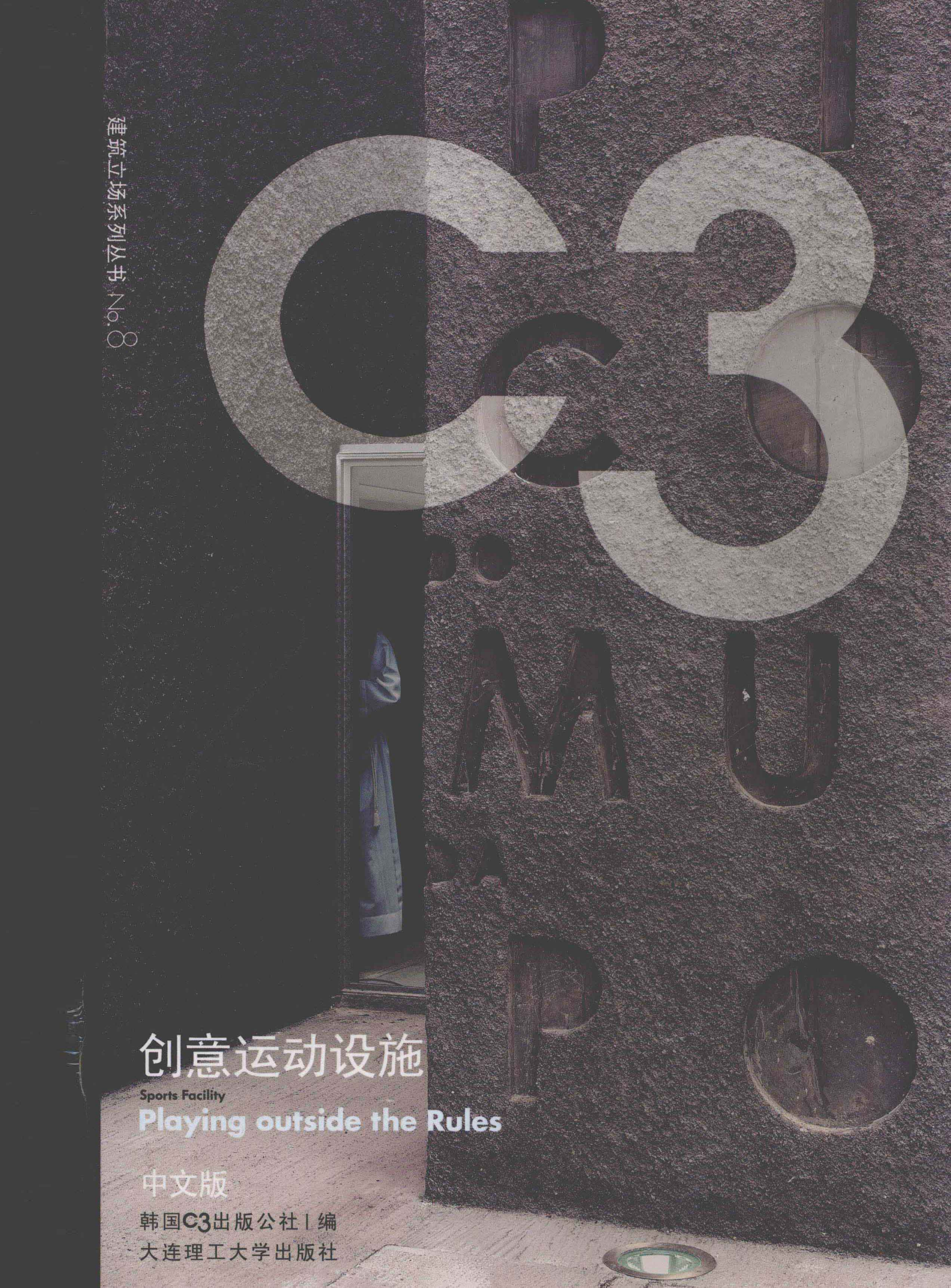
建筑立场系列丛书 No. 8



创意运动设施

Sports Facility

Playing outside the Rules

中文版

韩国C3出版公社 | 编

大连理工大学出版社

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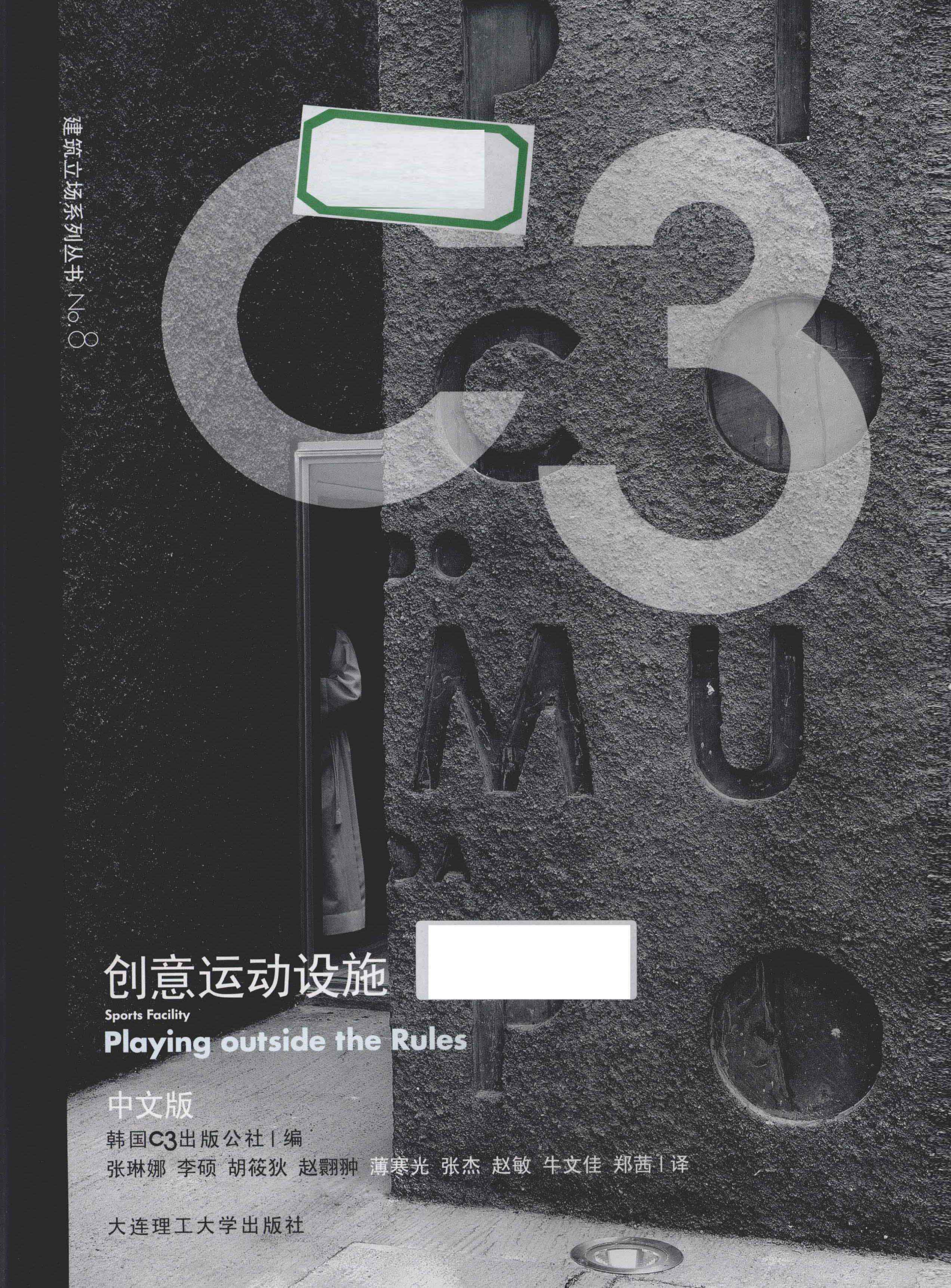

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AIA亭子

每年AIA（美国建筑师协会）都会组织一次设计比赛，挑选一个可以为新奥尔良这座历史名城带来生机的方案。今年AIA选中的是Gernot Riether的设计。它有着一系列发光的球形外壳，放置在该市很有特色的法国区的一个隐蔽庭院里。

它们一般都位于街区深处、远离街道的地方，在夜晚点亮，从而戏剧般地调节其所在环境的氛围，同时为这种浪漫、神秘且隐私的空间带来吸引力。

这个亭子展示了乔治亚理工学院由Riether领衔的数字设计工作室的作品，同时它还是使用PETG（共聚聚酯）完成的设计。这种材料可以用回收的塑料生产，也可以从甘蔗里面提炼，后者更符合地方特色：200多年来，甘蔗已经成为路易斯安那州文化的重要组成部分。这个亭子位于阿瑟·罗斯在当地开设的一个美丽画廊的后院，位于靠近North Rampart大街的奥尔良大街1025号。亭子占地18m²，含有320个不同的PETG单元格。这些单元格经过预制，然后组合成六大块，以便于用小型卡车运输，也便于Riether和他的八个学生在不到两天的时间内将它们安装完成。建造该亭子花费了2500美金。

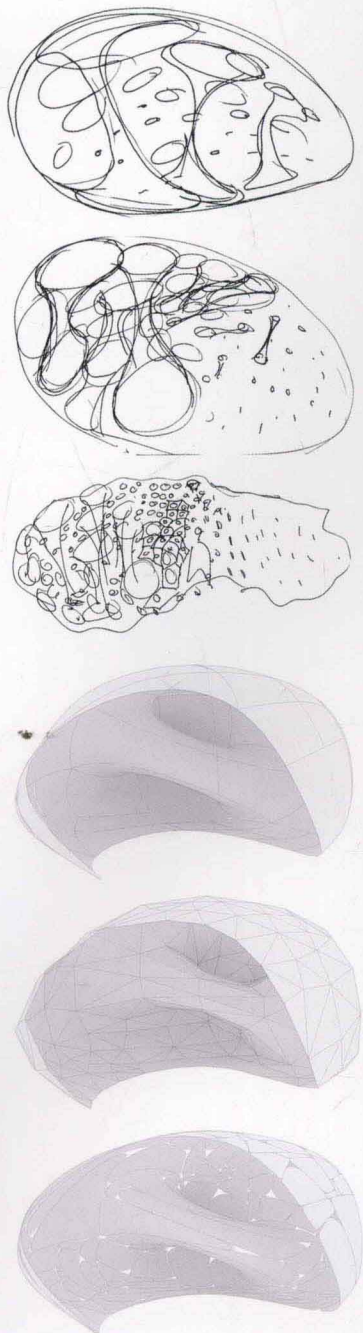
亭子的每个单元格都遵守特定的建筑规则，它的形状随着不同的场地环境、太阳朝向以及规划需求，像照明、座位、视野、种植和供水等，而发生相应的改变。通过使用电脑数控技术，他们将每块模板从PETG板材上切割下来，再利用设计精细的模型把它们加热成形。

之后对板材进行一下冲压再重新连接，这样可以增强外围护结构的结构性能。在关键部位，板块表面变成了支撑和柱状的系统。建筑结构和外围护结构合并成了一个单一的材料系统。

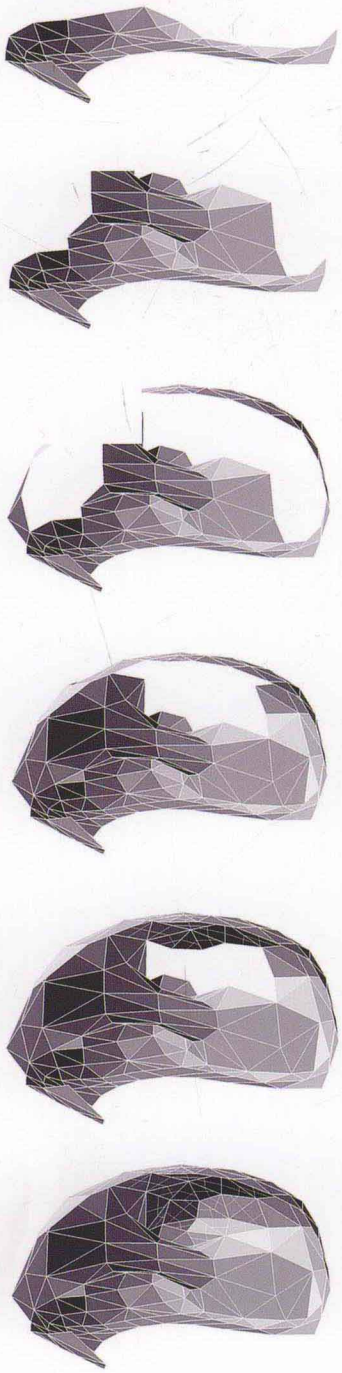
使用PETG可以减少碳排放量。根据世界上最大的制造商之一——陶氏化学公司的统计：每使用甘蔗生产0.5kg的共聚聚酯就可以从大气中去除大约1kg的二氧化碳。AIA亭子使用了123kg这种原料，因此可以从大气中去除246kg的二氧化碳，这说明用甘蔗制造PETG有巨大的环境效益，从而使塑料有可能成为21世纪的建筑材料。

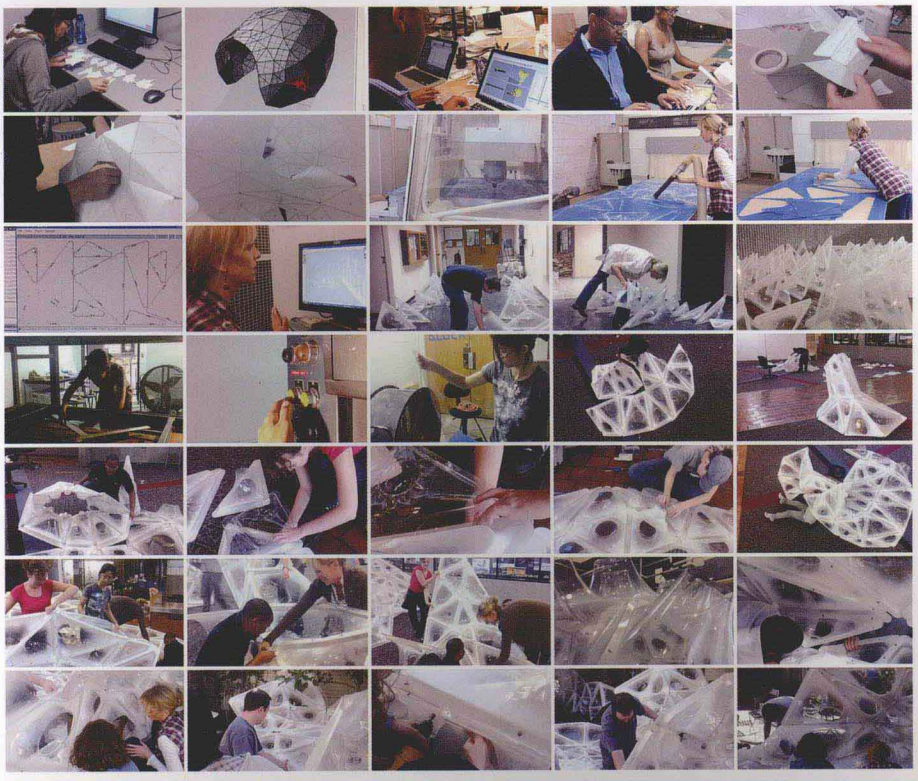
AIA Pavilion_Gernot Riether

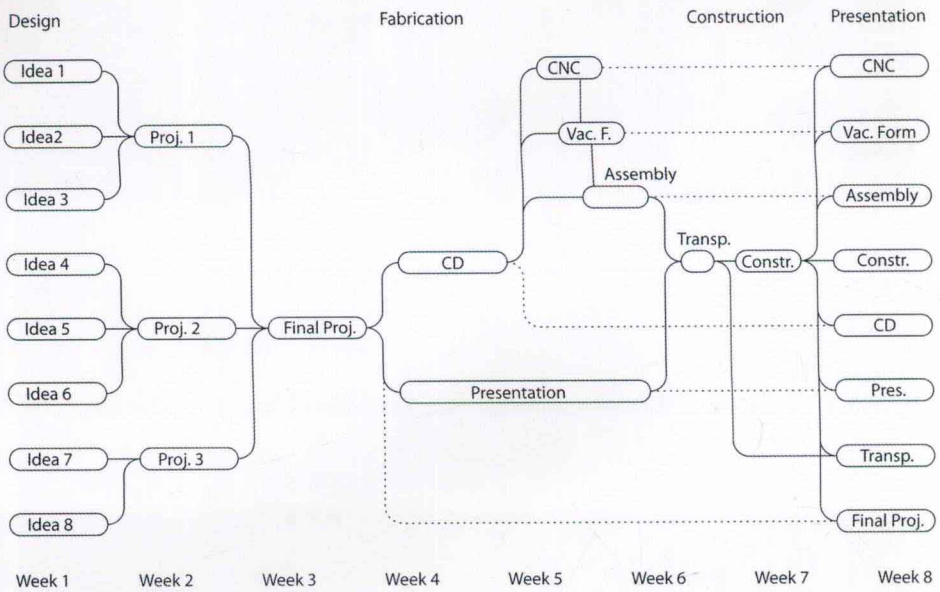
Every year, the AIA stages a competition for an intervention that brings life to the historic city of New Orleans. This year the institute selected a scheme by Gernot



Riether that proposed a series of glowing spherical enclosures sited within the hidden courtyards of the city's distinctive French Quarter.
They would be illuminated in the evening, dramatically modulating the host environment and bringing attention to these romantic, mysterious and usually private spaces, typically located deep in the block, away from the street.
The pavilion not only demonstrates the work of the digital design build studio that Riether leads at the Georgia Institute of Technology in Atlanta, but also uses glycol-modified polyethylene terephthalate (PETG). This material can either be produced from recycled plastic, or more



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Fabrication
Construction
Presentation
Idea 1
Idea2
Idea 3
Idea 4
Idea 5
Idea 6
Idea 7
Idea 8
Proj. 1
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Proj. 3
Final Proj.
CD
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CNC
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Assembly
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CNC
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Week 1
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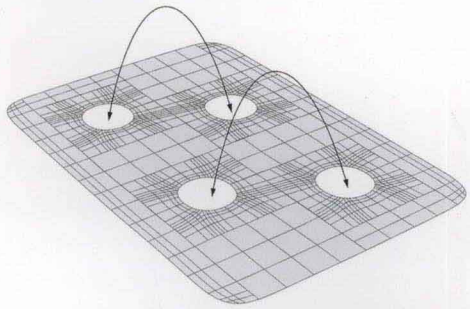
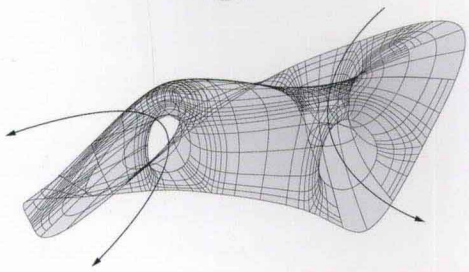
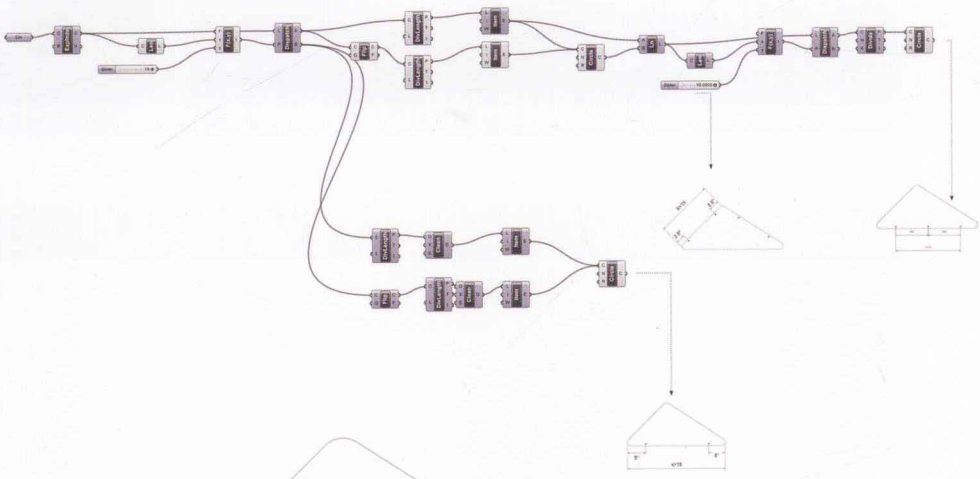
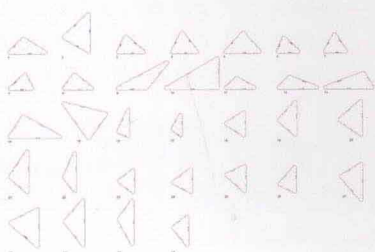
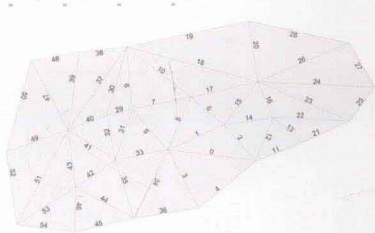
Week 8

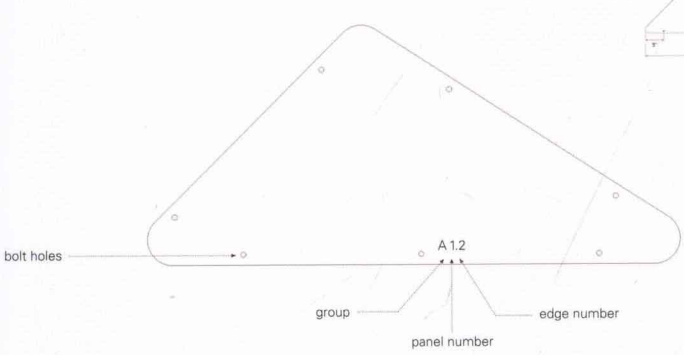








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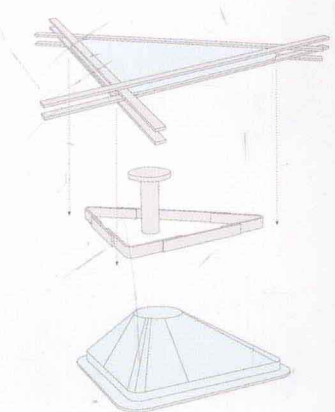
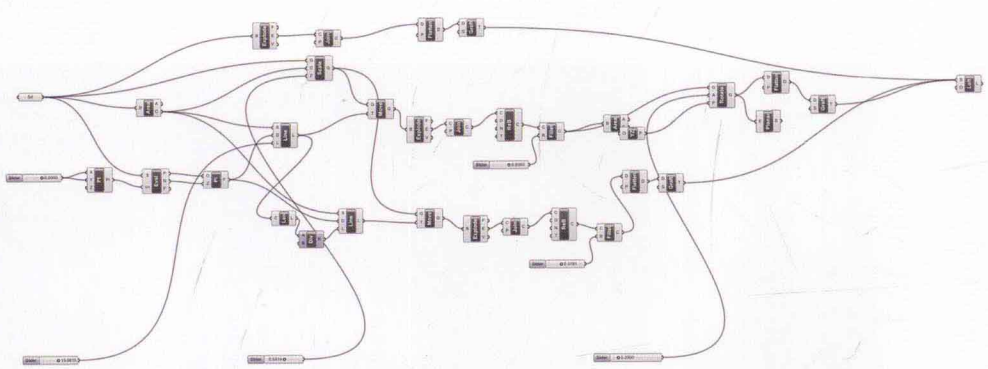
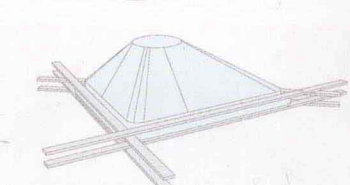
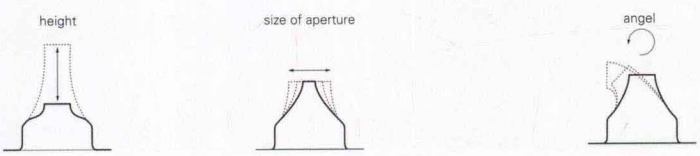
panel number





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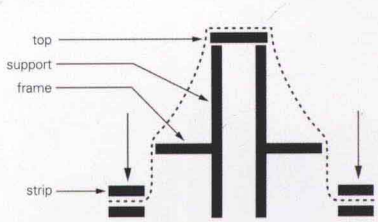
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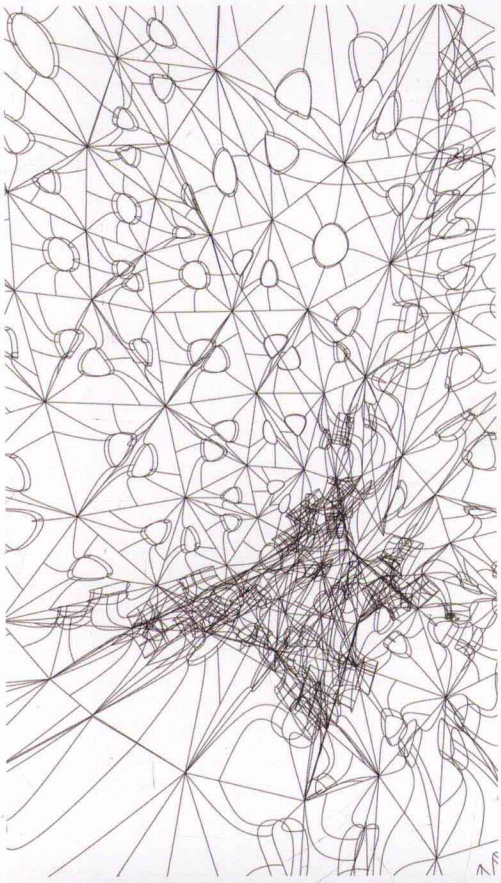

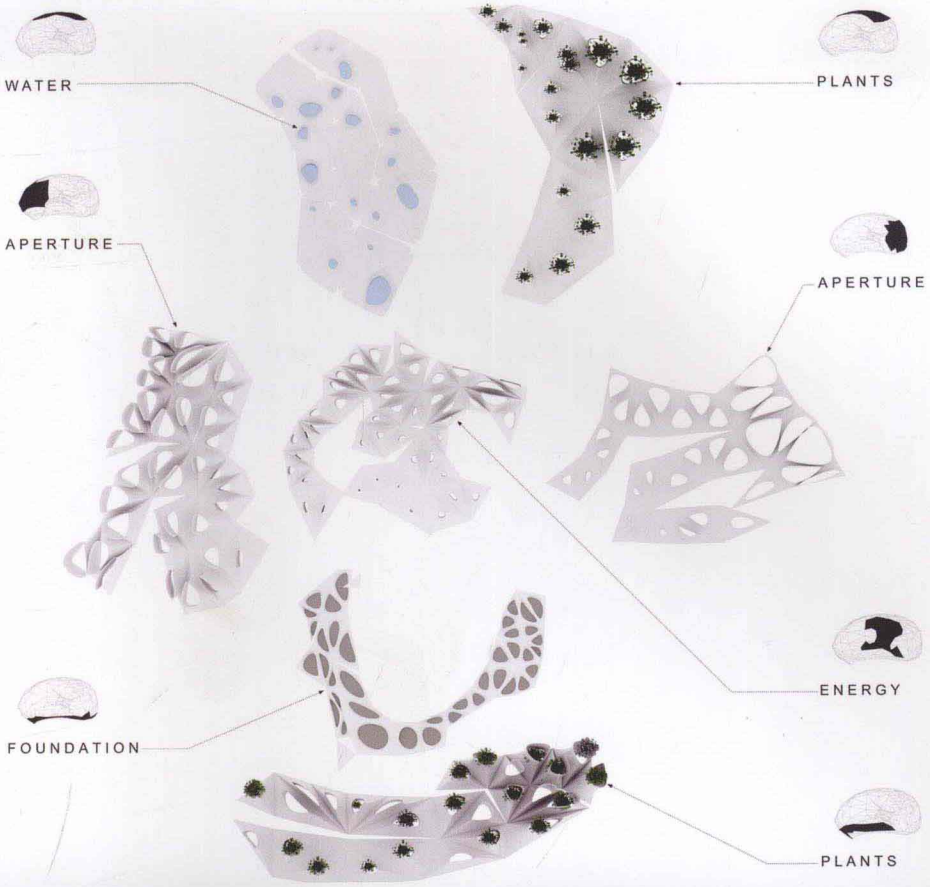
WATER
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APERTURE
ENERGY
FOUNDATION
PLANTS

lighting system

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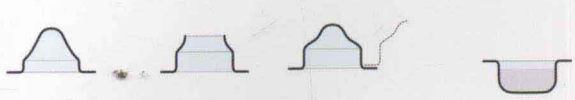
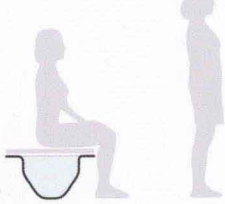
shelf

structural performance



furniture plug-ing



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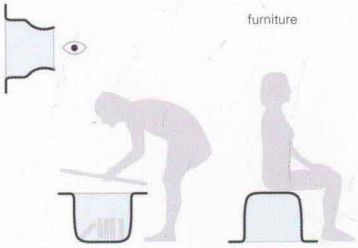

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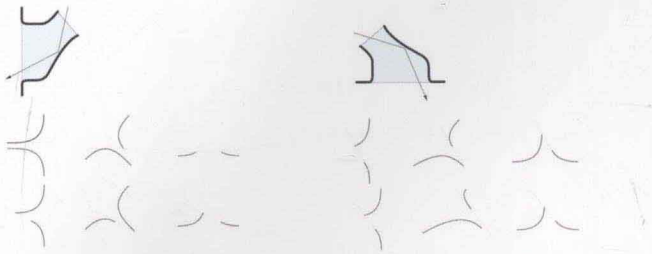

plug-ing

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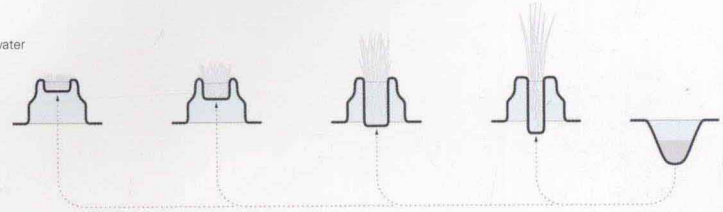


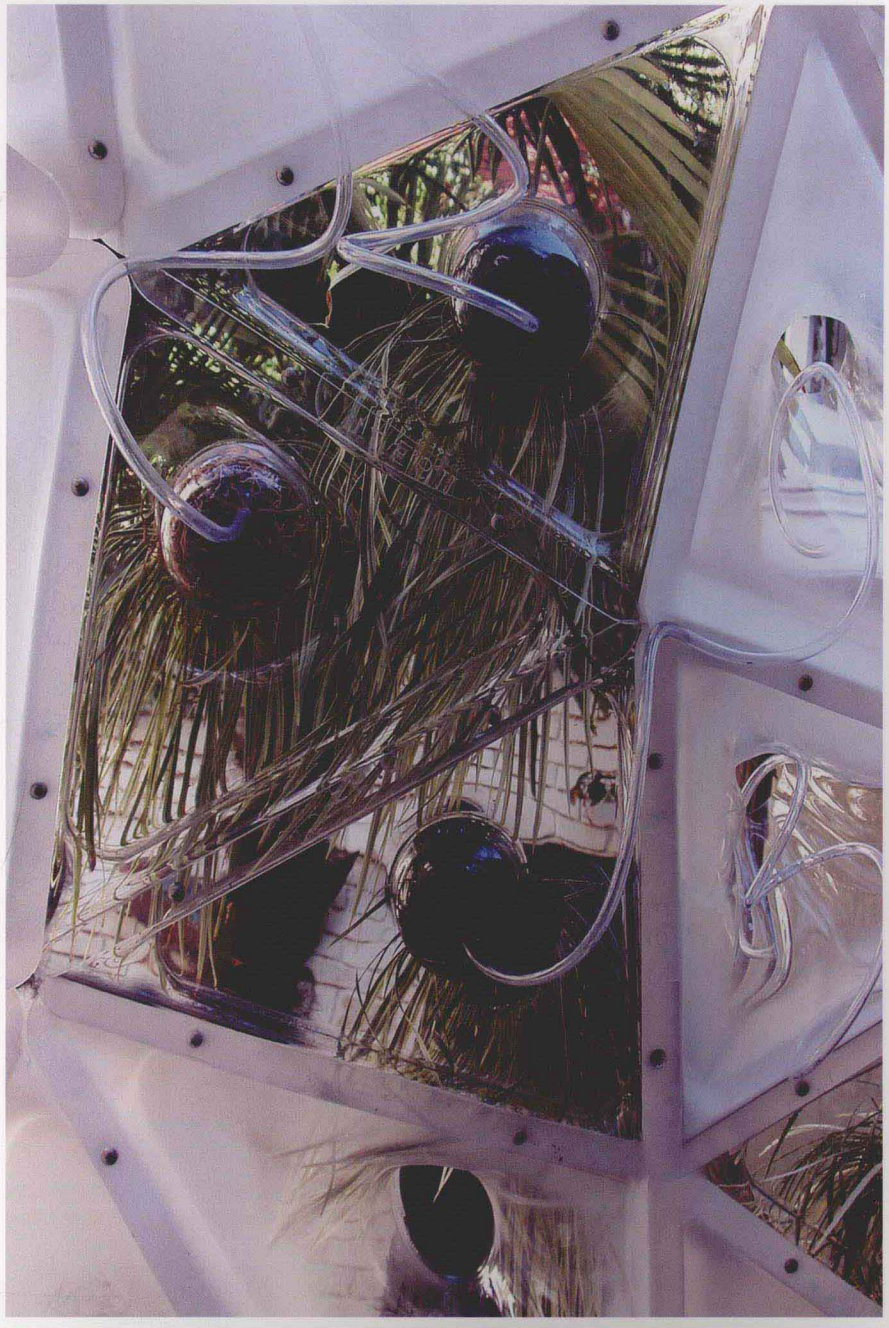
pertinent to this location, from sugar cane: a plant that has been an integral part of the culture of Louisiana for over 200 years. The pavilion is situated in the beautifully restored courtyard of a local gallery owned by Arthur Ross, closed to North Rampart at 1025 Orleans Street. The 18m² pavilion comprises 320 different PETG cells. The cells were prefabricated and assembled into six larger components, designed to stack and fit into a small truck, and to be installed in less than two days by Riether and eight students. The pavilion cost USD 2,500 to build.

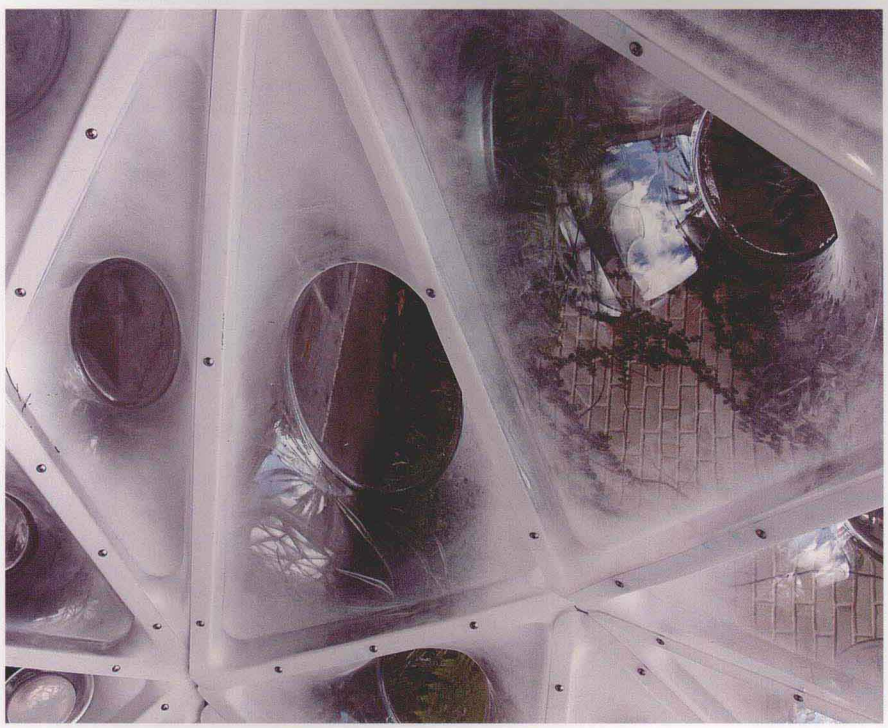
The pavilion's geometry distorts in response to specific site conditions, solar orientation and programmatic requirements, such as lighting, seating, viewing, planting and water harvesting, with each of the cells shaped by scripted rules.

Using CNC technology, each template was cut from PETG sheets, before being thermoformed into shape using a neatly designed adaptable mould.

Pinching and reconnecting the surface was used as a technique to increase the structural performance of the envelope. At strategic locations the skin morphs into bracing and column like systems. Structure and building envelope are combined into a single material system.

Using PETG as a material suggests a negative carbon footprint. According to one of the world's largest manufacturers, "Dow Chemicals", every 0.5kg of PETG produced from sugar cane represents a total gain of almost 1kg of CO_2 removed from the atmosphere. Since the AIA pavilion used 123kg of material, the production of the pavilion would remove 246kg of CO_2 from the atmosphere. This demonstrates that producing PETG from sugar cane has tremendous environmental benefits that might make plastic to be the building material of the 21st century.





项目名称：AIA Pavilion
建筑师：Gernot Riether
项目团队：Digital Design Build Studio
合作团队：Valerie Bolen, Rachel Dickey, Emily Finau, Tasnouva Habib, Knox Jolly, Pei-Lin Liao, Keith Smith, April Tann
地点：1025 Orleans St., New Orleans, USA
建筑面积：18.58m²
竣工时间：2011

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精致的复杂

Vlad Tenu设计的“精致的复杂”成为REPEAT数码设计建筑比赛的获奖作品。它是2011年1月在德克萨斯州的休斯顿受TEX-FAB 2.0活动方授权并建造的。评审团是一组享誉世界的学者和实践者，包括Patrik Schumacher、Marc Fornes、Chris Lasch、Lisa Iwamoto和Blair Satterfield。他们审查了所有的参赛作品后于2010年11月决定选择该作品。因为它呈现出了无与伦比的美感，应用了先进的科技并且表现出了典雅的细节，由此成为评审团的不二之选。评审团的评价是：“精致的复杂”拥有强健的结构，节省了原料，展现了其内在的组合逻辑特性，将竞赛的宗旨彰显到极致。

Vlad Tenu这样描述他的“精致的复杂”：该项目围绕最小曲面结构设计问题逐步展开。它还为最小曲面几何图像的产生以及用模块化组件来进行建造提供了另一套系统规则。该项目的建造方法与该领域的传统方法相反，因而作品具备了另类特性。

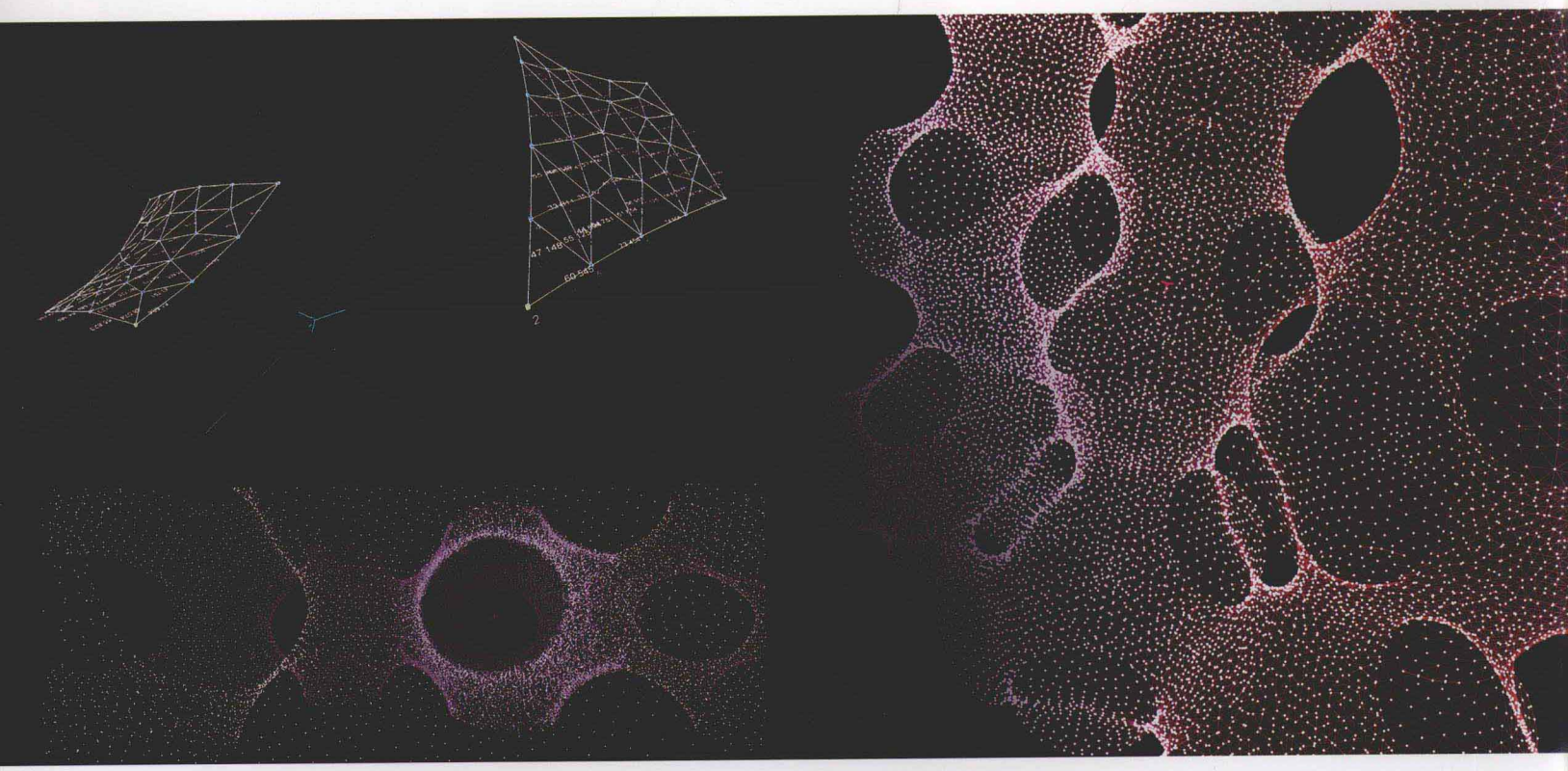
该项目通过模拟真实肥皂泡来制造最小曲面，并且使其在模块化制造系统中发挥最大作用。该方法的特别之处主要在于其由下而上的算法策略。它不像动力松弛法那样从预定的拓扑结构开始算起，而是模拟一种重复生长过程，使其发挥最大作用直到系统达到一种张力平衡状态。

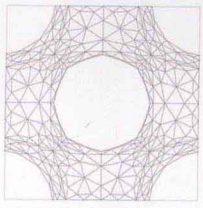
最终作品的初步结构由148块施瓦兹的P表面作为基本组成部分，每个面有16个组件，因此总共需要2368个组件。与过去的有机玻璃组件原型相比，现在的组件要比它大两倍，并建议采用激光切割铝作原料。Buro Happold提出的详细的结构分析在最终的几何结构，即壳状结构、梁结构和独立组件中都进行了分析。其中有限元素法在验证组件的潜在应力、挠度、频率和稳定性中是必不可少的。

Minimal Complexity_Vlad Tenu

Minimal Complexity, by Vlad Tenu, was selected to be the winner of the REPEAT: digital fabrication competition, commissioned and built in January 2011 for the event TEX-FAB 2.0 in Houston, Texas. A jury of internationally recognized academics and practitioners that included Patrik Schumacher, Marc Fornes, Chris Lasch, Lisa Iwamoto and Blair Satterfield reviewed all the entries and conferred their choice in November, 2010. Its aesthetic beauty, technical superiority and elegance of detailing made it a clear choice for the jury, noting that Minimal Complexity employed structural robustness, material efficiency and an inherent logic of assembly embodying the principals of the competition brief to the highest degree.

Vlad Tenu describes Minimal Complexity





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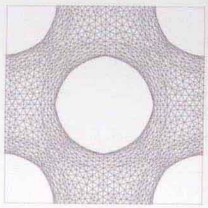
number of springs: 38 Rb: 30
ideal reference length: 100 Rc: 20



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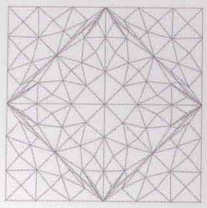
number of springs: 173 Rb: 7.5
ideal reference length: 30 Rc: 5



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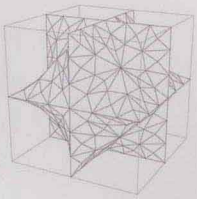
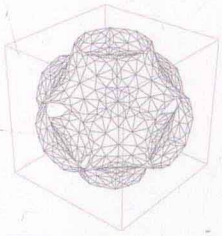
number of springs: 21
ideal reference length: 100





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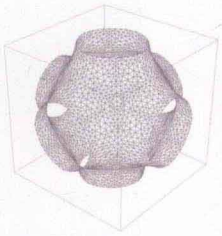
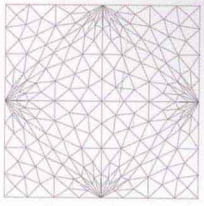
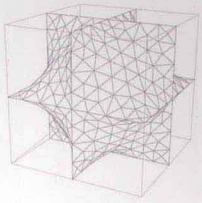
number of springs: 38 Rb: 30
ideal reference length: 100 Rc: 20

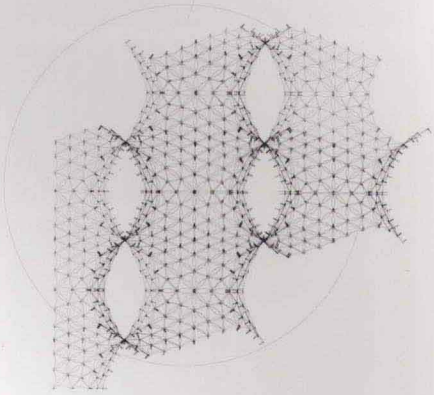


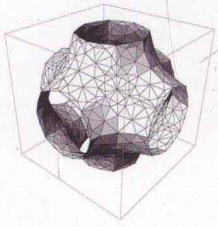
number of particles: 67 Ra: 15
number of springs: 173 Rb: 9
ideal reference length: 30 Rc: 6

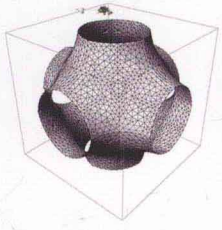


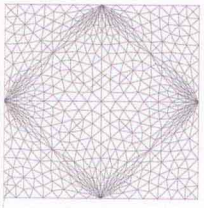
number of particles: 17
number of springs: 32
ideal reference length: 77



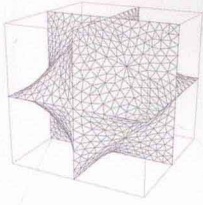


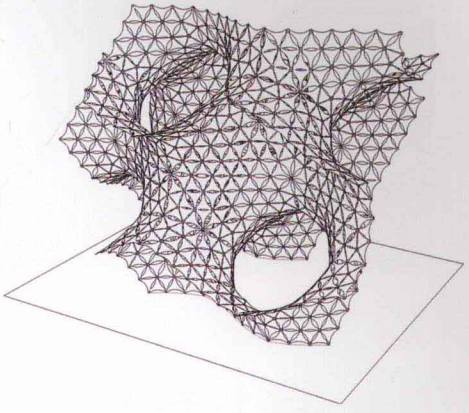


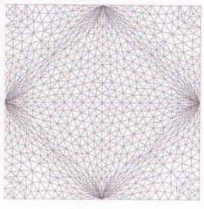




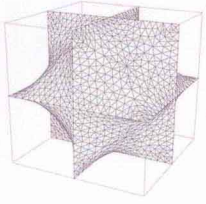
number of particles: 34
number of springs: 79
ideal reference length: 43

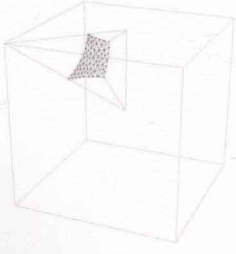


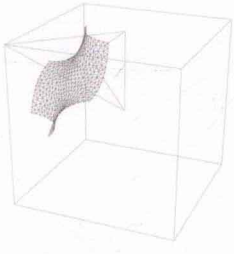


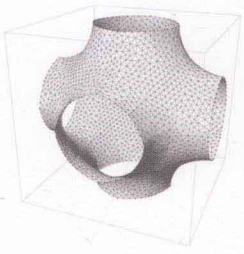


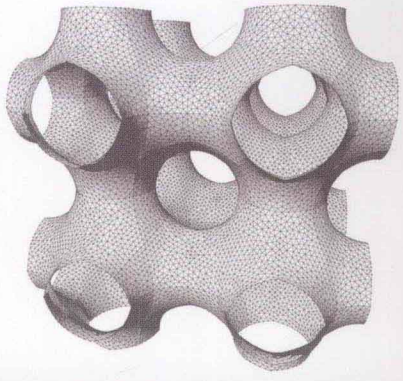
number of particles: 59
number of springs: 145
ideal reference length: 30

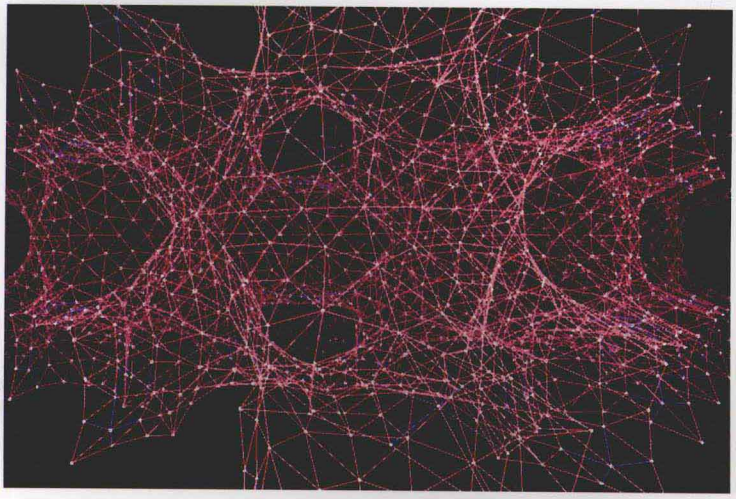


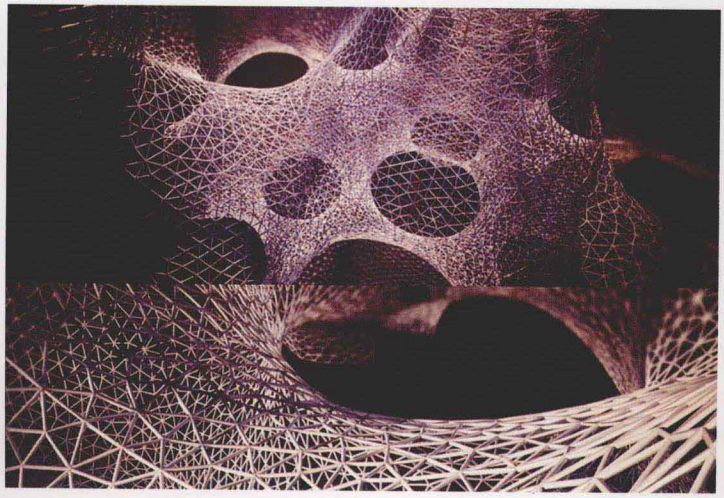


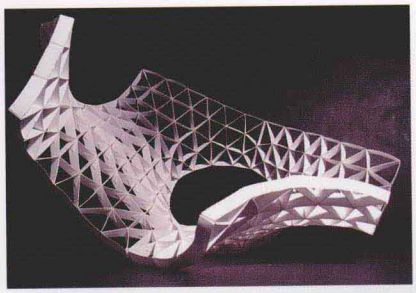


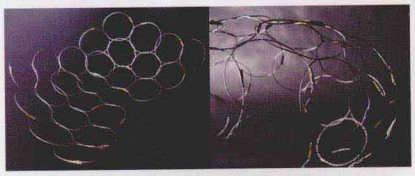


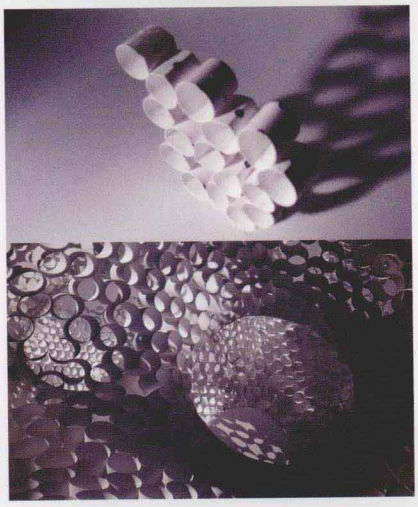


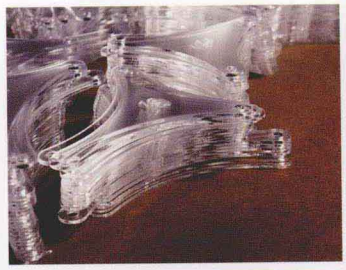


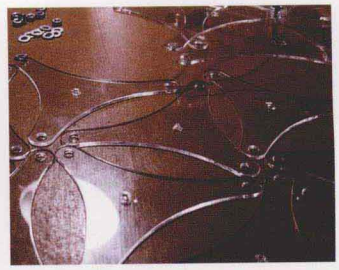


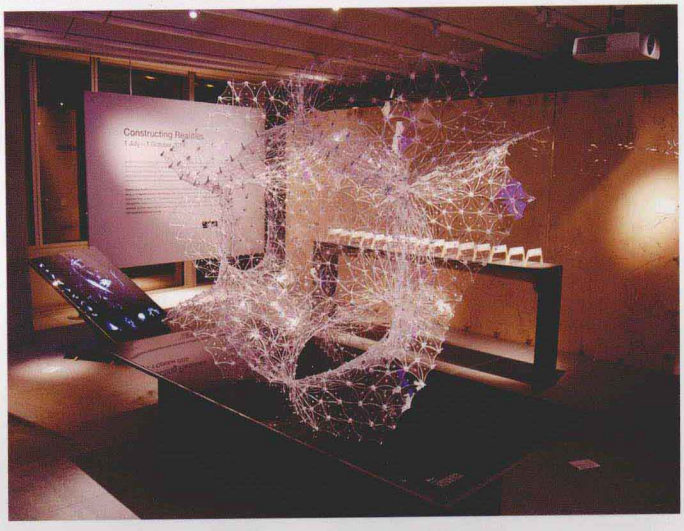


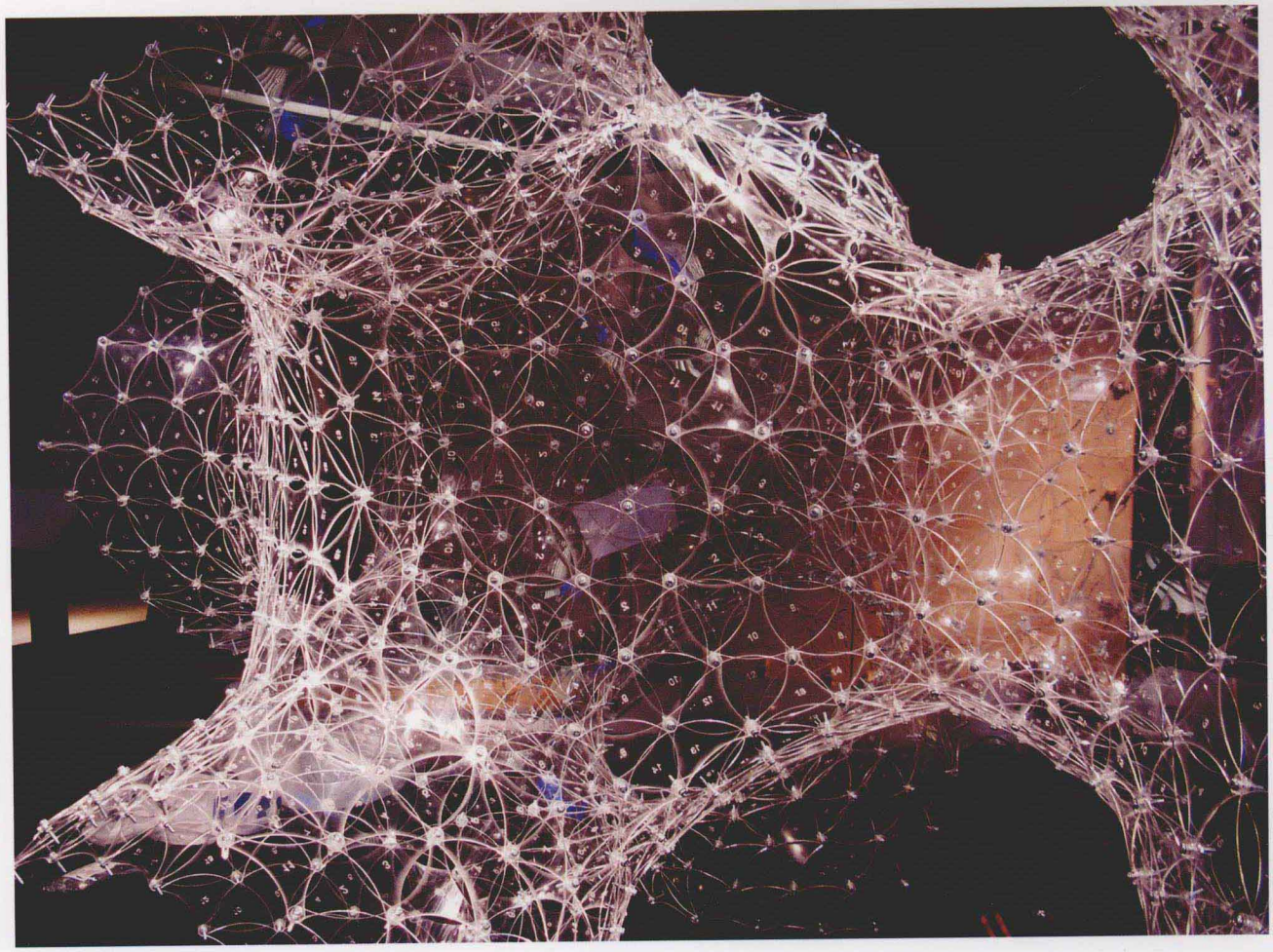




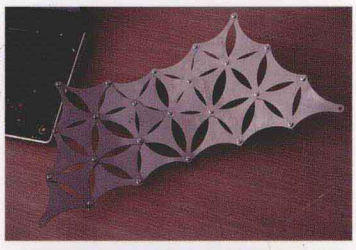


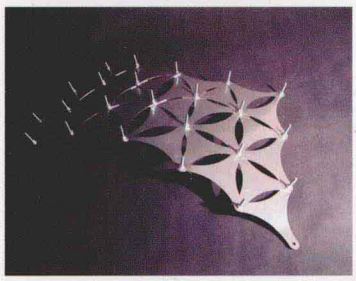



Constructing Realities



项目名称：Minimal Complexity
建筑师：Vlad Tenu
项目团队：Vlad Tenu, Thomas Behrman,
Janelle A. Brathewaite, Amy Brooks,
Stephen Bundy, Naomi Contreras, Austin Fleming,
Navid Tehrani, Rachel Kluger-Weston, Hai-Lin Yang
合作团队：TeX-FAB, Buro Happold
安装组和合作商：
Rice Design Alliance, A. Zahner Co.,
University of Houston (Gerald D. Hines College of Architecture),
University of Texas at Arlington (School of Architecture),
University of Texas at San Antonio (College of Architecture)
项目承包商：Crow Corporation
地点：Houston, USA
建筑面积：15m²
设计时间：2010.8—2010.12
施工时间：2010.12—2011.2
竣工时间：2011

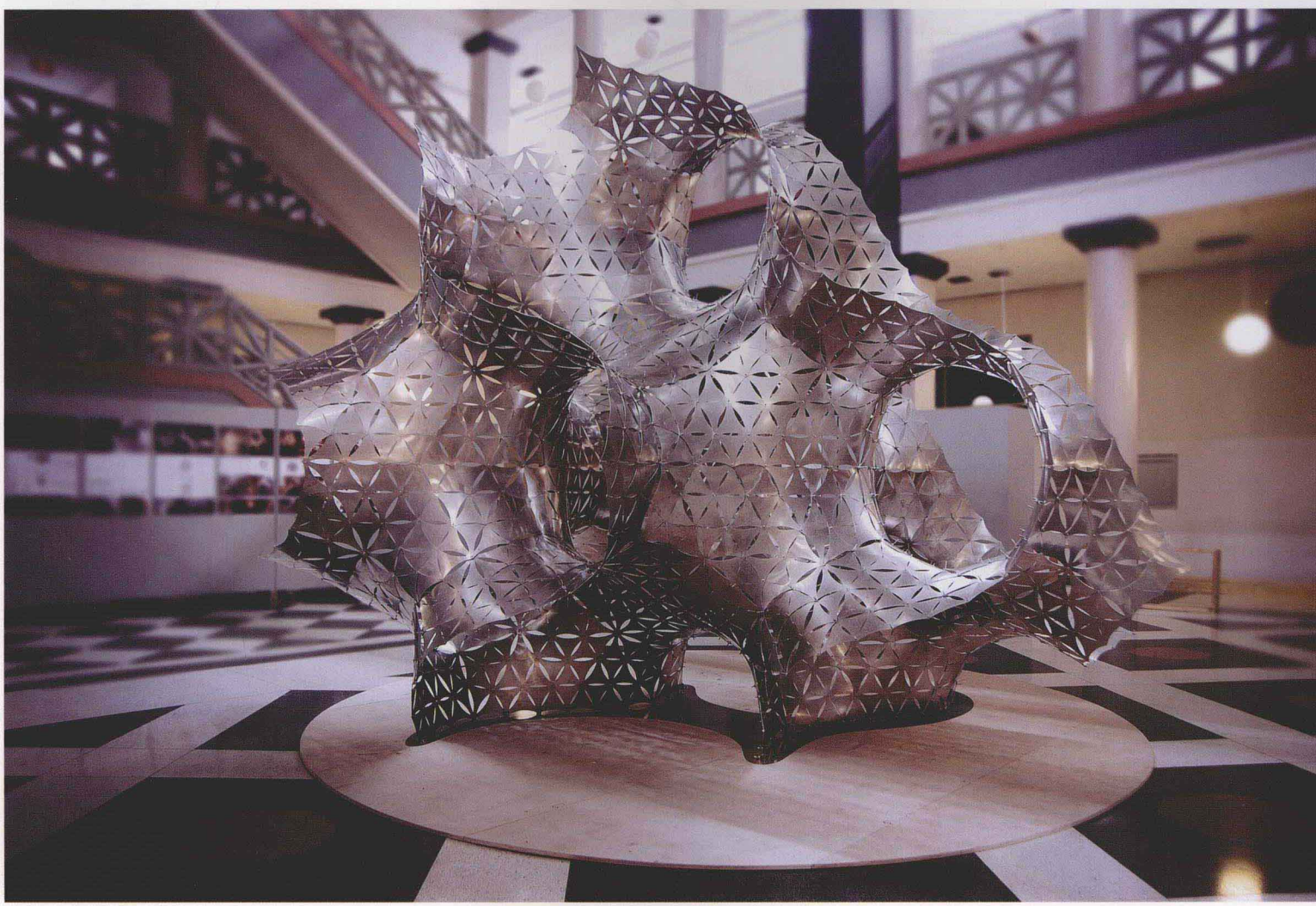




in the following manner: the project was developed around the design problem of minimal surface structures; this creates an alternative algorithmic method for generating minimal surface geometries as well as for building them from modular components. The alternative characteristic of the study comes from the different approach of the project, as opposed to the existing ones in the field.

This process uses the principle of simulation of virtual soap films in order to generate minimal surfaces, while optimizing them for a modular fabrication system. The main difference in this approach comes from the bottom-up algorithmic strategy of not starting with a predefined topology, as in the case of the dynamic relaxation method for example, but simulating an interactive growth process, optimized to reach a state of tensional equilibrium of the system.

The proposed structure for the final piece is composed of 148 basic regions of the Schwarz's P Surface, each made of 16 components. The total number of components would be 2368. In comparison with the previous perspex components' prototype, the components of the current one are more than two times bigger, and they are proposed to be made of laser-cut aluminum. A very detailed structural analysis provided by Buro Happold was done on the final geometry, both as a shell and as a beam structure as well as on the individual components. The Finite Element Method was essential in validating the potential stresses, deflections, frequencies and stability of the final piece.



月球临时商店

月球临时商店是为一个陈列月球日常生活用品的临时商店所做的模块系统设计，受欧洲一家私人艺术机构委托。

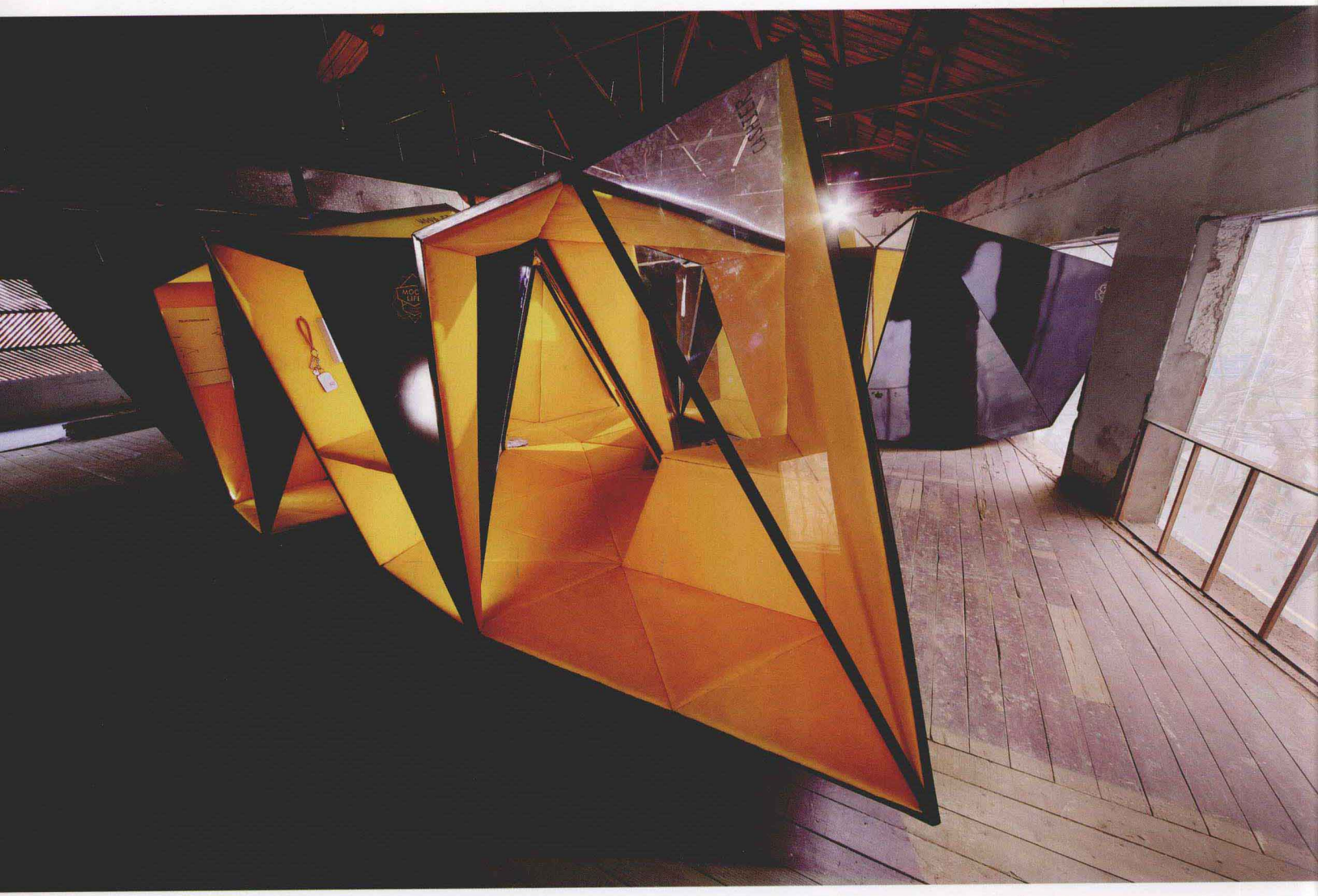
人们通过有棱有角的几何形状、也通过外部闪亮的黑色与内部柔软的黄色作对比来了解该作品。该作品用模块体系进行组织，通过模块体系将空间分割为绵延弯曲的三角形几何体，与月球航空舱的有限空间相适应；这里没有笛卡尔法则，游客们不得不采用一种特殊的姿态进入内部，这样人们的行为就更适合太空零重力环境。项目最初的色彩灵感来源于月亮从地球上升起时的景象。月亮如一个黄色的球体，而地球是黑色的。设计师将这些颜色在作品中加以演绎，顺利地实现了上文中提及的初衷——避免白色和曲线的标准空间构筑。它的内部是黄色，表示月亮（人们进入模块内部像是置身月球）；外部是黑色，代表地球（连接或者接触现实世界的表皮）。因为对传统空间构筑标准提出质疑，设计师一开始就决定使用有刻面、有棱角的几何体。该作品是对两个模块进行十七次聚合的结果。这一对模块呈环环相扣的几何形状（一个是凹面的，一个是凸面的），它平坦的切面则用于连接。每个模块都有四面，其中三面是连接面或开敞面，第四面作为墙面。这样的构造使设计师能够将模块组成线性空间、T形空间、方形空间和L形空间。停留在这个迷宫一样的空间里，使用者会完全感觉不到外界，因而感觉地球到月球之旅全无压力。为了增强零重力感，墙壁、地板和屋顶没有遵循笛卡尔法则，而是具有同等重要性。整个设计没有一处显示出重力的影响，唯一的定位指南是屋顶透明的天窗。无论如何，阳光都会垂直射下。

设计师曾面临三种挑战：概念上，要超越七八十年代的空间乌托邦，使设计师能够对太空建筑学进行重新思考。几何学上，模块的几何结构非常复杂，设计时既要允许模块的多种组合方式，又要兼顾人潮和艺术展览。实际操作上，要克服建筑技巧和预算难关——作品既要在两天内现场组合完成，又要重量小能够轻易地移动，还要拥有坚固的结构以便在展出首夜容纳250名参观者。设计师构思了一种方案，即游客可以通过观看视频中艺术家的舞蹈动作和眼睛来获知零重力空间中的人数。设计师构想的最大成功之处可能就在于建筑、舞蹈和视频的完美组合。

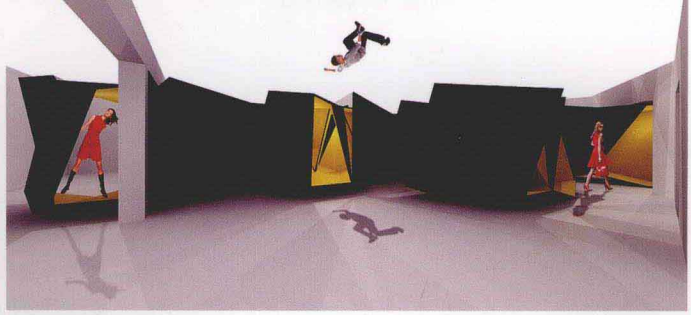
Lunar Pop-up Store_///byn

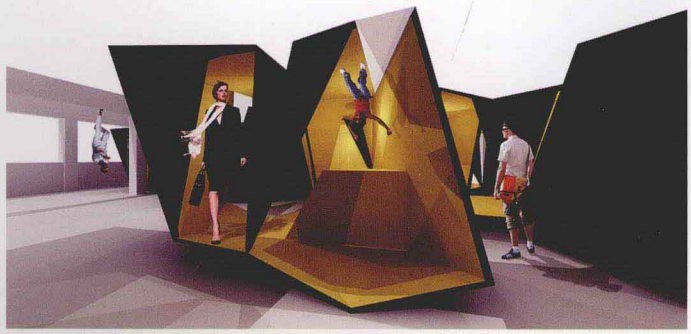
Lunar pop-up store is a modular system design for a pop-up store that hosts products for daily life on the moon. It is commissioned by a private European art institution.

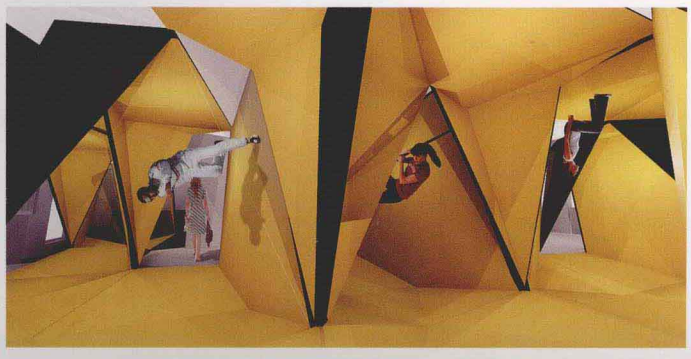
The piece is now understood through its very sharp geometry and through the contrast of a shiny black exterior and a soft yellow interior. The piece is organized through a modular system where architecture responds to the limited space of a moon capsule by breaking the space into a sinuous path of triangulated geometries; where the lack of any Cartesian reference forces the visitor to move through its interior in a very specific manner, triggering human behaviors that better fit 0-gravity. The original color palette for the project came from the image of the moon rising from the earth. The moon is understood as an yellow body and the earth is perceived in black. We translated those colors in our piece, taking advantage on one

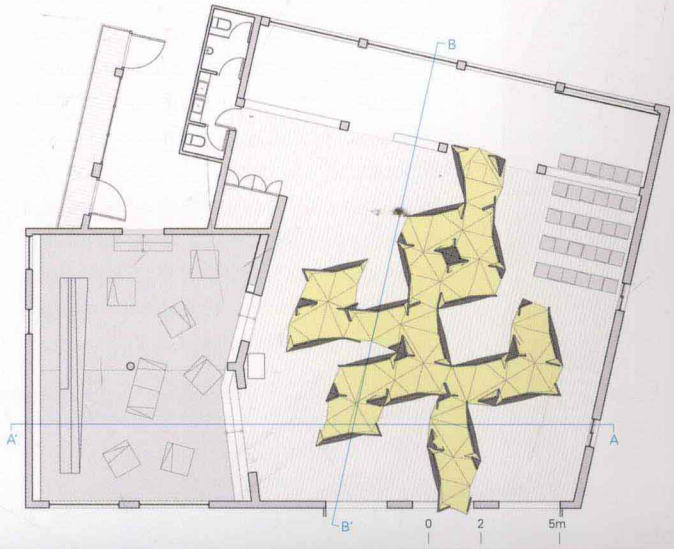


项目名称：Lunar Pop-up Store
建筑师：///byn
项目团队：Nicolas Salto del Giogio, Bittor Sanchez-Monasterio
合作者：Guo ZhiChuan & Li Min
地点：Shanghai, China
建筑面积：250m²
竣工时间：2011









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