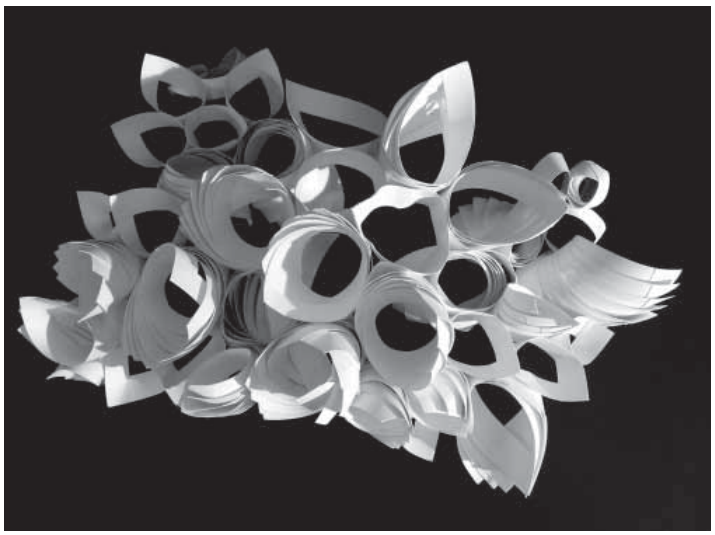
Form Defining Strategies

by Asterios Agkathidis

"Form Defining Strategies" is a seminar, which has been held in the Technische Universität Darmstadt since 2006. Its main aim is to investigate form-defining mechanisms in architecture and design. Form and geometry are generated according to rules and parameter based applications. To avoid direct reference to architectural planning, aspects of scale, program and urban planning are left out. Instead, a set of abstract techniques based on manufacturing principles, linked to suitable materials, function as a form generator. The emerging physical "pre-tectonic" models can be read as spatial prototypes, which then function as abstract machines for architectonic and design solutions.

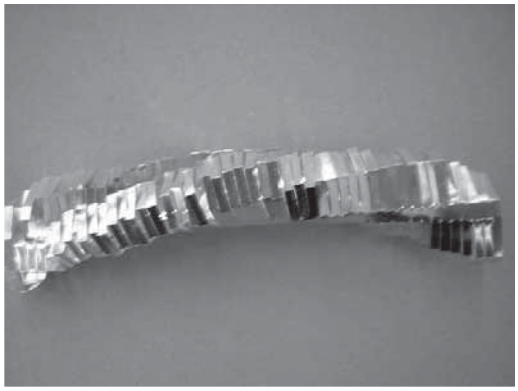


The class consists of three phases, which build on each other and are held as short-term workshops. In phase one, students are asked to create a series of physical models by applying a set of rules on a given two-dimensional geometry. Thus, a number of unpredictable but non-arbitrary objects emerge, which can function as a mechanism for architectural archetypes, even though it is not true architecture yet. Physical models prove to be extremely valuable, by introducing materiality aspects and physical properties.

The characteristics of different materials that were used for the models did not just influence geometrical possibilities, but brought with them material specific effects, with which spatial qualities could be intensified, explored and organised. This methodology is based on the conviction that working with physical models is indispensable even in today's all-digital climate. Architects are able to explore unpredictable, unimagined, and exciting spatialities that can emerge organically during the design process. Novel, experimental spatial structures and systems are discovered and inform this process and subsequent decisions.

In the second phase, the students are asked to digitalise the physical geometries developed in phase one. A process of mapping and analysing is therefore necessary, enabling a deeper understanding of the models and its geometry. Additional modelling and animation techniques introduced by **form•Z** are becoming essential tools for object determination and its further development and translation into architecture. Students who often never had any contact with 3D modelling, discover an exciting and efficient tool which allows them to draw, control and modify complex geometries.

In the third phase, the students have the opportunity to 3D print the modified models, thus establishing a relation to contemporary manufacturing technologies. This interplay between analogue and digital model proves to be highly successful not only as means to interconnect these two ba-

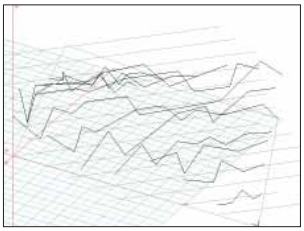


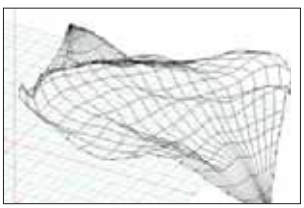
sic architectural skills, but also as an efficient didactic for teaching 3D modelling. Basic physical modelling attributes like materiality, performance, physical forces and allowance for coincidences or mistakes are later integrated in a digital determination process, which develops the geometries even further. Digital attributes like precision, parametric modification and animation are enriching the geometries while solving unclear points or problems.

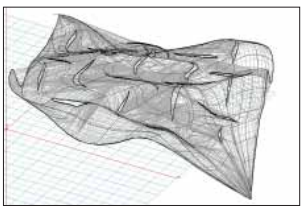
Physical models allow the quick translation of the chosen setup into form. The techniques used have to be applicable to the modelling material chosen. The chosen material dictates its own rules and informs, in that way, the emerging geometry. The final product is usually a non-static object which can be performed.

Digital techniques allow precise application of the form defining setup. Materiality can only be simulated. Testing modified variations, reproducing and optimizing components becomes a routine. Geometrical perfection becomes possible and complexity can be increased. The applied techniques are not linked to any materiality, but to the tools given by the software. Most often, the physical techniques have to be translated: bending becomes “sweep along path”, thermoforming gets translated into “nurbz“. This process contains both chances and dangers. It is definitely changing the structure of the emerging model.

The final 3D-ploted models are in no way perfect clones of the manual manufactured models. They certainly carry the “information” of both applied processes. Nevertheless the, lost sense of materiality is inevitable. The final product is static, but definitely more complex than its original. The differentiation of a structure’s “skin and bones” becomes relative. The models are precise but abstract at the same time, almost immaterial.





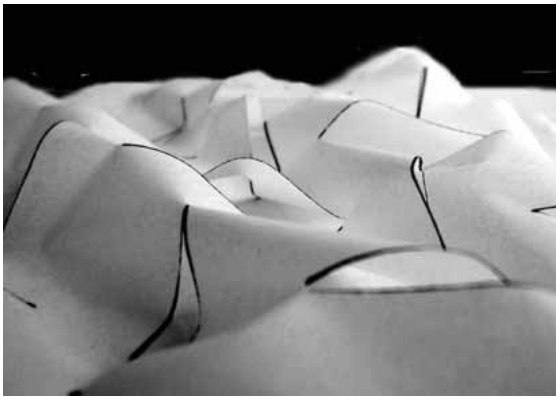


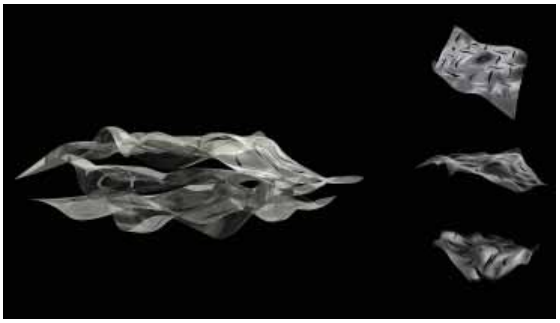
In sum, the described circle “analogue – digital – analogue” proves to be a very valuable architectural form defining procedure, which integrates traditional architectural techniques with the newly introduced manufacturing technologies. Joint venture instead of digital monotony. Analogue aesthetics via digital settings.

Perforated Skin

This model aims to explore spatial surface conditions. By using cutting and thermo-forming techniques, the two-dimensional surfaces deform to create a three dimensional structure. Three additional layers are overlapped and rotated by 45°. The final product could be read as a spatial landscape or as an instrument for generating architecture.

Physical Techniques cutting, bending, stretching, thermoforming, layering
Digital Techniques nurbz, trim with outline
Material Pvc foil

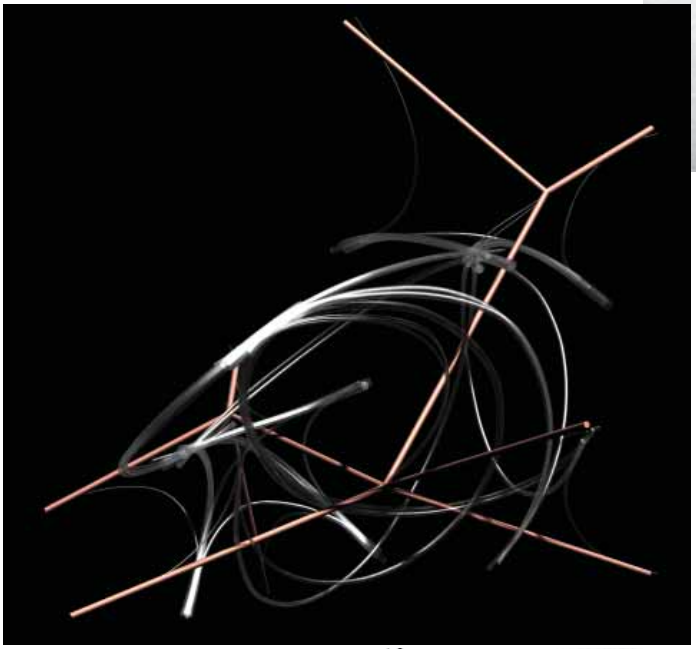


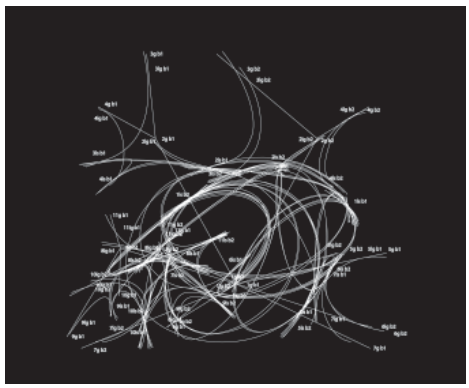


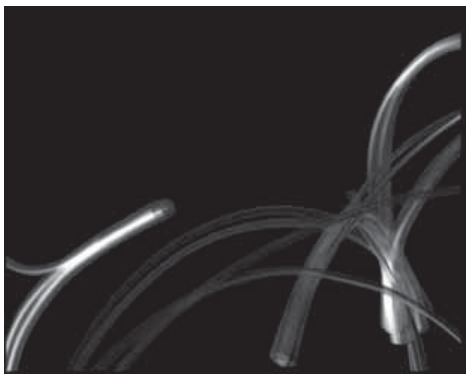
Synbot

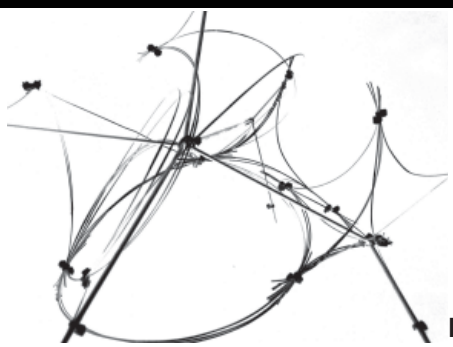
The functional schematic of a robot is translated into a dynamic system of knots and hinges. The model generated can perform movements in different directions, independently of its relationship to the ground. This sophisticated system can function as an organizational or structural diagram in an architectural design process.

Physical Techniques: bending, knotting, bundling
Digital Techniques: splines, sweep along path
Material: metal wire









References

- Form Defining Strategies, Agkathidis, Schillig, Hudert, Berlin-Tübingen.

AsteriosAgkathidis was born in 1974 in Thessaloniki, Greece. He studied Architecture in Thessaloniki and completed postgraduate studies in Advanced Architectural Design at the Städelschule in Frankfurt in 2001. He was a partner in the architectural practice b&k+ in Cologne until 2004, then at VMX architects, Amsterdam until 2005. He later founded the architecture and research laboratory a3lab Frankfurt-Thessaloniki. Teaching and lecturing experiences include AdBK Nuremberg, FH Frankfurt, the University of Patras (as online distance-learning lecturer) and the Städelschule. Today he teaches at the Technical University of Darmstadt, where he is currently working on his PhD.