

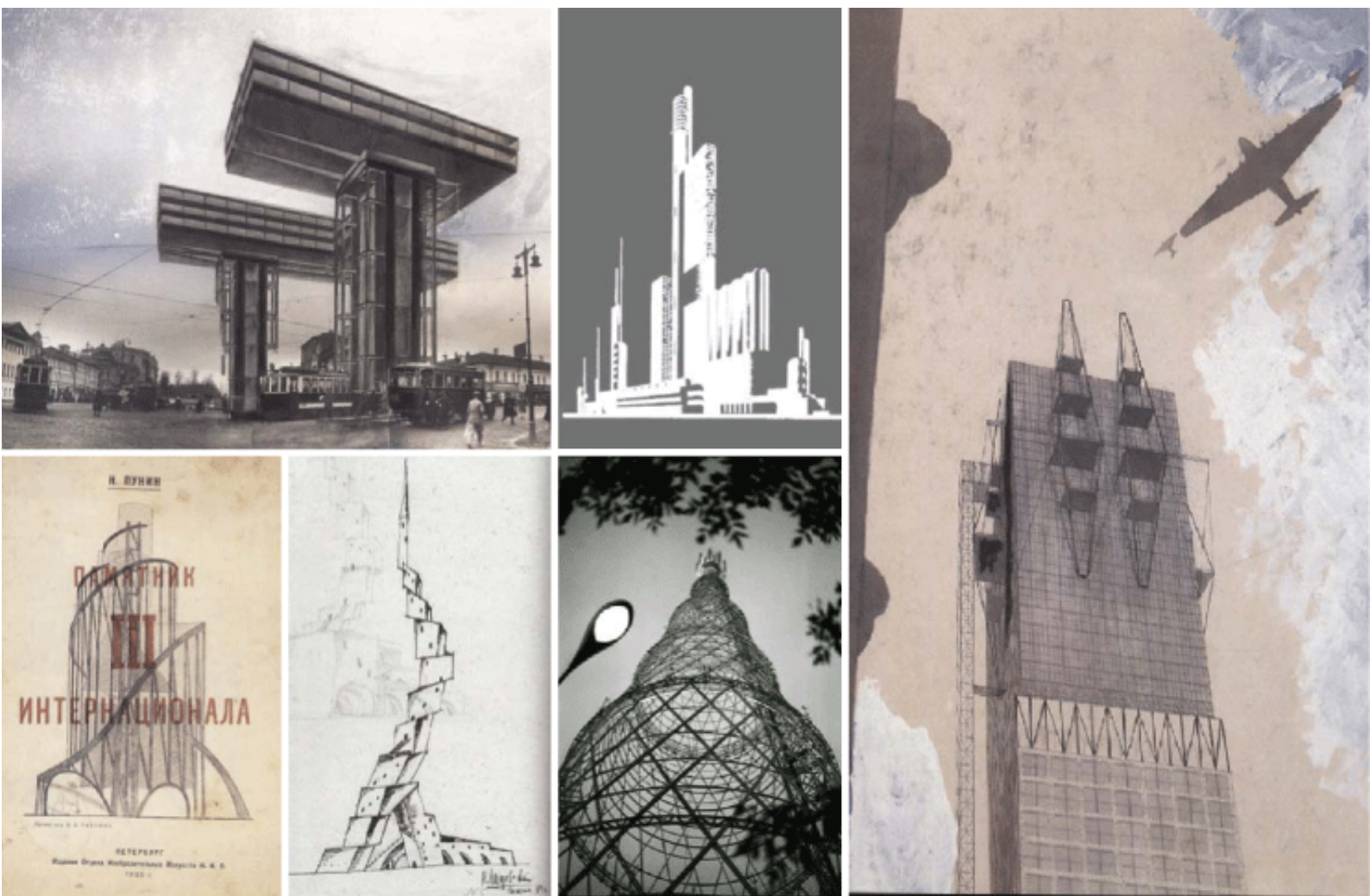
PORTFOLIO of DESIGN WORKS

by Dimitry Alexander Demin

My interests in architecture had begun with trying to justify beauty by looking at nature. I started my studies in 1999 at the University of Architecture and Fine Art of Rostov(Russia). During this time I had a great interest in juxtaposition of mathematics, geometrical proportion, colors and the architectural history. In order to come up with new design idea, first I learned classical methods of sketching and paintings[001], in which I learned to get a feeling for form, colors and proportion. Experience I gathered while doing research about constructivists[002] greatly influenced my design works afterwards.

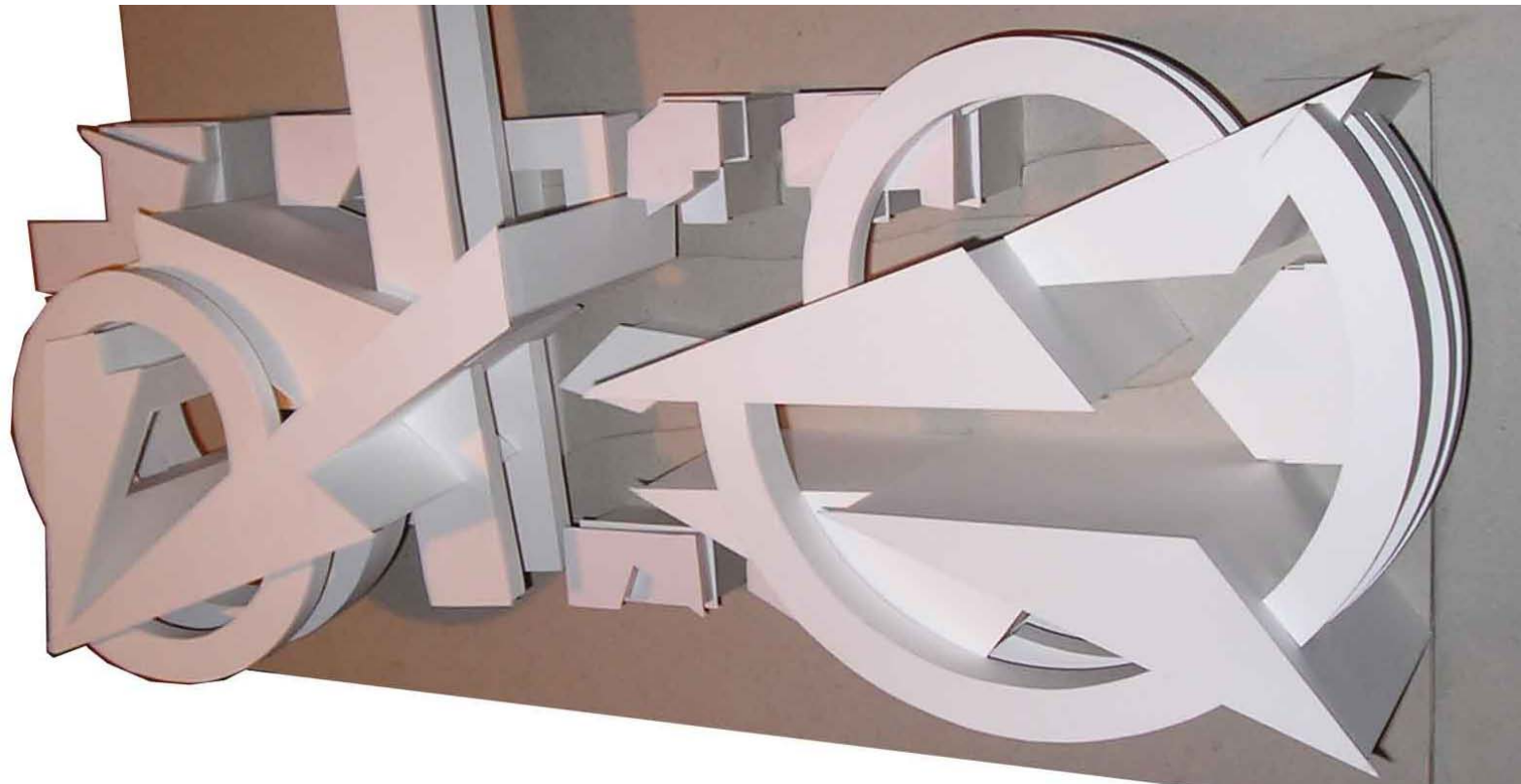
1998-2000 School of Fine Art of Rostow. Paintings exemplifying study of feeling for shape, light and proportion.





Pictures from research paper "Beyond the October Revolution". Theme was about the changes experienced in architecture towards one based on social concepts and processes driven by scientific knowledge. Paper was based on works of El Lissitzky, Ivan Leonidov, Vladimir Shchuko, Iakov Chernikhov, Vladimir Tatlin works.

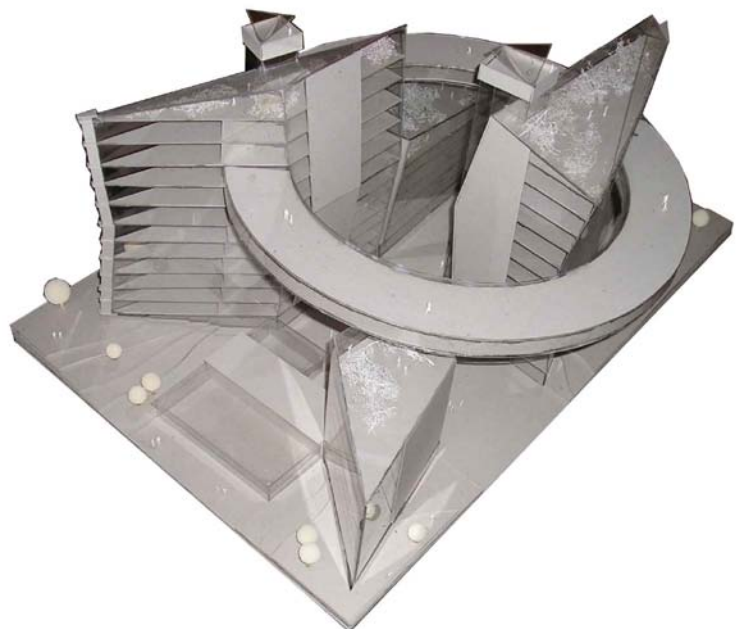
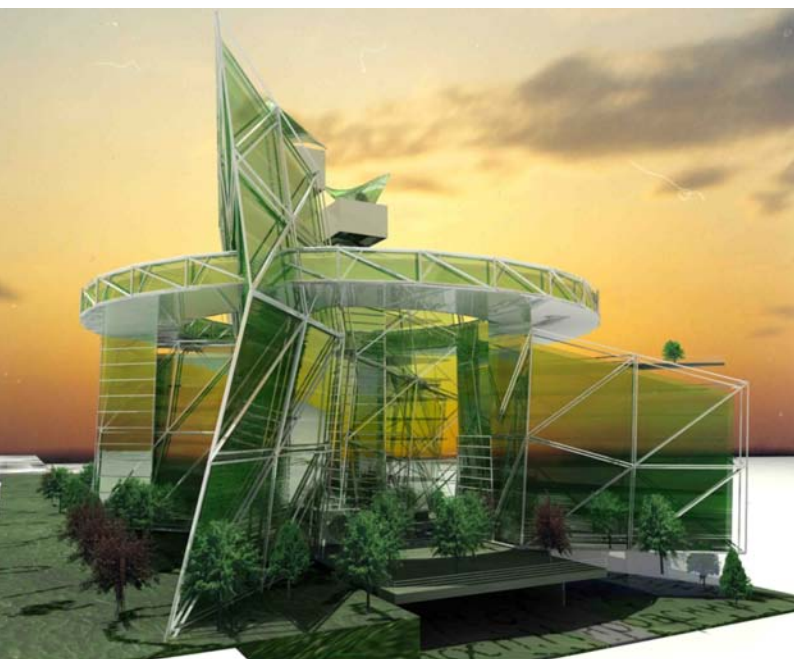
My bachelor diploma "ROSSELMASH Head Office" (p.4) was focused on the development of a new kind of office building, which would allow a flexible use while Russia entered a new area of economical and technical progress. During the design process I concentrated on combining the precision enabled by 3D softwares for digital representation and significant design techniques from the constructivists.



ROSSELMASH Head Office
Bachelor Diploma [2004]

by Professor Nikolay N. Titomirov

The design of this urban quarter is based on the landmarks of constructivist's buildings put together with exploration of geometrical possibilities in 3D Software.



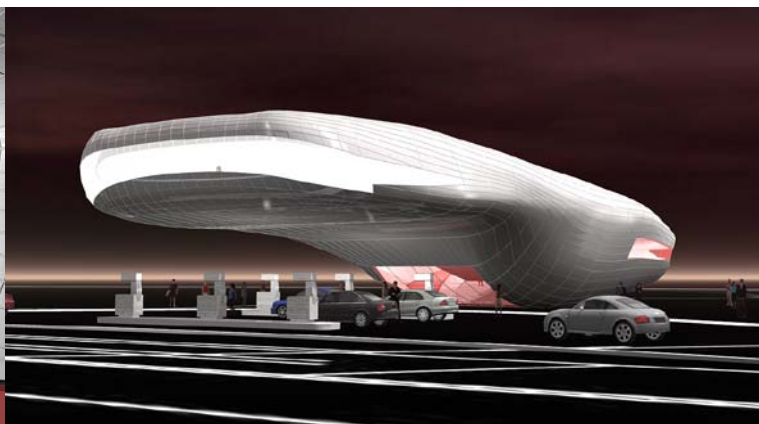
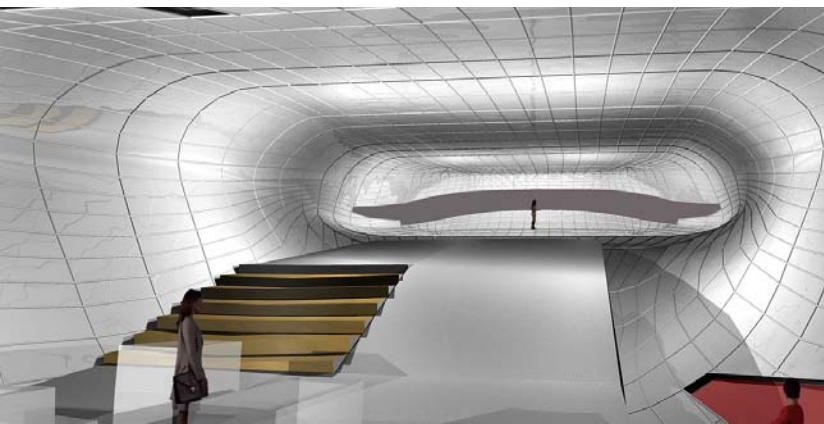


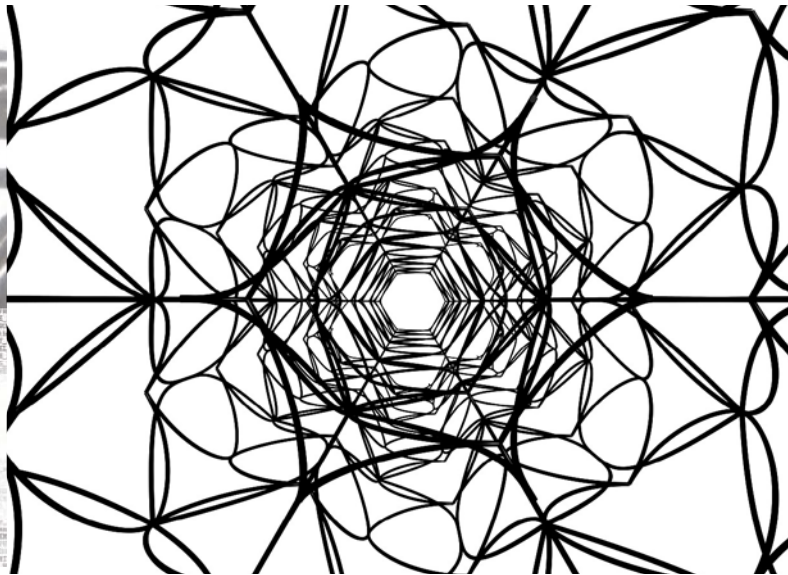
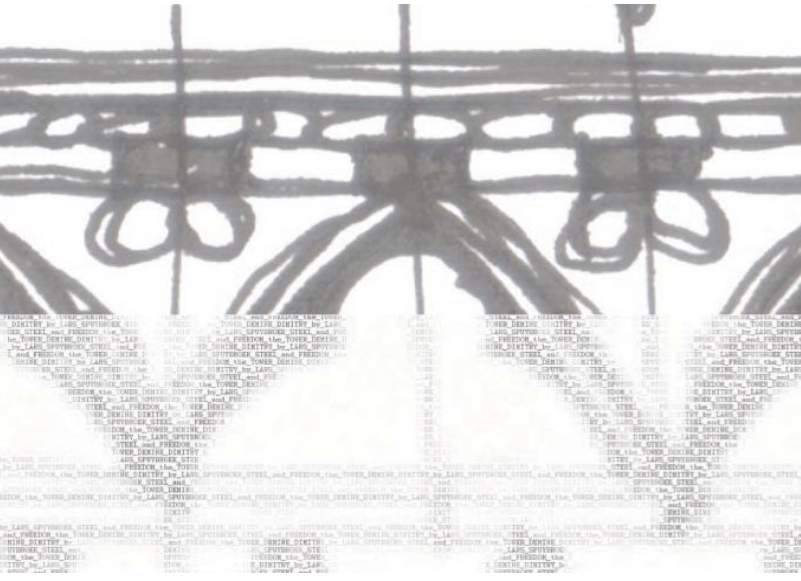
Autobahnmuseum[2005]

by Dr. J.H. Gleiter

After completing my Bachelor degree in 2004, I continued my education at Bauhaus University in Weimar (Germany). I was mainly attracted by modernism and the newest technologies. In autumn 2005 together with my colleague J. Gaun we designed a small museum for the German "Autobahn". The form here is based on a principle of deformation that follows function. I wrote an algorithm in MaxScript that makes geometrical transformations of the building possible.

During the work on this project I discovered the book of Lars Spybroeck "Machining Architecture". Next semester I moved to Kassel (Germany) in order to study it deeper.

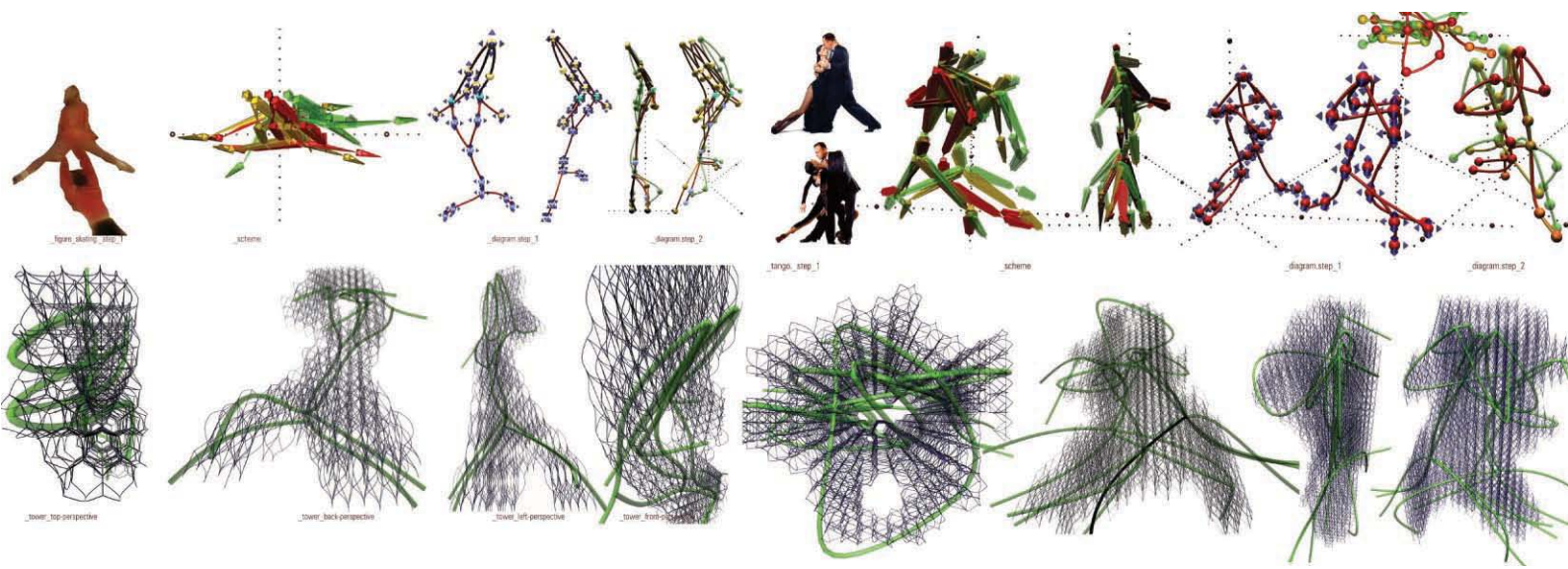


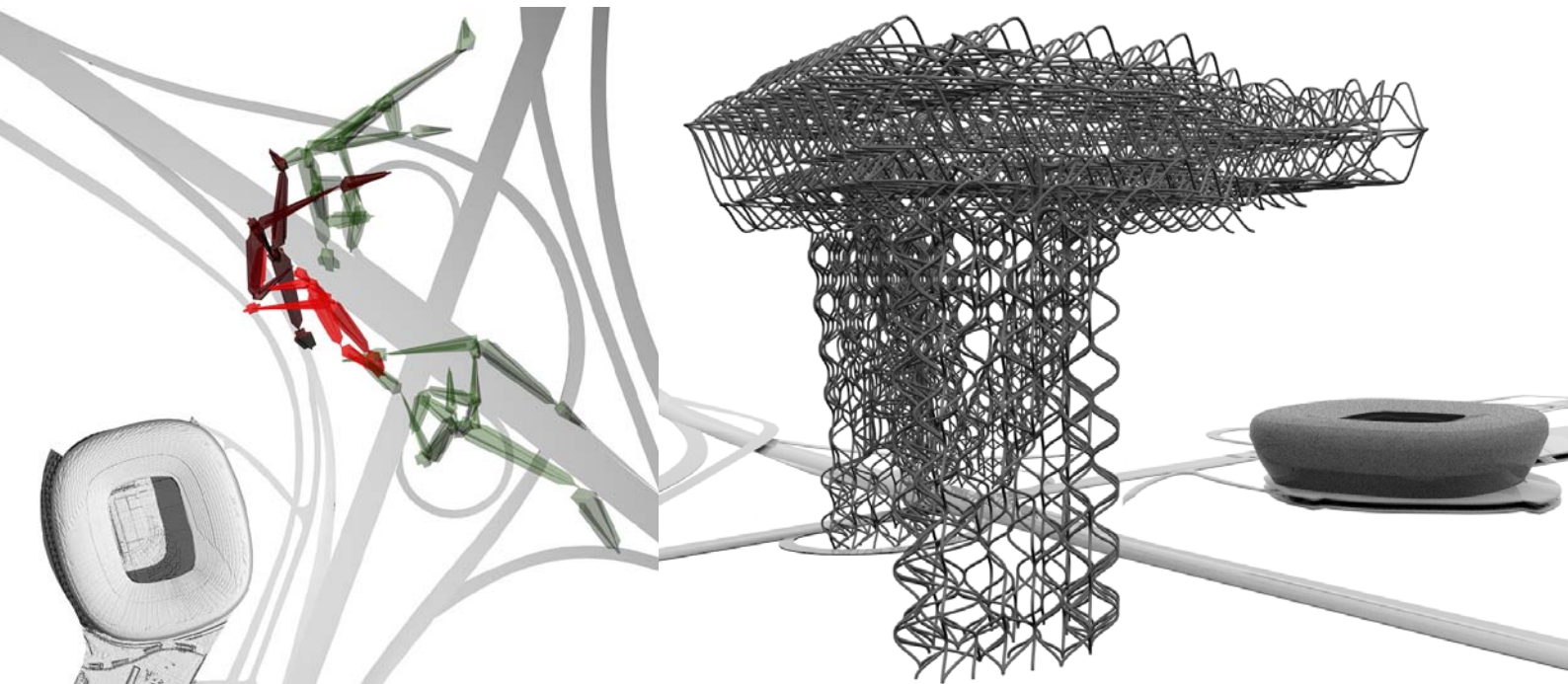


STEEL and FREEDOM Dancing Tower [2006]

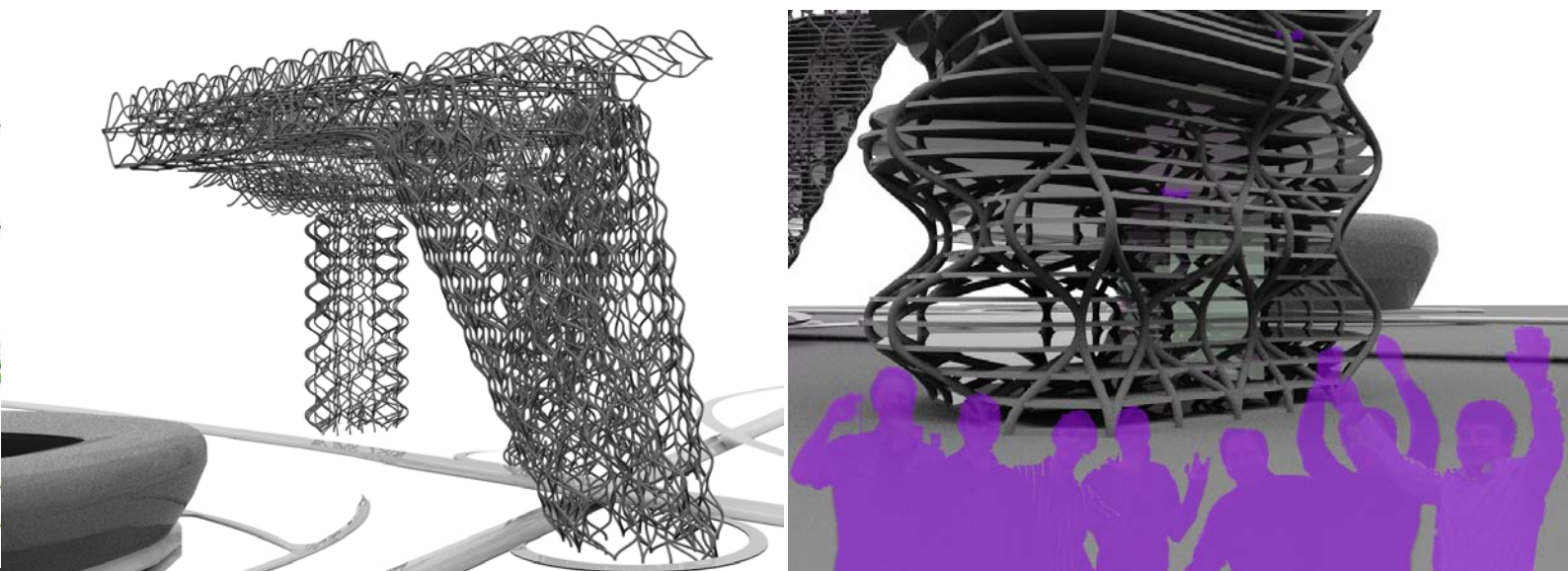
by Professor Lars Spuybroek

Dancing Tower is an example of application of "Machining architecture" tools. The researches in form-generation were promoted by Spuybroek. The basic structural principle of the skyscraper is based on the gothik principle of branching.





First part of the design was a research on gothic ornamental structures and their translation into the language of NURBs. Next step was a shift towards a structural system from a curve clustering into a set of nodes constituting the building. The next step was an act of convergence, which consisted in saving and using information contained in a diagram of dancers. I applied the movement of dancing people to design the skyscraper. Lastly was a divergent phase - I mobilized the systems onto the skyscraper, where the dancing diagram became a generative building. I was using MEL for the simulation of the dancing diagram.

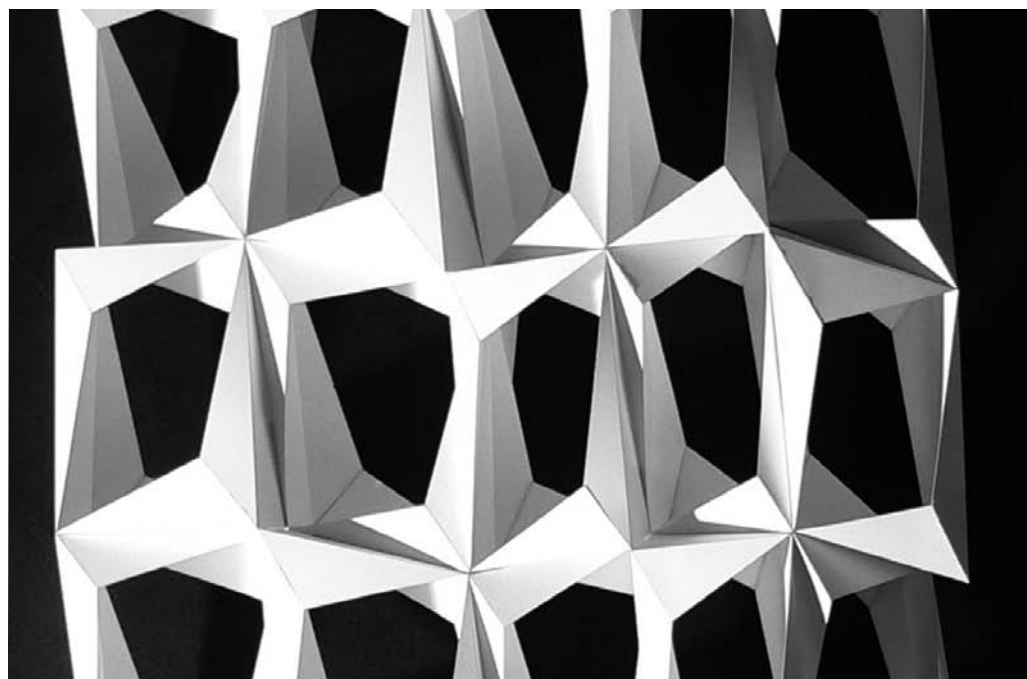
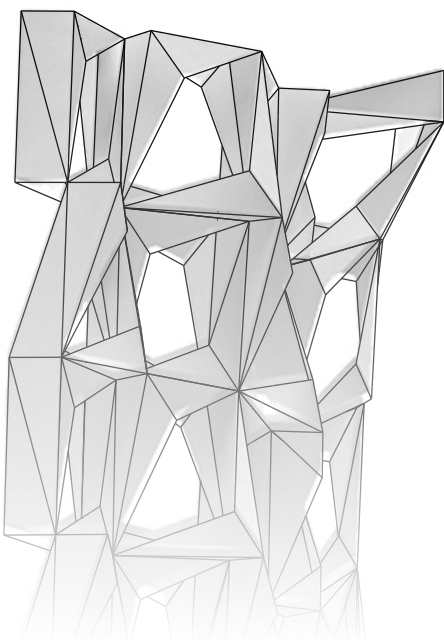




Parametric area moduls Digital Stones [2007]

by Oliver Tessmann, Markus Schein

In spring 2007 Oliver Tessmann and Markus Schein offered a seminar for students who were interested in getting better knowledge in RhinoScript and digital production. The aim was to design a parametrical module and bring it to production. The results of our works were published in the book "Parametrische Flächenmodule" by Tessmann and Schein.





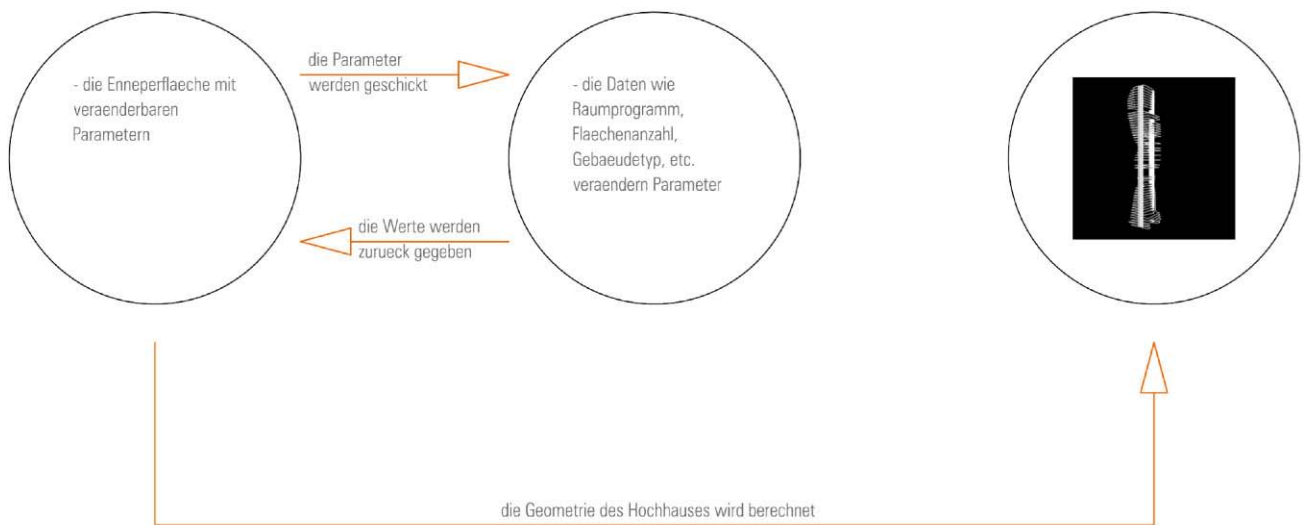
T E N S E G R I T Y

die Umleitung der Gravitation

TENSEGRITY
Die Umleitung der Gravitation

by Professor Frank Stepper

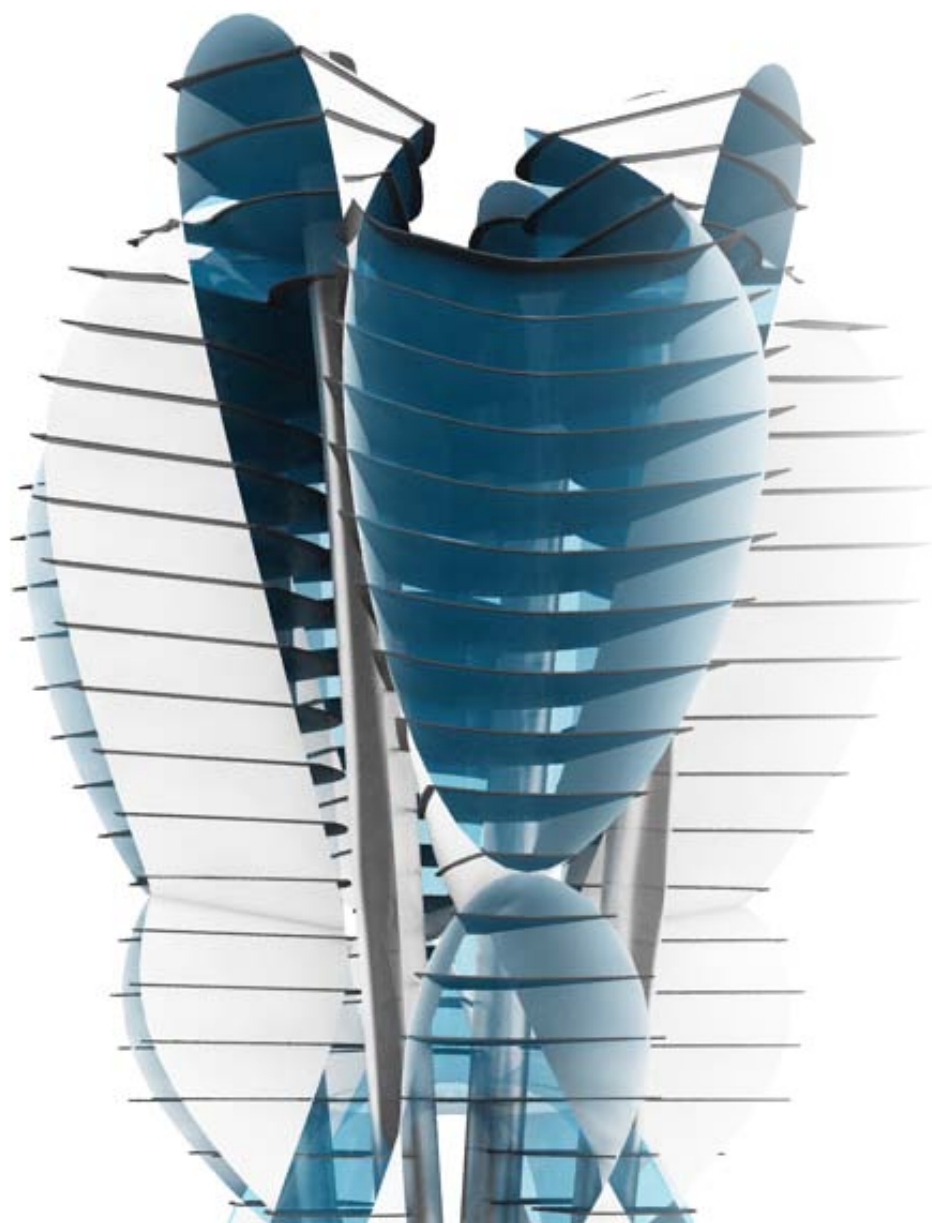
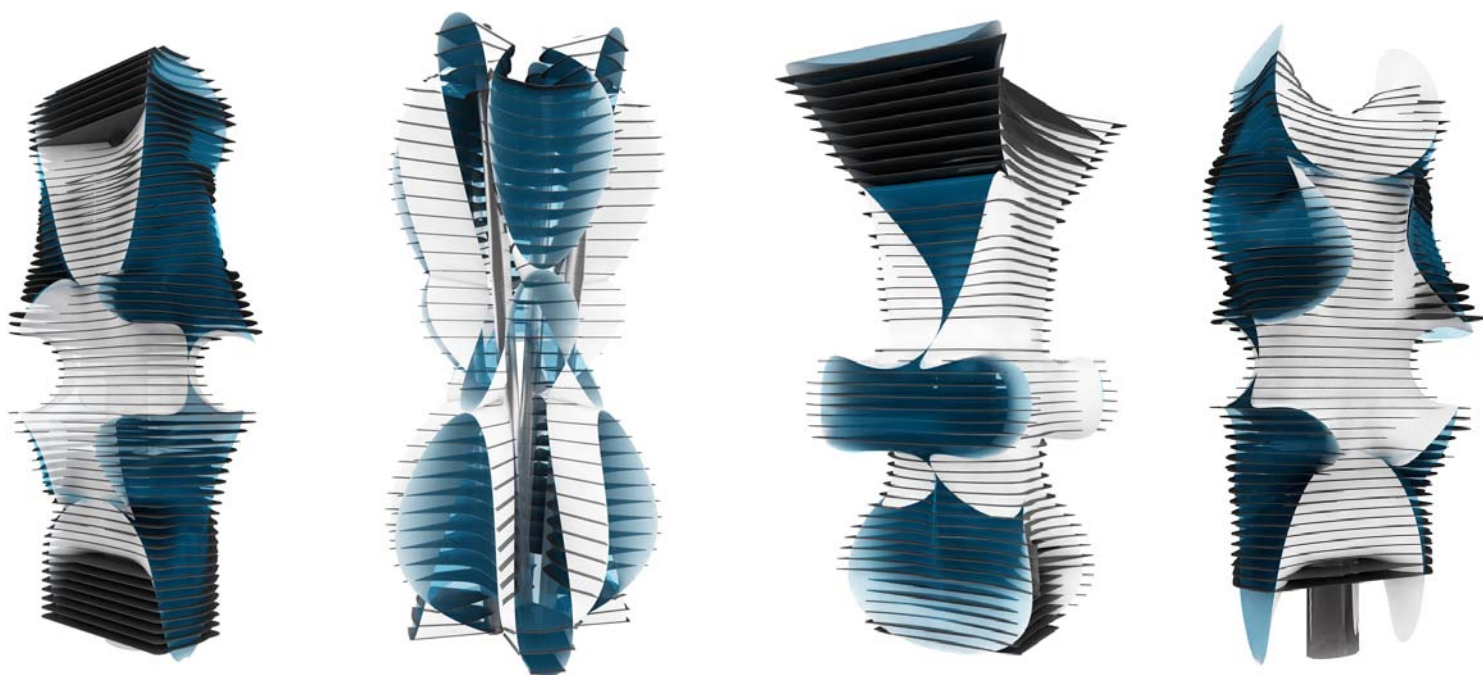
The twentieth century experienced a global shift towards the understanding of tensional structures, that is to say the substitution of compression elements by tension elements - the beginning of a suspended architecture. Tensegrity was a big part of it, unfortunately the process did not lead to any major architectural path. My work was aimed at researching possible ways to apply tensegrity to architecture.



Skyscraper structures based on mathematical area systems Diplom II [2007]

by Professor Dipl.-Ing. Manfred Grohmann,
Dipl.-Ing. Mirco Becker, Dipl.-Ing. Oliver Tessmann,
Dipl.-Ing. Christian Troche

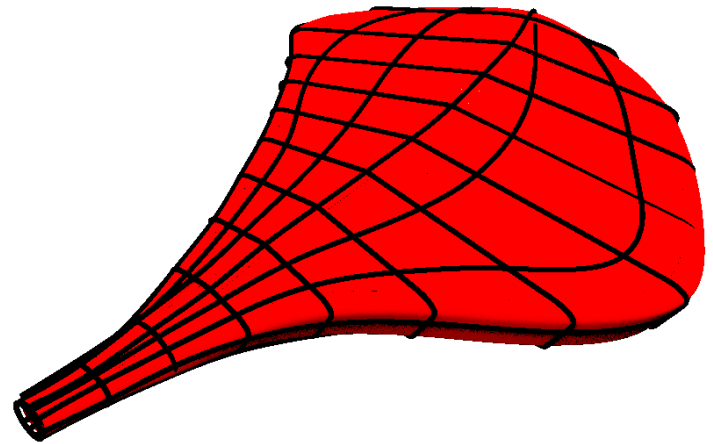
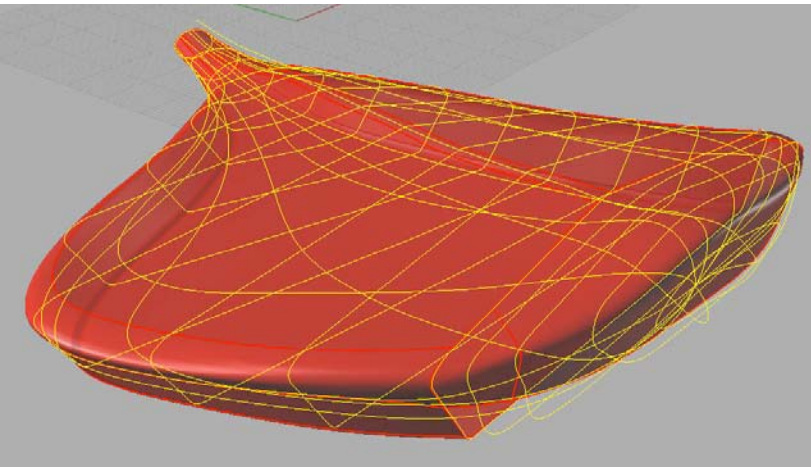
In my diploma I felt inspired by the beauty of mathematical surfaces, meanwhile paying attention to functional, constructive and historical principles of high-rise buildings. I designed a plug-in for Rhino which allowed thousand possible configurations of different skyscrapers following the principal of minimal surfaces in both symmetrical and asymmetrical ways.



I'm very thankful towards Bollinger+Grohmann for my time spent there and the experience gained in using "computer based design" (CAD) in a framework of international projects in close collaboration with famous architects like COOP Himmelb(l)au, Willmote&Associates SA, Schneider+Schuhmacher Architekten, ODBC ARCHITECTES and Gerber Architekten.

During my work I developed new kinds of computer based design techniques and focused on their integration in architectural and structural design. I concentrated on parametrical form-finding methods, algorithmical generation of structures and architectural forms, computer controlled fabrication processes - all of which belong to this emergent architectural paradigm widespread from the field of theoretical research unto new design niches.

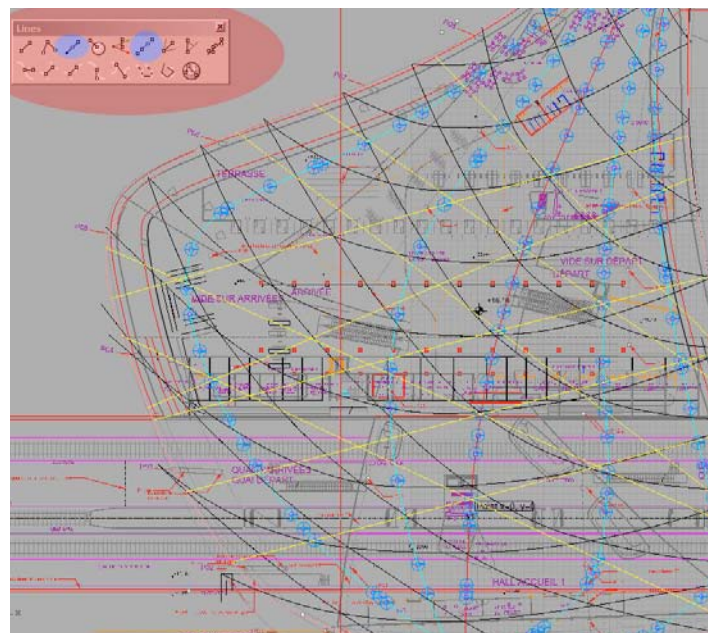
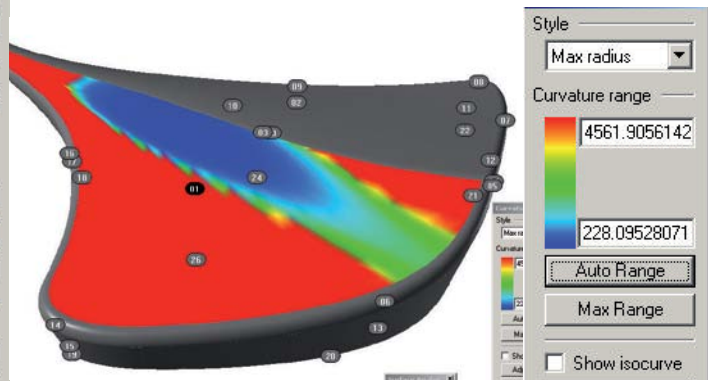
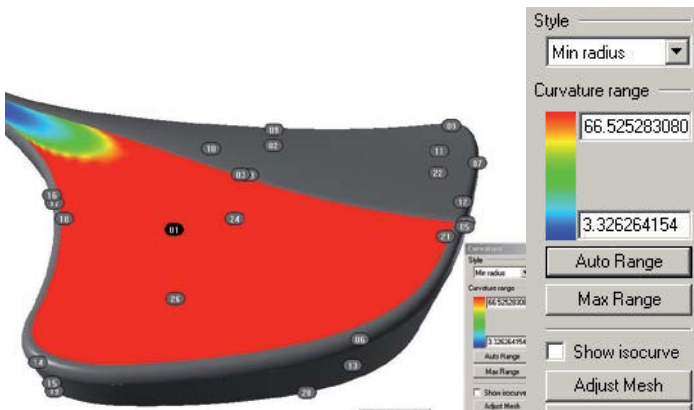
The potential of computer based methods reaches far more out than just the automation of given design techniques. It reshuffles the relation and collaboration between architect and engineer. I believe that they must still keep their distinction and expand in parallel thanks to these new tools. My focus was always on exploring new possibilities and following a strict set of rules.

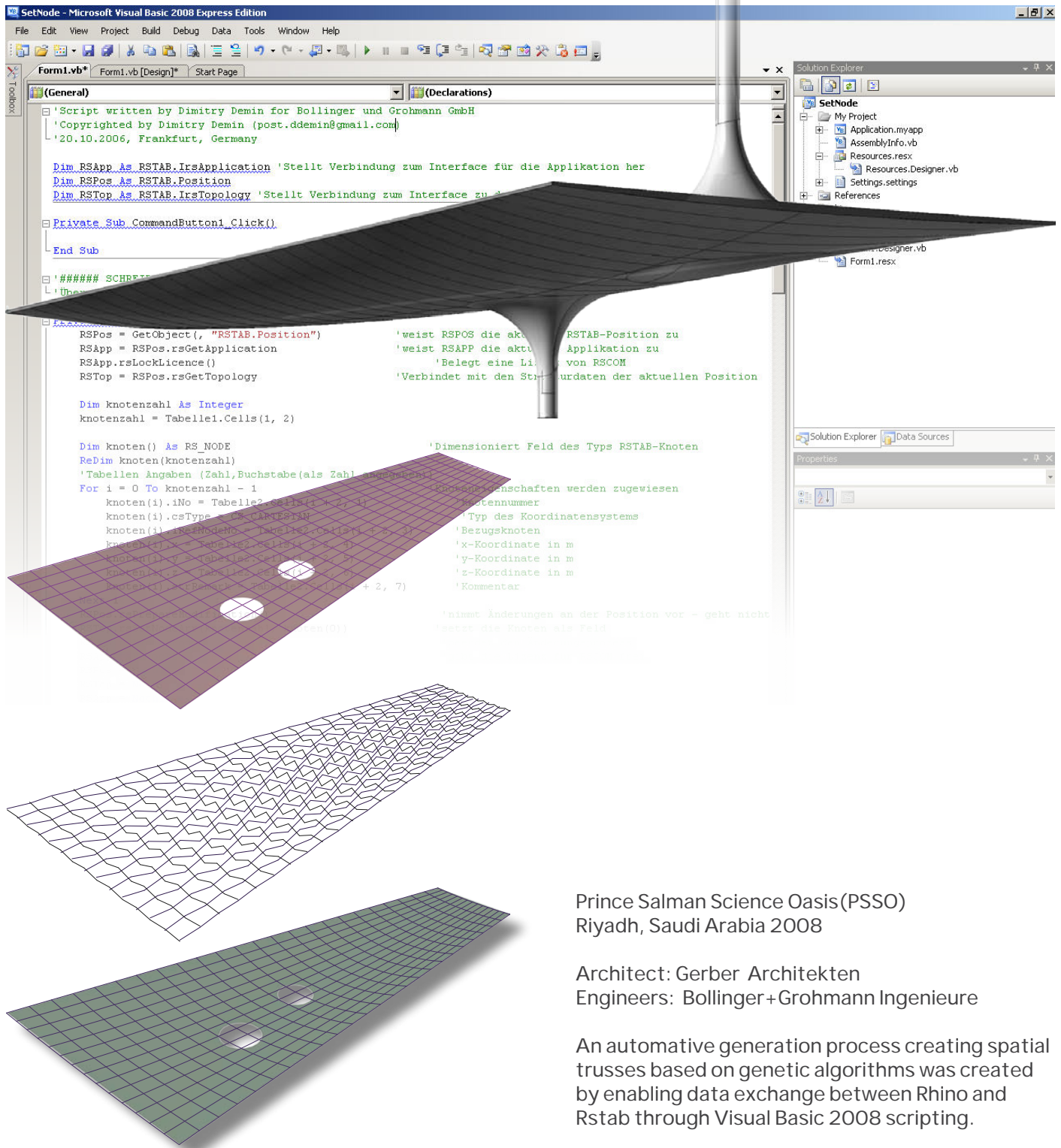


GARE MARITIME DE TANGER MED Tanger[2008]

The shape of ODBCA's building in Tanger is defined by an irregular three-dimensional freeform, with tree different layers inside. The special ODBCA's design would be more or less impossible throug a traditional approach.

The implementation of a parametric 3D-Model for the building's geometry helped to find new structural design solution - by changing the location of the beams for example. This model was used for the coordination of subsequent planning steps and to assess the influence of further design settings.



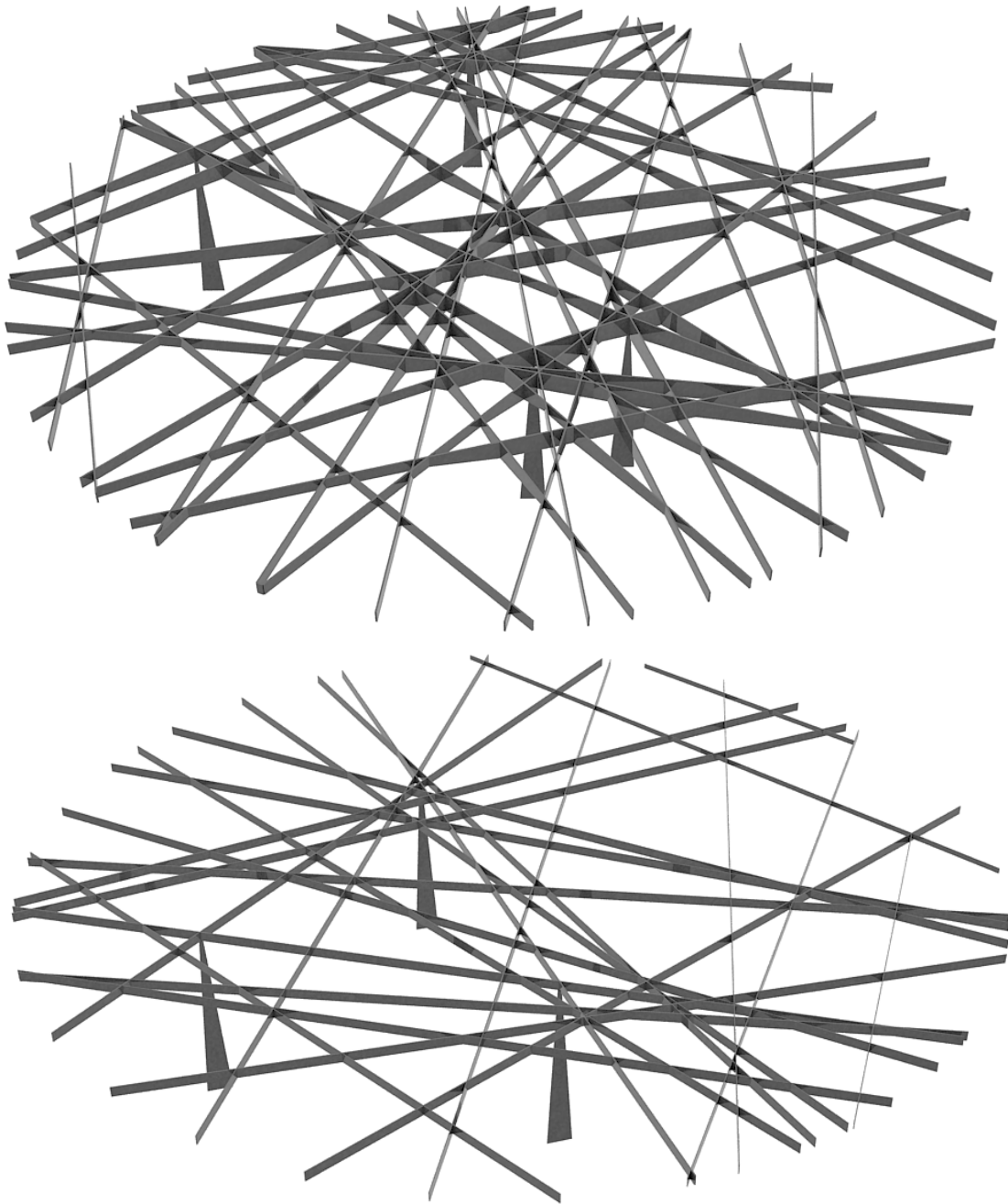


Prince Salman Science Oasis(PSSO)
Riyadh, Saudi Arabia 2008

Architect: Gerber Architekten
Engineers: Bollinger+Grohmann Ingenieure

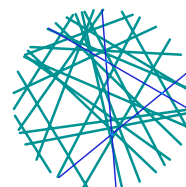
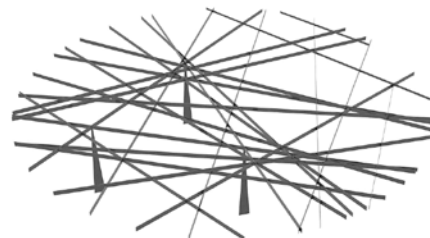
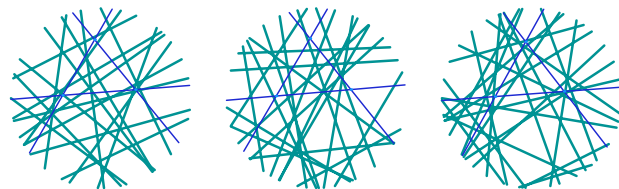
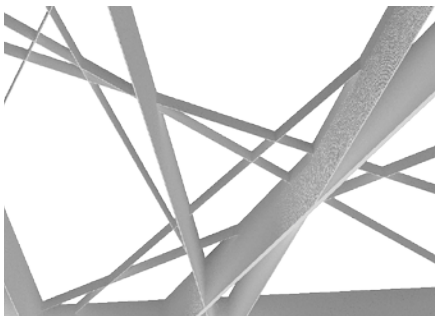
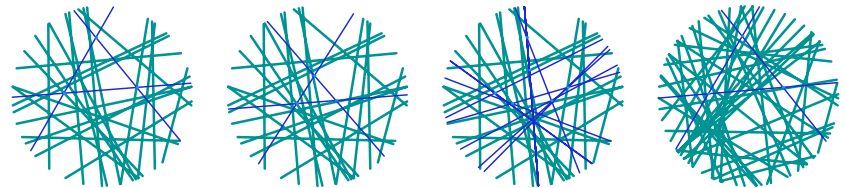
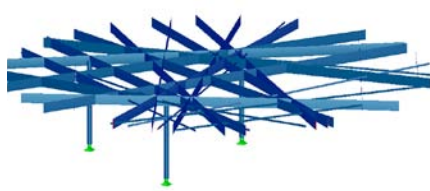
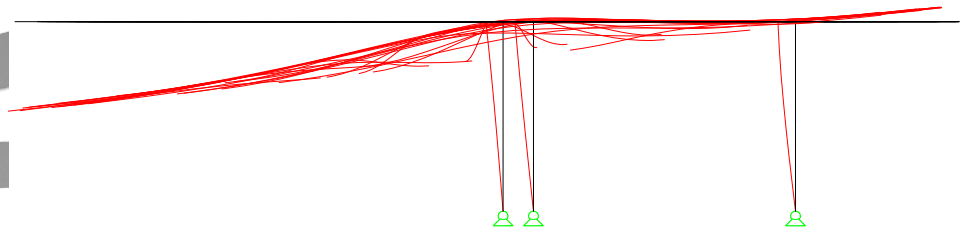
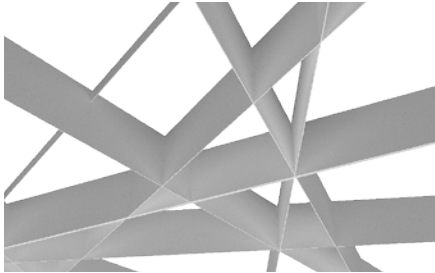
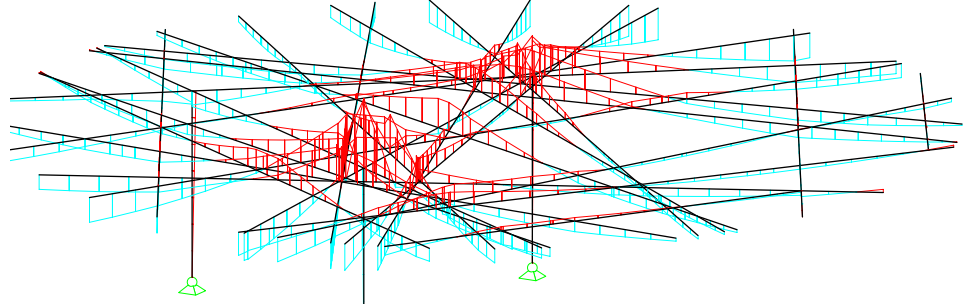
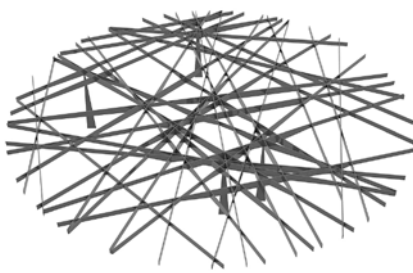
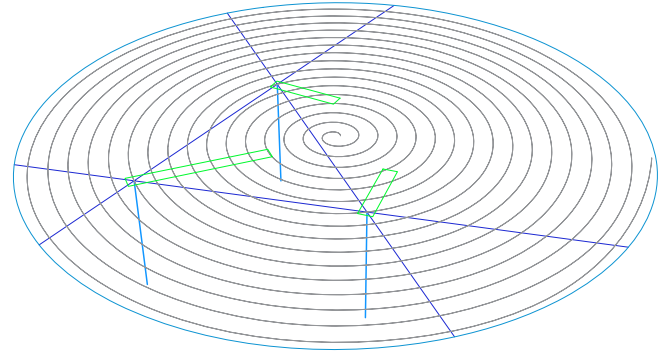
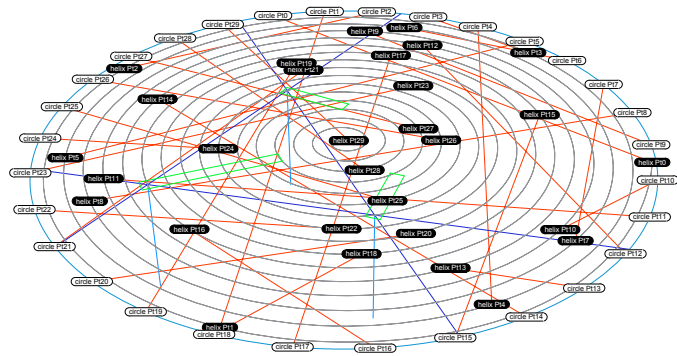
An automative generation process creating spatial trusses based on genetic algorithms was created by enabling data exchange between Rhino and Rstab through Visual Basic 2008 scripting.

This was developed further on into a CAADCroSS plug-in, which permitted to reduce the design process effectively by merging architectural and structural software together.



North and South Gate of the Frankfurt Fair Trade [2009]

In close collaboration with the architect Ingo Schrader, a generative structure for three roofs was conceived for the competition "North and South Gate at the Frankfurt Trade Fair". The basic idea for the design was to realize an efficient structure with the help of an optimization algorithm, which would remind of the lightness and shape of a lotus leaf. Lightness, functionality and efficiency were the three key parameters for the generation of the structure, which despite of the way it looks is mainly based on order.



Stadel Museum

Architect: Schneider+Schumacher Architekten

For this project a Script based on RhinoScript and Grasshopper was conceived for the design of the shell of the Stadel project. The form-finding was proceeded under Ansys. Three-dimensional geometrical scripting work made the combination of structural, architectural and constructive constraints possible. A specific module to implement the reinforcement bars in the shell was developed and the geometrical challenges due to the specific architectural shape in combination with a rectangular grid and the perfectly circular form of the different openings were met.

