FABLAB Kamp-Lintfort | HOCHSCHULE RHEIN-WAAL Rhine-Waal University of Applied Sciences

FabHouse

A Sustainable Open-Source System for Houses Made for Reproduction (in FabLabs) worldwide

Prof. Dr. Karsten Nebe, Ayse Esin Durmaz

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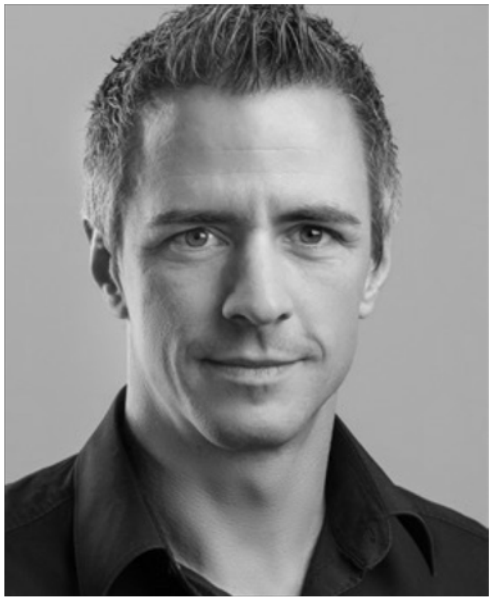
https://www.linkedin.com/in/ayse-esin-durmaz-9b614baa/

Daniele Ingrassia

https://www.linkedin.com/in/danieleingrassia/



Karsten Nebe

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FabLab Kamp-Lintfort

600m^2 workshop:

- 3D-Printers for plastics, food, ceramics
  - Fused Deposition Modeling (FDM)
  - Photopolymer Jetting (PJ)
  - Binder Jetting (BJ)
  - Stereolithography (SL)
- CNC large format milling (wood, metal, plastics)
- Conventional tooling for wood, metal, plastic (Lathe, milling, etc)
- Molding, casting, vakuum forming
- Eletronics production (PCB production, testing, reflow, soldering, etc.)
- Textile workshop (embrodery, knitting, etc.)
- CNC for vinyl- and textile cutting
- ...

FabLab Kamp-Lintfort

- Pupils/ Schools
  - fabLab@school - K12-courses to introduce STEM in different ways [https://fablab.hochschule-rhein-waal.de/fablab-school-en], more than 300 pupils per year
  - Make-It-Digital Symposium (for teachers, school administration) [https://youtu.be/q2D1ikC_nvs]
  - MakerLab, a '3 days summer camp' to explore Making (kids in the age of 6-14 years) https://www.youtube.com/watch?v=zILeVa4DpzQ
- Citizen
  - OpenLab, regulary
  - FabTalks
  - 'green' Mini-Maker Faire (April '19)
- Economy
  - competence center, contract research, etc.
- Students
  - >12 courses with Digital Fabrication embedded/purely focused on DF
  - 4 courses permanently implemented into the curricular
  - and Interdisciplinary Projects
    - cross-program courses, to bridge the perspectives of the diverse disciplines, i.e. design, psychology, economics, electrical and mechanical engineering, biology, logistics and computer science.
- Global
  - FabAcademy [https://fablab.hochschule-rhein-waal.de/fab-academy-en] since 2015
  - Fabricademy Bootcamp 2017 [https://textile-academy.org/textile-academy-bootcamp-wrapup/]
  - Fabricademy [https://fablab.hochschule-rhein-waal.de/fabricademy-en]

To make almost everything ...

Prof. Dr. Neil Gershenfeld, MIT

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Idea

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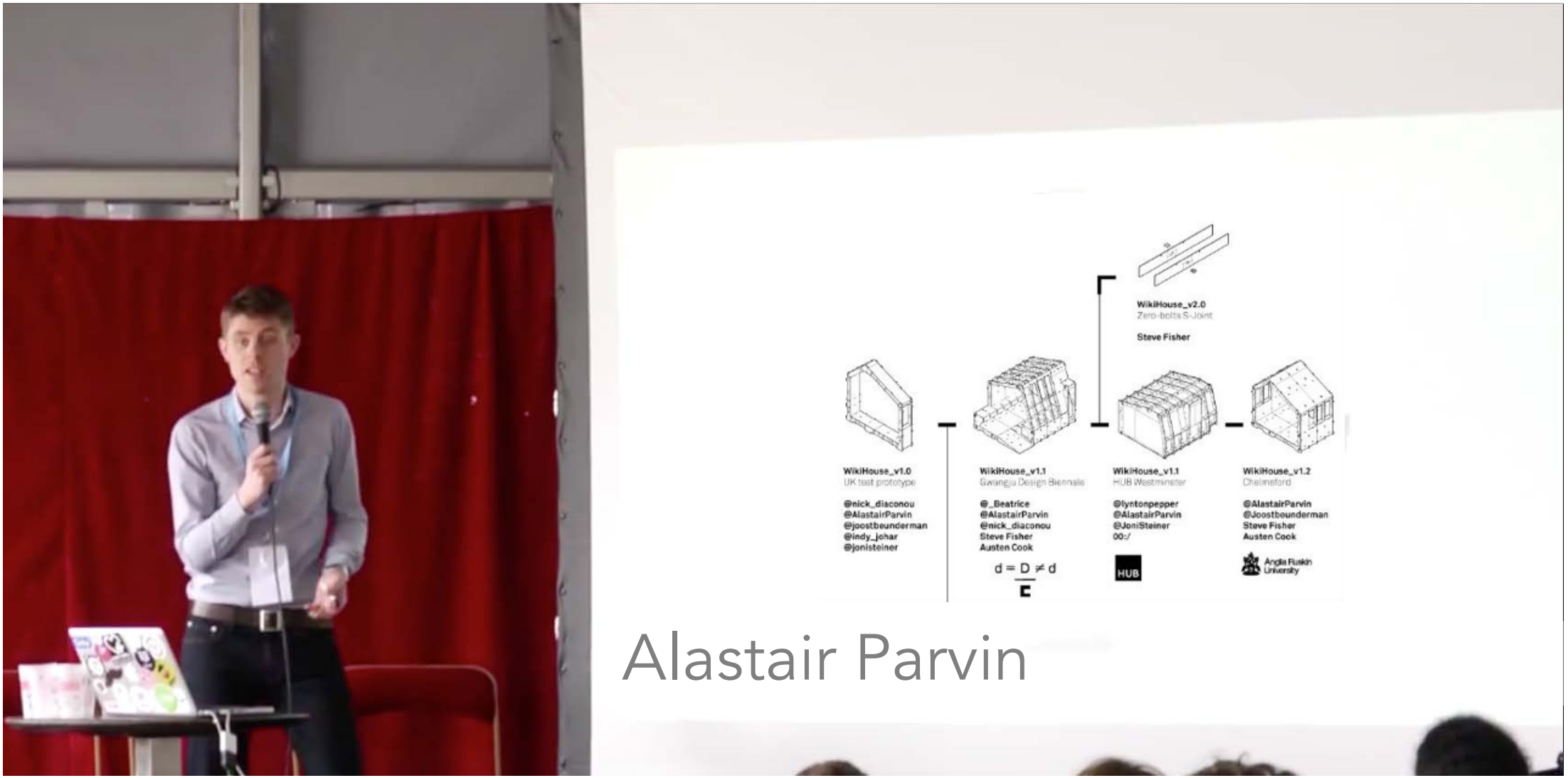

Alastair Parvin

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Make something BIG: A FabHouse

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2017 „pitch" idea „FabHouse"

FabHouse: An Interdisciplinary Project

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Focus on Sustainability


„minimize resource consumption and environmental pollution while at the same time creating the greatest possible benefit for the customer, the company, as well as the social and ecological environment.”
-- Ursula Tischner, Heidrun Moser. “How to do Ecodesign.”

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12 Students, different backgrounds (computer science, environmental sciences, mobility and logistics, international business sciences)

Eco-Design-Sprint

1. Analyse existing products:
Deep research on existing solutions (for the house but also its sub-systems), alternative construction methods and materials, etc.

2. 'Re-Think your product':
What if? Do challenge your decision at any time! Dig into the details and identify potential for improvements. Evaluate different techniques for production.

3. Identify potential for sustainability:
Analyse the envisioned solution and define criteria for sustainability. Create a plan for monitoring these criteria throughout the process. Run tests on materials and solutions. Measure data if you can; if not, do an analytical assessment.

4. Test the feasibility: Create prototypes. Test them.

5. Make it:
Turn your prototypes into real.

6. Prove the sustainability: Observe, measure and critically reflect your work, outcomes and impact.

Nebe, Karsten, Ingrassia, Daniele, & Durmaz, Ayse Esin. (2018). Eco-Design-Sprint for Makers: How to make makers think about the sustainability of their products. In Proceedings from the Fab14 + Fabricating Resilience Research Papers Stream (pp. 27–38). Creating 010, Hogeschool Rotterdam. http://doi.org/10.5281/zenodo.1344434

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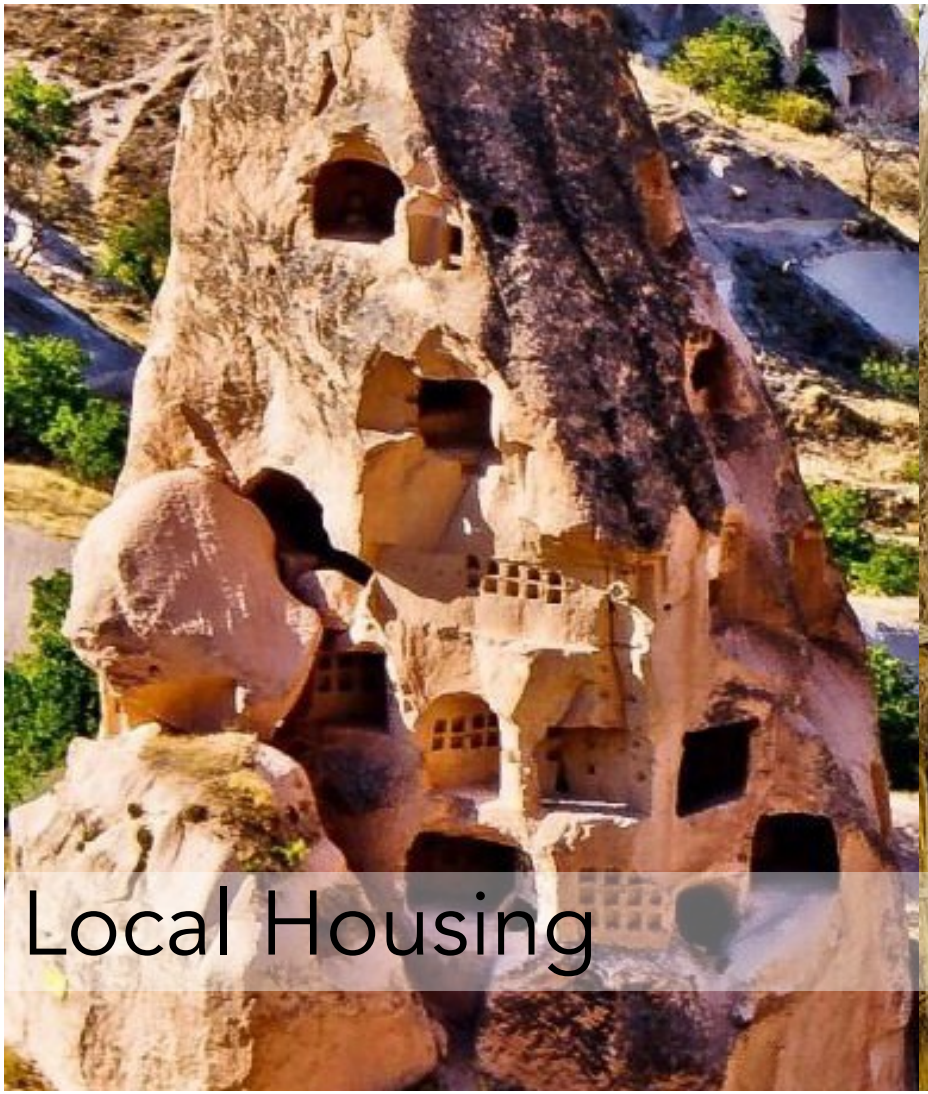

Local Housing

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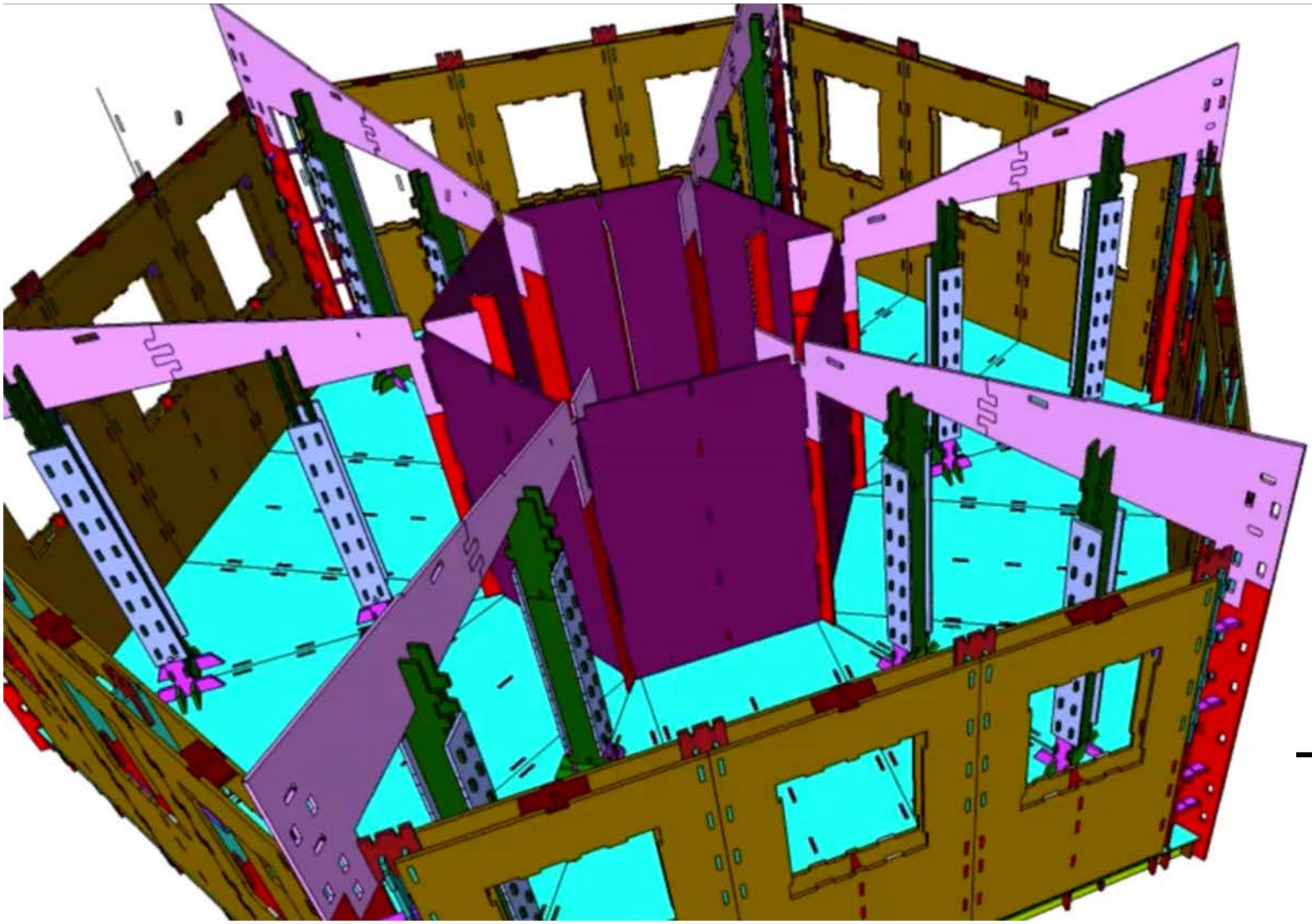
Deep research on existing solutions (for the house but also its sub-systems), alternative construction methods and materials, etc.



The „Core“

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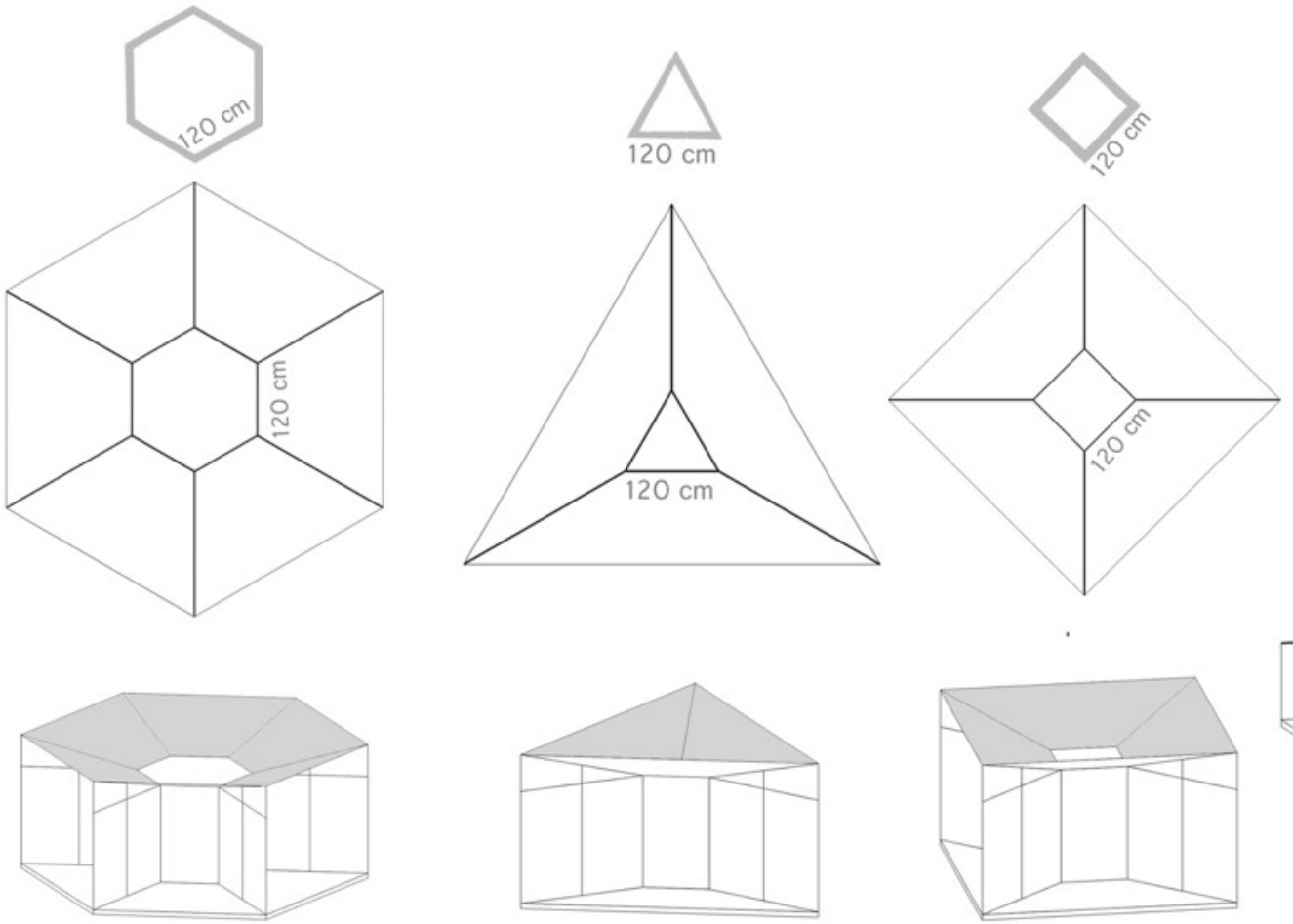

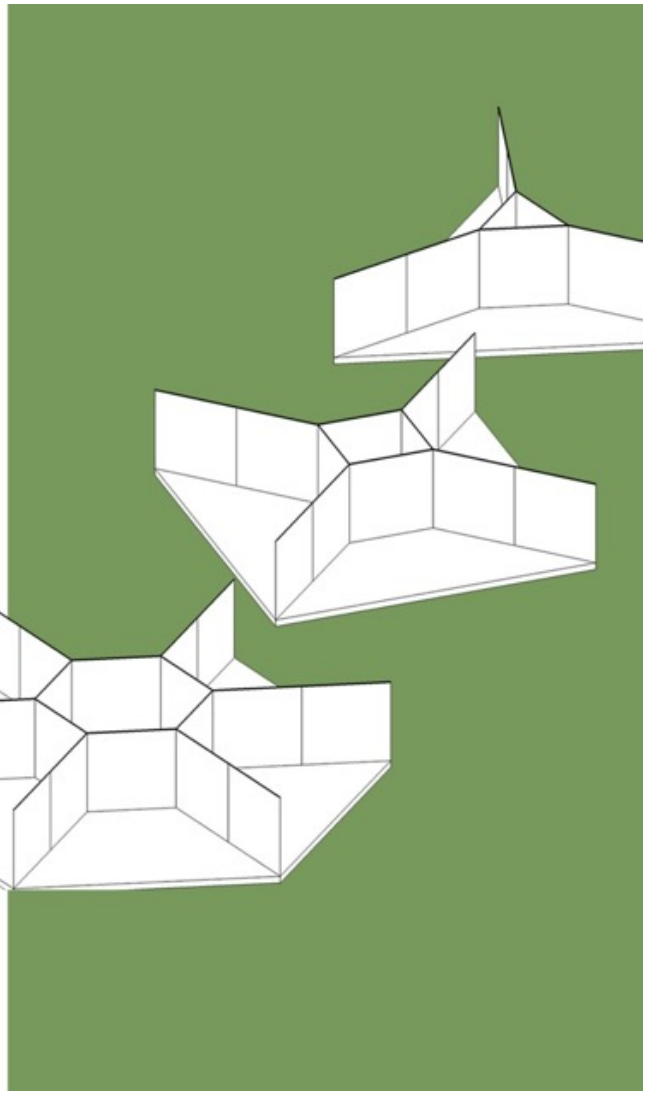

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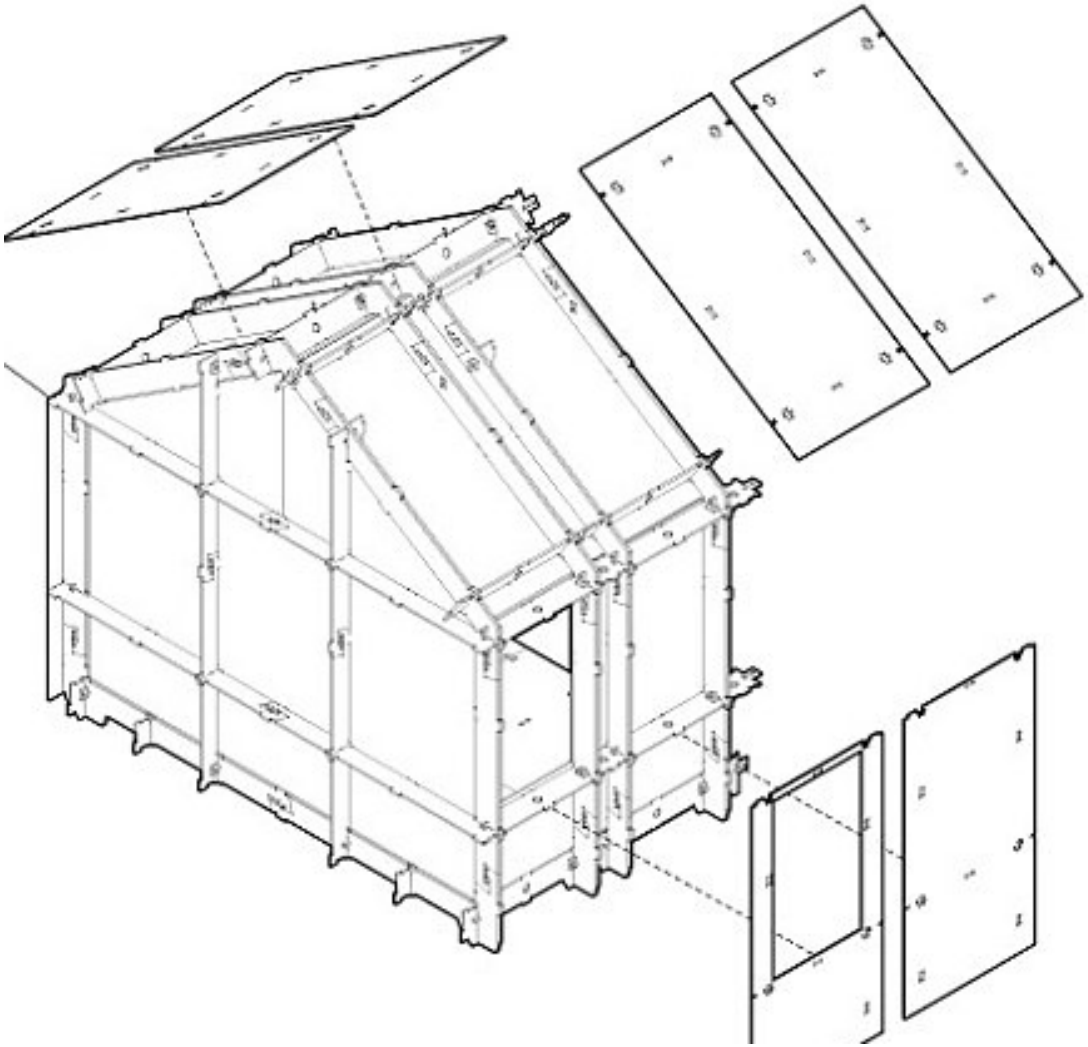

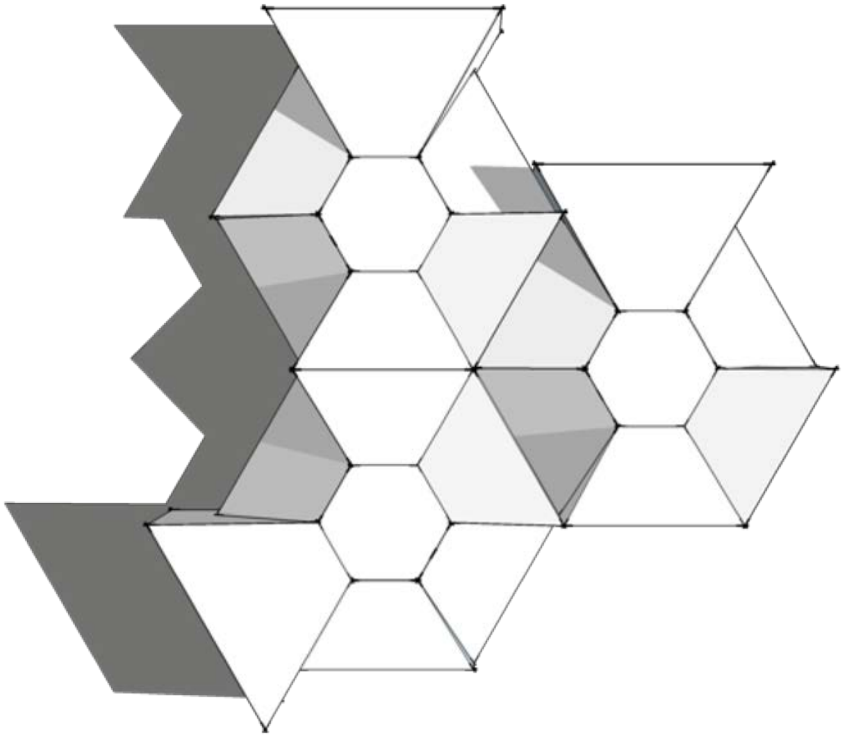

Modular in Growth

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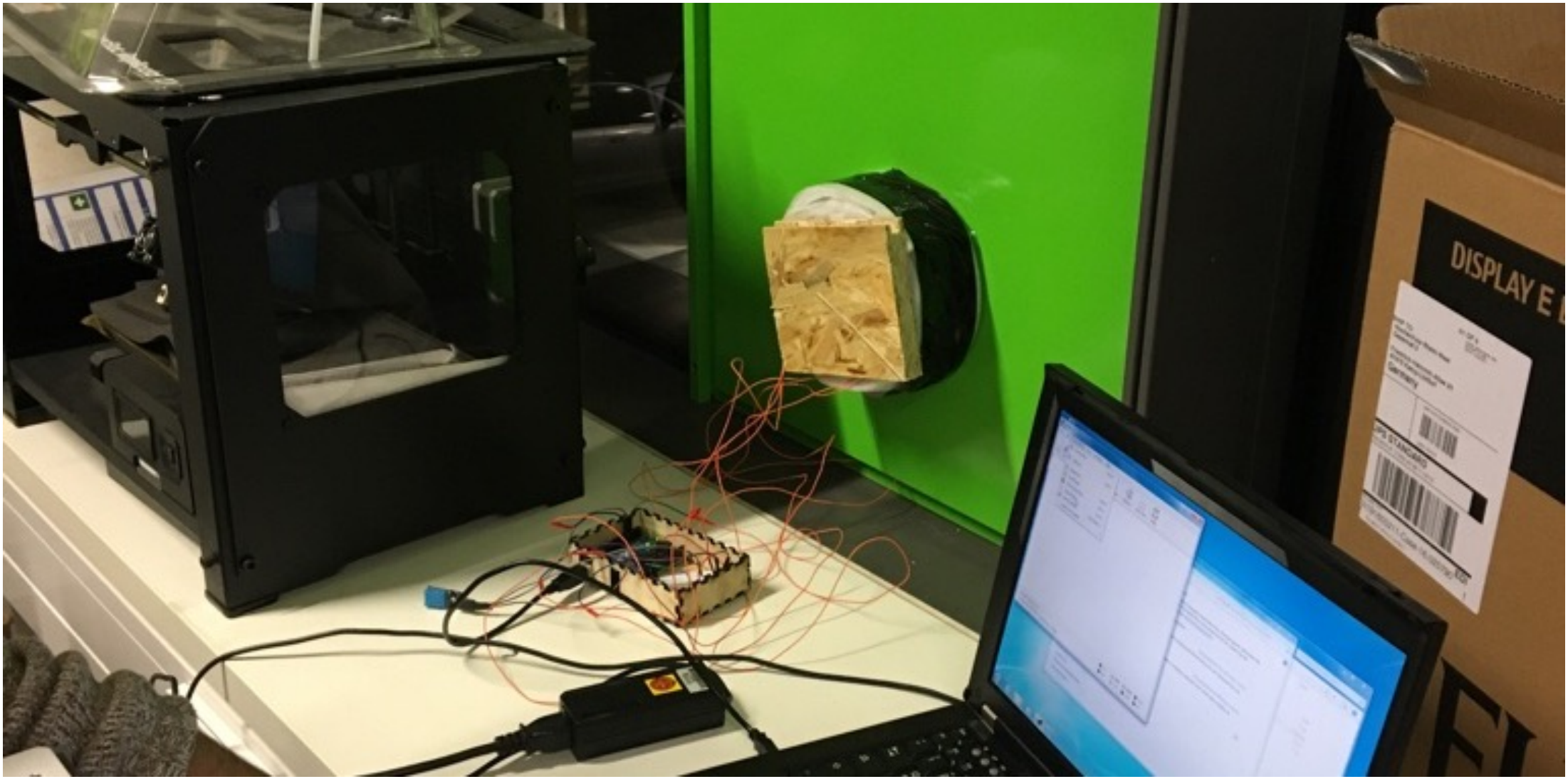

4. Test the feasibility: Create prototypes. Test them.

roof: self-made tiles vs. metal sheets

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Heating: solar heater vs. bio-mass reactor

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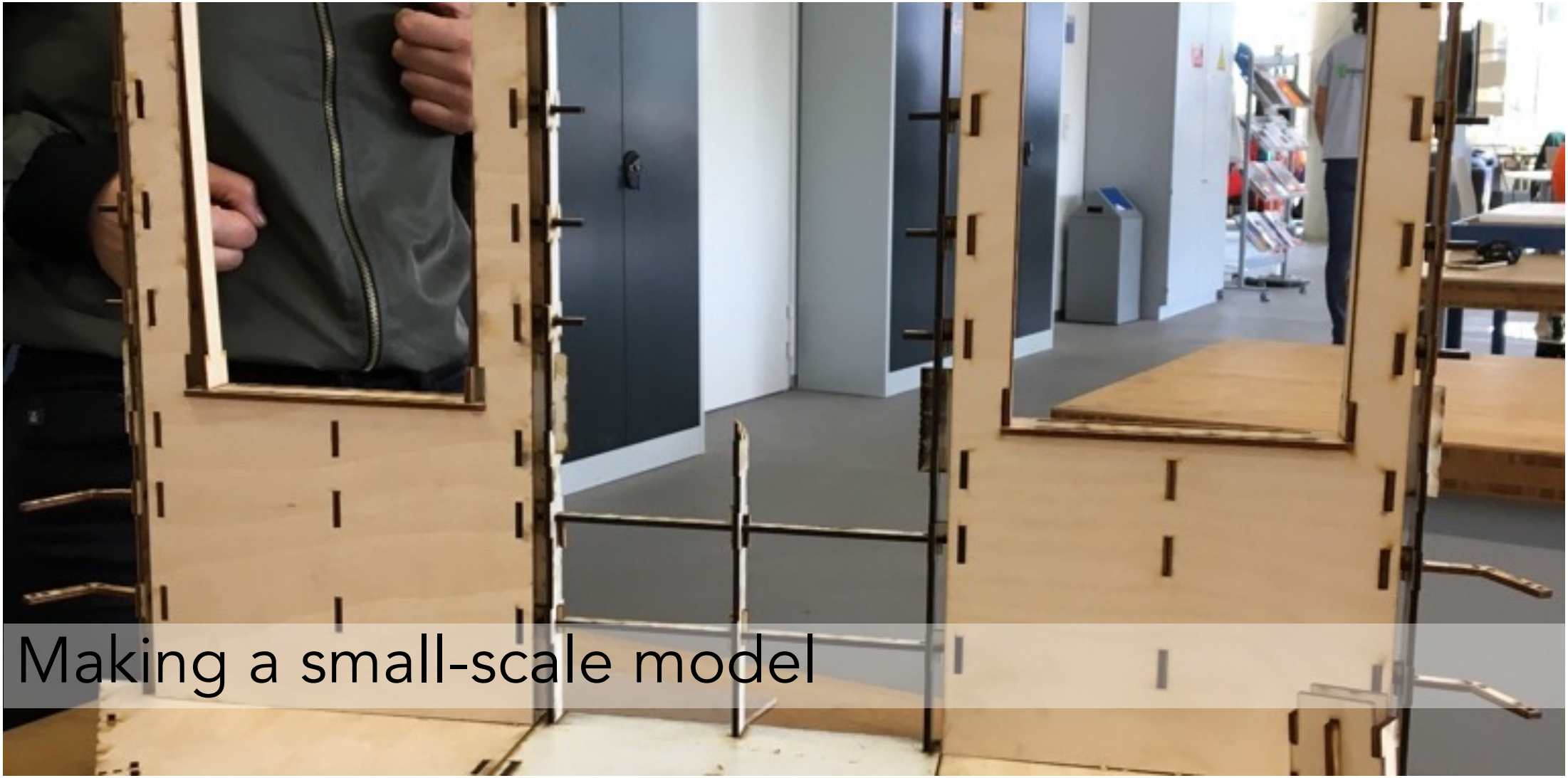

Making a small-scale model

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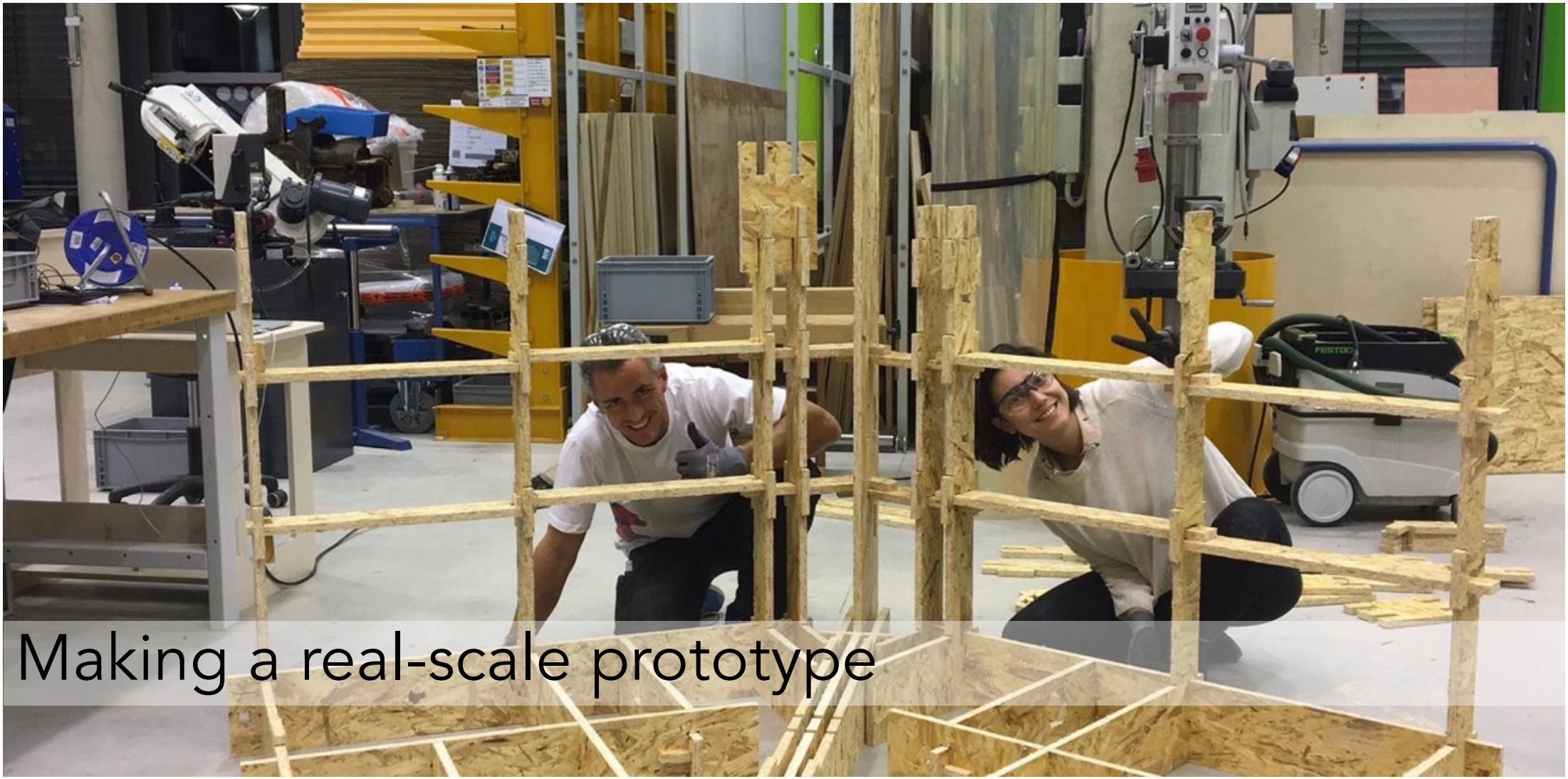
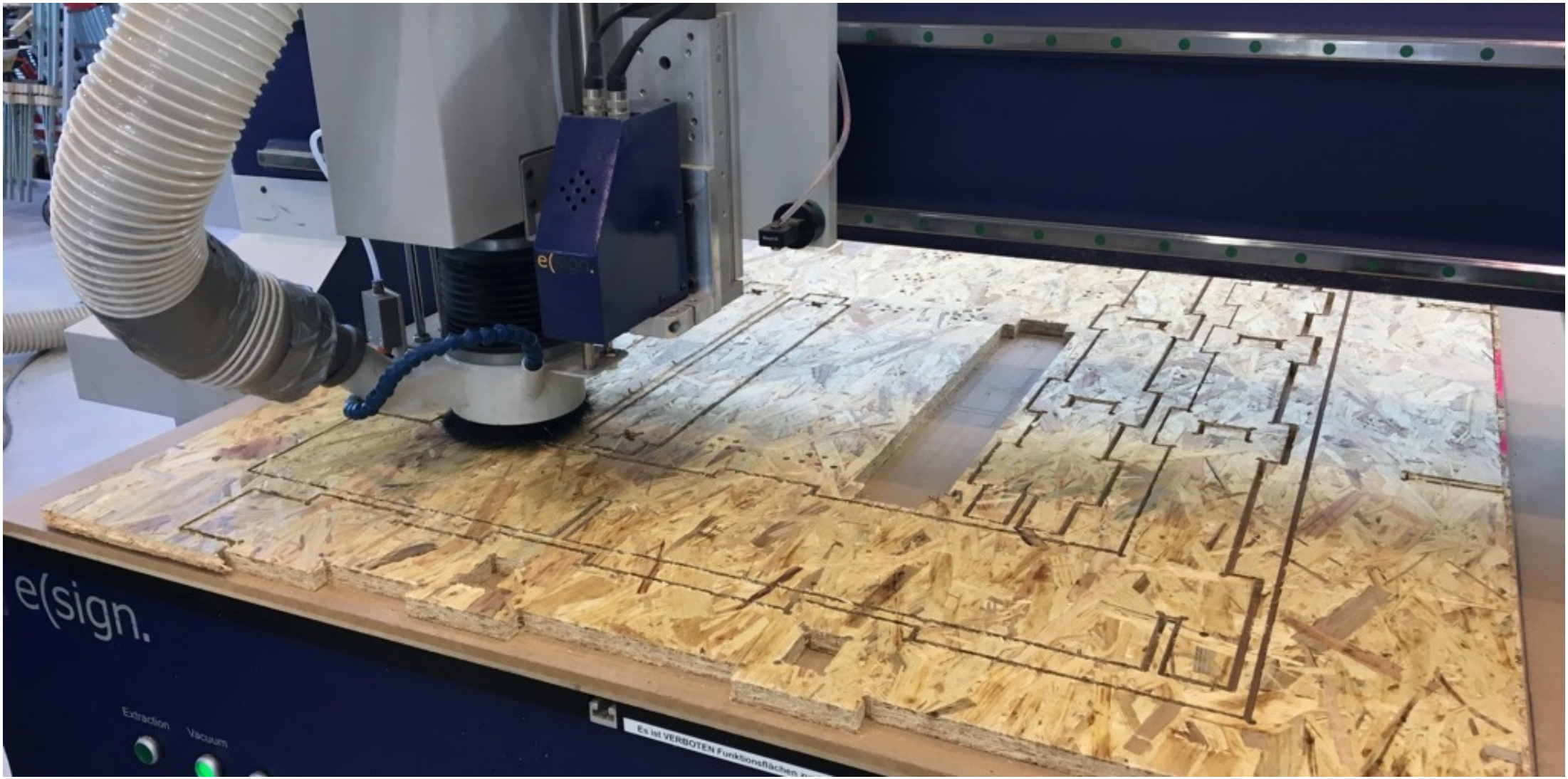


5. Make it:
Turn your prototypes into real.



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Production

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Construction and assembly

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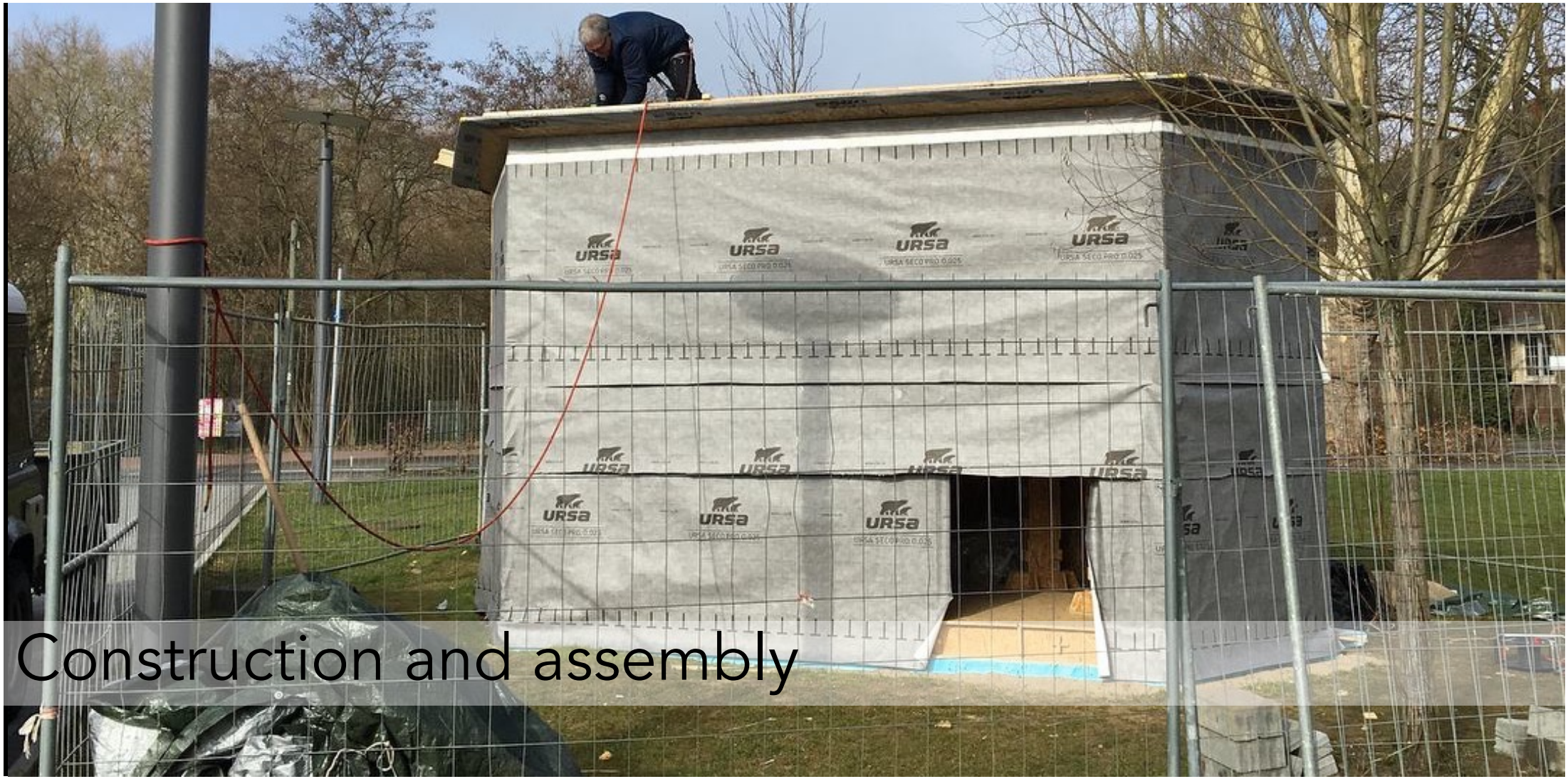

Construction and assembly

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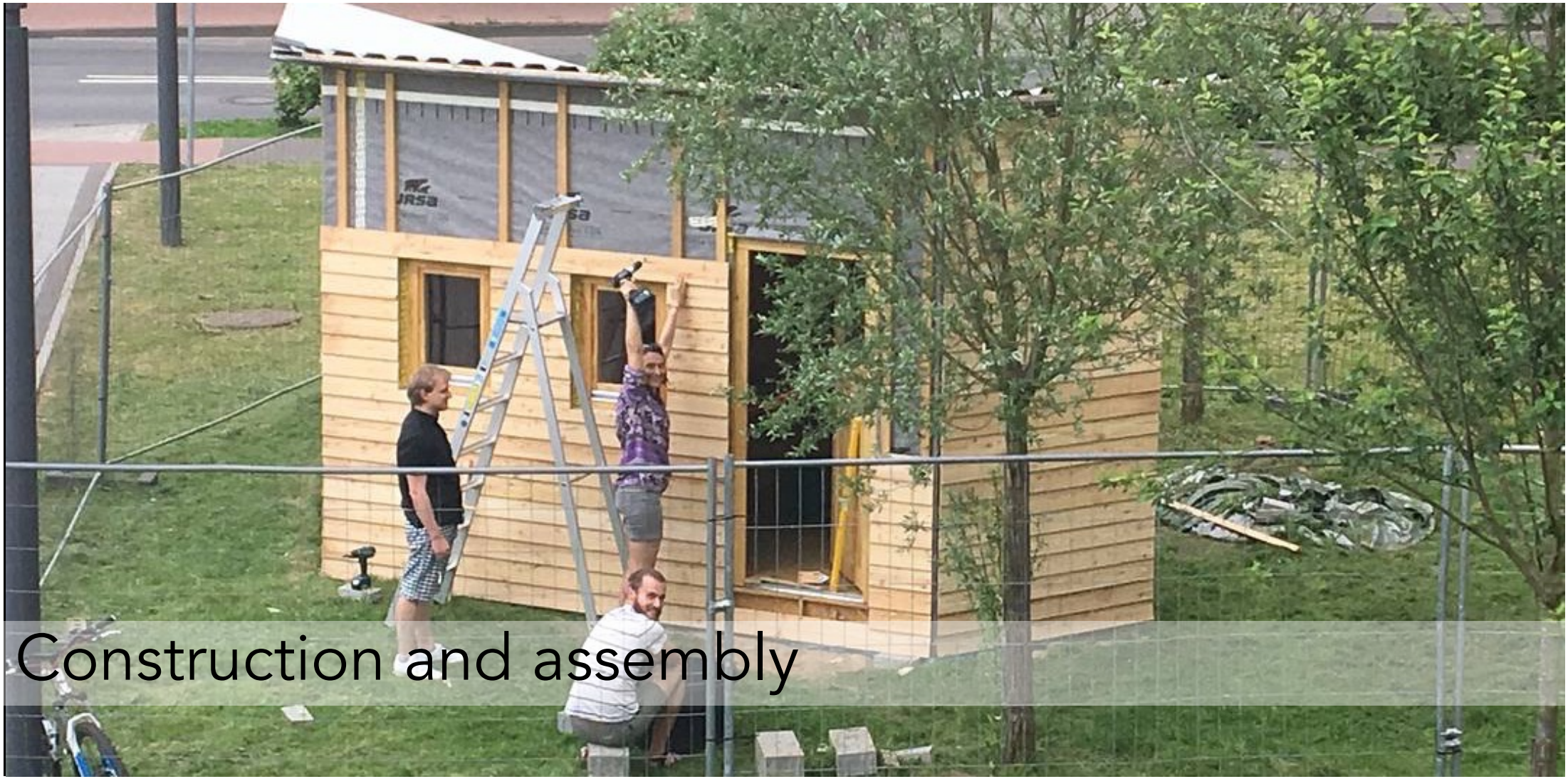


Construction and assembly

6. Prove the sustainability: Observe, measure and critically reflect your work, outcomes and impact.

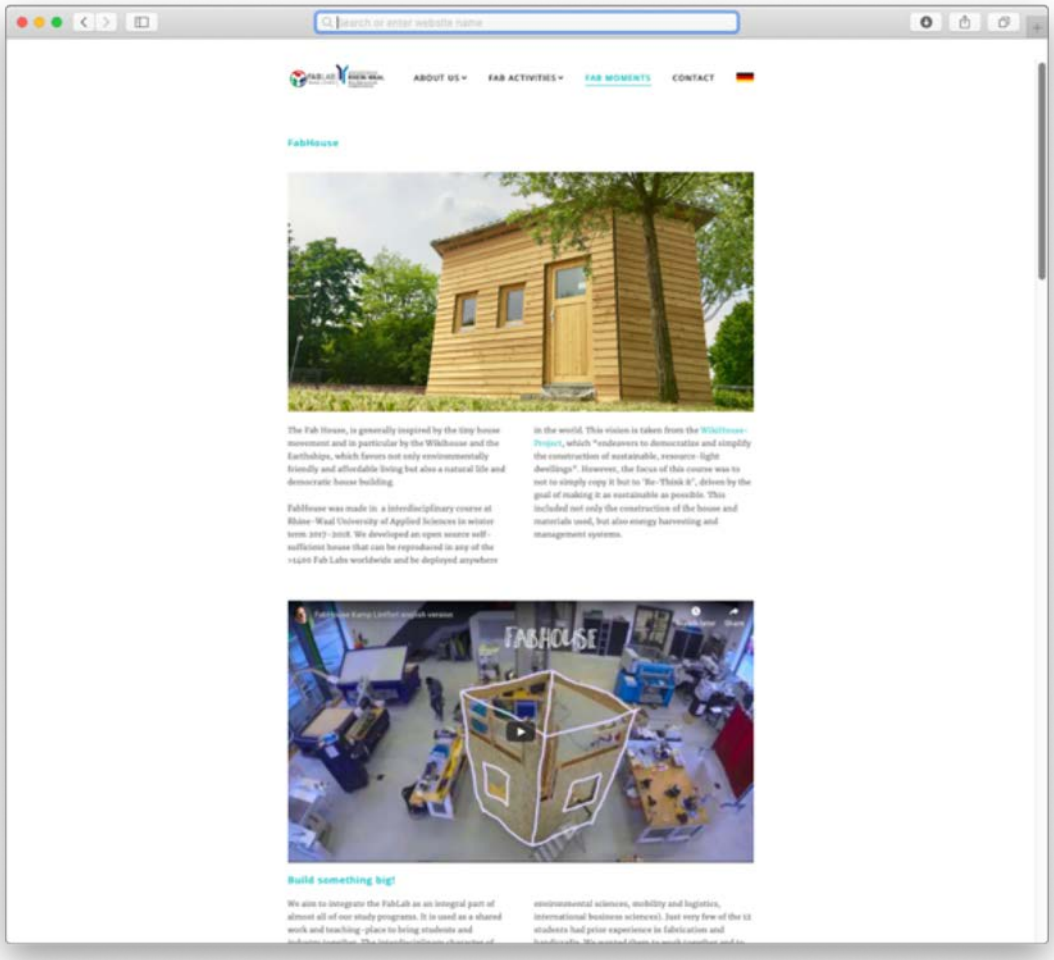

Real conditions...

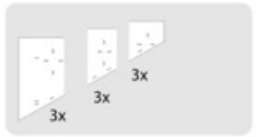
Review & Outlook

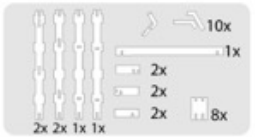
We made it…

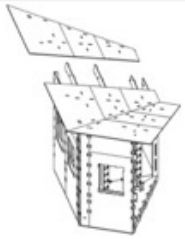
- It is a real house (even though just small scale, because of legal issues)
- It is sustainable (in mutliple ways)
- We have learned how to improve and will create another one – version 2.0
- We have tested a new eco-design approach (Eco-Design-Spint) and will further develop it.

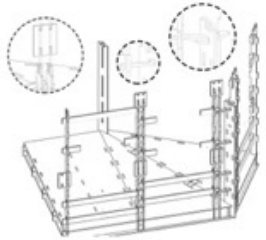
Documentation: Open Source

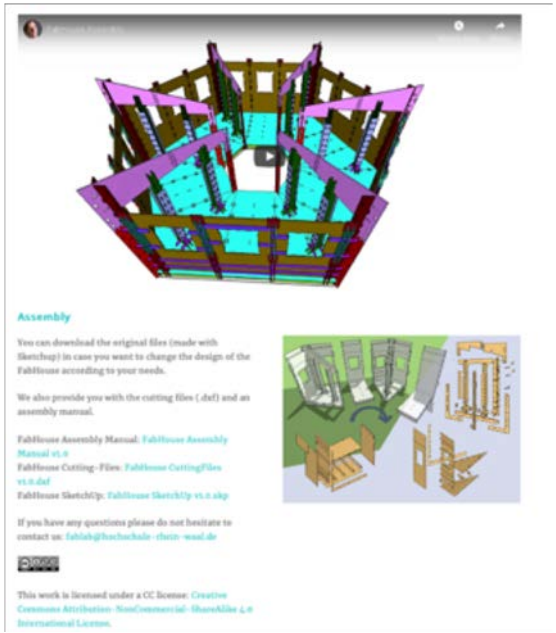












http://fablab.hochschule-rhein-waal.de/fabhouse-en

In 2020 we will open an additional FabLab at Kamp-Lintfort

As part of the fair „Landesgartenschau 2020“

https://www.kamp-lintfort2020.de/landesgartenschau/projekte/green-fablab/

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