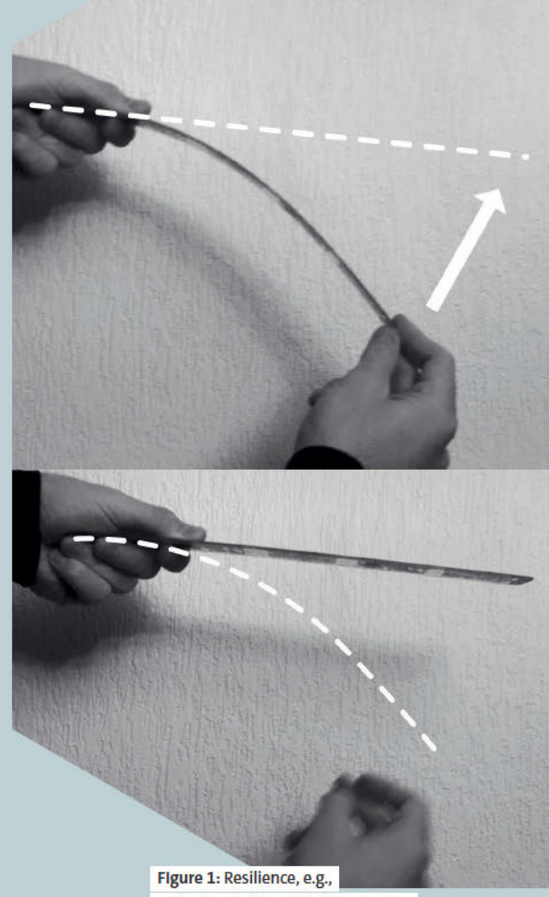

Figure 1: Resilience, e.g., returning to the original state after being bent.

based on the game as a learning method was used. By doing so, several aspects of resilience within the Hamburg's city infrastructure could be looked into during the short time period of project development.

2. Method

2.1 Games, Iterative Design and Co-Design with Prototypes

Contemporary science differentiates between play and game. Play is defined as a free, unstructured, non-competitive activity, which is performed for enjoyment. Game, in turn, is described as a rule-based activity with a set of certain outcomes, where players strive to win (Deterding et al., 2011). Both play and game in their essence are educational tools. Through play and game, animals and humans acquire new skills and social behavior. Compared to play, games, due to their structured nature, are more suitable for learning certain competences. They follow the basic principles of pedagogy, offering a set of progressive challenges, from easy to complex, with instant feedback on player performance and rewards for mastering new competences by completing the challenges (Winn, 2009). Linguist James Gee states that humans by nature appreciate learning, therefore games are gratifying due to learning which they initiate and foster (Gee, n.d.).

Originally games were tied to practical activities, namely, to the art of war. The strategy games, such as chess and go, serve as an example, or the ancient Olympics, where athletes competed in wrestling and chariot racing. In the 20th century with the rise of commercial video games, gaming became associated mainly with entertainment. As a counter-reaction, the concept of serious games emerged, which is the return to the gaming origins. Serious games are characterized by satisfying other goals beyond entertainment, such as education, training or social change (Dorner and Spierling, 2014; Winn, 2009).

The design of serious games is a complex task, which requires the convergence of pedagogy, game design and domain knowledge in a compatible and complementary way (Winn, 2009) (fig. 2).

Serious game design consists of multiple layers: learning, storytelling and game play, which are facilitated by the interface. Learning and storytelling layers are considered less flexible, therefore it is advisable to adapt the game play and interface to learning and storytelling, rather than vice versa (Winn, 2009). While designing a serious game, Winn suggests "designing, prototyping and play-testing" to check if the game functions as envisioned and then iterating back to the design and adjusting the prototype accordingly based on the experiences gained from the test plays (fig. 3).

Due to the interdisciplinary nature of serious games, the contributions of multiple experts are often required, leading to the co-design practice. Co-design emerged within product design and in recent years it has gained popularity, also in game design (Sanders and Stappers, 2014). Co-design with the potential end users is often applied in the early stages of design to provide inspiration for designers or in the late stages—to provide feedback (Khaled and Vasalou, 2014). Involving users during the design process yielded contradictory results, depending on the co-design method employed and the type of users involved (Khaled and Vasalou, 2014; Gugerell and Zuidermann, 2017).

Co-designing a game from scratch or with early stage prototypes did not yield any meaningful results. The co-designers are not able to generate novel and qualitative contributions, as they usually do not possess either the knowledge of the domain in focus or the skills of game design (Khaled and Vasalou, 2014). The open nature of the assignment and highly abstract conceptual prototypes further undermine the relevance of contributions (Gugerell and Zuidermann, 2017). On the contrary, co-designing with mid-stage prototypes was a success. Prototypes serve as boundary objects for focused discussion, directing the brainstorming process (Khaled and Vasalou, 2014) and as barebone systems which can be populated with real-life narratives (Gugerell and Zuidermann, 2017).

Judging from the studies (Khaled and Vasalou, 2014; Gugerell and Zuidermann, 2017), the requirements for co-designer profiles vary depending on the design stage and feedback they are expected to give. In the early stages the expert contributions regarding the narrative of the game are essential, whereas in late stages potential end user contributions concerning the playability, learning and fun aspects are indispensable.

2.2 Disaster simulation and subsequent infrastructure failures

Considering the existing tendencies of natural disaster occurrence, it is important to increase the resilience of cities. Unfortunately, there is no ultimate framework or method that would match all the different cases of disaster risks and variety of infrastructure. Each case must be studied individually to assess the potential hazards for the given area. Then further actions to increase resilience must be outlined. Such study about cities would consist of following basic steps: (1) determining natural events that disasters can follow; (2) determining vulnerability and exposure of infrastructure; (3) evaluating potential failures and their effect on community; (4) finding solutions to increase resilience to disasters.

The methods for utilizing steps (1) to (3) is risk assessment that in usual cases is performed by experts of related fields. Most often, risk assessments are limited to one type of infrastructure and consider its every detail. However, such study requires a lot of effort and time to be performed and usually would be confidential due to safety reasons, therefore cannot be used for academic study purposes. As for step (4), additional aspects must be included in studies related to disaster resilience, for example, financial capacity to change and adapt the infrastructure. This part is included in the game prototype and explained in the case study.

Figure 2: The heart of serious game design (adapted from Winn, 2009).

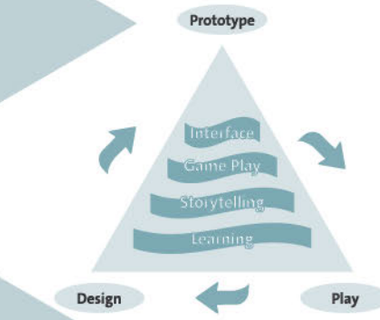

Figure 3: Game design layers and iteration (adapted from Winn, 2009).

Natural disasters			Disaster occurrence	
Disaster Main Type	**Disaster Sub-Type**	**Disaster Sub-Sub-Type**	Likelihood (%)	Disaster occurred (yes/no)
Earthquake	Ground shaking		20 %	No
Storm	Convective storm	Lightning/thunderstorms	4 %	No
		Rain	4 %	No
		Winter storm/blizzard	1 %	No
		Wind	2 %	No
Extreme temperatures	Cold wave		2 %	No
	Heat wave		50 %	Yes
	Severe winter conditions	Snow/ice	10 %	No
		Frost/freeze	5 %	No
Flood	Coastal flood		6 %	No
	Riverine flood		0 %	No
	Flash flood		50 %	Yes
Drought			10 %	No

Figure 4: Simulation tool screen (part 1); disaster occurrence.

For interdisciplinary learning purposes, a simple tool would be preferable. It must include simple information, as only a basic understanding of potential failure causes and their outcomes would be needed. For this purpose, disaster and infrastructure failure simulation tools are appropriate. Historical information about the natural disaster rate of return within the given area is used as a reference. Design of such tools can vary depending on information availability and purpose of use.

To use disaster and infrastructure failure simulation tools during B.I.S.S. 2017 as a part of the serious game prototype, the first step was to determine disaster occurrence likelihood in the study area. General natural disasters in Hamburg city were studied according to classification defined by the Centre for Research of Epidemiology of Disasters. Natural disaster occurrence likelihood was determined as the number of certain type of disasters occurring in 100 years. If the likelihood was less than once in 100 years, disaster was excluded from simulation. All the natural disasters that were used in risk assessment for this simulation tool are available in the annex. The first task of the simulation tool was to simulate the disaster occurrence. For this purpose, the stochastic probabilistic method was used. Disaster occurrence is based on a random number generation function that is used separately for every disaster. If the randomly generated number is in the range of disaster occurrence likelihood, the disaster has occurred, and vice versa (fig. 4).

The second task of the simulation tool was to report the infrastructure failures. Infrastructure failure occurrence is simulated. For this purpose, a infrastructure failure risk calculation must be performed. In traditional risk calculation hazard, exposure and vulnerability are included, where hazard is defined as return rate, exposure as quantity of exposed units and vulnerability as quantity of vulnerable units. However, in case of the B.I.S.S. 2017 serious game prototype, aspects of vulnerability could not be included directly because of limited access to utility service information. Therefore, the vulnerability aspect was replaced with the magnitude of natural disaster. In this case, risk of infrastructure failure is calculated as:

$$Risk_{xy} = Likelihood_y * Magnitude_y * Exposure_x$$

Where:

- $Risk_{xy}$ Risk of technology (x) failure under effects of natural disaster hazard (y) occurrence,
- $Likelihood_y$ Likelihood of natural disaster (y) hazard occurrence,
- $Magnitude_y$ Magnitude of natural disaster (y),
- $Exposure_x$ Exposure of infrastructure (x) to disaster (y).

For purpose of this simulation tool, magnitude of natural disaster is ranked from 0

Figure 5: Simulation tool screen (part 2); failure occurrence.

Disaster occurrence		Infrastructure						Individual system				
Likelihood (%)	Disaster occurred (yes/no)	Gas	DH	Electricity	Water	Sewage	Transport	Solar thermal	Solar PV	Wind energy	Geothermal	Biogas
20 %	No	*Operating*	*Operating*	*Operating*	*Operating*	*Operating*	*Operating*	*Operating*	*Operating*	*Operating*	*Operating*	*Operating*
4 %	No	*Operating*	*Operating*	*Operating*	*Operating*	*Operating*	*Operating*	*Operating*	*Operating*	*Operating*	*Operating*	*Operating*
4 %	No	*Operating*	*Operating*	*Operating*	*Operating*	*Operating*	*Operating*	*Operating*	*Operating*	*Operating*	*Operating*	*Operating*
1 %	No	*Operating*	*Operating*	*Operating*	*Operating*	*Operating*	*Operating*	*Operating*	*Operating*	*Operating*	*Operating*	*Operating*
2 %	No	*Operating*	*Operating*	*Operating*	*Operating*	*Operating*	*Operating*	*Operating*	*Operating*	*Operating*	*Operating*	*Operating*
2 %	No	*Operating*	*Operating*	*Operating*	*Operating*	*Operating*	*Operating*	*Operating*	*Operating*	*Operating*	*Operating*	*Operating*
50 %	Yes	*Operating*	*Operating*	*Operating*	Failed	Failed	Failed	*Operating*	Failed	*Operating*	*Operating*	*Operating*
10 %	No	*Operating*	*Operating*	*Operating*	*Operating*	*Operating*	*Operating*	*Operating*	*Operating*	*Operating*	*Operating*	*Operating*
5 %	No	*Operating*	*Operating*	*Operating*	*Operating*	*Operating*	*Operating*	*Operating*	*Operating*	*Operating*	*Operating*	*Operating*
6 %	No	*Operating*	*Operating*	*Operating*	*Operating*	*Operating*	*Operating*	*Operating*	*Operating*	*Operating*	*Operating*	*Operating*
0 %	No	*Operating*	*Operating*	*Operating*	*Operating*	*Operating*	*Operating*	*Operating*	*Operating*	*Operating*	*Operating*	*Operating*
50 %	Yes	Failed	Failed	Failed	Failed	Failed	Failed	*Operating*	*Operating*	*Operating*	Failed	Failed
10 %	No	*Operating*	*Operating*	*Operating*	*Operating*	*Operating*	*Operating*	*Operating*	*Operating*	*Operating*	*Operating*	*Operating*

Figure 6: Map of Rothenburgsort with utility infrastructure networks and students' dream houses.

to 5 based on the analysis of historical data about the area used in the game. Exposure is determined according to the infrastructure exposure to natural disaster effects. For example, district heating is not exposed to effects of heatwaves, but it is to earthquakes, as the pipeline system are underground.

Based on Riskxy, a probabilistic stochastic simulation of failures is generated using a random number generator function in software. Similarly as for disaster occurrence, if the randomly generated number is in the range of Riskxy, the failure has occurred, and vice versa (fig. 5).

2.3. Case: game prototype for B.I.S.S. 2017

For B.I.S.S. 2017, a multidisciplinary group of mentors worked together, whereby Maksims represented environmental engineering and Viktorija architecture and urban planning. The student team, in turn, was monodisciplinary, comprised of architecture and urban design students. To educate students about the basics of infrastructure resilience and its urban planning-related implications, the mentors designed a serious game prototype. As the mentors possess the expertise mainly in their domains, game pedagogical capacity and playability raised major concerns. During half a day of test play, these aspects were given extra attention.

In the current case the students did not possess any prior knowledge—neither in game design and pedagogy, nor in utility infrastructure resilience. Prior to the game session, the students were briefly introduced into serious gaming and infrastructure resilience. Furthermore, they were given several preparatory tasks: (1) mapping utility infrastructure in Rothenburgsort—an urban area in focus; (2) assessing utility infrastructure risks in the area; and, finally, (3) finding an image of their dream house.

The dream house served as the student's game piece during the game session and also as a boundary object. Dream houses had a distinctive architecture, like a floating house on a river or a house in a dense urban area. Thus, they had to be placed in a suitable urban context within the focus area, which in some cases was not the best location in terms of infrastructure provision (fig. 6).

In the game, players take on the roles of landlords aiming to develop housing, which provides all the essential utilities, such as electricity, heating, water and sewage. As already mentioned, the architecture of the dream houses sets certain requirements for the locations of the houses. For example, floating houses must be placed in the channels that are allocated for docking. Players are free to choose any location that fulfills these requirements. However, these locations are not equally supplied by utility networks. In the areas, which are serviced by networks, players can freely choose between grid and off-grid solutions. Whereas in the areas that are not serviced or partially serviced by networks, players must invest in off-grid solutions.

The game round lasts for one year. Every round, players have an opportunity to plug their houses to utility networks where possible or to install off-grid solutions. When the house is fully equipped with

Figure 7: Game investment sheet

	Year 1										Year 2
							Utility solutions				
Landlords	Budget	Income	Expenditure (plugging)	Expenditure (maintenance)	Expenditure (disasters)	Notes	Electricity	Heating	Water	Sewage	Budget
Agata	200	200	75	20	50		grid	grid–gas	grid	grid	255
Marta	200	200	75	20	50		grid	grid–gas	grid	grid	255
Djuilett	200	200	130	5.9	51		wind	solar	grid	grid	213.1
Daoyuan	200	200	75	20	50		grid	grid–gas	grid	grid	255
Yoon	200	200	195	13.5	101		wind	grid–gas	grid	individual	90.5
Fahimeh	200	0	200	4.4	51	floating house	wind	solar	no	individual	−55.4
Mats	200	200	135	3.7	51		wind	solar	rainwater	grid	210.3
Natalia	200	200	90	13.4	0		grid	solar	grid	grid	296.6
Anastasya I	200	200	75	20	50		grid	grid–gas	grid	grid	255
Anastasya S	200	0	200	6.8	51	floating house	wind	solar	no	individual	−57.8
Juliane	200	200	155	21	50		grid	grid–gas	grid	individual	174

utilities, it generates rent. After players finish their investments, the disaster risk simulation is launched, and the utility infrastructure failures, caused by disasters, are identified. Depending on the nature of infrastructure failure, the landlords are exposed to certain financial losses.

The round finishes by calculating income and expenditure of the landlords. The landlord who finishes the round with the highest profit, wins. During the B.I.S.S. 2017 the game was played for four rounds, and all the income and expenditure calculations were done manually in Excel sheets. For this game prototype, the financial aspects of technologies and services provided were estimated based on real-life costs.

3. Results and Discussion

3.1 The Strengths of the Game Prototype

The game did not have a meta-narrative, meaning that the authors did not want to steer students towards choosing certain utility solutions. Thus, the game results reflected individual stakeholder choices and preferences. Students whose houses were in dense urban areas that were well-supplied with utility networks, tended to invest in grid utility solutions in the first place because the costs of plugging to the grid and monthly fees were relatively low. After the houses were secured with grid utility solutions, students invested in off-grid utility solutions for diversification of supply. Students whose houses were in developing areas with no or partial supply of utility networks had no choice but to invest in alternative off-grid utility solutions. Most popular solutions were wind power for electricity and solar power for heating (fig. 7). Preliminary analysis of results shows that connection to the utility service grids is more likely to have a positive effect on the landlord's budget as off-grid technologies require larger initial investment and are more expensive to maintain. As the game was tested solely for four rounds, there was no opportunity to see whether the off-grid technologies actually paid off in the long run, e.g., in 20–30 years.

The disaster risk simulation tool worked well and provided qualitative information on disaster occurrence and subsequent infrastructure failures. The preliminary hypothesis embedded in the game that the diversification of utility supply will lead to cost reduction was not confirmed (fig. 8). For example, installation of both wind turbine and power grid does not help to deal with disaster costs, but it helps to maintain the energy supply if one technology fails. This is because with more technologies installed potentially there are more possible failures, thus, repair and maintenance costs. Usually, diversification is considered as one of the first steps to provide security of supply—based on the results of this game session, however, this should be looked into further.

3.2. The Weaknesses of the Game Prototype: Unfamiliarity with the Topic

At the game started, students were excited to be the landlords of their dream houses and did not hesitate with investments into various technologies. However, it appeared that not many aspects of all the technologies used in this game were known to architecture students. Lack of experience in dealing with technologies appeared as an obstacle for making reasonable investments. Also, students were unfamiliar with some off-grid solutions provided in the game, such as individual geothermal energy or sewage treatment plants and their characteristics. In the next game prototype, it is essential to include a short, but thorough description of available technologies, their characteristics, basic advantages and disadvantages.

As all calculations of income and expenditure were done manually in Excel sheets, the game play was slow and limited to four rounds. There is a need for a prototype, where calculations are done automatically, thus allowing the game play to proceed faster and be more entertaining for the players. Game play must be optimized to make the gaming time shorter, as

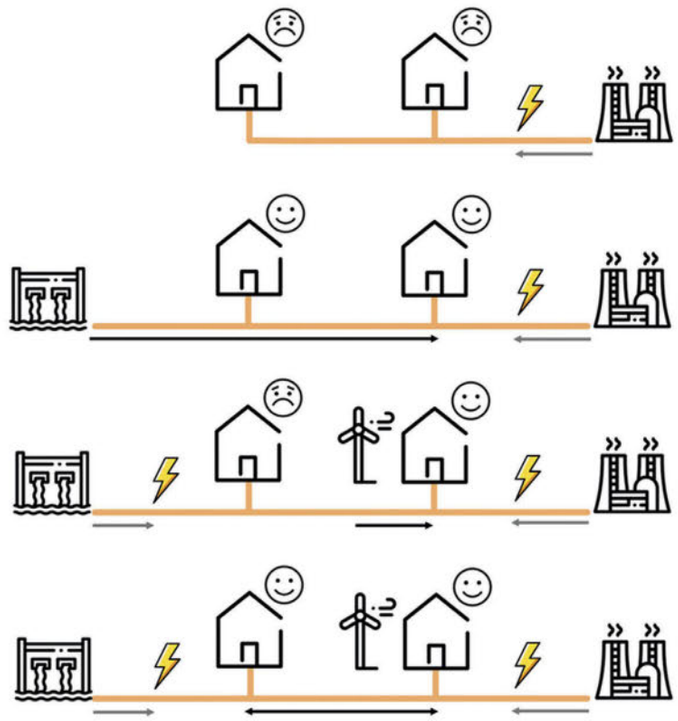

Figure 8: Game hypothesis—utility supply diversification.

for now it takes a long period to manage all the investment costs every game year.

3.3 Further Ideas to Consider

As more rounds are played in the game, students can learn about the different natural disaster effects on the infrastructure. However, results of this game session show that it is hard to find any pattern of failure occurrence to further determine the best investment strategy to avoid costs of infrastructure or off-grid technology failure, if the game is played for a few rounds. Overall, more years within game must be played to understand the pattern of budget growth. When a lot of rounds are played it is possible for players to perceive the statistics of failure and then determine the best investment strategy. In other cases, the game could be played a lot of times with a small number of rounds to perceive the statistics of failure and then change the investment strategy. Also, new locations that include rural areas and different hazards can be studied further with this game prototype.

The planning aspect is not articulated. The authors must decide whether there is a need for emphasizing the planning component—and if so, which aspects of planning should be articulated. How does the layout of the city contribute to infrastructure resilience? How do resilient infrastructure solutions affect the layout of the city? The development of the utility infrastructure along with assigning land uses is

a strong planning tool, which can speed up or slow down the development of the area.

The results show that in dense urban environments the most financially beneficial solution for housing is to plug into the utility networks. Diversification of utility solutions is necessary for strategic objects only, like hospitals, prisons, etc., where infrastructure failures lead to consequences other than losses in revenues. The authors should consider changing the roles of players from landlords to managers of strategic objects, for example. That might make the game be closer to real life and even contribute an entertainment component.

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From Infrastructure to Crowd

Karl Eriksson

Thinking of infrastructure, large-scale collaborative projects and physical networks comes to mind: roads, bridges, railways, sewers, water supply systems, electrical grids, etc.—networks that bind us together and literally hold a city together. The term *infrastructure* refers to "the underlying foundation or basic framework" and although its Latin origin (meaning *below* and *-structure*) suggests it has an equally long history as the element it describes, this is not the case. The term *infrastructure* first came to prominence in its modern civilian sense in the 1970s, before that large, state-funded projects that served the interest of the public were referred to as *public works* – something for the *public* made by the *public*.[1] This change in terminology may seem like a footnote but it tells a wider story about our understanding of grand projects, collaborations, what infrastructure can be and about the relationship between private and public.

The linguistic turn from *public works* to *infrastructure* coincided with a political move from public to private and from collectivism to individualism. New agents of power appeared: tech firms, international standard organizations, worldwide consultant and construction companies.[2] The once so clear *public* was dimmed. Hidden, complex, algorithmic networks of radio waves and data relay our actions and movements and also the urban spaces we inhabit. The very image of infrastructure, the concrete highway running from point A to B, has been replaced by a myriad of individual points that, in a much more indirect and diffuse way, shape our lives and the spaces of our cities. Infrastructure cannot be regarded as individual elements in the landscape anymore; instead infrastructure has become the landscape itself.[3] This was our starting point for the B.I.S.S. 2017 and we wanted the students to ask themselves: what; how; for whom; by whom; paid for by whom—are infrastructure spaces?

Next to the sinus-shaped *Neue Elbbrücke*, narrow granite steps lead down into a forest of reeds and at low tide one can make one's way down to a stony beach opening up east towards the *Entenweder Park*. The distant sounds from the motorway could be coming from the river and on a summer's day the scene is more reminiscent of Günter Grass' *Katz und Maus* than of central Hamburg. The students found this out-of-the-way place whilst swimming in the river as part of a (bodily) site analysis challenging preconceived and conventional ideas of how to understand a place. The swim just next to the *Neue Elbbrücke* spurred discussions amongst the students about recreation and infrastructure, opening up a set of paradoxes: Noise <> Tranquility; Slow <> Fast; Hard <> Soft; concluding that recreation is often linked to the opposing connotations that infrastructure carries: nature, isolation, rural, etc. Here in the late Hamburg summer, the students came up with the idea of investigating this opposition between recreation and infrastructure and in doing so, re-formulate their idea of what infrastructure *could* be.

The material aspect of infrastructure may seem unchanged, but if one looks closer, its phenomenology has changed. Keller Easterling argues that infrastructure space operates in the same way as digital software does, by making "certain things possible and other things impossible." She continues: "Infrastructure space is /.../ an updating platform unfolding in time to handle new circumstances, encoding relationships between buildings, or dictating logistics."[4] The United Kingdom's canals—a major network of waterways that crisscross the whole island—is a prime example. A child of the industrial revolution, it was all too soon to be replaced with the much more efficient railways. But after being obsolete for more than a century, the canals have recently sprung to new life and are now used more than they ever were during their prime. They have adapted to a new life characterized by leisure, sustainability and new economies arising. Checking the hashtag *#speicherstadt* on Instagram gives you 165,000 posts, the majority focusing on sunset views, recreation, fashion, coffee—actions and events dictated by social media. The infrastructure that used to be the veins and heart-

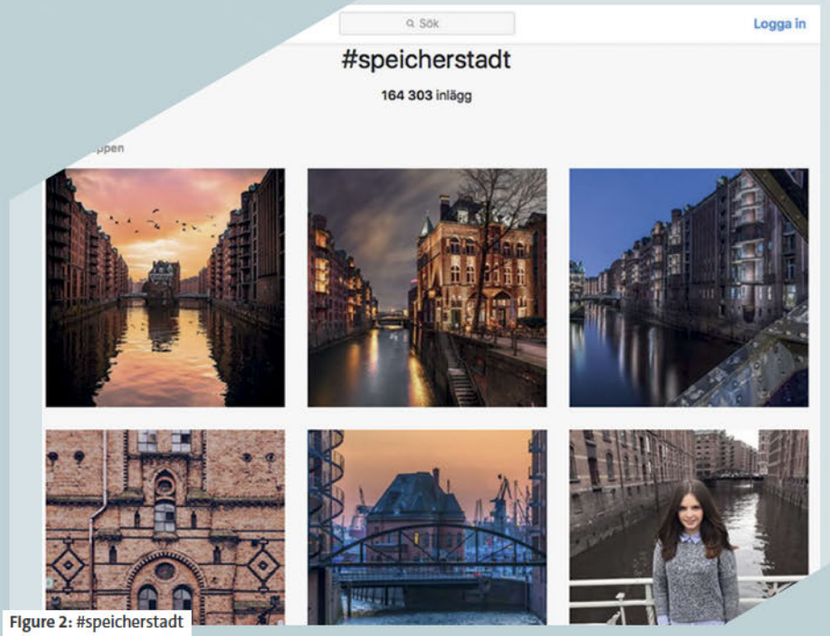
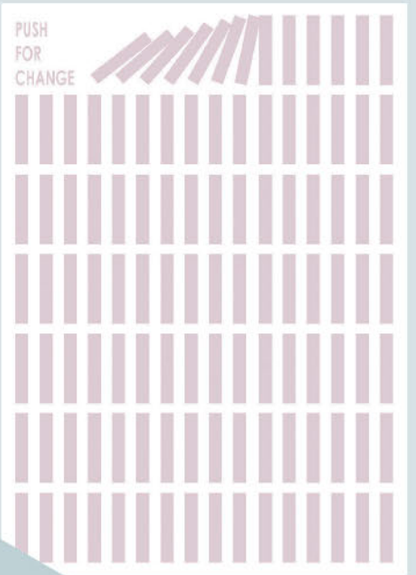


Figure 2: #speicherstadt



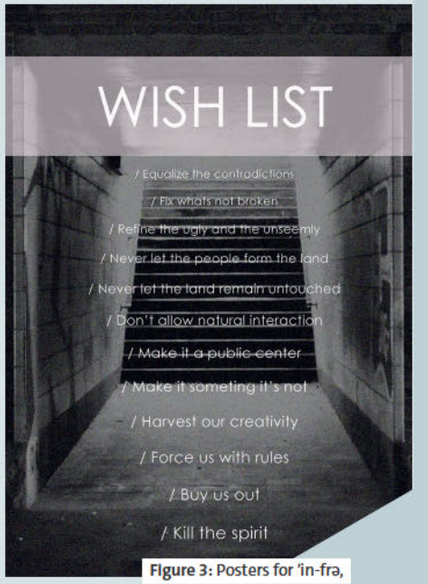


Figure 3: Posters for 'in-frə, B.I.S.S. 2017

beat of a mercantile stronghold are now the stage for recreation and leisure—the materiality of the canals has not changed but one economy has certainly replaced another.

In the same spirit, the project *'in-frə* aims at re-shaping the aura of the motorway without demolishing the structure but accepting it as the integral part of the urban landscape it is. The first connection across the Elbe at this point was opened in the 1880s and the current layout of the motorway is almost 60 years old (it was expanded between 1957 and 1960 and now has ten lanes). *'in-frə* envisages a nightclub under the motorway, a wordplay with infrastructure, bringing together people to create a social event and a new use for the infrastructure. There are no drawings or layouts of the nightclub and it is only materialized in a clay model, the material itself being chosen for its plasticity and impermanence. Instead there are posters, stickers, social media references and a mockumentary film describing the event leaving a haunting feeling that maybe this was not at all an architectural project in a summer school but an actual nightclub in Hamburg? It perfectly puts the finger on *how* infrastructure in Hamburg could change if clubbing overtook cars.

The future will hold new ways in which we use infrastructure: coal and fossil fuels won't power us in future; concrete highway flyovers will be obsolete when cars are not driven, nor owned by individuals; and when food deliveries are handled by drones we won't need congestion charges for trucks but rather a flight control tower in every neighborhood (or on every smartphone). Ultimately, the existing spatial configuration of our cities and the use of infrastructure will change. But the infrastructure space, the operating system,[5] although updated, will remain in place, enabling ever-newer types of software and apps. The materiality that once allowed barges to steam from A to B will now propel coffee sales and likes on Instagram.

In his 1990 work *Salerno I*, the Düsseldorf photographer Andreas Gursky captures a busy harbor basin in an Italian port town. The image can be seen as a depiction of infrastructure, logistics and globalization and in an interview Gursky talks about the *old world* and the *new world* and how "all [his] landscapes are man-made. My interest lies in people, civilisation, human presence and activity."[6] The balance between the great scale and the attention to detail is what Gursky calls a "democratic" perspective: "Each element of the image is given equal importance."[7] This is also something reflected in his later *May Day* series that depicts an annual rave that takes place in Dortmund. Each image is brought together from several photos with the crowd taking up every inch of the frame harnessing both an overview and

individual portraits in the same image. The infrastructure of *Salerno I* is in one decade transformed into the crowds of the *May Day* series bearing the same idea of the whole and its elements. Just as in *'infrə* where the *Neue Elbbrücke* is turned into a raving subterranean crowd.

Figure 4: Photograph of Gursky's *May IV* at the Gursky Exhibition Hayward Gallery, London 2018

1 George Foufas and George Papam, *Public Works of Infrastructure*, LOG Magazine 39, Winter 2017, Anyone Corporation

2 Infrastructure has always been a popular, effective, seemingly politically color-blind political tool (there is a wide ideological gap between the blue and the red—compare Roosevelt's "New Deal" and Trump's pledge "to fix our inner cities and rebuild our highways, bridges, tunnels, airports, schools, hospitals"). The New York Times, Transcript: Donald Trump's Victory Speech, Nov. 9, 2016

3 Easterling argues that the formulaic creation of the contemporary city "might appear to confirm the death of architecture, perhaps it really only demonstrates that the giant is alive again/.../perhaps it is reincarnate as something more powerful—as information itself. Infrastructure space has become a medium of information." Keller Easterling *Extrastatecraft*, p. 11. Verso, 2014

4 instagram #towpath (the path along the canals throughout Britain) and your screen will be filled with narrow boats, joggers and dogs—175 years ago that would have been barges, lock keepers and horses.

5 Keller Easterling argues that: "Infrastructure space is, /.../ an operating system for shaping the city", *Extrastatecraft*, pp. 13–14

6 "Les Mées is a recent work that I relate back to Salerno ... I also liked the fact that you could see the old world in the background, the mountains—and the modern world, the plant, up front." *The Guardian*, Andreas Gursky on the photograph that changed everything: "It was pure intuition," January 18, 2018. https://www.theguardian.com/artanddesign/2018/jan/18/andreas-gursky-each-photograph-is-a-world-of-its-own-best-photograph-salerno-harbour

7 Andreas Gursky, Hayward Gallery, Exhibition January 25–April 22, 2018.

Spotlights on:
City Elements—Infrastructure and Networks Shaping Harbor Areas

The Potential for the Vertical Urban Factory

Nina Rappaport

Figure 1: Highland Park, Ford Factory, Albert Kahn Architect, Detroit, 1910. Courtesy Albert Kahn Associates.

The factory as a social and physical structure corresponds to cultural and spatial practices in urbanism and architectural design, resulting in a form that follows a flow beyond that of pure function both in the internal operations and the manufacturing process.[1] Economic systems—from Fordist economies of scale to Toyota's flexible just-in-time (JIT) inventory strategy and now advanced technologies—influence the shape of production. Now that effects of globalized infrastructure, such as vast shipping costs, have been assessed in terms of environmental damage, manufacturing could shift again to the local within the global marketplace with more companies building factories closer to their consumers.[2] New industries have the potential to develop innovative architecture that vastly improves upon prevailing patterns of urban industrial zones and clustered production areas with a return to the Vertical Urban Factory as a space of innovation and renewed urbanization.

As challenging questions arise about worker justice, material versus immaterial labor, trade regulations and ever more populated and productive cities, I envision more democratic workplaces as cooperatives and shared ownership. And now as industry is lighter, cleaner and greener, manufacturing can return to cities in a new physical and social form that can maintain jobs and increase urban vitality and have a greater corporate transparency. We need to ask how this multi-faceted discussion that is part of economic and land use policy and social economic as well as now new political aspirations, will induce a paradigm shift in the spaces and places for production in the city and become new hubs of activity integrated with the urban environment. So we must ask what the relationship of the architect and urban designer is to this situation of work and space in the new economy. And how the Vertical Urban Factory both as a singular typology and as a hybrid with other uses becomes a method for new industrial infrastructure in cities.

Historical perspective

In the mid-18th century, urbanization paralleled the shift from early industrial water-powered mills and workshops to dynamos of mass production. Standardized parts and mechanical systems transformed both manufacturers and society. As urban land became more valuable, factories expanded upward, housing vertical systems of production on multiple floors and harnessing gravity for processing.

Layered and integrated

A factory is a space for the making, shaping or assembling of things. Conceptually and in practice, there are two basic types of vertical urban factories: integrated and layered.

In the integrated factory, the production flows from top to bottom or vice versa, as components or raw goods are mixed, sorted or assembled by workers and machines, then carried by conveyors or chutes to the end of the process for transport to market. The gravity method of production, which was later mechanized, is most commonly found in a multi-story building of a single company, such as Henry Ford's Highland Park (figure 1) automobile factory in Detroit. The other type moves production from bottom to top, as is exemplified by the Fiat Lingotto factory in Turin, Italy.

In the layered factory, there are separate stacked floors occupied by one or more companies sharing common areas and services, such as lobbies, elevators and power. While the building is multi-storied, the processing may be confined to all or part of a single floor or expand to adjacent floors. Lofts in New York City's Garment District or Hong Kong's high-rise factories concentrate this generic type. These production spaces are often built by real estate developers as rental properties—commodities of space—rather than by factory operators, who integrate the building with the machinery.

Early-20th-century engineers and architects rationalized factory design based on principles of time-motion studies and integrated processing. European architects including Le Corbusier and Bauhaus founder Walter Gropius embraced glass, steel, concrete and open spatial volumes as elements of a new modern aesthetic. Reinforced concrete could support widely spaced columns and concrete slab floors in gridded structures. These "daylight factories"—a reinforced concrete frame structure with expanses of open floors and large windows—had become the norm. Engineer-entrepreneurs such as Eugène Freyssinet, Wayss and Freitag, and Owen Williams in Europe and Ernest L. Ransome, C.A.P. Turner and Julius Kahn in USA pioneered the structures in response to manufacturing needs.

Modern factories improved production processes through mechanization and rationalization. By 1913, Henry Ford's Highland Park assembly line could produce a Model T automobile every three minutes, establishing an international paradigm of efficiency. Likewise, the principles of Frederick W. Taylor with the Gilbreth's work in time-motion studies promoted "Scientific Management" techniques, which accelerated the speed of mass production worldwide. They employed overhead conveyors, cranes, and transfer chutes to convey supplies through the new "cathedrals" of commerce, often flowing with gravity. Ample natural light also permeated these spaces via clerestory windows and sawtooth roofs. The idea of the multi-leveled factory became the norm with all production processes housed under one roof as factories populated the urban environment. Avant-garde European architects embraced the modern factory as a demonstration of their aesthetic ideals. In their writings and projects, architects such as Walter Gropius, Eric Mendelsohn and Le Corbusier celebrated the simplicity and functionalism for other building typologies as seen in Fiat's Lingotto, Highland Park, Bata, Starrett Lehigh, Duval and Van Nelle (figure 2). Together, they show that the factory—as an icon of progress and a place of dynamic convergence between architecture and engineering—came to epitomize the modern aesthetic.

Major changes to factory design came after WWII, when factories began to leave American and European cities for cheaper land and labor. In the 1950s, factories moved from being well-integrated machines to machines housed in tightly sealed, artificially lit, air-conditioned sheds. With the need for camouflage during World War II, along with speedy post-war construction, the factory was transformed into an omnipresent generic shed that divorced the factory from its more specific innovative design for product.

After World War II, industry shifted away from city centers, first to the edges and the suburbs and then to foreign shores. Some inventors, however, still persisted post-war, such as Buckminster Fuller (figure 3), whose concept for a vertical factory continued a sustainable and integrated industrial methodology. His vertical textile mill used flow of materials and goods guided by gravity in a "fountain factory" designed in 1952 with the assistance of students at North Carolina State University's College of Design. Basing the structure

Figure 2: Van der Vlugt & Brinkman, Van Nelle Factory, Rotterdam, 1931. Photograph c. 1960. Courtesy Collectie Gemeentearchief Rotterdam.

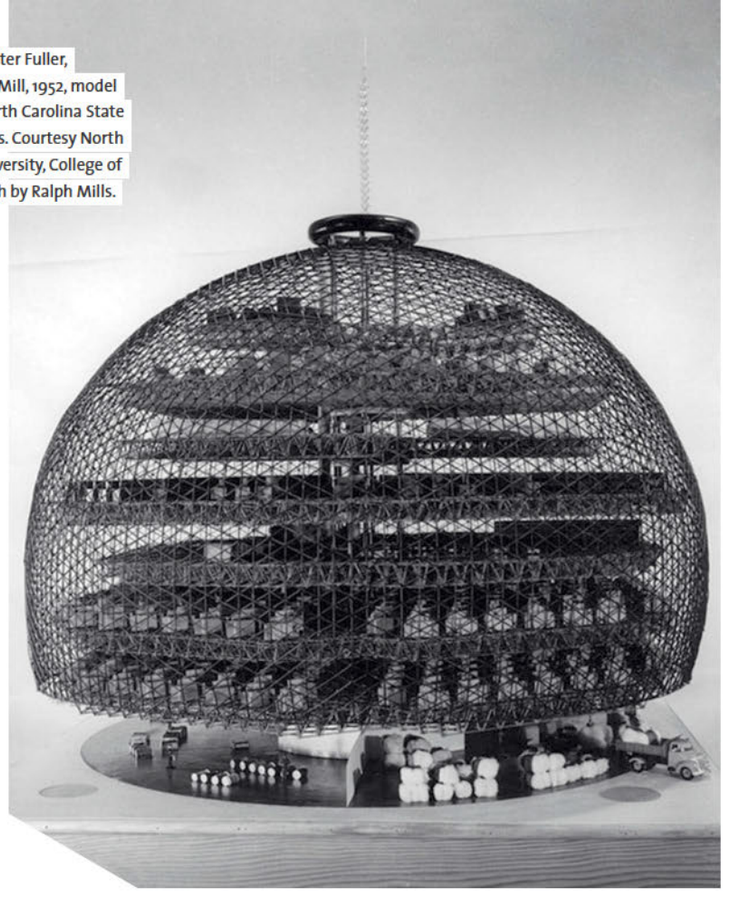


Figure 3: Buckminster Fuller, Automatic Cotton Mill, 1952, model designed with North Carolina State University students. Courtesy North Carolina State University, College of Design. Photograph by Ralph Mills.

on his Dymaxion House, he designed a direct system of efficient form and function that serves as inspiration.

By the 1970s, offshore tax-free export processing zones spearheaded possibilities for the globalized economy, and efficient, low-cost labor production. Manufacturing networks combined production with consumption, resulting in fast turnover of inventory and the elimination of warehousing, since a feedback loop between computer mechanisms in retail spaces and the factory floor informs the speed of the production line and specifications of the product as seen in the Benetton factories in northern Italy.[3] Inside factories, methods of Toyota's just-in-time production allowed workers to monitor production status and eliminate overstocked warehouses, and consumers to customize goods.

However, factory designs at this time were motivated by convenience and economy rather than innovation. The ease of highway transport, containerized shipping and the changed digital supply contributed to a global "flat" network. Industries moved further from their markets to new free trade zones in developing countries such as China, India and Mexico, but raised ethnical concerns regarding fair trade and labor conditions.

On the broader scale, economy policy, land use regulations, labor issues and politics form what can be called "spatial products," which define the current industrial landscape.[4]

In today's new mass-customized manufacturing, the consumer is involved in controlling both the financing of the product and the product design through customization of the traditional demand-supply circuit. The result is a "consumption of production" in which the architecture itself becomes a marketing tool. In this scenario, the factories become the actual display vitrines as well as the site of manufacture of a product.[5]

Today we can propose future scenarios: Why can't factories be in cities? How can people live with industry without negative health effects? Why not build them taller? And how can we integrate sustainable industries into the urban environment with a community base and have them produce as well as consume energy in a symbiotic and ecological feedback loop? In response to the urgent need for jobs and cleaner production, the vertical urban factory is a model for new innovative factories. Cities such as Detroit, New York City, London and Milan are redefining industry with new strategies to maintain their manufacturing sectors. These strategies and redefinitions of urban industry can inspire new modes of production.

The vertical urban factories of the past two decades, whether in new or existing buildings, can be divided into four primary themes: spectacle, flexible/neo-cottage, sustainable and hybrid. The "spectacle" factory is an iconic architectural design, often representing a company brand, e.g. the VW Gläserne Manufaktur by Henn Architekten (figure 4) in Dresden. A factory could be physically and ethically transparent and engage and educate the public about its activities by displaying its manufacturing processes through large windows. This would elevate workers' importance and reveal production process and an appreciation for it.

"Flexible" factories, which can be called neo-cottage industries, are often located in existing loft spaces, which are easily adaptable and changeable according to new machinery and economic needs. This is seen in American Apparel's reuses of a factory in L.A.; Hong Kong's high-rise density and Johannesburg's immigrants making things in former office buildings. Factories are now smaller so that high-tech workshops, neo-cottage industries or shared hacker spaces can be located in new incubator buildings with government support as in the French Hotels Industriels. With open-source manufacturing software, computer numerically-controlled machines (CNC) and 3D printers, designers can quickly make prototypes and develop a product in small batches. This can increase innovative, small-scale, just-in-time production for goods on demand to eliminate overproduction.

"Sustainable" factories integrate ecological building and manufacturing systems, such as the recycling plant by Ábalos and Herreros in Madrid, the sustainable redevelopment of the Brooklyn Navy Yard in New York and the Method Soap factory in Chicago. Manufacturing for sustainable industries, such as plastic and paper recycling, electric cars, and eco-furniture, can be urban-based. Renewable energy production could also support new infrastructures. Collectively, greener manufacturing can result in industrial symbiosis, where one factory's waste fuels another, or entire neighborhoods and towns.

Another future shift is the potential for the "hybrid" factory in which the current segregation of many manufacturing zones

Figure 4: Henn Architekten, VW Transparent Factory, Dresden, 2001. Photograph courtesy Henn Architekten.

could be eliminated and dispersed. Instead, manufacturing could occur everywhere in taller and denser factories. New clean manufacturing could be allowed in mixed-used districts to encourage working and living in proximity. The residential units can subsidize the urban manufacturing spaces, which have become unaffordable for many companies. The adjacencies of the small and clean factory are not as affected by noise or pollution. Some developers are taking on this challenge independently with support and encouragement of city planning offices that aspire to find a way to cross-subsidizing manufacturing as seen in the 2018 building in Vancouver, called Strathcona Village.

If industrialists and urban planners reconsider the potential for building urban factories vertically and mixed in use and by zones this would reinforce and reinvest in the cycles of making, consuming and recycling for sustainable and self-sufficient cities. Yet the architectural and urban issues addressing manufacturing in cities present not only an exciting design challenge of integrated systems, new fabrication technologies and emerging materials, but demand new solutions that would garner environmental benefits. This integration allows for a positive impact on the city, socially and economically, as well as a potential for a new urban ecological system in the new economy.

1 Adolph Behne, The Modern Functional Building, reprinted by the Getty Press, 1999. Discusses the dynamics of function and form often using the example of Finsterlein, Gropius and Mendelsohn where form was organic around a space.
2 Larry Rother, "Shipping Costs Start to Crimp Globalization," The New York Times, August 3, 2008.
3 This feedback method was spearheaded by Benetton and is now in place with Zara, among others. New handheld PDFs are also instruments of efficiency on the production floor.
4 David Harvey, The Condition of Postmodernity, London: Wiley-Blackwell, 1989.
5 Nina Rappaport, "The Consumption of Production," Praxis 5: Architecture After Capitalism, 2003.

Designing For and With Digital Machines

Bastian Wibranek

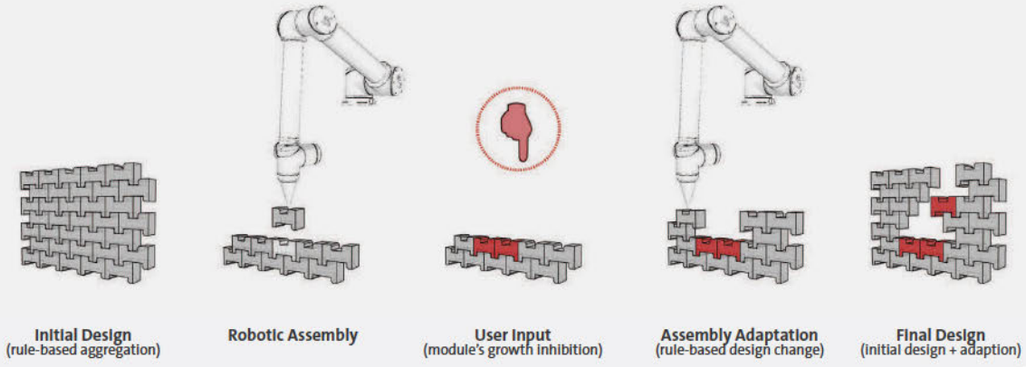


Figure 1: Collaborative assembly process steps.

"The machine is the architect's tool—whether he likes it or not. Unless he masters it, the machine has mastered him."
Frank Lloyd Wright, 1908

Machines can teach us more about ourselves than pure matter will ever do. Today's architecture is largely determined by digital tools. This increases possibilities for architectural production and conceptualization. For the last two decades, architecture has turned to digitalizing production both during design and fabrication. At the moment, we are shifting from using digital design tools creating forms that are conceived more complexly and vividly to a stronger link between digital fabrication, design and materials. At the same time, digitalization has an impact on every stage and operation within architectural production. Today you can work simultaneously with several people on your files. All of that is possible due to the tools providing certain services. Digital machines orchestrate all different actors to change the way one creates, interacts and positions oneself in the world.

Several researchers and architects have developed concepts which focus on digital fabrication and computational materialization processes. More importantly, they have shown how machines like industrial robots or drones can be combined with material sensitivity. The concept Digital Materiality emphasizes the link between the constructive logic of programming and material realization (Gramazio, 2014). Furthermore, cyber-physical systems focus on feedback mechanisms during production (Menges, 2015). The problem of those material endeavors lies in the conceptual framework that focuses on material artefacts which form qualitative rather than operational spaces. A material is something we act on.

In contrast, the concept Digital Materials points into an operational direction to allow interactive environments. The concept was developed at MIT and puts emphasis on how discretely parts can be assembled in a digital fabrication process (Gershenfeld, 2012). Additionally, it incorporates the idea of reconfiguring those parts. Moreover, Oliver Tessmann and Andrea Rossi showed that Digital Materials even allow designers to incorporate design decisions during the robotic assembly process (figure 1). Here, the machine interprets human decisions and changes the next assembly steps in the digital model, building accordingly (Rossi, 2017). Subsequently, it points into the direction of a more interactive built environment, where machines, humans and algorithms operate together.

Machines are assemblages of parts that collaborate with each other to achieve a higher-level operation. While the material is something we act upon, a machine is something that operates. The philosopher Levi R. Bryant argues in his book *Onto-Cartography* for an ontology of machines that frames every operating entity material or non-material as a machine (Bryant, 2014). Thinking of machines rather than materials places emphasis on how things are set in relation and how those relations can change (figure 2). In addition, the combination with digital qualities encodes communication between different machines and allows a designer to program certain behaviors.

Digital Machines in architecture focus on setting up systems, which constantly transform themselves and the ecosystem they are embedded in. One can compare them to digital logic, wherein different machines are interlinked and can be manipulated. Animate Matter is a machine that creates the sensation of behaving and operating matter (figure 3). As simple 3D-printed parts, Animate Matter is able to create the illusion of transforming matter (Digital Design Unit, 2018). Although the model is a rotating disc that shows 3D-printed abstract forms animated by a strobe light illusion for about one second in a constant loop, its effect on spectators is quite intriguing. During the exhibition, people started to believe that mini servos

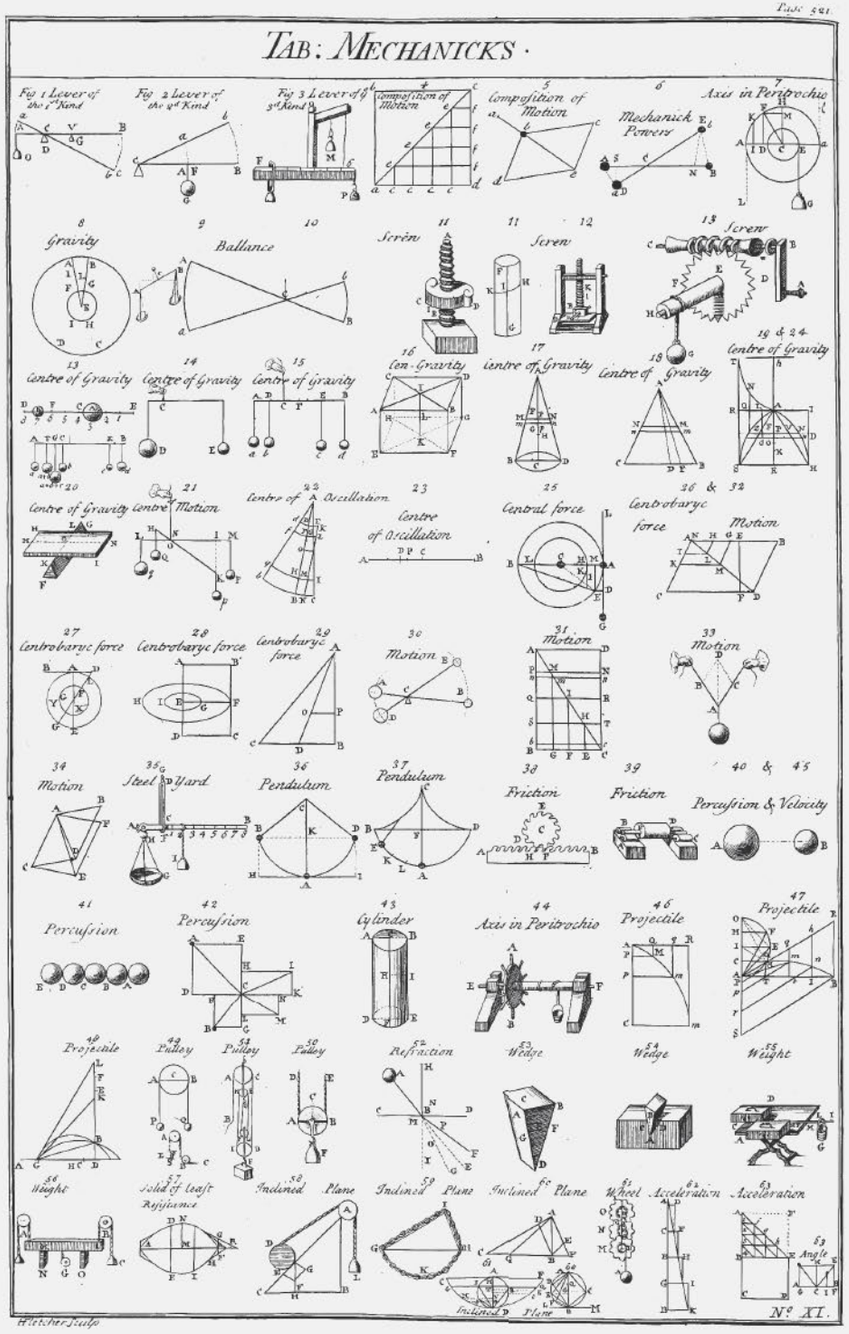


Figure 2: Table of Mechanicks, from Ephraim Chambers (1728).

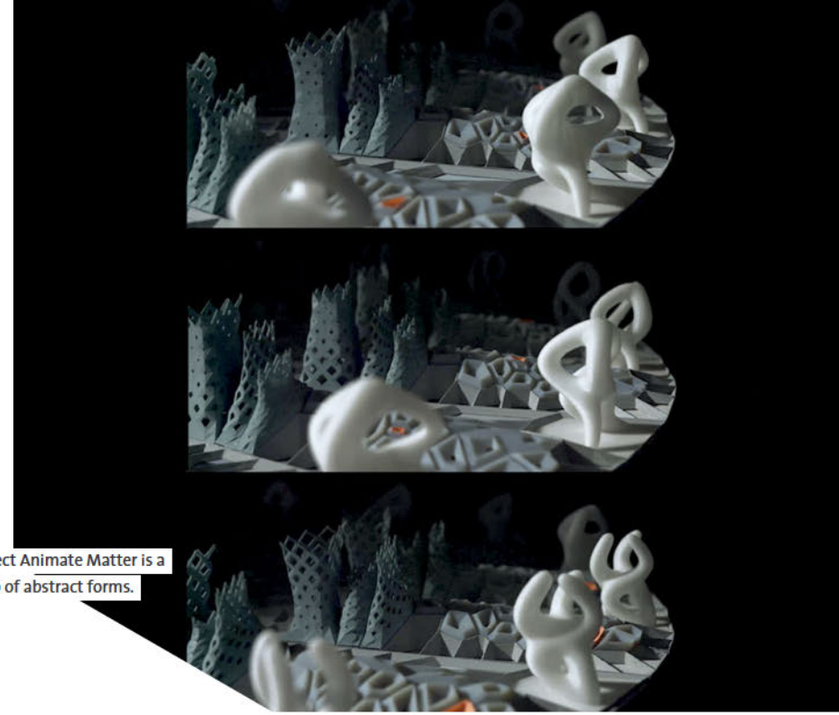


Figure 3: The project Animate Matter is a transforming loop of abstract forms.

Figure 4: All 18 frames of the disc.

Figure 5: The collaborative and augmented assembly process.

were built into the 3D-printed parts and wanted to touch the one revolution per second rotating disc (figure 4). This illustrates how strongly people connect to a mechanical illusion that is operational. Animate Matter is a project that exemplifies the countless possibilities for Digital Machines—which is constant transformation, suggesting structures that stay open to mechanical operations.

The project Robotic Bending investigates how different actors can be integrated collaborative to their best use. It works with a physical design interface that can be sensed by a machine (3D-depth camera) and a computational design tool that allows users to create different design varieties. It is an orchestration of different actors like a 3D depth camera, a rod feeder, several algorithms, human designers, human co-workers and a six-axis robot arm (figure 5).

Digital Machines can be physical or non-physical as long as they offer new operations between different parties. Under these conditions, the project "20,000 Blocks" by Anton Savov is another example for a process chain that focuses on operations (figure 6). The project incorporates combinatorial methods in a game environment (Minecraft) to enable non-experts to operate as designers. Firstly, there is the design tool which uses the computer game Minecraft to allow multiple players to contribute as a crowd-community to a design problem that is addressed through game mechanics within the Minecraft world. Secondly, there is an apparatus of algorithms checking the stability of structures as well as experts tweaking the game mechanics for desired results, based on the gatherers' knowledge during the process. And thirdly, there is a digital fabrication process in which a six-axis robot arm puts together hundreds

Figure 6: Interaction diagram.

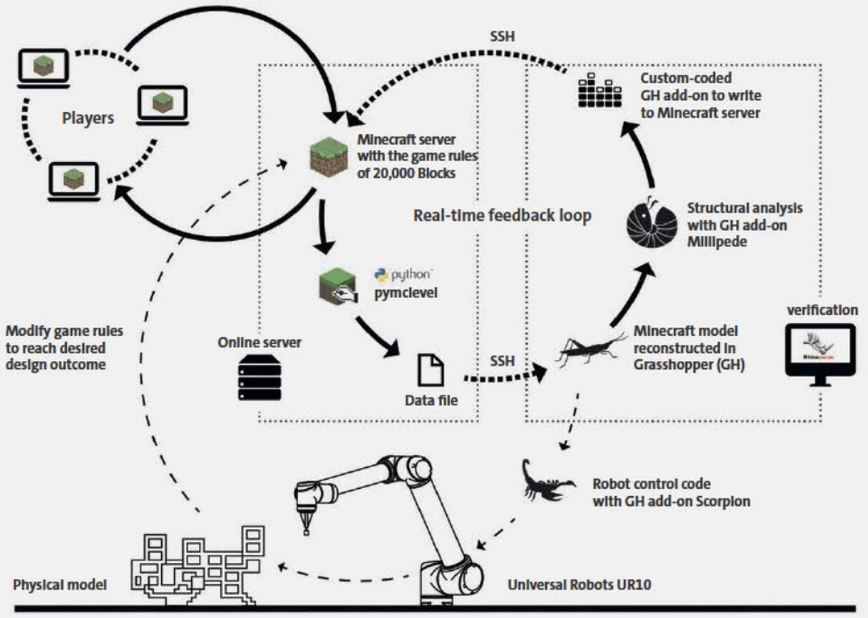


Figure 7: Wooden structure assambled by a six-axis robot arm.

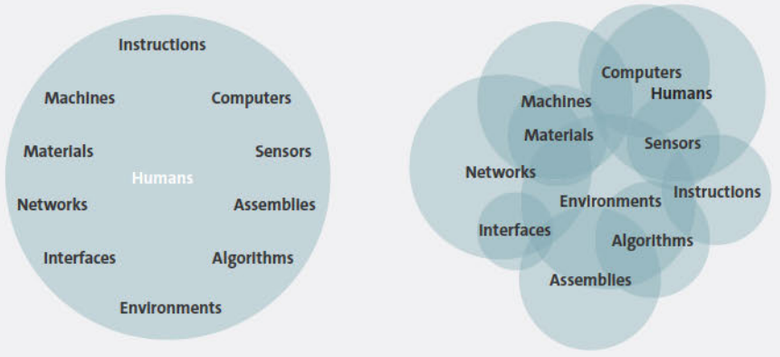


Figure 8. Illustration of the interplay of different actors in our environment. Left: the human-centred perspective. Right: many actors interact with synergies.

of small wooden blocks to create both the falsework and the actual structure designed in the previous steps (figure 7). In summary, it is a project that can be well imagined as a never-ending loop, as the only actual resources that can be exhausted within the process are the wooden blocks (Savov, 2016).

Digital Machines operate, collect and interpret data in a way that humans are not capable of. The goal to create technologies of self-learning machines and seniority embedded in our environment is an investigation into our own mechanics. By building those machines, we realize our own incapability. It may be the satellites around our globe that show us phenomena we cannot see from down here, a simple industrial robot arm executing the same movements for hours with an inhuman precision without complaints or a Google algorithm that analyses millions of search requests within seconds. Daniel McDuff, a researcher on machine learning at Microsoft, called for the term "superhuman senses" in an interview (Microsoft Research Podcast, March 28, 2018). Through sensors and the right algorithms, we are capable of seeing things in the captured data we were not able to anticipate before. It is a little bit like X-ray vision. Today's world is surrounded by hundreds of space satellites. Those are machines that allow us to communicate and operate in modes not possible 50 years ago. When you use GPS on your smartphone you are in touch with one of the satellites. Moreover, your smartphone and your computer facilitate new ways of collaboration. Digital Machines are already at play to provide new insights of our communication mechanisms and our environment. In short, machines have skills beyond human capabilities and, hence, we have to make use of them. A new actor is collaborating with us.

Architectural concepts are in change due to digitalization. This is happening because of a growing sensibility towards different machines and their synergies (figure 8). Digital Machines is a conceptual framework that focuses on collaboration between different actors and interactive operations through digital data. Thinking about data and how to manipulate, interpret and combine it is a task within the architectural production. Gathering this data and orchestrating the actors accordingly is a new challenge for architects that will be put more and more into focus.

Digital Machines illustrates conceptual framework focusing on operations that is a step into a future in which the actual construction process and finished building stay interactive and unfixed.

"The fact that buildings which require a longer planning period are often partially obsolete when 'completed' proves the inadequacy of traditional architectural philosophy."

Wolf Hilbertz, 1970

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Urban Transformation:
Heritage, Urbanity, Infrastructure and Resilience of a Post-Port City

Anna Kaczorowska

Diverse processes of transformation constantly influence cities, including a changing structure of population, economy, culture, lifestyles and national policies, which can lead to altered urban functions and new local needs and opportunities. Urban change aims to accommodate human needs and aspirations, encompass not only the protection of environmental systems but also the development of areas best suited for construction as well as restoration of global systems, create economic vitality (income and wealth). Cities are influenced in diverse ways by external large-scale transformation processes, but opportunities for cities may also differ due to internal factors, such as the local economic structure as well as external relations and the geographic location. It may vary from large-scale waterfront projects like, for example, in Baltimore, Boston and London to long-term developments due to coexistence of still industrial and post-industrial city functions under dual impulse of economic growth, like in Hamburg and Gdańsk, or to slowly growing city functions in gradually released and planned post-port areas, like in Gothenburg.

Hamburg HafenCity, like many urban post-industrial areas in the world, is going through radical transformation of the former port areas and extensive expansion of the inner city. The mixture of old and new with a high variety of uses aims at developing new urban qualities as well as a new waterfront location for Hamburg's citizens and visitors.

Recognizing a dynamic nature of living cities and their constant transformation, there is a need to understand the underlying structure of the built landscape, the social, cultural and natural values as well as have the knowledge about changing the form of cities. There are four important actions to be taken into account when transforming post-port areas:

Figure 1: HafenCity Hamburg, © A. Kaczorowska

1) assessing values of cultural heritage in the process of building a new identity,
2) planning for urbanity, integration of urban life, diversity of city functions, social cohesion far from mono-cultural "office cities" or "retailing ghettos,"
3) re-development of infrastructure, often associated with a number of well-documented problems including rising levels of energy consumption, road congestion, greenhouse emissions and pollution as well as road safety and health,
4) strengthening urban resilience and complex interactions among natural, cultural and social aspects in order to reduce or avoid shocks and stresses in cities.

Industrial Heritage

Post-port heritage generates social, cultural and economic assets for the society, historic layering of those values, produced by successive and existing cultures and an accumulation of traditions and experiences. Post-industrial landscape often represents strong relevance to its past industrial character. Due to the urgent transformation redefining the role and purpose of industrial landscape, there is a certain danger of losing historical and cultural identity. A rapid and sometimes uncontrolled development may be a reason of later fragmentation and deterioration of urban inheritance with deep impacts on the community values. The principle of sustainable development is accountable for the conservation/preservation of existing resources, the active protection of urban heritage landscape:[1]

"Urban heritage, including its tangible and intangible components, constitutes a key resource in enhancing the livability of urban areas, and fosters economic development and social cohesion in a changing global environment. As the future of humanity hinges on the effective planning and management of resources, conservation has become a strategy to achieve a balance between urban growth and quality of life on a sustainable basis."

Figure 2: HafenCity Hamburg,
© A. Kaczorowska

Figure 3: Hamburg Inner-city,
© A. Kaczorowska

Figure 4: HafenCity Hamburg,
© A. Kaczorowska

Adaptive Urbanity

Urbanity can be seen as the high-reaching quality perspective of urban development of post-port city but it is rather hard to achieve. This is due to complex redevelopment processes and difficulties to plan for a vital, welcoming, livable inner city, adaptive structures and infrastructures, development of new social relations. In many cases, urbanity can be described simply on two levels: commercial and non-commercial, where the former builds on providing services and commercially successful urbanity. The adaptive urbanism promotes the building capacity of urban spaces to evolve, reverse and improvise to allow residences, workplaces and spaces of leisure to intertwine. This is to imply a greater connection and complementarity between different parts of given territory.[2] Planning for a mixed and balanced urban environment with added non-commercial activities, cultural and social spaces for meetings may generate social cohesion but also openness. From the urban redevelopment perspective, residents willing to initiate an open, social and inclusive neighborhood are important for the adaptive use of public space. This stands in opposition to the tendency of building closed, well-selling, exclusive and fashionable redeveloped urban blocks in close proximity to post-industrial waterfronts.

Redefining Infrastructure

Cities are sustained by infrastructures, also seen as mature technological systems.[2] Highways, roads, power plants and landfills figure among the icons of contemporary urbanism. Cities depend on them, yet we notice them mainly when they fail or bother us. Despite economic forces and monetary gains coming from effective and efficient planning of infrastructure, the economy is now inseparable from the environment and socio-ecological benefits. Promoted density patterns, nodes of mixed use, demands for more renewable forms of development and flexible forms of infrastructure are fundamental for interdisciplinary cross-over. Today, the contemporary ecological reorganization of urban infrastructure must include the management of water resources, water cycling, energy generation, food production and mass mobility. There is a need to reintegrate and redefine infrastructure as a sophisticated landscape of essential resources, processes, and services collectively underpinning the ongoing process of 21st century urbanization. Combating the undesirable effects of the infrastructure developed in the past decades, like congestion and noise of road traffic, rail traffic plus docks activity, has become a key issue in the development of sustainable policy in the transformed post-port inner city. This is also to highlight the new role of contemporary transportation infrastructure and mobility development in a *user-generated urbanism*[2] (as opposed to *technocratic urbanism* defined mobility for future users). Planning transport infrastructure for HafenCity is a challenge. An efficient public transport system is a fundamental requirement for attractive urban development (property marketing) and for this reason various public transport systems and their combinations were evaluated (underground railway, buses). An introduction of new public transport system (new-style tram) was also discussed. Pedestrian and cycle routes for HafenCity off the street grid are designed to be part of the open space concept. The example from HafenCity (chosen for B.I.S.S. 2017 student projects) situated to the east of the railway bridge demonstrates the area of approximately 3.3 hectares filled with an intensive concentration of transport infrastructure.[3] In the master plan, this area is part of HafenCity's redevelopment. Despite many transport lanes, it is rather perceived as an isolated space in the close proximity of rapidly developing housing units in the neighborhood. It was established that neither an urban railway with its requirement for a new track, nor a regional railway cutting the area with a need for extra stops would be suit-

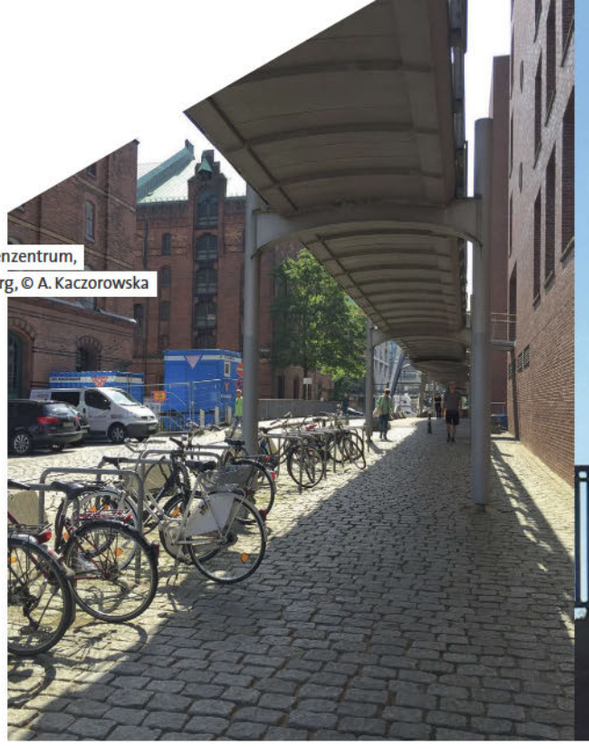


Figure 5: Elbbrückenzentrum, HafenCity Hamburg, © A. Kaczorowska

Figure 6: HafenCity Hamburg, © A. Kaczorowska

able. The user-generated approach applies to a planned pedestrian bridge at Elbbrückenzentrum connecting Hafen-City with the riverside park at Entenwerder.

Urban Resilience

Climate change is expected to have a number of direct physical impacts due to shocks (extreme and sudden variations of temperature and humidity), flooding (with the invariably dirty water and the erosive character of rapid flowing water) and increases in storminess and wind gusts. It is primarily a threat that has physical impacts on the environment, but, in turn, these effects may have societal and cultural consequences in the bigger scale (city, region). In other words, today's urban environmental problems cannot be presented as purely ecological issues and cannot be solved by new technology alone. Instead, new ways are needed of both formulating and solving sustainability problems, as well as increased knowledge to integrate "socio-ecological" perspectives on urban planning. Intense developmental pressures drive urban development frequently based on a short-term economic interest rather than social and ecological values and a long-term perspective on human well-being. Still more often than before, the subject of preserving urban landscapes is focused on preserving and strengthening biodiversity and cultural/recreation values. Emphasizing the value of natural assets of the landscape for culture and living space as a provider of essential ecological infrastructure is important in the process of architectural and urban transformation.

The conceptual actions shaping the character of urban transformation of post-port areas are associated with many overlapping strategies to re-develop new urban centers. A careful transformation process needs to balance monetary gains with social and ecological ones. Urban resilience is becoming a decisive factor for a new identity, urbanity and infrastructure redevelopment, inseparable from integrated "socio-ecological" perspectives.

1 UNESCO (2011). *Recommendation on the Historic Urban Landscape*. URL: http://portal.unesco.org/en/ev.php-URL_ID=48857&URL_DO=DO_TOPIC&URL_SECTION=201.html, viewed December 2017

2 Mostafavi, M., Doherty, G. (2010). Ecological Urbanism. Lars Müller Publishers.

3 HafenCity master plan (2006). Hamburg.

Development of the City Infrastructure in Gdańsk in the Years 2010–2016 and its Influence on the City

Piotr Czech

Figure 1: Slowacki Route with access to the tunnel under the Vistula River, © Gdańskie Inwestycje Komunalne Sp. z o.o.

Gdańsk is the capital of the Pomeranian Voivodship region. The Pomeranian Voivodship is located in the northern part of Poland, on the coast of the Baltic Sea. The major cities are Gdańsk, Gdynia, and Sopot (creating the Tricity agglomeration). Over one million people live within the borders of the Tricity metropolitan area, which is almost half of the Voivodship population. The Tricity is one of the biggest urban areas in Poland and with over one million inhabitants, it is the fourth largest metropolitan area in Poland.

Gdańsk is also an industrial center of the region. The main industrial activities are the harbor, shipbuilding, the petrochemical industry, food and the high-tech and IT services.

An important factor for the city's industry is the harbor serving an increasing amount of cargo of different types every year. The harbor is equipped to receive a variety of different goods, including general cargo, package, bulk goods and oil. The port of Gdańsk is the biggest port in Poland. It takes sixth place of the Baltic Sea ports in terms of size of cargo and second place in terms of TEU (containers).

Due to the location on the coast of the Baltic Sea, Gdańsk is easily accessible by all means of transportation. Gdańsk has good road access thanks to multiple road connections. The very fast development of road infrastructure in Gdańsk took place in the years 2010 to 2016, when some important roads were built or modernized.

The impulse for the fast finalization on the road construction in Gdańsk was given by the EURO 2012 tournament. The UEFA authorities decided on April 18, 2007 to award the organization of the European Soccer Championship in 2012 to Poland and Ukraine.

In the group of four Polish cities hosting the participants of EURO 2012, Gdańsk was included for the group games and quarter finals.

Because at that time, there was no facility in Gdańsk which could become the arena for the games of such status, it was necessary to build a modern soccer stadium with the capacity required by the UEFA (40,000 seats). The area assigned for the construction of the stadium was located in the north-western part of Gdańsk, approximately two kilometers from the coast of the Baltic Sea in the district of Letnica in a port industrial area. The chosen location of the stadium also had a large impact on the development of the road infrastructure, because the existing one did not yet provide proper access to the new stadium.

The most important new road is the connection of the Port of Gdańsk with the highway A1 called Sucharski Route. This almost nine-kilometer long road was built in 20 months from spring 2011 to winter 2012. At the same time, the modernization of the Slowacki Route was also achieved, the road which connects the industrial area located in the western periphery of the city close to the Gdańsk air-

Figure 2: Slowacki Route, viaduct WD1 and the soccer stadium, © Gdanskie Inwestycje Komunalne Sp. z o.o.

Figure 2: Inside the tunnel, © Gdanskie Inwestycje Komunalne Sp. z o.o.

Figure 2: Performance during St. Dominic Fair in July 2017, © gdansk.pl

port with the Port of Gdańsk. The construction of the road was divided into four tasks. Tasks I to III were built in two years and began in 2011. Task IV was a tunnel under the Vistula River. The tunnel was set up using TBM methodology (Tunnel Boring Machine) and connects the Sucharski Route with the Slowacki Route. The tunnel closes the loop around Gdańsk from the north. But the tunnel is very important as a local road too, because the tunnel connects two sides of the inner port localized on both sides of the Vistula river. Thanks to the tunnel, the efficiency of the road communication system in the city improved significantly.

As a result of over 20 road projects completed in the years 2010—2016, there were 26 kilometers of new roads built in Gdańsk, including 27 engineering objects like bridges, viaducts and tunnels. Of course, this would not have been possible without Polish membership in the European Union and the effective use by the City of Gdańsk of the European funds for the road projects which in many projects paid for the highest level of 85 percent of the costs for the projects.

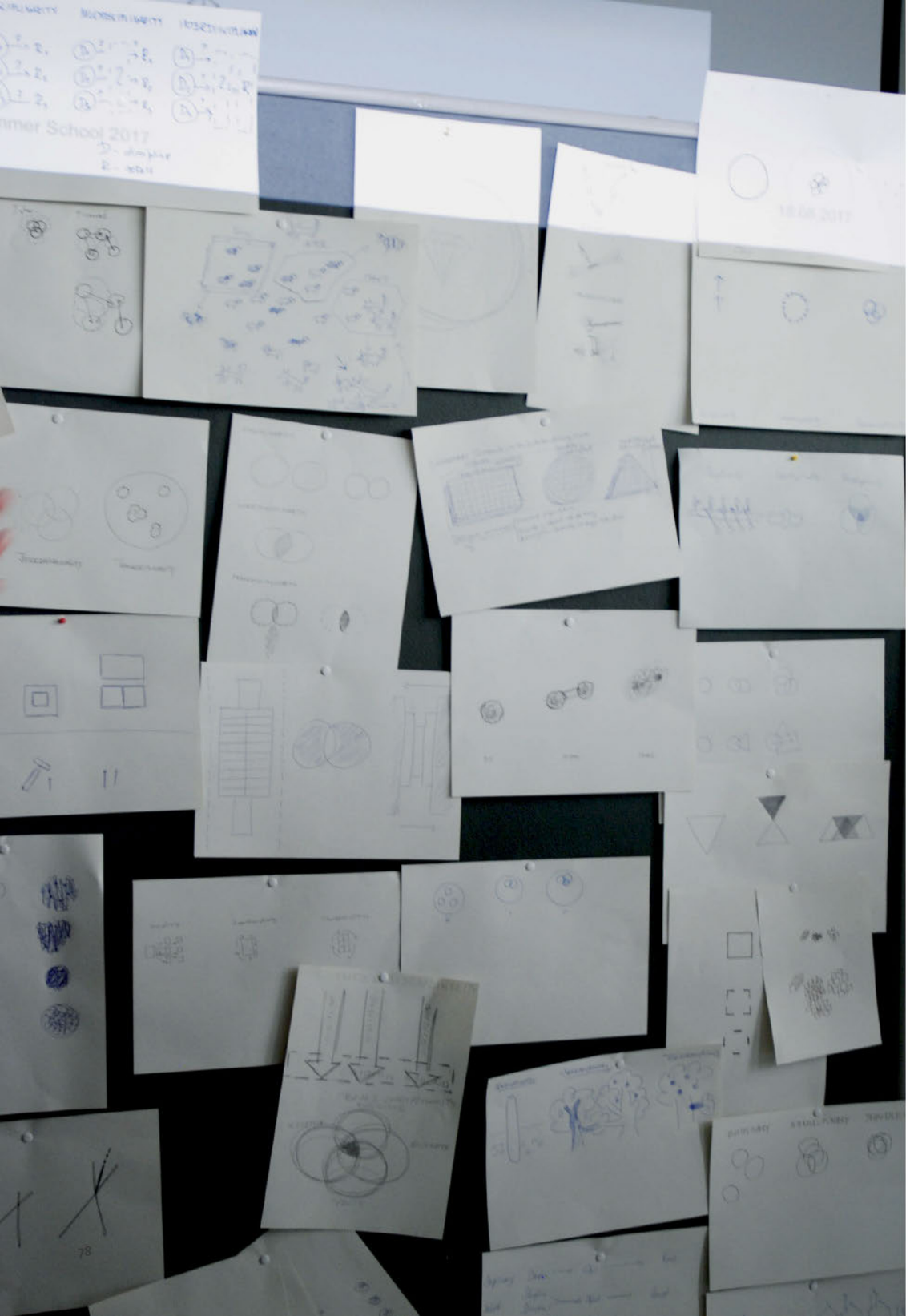
Having the projects co-financed by the European Union required a high efficiency of project management. The projects had to be finalized in the defined time limits relating to the European Union accounting periods and at the expected budgets. To achieve these goals concerning time, budget and the high quality of work, it was necessary to create proper project teams. Success always requires teamwork, especially in construction, in every project phase from planning to realization.

A good road system affects the region's economic development and its competitiveness, reducing transport costs and increasing road safety. The social effect of a good road system is a reduction of travel time which has influence on the level and quality of life. According to the annual report prepared by the consulting company Deloitte, which takes into consideration the time spent in traffic jams in seven of the largest Polish cities, Gdańsk, thanks to the improvement of the road system, moved from the second most congested city behind Warsaw in 2010 to sixth position in 2016. According to the Deloitte report, the average time spent in traffic jams in Gdańsk was reduced by over 20 percent.

The improvement of the road system and public transport is not only important for the citizens, but for tourists as well. Tourism is one of the main dynamically developing branches of economy in Gdańsk now. Gdańsk is one of the most popular Polish destinations for domestic and foreign tourists and is visited by over six million tourists every year.

One of the events which attracts numerous tourists to Gdańsk every year from all over Poland and from abroad is St. Dominic's Fair. The fair always starts at the end of July. St. Dominic's Fair is the largest open-air trade and cultural event in Poland and one of the largest of such events in Europe. It has enjoyed over 750 years of tradition; it was established in 1260. St Dominic's Fair recalls the medieval tradition of fun and trade. More than 1,000 traders, artists and collectors participate in the fair, occupying with their stands several streets in the historical city center. During the 23 days, a lot of cultural events take place like performances of street theater, concerts and exhibitions.

So welcome to Gdańsk!



PhD symposium August 18: Reflections

Emiliya Popova

General Information
On the seventh day of the summer school a PhD symposium, titled: **"Innovations in Interdisciplinary Research in Built Environment within the Baltic Sea Region"** was introduced to the format of the B.I.S.S. 2017. The symposium took place within the "BalticInnoBuilt" project, which was kindly funded by Hamburg's Ministry of Science, Research and Equalities.

The aim of the symposium was to support interdisciplinary and international communication between young scientists from the Baltic Sea Region, to facilitate collaborative research, networking and knowledge transfer on the interdisciplinary research within the disciplines of built environment.

The call for abstracts was addressed to advanced doctoral students from the Baltic Sea Region with a background in architecture, civil and structural engineering, urban planning, urban design and other related disciplines who were interested in:

- presenting their research work in an interdisciplinary context in the field of built environment,
- gaining a theoretical insight on the essence of interdisciplinary research,
- gaining general methodological input as well as methodological input from the other disciplinary researches (presented within the symposium),
- becoming part of the network of young researchers in the Baltic Sea Region.

14 young researchers, advanced doctoral students and 11 experienced researchers and senior professors took part in the symposium. All of them were members of institutions that are already established members of the B.I.S.S. network. A representative of one new institution (still not part of the B.I.S.S. network) took part in the symposium: a PhD candidate from the

Riga Technical University (RTU) in Latvia.

A methodological and theoretical input was provided by renowned experts that served as a starting point for a moderated discussion, during which participants could reflect on the contribution of their own discipline to the development of interdisciplinary research as well as on the impact of the interdisciplinary context on their individual research.

The PhD symposium took place in Hamburg at the HafenCity University during the third Baltic International Summer School (B.I.S.S.) 2017. Thus, it provided for the transfer of the focus from teaching in the interdisciplinary context of the built environment on to the research level.

Program
The symposium was divided into two blocks; the first one was dedicated to the general theoretical and thematic input on the concepts of interdisciplinarity and transdisciplinarity in the scientific research, provided by Prof. Ingrid Breckner (HCU Hamburg) and Prof. Ulli Vilsmaier (Leuphana University Lüneburg). The second block constituted of the individual research presentations of selected participants and an openly moderated discussion led by a member of the network.

Thematic Input by Experts
Methodology and methods in scientific research—Prof. Ingrid Breckner, Professor for Urban Sociology (HCU Hamburg)
The symposium was opened with the theoretical introduction on methods and methodology in the scientific research by Prof. Breckner. In the first part of her presentation she focused on the nature and different types of scientific research as well as on the societal and disciplinary context of the research.

Then she dealt with the question of motivation and of scientific objectivity and subjectivity. At the end she offered an in-depth explanation regarding the three phases of the research process: semantics, syntax and pragmatics.

Her input offered a stable foundation for the further discussions throughout the symposium.

Interdisciplinary Approach
What is interdisciplinarity, what is transdisciplinarity, what is a cross-section?—Prof. Ulli Vilsmaier, Professor for Transdisciplinary Methods (Leuphana University, Lüneburg)
The second thematic input was given by Prof. Ulli Vilsmaier who offered a theoretical and historical perspective on the notions of inter-, trans- and multidisciplinarity in scientific research.

She began her talk with an interactive task, asking all the participants to give a graphic expression of their understanding of interdisciplinarity. The task was received with great interest by all the participants. Within a few minutes they managed to deliver a large variety of individual graphic models, symbolic expressions of their personal understanding of the notion of interdisciplinarity. All the collected material was pinned on a wall in order to be visible to everybody and available for a common discussion. This activity revealed not only the large spectrum of interpretations and aspects of the idea of interdisciplinarity but also the similarities within these interpretations (see also page 78).

Using the outcomes of the task as a starting point, Prof. Vilsmaier continued her talk with an introduction of the general considerations of societal regimes and the landscapes of knowledge. She presented the characteristics and types (forms) both of the interdisciplinary and the transdisciplinary research and outlined the boundaries they are confronted with. The boundaries could be between established disciplines, between societal domains, between institutions that have particular

roles and aims in society and established practices and last but not least between people being trained and socialized in a specialized field of knowledge and work in different societal fields, too. Prof. Vilsmaier also introduced the three levels of transition when it comes to interdisciplinary or transdisciplinary research, namely: the societal (macro), the research (meso) and the personal (micro) level. At the end she raised the question of the transformative potential of the transdisciplinary research leading to the introduction of the idea of the "Transformative Research" which has been strongly adopted in German-speaking discourses, including governmental policies and research funding policies.

Her input, based on her academic and practical research experience in the field of inter- and transdisciplinarity, proved to be very inspiring and fruitful for the group. Thus, new notions and aspects could be introduced to the ongoing discourse within the Baltic Sea network.

Moderated Discussion
The discussion was led by Dipl.-Ing. Martin Kohler (HCU) who has been involved in the Baltic Sea network since the first International Summer School in 2015. Thanks to his experience in the field of interdisciplinary teaching as well as to his personal and academic affiliation with the topic he managed to launch a focused and concise format for the discussion.
The discussion was based on the individual presentations of six of the participating doctoral students. The presented topics were collected with the help of a previously distributed "Call for Abstracts" and were selected based on the following criteria:

- inscription at a research institution from the Baltic Sea Region,
- quality and relevance of the submitted abstracts,
- availability of a diverse scope of disciplinary backgrounds,
- balance between "old" and "new" members of the network (established through the Baltic International Summer School).

List of the Presented Research:

- *Applying Disciplinary Expertise to a Holistic Design Process*
  Mathilde Landgren (DTU Copenhagen) & Kai Schramme (HCU Hamburg)
- *Game Design as an Interdisciplinary Teaching Tool in Built Environment Studies*
  Viktorija Prilenska (TUT Estonia) & Maksims Feofilovs (RTU Riga)
- *Climate 559—Rent Increase Due to Energetic Refurbishment?*
  Kerstin David (HCU Hamburg)
- *Fracture in Concrete at Aggregate Level—Experiments and Calculation Results Using Discrete Element Method*
  Jan Suchorzewski (GUT Gdańsk)
- *Dwelling as a Fugitive Practice? Accommodating Refugees: Inquiries into the Relation between Dwelling (Functions) and the City*
  Maja Momic (HCU Hamburg)
- *Contemporary Interventions in the Architectural Heritage and Regeneration of Spaces*
  Elida Rios (HCU Hamburg/UPM Madrid)

Some minutes were left after every presentation for content-related questions. Having heard all the presentations, the group was then confronted with the challenge of finding the common links and connectedness between the presented topics. Dealing with the challenge of finding a logical path for interlinking the heterogeneous topics turned out to be the essence of the follow-up discussion. The main outcomes could be summarized as follows:

The discussion ...

- made visible the wide range of research questions related to the built environment that are being investigated at the moment within the Baltic Sea network of young researchers as well as their highly specialized nature and needs;
- made the large variety of applied tools visible in the individual and joint research;
- introduced the possibility of finding common ground for future joint work beyond the single disciplines based on the example of the joint presentations of Mathilde (DTU) and Kai (HCU), and Viktoria (TUT) and Maksim (RTU);
- placed emphasis on the tools and methods as the concrete means allowing for knowledge transfer and exchange between the disciplines.

Future Steps
Focus on tools/methods

One of the main outcomes of the symposium was the recognition that a clear framework should be offered for the categorization of tools and methods used in the interdisciplinary research on the built environment. This should allow the introduction of a discussion which, on the one hand, allows for a profound investigation on the implementation of the tools and methods in an interdisciplinary context (the expansion of their area of implementation), on the other hand introduces fresh input from other areas of application (disciplinary ones) in order to foster the further development of the tool/method.

The PhD symposium was sponsored by external funding bodies.

Climate Protection and Rent

Kirsten David

"The problem is not the problem. The problem is your attitude about the problem."
(Captain Jack Sparrow)

Germany's climate protection targets require enormous investments, as 75 percent of our building stock was built before 1979 when it was not subject to energy efficiency regulations. The energy saving potential is correspondingly high.[1] However, when it comes to the economic efficiency of investments in the energy-efficient refurbishment of rented housing stock, the prospects of the parties to the lease are diametrically opposed. Tenants generally accept an increase in rent, which is offset by savings from reduced energy consumption,[2] landlords want to refinance their investment profitably through rent increases.[3]

The BGB (German Civil Code) tenancy law entitles investors to an increase in rent after modernisation of up to 11 percent of the costs. However, costs which would have been necessary for maintenance measures must be estimated and deducted from the investment. They must not lead to an increase in rent (§ 559 BGB).[4] This system combines the politically intended investment incentive[5] with the consideration of the maintenance costs already received with the rental payments (§535 BGB).

The law doesn't specify at what age of the building stock nor to what extent maintenance measures are required. And even specialists in the field of building condition analysis are not sure about adequate methods to identify necessary maintenance measures or to estimate costs for them.[6]

It is obvious that the tenants would take up an enormous portion of the necessary maintenance costs within the investment, while the landlord wants to refinance as large a share of modernisation as possible through the rent increase after modernisation.

Example: Details of components that are relevant for the energy efficiency of a housing stock before and after its energetic upgrading. © Kirsten David

Example:

- Could you easily estimate the maintenance costs that would have been required in the example?
- In a sufficiently resilient manner accepted by your opposition contract partner?
- Which still corresponds to the required workload of the estimation?
- As a consequence, planning uncertainties arise, that is to say, the question of cost shares represents an obstacle to investment.

But still profitability analyses come to the result that the energetic renovation of apartment buildings pays off—both for landlords and tenants.[7, 8] And as long as politicians rely on these results, the incentive system is confirmed in their eyes.[5]

The aim of my research is to understand the different perceptions and descriptions of the economic efficiency of energy measures in rented housing stock, to clarify their causes and to create the basis for a more balanced view.

Seen on the described macro level, my research object occurs not only between scientific disciplines but furthermore in practice, in the everyday life of the energetic refurbishment of our housing stock. According to the definition of Hanschitz et al., the object of investigation is to be described as transdisciplinary.[9]

Transdisciplinary one-man job?

My goal of closing a knowledge gap that appears transdisciplinary, with only one disciplinary knowledge background, has repeatedly led to justification discussions. The reflection of the ideal-typical research process, as presented to us by Prof. Ingrid Breckner in the three working phases Semantics, Syntax and Pragmatics, combined with the findings of the discussion on inter- and transdisciplinary research structures, which were lectured by Prof. Ulli Vilsmaier, allows me today to take a new, research-based and differentiated position in such discussions.

The object and subject of research do not always meet as a result of a disciplinary scientific discourse. They can meet in a wide variety of situations, completely independent of the research subject's home discipline. Decisive for the right to exist for a "transdisciplinary one-man job" is the context of discovery, which is formulated after exploring the world of the object in the work phase of Semantics of the research process. The researching subject only succeeds in formulating and plausibly substantiating this on the basis of its background of knowledge, in which it has noticed a gap.

In the work phase of Syntax—the exploration of order in the object world—the perspectives of all disciplines and protagonists in practice that play a role in the world of the object are to be considered. Only after taking their influences into account can a well-founded statement be made about the existing order of the research field. Since this statement is the basis for the logic of the methodological reasoning, it must be worked out thoroughly. Finally, the disciplinary background of the research subject comes into play again in this phase. The already identified disciplinary knowledge gap is further narrowed down with the knowledge of the transdisciplinary field order and the research-led question is developed. This now contains the perspectives of the disciplines and protagonists relevant for the object world, but aims at a disciplinary knowledge gap.

The answer to this question, however, must do justice to the need for action in the object world, which is determined in the work phase of Pragmatics. If the object appears in a transdisciplinary manner, the exploitation context of the research results is just as transdisciplinary. Following this logic, the scientifically strategic approach is to be deduced from the developed transdisciplinary framework conditions of the object world. Since the scientific path thus defined will then only be gone through by one discipline, the research process and the knowledge gained should ideally be evaluated by the disciplines and protagonists most relevant for exploitation. If the newly acquired disciplinary knowledge is to be implemented in the existing knowledge structures of other disciplines relevant to the object world, this can only be achieved with a further interdisciplinary research approach that needs to be formulated by the discipline(s) concerned by going through the work phase of Semantics again and, if necessary, together.

This approach ensures that inter- or transdisciplinary research, even if carried out as part of a doctoral project as a "one-man job," does not lead to a local mass of knowledge that is unusable or even disruptive for disciplines that are adjacent or further away in our knowledge landscape. However, the path requires an intensive examination of the disciplines among themselves and the condition for it is that all participants are ready to leave the comfort zone of their own discipline. This will only be possible if the research object, which was initially identified as a disciplinary knowledge gap, appears relevant (enough) for the disciplines involved in the object world to assume this task.

To put it in Jack Sparrow's words: to solve a problem, it is not helpful to change the attitudes of the others about it— you have to understand them!

So what did I do?

My approach

Seen on the research level, the multilayered nature of the object can be differentiated: the problem was created by our tenancy law (jurisprudence) and was not recognized as such by the legislators on the basis of economic analyses (economics). In the everyday life of the research object, however, it is up to the housing industry (real estate) to calculate and invest profitably. The considerable cost position of the necessary maintenance costs is usually determined by architects or civil engineers. And broken down into construction costs and financial planning security, the expertise of the construction economics offers the core competencies for this problem. In other words, the gap to be closed must be located in the existing knowledge of construction economics. The different perceptions of the economic profitability of energy measures exist because there is no appropriate and comprehensible method for estimating the costs that would have been necessary for maintenance measures. I therefore ask for criteria and an approach for an appropriate and comprehensible determination of the rent increase after modernisation.

Ideally, this newly developed construction economics approach should complement the existing knowledge of the relevant disciplines mentioned like a puzzle piece. For this, the framework conditions and the adjacent puzzle pieces—the attitudes—must be known. To achieve this level of understanding, it makes sense to start from the existing hole in the puzzle and ask the questions to the puzzle that help to find the missing piece. How is the puzzle as such—its motive—to be understood? What can be seen on the adjacent puzzle pieces? What forms do the interfaces of the adjacent puzzle pieces have?

To speak more scientifically: to gain a more comprehensive understanding of your research object, you need to develop your scientific investigation process based on it.

I structured this so-called problem-oriented approach on the basis of the steps in the interdisciplinary research process that Newell introduced[10] as follows:

1) Define the object and determine the relevant disciplines.
2) Understand disciplinary perspectives.
3) Deduce and adjust a frame for the empirical study of the problem.
4) Develop specific methods for data collection and analysis.
5) Develop a new construction economic approach to solve the problem.

Especially in my case of the transdisciplinary one-man job, communication between these steps is absolutely necessary—both disciplinary and interdisciplinary.

Presenting a knowledge gap and the corresponding research approach to an audience helps to develop a clear structure for one's own work—regardless of whether the audience is disciplinary, inter- or transdisciplinary. In addition, an inter- or transdisciplinary examination of a research topic shows the possible different use of language in the disciplines or in practice. Only with a uniform use of language can the work, its approach and the solution be equally understood, reflected upon and, if necessary, continued in an interdisciplinary manner by all disciplines involved. The further away from one's own discipline a discipline relevant to the problem lies on the map of science, the more important it is to calibrate mutual understanding of the work and in particular the solution.

Conclusion

I am very glad that I had the opportunity to present my work to an interdisciplinary and international audience at the PhD symposium of the B.I.S.S. 2017. The very limited time window for the speech has already lured me out of the comfort zone of my discipline and made me see my work from a different perspective. The input lectures, the discussions and the reflection on what happened confirm that respect and trust, a genuine will to understand each other and the ability to think in a networked way are conditions for inter- and transdisciplinarity. With reference to the title of the symposium, it can be summarized: only interdisciplinarily can we generate *Innovations in Interdisciplinary Research!*

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Contemporary Interventions in the Architectural Heritage and Regeneration of Spaces

HafenCity Project Hamburg — Germany

Elida Rios

Figures 1–2: The Elbphilharmonie, or Warehouse A, and the Maritime Museum, or Warehouse B, © Elida Rios

Abstract

Keywords: Waterfront, Architectural Heritage, HafenCity, Warehouse District (Speicherstadt), Urban Transformation, Regeneration, Public Spaces, Accessibility

The contemporary interventions in industrial architectural heritage have many references. One is in the city of Hamburg (Germany), where there is an important historical sector called the warehouse district (Speicherstadt), declared an architectural heritage by UNESCO in 2015. Due to its large scale of intervention and characteristics, the site is currently used as an example when discussing urban topics. A contemporary intervention on the waterfront and in historical spaces with different criteria and concepts is used to intervene in the industrial architectural heritage, with the condition of maintaining the identity of the place.

Considerable value is being added with the project HafenCity, where this historic context and the urban environment are being recovered. This context requires a delicate intervention for its integration of the new city, which is still under discussion.

The compatibility and integration are not only effective with the projection of contemporary architecture but also with the integration of new public spaces to be more accessible and compatible with these two types of contexts of the development of HafenCity and the old port area, with the objective of integrating the industrial context as the warehouses in a new city, creating an interesting connection and interaction. There is a specific area to analyze in this project, in which interventions in *historical buildings* play an important role in the regeneration of this area and can be compatible with a new *contemporary urban context*.

This area where the old A and B ware-houses are based, is marked by the location and historical urban structure. It holds the most important cultural projects of HafenCity, as the Elbphilharmonie, previously called *Kaispeicher A*, and the International Maritime Museum, previously called *Kaispeicher B* and part of the warehouse district, today present two types of interventions in industrial buildings between the traditional and contemporary.

These opposing types of intervention are present in the buildings where the urban context is an important part of integration with different types of projects in public spaces, plazas, new promenades changing the urban landscape.

Introduction

There are important projected districts between points A and B and they are integrated directly by the water, the main element for the design on the waterfront[1]

Figure 3: Regeneration of the Elbe riverfront concluding in the Elbphilharmonie shows the activity in promenades, traditional materials along this intervened context, where water is the dynamic element of the new city, © Elida Rios

and, at the same time, integrated within the existing architectural heritage (Speicherstadt) parallel within this context. The identity of the place is an important aspect represented by these two industrial buildings, whose functions and history are present still today. The port atmosphere is clearly observed in the HafenCity project through its new urban spaces giving a new architectural language.[2]

In this context, the water element is important, generating dynamic interaction with the new architectural projects and open spaces, an effective concept for the activation of these industrial residual spaces on waterfronts and keeping the memory of the place by using traditional materials, such as red brick, within this new urban environment.

Perspectives on the two points

The first strategic point, Kaispeicher A, is where the historic warehouse was built by architect Werner Kallmorgen. The brick base supports the Elbphilharmonie, changing the image and the architectural landscape in this environment.

This project is the other concept of intervening an industrial-type building, projected to be an architectural icon for the city of Hamburg. Urban regeneration and strategic plans are not only tools to recover an industrial space in this project, but also to create the connection and compatibility with its present architectural heritage.

These architectural heritage sites form an important conditioning context to be considered on account of their normative concepts for compatibility with a new projected environment. ICOMOS speaks in its evaluation of the nomination for it to become a world heritage site of a mixture of technological and aesthetic value in the Speicherstadt, where the warehouses were constructed following modern techniques and incorporating advanced technical installations and equipment that allowed a proper operation and delimiting flexible interior spaces, but with a historic exterior, with continuous brick architecture and the construction tradition of the city.[3]

The oldest warehouse in the Speicherstadt, Kaispeicher B, is another cultural point, this warehouse maintaining its architectural typology in façade and structures and its interior spaces adapted for museum uses. It is considered an important intervention in terms of museum uses interacting with two languages, the history of the building and the contemporary intervention of its immediate environment—the beginning of the intervention in this regenerated environment is next to the new Elbtorquartier district.

Between these two points, the concept of connection, compatibility and the use of new methodologies in the urban spaces predominate with more intensity than in other districts in terms of the combination of horizontal and vertical activities. The flexibility of this context helps the compatibility, the setting of new standards of intervention in industrial contexts, where sustainable urban development is currently the norm.

The public spaces developing activities create a flexible matrix for a development and activation with an effective combination of the compact, mixed and architecture heritage. This new urban transformation is not just an effective tool for regenerating urban space, but also an activation of existing Architecture Heritage. It is important to mention the principles that were used in the master plan and that are currently observed:[4]

- the development of new neighborhoods with mixed typologies,

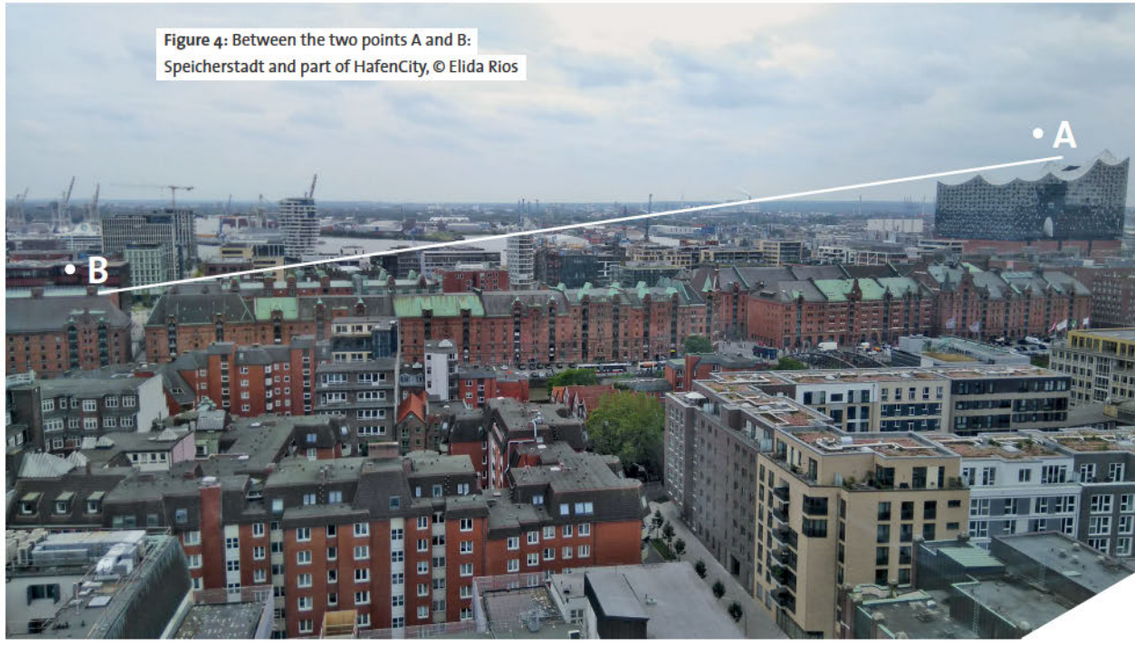

Figure 4: Between the two points A and B: Speicherstadt and part of HafenCity, © Elida Rios

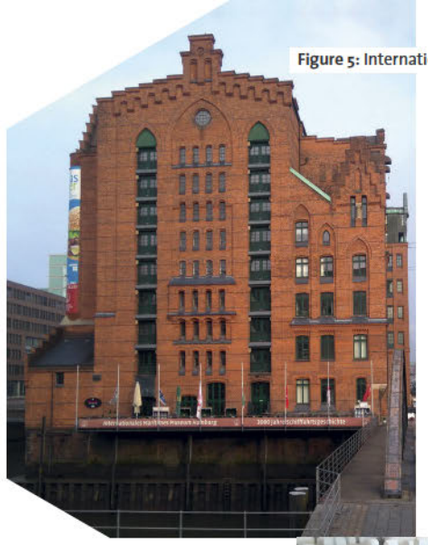

Figure 5: International Maritime Museum, © Elida Rios

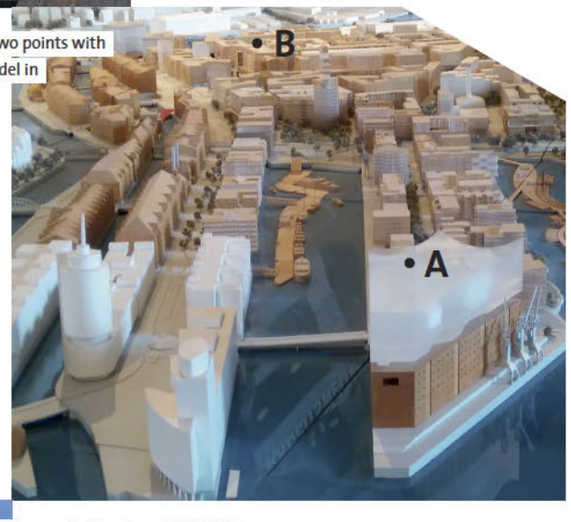

Figure 6: Connection between these two points with a new urban context, © Elida Rios (model in Kesselhaus—Hamburg)

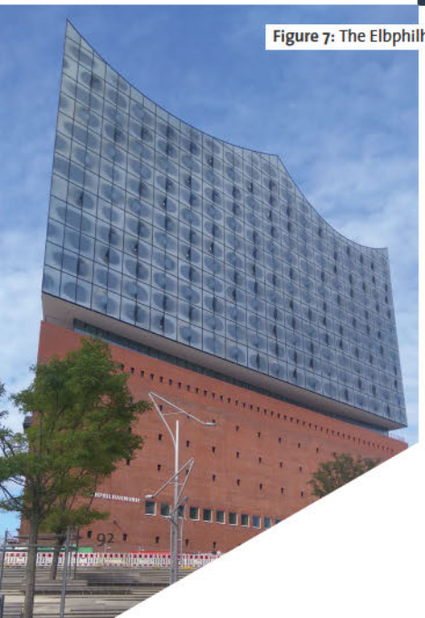

Figure 7: The Elbphilharmonie, Hamburg,© Elida Rios

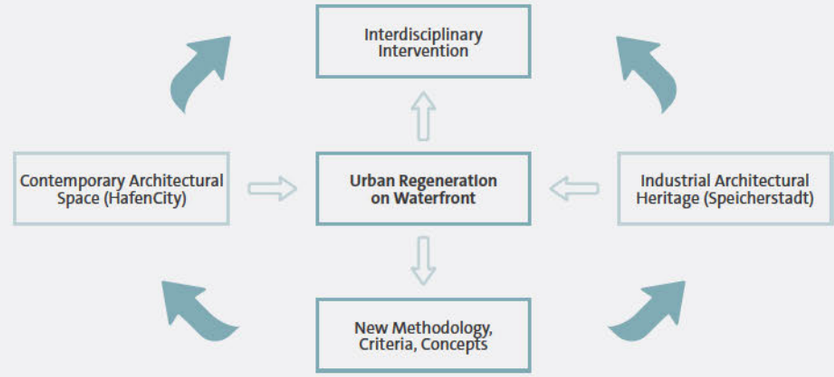

Figure 8: Conceptual Map 1 by Elida Rios, the scheme shows the relationship of concepts that research focuses on from the port city as a study context, its new built environment and the result in relation to the present architectural heritage.

- the mix of land uses, designed to re-evaluate the surrounding urban environment,
- the preservation of the typological characteristics of the port facilities and their relationship with water,
- the quality of public spaces in direct relation to water.

Reflection

This is how multidisciplinary concepts will be the basis for developing urban regeneration projects, taking aspects from the social, architectural, urban, engineering sectors, where the history of the place and the existing architectural heritage will also be important determinants for the development of new strategies and methodologies in the projection of this type of project.

There are many references to this typology, but not all meet their objectives, instead only projecting scenarios with contemporary architecture without active integration of their city. In this sense you can consider the HafenCity project a good reference in the recovery of its river front, in which the master plan considered many multidisciplinary concepts. These in turn resulted in strategic points such as architectural projects in particular and their open spaces with different types of uses, serving as connectors between their new districts, the architectural heritage and the city.

The project HafenCity holds these principles in three concepts, identity, sustainability and urbanity,[5] showing different perspectives in urban planning, now converted into a new active city along the Elbe river, with an architectural language typical of the port city of Hamburg with strategic projects achieving an integration into the urban environment.

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Jury's Reflections:
Tidal Design

Bartlomiej Halaczek

Few cities in the world recognize and harness the architectural potential that comes with tidal movement. The perpetual cycle of a rising and dropping water level has influenced an entire sub-genre of functional architecture designed to override the nature of the tide rather than embrace it. Consequently, most of these structures serve the marine industry and are therefore designed to be purely functional and robust with no ambition to have a pleasing visual appearance whatsoever.

On the other hand, these structures—landing piers, pontoons, lighthouses, signaling buoys, loading cranes—are the very objects defining the typical character of every harbor city. It is this familiarity that leads the visitor to feel used to this typology, letting him or her forget that all of these structures are lacking one particular quality. There is simply no man-made object that would react directly to the creative potentials that come with shifting water levels.

Interestingly, this unique potential was recognized by many of the groups of the 2017 Summer School and turned into a set of fresh concepts that could enrich the urban landscape and infrastructure in unusual ways.

The discussed works can be roughly subdivided into three genres: first, projects that recognize their marine setting and extrapolate the aforementioned building typologies into new concepts. These projects focus mainly on infrastructure and could be adapted in any other environment with few adjustments. Second, concepts that focus on other topics but are very aware of the tidal situation and utilize this reality to enhance their quality. The last category is a direct response to the tidal setting and would be rendered obsolete in any other context.

Category 1

In the first category, there is a set of varying concepts which acknowledge their harbor setting in indirect ways by referring typical marine infrastructure and the buildings that define it. In "Bubble Trouble" the design space is developed into a vast park landscape, defined by man-made, rolling mounds and lush foliage. The landscape is subdivided by meandering pedestrian paths, connecting the neighborhood to the peninsula. Waterways are either crossed by ferry or by a floating bridge. In the center of the landscape sits a futuristic, bubble-shaped building which contains a vibrant selection of leisure amenities. Its bubble shape

seems entirely unrelated to the urban fabric, instead it appears like the hull of a holiday cruiser, accidentally stranded in the park landscape, waiting for the next tide to carry it away. The picture evokes Hans Hollein's Aircraft Carrier City in Landscape. "Next Level" draws its inspiration from moving harbor cranes, designed to handle shipping containers. These linear moving devices consist of a lifting beam sitting on two longitudinal, elevated rails. This concept has been disassembled, leaving only the elevated rails. But instead of leaving the rails linear, they are now meandering several meters above a park landscape, connecting the neighborhood and turning the arrangement into a network of elevated routes. The typical crane trolleys are replaced by rail-mounted cars which are not self-powered but rather provide safety and stability to bicycle riders who will plug their bikes into the car.

Category 2

The second category makes indirect use of the tidal effects in Hamburg. For example, the ambitious concept of "Infra" picks up on the often-used idea of leaving the land to its users allowing them to constantly shape and re-shape the landscape to their liking. Despite its anarchistic character encouraging playful disorder, the design space is clearly demarcated by a rigid boundary in the shape of solid glass wall reaching all the way down to the riverbed. As a result, earth can be excavated from the edges of the enclosure allowing the spectators to sit in an artificial landscape below water level, comparable to an inverted aquarium. The approach of "HafEndSoul" turns the Elbbrücken peninsula into a recreational space providing a vast supply of leisure activities intertwined with a selection of small businesses. Centerpiece of this design is a swimming pool located within the basin of the river Elbe. A sophisticated system of filters allows the water in the river to enter the pool during high tide, thus allowing the visitors to enjoy a swim in the Elbe without being exposed to its pollutants. The purified water drains from the pool at low tide back to the river, introducing a natural, perpetual circulation—a clever concept, first introduced at lidos in early 20th century England. Two similar schemes—"social link" and "seesaw"—draw their potential from the concept of interaction and self-organization. A myriad of modular platforms floating in the river basin can be organized into a great number of various spaces—from bridges to stages and bars or as individual ferries for their users to cross the water. The benefit of such "ad hoc" spaces lies deeply within their flexibility to respond to external circumstances, such as time of day, weather and tide.

Category 3

Compared to the categories discussed above, which could potentially work in non-marine environments, the last three concepts to be presented are heavily dependent on the tidal flows and would be impossible to realize anywhere else.

"Waterhub" is an artificial, tectonic landscape, designed to be almost completely submerged in high tide. As the space is modelled upon a highly irregular topography, its appearance and grid of roads and paths is undergoing perpetual reshaping. As the tide goes back, various water features emerge from the water, such as artificial pools, cascades and saltmarsh gardens. The landscape is a successful method to visualize how the tides shape our environment. A similar idea was used by the "Sea the Noise" team. But in this case the landscape was built entirely from vertical glass tubes of varying lengths set straight into the water. All tubes are rammed into the riverbed and connected by triangular platforms at different levels. Each tube is fitted with a light and a microphone regulating the intensity of the emitted light depending on the level of the ambient noise. A matrix of hundreds of those tubes is built into the river basin turning it into an attractive installation, a blurring of boundaries between infrastructure and sculpture. The amorphous, reed-like shape disappears and emerges with the tides while at night it provides a graphical feedback on the level and dispersion of noise in the neighborhood.

The last project to discuss here is "Unterhafen." This ambitious design is the outcome of a thorough study of the river currents and the natural sedimentation of silt. This long-term progress impedes the shipping on the river and requires a constant dredging regime in order to keep the waterways clear. The change of use of the Elbbrücken peninsula including the canals that frame it is likely to lead the authorities to stop any further maintenance works in this area. The subsequent increase of the silt-bed will gradually introduce a new, natural landscape formed entirely by the flow dynamics of the river resulting in a set of grown landscapes. This growth however, is not entirely uncontrolled, as it all happens around a modular, dynamically operated spaceframe which is submerged into the water and influences the flow of the river water. In this way, similar to coral reefs growing on shipwrecks, the development of the natural riverbanks can be influenced over a long period.

In sum, the B.I.S.S. 2017 has shown a wide selection of unique and unusual ideas referencing a topic that has been mostly ignored by the urban planning departments, namely the perpetually transforming tidal landscapes. As this topic holds a lot of potential for entirely unprecedented concepts, it deserves much more attention in future.

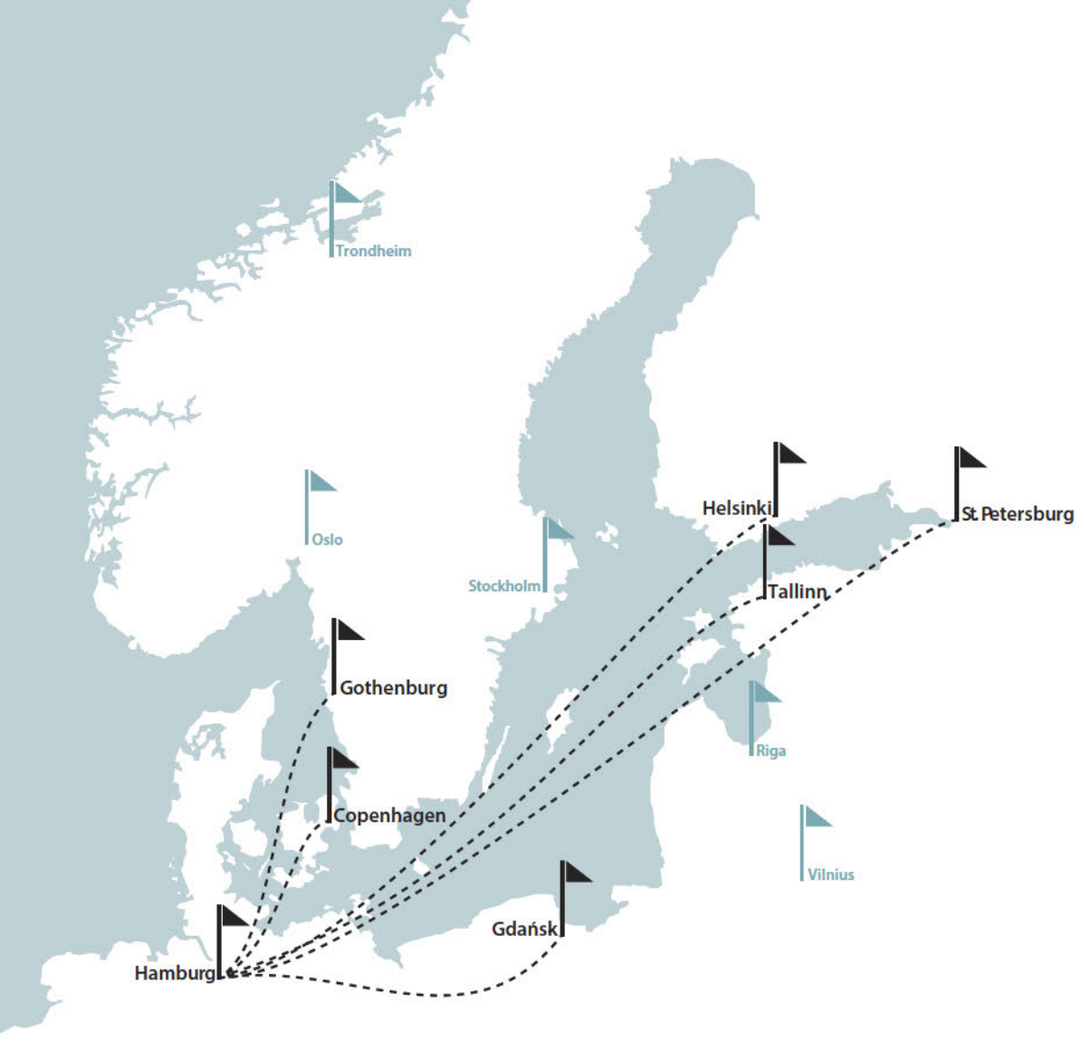
Documentation of the Third Baltic International Summer School 2017

think the link: City Elements—
Infrastructure and Networks Shaping Harbor Areas

“Introstruction”

Compressing nearly two weeks of a summer workshop with all its accompanying events, social events, social activities, lectures and keynote presentations, vivid discussions, nights out and much more into a few pages is quite a task. Nevertheless, on the following pages, we would like to give you an idea of the spirit of B.I.S.S. 2017, laying out the feedback of the individual groups, giving you an idea of the agenda of the summer school, the work in the groups as well as some impressions of the final closing event. Included is also a non-ranking list of all projects.

The motto for the third Summer School, “think the link” with the topic “City Elements—Infrastructure and Networks Shaping Harbor Areas,” indicates the interdisciplinary approach. B.I.S.S. overriding aim is the quest for ties and commonalities in culture, in the collective wealth of experience, in the understanding of city and buildings. The careful analysis of the initial position of each B.I.S.S. partner city and the linkage of the connection points worked out are the major tasks that B.I.S.S. seeks to accomplish over the coming years. The Baltic International Summer School not only linked related disciplines but people such students, teachers and researchers. Friendships emerged, ideas for the future projects arose.



The Network — Partners and Participants

When the B.I.S.S. project was launched in January 2015, we approached a few of our partner universities to see whether they were interested in the idea of an international summer workshop. It evolved that our initial contact was highly successful— not only did the following partners agree to participate; they all actively contributed to the development and implementation of the very special format of this summer school.

Due to so much positive feedback, we are looking forward to integrating even more partner universities from the Baltic Sea Region within the network in the years to come.

Aalto University
in Helsinki, Finland
Prof. Dr. Toni Kotnik,
Design of Structures

Chalmers University of Technology, CHALMERS
in Gothenburg, Sweden
Anna Kaczorowska
Prof. Dr. Karl-Gunnar Olsson,
Architecture and Engineering

Technical University of Denmark, DTU
in Copenhagen, Denmark
Assoc. Prof. Lotte Bjerregaard Jensen
Department of Civil Engineering

Gdańsk University of Technology, GUT
in Gdańsk, Poland
Dr. Bartosz Macikowski
Department of Architecture

Royal Danish Academy of Fine Arts, KADK
in Copenhagen, Denmark
Prof. Dr. Olga Popovic Larsen
Institute of Architecture and Learning

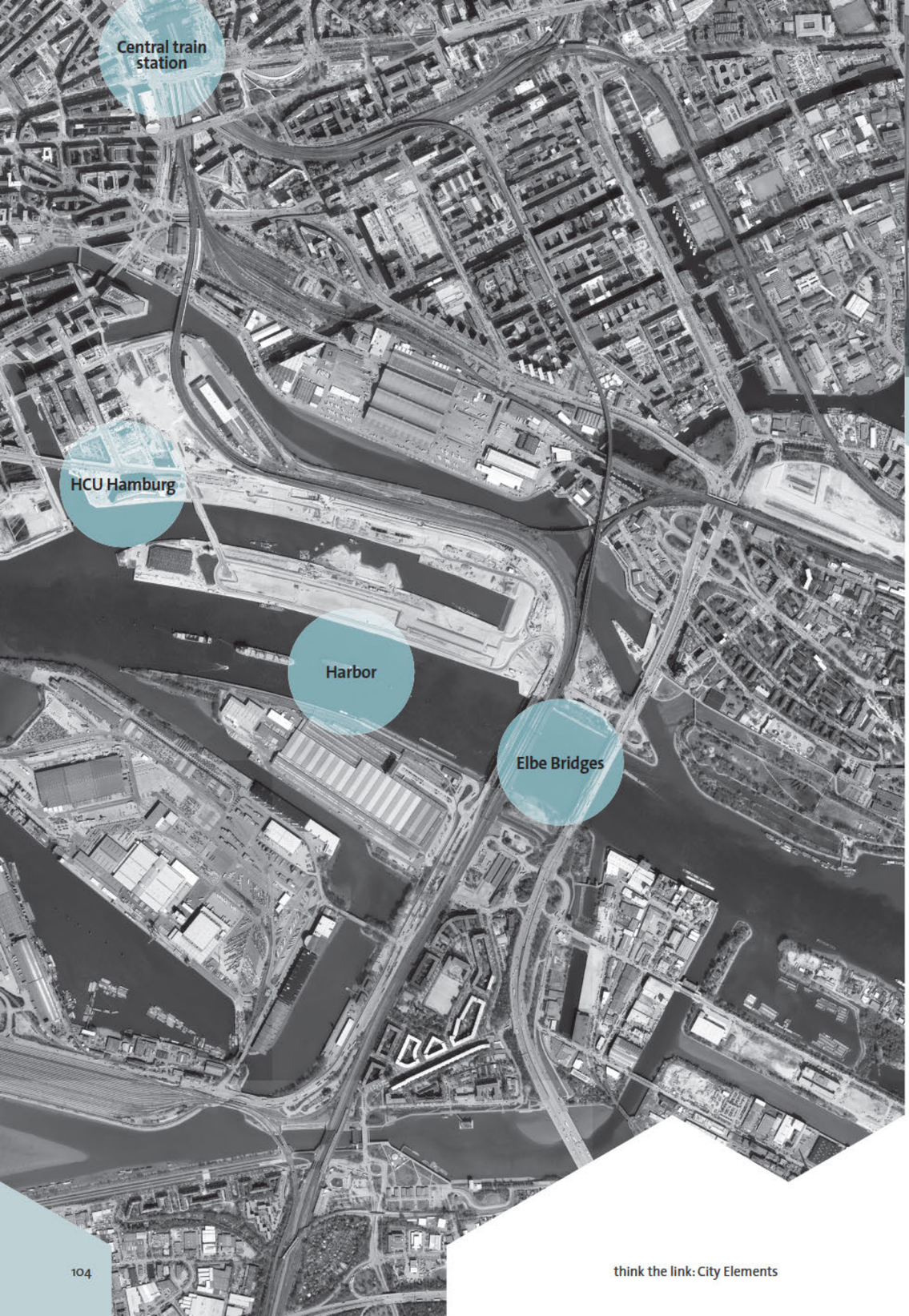
Tallinn Technical University, TUT
in Tallinn, Estonia
Prof. Roode Liias
Faculty of Civil Engineering

HafenCity University, HCU
Hamburg, Germany
Prof. Dr. Annette Bögle
Structural Engineering

Riga Technical University, RTU in Riga, Latvia
Prof. Ugis Bratuskins
Department of Architecture
Department of Power and Electrical Engineering

Saint Petersburg State University of Architecture and Civil Engineering, GASU
Department of Architecture

ITMO University
in Saint Petersburg, Russia
Department of Urban Informatics



The 2017 Topic: City Elements—Infrastructure and Networks Shaping Harbor Areas

Located in the heart of one of Europe's largest inner-city development projects—Hamburg's HafenCity—the HCU offers its students and guest scientists an attractive urban laboratory just outside its university building, providing many opportunities for avant-garde case studies that are relevant to the area. Given this top location and the similar interests and conditions, such as the participating partner universities being harbor cities, the B.I.S.S. team selected one of Hamburg's most developing districts as the object of research: **HafenCity**.

The motto "think the link" indicates the interdisciplinary approach that looks for ties and correlations between experiences, cultures, cities and objects of the built environment, creating even more links on social levels between the participants across north-eastern Europe. Its main idea is to join different disciplines—such as design and art—with the goal of creating various social and urban links between the existing problems and the possible solutions to cover the Baltic cities.

The area east of Hamburg's city center, in particular around the infrastructural joint "Elbbrücken" (Elbe Bridges) set the stage for the 2017 topic "City Elements—Infrastructure and Networks Shaping Harbor Areas." The students were asked to deal with the water and land relationship in the strategic point given and to propose on-site design and project production, which would also serve as an example for other harbor cities in the Baltic Sea Region. They were to look at the development of Hamburg as a model for other harbor cities in the Baltic Sea Region, thereby also for the participants of the B.I.S.S. Multiple realistic suggestions for the near future of our cities and answers to a variety of current questions about the built environment were the main focal points of the workshop.

The B.I.S.S. hereby seeks to address not simply a typical problem in Hamburg but one that is characteristic for most harbor cities and is thereby of interest to the participants of the B.I.S.S. The results range from artistic to architectural and engineering concepts for the development of the cities. Thus, the task was to look at the integration of the area, while at the same time provide the students the chance to transfer their solutions to their current homes.

The Mentors

The mentors, PhD students and junior professors from nearly every participating university were major assets for the summer school. They were the first points of contact for the students during the ten-day course, taking care of two or three working groups, coaching them independently, identifying the missing links in the proposals, solving the problems that emerged during the process of defining their individual tasks as well as consulting and supporting them when it came to presenting their results. In their roles and with their knowledge and dedication, the mentors were literally the backbone of the summer school, sharing their teaching experience on an international as well as intercultural and interdisciplinary scale.

The Schedule

The Program—Formats and Schedule

The workshop took place from August 11 to 19, 2017 at the HCU in Hamburg.

Working in small interdisciplinary and internationally mixed teams of students and mentors was to ensure an intense and continuous scientific, organizational and cultural exchange among the B.I.S.S. participants.

Several formats were applied:

- Keynotes: Sheila Kennedy, Bastian Wibranek and Nina Rappaport gave the thematic impulses.
- "Food for the day": each working day began with one of the participating professors giving a short morning lecture.
- Group work with mentors: the students worked on their projects in groups of three or four following their own thematic and methodic focus, and supported by their mentor.
- Expert critique: the groups' progress was commented on by a number of experts present during the workshop.
- Final public presentation: guests from press and politics as well as local and international experts and participating teachers commented on the projects at the closing event on Saturday, August 19. This event was open to the public and followed by a farewell party.

A special social program was also organized, where all participants from different countries and disciplines could meet up in a casual setting.

The Groups

On the first day, nearly 60 students—most of them in master's programs in the fields of engineering, architecture, urban planning and other related disciplines—created cultural and disciplinary mixed teams in a large team-building event: cooking together on the HafenCity University terrace.

Once the teams were established, they had only nine days left to explore the field, identify missing links in HafenCity, agree on a project, work on it and prepare the public presentation. This time-schedule was enriched by regular input—so-called "Food for the day"—by various participating professors, who also launched a workshop day. Guest speakers gave presentations on a variety of themes, which added further spice to the food—as did the social activities.

Highlights of the workshop were when the B.I.S.S. opened its doors to the public for the keynote lectures by Sheila Kennedy, Bastian Wibranek and Nina Rappaport. They gave significant thematic impulses on their specialist fields of expertise, future in engineering and design.

Presentation

Jury

The Final Presentation and the Closing Event

At the end of the B.I.S.S., the results of the students' projects were reviewed by an international jury of architects, engineers, urban planners and the head of the jury, Toni Kotnik, Professor of Design Structures at Aalto University, Helsinki. Together, they selected three projects that were presented to the guests at the official closing event on August 19.

Jury

Prof. Toni Kotnik
Professor of Design Structures at Aalto University, Helsinki

Prof. Antje Stokmann
Professor for Landscape Architecture at HafenCity University Hamburg

Bart Halaczeck
Knight Architects, London

Prof. Lucyna Nyka
Prof. Dean Faculty Architecture Gdańsk University of Technology, Gdańsk

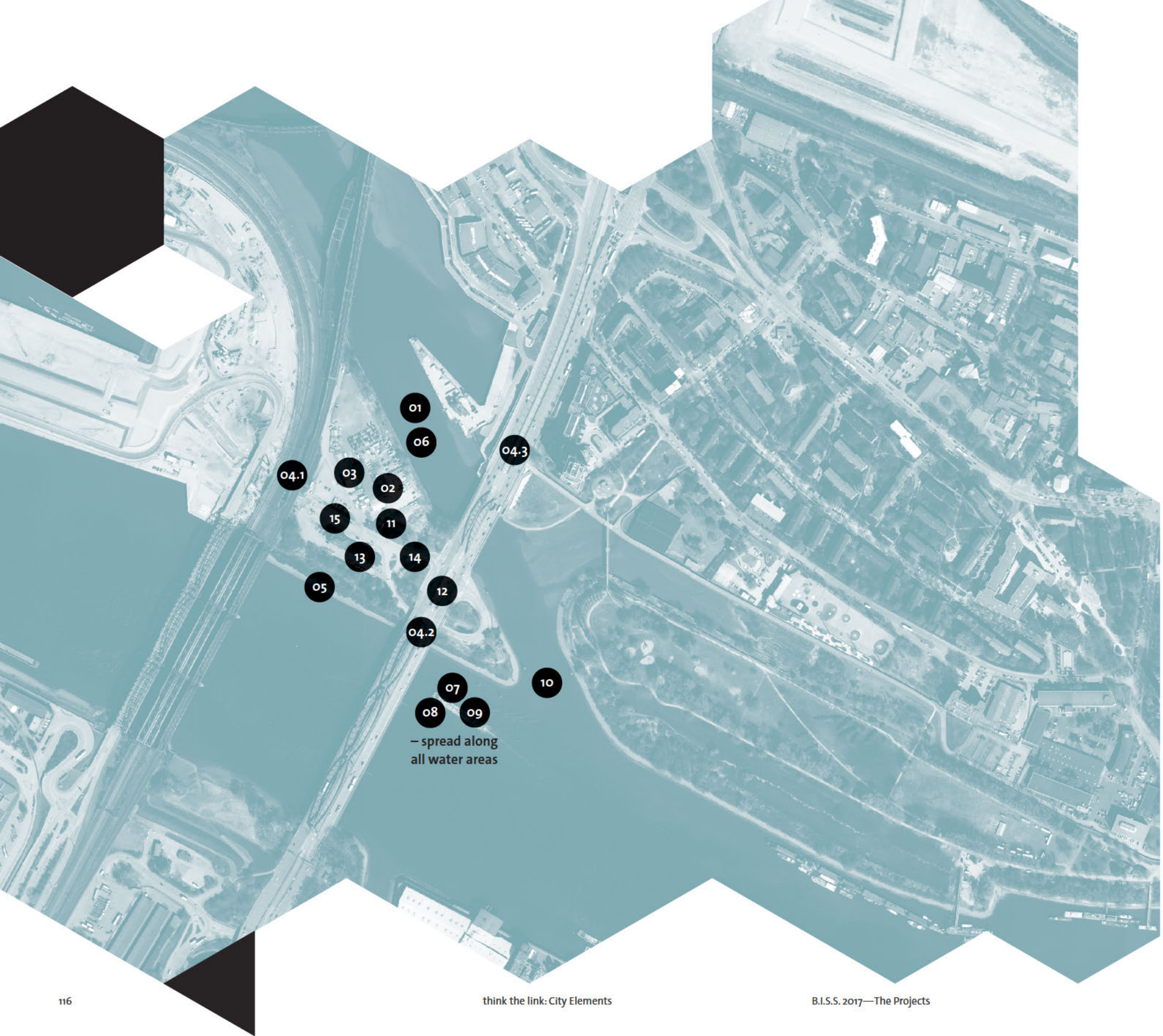
Prof. Ugis Bratuskins
Dean Faculty Architecture and Urban Planning of Riga University, Riga

Prof. Annette Bögle
Professor for Structural Engineering at HafenCity University Hamburg

Exhibition

BISS Organisation

Celebration



The Projects

As the young researchers and teachers—the mentors—are the most important people involved in the B.I.S.S. apart from the students, they play a major part in the documentation. The layout of the documentation is divided into blue areas for the mentors' profiles and comments and white areas for the students' comments, profiles and projects.

Each group was asked to give us feedback—to describe the group members' characters, the projects and the impressions of the summer school.

Kai Schramme,
Mentor

HCU, Hamburg
I graduated with a bachelor's degree in Civil Engineering and a master's degree in Architectural Engineering. I also did an Erasmus stopover in Stockholm. My academic interests are algorithm-generated structures, parametric design and folded structures. I just got started, but my research is about folded shell structures. It started with rigid-foldable origami structures during my master's degree and next, I will analyze the load-bearing capacities of more complex folds and research how the overall structure can be improved.

I hold exercises to teach the load-bearing behavior of spatial and shell structures during the summer term. During the winter term, I give lessons on how to digitally design, analyze and optimize complex structures and how to use parametric design as a method for engineers. I love the ability to work on projects that focus on great ideas and explore the possible. Without the requirement that everything has to actually be built, there are no restrains set by a client the need to be the profitable. Also, the processes I work on and with are still being explored and grant the invitation of becoming involved.

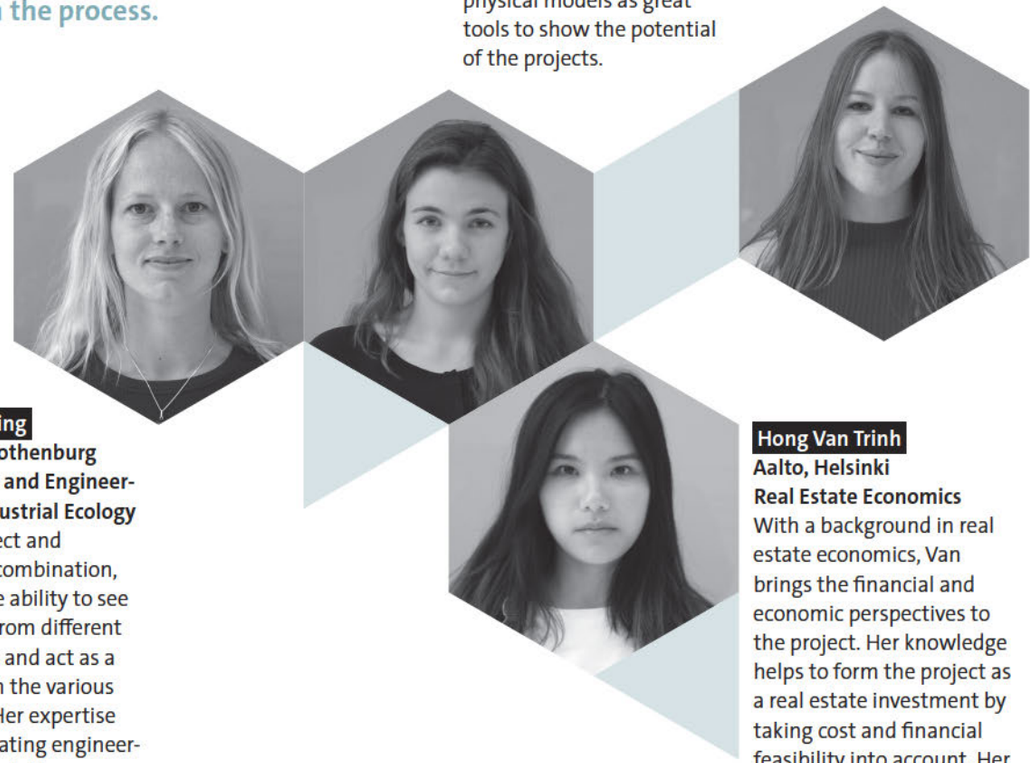
I like to leave the comfort zone of my own discipline as often as possible and to get in touch with other people. The B.I.S.S. last year was a great way to meet students and mentors from abroad and it was very interesting to learn about and share ideas.

Maja Svending

Participating in the B.I.S.S. gave me the valuable experience of sharing a creative process with students from different countries and disciplines. With the right group of people, great things can be achieved, while having lots of fun in the process.

01 Sea the Noise

Alicja Olszewska
GUT, Gdańsk
Architecture
Alicja is concerned with creating unique design ideas connected with nature and urban surrounding. Enthusiast of simplicity and sustainable solutions in architecture. Especially impressed by the power of graphics, composition and physical models as great tools to show the potential of the projects.



Maja Svending
Chalmers, Gothenburg
Architecture and Engineering, MSc Industrial Ecology
As an architect and engineer in combination, Maja has the ability to see the project from different perspectives and act as a link between the various disciplines. Her expertise lies in integrating engineering solutions in the architectural design and taking sustainable solutions into consideration at all stages of the process.

Hong Van Trinh
Aalto, Helsinki
Real Estate Economics
With a background in real estate economics, Van brings the financial and economic perspectives to the project. Her knowledge helps to form the project as a real estate investment by taking cost and financial feasibility into account. Her greatest strength is flexibility. She can pick up tasks relevant to her ability even though the project is far off her field.

Ronja Frigg Brask
DTU, Copenhagen
Architechtural Engineering
With a background as an architectural engineer, Ronja is motivated by how a project can be useful in more than just an aesthetic or structural manner. Her great passion for water in the urban environment due to her specialization in storm water management allows her to be aware of the natural processes when adding to urban landscape.

Imke Wies van Mil,
Mentor

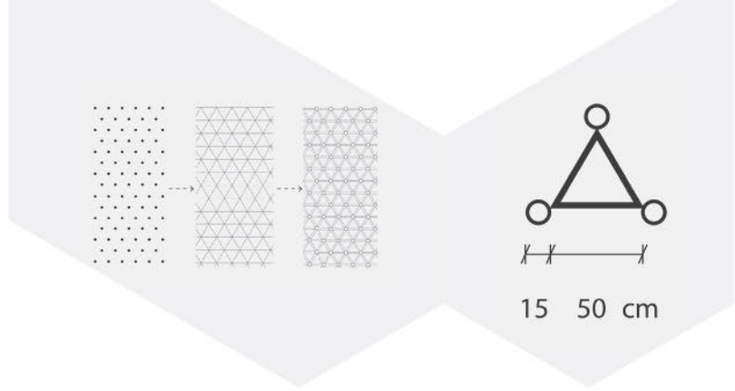
KADK, Copenhagen

I am an architectural lighting designer as well as an industrial PhD candidate working at Henning Larsen Architects. My research is based on improving educational environments through knowledge-based artificial lighting design. I worked for eight years as a lighting designer for the multi-disciplinary design company Ove Arup in London and Amsterdam. I completed degrees in Product Design in 2005 and Lighting Design in 2009.

As my current (research and design) position is grounded in architectural practice, my approach to teaching is both pragmatic as well as conceptual. I like to apply a knowledge-based method, meaning that it is important for me to enable students to understand the context of the assignment at hand.

I enjoy combining practicing as well as teaching "design" as it allows me to understand both worlds, and to reflect upon my own and others' work and thought processes.

This is my first time participating in the B.I.S.S. Feedback from previous mentors and participants has been extremely positive, which ignited excitement and curiosity in me to participate this year. I am looking forward to a period of intense work, knowledge-sharing and laughter together!



Description of the context of the project

Historically Today, HafenCity is under development, which means that the area of the site is undergoing a transformation. The site is located at a peninsula with the posh HafenCity adjacent to the working district of Rothenburgsort. The contrast between the two communities raises the question of who the site is meant to appeal to.

Socially Socially, the site is a place mostly used for traffic purposes, which does not make it attractive for social interactions as such. However, due to the two very different communities in matters of social status, users of the site are quite mixed. Because of its location, it is necessary to create a natural flow between the two communities.

Structurally and architecturally The site is located between two bridges in an area covered in concrete. From the architectural point of view, there is a lack of space that could create a node. Due to the rather negative impression of the site as such, it is important to turn the impression around, making the traffic noise and the raw industrial look the unique features of site.

Description of the site and the direct surroundings of the project

Infrastructure The area contains a lot of heavy traffic from both the west with the end of a highway, the north with heavy traffic mostly containing construction trucks due to the new HafenCity being built and to the east with regular train traffic.

Missing links The site is currently quite isolated. To the east the new HafenCity is being built, but it will take a while until it reaches the border of the site. To the southwest is Rothenburgsort on the other side of the Elbe river. Not many people pass by the site at this point, since the street from Rothenburgsort to the site runs alongside a street very heavy in traffic, which is not very pleasant to travel on by bike or as a pedestrian.

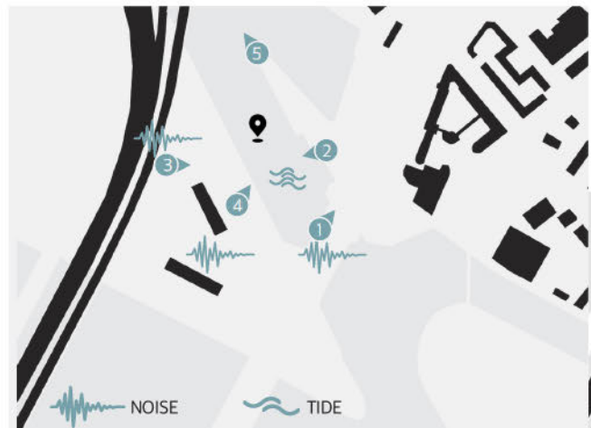
Utopian potential The site holds quite an interesting location for the future. A new important train and subway station is being built, making it a hub for people traveling out of the city.

Description of the thematic focus, goals and motivation of the project

Conceptional idea and development The main goal of this project is to draw attention to the site. When more people come to the area, they will naturally create the demand for different services and infrastructures. Along with the data collected from the system, it will help developers and investors to have a better idea of what should next be built or developed at the site.

Interpretation of "link" The "link" here can be interpreted as the connection between noise and light, HafenCity and Rothenburgsort. With the data collected, the pavilion also delivers the demands of people visiting the sites to the local municipality and developers. Thus, it can be considered as a link between users and developers. For the daring among us, the structure can also be a physical link reaching across the Elbe.

Relevance for future cities The structure will become a tourist attraction. It will be the landmark that marks the end/beginning of HafenCity. And since the pavilion is

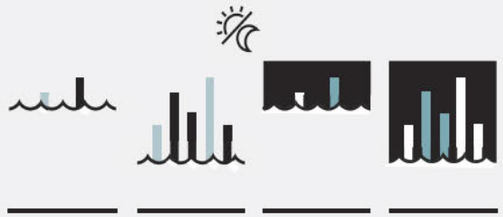


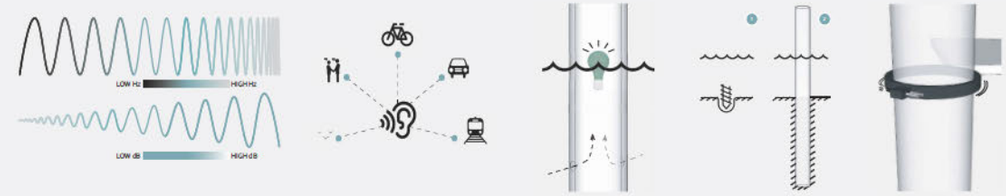
Mentors' comments on Sea the noise

The Sea the Noise project is a direct response to the site visit at the beginning of the workshop: the area directly north of the Elbe Bridges is exposed to noise which is emitted by the trains and cars crossing the river and is heard across the island. In contrast, the effects of the tide changes that are perceptible at the riverbanks are intriguing. Birds walk through the mud flats in search of food and convey a feeling of being in a natural habitat.

The idea to merge both influences into a project was clear to the group from the start. Therefore different concepts of implementation were discussed that led to a sculptural installation. Tubes that light up reflect the noise of the area and change their color and intensity depending on the type, frequency and volume of the noise source.

The accessible installation makes the transformation and influences of the area visible: the tidal influence changes the visible amount of the rods and platforms due to the lunar orbit, something humans do not influence. On the contrary, the visualization of noise depends on the acoustic pollution by humans and therefore every member of society can help to transform the site into a calmer and more pleasant one.





not permanent, it can be moved to other areas in the city or other cities for festivals or other cultural events.

Description of the final design

Utopian idea Sea the Noise is a temporary structure designed to attract attention to the site, an area isolated by two noisy highway and railway connections between HafenCity, central Hamburg and Rothenburgsort. The structure reflects the area's two distinct elements, the noise and the tide, to create an ever-changing experience on different scales that has not been witnessed before. The project is not only an aesthetic installation but also collects traffic data for further development in the area.

The link The site itself is the missing link between HafenCity and Rothenburgsort. By making a temporary construction for all users, the site will feel open and welcoming from both parts of the city.

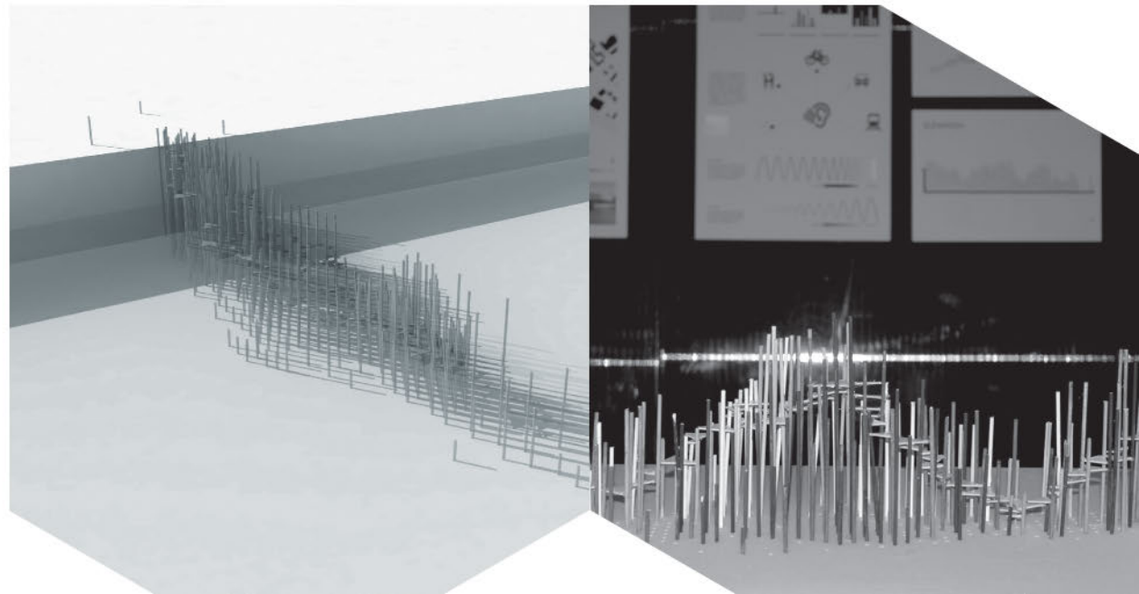
Implementation of the link From an investment point of view, Sea The Noise is an interesting project. It is financially feasible thanks to the inexpensive material and simple construction. The technology for the transformation of noise into light is entering the mass market, thus its price would be reasonable to implement. On top of that, this temporary project is excellent for collecting user and traffic data. The data collected is what we need to have an idea of the market and customer behavior, paving the way for further investment in the area.

The most important details and characteristics of the project

The noise The noise from the busy traffic, a distinctive and rather negative element of the area, is now embraced and translated into lights using Sound Reactive Visuals technology. A Bimodal Sound Vehicle Tracking system allows the lights to change color and intensity as different vehicles with different speeds pass by. The light inside of the tube floats on the water, making it move with the tide. The tubes are made out of transparent acrylic. The structure is composed of two main elements, the tubes acting as pillars, and the platforms connecting the pillars. The elements are joint using bolt clamps.

The tide The tide, whose level varies daily, affects the appearance of the structure and the height of the light sources. As the water rises and falls, it reveals or submerges the pavilion, creating different access paths and at the same time, floating the light vertically inside each pillar.

The grid The design of the structure is inspired by the equilateral triangle, the strongest shape, as it can only collapse due to material fatigue and not geometric distortion. Being built from this, the grid provides the sturdiest structure for the pavilion. The platform sizes vary from 1x1 to 3x3 m grid of equilateral triangles.



Veronika Ignataviciute
Mentor
KADK, Copenhagen

My master's thesis, undertaken in Lanzhou, China, explored how the indoors can be lit up based on light theory and simulation: the character of windows draws on daily experience. At Lanzhou University, dorms for students with families do not exist; dorms are poor with a low daylight factor. I challenged the high-rise in creating a method that deals with daylight restrictions, desert landscape and context to reconstruct the residence for students and those working at the university.

With an interest in sustainable design and technologies as well as experience and specialism in contextual design within extreme environments, I offer simulation software tutorials that can be used to anticipate environmental conditions, especially daylight.

I have always enjoyed collaborating with designers from different disciplines and intend to learn more about the link between architecture and engineering.

Having participated as a student in B.I.S.S. last year, I expect to experience the summer school from the perspective of a researcher and engage with projects that take a different slant this time around. I hope to see a high standard of work that draws on a range of media, as seen at B.I.S.S. last year, with new direction and challenges. I also anticipate new discussions, interests and the development of new friendships.

Anna Jasieńka

Participation in B.I.S.S. gave me insight in the plurality of professional approaches to a given task. I will surely use the structure of lecture in my future practice, which managed to catch most of the auditorium's attention.

Zeynep Bacinoglu
Aalto, Helsinki
Architecture

Zeynep proved to be a self-motivated, impassioned, creative, responsible and dependable student, who always brought in positive contributions for every task that she handled.

Ekaterina Ilina
ITMO, St. Petersburg
Urban Informatics

Ekaterina is a self-organized, responsible and highly motivated student. She showed her ability to articulate solutions to difficult problems, her sensitivity to the details in the project, and her passion for acquiring new experiences and gaining new professional skills.

Anna Jasieńska
GUT, Gdańsk
Architecture & Urban Design

Anna distinguished herself by her leadership skills and persistence in dealing with the trick questions of the experts. She kept spirits high by setting out a thorough plan of operation for the group.

02

Scrap the Skyscraper

Mentors' comments on Scrap the Skyscraper

The inspiration of "Scrap the Skyscraper" came from a study of the master plan in parallel with the concerns of the people living in Rothenburgsort. The HafenCity is a new district planned top-down by the city of Hamburg on empty ground that was formerly used for harbor activities but became fallow after the shipping industry switched to containers. At the eastern tip of the HafenCity, this development reaches an area in direct neighborhood of existing living quarters. On top of that, the top-down approach of planning is proposed due to densification of the living quarters in Rothenburgsort. The strategy has, of course, opponents among the residents in this area.

The group tried to identify various concerns and presented an alternative to the plans made by the city. Their proposal carefully works with conditions at the site and an alternative process of transformation is introduced. The existing remains from industry will be transformed to screen walls and facilities for creatives to meet. In interaction with the community, temporary pavilions will be designed, evaluated and erected together with locals. Thus, a bottom-up strategy to develop the area is suggested which may well conclude that a skyscraper is not what the residents living close by desire.

Description of the context of the project

Historically Elbbrücken ("Elbe Bridges") was a part of the Hamburg harbor area for a long time. There was an industrial area on the western side of it and a living area on the eastern side, Rothenburgsort. When the sizes of the ships increased over time, it became impossible to use narrow canals in the center of Hamburg, so a new harbor was developed. The decision was made to revitalize part of the old port area and the HafenCity 2025 master plan was devised. The first building phase started at the beginning of 2000. In this master plan, a group of 200-meter high-rise buildings are planned to be built in the Elbbrücken area.

Socially Elbbrücken is the area between the developing high-class district of HafenCity and the low-cost residential areas of Rothensburgsort and Veddel. This area has been used for transition where most people do not stop. Currently, not many tourists and locals take a break there for the pleasant view while passing by this area using the bike path. The area has been occupied by some young generation artists from different ethnical backgrounds in the last few years.

Structurally and architecturally The area is surrounded by the Elbe river on three sides and there are many bridges in the proximity. The noise is very distinctive in this space, with a lot of industrial structures, roads with wide lanes and railroads with high traffic. The place looks like a node of different transport ways and only very few parts of it are comfortable enough for a passing person to stay. There are residential buildings on the eastern side and a large HafenCity construction area on the west.

Description of the site and the direct surroundings of the project

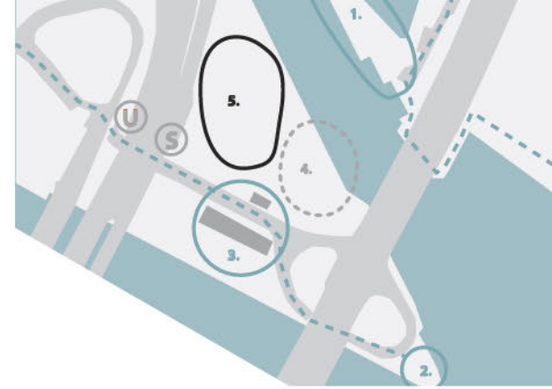
Infrastructure The site is shaped like a triangle and there is wasteland in the center of it, which is used as a container storage place. There is only one three-floors brick building in this area. A highway, some winding secondary roads and a railroad go through the site, making it noisy. There are some green and quiet places that can attract people—to the east of Rothensburgsort and at the northern part on a tongue pier. There is one bike road, which runs independently.

Missing links The industrial area and site set HafenCity, Rothensburgsort and Veddel apart, making the difference between these districts even stronger. The highway and railroad go through the site, creating transport links between the northern, southern and western parts of the city for people using cars and the subway. Still, there is no comfortable link for cyclists and pedestrians between Rothensburgsort and the part of HafenCity that is located to the east of the site.

Utopian potential The site can be used as an in-between area for HafenCity and Rothensburgsort and as an attraction point for the people from these districts before the subway and tram stations open in December 2018. In future, when the stations are open, the site can attract and gather people from different parts of Hamburg.

Description of the thematic focus, goals and motivation of the project

Conceptional idea and development In ten years, a new transport hub and a skyscraper will be built in the Elbbrücken area.



However, people who live nearby in Rothenburgsort will be affected by this plan, as the prices will increase and a shadow of the skyscraper will loom over their houses. Thus, this project aims to link HafenCity and Rothenburgsort and proposes a three-phase strategy to transform the area as an ever-growing attraction point for the public.

The first intervention starts at the tongue pier (1) and the cape (2). Today, this area attracts the inhabitants of Rothenburgsort with its pleasant scene and some artists with its artistic graffiti ruins of walls. We propose to transform this project through small art interventions. At the same time, the Rothenburgsort community will be responsible for the ongoing future events in using the old customs building (3) as a community center.

In the second stage, between December 2018 till 2020, the community will be organizing events—not only music and art events, but also architectural design events. These events will give an opportunity to create participatory designed temporary pavilions (4), which can be redesigned every season and can be used in different ways.

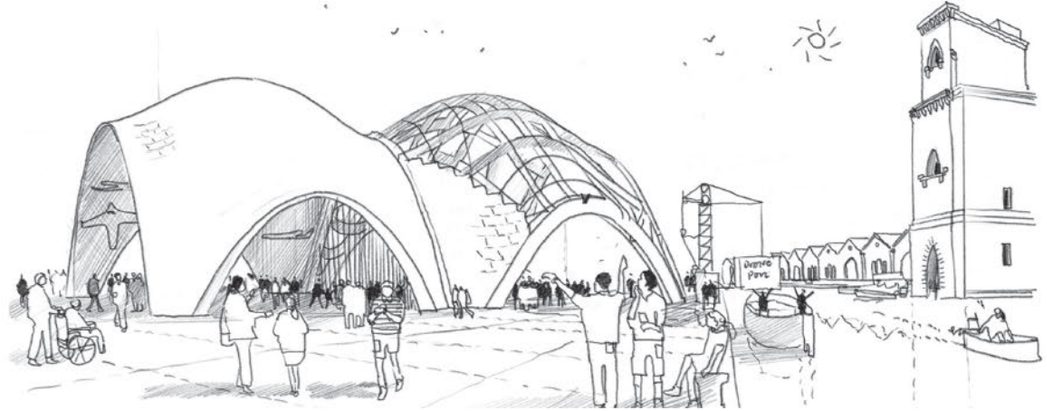
In the third stage from 2020 till 2025, permanent construction (5) for the events can appear on the site instead of a skyscraper, if this place has the aim of attracting and gathering people.

Kai's comments on B.I.S.S. 2017

It is always a pleasure to participate in the B.I.S.S. with its friendly and also ambitious atmosphere. The compressed nine days were filled with nice chats, professional discussions and focused working. This combination led to the fantastic output that was produced by the student groups.

The mentor setup is great to experiment with the workshop format and try various teaching approaches. As mentors, we are still learners and learn from the students' feedback and reflections, the experts' critiques and, of course, the partner mentors. This year, I shared the mentoring job with Imke and Veronika. Their insight, personality, and professional background, coming from other disciplines than myself, helped me to explore various takes on hosting a workshop.

The introduction of the PhD symposium was a nice possibility to exchange experiences with fellow researchers on a different level and to talk about their methods used in science. Meeting in an interdisciplinary context reminds engineers that there are not only technical aspects of a problem to solve and, on the other side, it gives them the opportunity to make architects aware that they are not the focal point of the universe and research is a multi-faceted process with contributions made from all sides.



Description of the final design

Utopian idea We propose our final design as a bottom-up community-engaging project which will be put into practice through the transformation of the current customs building in the site as a community center. This project aims to gather expert and non-expert locals to engage with the site and with each other, facilitating collaborative outcomes. These outcomes are the decisions of which events will be run and the temporary shells that host these events in different time periods of the year.

The link Both the community center and the temporary pavilions will link different levels of the society. While the Elbbrücken itself is already gathering low density of people through artistic events, the existence of workshops and temporary roofs for festivals and events will increase the density of the community. We believe that this gathering can transform the area as a cultural complex instead of a high-rise building that will serve the upper class and only create shade for the lower class.

Implementation of the link We propose to use interactive hanging chain models as a method for collaborative decision-making. The reason we chose hanging structures as a method is both their interactive nature, its enabling to visualize the ideas and its guarantee to find a structurally stable form. These models will be implemented through the workshops in the community center four times a year. At the end of the workshop, one proposal will be selected via public voting and constructed with the experts.

The most important details and characteristics of the project

Strategic approach Our proposal is based on a strategic approach towards urban planning, which allows the site owner and city authorities to act in a changing situation. This undervalued attitude comes handy in locations with undefined or hard circumstances, compared to a plan which is solid for 20 or 30 years and still claims space for part of an infrastructure no longer needed by society.

Community participation Therefore, participation of local community in design and decision process regarding the site in question is vital to its success. It is an easy task to create another picturesque landmark from shiny glass and concrete, but to work together in creation of a space that functions well within the community is harder.

Social impact The most important part of our proposal is the social impact on two communities—locals who feel invaded by high-class neighbors and newcomers in HafenCity who are searching for a home there. By creating a hub where both fractions can integrate, we aim to save the site from a monstrous skyscraper and give it back to the public for good and beneficial use.

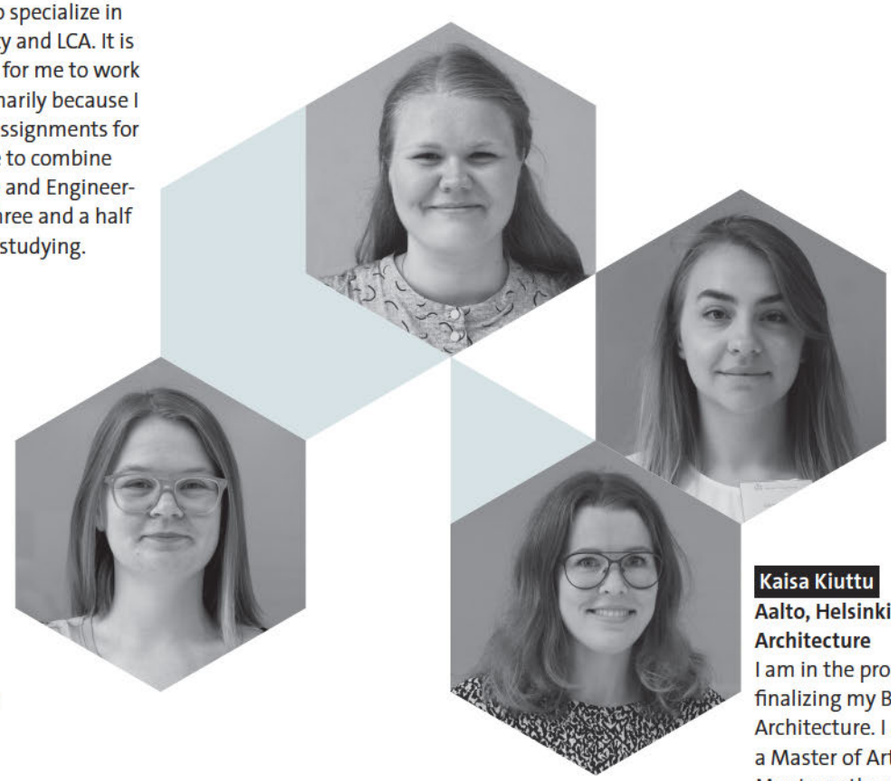
Mentors' comments on Next Level Biking

The unpleasant solution for cyclists fueled the development of the project "Next Level Biking." Today's situation for cyclists and also pedestrians is unsatisfying because various bike paths that connect to the area are disbanded and the cyclists are forced to either ride on the busy streets or on a shared sidewalk with pedestrians, which is too narrow and thus results in dangerous overtaking. To solve this problem, the proposal separates the bike lanes from the other traffic and enhances them.

The group explored various concepts of how the bike lanes could be arranged throughout the area—string-like, linear paths as well as surface morphology were discussed. In the end, a more adventurous approach was favored that sends the cyclists on an exciting ride. It has two key features: everybody uses his or her own bike which can be hooked to a wagon Device. This device stores energy from going downwards and releases it going upwards. This enables cyclists to cross the area faster, with less effort, but more fun. The design of the wagon device iterated to become more simple and easier to use. A further development seemed promising to get the most out of the concept but unfortunately the group could not take all considerations into account, due to the narrow timeframe of the summer school.

03

Next Level Biking



Amalie Nielsen
DTU, Copenhagen
Architecture and Engineering
I chose to study Architecture and Engineering because I wish to make a difference in the world. I would like to specialize in sustainability and LCA. It is not unusual for me to work interdisciplinarily because I often have assignments for which I have to combine Architecture and Engineering. I have three and a half years left of studying.

Agnes Nerelius
Chalmers, Gothenburg
Architecture and Engineering
I studied both Architecture and Engineering and have often combined the two disciplines within the same project, thus I am already used to working interdisciplinarily. Furthermore, I have been focusing on Design and Construction Management for one and a half years within the scope of a master's degree, so have knowledge of how you manage interdisciplinary groups.

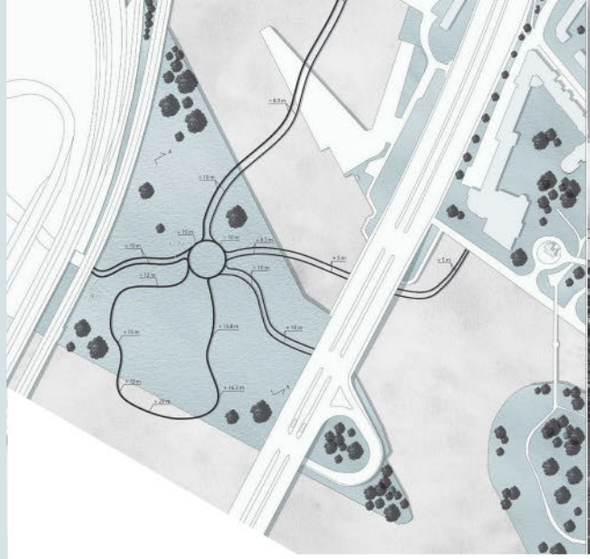
Iga Nowacka
GUT, Gdańsk
Architecture
In the first phase, I discussed and brainstormed different concepts together with rest of the group, searching for solutions on how to solve problems. Good sketching skills helped in creating preliminary posters. After reaching the final solution for our project, I used Photoshop skills to create graphics for the posters.

Kaisa Kiuttu
Aalto, Helsinki
Architecture
I am in the process of finalizing my Bachelor of Architecture. I also have a Master of Arts degree. My strengths are an open-minded attitude towards new ways of thinking and a good understanding of the society and the people who are the end users of the architectural projects.

Veronika's comments on B.I.S.S. 2017

Having previously participated in B.I.S.S. as a student in 2016, I gained a new perspective of the summer school as a mentor. As mentor, it was my role to guide the students and raise their creativity during the summer school. This year, I shared my role as mentor with Imke, stepping in halfway through the workshop. Following up towards the development of concepts and final schematic presentations, I pursued our original workshop strategy in continuing to inspire and assist students to develop their designs and rationalize their concepts in greater detail, through the lens of Design Thinking. Having learned the previous year, I was aware of the format of B.I.S.S. and could therefore advise the groups about their opportunities and the expectations at the final presentations.

I was very pleased to be a part of B.I.S.S. again, to have met and engaged with other mentors before and during the summer school. Personally, through B.I.S.S., I have been able to establish a direction for my career as an architect by making connections and relating to others at B.I.S.S., and also having gained more understanding about research in the field during the PhD symposium. I was delighted with the outcome that our student groups presented, although I had brought a fresh outlook which tested their initial concepts and ideas midway, challenging them as groups. They worked professionally and welcomed me as their mentor despite the change. Furthermore, I was very glad to work with Imke and Kai who both brought edge to our topic with their specialism and knowledge and, given our like-mindedness, I felt confident to work with them both, throughout.



Description of the context of the project

Historically We started by investigating the area and found out that the infrastructure for pedestrians and bikes was missing. Our goal was to make a bike path on which you could bike from A to B and make an experience out of it. During the design phase, we spent a lot of time designing an idea and optimizing it. At some point, we took a step back and found it too "safe." Therefore, we changed it and went to the other extreme by making a future bike path that would be elevated above the ground.

Socially Cycling often has a positive effect on people's health and mood. Besides being a good way of exercising, it's also a good way to create a social life. A new link for cyclists that connects Rothenburgsort with the central part of town and to the new stations that will be built in the area would make the site much more accessible and it would stimulate the social potential of the area.

Structurally and architecturally Today, the site is very bare and its main features are the large roads that frame it on two sides and the water that encloses it on the other sides. So the proposed structure would have to be strong in its architectural language not to be overshadowed by the large pieces of infrastructure that act as its backdrop.

Description of the site and the direct surroundings of the project

Infrastructure The site is framed by water to the north and south, train tracks to the west and a motorway to the east, so it is surrounded by different kinds of infrastructure. Furthermore, they are in the process of constructing a station for the S-Bahn and the U-Bahn on the outskirts of the site and this station in combination with the bus stop on the motorway will make the site an infrastructural node in the future.

Missing links Even though the site is or will be connected to the bus and train systems, it still misses a link to the bike paths in the area. The existing cycling routes around the site are highly fragmented and do not function properly. The large bike path connecting Rothenburgsort with HafenCity is located just north of the site, but the link between them is missing.

Utopian potential The site will be a transportation node in the future and this brings with it many new opportunities. When the new stations are opened, a lot more people will pass by and stop at the site on a daily basis and this is a great opportunity to develop the location and turn it into a welcoming part of the city.

Description of the thematic focus, goals and motivation of the project

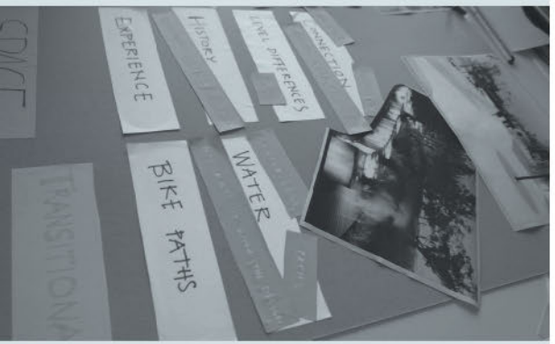
Conceptional idea and development Our main idea was to create a link that was both transitional and an attraction in itself. Initially the idea was to create an ordinary bike path that could also host other functions, such as a pool. But this idea was developed and turned into a more spectacular solution, a rollercoaster-like structure, that would be both much more of an attraction in itself and a transitional space that would give the passerby an added special something.

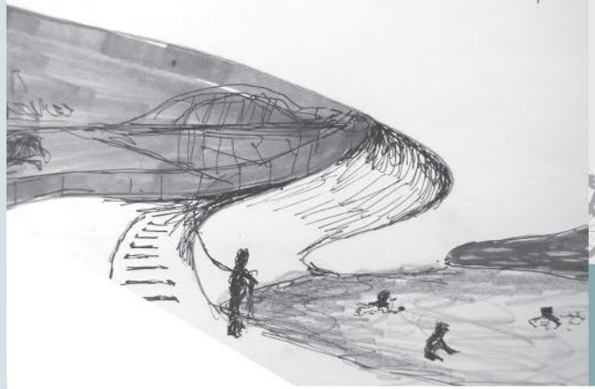
Interpretation of "link" We understood the term link in a very literal way and identified an infrastructure link that is missing. This link is not only a physical connection, it is also a social link that will reduce the gap between HafenCity and Rothenburgsort. Our bike transportation system is also a link into the future since it explores potential developments of cycling systems in cities.

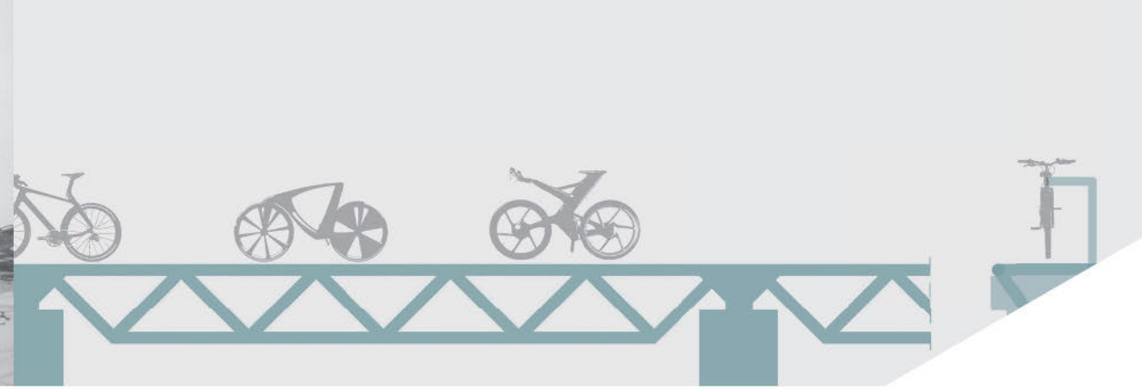
Imke's comments on B.I.S.S. 2017

This third edition of the B.I.S.S. has been my first time participating, and I would like to emphasize that is has been a pleasurable, meaningful and fulfilling experience. As I was brand new to its format and expectations, it was beneficial to be teamed up with a fellow mentor with previous experience. It's been interesting to develop a workshop strategy together, stemming from different professional backgrounds, and then to roll it out over the course of nine days.

I shared my mentorship role with Veronika, with me covering the first five days of B.I.S.S. and Veronika taking over the remainder of days. During the days of my attendance I found that students with various backgrounds may collaborate very efficiently and effectively when stimulated to be open-minded and interested in each other's views. B.I.S.S. offers a unique opportunity for this, and such experiences, I believe, are very valuable to all of those wishing to enter the multi-disciplinary building industry. As a mentor, it has been very fruitful to engage with other mentors, who are mostly researchers and/or practitioners from related fields. New relationships have formed, ideas shared and potential collaborations in the future nurtured.







Relevance for future cities The project starts to tackle the concept of making biking more attractive as a mode of everyday transportation. As many cities are aiming to reduce the number of cars and increase the usage of bikes, our project touches upon one possible solution of how cycling can be made more interesting by changing the way we bike and what types of routes we bike on.

Description of the final design

Utopian idea We wanted to create a node that was not only for the people traveling by trains and busses, but also for cyclists. Our idea was to create a futuristic roller-coaster for bikes that would encourage people to use the bike due to this new take on a bike path. The robotic arms attached to the path and the bike would even make this form of transportation easier than ordinary biking.

The link The new bike path is connected to both of the surrounding bridges and also to the main cycle road that goes from Rothenburgsort along the water into the city center. With the future expansion of Rothenburgsort, this link will become even more important and our biking structure will connect all the points in the area that are now unconnected.

Implementation of the link This new type of bike path system that we have created will not only connect the as yet unconnected parts of the site, it will also kick-start the process of innovating cycling roads and how they function in the city. Our biking structure, in combination with its excellent location near one of the main entry points into the city, will ensure that it turns into a landmark and a stellar example of how future modes of transportation can look.

The most important details and characteristics of the project

Agnes Nerelius In my opinion, the most important characteristic of the project is the question about the future modes of transportation that it raises. We wanted to create a new and more exciting way of traveling by bike that can motivate more people to choose cycling over taking the car.

Amalie Nielsen The project idea was to create a connection that makes it easier for people to get from A to B. It is not always fun to ride a bike, so I think the strength of our project is the experience you get out of your bike trip. You are helped to move along as you cycle the trail and it is therefore possible for you to enjoy the view across the whole Elbe.

Kaisa Kiuttu The essential idea of the design is to create visions of how the future transportation systems could be like. The project suggests a cycling path connected with an entertainment angle to it. The design is also derived from the idea of combining both transitional spaces with the sites one wants to spend time on.

Mathilde Landgren
Mentor

DTU, Copenhagen
MSc Architectural Engineering, specialized in Energy Design. Mainly worked with thermal indoor climate and daylight simulations in relation to design projects. Now working as an Industrial PhD at JJW Architects in Copenhagen in corporation with DTU, with a broader focus on sustainability.

My PhD research theme focuses on developing design methods for Integrated Sustainable Design. The purpose is to emphasize sustainability in the design projects from the very early design phases onwards and to use the certification system DGNB as a design tool.

Through teaching, information is transferred and weighted by the student and questioned, which leads to valuable dialog and understanding from both sides. The close relation to research is a way to keep the interest and intensity of a topic up-to-date, always with new knowledge and next steps in focus.

My expectations for the B.I.S.S. 2017 are therefore for it to be challenging, exciting and fun. I hope the topic of our group will encourage the students to include the approach of sustainability in their projects. Sometimes things that seems like a limitation or an obstacle might be the quality and strength of a project—for example, waste can obtain value as a resource.

Diem Nguyen
Aalto, Helsinki
Real Estate Development
Diem is good with human psychology and that is why she was always making sure that everyone was in agreement as to where the project was heading. Thanks to her, it was easier to understand each other and solve the issues we faced during the project in different ways and thereby take the project to a higher level—beyond just infrastructure and architecture.

Helena Kuivjõgi
TUT, Tallinn
Heat and Ventilation Engineer
Helena is a patient person with a good eye for detail and is excellent at analyzing problems by looking at them from different perspectives. Her calm and friendly personality was helpful in bringing team members closer together and making friends even when the project was over. Thanks to her contribution, our project was finalized neatly and it was a pleasure to work with her.

Niels Christian Jacobsen
DTU, Copenhagen
Architectural Engineering
Niels has a lot of experience in different fields, which he brought into our project, and he is very open-minded. He was our team engineer and kept us on a realistic track, but also kept the creative process going. He is very calm and deliberate—he listens to you and wants to be absolutely sure that he understands you correctly when you're presenting an idea. If the idea is not good enough, he comes up with alternative solutions to improve it.

Kadri-Ann Kertsmik
TUT, Tallinn
Architecture
Kadri-Ann is highly creative and has many good ideas, for which she brings forward sound arguments. She brings good energy to the group and takes responsibility for the project and functions as a leader when needed. Kadri-Ann is also great to bounce ideas off and to discuss with when trying to find solutions and taking the project to the next level. Her background in architecture comes to show in excellent visual presentations and deliverables, which the group benefited greatly from.

Helena Kuivjõgi

First I thought that the B.I.S.S. would be a very formal and difficult project—actually, I was a bit afraid: did I have enough knowledge to participate? But on the first day already, I realized that for the B.I.S.S. it's ingenuity and the ability to grasp the connection between different fields of knowledge this is required, rather than education per se.

04 Do It Differently

Michał Kwasek
Mentor

GUT, Gdańsk
M.Sc. in Civil Engineering specializing in steel structures, M.Sc. in Architecture and Urban Planning specializing in historical objects, postgraduate studies in conservation of architectural monuments.

My research is based on the architecture of historical objects, focused on architecture of the 19th century. Subjects given to the students of architecture in terms of technical fundamentals in object design: building mechanics, general building—building materials, building installations, building structures—metal structures.

My motivation is to improve the ability to recognize things not visible to others, to draw conclusions and make discovering in areas so far unexplored—also to encourage and inspire students to develop their skills in a wide range of fields and to apply them in comprehensive design refined in every detail.

From the B.I.S.S. 2017, I expect to participate in an interdisciplinary design process that will prove that the development of good architectural solutions requires a broad view on it.

Description of the context of the project

Historically The development of the area and a new train station will bring many people with it and will only emphasize the importance of this connection. Accepting the fact that there is a lot of noise from trains and traffic in the area and finding it unreasonable to build something new here, the focus is set on improving the link.

Socially Taking social sustainability into consideration, it felt necessary to look at the surroundings and incorporate some aspects from the recent history of the area. "Mach das mal anders," or "do it differently" in English, was painted in large letters on a concrete wall along the river, and this came to be an inspiration in this project—to look at things from another perspective. Preserving and improving the existing values of the area came into focus and continued to mark the process.

Structurally and architecturally The areas underneath the bridges felt unwelcoming and appeared as dark barriers. Even on a sunny day, the underpasses were dark and did not give the impression of being safe. To solve this issue, the idea came up of integrating the surrounding areas into the underpasses and giving passengers positive emotions when entering the areas underneath the bridges—for example using slogans from the area and highlighting them by utilizing the daylight.

Description of the site and the direct surroundings of the project

Infrastructure The first impression of the site was infrastructure that looked old and worn down, due to the lack of maintenance, cleaning and people in the area. Dust and spiderwebs were everywhere along the pedestrian and cycling road, indicating that it was not being used. Furthermore, there was a lot of graffiti on the wall which local people had sprayed. The combination of these elements meant that the journey for pedestrians and cyclists through the area had an unsafe and unwelcoming feeling to it and invoked fear even if you were just there for a short amount of time.

Missing links There are various problems in the area, but what we came to find was that one of biggest issues, not taking account of the noise, is the dark areas under the bridges. This then becomes a missing link between the city and residential area and the industry and landscape on the other side, because the tunnel itself is a connection for the people traveling through. The darkness triggers a primal fear inside humans—people fundamentally want to avoid dark areas, as they appear dangerous, harmful or unsafe. In this case, the darkness causes an interruption in the connection and plays a role in the missing link.

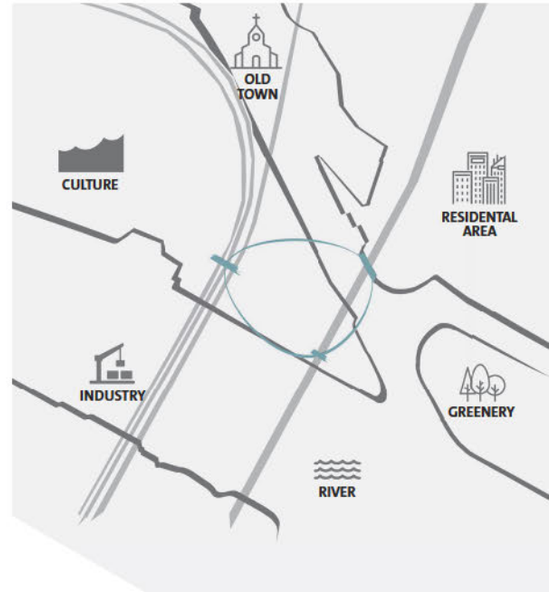
Utopian potential After identifying the main problems as being noise pollution, darkness and a missing connection to the water in the Elbbrücken area, we focused on the darkness as the main problem we wanted to solve. We sought to create a link that connected both sides and to make the underpasses feel safe and easily accessible to everyone.

Description of the thematic focus, goals and motivation of the project

Conceptional idea and development Accepting the fact that the area is meant for transporting people from A to B and not looking to attract people, the focus was on the journey itself. The idea of the project was to improve the existing infrastructure and the link to the surrounding areas and doing that in a way with the least impact on the built environment. It was important to incorporate the social aspect from the present environment and find an environmentally friendly solution.

Interpretation of "link" The current situation of the area is that the vast majority of people passing through travel by car or train. Very few people travel by foot or bike, let alone stay in the area. With the future U- and S-Bahn station and development in the Elbbrücken area, many more people will be walking and biking through the area, which will function as an important link between residential areas, industry and nature.

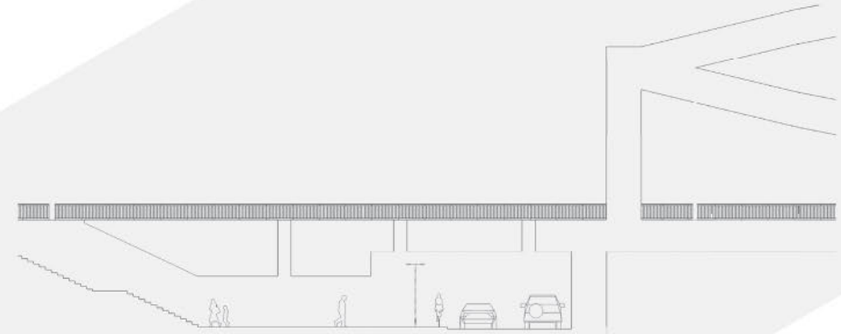
Relevance for future cities This project was focused on improving what was already there and solving a well-known problem, dark underpasses underneath bridges, in an environmental and sustainable way. Using daylight with a minimal impact to the new or existing infrastructure is a low-tech solution, which can possibly help to solve this problem. Thinking about integrating it into a new infrastructure was able to yield much better results than trying to retrofit it into what was already there.



Mentors' comments on Do It Differently

Three groups of students were included in the mentors' group "THE SUSTAINABLE LINK—the haze of the past in the future"—group 4, group 5 and group 6.

Group 4 was an optimal interdisciplinary group, having both architects and engineers from different fields and nationalities in the group. All through the summer school, the group showed an interest in cooperating and getting to know the interdisciplinary approach. This meant difficulties and hard work communicating, but they improved along the way and all four can bring this experience back home with them.



Description of the final design

Utopian idea Having the dark underpasses being comforting and inviting spaces rather than intimidating areas to avoid or get through as quickly as possible and doing so in a way that caters to the surrounding area and history, respecting what was/is there and the people who use and live in the area, instead of disregarding the past and paving over existing culture to make room for the future.

The link Transforming a part of the existing infrastructure for pedestrians and cyclists from an unpleasant, dark and unwelcoming area into an interesting, brighter and cultural place with influence from the surrounding area. This will also support the use of sustainable transportation by creating comfortable traveling for people on foot or bike, letting people know that it is safe to walk or ride their bike in the area.

Implementation of the link The light tunnels that are to be installed in the existing bridge will improve the daylight in the tunnel and staircase and do so in a way that does not require many resources or produce much waste. By not using artificial light, this is also a solution that considers using nature as a resource and draws on as little energy as possible.

The most important details and characteristics of the project

Accept what is there We accepted that there is a lot of noise in the focus area and that it belongs there. It is an area where people don't want to be for longer periods of time and we chose to embrace and work with that. Therefore, our idea was to improve the site's function as a link between surrounding areas so people can easily and as comfortably as possible make the journey through the area.

"Mach das mal anders" DO IT DIFFERENTLY—this was spray-painted in large letters on a concrete wall along the river and this came to be an inspiration in this project. In all our thoughts and in the way we approached tasks, we tried to look at things from a different perspective. The mantra became: it is not always necessary to build new houses, streets or landmarks to attract people. Sometimes what the place needs is more sympathy and embracing the culture and history—zoom out and then zoom in again, analyze and try to find the special features and look at it in its natural form.

Sustainability This project is focused on minimizing the impact on the natural environment and using very little energy in doing that and in everyday usage. Furthermore, social sustainability was important and incorporating it into the solution became a priority. Using existing objects and the surrounding environment—an old bridge modified for safer travels—and finding inspiration in the area, resulted in a solution for the darkness problem underneath bridges by allowing more daylight to shine through and minimizing the use of artificial light in the process.

Mathilde's comments on B.I.S.S. 2017

B.I.S.S. '17 was yet another inspiring summer school for me. As a young researcher, you are not always confident in your own work and capabilities, so working closely together with the students and having their feedback means a lot. I got an insight in the interdisciplinary difficulties and qualities through the group work of the students, which inspired me to further focus upon interdisciplinary work and this difficult communication among architects and engineers.

The mentor's group was rather interdisciplinary in itself, consisting of an architect focusing on history and an architectural engineer focusing on sustainability. To include the two fields, a mapping tool was used by the students during site visit. Otherwise, a more iterative process was emphasized to ensure both history and sustainability were included and implemented during the entire process.

During my own work, mapping has been a tool used in many shapes for many purposes, so the tool in itself is not new to me. However, the awareness of historical elements and including these in the development of sustainable solutions took me a step further. What is most important is the different disciplines' openness and respect towards each other to be able to communicate and develop projects.

From my point of view, B.I.S.S. 2017 was overall a success, with good input through keynotes and "Food for the day" lectures. All students seemed to get along with each other and within the groups. As always in summer schools, some students participate for fun and others want to acquire more knowledge about the topic, but despite the different approaches, I think the students succeeded in cooperating and achieving good final output. Not all students managed to create interdisciplinary groups, but those who did, had their difficulties during the process and at the same time, their feedback was that they had learned a lot. The students learned about

05 HafEndSoul

Beatriz Campos

The B.I.S.S. gave me the opportunity to work with people coming from a range of cities. This situation is similar to most of the professional conditions, where people with different backgrounds need to work with each other and develop a project successfully.

Lisanna Remmelkoor
TUT, Tallinn
Architecture
The photographer of the group, always ready to take useful pictures. Our time manager who pressured us to finish on time without neglecting the quality. An expert in Photoshop and layouts.

Katrin Vilberg
TUT, Tallinn
Architecture
The most productive of the group, always coming with good ideas. Great analyst of the current situation and future development. She was responsible for the schemes and kept the group work fluent.

Pietari Sulonen
Aalto, Helsinki
Architecture
Finnish man who is really into conceptual thinking and technical details. He is a clever person who likes to find solutions to the problem or problems to the solutions. Responsible for making the model come true.

Beatriz Campos
HCU, Hamburg
REAP
The "local one" (although she comes from El Salvador), our knowledge source of HafenCity and Hamburg. She was responsible for delivering our ideas to the experts. Adept at doing research and writing text.

their own discipline in the context of others and about which strengths and weaknesses are involved in the process.

Mentors' comments on HafEndSoul

Group 5 was not as well mixed as intended, having four architects from two different nations. However, the group learned that despite the same profession, they had different methods and approaches, which had to be communicated and tested. The lack of variety in background might be the reason for the limited or more simple discussions as well as the final output.

Description of the context of the project

Historically The site is located between HafenCity to the west, Rothenburgsort to the east, the Elbe river to the north and south. The whole area of HafenCity, including the site, was part of Hamburg's port and warehouse facilities. However, with the inventions of bigger container ships, the area was no longer suitable and became an abandoned part of the city. At the end of the 90s, the city decided to build a modern development in this area: the HafenCity.

Socially The HafenCity attracts people from all around the city as well as tourists with its many points of interest such as the Elbphilharmonie, modern parks by the water, museums and other modern buildings. Rothenburgsort is a simple place; the Elbpark attracts people living nearby.

Structurally and architecturally The planned development of HafenCity is characterized by modern architecture that accommodates offices, housing buildings and commercial uses. Open spaces in closeness to the river are also found in the new development. Rothenburgsort's architecture is mostly modest, accommodating industrial and housing buildings.

Description of the site and the direct surroundings of the project

Infrastructure In the area, a red brick building—a very typical construction for Hamburg—is located in the south. A customs office uses this building. In the north, some containers can be found as well as a small Turkish club. Two main bridges—a highway and an S-Bahn railway—connecting the north with the south of the city passes through the area.

Missing links Despite the closeness to the river, there is no real interaction between the land and the river. The barriers between the land and the river might be a result of the high risk of floods. There are no proper pedestrian and bike lanes connecting to the other areas. Despite the great location, there is no connection to the areas around the site.

Utopian potential The city of Hamburg proposes in its plan a complex of high-rise buildings in the north part of the site. The development of HafenCity also includes many residential and office buildings west of the site and a new U-Bahn and ferry station. Yet the high-rise buildings don't blend in with the city's character, therefore we reject this proposal.

Pietari Sulonen

B.I.S.S. gave me alternative ways to view the occurring problems, find the solutions and further question these solutions. The summer school also allowed me to practice my teamwork skills (... and spoken English!).

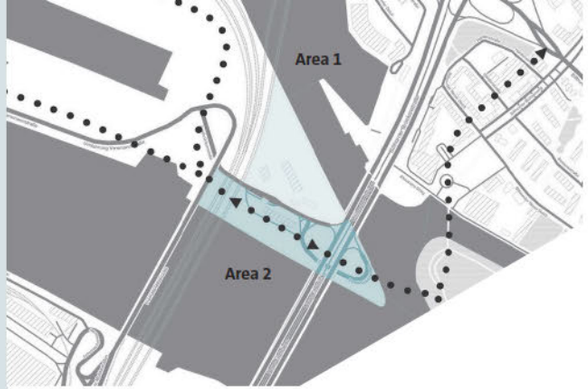
Michałs comments on B.I.S.S. 2017

Participating in B.I.S.S. allowed me to be a part of a great community of young researchers, who wanted to use their expertise in interdisciplinary work. It became truly valuable and engaging for me both pedagogically and creatively. Being a mentor for groups which consisted of people with different strengths and skills made it possible for me to be a part of an ongoing "brain storming" lasting throughout the whole workshop. It was fascinating to see the process itself.

Extremely important from the mentors' point of view was being able to visit the plot that we were working with. It is always essential in every designing process, but taking into consideration aspects of sustainability and history of the place, it would not have even have been possible to start with it. During the whole process, mentors set a schedule (visible for everyone throughout the period). Every morning we indicated the most important checkpoints of a day. We conducted discussions and presentations of the design's progress. It occurred within the small project groups and in front of all the people working on the same main topic.

Working at the university, I'm not usually a part of my students' designing process. I work with them to find the best technical solution for their ideas that should be easily implemented. It was something new for me to participate in the process as a teacher and to see how different groups struggle with different ideas to pick up the best ones, to use their knowledge and former experiences in group designing. I think that it will help me to improve my ability to reconcile the various positions during the complex process of architectural designing.

It was the first time for me to participate in the summer school as a mentor. However, I can easily say that the way the workshop was conducted was great from an organizational point of view. I like the concept of a few groups working on one mentor's subtopic. I'm glad that the groups were



Description of the thematic focus, goals and motivation of the project

Conceptional idea and development The purpose of this intervention is to attract people from both quarters, HafenCity and Rothenburgsort, to come together in this area. To do so, a unique proposal is required; one that is innovative and that can adapt to different scenarios within the character of the city of Hamburg. The site is divided into two main areas; the focus is the southern area.

Interpretation of "link" The lecture by Rolf Kellner on the second day showed that there was a missing link between the districts Rothenburgsort and HafenCity. Our aim in the project was to establish the link by creating a space between two bridges which could be attractive to both users. The roads for cars were cut off and the bicycle lane projected to create sustainable urbanscape and link citizens of Hamburg.

Relevance for future cities Many cities of the world that are situated near a river have polluted their waterfronts to the limit of being unattractive to citizens. Our project shows how this issue can be dealt with by making the river not only tangible but also a place to swim in. Proposed filtering solution with floating platforms can be adaptable to any kind of reservoir to create a valuable space and reconnect people to water.

Description of the final design

Utopian idea For the northern area, a flexible open space is proposed for any kind of social event from summer festivals, food trucks, sports events, flea markets, Christmas markets and others. To maintain the character given by the bridges, the place holds adaptable containers that can easily be arranged for the different events. In the southern area, the main intervention consists of creating a pedestrian promenade. This platform outlines a swimming or ice skating space, depending on the season. The whole system adapts to the river flow and tide. Sustainability is another important aspect of the project: social inclusion and interaction of the residents from the nearby quarters are intended with environmentally friendly solutions at the core of the intervention—economic opportunities for small businesses are to be created.

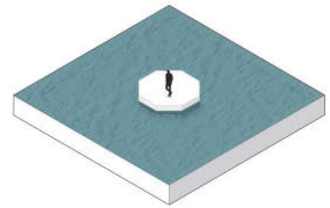
The link The diverse interventions will connect the area to the surroundings. Special attention goes to pedestrian and bike users.

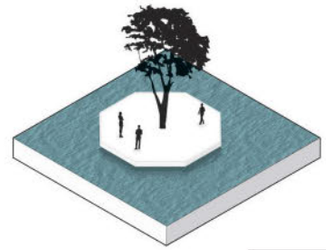
Implementation of the link The pedestrian and bike promenade is a floating platform that extends from the planned promenade of HafenCity into the Elbe river and then connects by bridge to Rothenburgsort. User flow is also possible by the Zweibrückenstraße, which works only for pedestrian and bike transit.

Tackling noise The two bridges surrounding the site bring a high noise level. Due to the difference between the level of the bridges and the level of Area 2, the noise levels are lower. Greenery will be placed to absorb this noise. A net going from the bridges towards the existing buildings could host hanging plants. These plants will not only reduce the noise but will also block air pollution from coming into the area by cleaning the air. Plants such as celastrus scandens, humulus lupulus "aureus," schisandra chinensis, hydrangea petiolaris and parthenocissus quinquefolia could work well in this concept.

Embracing water The Elbe river shapes the city of Hamburg physically, economically and socially. It is the most prominent element within the site and yet no function interacts with the water. The water level is constantly changing, therefore the proposal needs to adapt to the river's motion, as it should also respond to the water flow. Therefore, the platform is made of floating modules—from reprocessed timber-waste—that connect with each other with turning knots. The platform itself is connected to land by adjustable platforms that adapt to the water level. This promenade also outlines a blue space for swimming or ice skating, according to the season. A filter system cleans the water from the river and lets it into the area. An expandable membrane lets the water out by an osmosis process. This way, the water is in constant flux.

working under the guidance of two mentors, instead of one. It was easier to organize the work. Even between two of us there were differences of opinion sometimes. It seemed to be inspiring for students and for us. I think that the visits of experts were also important checkpoints during the designing process. I noticed that the largest group of students was studying architecture. Thus, the idea of creating the interdisciplinary groups could not be accomplished in every case. I also think that even if the subtopic of our mentor's pair could be implemented into the main topic, it was a really difficult task for students to do it working on the given plot. I liked the "Food for a day"—one of the biggest assets of the workshop. The ambiance was great in every combination: between mentors, mentors and students, students' groups and what is important between them and the organizers. It was an intense time for everyone, but in my opinion well worth spending it in Hamburg, working in the international community.





Dan Palarie

It was a good challenge to find solutions to a very demanding site in such a short timeframe. I believe I have also learned how to be a better listener as well as a leader. The B.I.S.S. helped me to discover new visions and concepts for my future thesis and career.

Dan Palarie
Aalto, Helsinki
Architecture
Dan is able to look at a problem from different angles. With a broad knowledge and interest in the historical context and a strong belief in contemporary architecture, Dan makes sure no stone is left unturned.

Priit Rannik
TUT, Tallinn
Architecture
Priit is a person who makes things happen. With a broad knowledge in virtual design methods, he creates widely diverse designs for any given task in an instant. He is a big loving bear with an even bigger heart, always making sure everybody is in a good mood.

Ola Sjöberg
Chalmers, Gothenburg
Architecture and Civil Engineering
Ola is a natural born leader with one foot deep in the architectural world, the other firmly rooted in a broad knowledge of engineering. He sees the potential in people and makes sure he brings out the best in them. Always in a good mood, showing up to the table with coffee and a lot of new and innovative ideas.

06 Social Link

Mentors' comments on Social Link

Group 6 was an interdisciplinary group, having one architectural engineer and two architects, all of different nationality. From the start, they showed dedication to each other and to developing design concepts, however, they had to struggle to keep up the energy and engagement to take the project further from concept to product. Their focus on lifting the main concept of the mentor's theme was strong all the way through, which also led to their final output being chosen as third place by the juries.

All in all, the three projects were very different, each navigating their own way through the process. The students had times when interest in the project was low, but they all ultimately found it again and produced high-quality products.

Description of the context of the project

Historically Historically, the site was used as an industrial port for both storage and transportation. Meanwhile, with the enlargement of the city, it has become one of the most strategic areas in between the old town, the port, local residences and offices. However, because of its change of function and uncertainty, the site became a non-space that does not relate anymore to its original functions. It is crucial to integrate the old heritage of the past, which included port infrastructure, mobility, cranes, flux of commerce and transportation network as well as office systems in the new upcoming architecture.

Socially Aggressive socio-economic changes surround the site, which is why in the last few decades, it has become immersed by a huge array of social groups. In the north, we have the city center with its daily changing influx of visitors and workers; in the east, we have the traditional working class with its residential houses and offices; in the south there is still the industrial port and finally, from the north, we get the new upcoming visitors, residents and users of the new development that is HafenCity.

Structurally and architecturally The main architectural objects on the site are the existing customs office, the new upcoming U-Bahn station as well as noticeable transportation infrastructure including metal bridges and fast roads as well as sharp edges to the surrounding waters. Lastly, there are several more elements like containers for local small offices as well as a Turkish club.

Description of the site and the direct surroundings of the project

Infrastructure The site for the project was located in the eastern part of HafenCity, the still undeveloped area between the highway and the railway bridges. Our team focused mostly on the northern part of the described area, especially the part on the water between the HafenCity and Rothenburgsort area. In the water, we saw great potential to use the main characteristics of Hamburg to create strong links between areas.

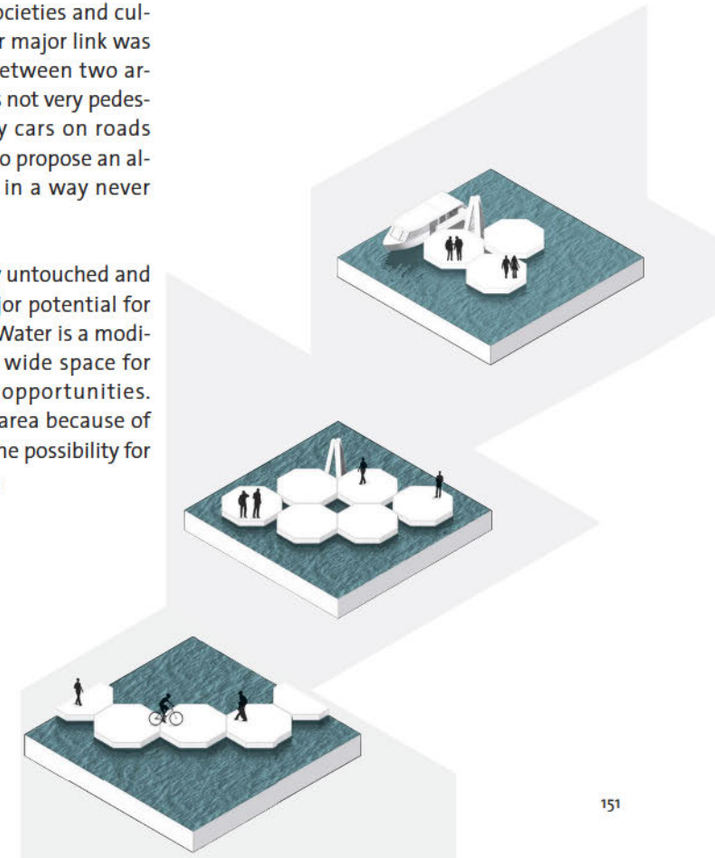
Missing links The missing link between HafenCity island and Rothenburgsort was the foundation for our final product design. We focused mostly on social links, links between different kinds of societies and cultural backgrounds. Another major link was the physical connection between two areas. The current situation is not very pedestrian-oriented, it's mainly cars on roads that are seen. We wanted to propose an alternative connecting link in a way never done before in Hamburg.

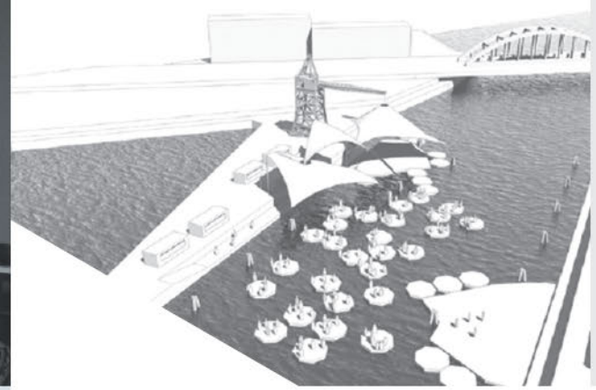
Utopian potential Mostly untouched and undeveloped area has major potential for the utopian environment. Water is a modifiable element that gives wide space for playfulness and various opportunities. Noise that is heard in the area because of the trains and cars grants the possibility for a utopian temporary space.

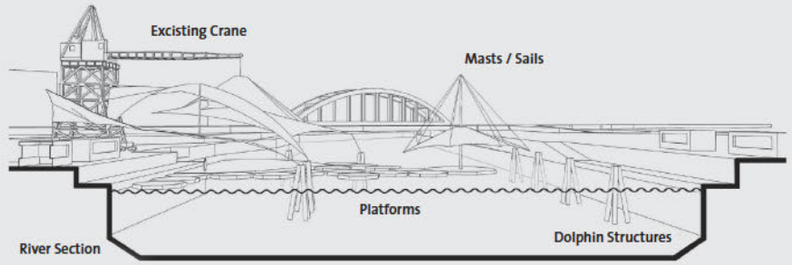
Description of the thematic focus, goals and motivation of the project

Conceptional idea and development Because of the noise levels and the non-space character, the main focus of our proposal was to give life to the space and to populate it with a new function as well as keep it modular for all the different actors that surround it. Besides the strong architectural languages used, we also established a stronger connection between historical context, existing functions and the waterfront.

Interpretation of "link" A major role is played by the existing elements like cranes, river, topology and users, so we are trying to optimize and reuse the existing elements by generating minimal impact on the area. The three key concepts are social sustainability, modularity and transformation. Thus, with this concept, we try to achieve an entirely new socio-architectural link between all the elements at both urban and







macro level. By bringing these values together, we do not just shape the space, but help the space shape us.

Relevance for future cities Today, in an age of fast urban development and acute transformation, residents and users start to lose the connection with the built environment. The same principle is veridical for Hamburg and the new HafenCity area. Our main aim was to create a modular and adaptable space. With the fast change of places, people are less and less attached to a place, thus our aim was to bring a high level of mobility and adaptability in order to accommodate new users as well as create a connection to the local environment and historical context.

Description of the final design

Utopian idea Our design's utopian potential consisted of making a space for people, an area to be and to go to. The main idea was to revive the area with activities for everyone. Space would be adaptable by the function of the activity and not by having fixed functions all year around—great temporary architecture and urban space for all.

The link The two main links our project would create in the area are a social and a connection link. The area itself would work as a link for different actors and communities. The area would work as a two-in-one link, a social and connecting link in one.

Implementation of the link The key element for making the link was using different kinds of pontoons and platforms. A different variety of platforms and formations would create strong adaptable links for the area. Covering some fixed platforms supporting movable platforms together with historic dolphin structures creates a strong conceptual unity.

The most important details and characteristics of the project

Modularity Modularity is the degree to which a system's components may be separated and recombined. We used it as our project's main element: an adaptable and reorganizable system of movable platforms for creating strong links.

Social interaction Through a changeable platform system, the area works as a link between HafenCity and the rest of Hamburg. It creates social space for different actors.

Cranes and dynamic sails Cranes play a major role in our project character. They serve as a historic link to Hamburg's history and traditions. Adding modern value and purpose for them with dynamic sails, they form a new symbiosis for the city.

Martin Kohler,
Mentor

HCU, Hamburg
Martin studied Landscape Architecture at Hanover's Leibniz University and the South Australian University in Adelaide.

His research focuses on open urban spaces in a comparative international perspective and the use and potential of neglected spaces in urban agglomerations. He also specializes in urban photography and visual anthropology. Today he teaches disciplinarily and interdisciplinarily in the fields of urban planning, urban design as well as "urban photography." His special interest lies in urban processes and informal planning. He gains his motivation out of the engagement and enthusiasm of the students. At the outset of B.I.S.S. 2017, he looked forward to discussion and collaboration between students and teachers from many different backgrounds on one of the most distinguishing factors in Hamburg: the water—city relationship in the port area and beyond.

Daniel Innes

This has helped me to learn to be more patient when hearing others' ideas as well as my general ability in asking questions. It has also shown me quite how much is possible when a team has good energy and collaborates effectively.

Daniel Innes
Aalto, Helsinki
Architecture
Dan starts his designing process with drawing and creating a system. After that, he tries the first concept in different scales and areas or zones. The main goal of his methods is to understand a situation or a system in a variety of ways; he also uses a wide variety of media.

Darius Narmontas
KADK, Copenhagen
Architecture
Working both from the theoretical and conceptual perspective, Darius uses various digital methods and parametric tools in order to analyze the given problems and work towards establishing the initial ideas and realizing them.

Raimonds Bogdanovičs
RTU, Riga
Heat, Gas and Water Technology
Raimonds wants to define a specific problem and then find practical solutions with the aim of improving environmental and life conditions. He uses computer programs combined with logical thinking and analyzing abilities to achieve this aim.

07 08 09 Unter Hafen

Jan Suchorzewski,
Mentor

GUT, Gdańsk

Jan studied Civil Engineering at Gdańsk University of Technology till 2014. At the moment, Jan is working on his PhD in experimental and numerical studies on size effects in concrete. The basis of his work is the multi-scale experimental study of concrete material properties (size changing from microns to meters). Moreover, he runs numerical studies using non-continual models (DEM) on micro-mechanics influence on macroscopic material fracture. He cooperates with architects in urban projects revitalizing green and industrial areas as a member of the downtown district council.

At the university, Jan teaches building design in traditional technology, which is the first project for students of Civil Engineering at GUT. In his research, Jan is most fascinated by discovering and understanding very basic phenomena and transferring knowledge about it to solve more complicated problems. He believes that it is very similar to teaching and he sees his purpose in equipping students with a few skills that will enable them to create something greater.

He says, with a smile, that he hopes that after his mutation from a student to a mentor, he will have remained a human being—and expects interesting debates, discussions and controversies on some views that can be a challenge for an engineer. He is also keen to meet interdisciplinary people from the inter-Baltic cultural community.

Leonardo Castaman
KADK, Copenhagen
Architecture
Leonardo places strong emphasis on creativity and inventive problem-solving. Using digital media, he is able to develop expressive representations of concepts and further investigate the possible opportunities.

Elisa Sein

Personally, the B.I.S.S. has given me insight into the creative and analytical processes found and used in different professions and different countries. Since I'm on the verge of finishing my studies, I feel that the B.I.S.S. experience has been of great help with getting started on my master's thesis.

Axel Larsson
Chalmers, Gothenburg
Architecture and Engineering
Axel's process is deeply influenced by an artistic methodology. He seeks to combine a poetic viewpoint with a technical solution. He can grasp concepts and make them understandable to others.

Maarja Abel
TUT, Tallinn
Architecture
Maarja starts her process with researching the task and identifying the problem. Having done so, she makes drawings and illustrations of her ideas and concept to visualize the task. In her works she uses different designer programs. What's important to her is to stand out with her work and create original designs.

Elisa Sein
TUT, Tallinn
Urban Development
The most important factors in Elisa's working methods are laws, standards, the budget and the goal. Creativity evolves out of necessity. She begins with making bullet-pointed lists of tasks and subtasks, sets out a timeframe and schedule for each task, which leads to collecting data and making calculations.

Mentors' comments on B.I.S.S. 2017

At the B.I.S.S. I met many great inspiring characters among lecturers, other mentors and students. Professionally, I especially benefitted from my mentor partner, whose very different background taught me a lot about conceptual thinking and critical design.

My mentoring interdisciplinary group focused on two fields: introducing students to planning and performing laboratory tests and numerical simulations. An experiment is the perfect interdisciplinary tool, as well-presented results make understanding problems easy for every discipline.

I was amazed with the graphical presentation techniques of experiments. I will definitely use some of them in my own presentations. Moreover, I found working with interdisciplinary students on experiments a very effective method of teaching.

Linda Wallander
Chalmers, Gothenburg
Architecture and Engineering
Linda begins her process by analyzing the concept and establishing a framework for ideas. She develops concepts within the framework and analyses the good and bad parts of each concept. Then she iterates this process.

Maja Lindborg
Chalmers, Gothenburg
Architecture and Engineering
Maja is a strong team player. She uses collaboration as a mean to generate interesting ideas and concepts. Thinks one step ahead and tries to steer her group in the right direction.

Maja Mawusi
GUT, Gdańsk
Architecture
Maja is very good at creating strong architectural concepts and also in making great visual graphics to present the ideas. She describes herself as a goal-oriented person.

Julie Skrydstrup
DTU, Copenhagen
HVAC engineering
The main idea is to find out the purpose of the project. Once that is clear, Julie sets out a timeframe, baseline, the cost and benefits of the project. In addition, she investigates impacts on surroundings, maps and stakeholders. She then creates the final proposal and introduces her ideas to the client.

Maja Mawusi

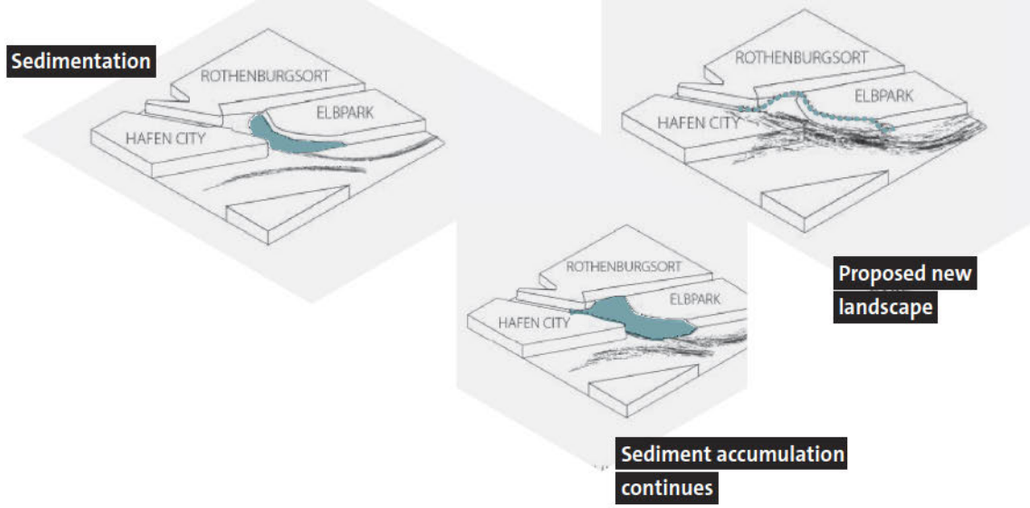
The possibility to collaborate with students from different backgrounds has given me an extraordinarily fresh standpoint and approach to resolving issues. Also, work in such a diverse and multi-talented group has enhanced my communication and negotiation skills.

Mentors' comments on Unter Hafen

The group working with our duo of mentors had a non-typical process of collaboration and working. We invited participants to begin the project as one big assembly, gathering in a very broad way different aspects and topics connected to cyborg landscapes, water treatment and engineering infrastructures. The social aspect of working together was not negotiable, either. Creating personal bonds created an open atmosphere supporting sharing of information and early ideas in further debates. The initial discussion on the topic of cyborg was meant as a disruption in the way we usually develop concepts and ideas in spatial configurations connected with water, ecology and urbanity. Introducing the cyborg metaphor erased the distinction between what is "made" and what is "grown."

After a short introduction by the mentors, the participants searched for references on the topic, shared findings and discussed. We repeated that loop a couple times to open minds and gather possible implications of coupling machines and organisms in urban context. Then the participants individually went to the site to capture "cyborgs" in the field. After that quite long introduction the group decided to split into three teams working on different projects. Given the complexity of the project, the groups decided to reunite and work on one large project, but on various levels: conceptual (story-telling), designing (shaping the landscape in details) and analytical (analysis of urban needs, sedimentation and scientific water simulations).

For their organization of work and decision-making processes, mentors gave advice and help, but gave the responsibility to the group itself. Without establishing a clear leader, the group members could all participate and contribute to the overall project that brought their very diverse special expertise, skills and knowledge into a fruitful connection between each



Description of the context of the project

Historically Historically, Hamburg has always had lots of rivers and waterways. This is the main economical income source of the city of Hamburg. It is important to maintain the field of water economy. To reach that goal, we have to investigate different factors that come from nature. The natural dynamics of the river estuary have changed dramatically as a consequence.

Socially The cruise industry is an important part of the tourist offer in Hamburg, with cruise operators being among the most important stakeholders in the Hamburg tourism industry. The majority of German citizens cherish Hamburg above all as a "city on the water," the maritime atmosphere of the city having always been characterized by the harbor, the "Landungsbrücken" and the "Speicherstadt" or warehouse district.

Structurally and architecturally Rivers divide the city into different parts and areas. To understand the purpose of the concept and its necessity, we have to understand water flows, high tide and low tide systems as well as sedimentation. We can remove sediments from the seabed as we are doing now, but at the same time, we can change the way and system we are currently doing it. The main idea is to agree on whether we let nature shape the riverbed or we shape it.

Description of the site and the direct surroundings of the project

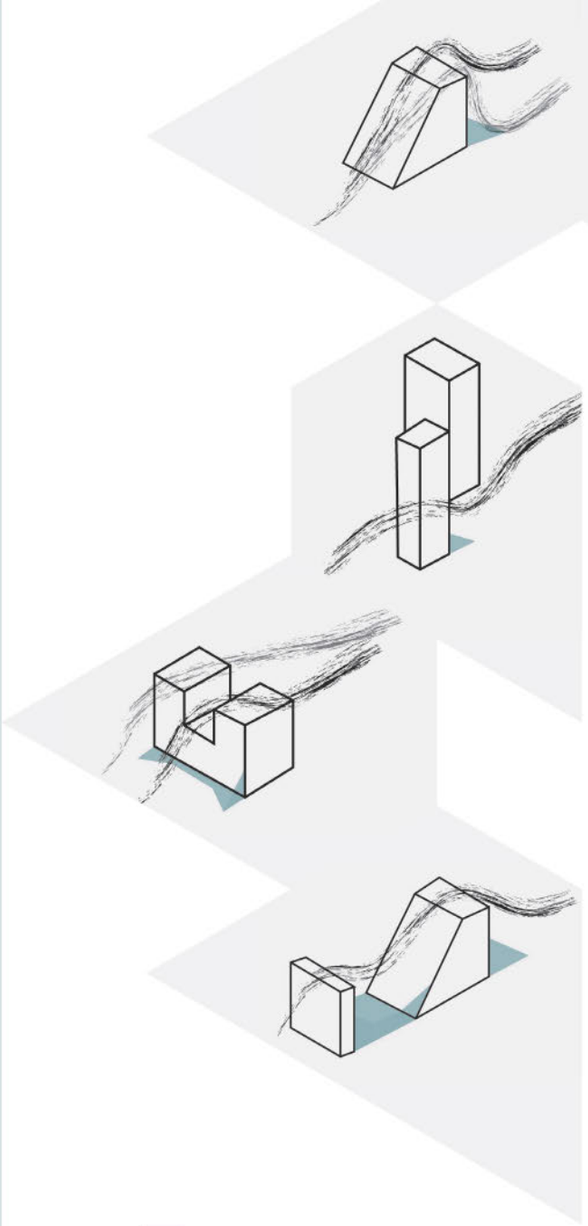
Infrastructure The tide changes from high to low approximately every six hours. The shift in tides causes the water velocity to change direction. Low water velocities cause suspended particles to settle on the riverbed, a process called sedimentation. The relationship between water velocity and sedimentation is thus inversely proportional.

Missing links If obstacles are placed in the river, either on the bottom, the surface or both, the water velocity will decrease. The surface velocity will decrease by creating vortexes. This provides an opportunity for particles to settle on the riverbed, both before and after the obstacle, if the flow is constant.

Utopian potential Between 2000 and 2005 the dredging in the port increased from two million m^3/yr to eight million m^3/yr to maintain the harbor economy. If we assume that dredging in the harbor is stopped and the rate between 2000 and 2005 is the valid rate now and the future, the whole harbor area will be filled with sediment within the next 125 years.

other. Whereas this resulted in great, well-thought-out proposals, it also left some details in the dark and it was a continuous struggle to bind all the different strands together. Here, a group of three to four participants stepped up organizing the weaving together in each phase of the project. Most participants were highly devoted to the project and spent nights working on it.

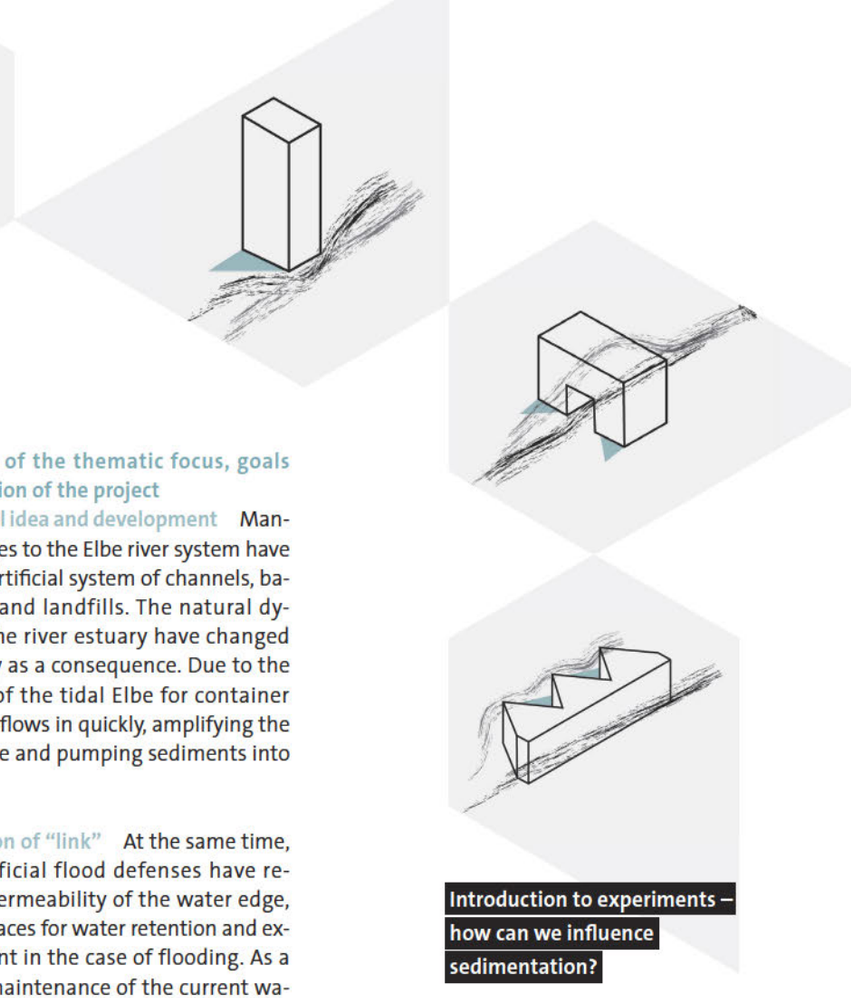
The final presentation was very well-prepared and highly impressive. However, the link between the conceptual strategy and the actual creation of the new landscape remained somewhat vague. Working in large groups might be sometimes problematic due to the lack of clear leadership, work division and engagement of all participants. However, in this particular workshop it worked very well and led to the fantastic results.



Sedimentation

Water flow

Various objects shaping the water flow and thus the sediment accumulation



Introduction to experiments – how can we influence sedimentation?

Description of the thematic focus, goals and motivation of the project

Conceptional idea and development Man-made changes to the Elbe river system have created an artificial system of channels, basins, quays and landfills. The natural dynamics of the river estuary have changed dramatically as a consequence. Due to the deepening of the tidal Elbe for container ships, water flows in quickly, amplifying the tidal variance and pumping sediments into the harbor.

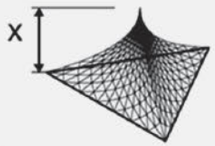
Interpretation of "link" At the same time, various artificial flood defenses have reduced the permeability of the water edge, removing spaces for water retention and excess sediment in the case of flooding. As a result, the maintenance of the current water depths is a costly and arduous undertaking, which applies considerable strain to the financial infrastructure of Hamburg city.

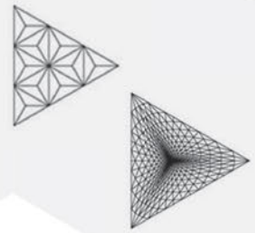
Relevance for future cities The design and open space concept of HafenCity relies heavily on these water spaces as structuring elements and open spaces (the "blue parks") between the dense city blocks.

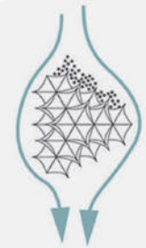
Description of the final design

Utopian idea The natural flow of water would deposit more and more sediments in the basins. Over time, open water spaces would become muddy beaches with occasional flooding. New plants would appear, enriching the landscape in order to enable further species to thrive. After decades this would develop into a wetland forest landscape such as the Heuckenlock on the southern tip of the Elbe island. Such an occurrence could become a vital element within Hamburg's ecological identity.

The link There is no way back in history. There is no restoration of nature. The harbor exists as do the new water dynamics. Around the Oberhafen basin, the HafenCity develops a creative quarter, on the other side the opening of the former Großmarkt area for events and cultural uses will change the users and forces acting on the







Intervention: using synthetical elements to shape nature. The frame dimension can vary to change their effect on the surrounding physical environment

harbor: a new urban core in Hamburg with the Oberhafen basin in the middle, separating the two parts.

Implementation of the link By modifying the water flows and the resulting sedimentation and by bringing in plants and birds from the Heuckenlock, we will influence the natural succession, creating a landscape which is neither land nor water. A new type of public park in the HafenCity spring to life with the ecological functions of an ancient and valuable ecosystem. We believe that measures such as these will create a harmonious symbiosis between mankind and nature.

The most important details and characteristics of the project

Sustainable solutions for the harbor industry The intention of our scheme is not only to provide a sustainable solution for the harbor industry, but also to contribute to Hamburg's ecology and generate new natural habitats. Our main precedent for this aim is the nature reserve Heuckenlock, one of the few remaining natural wetland forests in Europe. Such environments are characterized by frequent flooding—both daily and seasonally—and are some of the most biologically diverse regions on Earth. One could roughly understand them as the European counterpart to rainforests.

The Heuckenlock as a model The Heuckenlock is a useful model for our scheme because it lies just a short distance upstream on the Elbe. As such, the two areas share a similar water composition and climate. If the sedimentation were allowed to continue, an environment like Heuckenlock would eventually develop. Our intention is to guide and amplify this process by inserting synthetic elements.

Final proposal We suggest the above components as the agents of our proposal. They are comprised of tetrahedral meshes which are made of the recycled plastics which accumulate on the Elbe. They will act as a frame onto which hyperaccumulating plants can grow. The meshes can connect to form a smart system which varies the speed of the water flow to alter the siting of the sediment.

Axel Larsson

I participated in the B.I.S.S. as a first-year student, and as such, I thought it was a demanding, but ultimately very rewarding experience. I had the possibility to learn from students of other disciplines as well as students who had studied the same subjects as me, but for a longer time.

Maksims Feofilovs
Mentor
RTU, Riga
Studied Environmental Science, focusing on the application of biological, chemical and physical principles to the study of the physical environment and the solution of environmental problems, including subjects such as abating or controlling environmental pollution and degradation.

The effects of disasters on communities are a critical issue to be considered in terms of growing exposure of infrastructures to natural hazards. The role of infrastructures should guarantee the support of urban life standards to guarantee public welfare. My research is dedicated to methods that help describe resilience communities and infrastructures and enhance them.

My experience with participation in international summer schools in previous years has shown me that I can contribute to group work and solve problems together with students from different countries. This summer school gave me a chance to use my skills on this topic in a new environment, share my experience and find the possible ways for improvement of the methods that I use for my research.

Anastasiya Nudina

First of all, I really enjoyed communicating with students from other countries, which helped me to find out some details of their educational processes. Then, I learned some new ways to deeply analyze the building site and its connection with all the nets and structures.

Anastasiya Soshnikova
GASU, Saint Petersburg
Urban Planning
The most important question for Anastasiya is "why?". She believes that to carry through a good project you need to collaborate with people of various professions. She has an industrious and resilient nature.

10 Seesaw

Juliane Benachio
HCU, Hamburg
REAP
Graduated in Architecture and Urban Planning from a Brazilian University and currently studying the REAP master at the HCU, she brings in knowledge from different fields. Juliane has superb communication skills and enhanced creativity to solve the proposed tasks.

Yoon Han
Aalto, Helsinki
Architecture
Yoon incorporates knowledge of computation and digital fabrication into the project. She seeks to bring in all members' ideas in the process.

Anastasiya Nudina
GASU, Saint Petersburg
Urban Planning
Currently studying Urban Design at GASU, Anastasiya is good at proposing solutions to problems and possesses excellent communication skills.

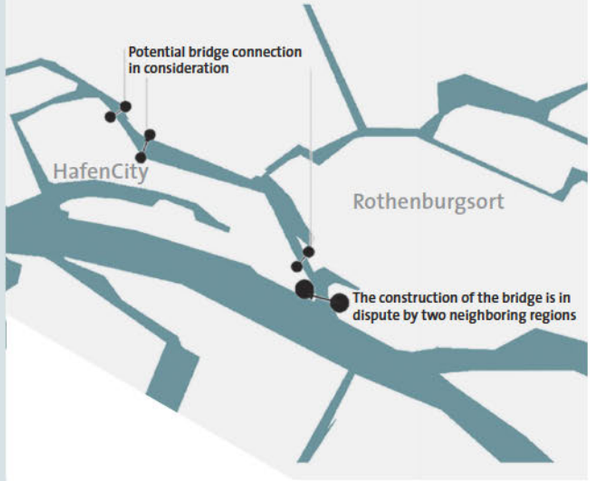
Viktorija Prilenska
Mentor

TUT, Tallinn
MSc in Architecture (2009, Riga Technical University), MSc in Urban Design and Planning (2012, Delft University of Technology), since 2014 doing a PhD in Urban Planning.

Her research is based on the application of games and gamified smartphone applications for community engagement in urban design and planning. She teaches scientific writing, urban design and planning and the history of urban design and planning.

She is driven mainly by curiosity. Planning is a complex multidisciplinary phenomenon, thus planning research forces her do dive into unfamiliar fields to discover insights about the mechanics of the world. Teaching provides an opportunity to share her experience with others and, in turn, learn something new from them.

She is looking forward to interesting keynotes, fun parties and fruitful collaboration with students and hopes that her team, Maksims and herself, will be able to give students a new perspective, an alternative way of understanding the city.



Description of the context of the project

Historically Urban developments can cause social conflicts, such as the one about the bridge construction between HafenCity and Rothenburgsort. Here a social infrastructure is proposed, the Seesaw link.

Socially It enables the residents of both of the regions to experience the link over the water between the two areas, simultaneously inducing social interaction through operation of floating platforms moved by human power, inspired by the mechanism of railroad handcars.

Structurally and architecturally The organization of the infrastructure can be expanded to accommodate more diverse user experience, thus enabling social links between the places and the people by assembling and disassembling the units.

Infrastructure The site has already got bicycle lanes, metro and the bus station under construction process, it also has a bridge to Rothenburgsort.

Missing links The site hasn't got any convenient infrastructure for pedestrians, for disabled people. It hasn't got any connection with the water or any water infrastructure. Moreover, it hasn't got a connection with the Elbpark on the next island, so residents don't have a convenient way to get there.

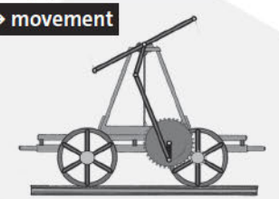
Utopian potential In the near future the site will have a good subway connection, so it will be easily accessible. It will have a connection with water and water infrastructure, so people can use it as a faster way to get to another part of the city. It will have a good pedestrian infrastructure and some parks.

Description of the thematic focus, goals and motivation of the project

Conceptional idea and development Social interaction through operation of floating platforms moved by human power, inspired by the mechanism of railroad handcars.

Interpretation of "link" A seesaw link—we suggest creating an infrastructure for social activation. The construction of the bridge is in dispute by two neighboring regions.

HANDCAR concept
Two people → movement



SEESAW
interaction + fun together

Mentors' comments on Seesaw

The members of the group decided to focus on something different than their major studies. Group members came from urban design and planning fields, where they focus on large-scale abstract projects. The Seesaw link, in turn, is a fine-scale detailed project with complex engineering solutions. Additionally, group members for the first time experimented with 3D printing, developing a working prototype of the Seesaw link.

Description of the final design

Utopian idea We propose an infrastructure for social activation in order to create interaction between two people at least. Therefore, we introduce the Seesaw link, a mobile platform between HafenCity and Rothenburgsort. The proposal induces social interaction through operation of floating platforms moved by human power, inspired by the mechanism of railroad handcars.

The link It invites the residents of both regions to experience the link over the water, a remarkable city element of the area between the two lands.

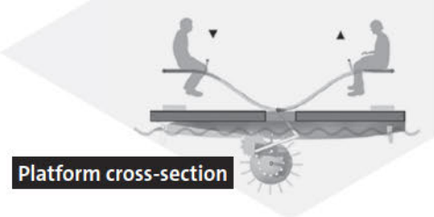
Implementation of the link The organization of the infrastructure can be expanded to accommodate more diverse user experience, thus enabling social links between the places and the people by assembling and disassembling the units. Moreover, the platforms are equipped with direction sensors, which guide the platforms to the intended direction. Those sensors and the lighting of the Seesaw are powered by tidal energy produced by the water level difference that moves the piers attached on one side.

The most important details and characteristics of the project

3D printed model Our model depicts the general look of a water vehicle, which is an important part of our project. It plays the role of a link between our side and the Elbpark and at the same time creates social interaction.

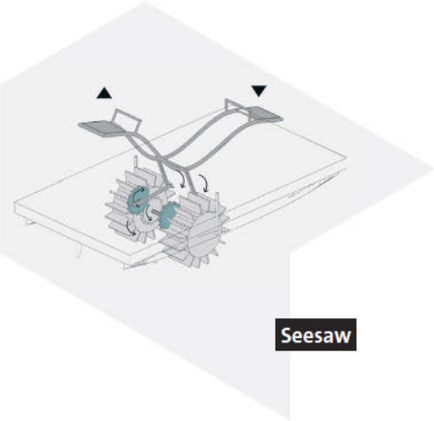
Animation Animation outlines the scheme of mechanism that makes our platform movable. That mechanism is set in motion by a seesaw movement, in which two people are engaged. In other words, it is a social activating structure.

Poster We carried out a complete analysis of the site and solved some problems of the current situation. First of all, we created a sustainable structure that works on tidal energy. It provides lighting on the shores. Moreover, our water platforms don't need any energy because of their mechanism.

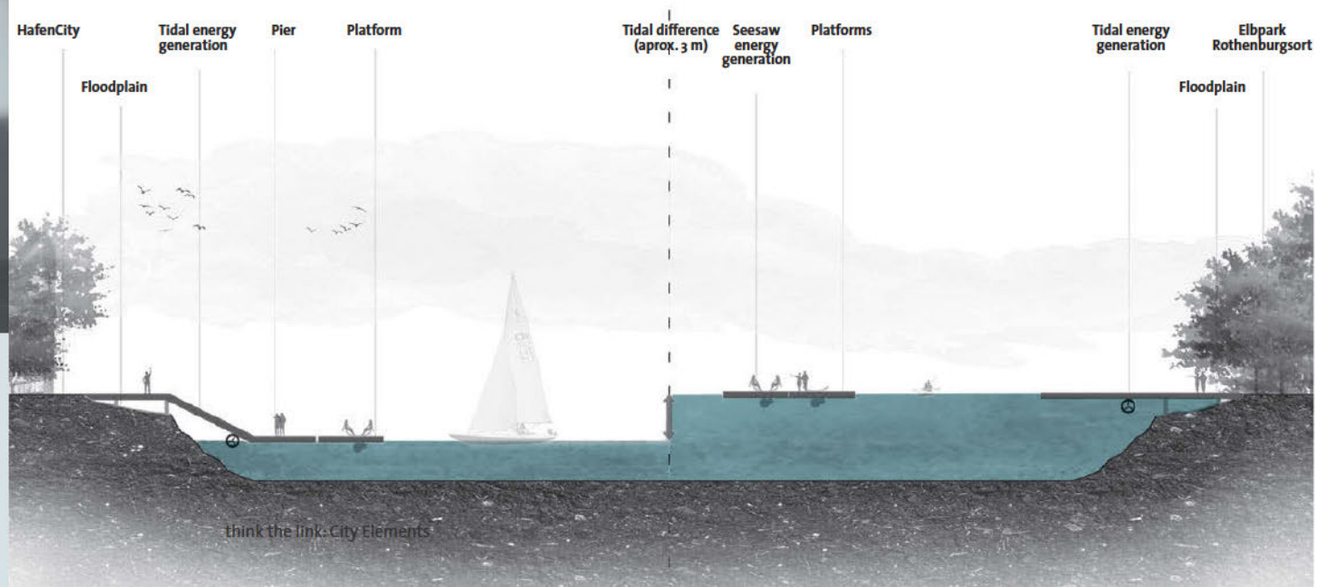


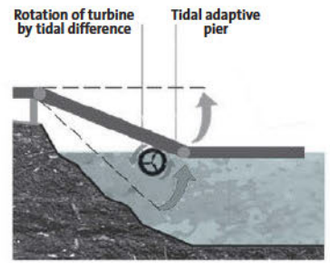
Platform cross-section

Platform long-section

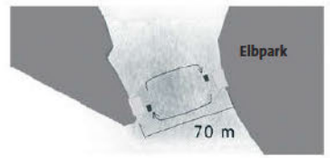


Seesaw





Tidal energy scheme



Maksims' comments on B.I.S.S. 2017

The experience of working in interdisciplinary groups was not new for me. However, this specific project showed me the perspective of architecture and city planning solutions for environmental problems. For me as an environmental engineer, this was an inspiration for future projects.

The overall work was performed with an approach of serious game. Within this game, a stochastic probabilistic simulation tool was used that was developed with participation of students. Such an approach would let students learn in an informal way about the city infrastructure and allow them to draw their own conclusions.

I acquired the most benefits for my future research and academic work by observing the advantages and disadvantages of students from different fields. I will put what I learned into good use when planning my work for future projects to make them fruitful and interesting.

Mats Andersson
Chalmers, Gothenburg
Architecture
Artistic Swede, in the third year of doing his bachelor's degree. Has a toolbox containing CAD-, BIM- and Parametric design skills, added with fondness of being hands-on at work.

11 Hafen Lift

Natalia Bejrowska
GUT, Gdańsk
Architecture
Taking a master's degree in Architecture with a bachelor's in Civil Engineering under her belt, knowledgeable in various software relating to project development, loves the science and maths aspects in design and a true movie and book freak.

Fahimeh Fotouhi
Aalto, Helsinki
Architecture
Began the architectural path with a bachelor's degree in Architecture in Teheran, continuing with a master's degree in Aalto University, Finland.

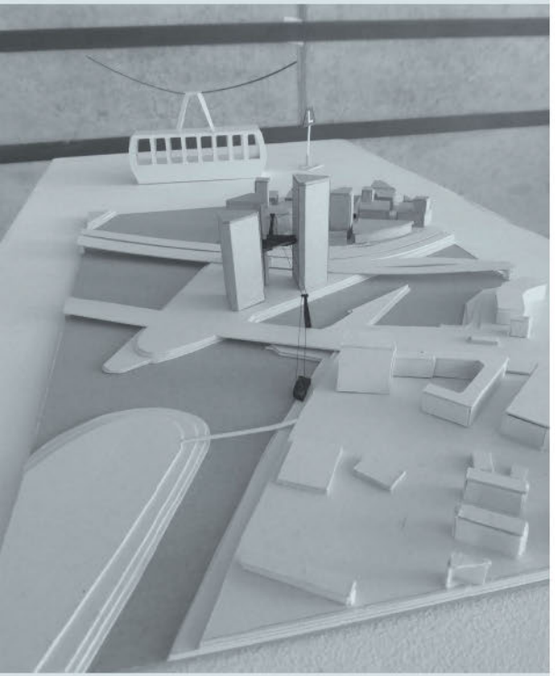
Agata Dalach
GUT, Gdańsk
Architecture
When I was a child, I always wanted to be an artist; as a teenager, I started to connect my future with more scientific fields. Therefore, I have chosen architecture as the link between those areas of interests. As an architecture student, I try to connect environmentally friendly solutions with the social aspects of the design.

Agatha Dalach

I learned how to work in an international team on a project that is not strictly connected with my field of studies. For me personally, it was especially important, because of learning how to communicate with people from different branches.

Mentors' comments on Hafen Lift

The group delivered a witty and controversial idea—a public space, suspended between three office towers that epitomize private capital and property, which serves as a cable car station connecting a deprived neighborhood in Rothenburgsort to a posh developing neighborhood in HafenCity.



Description of the context of the project:

Historically Former harbor area in Hamburg on the central island of Grasbrook, which is in the process of being transformed to become the residential and commercial area that is the HafenCity. In the east lies Rothenburgsort, a residential area totally destroyed during the Second World War.

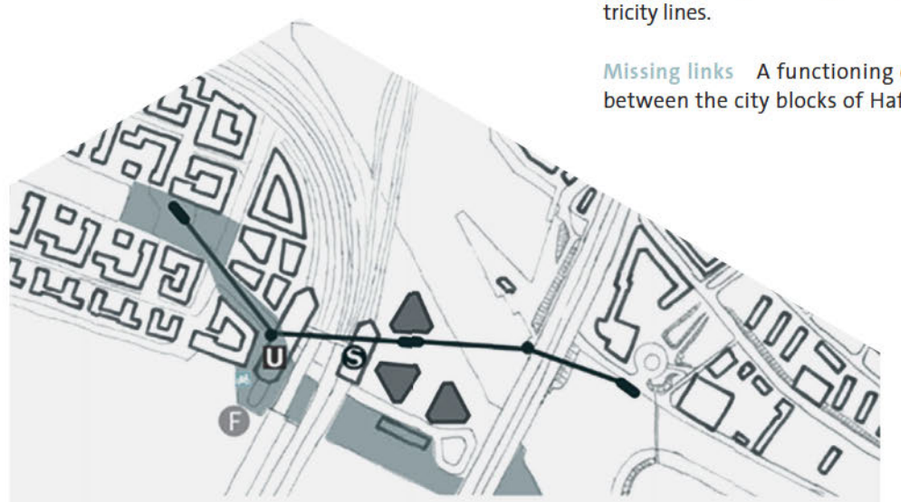
Socially The HafenCity project holds a potential of 13,000 jobs in the new area, this could also be a potential for neighboring areas with a different socio-economic situation than the one expected in the new HafenCity area. In Rothenburgsort, the S-Bahn Hamburg-Rothenburgsort station grants access to a proportionally large part of Rothenburgssort. The Elbbrücken connection is closer in distance to the western part of the area, but the psychological distance is greater due to the barrier of the current roads and railroads.

Structurally and architecturally For now, the upcoming area of HafenCity and the area of Rothenburgsort are separated by railroad and express road bridges. The bridges, made of exposed steel constructions, stand on the island on brick foundations that are pierced by tunnel passages. Heavy traffic that occurs in this area can be dangerous for pedestrians and cyclists. Narrow paths are uncomfortable to walk on and moreover big slopes and stairs make the area not accessible for people with disabilities or parents with strollers.

Description of the site and the direct surroundings of the project:

Infrastructure The Elbbrücken connection is at the most eastern tip of the island and there is an area crossed in a southern to northern direction by the S/U/regional railroads and the 75 express road, with the bridges accommodating many installations, including heating, sewage and electricity lines.

Missing links A functioning connection between the city blocks of HafenCity and



Viktorija's comments on B.I.S.S. 2017

B.I.S.S. 2017 resulted in a fruitful collaboration between Maksims, an environmental engineer, and I, an architect and urban planner. We developed the demo version of an energy game, which was tested with students in Hamburg. The game is being developed further into a fully-fledged desktop version.

Maksims and I ran two seminars with our groups about energy infrastructure resilience and game design, which consisted of introductory lectures and practical assignments. Following the seminars, an energy game session took place for half a day, which aimed at integrating previously learned knowledge and skills.

Observing student behavior and listening to their feedback, Maksims and I gained an understanding of which aspects of the game needed to be upgraded. Additionally, I received an excellent opportunity to train and develop my tutoring skills.

The informal atmosphere of B.I.S.S. made for easy communication between specialists of different fields and levels. The mentoring groups provided support for students' practical work in terms of knowledge, agenda and creative backup, and the positive outcome of the group work speaks for itself.

Rothenburgsort. Although possible as a pedestrian or cyclist to pass under the 75 express road and the S/U/regional railroads, the passages through tunnels and along the noisy traffic vein do act as physical and psychological barriers. By changing the level of presence in those structures, a person needs to give way to vehicles and other kinds of infrastructure.

Utopian potential A social node for two city blocks. Avoiding the current barriers and possibly enriching surrounding neighborhoods, not just the newly developed area. With such a link, the districts that feature totally different living conditions could blend. This could influence the emerging opportunities for the future development of neglected areas.

Description of the thematic focus, goals and motivation of the project:

Conceptional idea and development The proposal: using the outline of the city plans for the district by avoiding saying "no" to the current plans, and instead saying "yes, and ... we also like to add this for the people." Specifically, the project involves transformation of the planned skyscraper into the public space, accessible for the people from different parts of the city.

Interpretation of "link" A social human link, mainly not connecting the infrastructure, but the people that use the infrastructure. The new areas would cause people to interact, meet, and communicate with each other.

Relevance for future cities Highlighting barriers between city parts, economical differences, pedestrian barriers, promotion of human interaction.

Description of the final design:

Utopian idea A way of emphasizing the importance of creating a link is by making a visual gondola lift link between the areas of HafenCity and Rothenburgsort. The central station of the new transportation system would additionally serve as a panoramic platform.

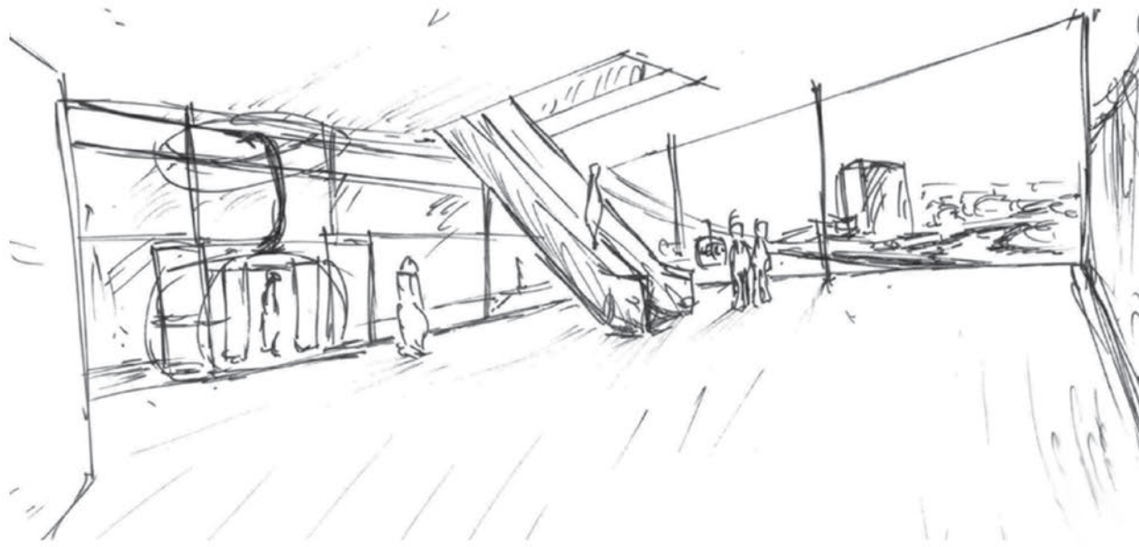
The link Connecting two areas with a cable lift system. The stop at the HafenCity area is also designed as a node of transportation. It connects S-Bahn and U-Bahn stations, but could potentially also harbor a ferry stop, a city bike stand and the HafenLift, of course.

Implementation of the link Situating a station platform in the western greenery of Rothenburgsort and the other end station in the proposed open plaza of the eastern HafenCity. The cable system would glide over the express- and railroads. In the middle, making a stop on a central public platform would add to the proposed towers, creating a central public space. In such a space, services such as a library, shops and restaurants could be located in order to create an array of possibilities for spending free time.

The most important details and characteristics of the project:

Your individual heading Creating a visible skyline connection by using the complex of the three proposed towers as a public terrace/space—but instead of making these new towers just a shodowing menace to Rothenburgsort, also making an addition to them for the public. In this way, connecting and creating an economic potential for the whole area is granted, while also improving the connectivety between the two areas HafenCity and Rothenburgsort.

HafenLift could become a new icon of the city and therefore attract new people to this region. As a tourist attraction, it could transform the area into a new public space that could be the next public node in the line of the existing places located along the Elbe river.



Mentors' comments on
Dancing Noise

The group demonstrated good focus on one idea and excellent, efficient teamwork from beginning to end. Although the project seems modest at first glance, it is well developed from the concept right through to the details—elegant with a simple, powerful message.

Dayouan Zhu

As part of B.I.S.S., I designed a mixed bus station with my group. At the beginning, we visited the site in HafenCity and then discussed the current problem and solution for the future. It was a great experience for me to meet so many students from other Baltic universities. Above all, B.I.S.S. revealed the importance of teamwork in the architectural design process and will make a contribution to my future study and career both in theory and practice.

Daoyuan Zhu
KADK, Copenhagen
Architecture
Daoyuan is the inspirer of the group and likes photography and sketching. He has traveled throughout Europe.

Marta Sienkiewicz
GUT, Gdańsk
Architecture
Marta is interested in user-centered design and likes to work hands-on, in general using a physical model.

Djuliett Bobrova
GASU, Saint Petersburg
Urban Design
Djuliett is a student with a fine sense for details and proportion. She cooperates well with others and is not afraid to speak her mind when necessary.

12

Dancing Noise

Description of the context of the project

Historically The site of the project is a link between two areas of Hamburg with completely different social backgrounds. HafenCity is a rapidly developing, modern part of a new city center. On the other hand, Rothenburgsort is a quarter of the city that is rich in history but has not been greatly invested in.

Socially Whereas commercial investment may create some conflict between the communities, a beautiful and functional bus stop can be enjoyed by everyone and provide an interesting and inclusive meeting place.

Structurally and architecturally The project is set in the area of our focus, two bus stops in the middle of a noisy highway. Because of the limited space, we had to use it very consciously and efficiently. The two bus stops together create a silent urban interior with carefully designed proportions, taking into account the safety and convenience of people waiting for a bus. The outer acoustic wall is high enough to provide ample space for sound visualization.

Description of the site and the direct surroundings of the project

Infrastructure There is a lot of noise pollution from the motor and vibration of the bridge structure on the site. The well-developed transport infrastructure replaces the people.

Missing links Noise pollution is stopping people from enjoying the nature of this place. It is an area of transport congestion, not one for humans to stay.

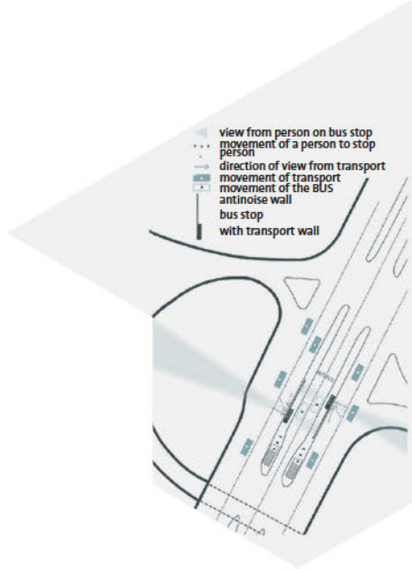
Utopian potential In the longer term, it is planned to develop this area as a residential quarter. The green areas offer great potential. In future, this place can be a popular point of attraction for people. There is a need for an affordable transport infrastructure.

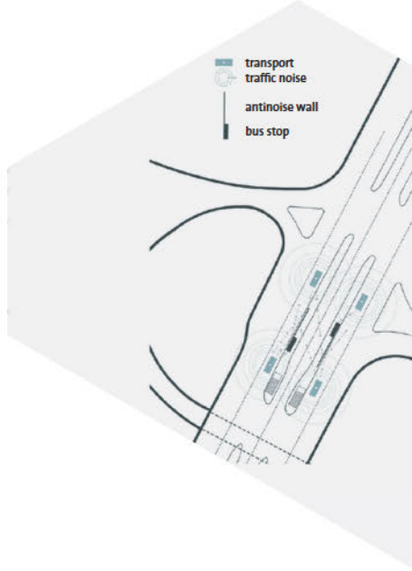
Description of the thematic focus, goals and motivation of the project

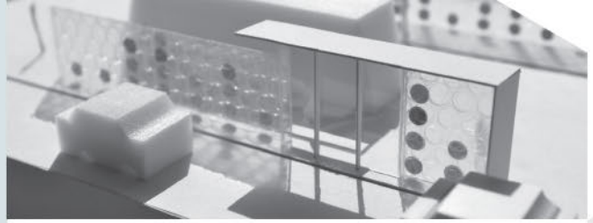
Conceptional idea and development How to protect the area from noise? A serious problem of the high noise level was noted during the inspection of the territory. A noise level of more than 65 decibels is considered uncomfortable for human habitation. Also, the noise has a bad influence on human health. So we decided to replace the sound that we hear with the sound that we see.

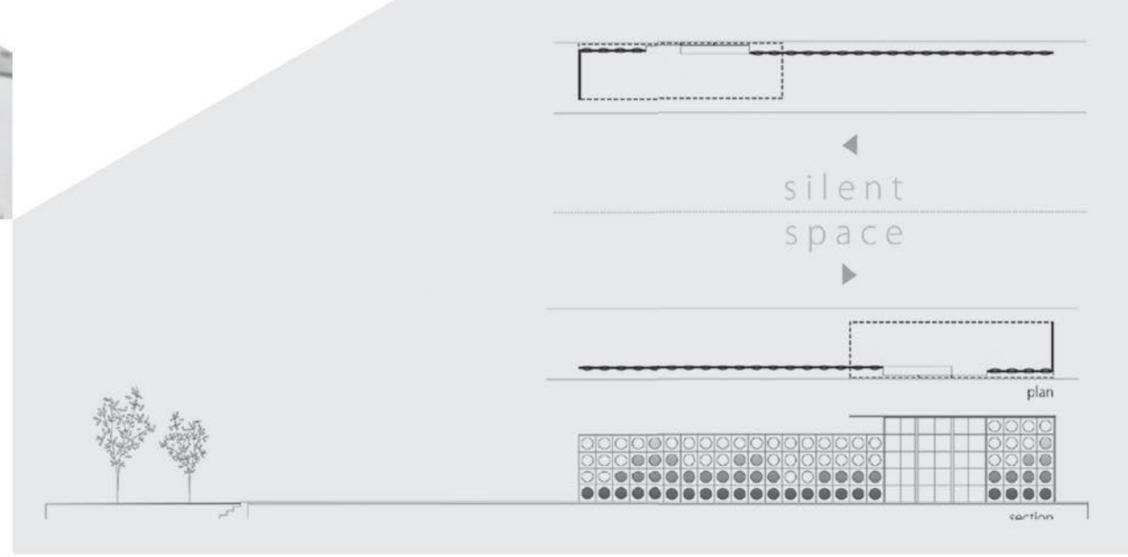
Interpretation of "link" The link between the transport infrastructure with nature is achieved with a transparent surface stop and the quiet space created through sound-absorbing materials.

Relevance for future cities The simple design and modular construction of a sound-absorbing wall creates the universal bus stop. It will organically fit in different environments. In connection with the increasing number of vehicles in the world, the new bus stop will be relevant.









Description of the final design

Utopian idea The idea of the final design is that of a bus station with a noise-absorbing wall. The wall is made of LED light and a sound interface. Basically, when cars and trucks pass through this station, this wall will have different light to reflect and reduce noise. Additionally, it will create its own natural sounds.

The link This bus station will be a new point in HafenCity to link to any other place. It will link people from HafenCity inside and outside, as well as other infrastructures in Hamburg.

Implementation of the link As part of all the infrastructures in HafenCity, it will play an important role in urban design. It will enhance the accessibility for people to visit the nearby park and bring in new tourists.

The most important details and characteristics of the project

Imagine you are standing in the middle of the bridge at the bus stop among the fast flow of cars and hear the noise from engines, feel the vibration from the friction of the bridge structure.

The concept of Dancing Noise is to protect the bus stop from noise by acoustic panels, which transforms it from the auditory to a visual format. This is achieved by a modular system of LED lights that respond to traffic noise detected by the sound sensors. Together, they create a selection of patterns, such as sound waves, that can be changed with an interface by people waiting at the bus stop. The unwanted sound is blocked by a combination of insulating reflective and diffuse materials.

Two bus stops in front of each other create a silent space with comfortable proportions. Transparent walls in strategic places of the bus stop provide safety and visual connection with the surroundings. The installation is equipped with an interface that includes a microphone with which people can see the sound level of the speech. They can also enjoy a soft, relaxing sound of nature produced by speakers.

Marta Sienkiewicz

For me, participating in B.I.S.S. provided a valuable learning experience in cooperation and intensive, efficient work. By having an opportunity to work on one design from the concept to the final presentation within only nine days, I realized how many things can be achieved in such a short time, especially in cooperation with others.

Karl Eriksson
Mentor

Chalmers, Gothenburg
Trained as an architect in Gothenburg and London. His interest has been guided towards the housing question and the transformation of the contemporary European city, it especially lies in the meeting point between housing and urbanism where our cities are shaped.

In his research, he is concerned with the process of regeneration and how it shapes our cities. How can we create beautiful and well-integrated new parts of urbanism that learn from the past but also anticipate what is yet to come?

Karl is a practicing architect working for London-based Karakusevic Carson Architects. Its work incorporates the new wave of public-driven housing, especially focusing on social housing. Working closely together with local councils, its aim is to form sustainable and well-integrated neighborhoods that contribute to the wider city.

To test the "unforeseen solutions" and use architecture as an instrument that explores how the industrial harbor area of Hamburg can be transformed and adapt to the future—this transformation and the articulation of the post-industrial/post-capitalist city is without a doubt one of the most pertinent architectural questions of today.

Mads Kampmann Petersen

Working so closely with people from different countries and with different cultural backgrounds was truly a great experience. The intensity of the work made a huge impact on me as well and it took several weeks for me to realize the extent of it. I'll consider this intense work process as a possible method for future work.

13 Infra

Christian Brandt Østerby
DTU, Copenhagen
Architectural Engineering
Rooted in the countryside and with a background in project management, Christian is a person who works hands-on. He brings to the table good skills in the model shop and innovative working methods.

Mads Josef Kampmann Petersen
DTU, Copenhagen
Architectural Engineering
Educated in the technical line of building systems, Mads always asks why and, as the engineer he is, works towards developing the project. He is also a highly artistic person, sketching ideas to both coffee and sound.

Clara Havström
Chalmers, Gothenburg
Architecture and Civil Engineering
With an interest in architecture, engineering and art, Clara is one to bring things together. Seeing the bigger picture, she finds the connections and reasons for the project in development.

Adriana Rajch
GUT, Gdańsk
Civil Engineering and Architecture
On her own initiative studying both architecture and engineering, Ada is one to make things happen. Inspiring and creative with architectural working methods and her skill in graphic design and illustrations.

Dr. Markus Hudert
Mentor

Aalto, Helsinki

Markus studied architecture at the University of Applied Sciences in Coburg and completed his postgraduate studies in Advanced Architectural Design at the Städelschule in Frankfurt. After several years working with internationally renowned practices such as UNStudio and Benthem Crouwel Architects, he became a postgraduate research and teaching assistant at the IBOIS Laboratory for Timber Construction at EPFL in Lausanne, where he obtained his PhD in 2013.

His research focuses on experimental and innovative timber structures as well as material and assembly-driven design strategies and aims to bridge the gap between architectural and structural design. Markus' teaching activities are an extension of his research. Most recently, he co-directed an interdisciplinary timber design studio at Technische Universität Braunschweig. As a visiting lecturer, he has conducted seminars on spatial design at the Peter Behrens School of Arts in Düsseldorf.

The B.I.S.S. summer school is a unique opportunity to work with people from different professional and cultural backgrounds and to generate catalytic concepts for the future development of port cities in northern Europe. The intense and dynamic working conditions at B.I.S.S. will not only lead to one-of-a-kind design proposals for Hamburg Rothenburgsort, but also make an important contribution to the personal and professional development of the participants.

Description of the context of the project

Historically The harbor of Hamburg has for recent years been a reconstruction site with new projects occurring every so often. A former cradle for industry and shipping is now a field for the new city to grow.

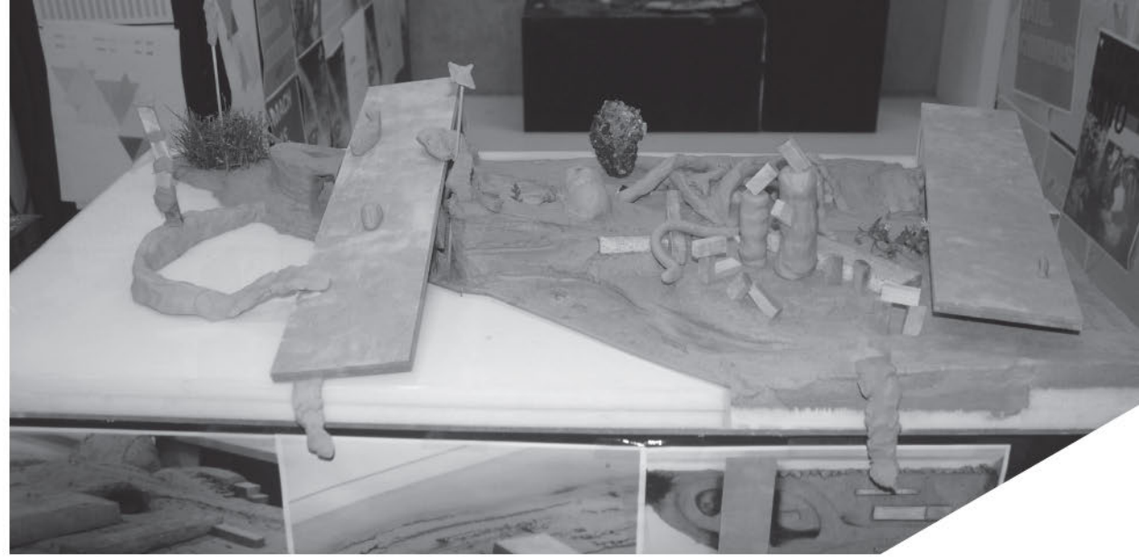
Socially Hamburg, alongside Berlin, is a center for cultural events in the subcultural spirit. The most popular activities in the cities rarely happen in broad daylight but rather in the hidden and not so obvious spaces. Indie clubs and spontaneous events created by small-scale actors that pop up in the least expected places is a part of Hamburg's soul.

Structurally and architecturally The city wants to make the harbor habitable and attractive for new inhabitants. In the site given, for example, a skyscraper will be established alongside the new train station already under construction. When the work starts, temporary buildings such as a small construction of containers, which today constitutes a venue, will have to make place for the new project.

Description of the site and the direct surroundings of the project

Infrastructure The site is first and foremost a thoroughfare connecting Hamburg to Europe. The two large bridges cutting through the site is something every developer here has to take into account. The potential increase of tide that today is palpable is taken care of by large concrete walls.

Missing links At first impression, the site is not the most attractive and connections for human pedestrians and bikers is awkward. One could say the site is a missing link in itself, the only thing prioritized in the area is the traffic.



Utopian potential Thanks to this disconnection, the place takes on a whole new face at nighttime. As a construction site, the laws are diffuse and the bridges create a loud and slum-like landscape, attracting some of the trendiest nightclubs in town.

Description of the thematic focus, goals and motivation of the project

Conceptional idea and development Our main focus throughout the workdays was to capture the actual site. This is why we went to the site on a daily and nightly basis to collect film and sound footage, to party at Vanessa 16 or simply to walk along or swim in the Elbe river.

Interpretation of "link" As mentioned, the site seems almost disconnected to Hamburg's city center, though it is situated very close. This is a quality. It makes the site interesting and gives it a value of being a hidden treasure. It's the missing link you may know where to find.

Relevance for future cities The understanding of disconnected places has relevance to any current or future city. Especially a future city in which more and more architecture and infrastructure will rely on data collection of human behavior. The HafenCity project site is an example of a place that has not yet been shaped to meet the masses but is still a space for individuality.

Christian Østerby

At B.I.S.S., I was able to strengthen my understanding of approaching normal tasks in different and even unusual ways, which led to results in projects that wouldn't have been obvious in the "standard procedure."

Description of the final design

Utopian idea The exhibition and workshop Touch Me culminated as an expression for how the area should be designed interactively, rather than being the final design. Our utopia was to find a way—a tool, a method, a medium—to let the people of

Mentors' comments on Infra

The group's curiosity and will to investigate, in the broadest sense of the word, was inspiring to say the least. The students truly "lived" their project in an architectural and sociological nod to method acting. Swimming, clubbing, filming, sketching—everything was an analytical tool in a group that worked very well together. The process became the project; and at the end of the B.I.S.S. it was impossible to tell where the process ended, and the outcome began. Therein lies the strength of the project—it should be read as an approach rather than a solution—however, it is also its weakness. The outspoken will to "not make an architectural" project makes, at first sight, the result hard to read. But if one scratches beneath the surface (as one should), the whole magical world of the investigate process starts to come to life and suddenly it is beyond doubt that there is a lot to learn from it.

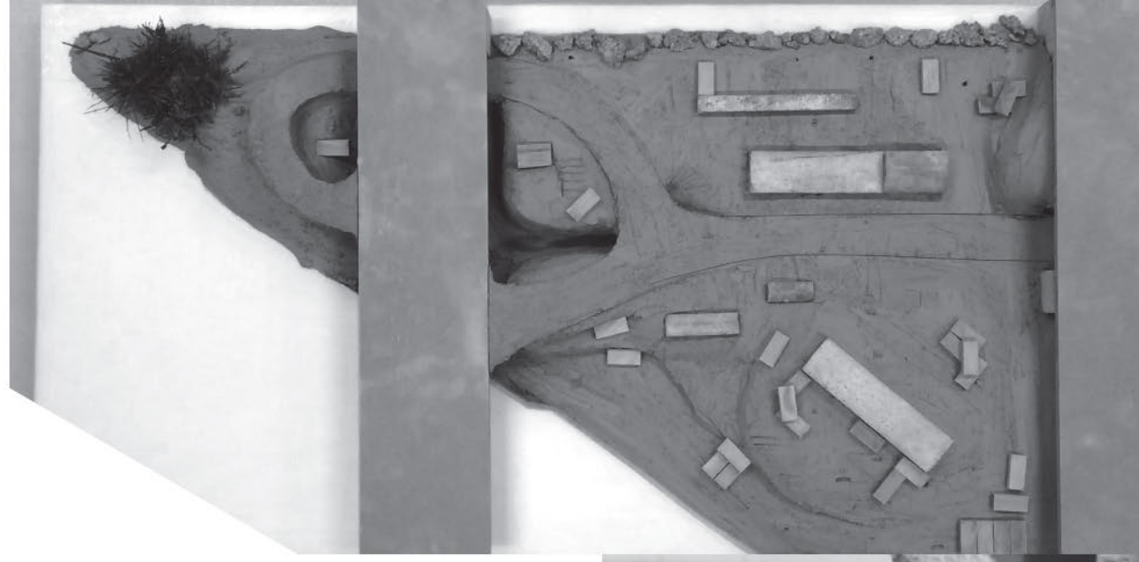
Hamburg shape the area in order to create and design a space in which every inhabitant of Hamburg would or could be represented. This mindset was spiked by the sense that the entire HafenCity has been planned by the same hand, creating a manufactured area that attracts only a certain part of society.

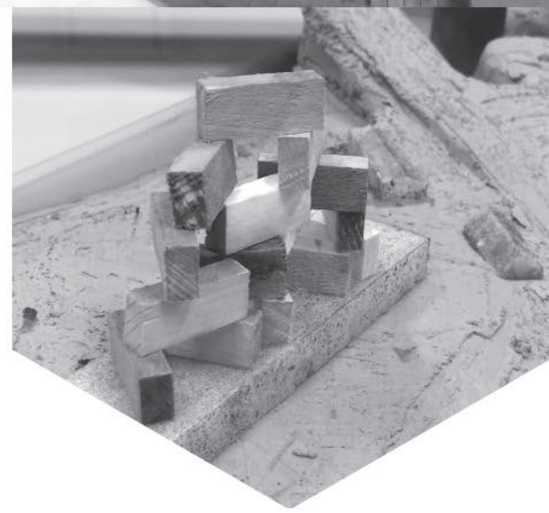
Furthermore, Touch Me was an exhibition with a sharp contrast to modern master planning that is usually characterized by ideally pictured parks, family-friendly streets, shopping facilities, "nice" neighborhoods, pleasantly polished office buildings, etc. This contrast was intended to remind the viewers of what the area actually was, showing its qualities and that these should not be neglected. The exhibition also held internal contrasts—shifting soundscapes from the speakers and contrasting motion pictures (sunny landscapes and dark, rainy dungeons)—which should serve the point that we allow every contrast to exist and embrace every person possible to influence and represent the area.

The final product strove to capture the quality of the site. By projecting film clips from the site while loudly playing a 40-minute-long sound recording from the night club Vanessa 16, the audience experience the site as being closer.

The most important details and characteristics of the project

Contrasts Contrasts became a recurring element of our project. We found it everywhere in the understanding of public (net) works, in the project area and the surrounding areas. We found contrasts in the way of thinking about the use of the area and the contrast between a desolate container city to a multi-million high-rise master plan. These contrasts were in focus in the final product—the exhibition—and the exhibition was a contrast to the rest of the exhibitions.





Interaction Embracing contrast, our project focused on the interaction of people—making them create an area touched and shaped by people with different backgrounds and different intentions—making them coexist as a whole. Interaction was another great focus point at the exhibition, where we encouraged people to interact with the entire setup based on what we know best as human beings: feelings. The viewer was given the chance to touch and shape a clay model of the area—with minor modifications—that occurred as one of the main components of the installation. Tools were given in order to awaken the urge to create an impact as the "user" of the exhibition space, not only on the clay model, but on the surrounding walls as well to express, for example, statements, graffiti.

People The main focus of the project can be summarized in one word: people. Throughout the workshop, the project was designed to put the people first, as opposed to a very decisive master plan "forced" on the area and thereby on the people. In order to break with this, the project sheds light on this problem, taking into account that it is not going to come up with a final solution, but rather start a debate about the balance of power, money and how cities are formed in today's world. The project could very well seem like nothing more than a provocation to the agencies forming our cities, but is intended to remind everybody that we should all be given the chance to be heard and have influence.

Karl's comments on B.I.S.S. 2017

It is inspiring to meet such a diverse group of students held together by curiosity, imagination (adding swimming and clubbing to the architects' toolbox), ambition and, last but not least, newly formed bonds of friendship. I'll take the investigate joy home with me and will try to remember that for every good project you do, having fun is an important part.

We focused on having a set of clearly structured tasks but with a looser content or findings as the basis for the initial group work. We used text (1), drawing (2) and model (3) applied in a waltz rhythm (1, 2, 3) to get the students starting to curate and frame what they thought that infrastructure could mean. It was our hope that this rhythm would not only structure their early investigations but also find its way into their final projects.

I believe that a strong framework with a defined format allows you to be freer in the way you conduct your investigations. If that framework can support you through the iterative and painstakingly inconsistent design process it can give your free ideas more space to move. In future I would fine-tune what and how much to define to allow for as much as possible of an unexpected but in hindsight obvious outcome.

Olga Rybicka
GUT, Gdańsk
Architecture
Olga's main interest is design for children. She's playful with her ideas and not afraid of bold concepts. She is also patient, extremely precise and a down-to-earth team member, helping the team to keep to the time plan.

Einar Persson
Chalmers, Gothenburg
Architecture and Civil Engineering
Einar is a really productive team member, also without a computer. Studying both architecture and civil engineering, he is very good at rendering by hand and finding solutions to make ideas work. He has a way with words and putting explanations down on paper.

Annika Laidroo
TUT, Tallinn
Architecture and Urban Planning
Annika is the idea generator of the team. She is patient yet demanding. She doesn't settle for an easy solution. She sees the complexity of a project and brings in a wide array of ideas that all relate to the problem.

Kitwai Chan
KADK, Copenhagen
Computation in Architecture
Kit is the happy one of the team. He is not affected by the pressure and helps to keep the whole team motivated. He is always determined to finish what he started and helpful with all aspects of work.

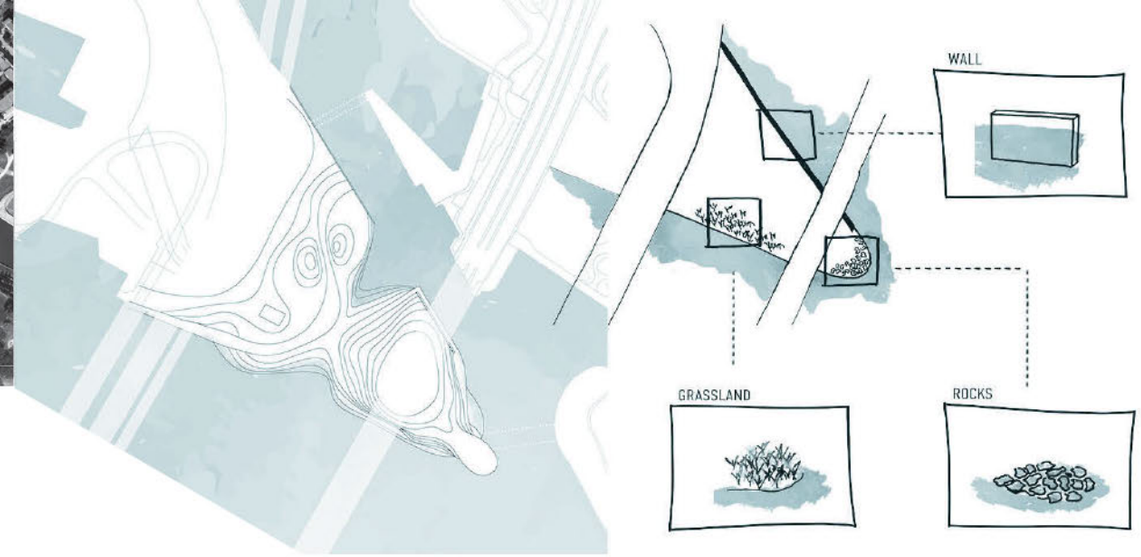
Einar Persson

Working, living and spending our leisure time with other students with whom we had a lot in common through architecture and engineering, but who were also from vastly different cultures was transformative.

14 Waterhub

Mentors' comments on Waterhub

Working with water in all its shapes and forms made for a very strong project with a firm local connection yet a global relevance. Water was used as an instrument, inspiration and idea throughout the whole project, knitting several different parts and techniques together to form an assemblage of proposals and solutions. A critique was that what the project had in variations and possibilities, it lacked in clarity and definition. The mentors choose to see this differently: the many options are a starting point for the many beginnings, not an end for the one solution. If time had allowed, numerous projects investigating water as a phenomenon would have arisen from the foundations laid. It must also be said that the clear and beautiful drawings made this project a pleasure to mentor.



Description of the context of the project

Historically The Elbe is Hamburg's gate to the world. The trade opportunities provided by the Elbe have allowed Hamburg to prosper and its flow and floods have changed the cityscape directly. Hamburg has in turn shaped the river by its people building canals, reclaiming land and dredging.

Socially The river itself has been cut away from the inhabitants as the riverfront was filled with ports and industries. After the bombings of the Second World War, the area was empty, waiting to be used again and being opened for new functions.

Structurally and architecturally The HafenCity project is considered the largest urban redevelopment project in Europe in terms of land mass. However, the site at the end of the district doesn't seem to belong to the area as it's been cut away with many bridges that dominate the area without any connections to the water.

Description of the site and the direct surroundings of the project

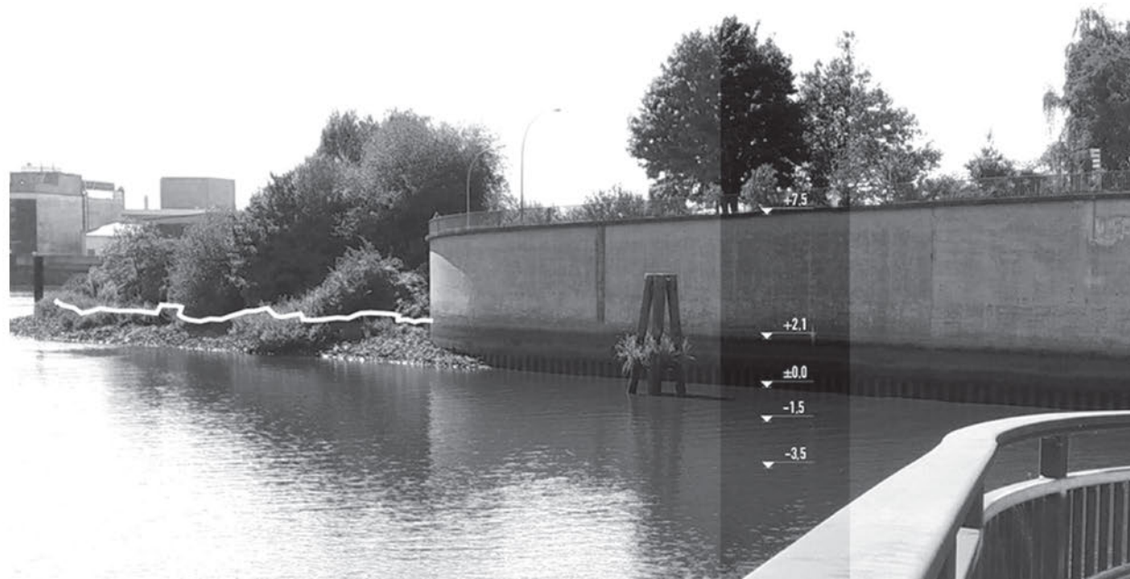
Infrastructure The site is surrounded by the water from two sides and by vast bridges from the other two sides. The site right now looks as if it is used only for the road that connects to bridges leaving just traffic in the area without any pedestrians. The future transportation hub seems to have only relevance to the other side.

Missing links Bridges are usually defined by their connecting feature. However, these bridges are cutting away this site from surrounding sites and disconnecting the greenery starting with the Lohsepark on one side and the Elbpark on the other side. Another missing link is the connection with the water. The edges with grasslands and rocks on the riverside and a high protective wall on the canal side make water unreachable for the people.

Utopian potential The isolated site would make more sense to be absent from the map, which led to an idea to let the area be flooded to make people understand nature and the changes happening due to climate change. Public works are not responsible only for the immediate well-being of people, but also for well-being in the future. Altering the landscape still allows to have buildings above it in the next stages.

Description of the thematic focus, goals and motivation of the project

Conceptional idea and development The basic concept is to create a landscape which interacts with the tides of the Elbe, inviting the river to change the land. As the tide rises, a large part of the site floods, creating



Michałs comments on B.I.S.S. 2017

The immediate results of summer schools like the B.I.S.S. are difficult to anticipate. The motivation, professional and social skills of the participants as well as the compatibility and team play of the mentors involved are crucial and only partially foreseeable.

By means of physical and digital models as well as drawings, the students explored to what extent patterns and principles of material organization and agglomeration can act as generative factors in the design of buildings, urban infrastructures and networks.

Similar to its previous editions, the full impact of this summer school will only unfold in the future and continue to benefit not only the students, but also everybody else involved.

unique dynamics while also referencing the past floods of Hamburg and the future threat of global warming.

Interpretation of "link" By flooding the area, the two bridges are disconnected for vehicles to allow more pedestrian links through the site and also to allow people to walk by the water with different levels of the tide. This connects people with water and by making spectacles out of the natural tidal movement, it is possible to find an emotional way to link with the water.

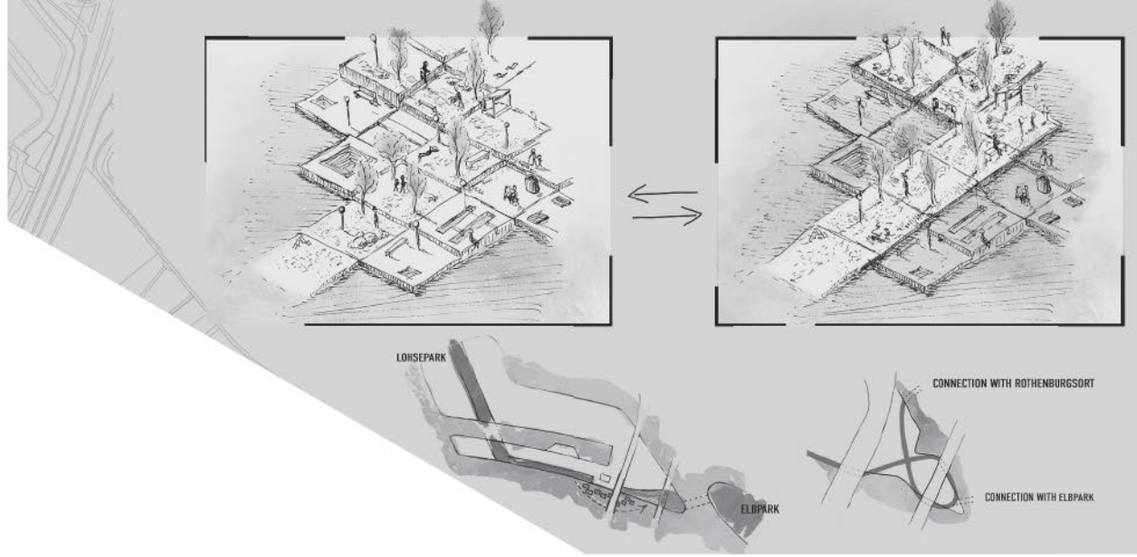
Relevance for future cities With the rise of the sea level and more storm surges, cities are defending themselves with higher and higher protective walls that take people further away from the water itself. In the future, cities should find a way to understand the natural forces, know how to live with and make use of them.

Description of the final design

Utopian idea Waterhub is a landscape designed to flood, designed to visualize the tides. In order to achieve this, the landscape is stepped so that large parts are flooded in an instant as opposed to a natural landscape where the land recedes bit by bit as the water rises. To further strengthen this interaction, the project features basins which flood in dramatic fashion when the river reaches the edge.

The link Waterhub is intended to be a place where the people of Hamburg can discover and connect with the Elbe river. The project also serves as a missing link in a chain of greenery between HafenCity and Rothenburgsort.

Implementation of the link By walking through the area, it is always possible to choose a path just by the water. The land has been given back to the water and at the same time taken from it to make a link with floating paths filled with greenery. The floating units go under the bridges and climb up the landscape of Waterhub. At low tides, they integrate into the landscape, acting as a patch of green. As the tide rises, they rise with it, leaving the landscape submerged.



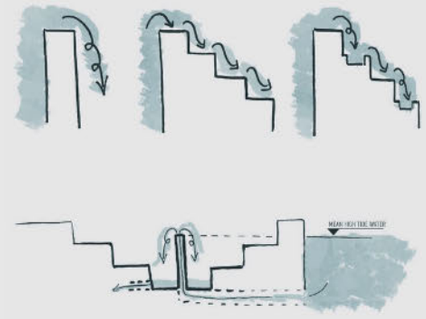
The most important details and characteristics of the project

Making the tide visible Waterhub is a public network to bring water to the people with its natural forces and characteristics to make the movement of tides and rising of sea level easily understandable and noticeable to everyone—otherwise unnoticeable changes in water level have a big impact on the landscape until cthe area is covered with water during high tides.

Cleaning water The water of the Elbe is unfortunately not very inviting, so a simple purification system is integrated in the landscape to make the water attractive and show the possibilities of how the water can be used. The clean pool is intended to become a unique place for leisure but also to teach visitors the principles of water filtering and the value of the Elbe's water.

Bringing back water and small industries The project is a public platform for further development for entrepreneurs to see the benefits of the sustainable use of the Elbe river. The first stage is to create a platform for future developments contrary to the rapid developments in HafenCity now. The second stage of the project is to facilitate future development through the entrepreneurship. The project is a platform for different uses from temporary pavilions and installations to facilities that want to work with local water.

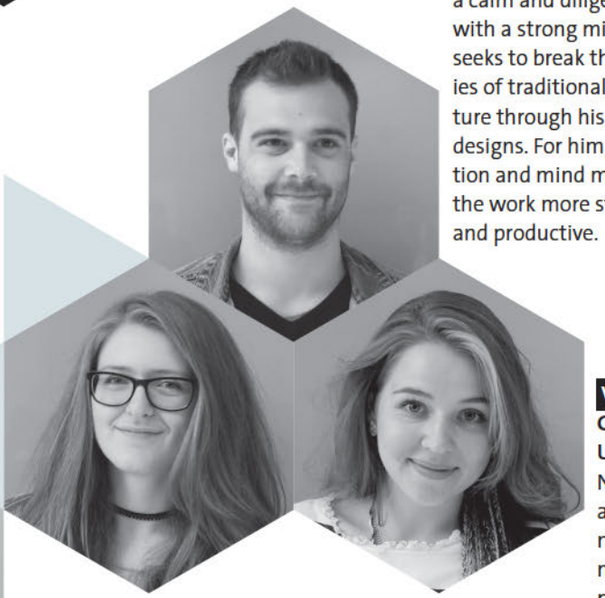
Natural forces



Veronika Zhukova

The B.I.S.S. allowed me to see many different projects relating to the same area. I saw a lot of options from different teams. All said similar things, but in different ways and this gave us the opportunity to dream and develop each idea further.

Mouloud Bachir Cherif
ITMO, Saint Petersburg
Urban Informatics
Mouloud is a team player with good communication skills. Hard-working but always open for a good laugh. Interested in the dynamics between urban design, architecture and society. Focused on making the project feasible and on having it correspond with the local context.



Enrico Pontello
KADK, Copenhagen
Architecture
Enrico as a natural leader is a calm and diligent worker with a strong mind. He seeks to break the boundaries of traditional architecture through his innovative designs. For him, visualization and mind maps make the work more structured and productive.

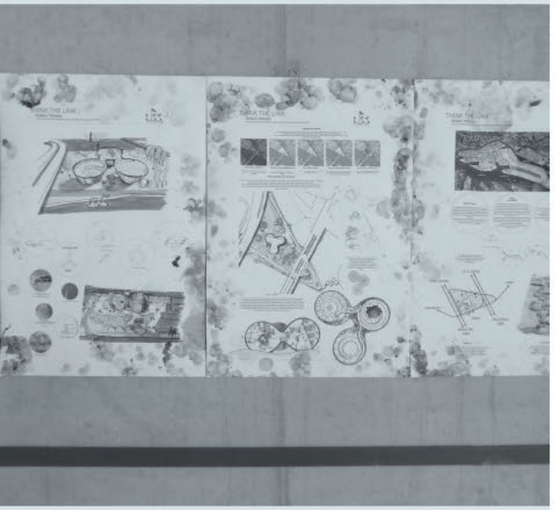
Katarzyna Muzyka
GUT, Gdańsk
Civil Engineering
Kasia is a strong-minded person. She thoroughly assessed the project's feasibility and encouraged a grounded approach. She likes to analyze things thoroughly and uses this as a motor for her creativity. Eager to run projects with structured methods and exercises that open the mind.

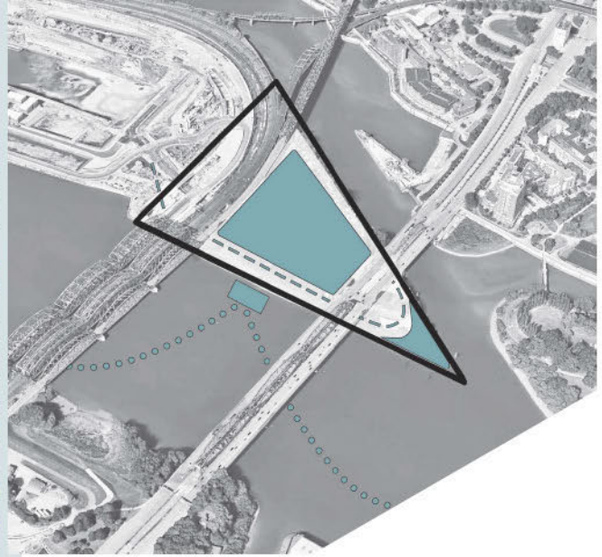
Veronika Zhukova
GASU, Saint Petersburg
Urban Planning
Nika is an optimistic person and a passionate artist and not least the originator of most drawings in our presentation. Interested in the interaction between architecture, space and users, she is able to recognize new opportunities and has a great deal of initiative to pursue such opportunities.

15 Bubble Trouble

Mentors' comments on Bubble Trouble

Inspired by Buckminster Fuller and the Eden Project, this scheme envisaged a lightweight yet vast structure, covering as well as knitting together the many transportation modes of the site—pedestrians, S- and U-Bahn, cars and river boats—to form a spherical transportation experience: something very different from your everyday commute! But there is also another hint in the title of the project—the group work wasn't always frictionless and there was sometimes a struggle to focus. Despite that, the students never lost faith or stopped working and in the end, the many hours they put in did indeed materialize into a project they (and we) were proud of. During the whole B.I.S.S. there was laughter and discussions, co-work and compromises and a lot was learnt for the future—in equal amounts amongst students and mentors.





Description of the context of the project

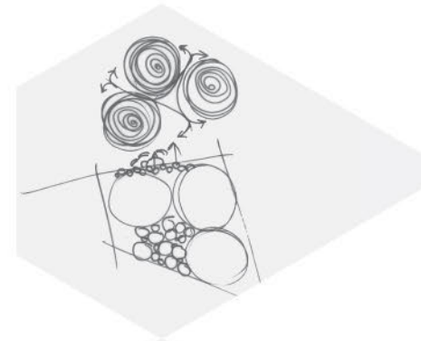
Historically At the end of 19th century, the current HafenCity zone was used as an extension of harbor areas and trade locations, built up with docks and port installations. The project of inner-city development and urban regeneration was established in 2000. The completion is planned for 2025.

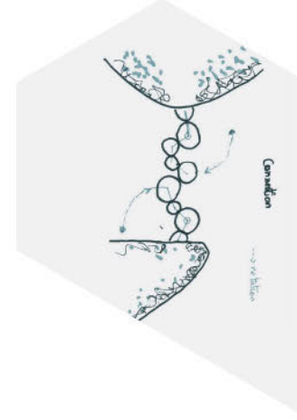
Socially The problem of social segregation and difficulty with public networks may occur. The integration of HafenCity with other quarters is a challenge. It is desirable for the zone to be attractive for young families.

Structurally and architecturally According to the master plan 2010, the quarters close by have their own profiles. The Baakenhafen is a place of habitat and recreation. Oberhafen is a space of creative and cultural development. The Elbbrücken is considered a location of economic activity and a residential area. Architecturally, the premise was to diversify the types of buildings, while achieving the effect of the whole composition according to a clear definition of the public networks.

Katarzyna Muzyka

This extraordinary opportunity will have a great impact on my future work practice. Co-working in an interdisciplinary environment was a novelty for me but it will be crucial in my profession. In addition, I have learned how important it is for the group to control and navigate team dynamics in order to undertake the task.





Description of the site and the direct surroundings of the project

Infrastructure The considered area is a well-connected transport node containing a regional railway station, bus stops and highway access. The nearby bridges operate as entrance points. However, it is a spot of noise and pollution cumulation. In the near future, this transport node will be crucial for the whole HafenCity district.

Missing links There is no connection with Rothenburgsort and its green areas. In addition, the ferry line could also be extended. The area is isolated in between two bridges and seems inaccessible and inhospitable.

Utopian potential The area would become not a "go-through" place but an actual location where people can stay longer. There would be some commercial and social spaces which would allow users to meet their needs.

Description of the thematic focus, goals and motivation of the project

Conceptional idea and development/balanced concept Sustainability, efficient space development and meeting people's needs are the main dominating factors of the implemented balanced concept. Providing the foregoing goal would be accomplished, the considered area, now deserted, would transform into an integral part of HafenCity, the whole of Hamburg even.

Interpretation of "link" Referring to the main concept: a layered number of connections will be established with nearby areas and public (net)works being instituted.

Relevance for future cities/public (net) works Understanding the meaning and influence of public works on the city structure is based on the connection material and immaterial aspects of networks. Public work should be considered as any place or

infrastructure with significant accessibility. The other dimension of the subject is associated with any kind of social action, including public functions. The definition of network embodies many ambivalent features, but the most substantial ones, such as connectivity, adaptability and penetrability, are the ones that remain common for every network. The combination of the two afore-mentioned topics is the true sense of public (net)works.

Description of the final design

Utopian idea/bubble concept Complex activity of a system of soap bubbles and a mutual response to others which are broken is similar to the self-modifying adaptable network in case of damaged nodes. The triple nature of the project and direct visual link soap bubbles to the node of network is a parallel to an actual destination of this area. The perfectly balanced spherical form of a soap bubble resolves into an inspiration for the integration of diversified functionalities in one spot. The floating soap bubble, reachable from every side, is an image of an area considered accessible.

The link Increased flow of people and developed green areas would be conducive factors for creating an accessible spot for public gatherings. An imposing and connection of many networks becomes a merged node.

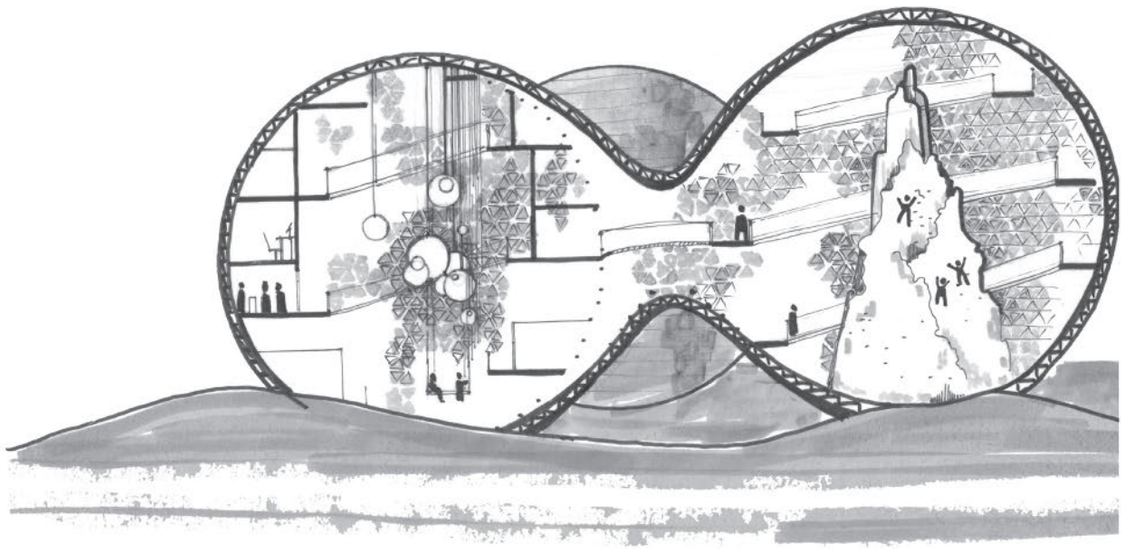
Implementation of the link The area would be expanded as a transport node with additional infrastructure like cycle paths, pavements and a port with a ferry station. An inhospitable tract of in-between bridges would become a hospitable space with additional value where people can stay for various reasons or walk through to another transportation. This variety of engagements would emit a social activity balancing the one brought in by the Elbphilharmonie.

The most important details and characteristics of the project

Balanced panorama The main concept behind balancing the HafenCity is to counteract the spectacular Elbphilharmonie building with less massive complexes. The considered area provides equipoised functionalities and infrastructure significant for the local zones. Likewise, the impression of the balanced sight from the Veddel perspective would be preserved.

Connectivity amplification The movable bridge would create a visual and physical connection between nearby districts and green areas. The construction is a continuation of the main concept and creates the doubly functional adaptable link: public recreation close to water space and infrastructure. The new crossroads would establish the project as an element of the Elbe river network.

Multi-functionality The combination of diversified and interior balanced functionalities would allow to attain the need of potential users. The three user groups were identified as the citizens of nearby areas, the office workers and the public transport users. The proposal of layered public spaces would contain a climbing center, restaurants, manufacturing shops and offices.



Participants

B.I.S.S. 2017

See you next year for B.I.S.S. 2018

Full list of participants

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Steffen Reis

The professional reality is really interdisciplinary!

When city transformation and evolution starts, what are the tools for successful strategies for urban interventions? How is the digital planning to digital fabrication process? How engage are the new professionals? And how could this influence the future of the bridge design?

These and other questions were analyzed by more than 60 students representing various disciplines of built environment and working together in international and interdisciplinary mixed project groups within the third Baltic International School (B.I.S.S.) – "think the link". The B.I.S.S. launched by the HafenCity University Hamburg together with eight international partner universities from the Baltic Sea region aims to develop, test and implement new ways of the interdisciplinary teaching, learning and designing as well as search for ties and correlations between experiences, cultures, cities, in particular around the infrastructural juncture along the Elbe Bridges, was chosen as the area to be explored and worked on for 2017´s "City Elements – Infrastructure and Networks Shaping Harbour Areas" topic.

This publication serves as a source book for fresh and unconventional urban development and intervention in harbor cities as well as an inspiration for successful interdisciplinary working, teaching and learning. On top, it gives a full documentation of the B.I.S.S. and expert comments on the 15 interdisciplinary projects that were designed during the ten day workshop in Hamburg in 2017.

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