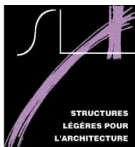


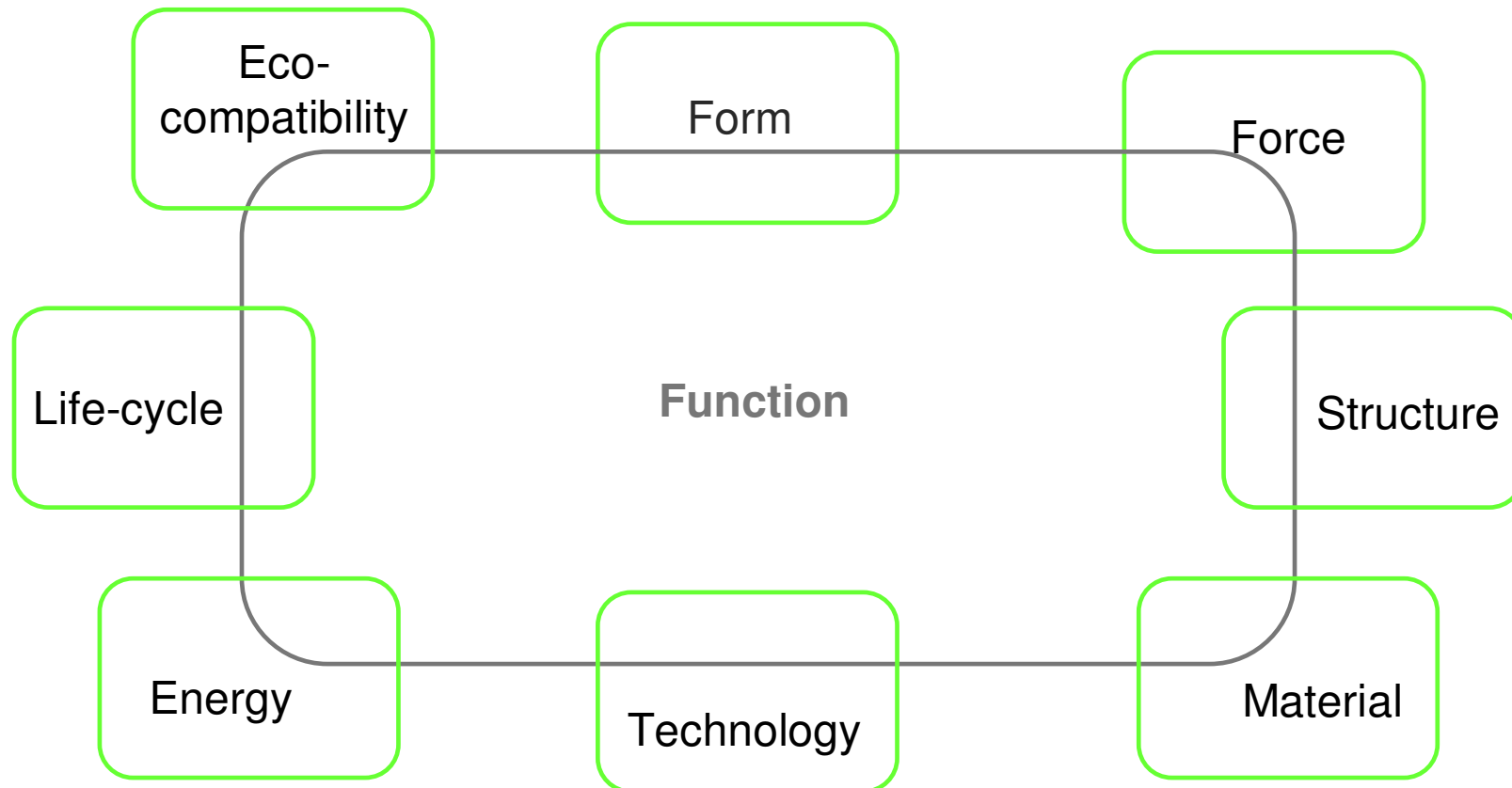
Experimental structures

Marine Bagnéris

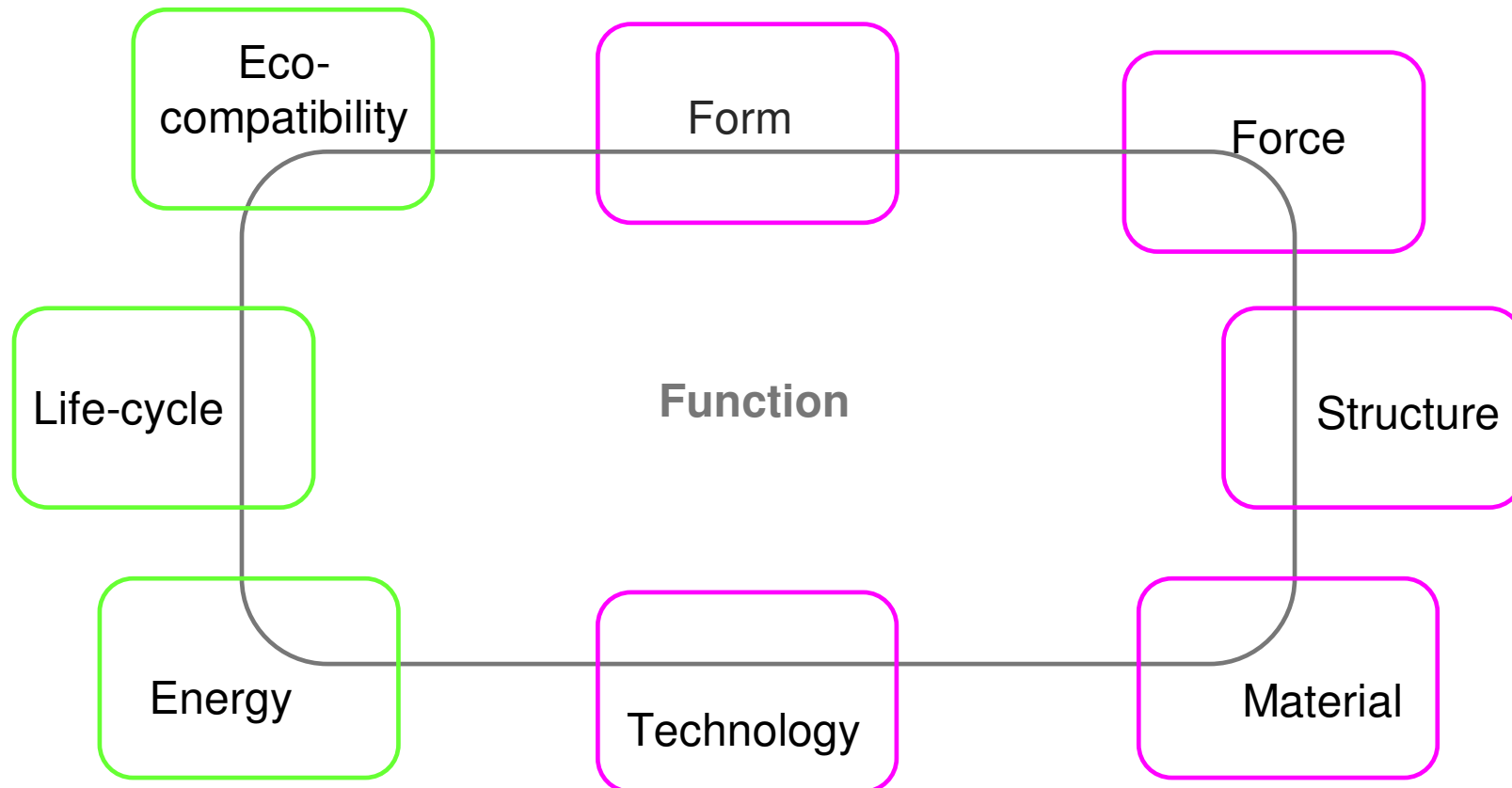


- 1 introduction
- 2 seminar practical
- 3 experimental structures 1
- 4 experimental structures 2
- 5 conclusion and expected outcomes

DESIGN PROCESS



DESIGN PROCESS



DESIGN PROCESS

- ▶ Complexity
- ▶ Rationality
 - ▶ Information flow from « 0 to 1 »
 - ▶ Close collaboration between the design partners
 - Tool Interoperability
- ▶ Experimental systems
 - ▶ Tool boundaries
 - ...Communication boundaries ?

EXPERIMENTAL SYSTEMS

- ▶ is it an experimental system ?
- ▶ form complexity
- ▶ ...not an experimental structure

—● dissociation Form and Structure



Gehry Partners Bilbao 1997

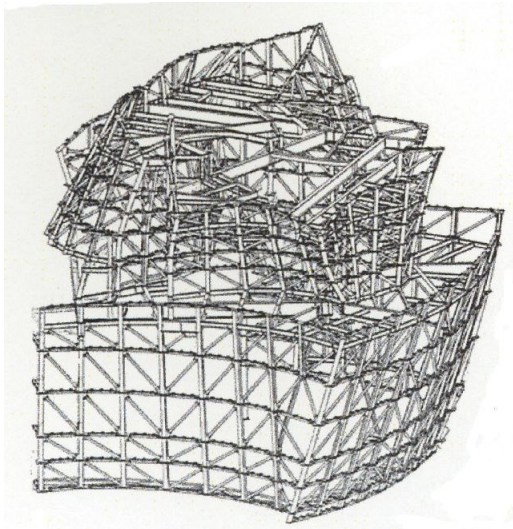


Gehry Partners Herford 2004

EXPERIMENTAL SYSTEMS

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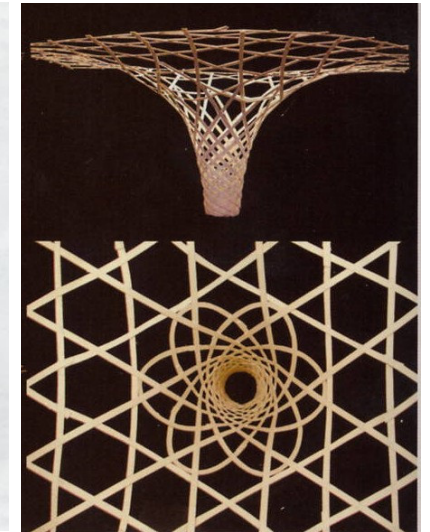
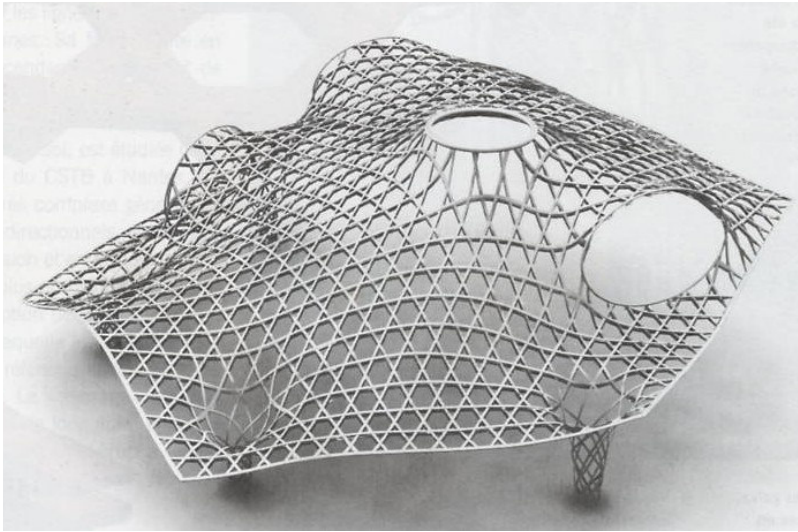
Gehry Partners Bilbao 1997



Gehry Partners Herford 2004

EXPERIMENTAL SYSTEMS

- ▶ evolution...however
 - ▶ scale effect entails structural & material compromises
 - ▶ the initial weaving concept is lost
- dissociation Form, Structure and Technology



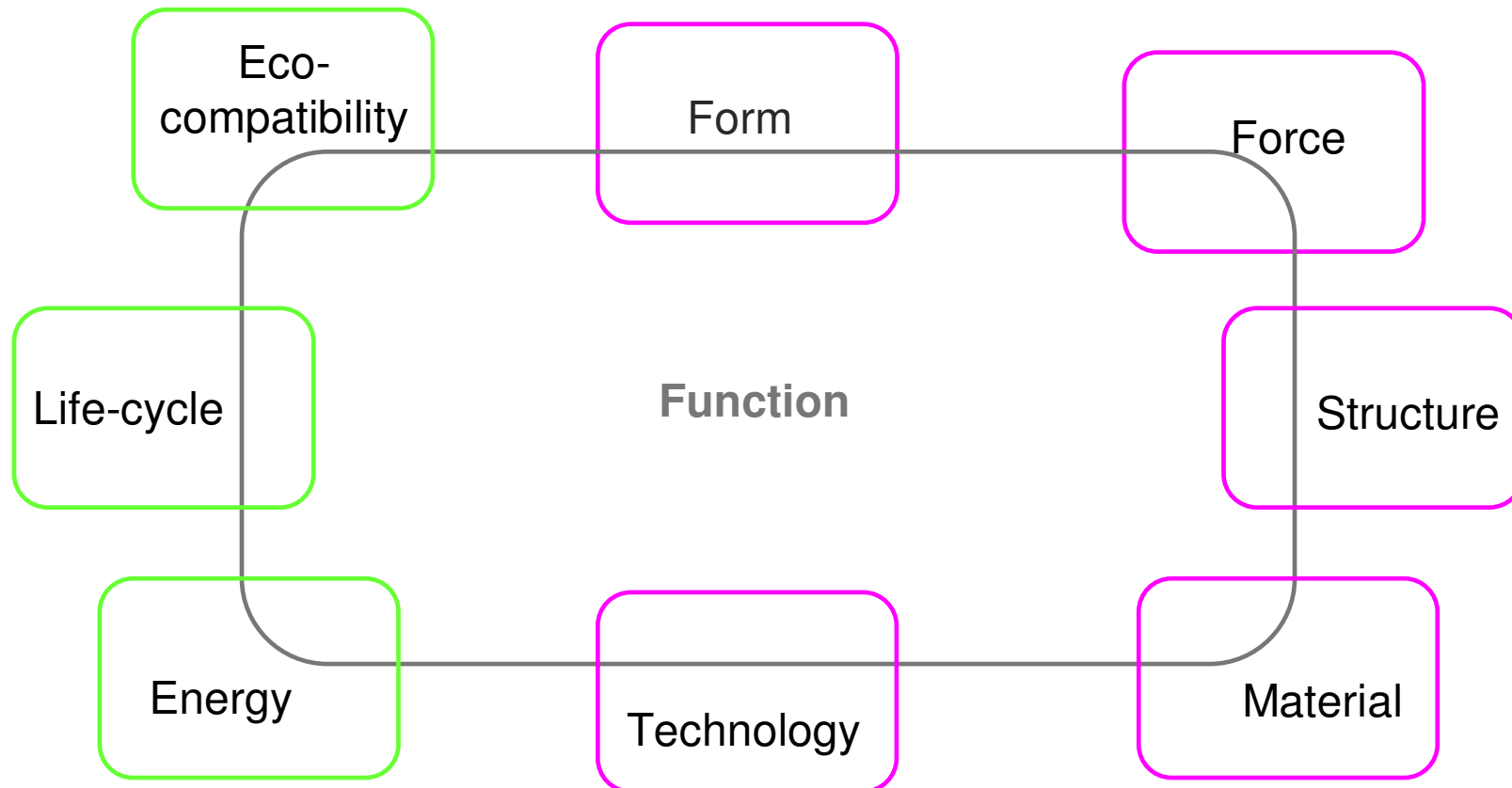
Ban Metz 2010

EXPERIMENTAL SYSTEMS

- ▶ evolution...however
 - ▶ scale effect entails structural & material compromises
 - ▶ the initial weaving concept is lost
- dissociation Form, Structure and Technology



DESIGN PROCESS



EXPERIMENTAL SYSTEMS

► consequences

- aesthetic ambitions
- engineer team has changed (Arup to Terrel Group)
- no local contractors to provide the technical capabilities
- delay: 3 years
- budget : Initial 45 millions euro
Final around 80 millions



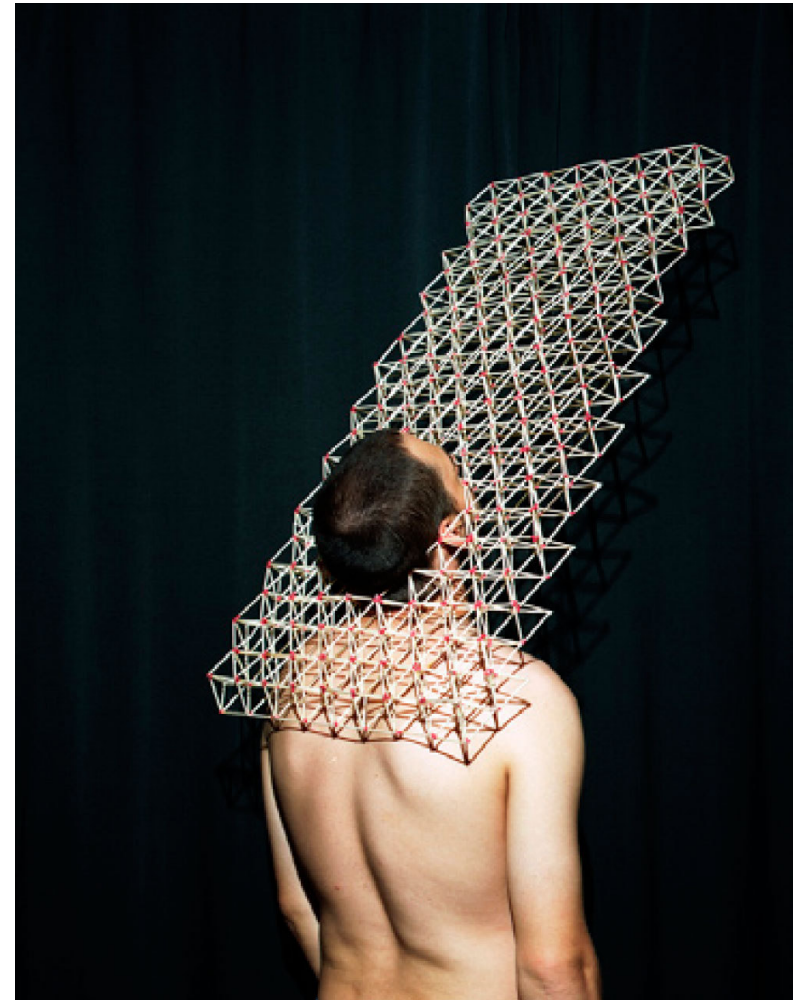
► complexity might degenerate into complication

Ban Metz 2010

EXPERIMENTAL STRUCTURES

- ▶ Form
- ▶ Force
- ▶ Material
- ▶ ...

—● Modelling boundaries



Lukas Wassmann

PRACTICAL STRUCTURE

“The intuition of the form and its materiality do not constitute distinct moments, concerned with a conflict dualistic design, but many moments - in constant relationship - of a creative process which is solved in the architectural synthesis”.

Pier Luigi Nervi

- ▶ **1** to research, investigate and **experiment** structural systems which are based on a strong “Form-Force-Material” coupling,
- ▶ **2** to give a brief introduction into traditional structural engineering approaches, its vocabulary and its underlying assumptions,
- ▶ **3** to present examples of advanced structural engineering solutions and materials to currently designed forms and projects.

PRACTICAL STRUCTURE

- ▶ the three aims are further illustrated and explained at the beginning of each seminar through a lecture
- ▶ the lecture is followed by a discussion
- ▶ the students projects are developed

Experimental Structure 1

03.12.09 16.12.09 22.12.09

Experimental Structure 2

Waste

14.01.10 28.01.10 04.02.10 11.02.10

EXPERIMENTAL STRUCTURES 1

Tensegrity

Foldability

Catenary

Membrane

Grid Shells

Particular
Meshes

Fold

Weaving

Interactive
Kinetic

EXPERIMENTAL STRUCTURES 1

- ▶ Groups of 1, 2 or 3
- ▶ Expected outcomes
 - Small scale model
 - Digital model
 - Written piece as it can be tested through any rational method
 - Presentations of your researches

EXPERIMENTAL STRUCTURES 1

Tensegrity

Foldability

Catenary

Membrane

Grid Shells

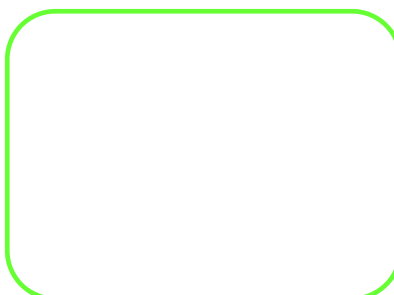
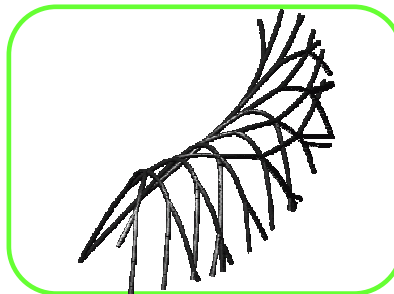
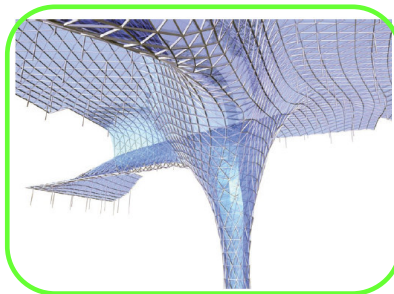
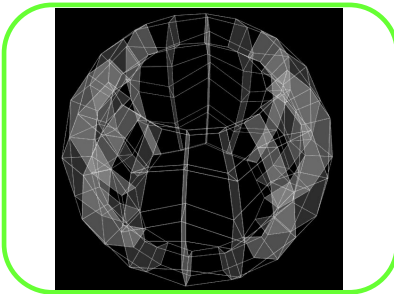
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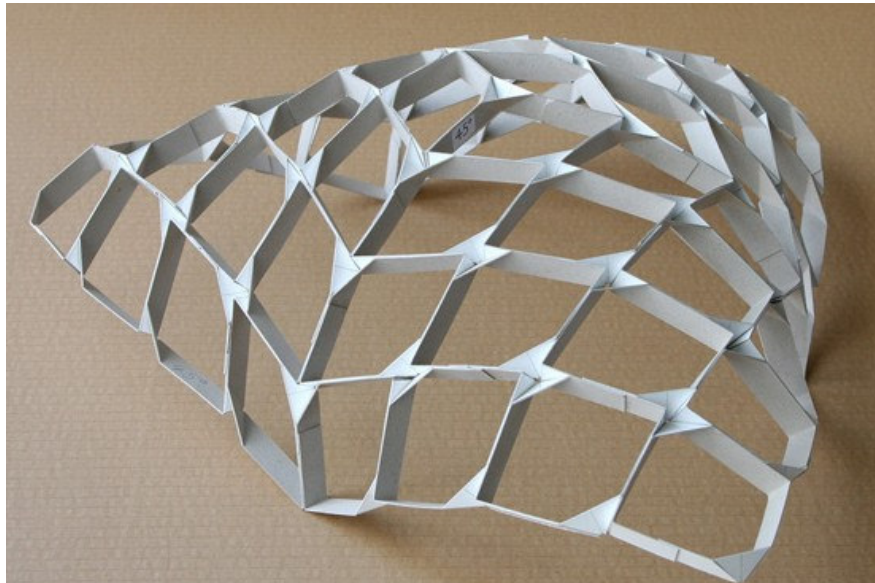
EXPERIMENTAL STRUCTURES 1



EXPERIMENTAL STRUCTURES 2

ARCHIWASTE

- ▶ General concepts and approaches
- ▶ Fold Architecture
- ▶ Cardboard Architecture



EXPERIMENTAL STRUCTURES 2

ARCHIWASTE

- ▶ General concepts and approaches
- ▶ Fold Architecture
- ▶ Cardboard Architecture



EXPERIMENTAL STRUCTURES 2

- ▶ Selected projects from the first phase that could be realized at a bigger scale by student groups
- ▶ Personal project linked to other research fields and seminars at IAAC but it should always consist of experimental solution which wants to be tested
- ▶ A cardboard project linked to Waste approach
- ▶ Expected outcomes
 - Small or/and large scale models
 - Digital model
 - Written piece as it can be tested through any rational method
 - Presentations of your researches

CONCLUSION

- ▶ Please choose a field research among the stated above
- ▶ Let's start the first experimental phase...

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