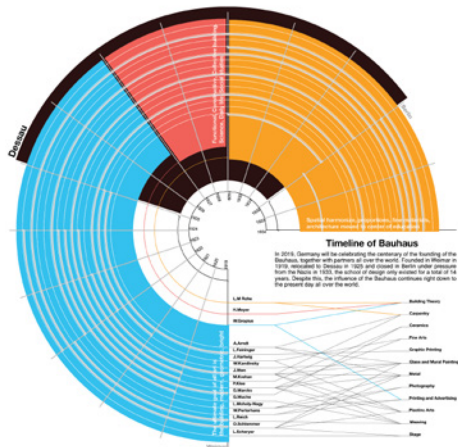


## **Research;**

Connection between theoritical and practical aspects from workshop

From the stage of the design for 100Y bauhaus pavilion, the theoretical and practical bases had achived. Histort and aspect of the bauhaus, and urban context became the foundation of the research. At the same time, one of the method for design language, procedure modeling process also started. In order to implement the design princple from the theoretical research and purpose of ‘being an architecture, not an only sculpture’, the procedure process was accepted. To expand the possibility of the making, mesh control coding was also started.



History

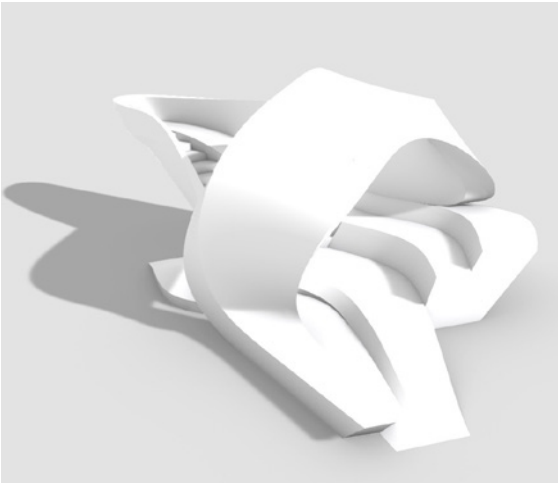


Context

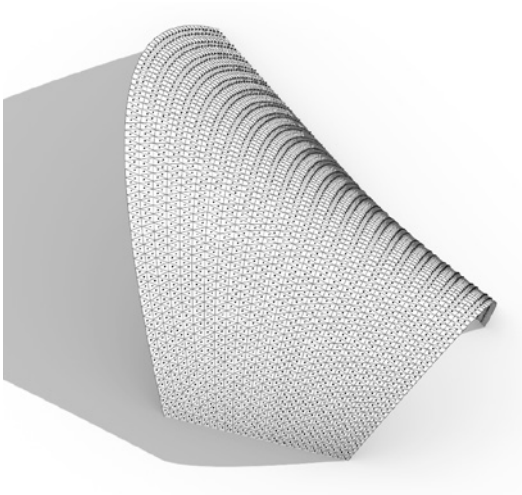


Bauhaus Aspect

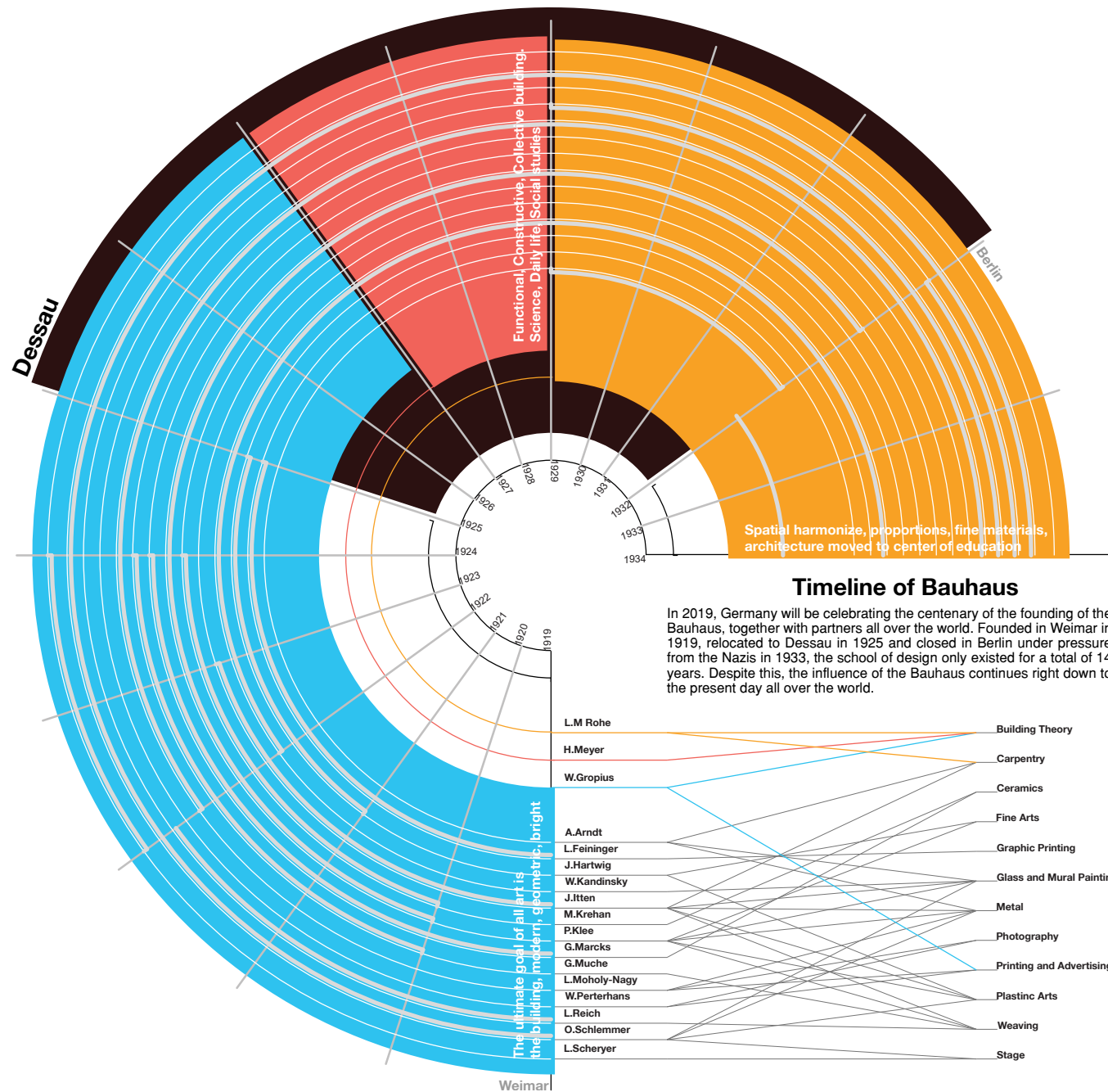
Practical Research



Procedural Modeling

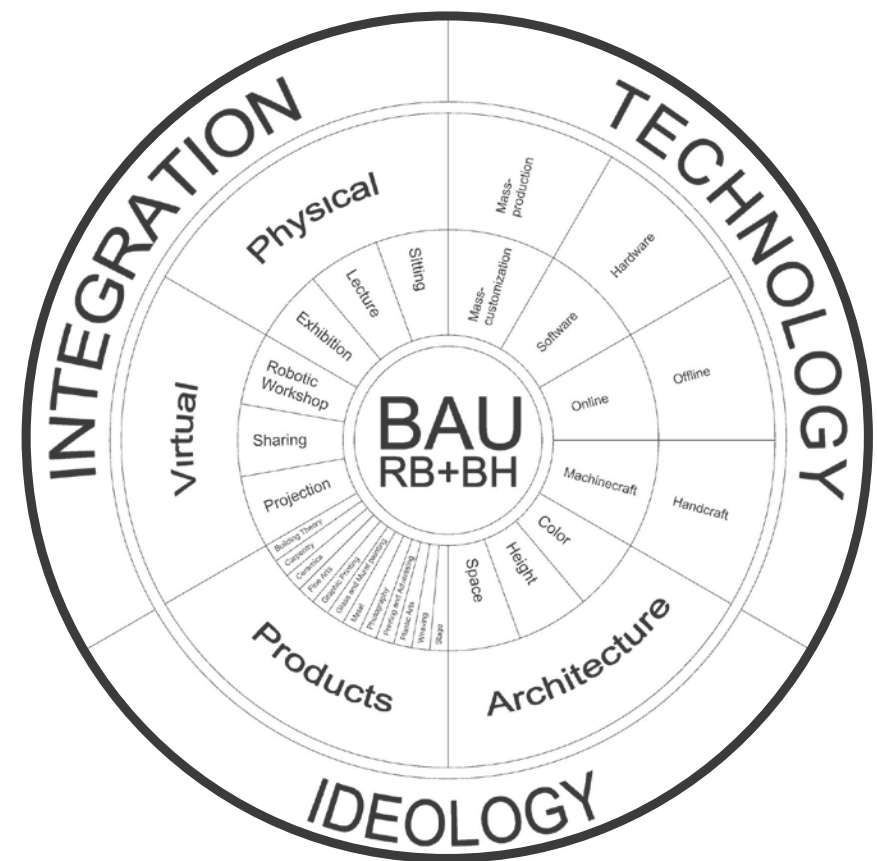
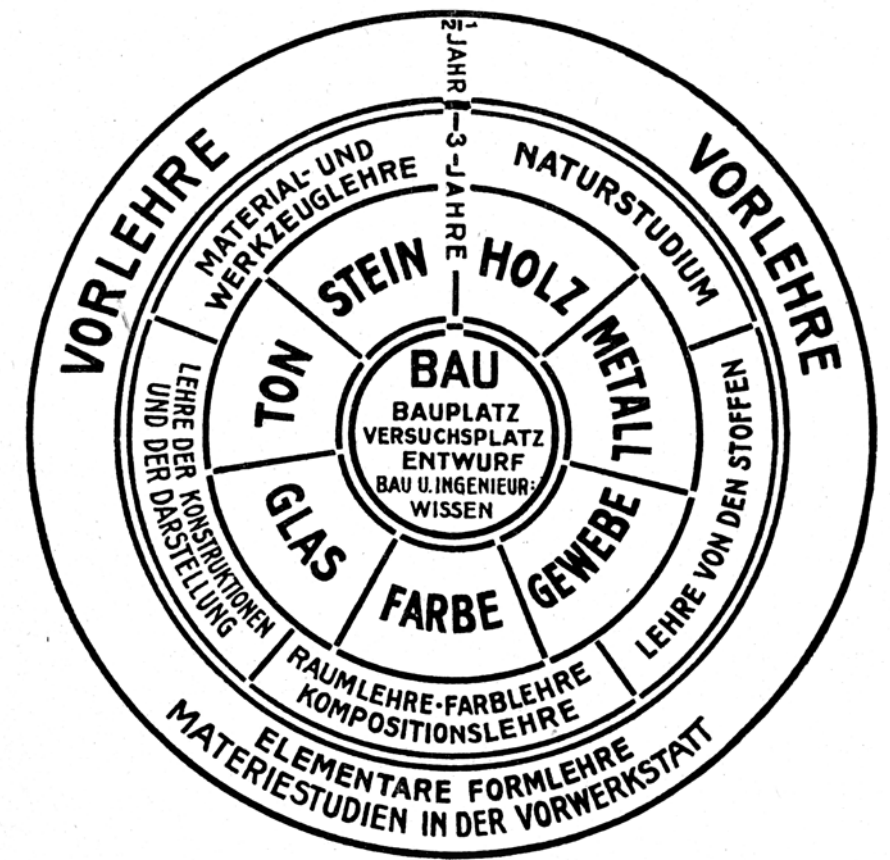


Mesh Data Management



## History of Bauhaus

The principle of the Bauhaus was now a style, but it was an attitude with diverse aspects. From the hand craft to industrial technologies, they accepted issue of the periods, and had expanded own boundary of the art and architecture. From this view, the principle of the 100year Bauhaus pavilion is suggested as new architectural implements with new technologies in this era.

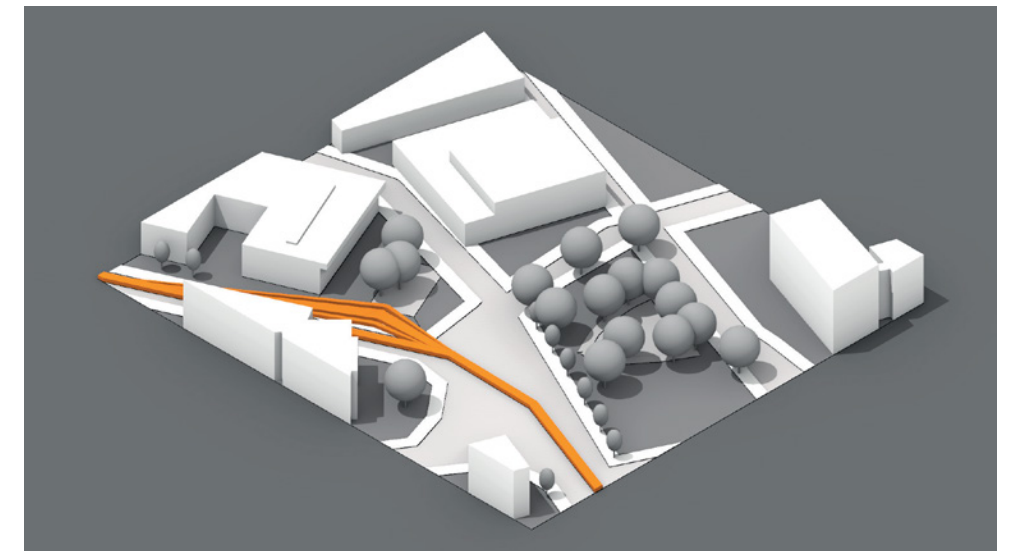
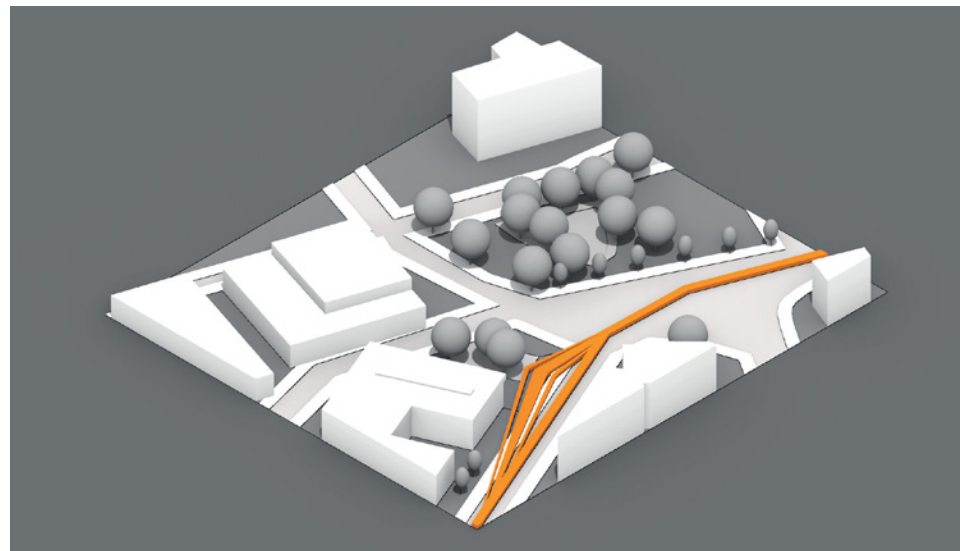


### Ideological continuity



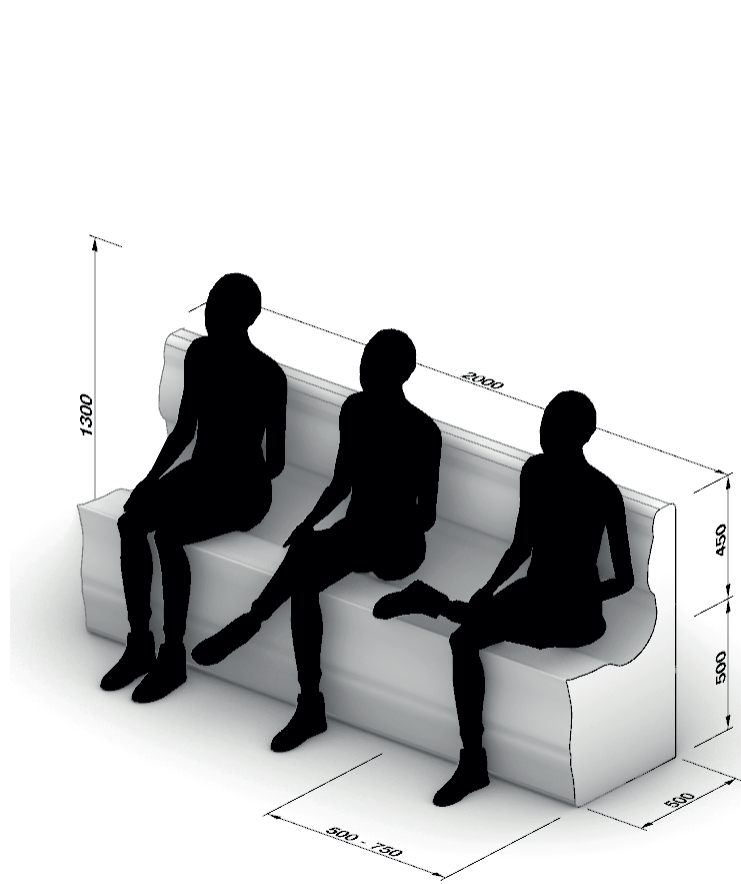
## #Research\_workshop-0

Main concept was 'connecting bauhaus' to the Dessau station with diverse activities. An invisible flow is suggested, and it is the location for setting the 'space' for the pavilion. Our main attitude wasn't suggesting just some geometry, or structural components. This project should be an 'architecture', 'building', and 'space' itself by containing activities, design aspects, and construction logic.

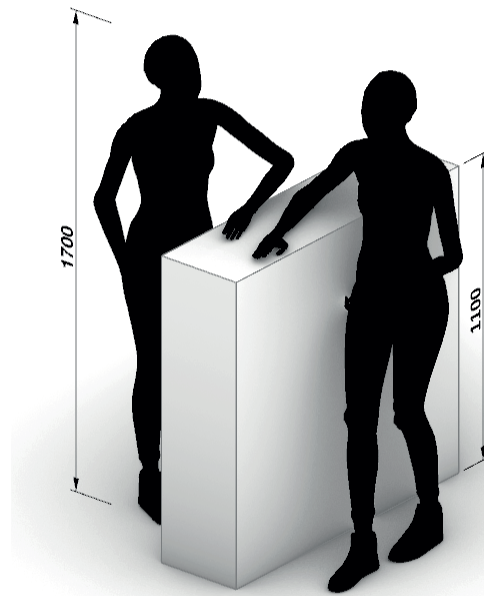


# #Research\_workshop-0

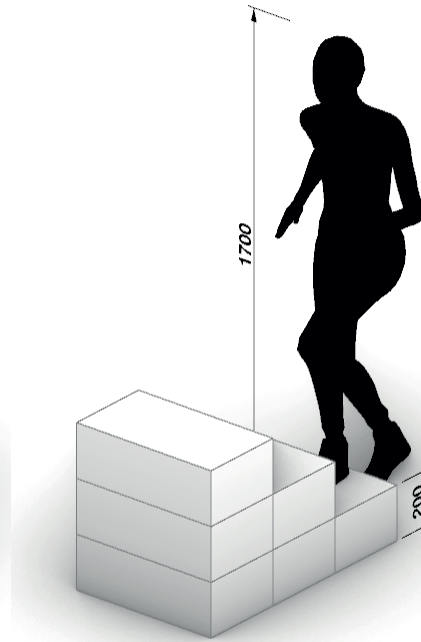
Activities are selected with the purpose ‘presenting information of the Bauhaus,’ ‘having exhibition about new technologies,’ and ‘providing functions as urban furniture.’



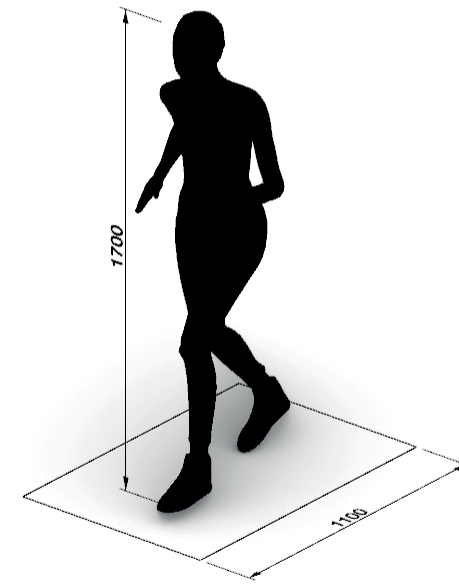
## Seating



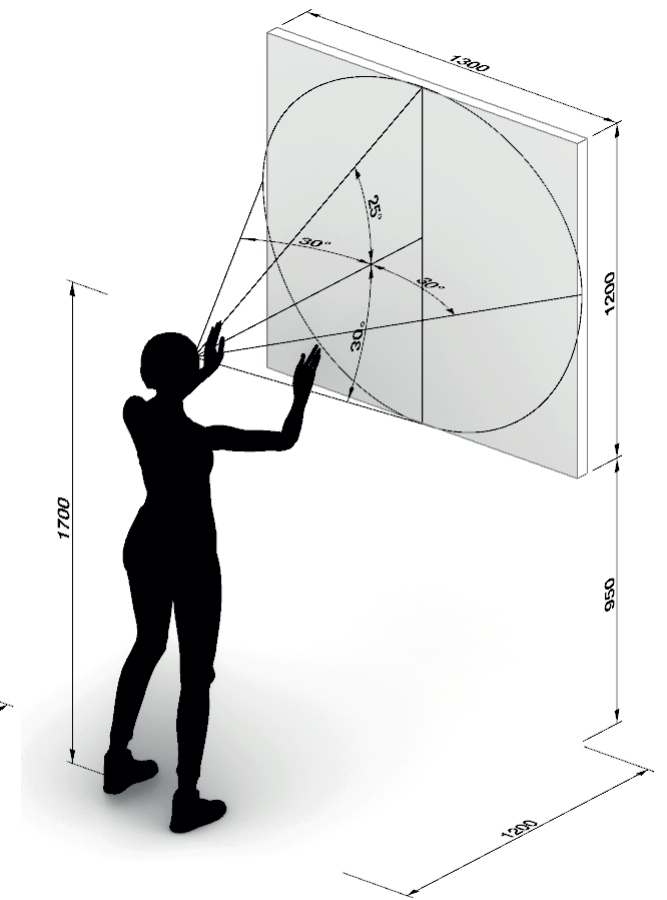
Bar



## Stairs



## Walking

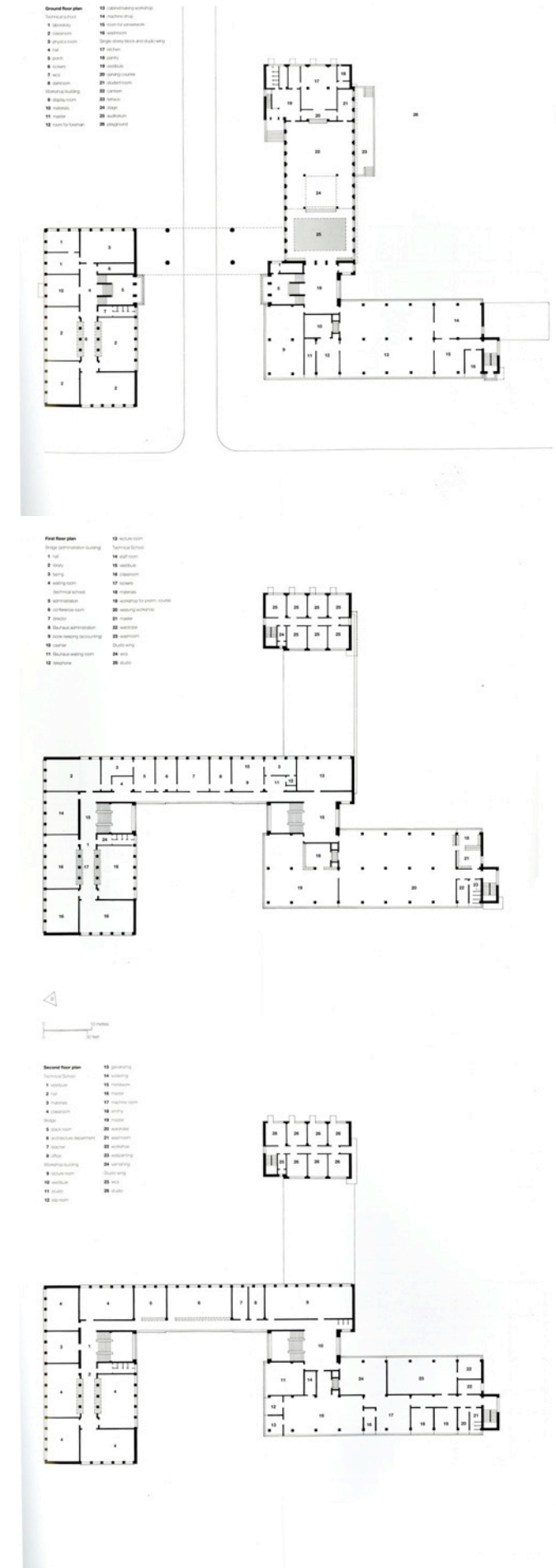
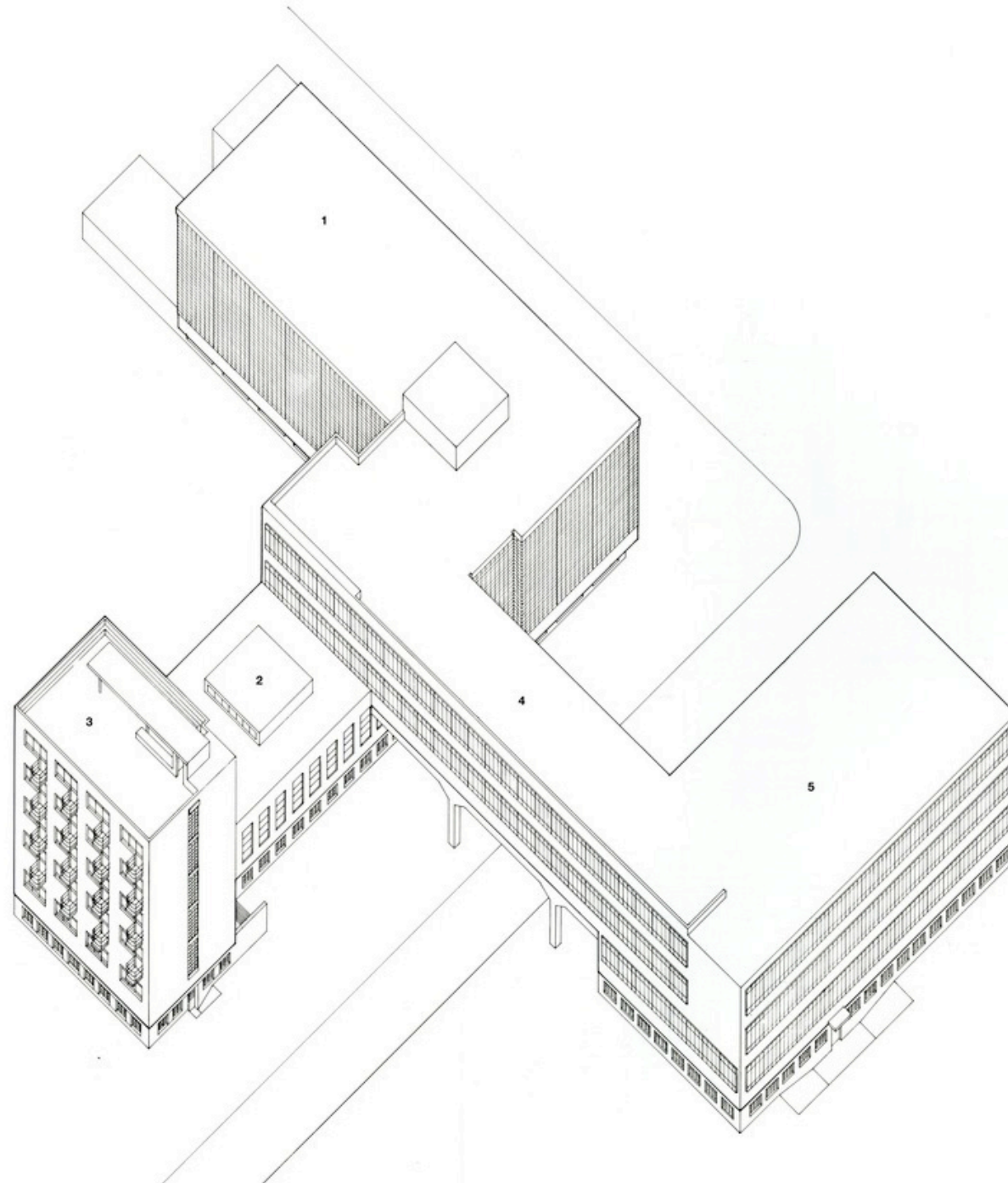


## Workshop



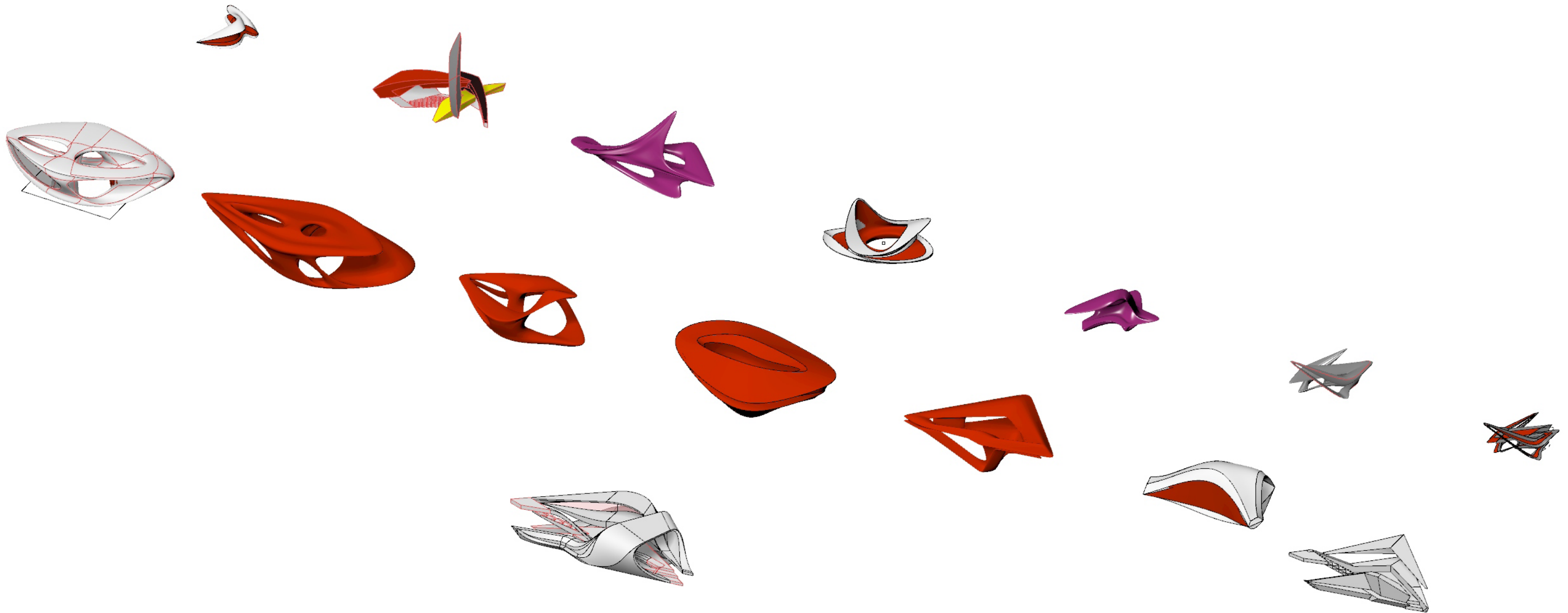
## #Research\_workshop-0

Architectural languages are suggested based on the Dessau Bauhaus. This modern architecture implemented organic shape with divers function with plan, height, and details.



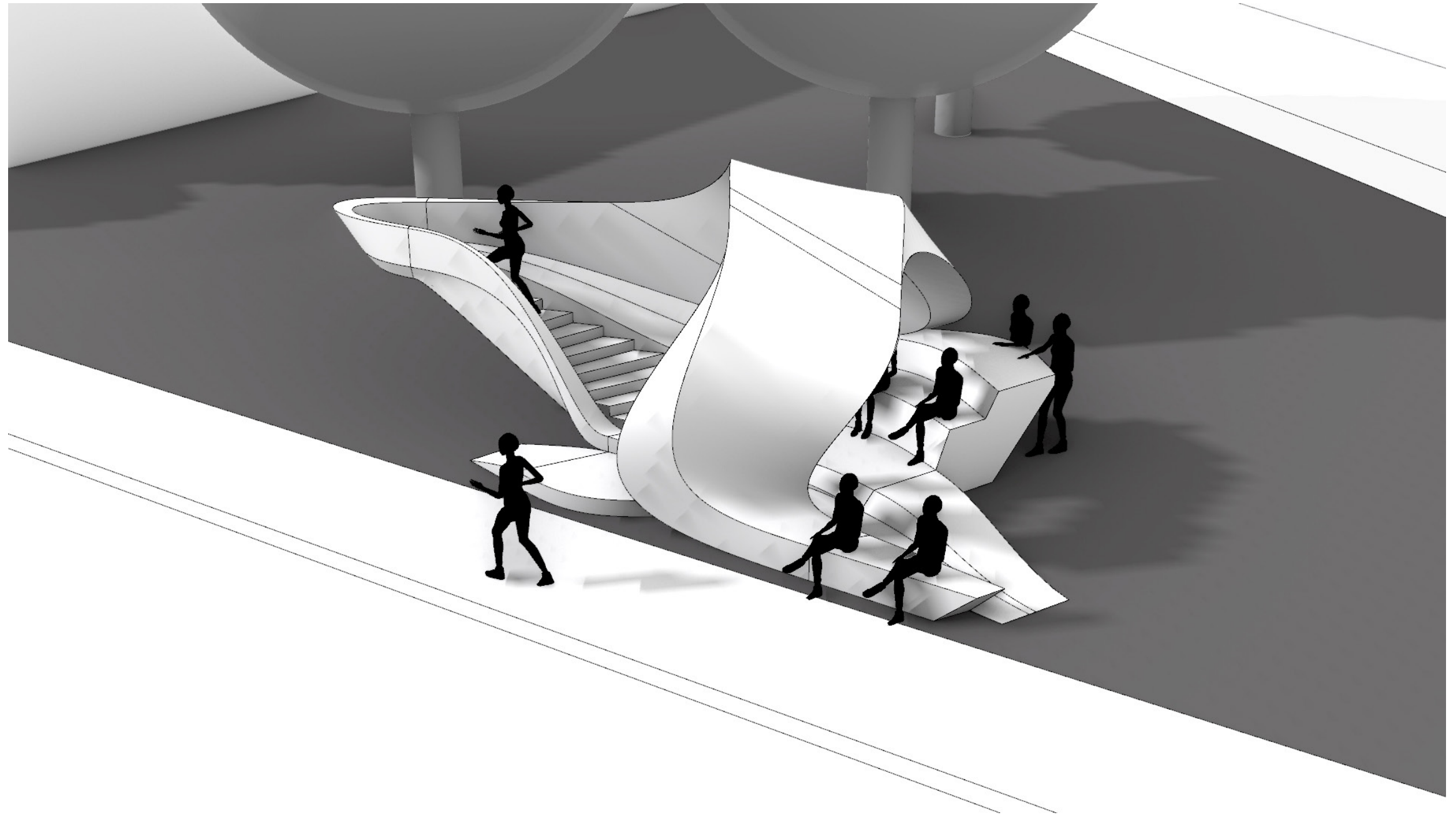
## #Research\_workshop-0

Diverse design languages was tested. With the diverse scales, geometric attitudes, and spaces, several options tested, which design can implement the principle of relationship with bauhaus and robotic building.



## #Research\_workshop-0

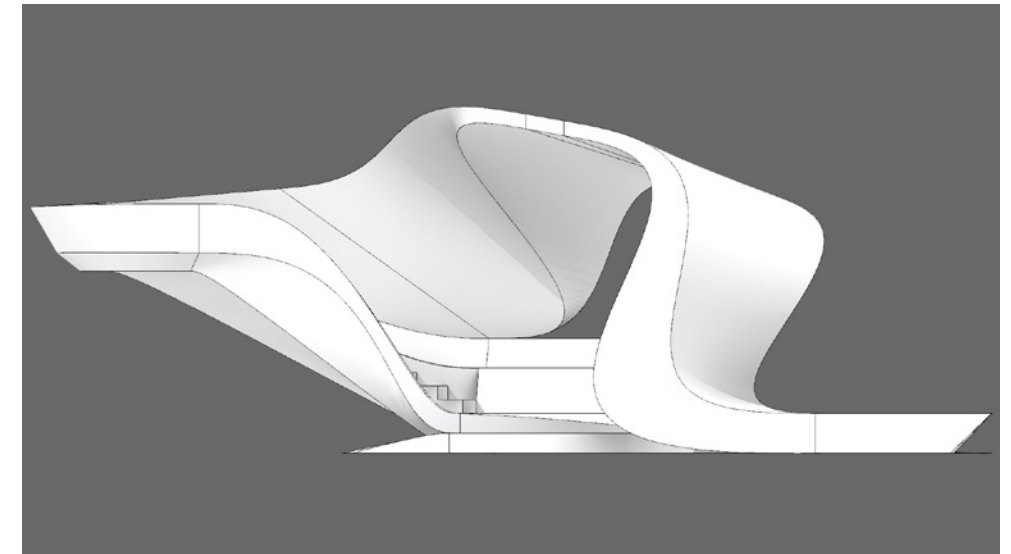
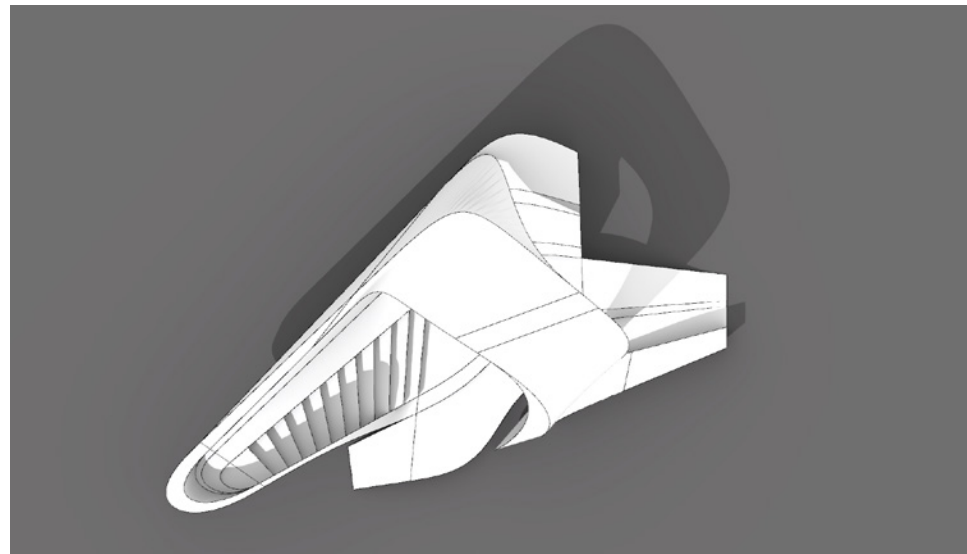
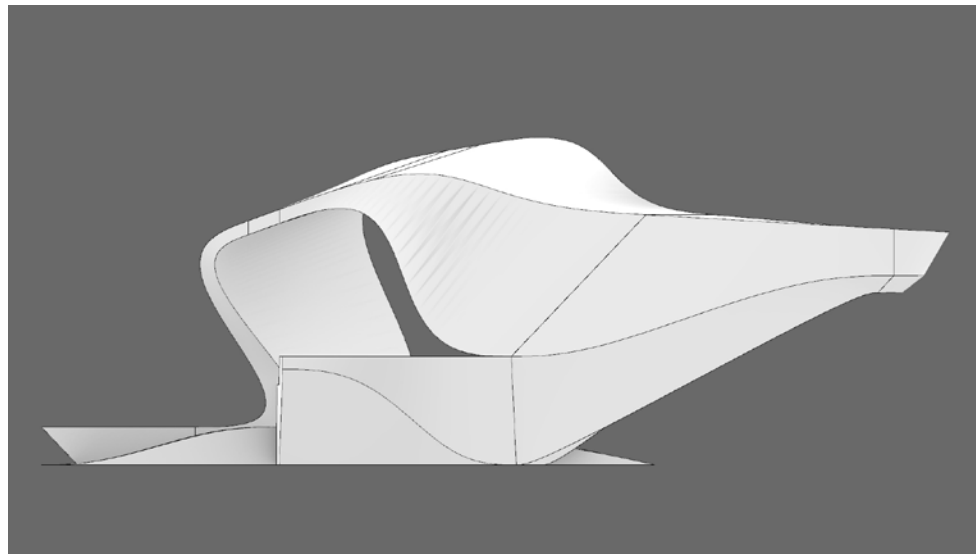
The selected option contains multiple activities with the space which connect the bauhaus and Dessau station. From the horizon to vertical, the geometric languages are also diverse. Even if the 'shape' is not similar with the Dessau Bauhaus building, but the principle is continuing in this option.





## #Research\_workshop-0

Furthermore, this result was based on the procedure modeling format. It means, by depending parameter, this design can be changed the scale, dimension, or function with same design principle. This part connects to the part of the design aspect of the graduation project.



## #Research\_workshop-1

### Theoretical Research

In the 2018 Msc3 Dessau workshop, the aspect about material, concrete and casting by EPS was tried. It was based on the theory of Brutalism which is considering the connection between architecture and raw concrete. But it is not a style, but a consideration about the technology and implementation of material properties. The parametric process applied into the modeling from structural analysis. The aim was that trying to achieve not only a structural modeling result, but also containing a beauty from the analysis.



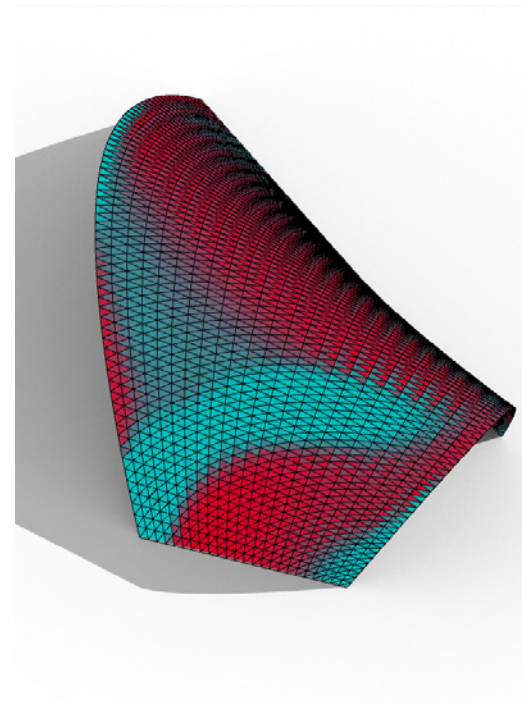
Material Properties



Theory of Brutalism

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### Practical Research



Structural Analysis

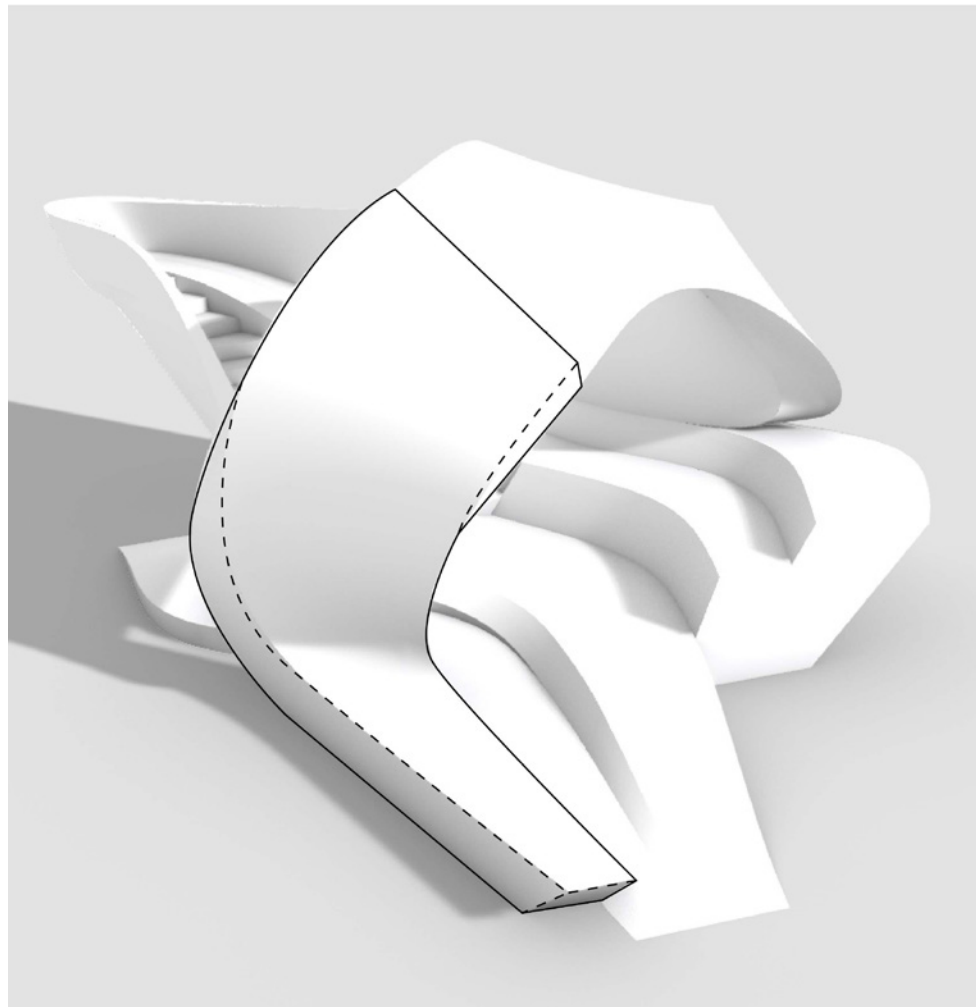


Parametric Modeling

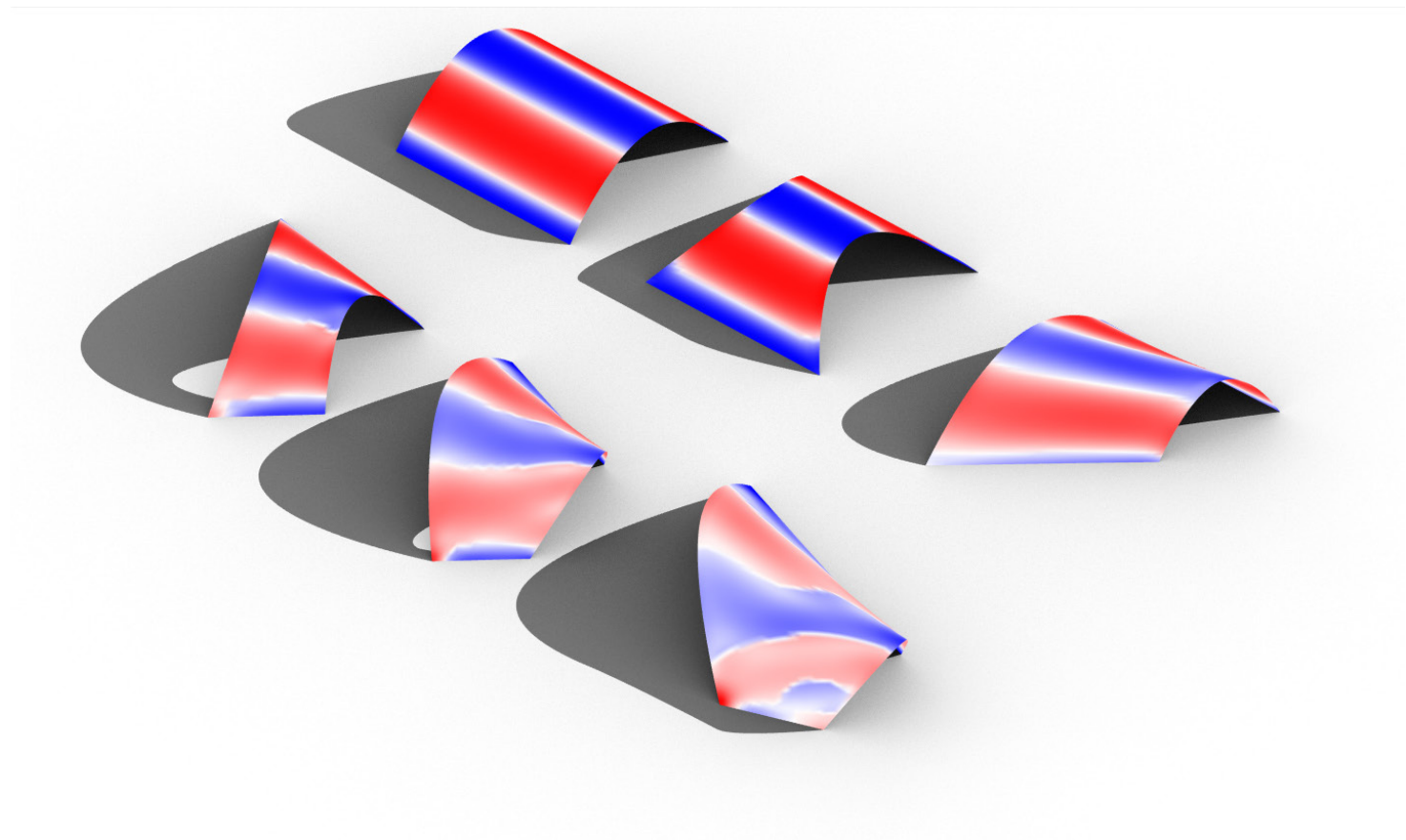
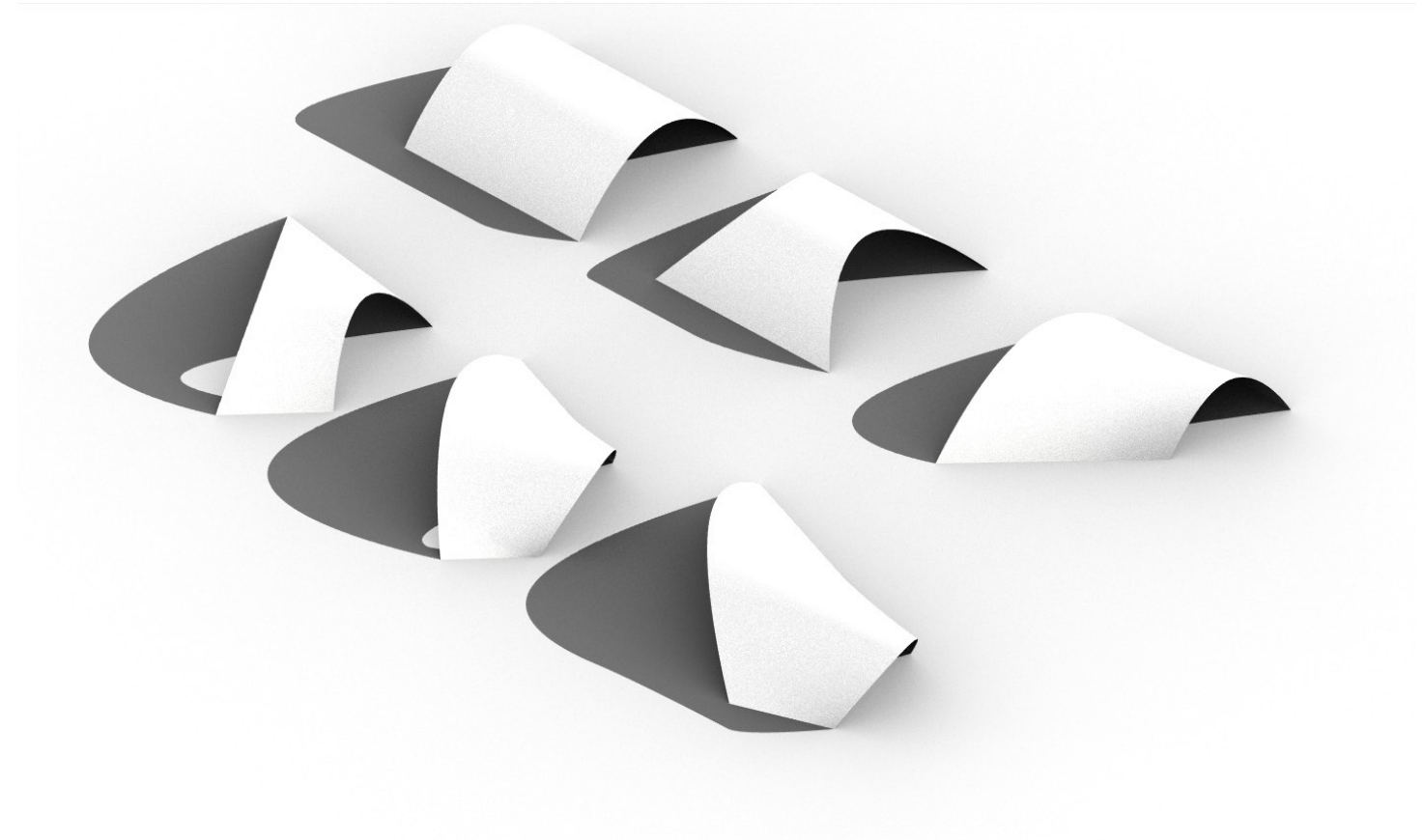


## #Research\_workshop-1

The main aspect of the prototyping was based on the theme of 'how to implement material property to architectural aesthetics with reducing the process of construction.' The part for the prototyping was selected from the Bauhaus pavilion, and custom coding was suggested to generate an adjusted mesh to make the similar situation with the selected part. From the mesh, structural analysis is excused.



Selecting part for prototyping

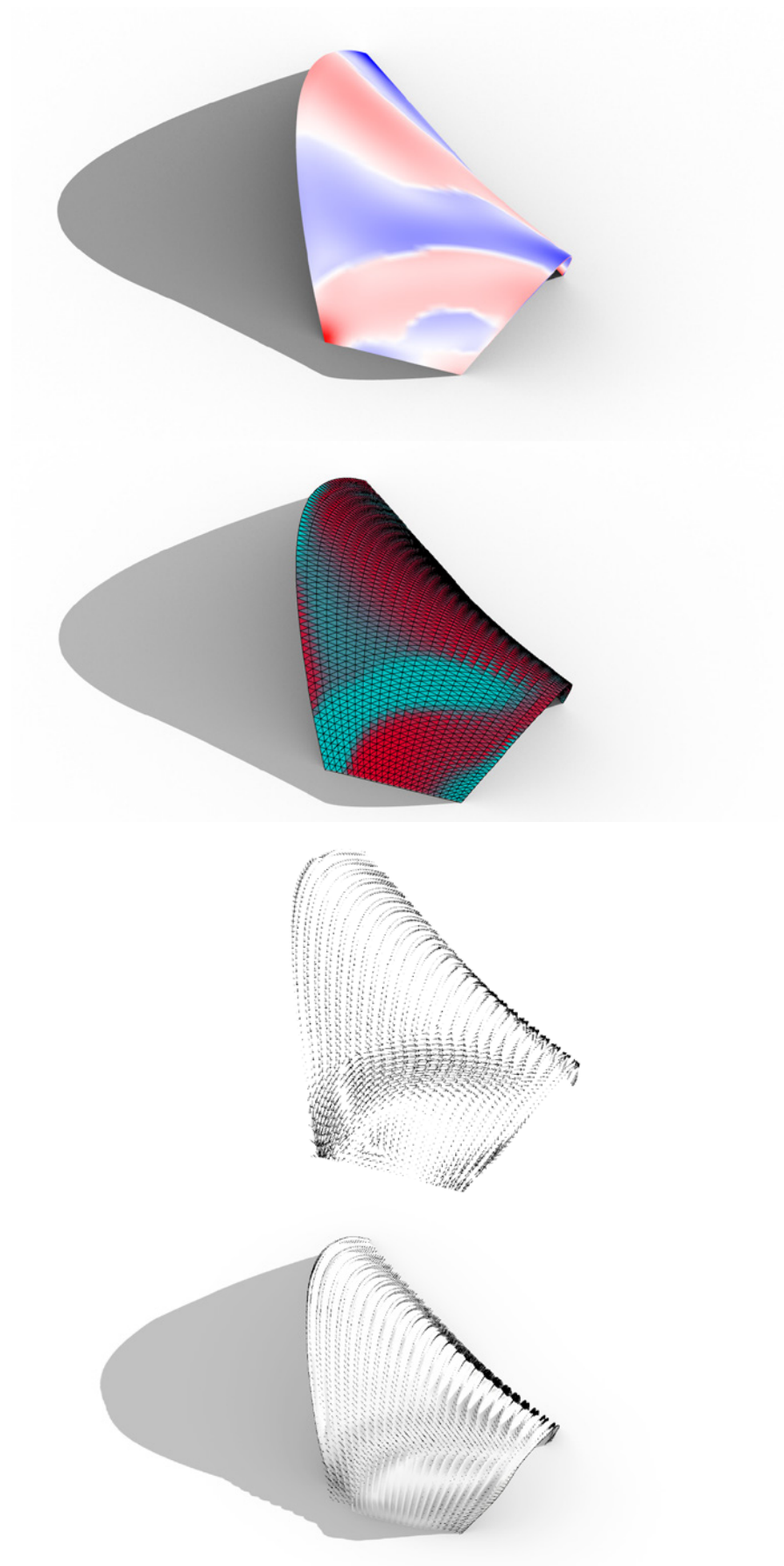


Structural Analysis

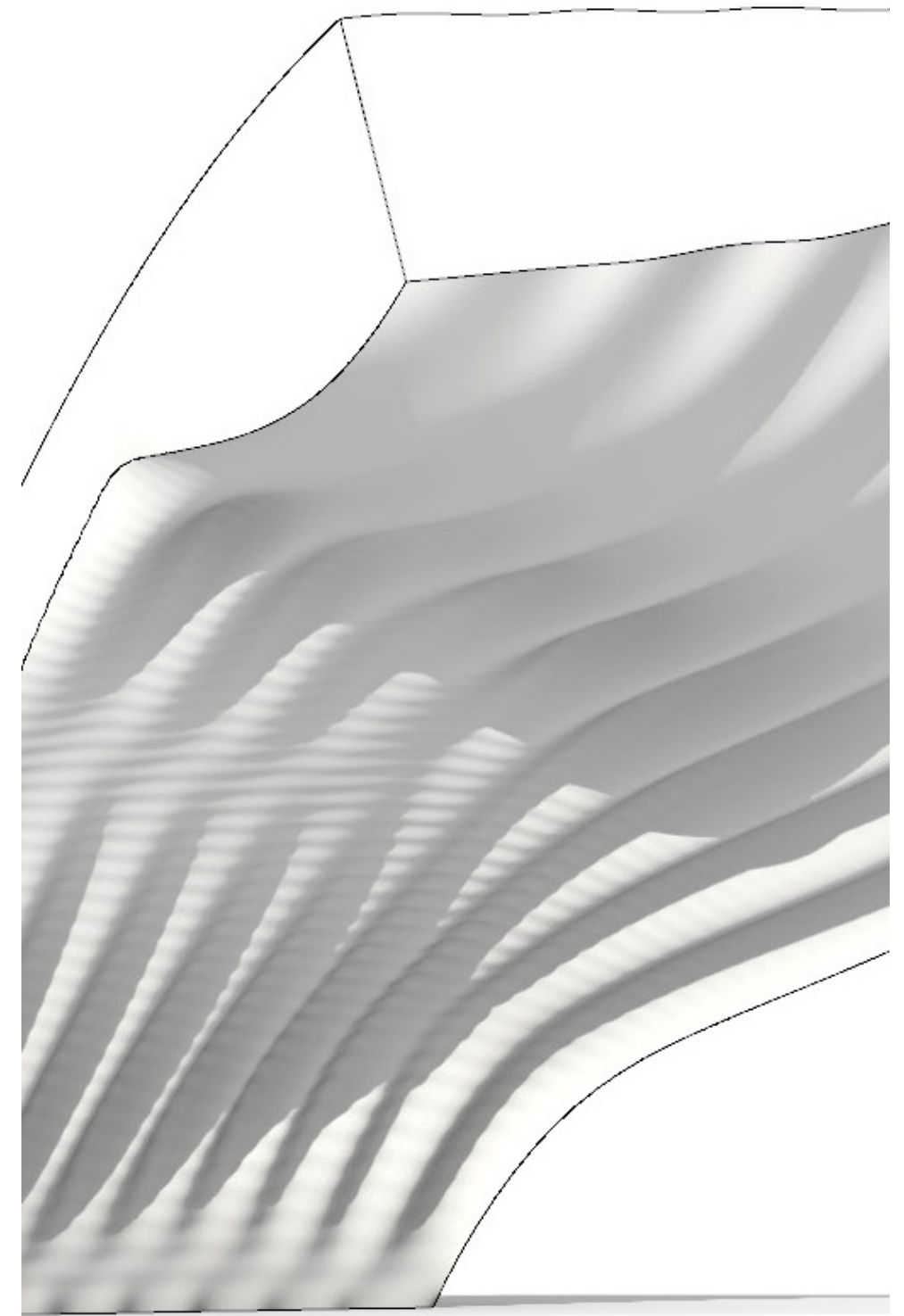


## #Research\_workshop-1

The analysis will return just data. The role of the architect is that finding 'information' and the way how to use the information to the architecture. The structural analysis was translated to the value of the compression and tension, and the numbers re-mapped the depth of the walls. The problem is how to change the depth of the wall. In this prototype, the geometrical property, 'flow' was chosen as criteria of the language. By doing that, from the data to an architectural component, everything was connected parametrically.



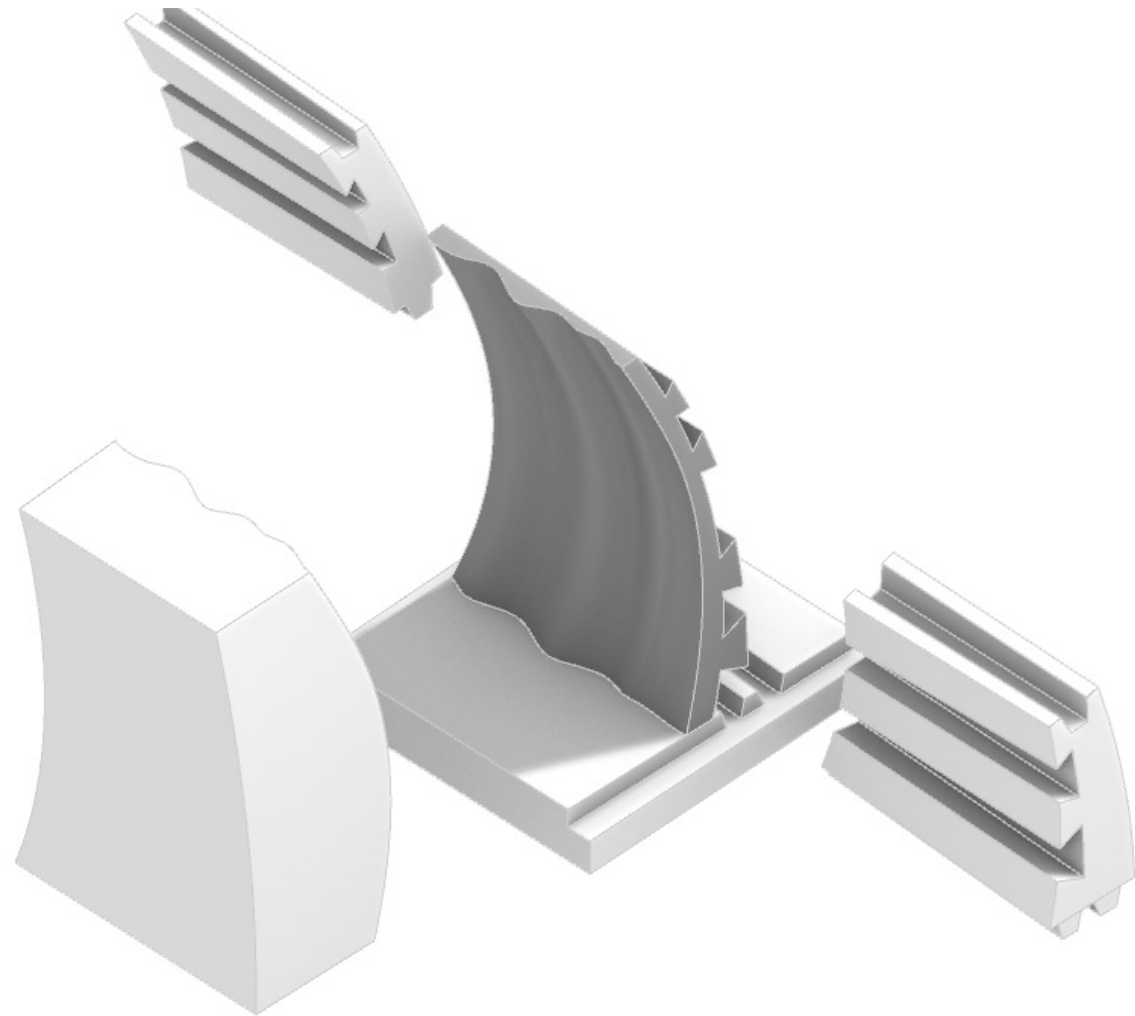
Parameterize analysis data



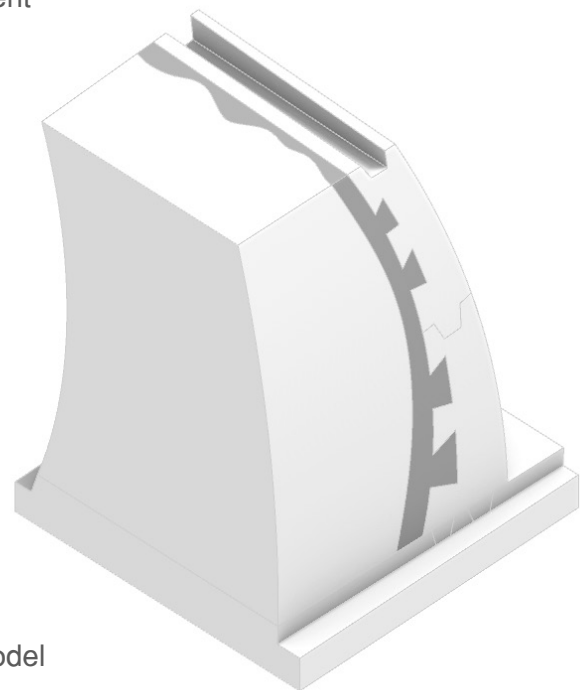
Parametric modeling

## #Research\_workshop-1

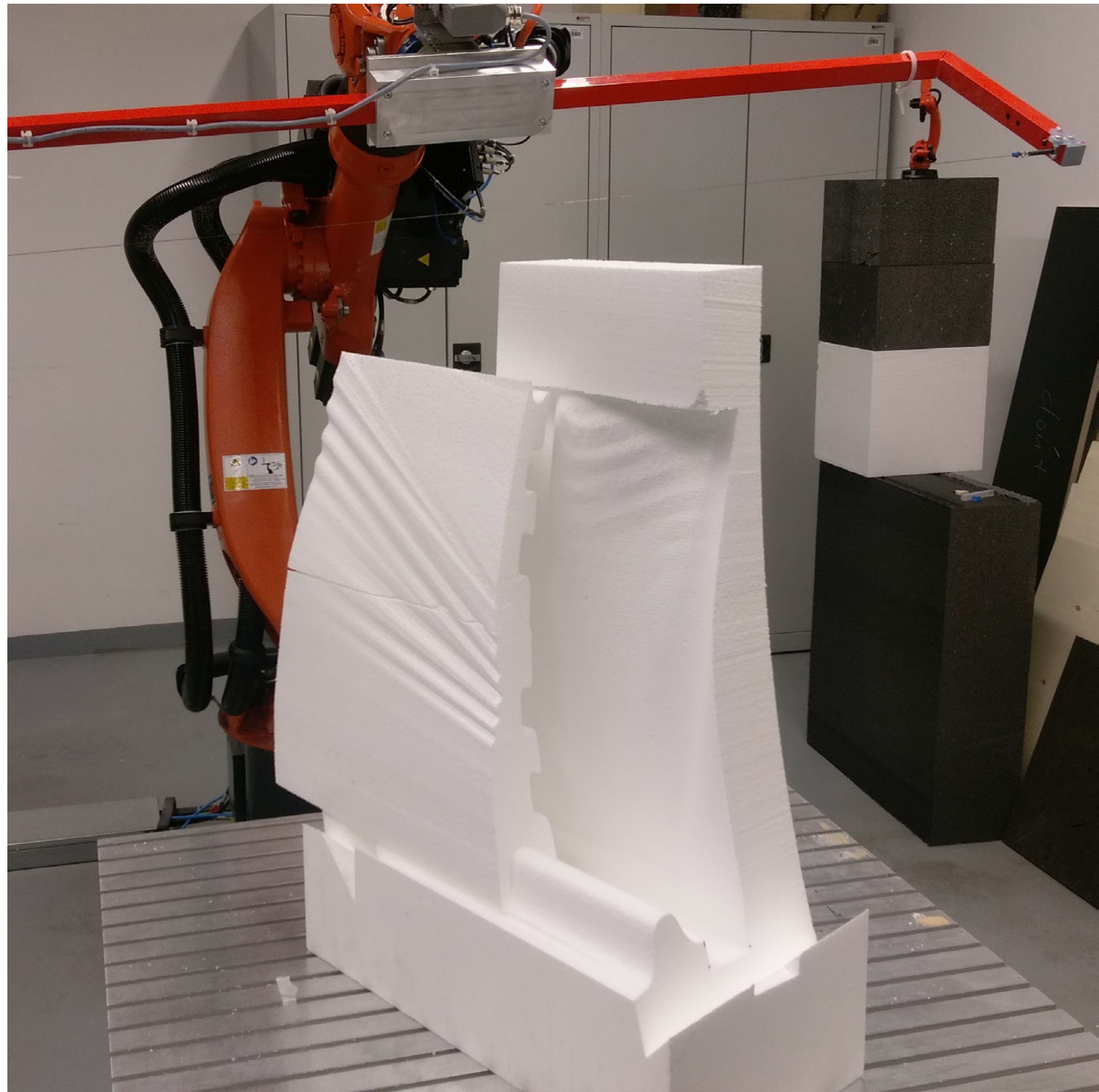
Whole results were fabricated with robotic technologies. The construction methods took the eps as 'mold' By doing that, the construction material, and the process also can be reduced. This solution came from the research of the 'brutalism.' If we need to implement new technologies into raw material, what kind of combination can be seen? One of the ideas was that, having hybridity with insulation material. Until now, insulation materials are just attached to the load-bearing structures. However, this solution suggests a new relationship with raw materials.



PROTOTYPE\_component  
TUD\_GROUP1



PROTOTYPE\_profilemodel  
TUD\_GROUP1





## #Research\_workshop-1

This prototyping project provides a chance to think about 'parametric' geometry. From the data to an architectural component, the combination generated the logical process of design. Also, the aspect of the material properties was directly connected into the theme of 'robotic brutalism'; how the characteristic of the raw concrete can be re-defined with robotic technologies. These two big horizons bring the aspect of 'parametric design part,' and materialization detail.



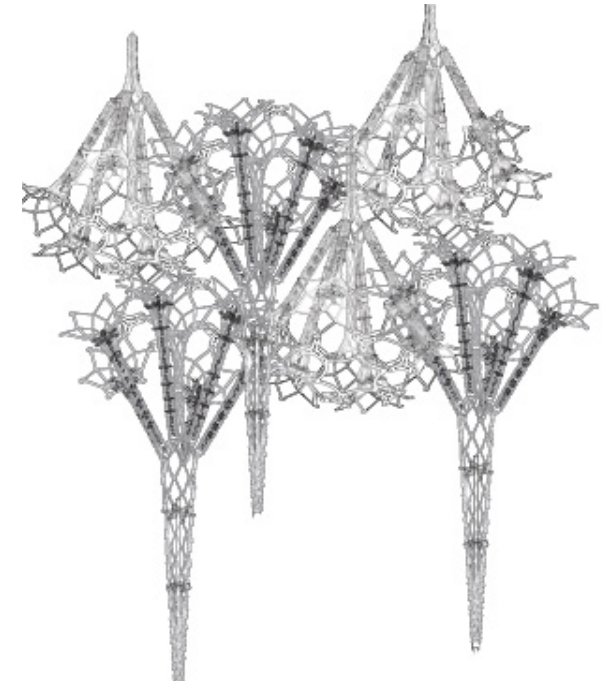


## #Research\_workshop-2

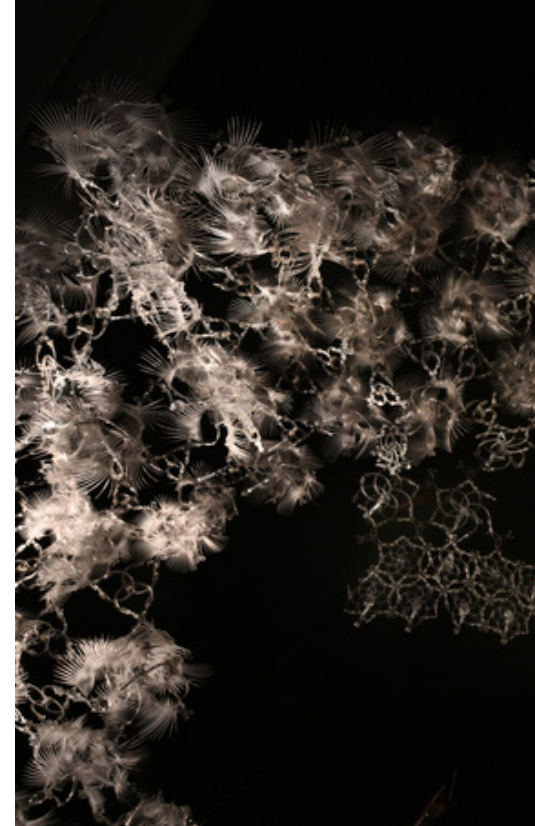
The second workshop didn't have a direct connection to the project, but provided a lot of hints for the design process. First of all, the process of the workshop gave a chance to recognize the space of the collaboration, and it is a base of the program of the graduation project. Second, the organic geometry design becomes a base of one of the architectural language for temporary life cycle space from the reason of efficiency and lightness of the components. Furthermore, the experience of interactive engineering is connecting to the concept of internal sound proof/ ventilation skin.



Collaboration Senergy



Oganic Geometry Design



Interactive Design

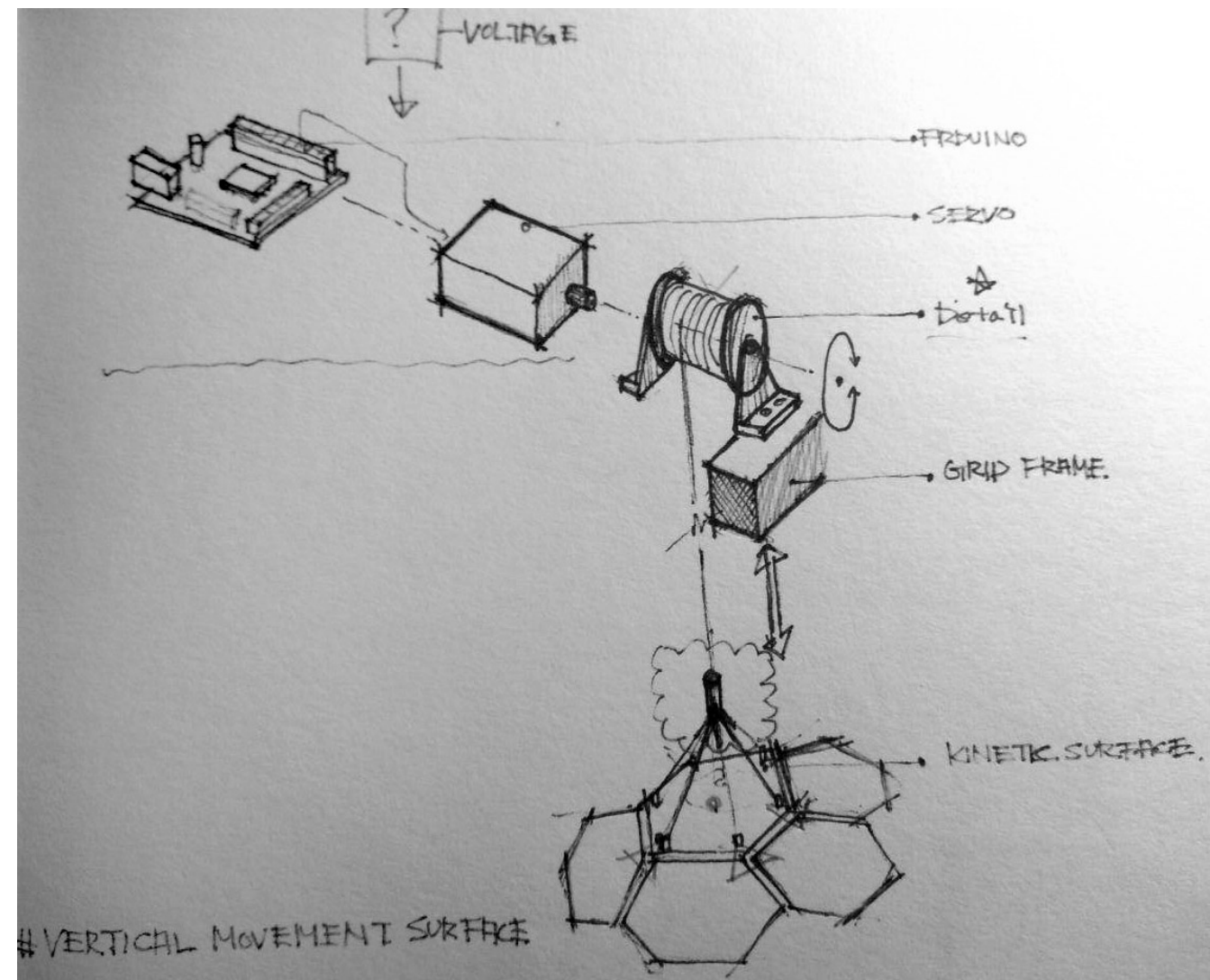


Fabrication Aspect



## #Research\_workshop-2

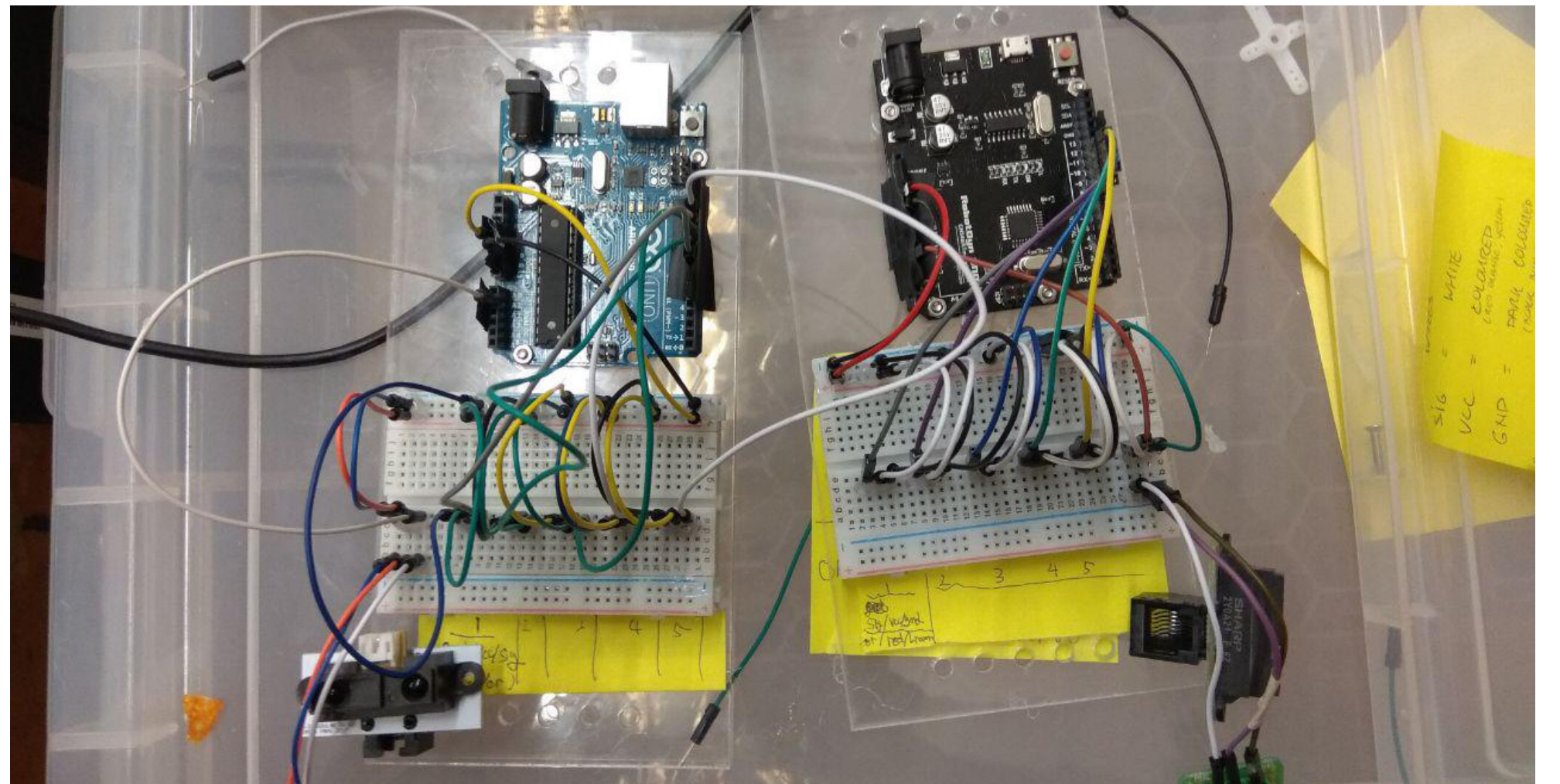
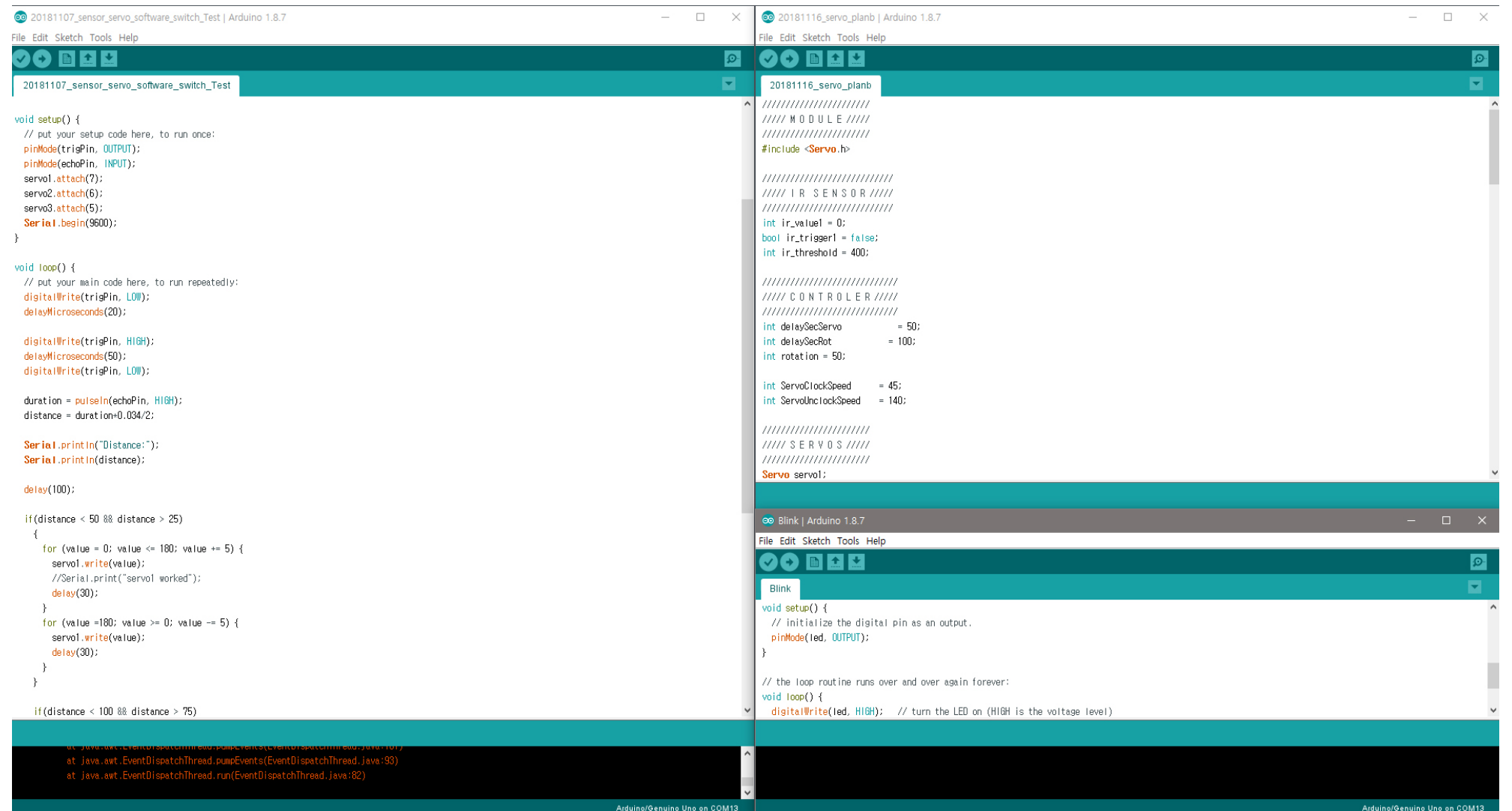
The aim of the 2nd workshop was breaking the boundary of the architecture by using materiality and interactive solutions. My role for the workshop was interactive engineering. From reality, some activity translated to data, and by using data, generating some actions through coding was the role. My source code was based on C++ for Arduino devices to converting the moving sequence to data, and through the data, turning on and off, adjusting speed, and density of the fragment of the installation was suggested.





## #Research\_workshop-2

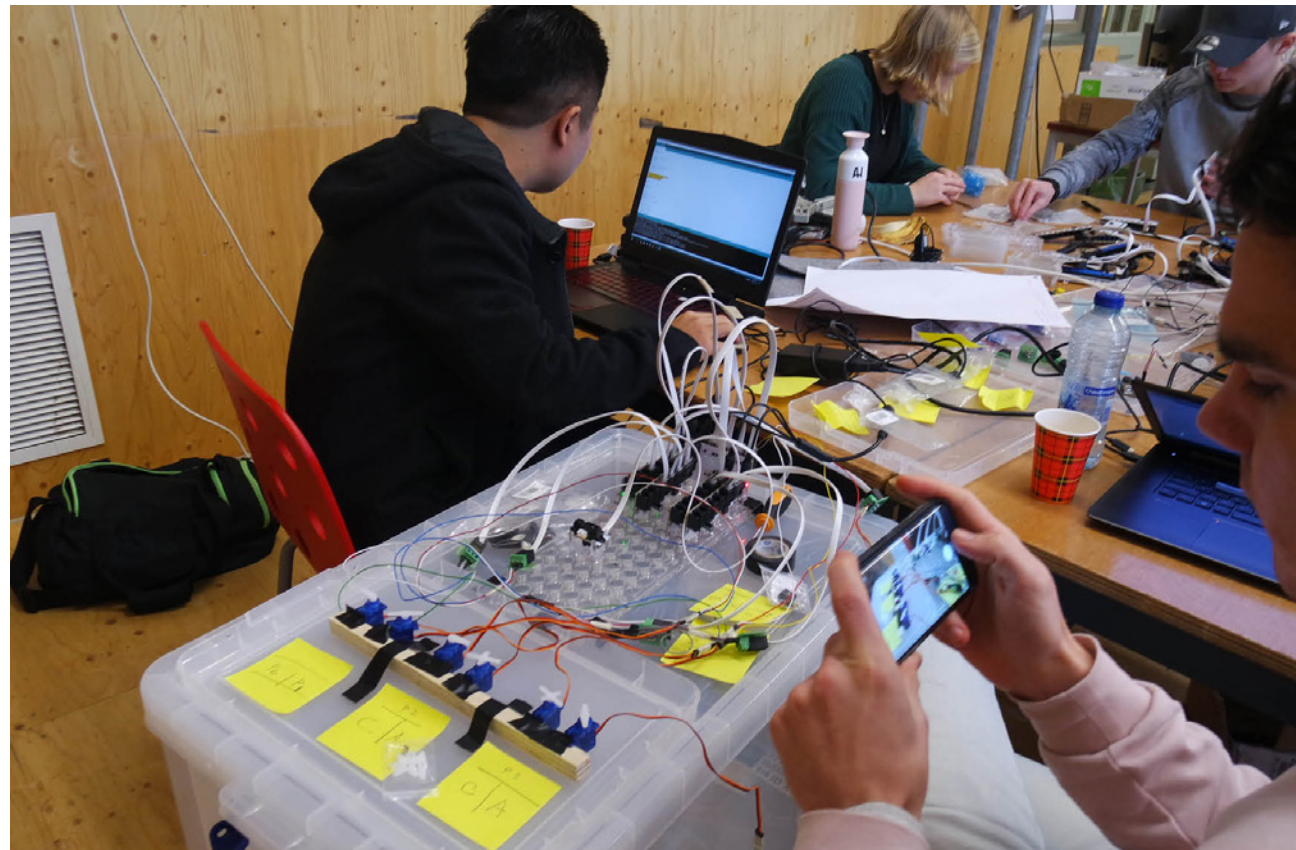
The coding was based on the objected-oriented aspect. It means, each of the steps was modulized, could be shared to other sequences, such as setting sensor, getting data from sensors, giving the data to servos, rotating servos ETC. By doing that, every module can be used not only one part but also another team's module. Furthermore, those kinds of aspect could be seen physically, in the interactive mechanic part because the data dependency and flow are exactly based on the sequences of the machines.





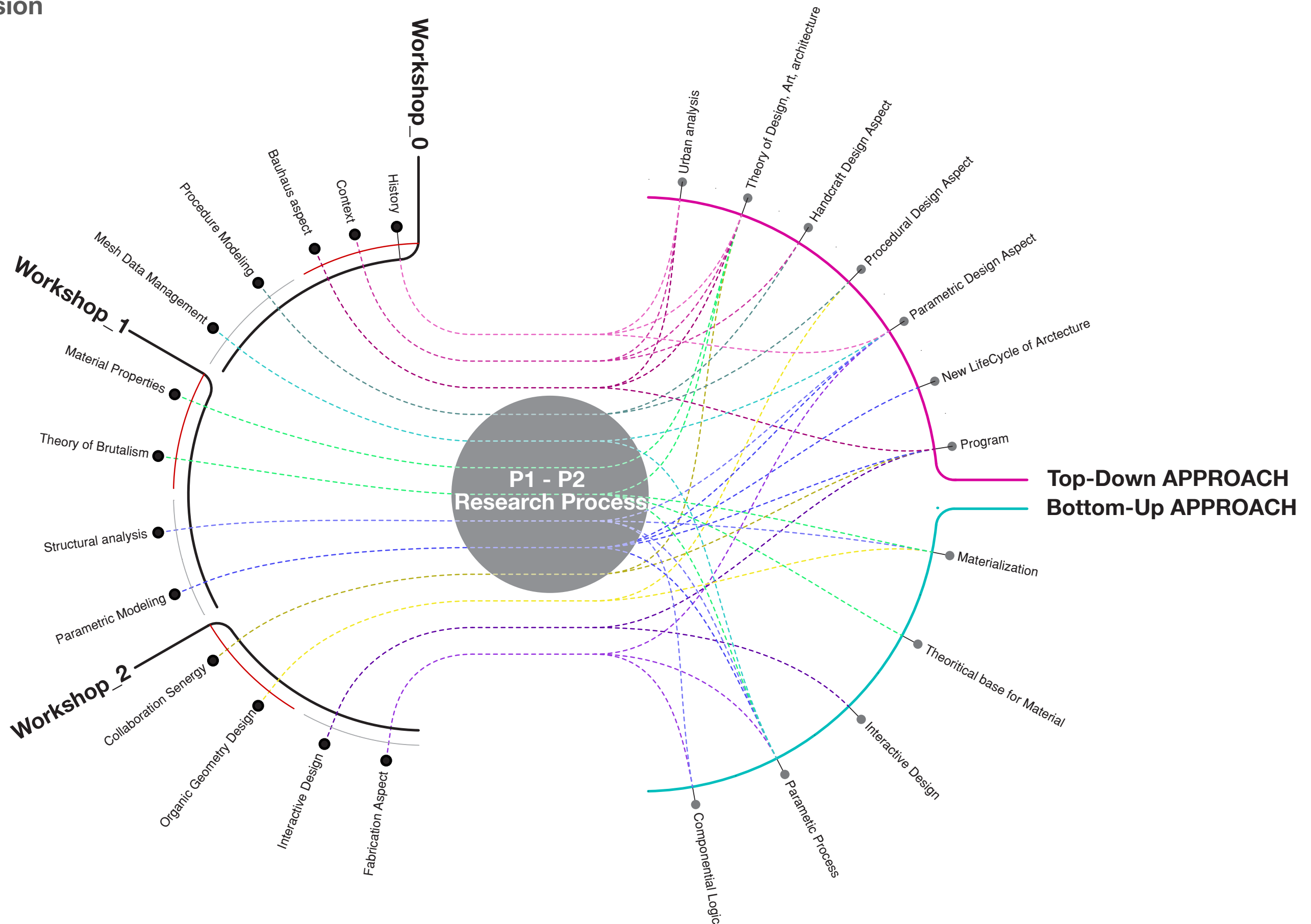
## #Research\_workshop-2

At the same time, the overall system of the workshop was based on 'collaboration.' For breaking the boundary of the architecture, multiple knowledges and aspects were needed, from the architecture to mechanic, from hardware to software. This experience directly provide the idea about static and dynamic status of workshops for the graduation project. Also, process of the interactive architectural components connects to the idea of the interior skin for adjusting air quality and noise reduction.





## #Conclusion



Each of the workshops has multiple influences to research; not only top-down but also bottom-up. This project is trying to achieve a connection between technology and theory. To find a position of the architect who faces a new technological situation, having a theoretical aspect should be important as modernist did. One of the aims of this project is that not mimicking some aspects or technical tutorials, but finding a reasonable aspect for the new relationship between architecture and technologies.