



MAMOU-MANI

# A New Kind of Architecture

## with Digital Fabrication & Parametric Modelling

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Partner Companies and Initiatives:



 Silkworm

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## Introduction to Our Practice

Mamou-Mani helps people and companies create inspiring spaces and products.

We are an award-winning RIBA chartered practice based in London, UK with a fabrication facility.

We use computational design tools to generate and evolve designs based on rules and parameters, similarly to natural processes. We

believe in craft and link our digital files to our fabrication tools (laser-cutting, 3D Printing, CNC-milling) through custom software.

From design and fabrication all the way to assembly and construction, we provide services for every step of a project which allows us to achieve very high standards.

We provide architectural and computational design consultancy as well as fabrication services.

We like challenges, collaborative work and beautiful designs and are open to any ideas and opportunities.

*“Our collaboration has helped influence the course of Karen Millen’s journey.”*

*Mike Shearwood, CEO*

*“Arthur Mamou-Mani is an architect from the 22nd Century”*

*Stephen Melville, Director, Ramboll Engineering*

*“One of most brilliant architects of our generation” Arturo*

*Tedeschi, Architect and Computational Designer*



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*Portrait of Arthur Mamou-Mani in our Hackney Road workshop for the New York Times – Picture by David Azia*



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**Arthur Mamou-Mani** AA dipl, ARB/RIBA FRSA – Wikipedia – is a French architect and director of the award-winning practice Mamou-Mani Architects, specialised in a new kind of digitally designed and fabricated architecture. He is a lecturer at the University of Westminster and owns a digital fabrication laboratory called the FabPub which allows people to experiment with large 3D Printers and Laser Cutters. Since 2016, he is a fellow of the The Royal Society for the Encouragement of Arts, Manufactures and Commerce. He has won the Gold Prize at the American Architecture Prize for the Wooden Wave project installed at Buro Happold Engineering. Arthur gave numerous talks including the TedX conference in the USA and has been featured in The New-York Times and Forbes. Mamou-Mani's clients include ARUP, Buro Happold Engineering, Karen Millen Fashion, The Burning Man Festival, Food Ink and Imagination Ltd. Prior to founding Mamou-Mani in 2011, he worked with Atelier Jean Nouvel, Zaha Hadid Architects and Proctor and Matthews Architects.



**Holly Hawkins** (MA RCA, BA Central St. Martins) - A recent graduate of the Royal College of Art, Holly's cross disciplinary research explored the process and possibilities of digital fabrication. A holistic approach to the design process and intense curiosity to explore the unknown has seen Holly take on an ambitious scope of projects, honing skills from metal work to mould making and CNC milling. Holly graduated with a BA Hons in fashion design from Central Saint Martins in 2016, and has since worked on various projects assisting artists, while continuing her research into digital craftsmanship. Drawn to the practice through an interest in complex geometry and generation of form, Holly's diverse experience will take on the management of the Mamou-Mani studio alongside the running of FabPub.



**Bilal Mian** (MArch UCL-Bartlett, ARB/RIBA) – Bilal worked with sustainable practices including sauerbruch Hutton architects in his earlier career. He has also worked for Solmaz contractors, collaborating with project architects on tenders, technical and detail design, and project management. At Mamou-Mani Bilal has developed his parametric design and 3d printing skill set and overseen the design and fabrication of the feature lights from biodegradable plastics and the steel procurement package for the Temple Galaxia project at Burning Man 2018. Has also worked with Rhino 3d developers on beta testing BIM software in Rhino for architectural design. Bilal was a collaborator with the Light Surgeons art collective and has co-curated architectural exhibitions at the Geffrye Museum and The Oxo Bargehouse. In December 2018 Mamou-Mani Bilal curated the Mamou-Mani exhibition Code Builder at the Sir John Soane Museum in partnership with the museum curators & conservationists and displayed some of the work he has done for and with the practice in the museum.



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**Nina Pestel** - Nina completed her architectural studies at 'l'Ecole Supérieure d'Architecture' of Nantes in France before pursuing a year's study in Addis-Ababa, Ethiopia. There, she learnt how to mix architecture with complex context and local materials. Her first work was in the Czech Republic at Franek Architects, where she was involved in a range of projects and programs; including Prague's Botanic Garden Entrance building and several housing schemes. At dRMM, she worked upon the competition "what is the future of last-mile logistics?" and large urbanistic schemes.



**Alexander Onufriev (BA)** - Sasha is a Part I Architectural Assistant and Fabricator, with a first class degree in Architecture from the University of Westminster, awarded the Hubert Sands Award for best detail design of the Oculus Pavilion at Westminster. With previous experience in digital fabrication and carpentry, Sash is now looking into automation and computation as means of empowering design and redefining the relationship between virtual and actual potential. Having come for the Fabrication Laboratory at Westminster, Sash is working on computational and fabrication strategies at Mamou-Mani, and assisting with the running and development of FabPub.



**Ayham Kabbani (MArch)** - Ayham is an Architectural Assistant and a 2016 award co-recipient (BPro Gold Prize and Peter Cook Prize) MArch, (Graduate Architectural Design Programme). Prior to his masters at the Bartlett, Ayham had undertaken his bachelor studies in architecture in Aleppo, Syria. At the Bartlett, Ayham had been involved in computational design and fabrication while collaborating on the award-winning 'Morpho[cyte]' project. Prior to working at Mamou-Mani Ayham had worked as an architect and deputy manager at ProDesign in Beirut, Lebanon, where he was involved in various projects including façade design and interior design.



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*This year Mamou-Mani has been nominated in the 2019 Dezeen Awards for:*

*Emerging Architect of the Year, Best Small Interiors for Wooden Waves, and Galaxia for Best Small Building*



*We have previously recieved the following awards*



*Best Christmas Display in the UK  
With Karen Millen's flagship  
On Regent Street, London*



**GOLD WINNER**

*Gold Medal for the best Interior installation  
with Buro-Happold's Headquarters in  
Newman Street, London*



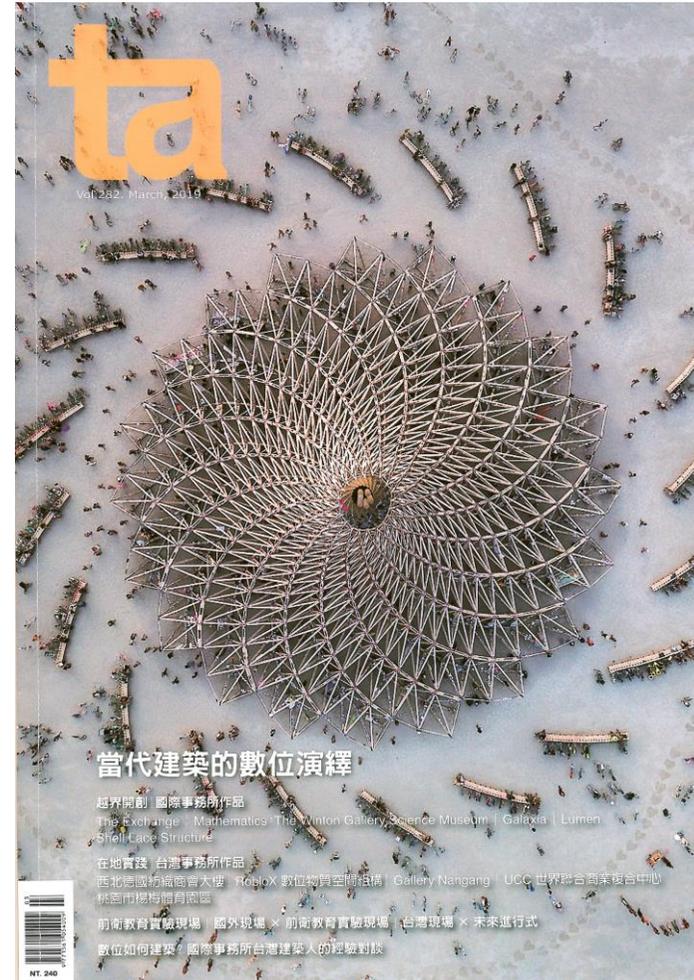
*Finalist for best Pop-Up display  
for Karen Millen's Magic Garden*



*RIBA and Crown Estate (The Queen) best  
Regent Street RIBA Windows Project*



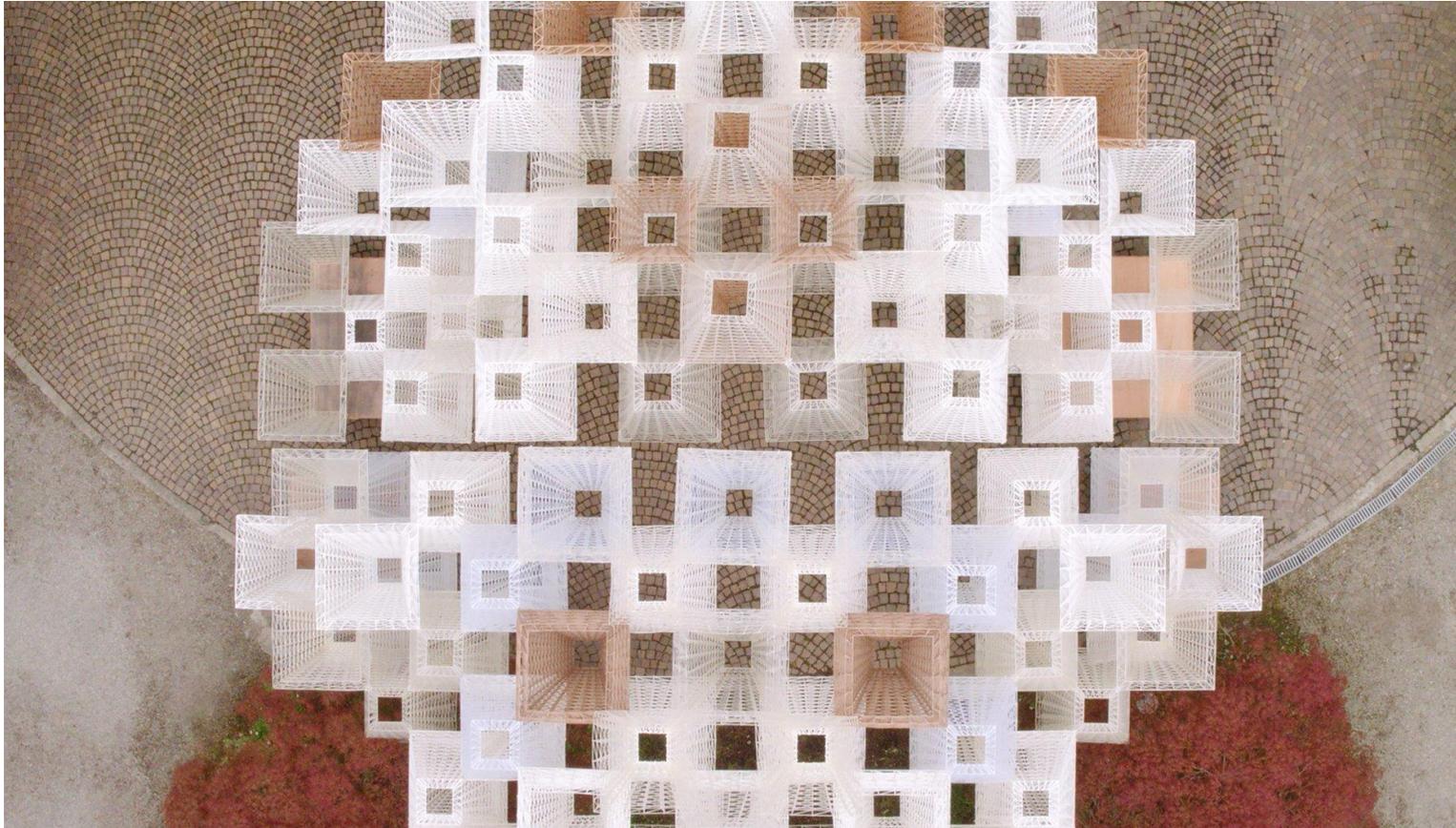
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*Mamou-Mani has been featured on the cover of the Financial Times, and Taiwan Architecture Magazine*



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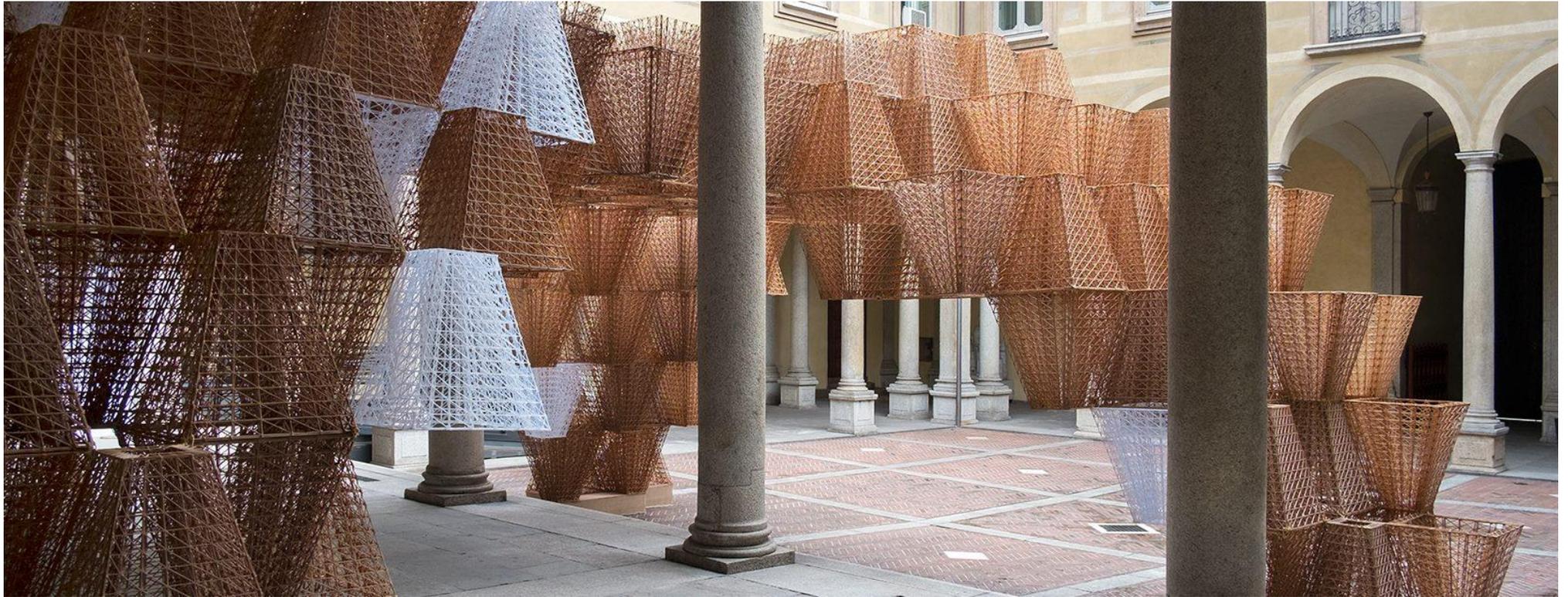
### **COS X MAMOU-MANI - CONIFERA -**

*A large-scale 3D printed architectural installation made from renewable resources which was open to the public for the duration of Salone del Mobile, 9 -14 April, 2019.*

*Digitally designed and fabricated, Conifera has been created from seven hundred interlocking modular bio-bricks, 3D printed in a mix of wood and bioplastic. Aiming to be one of the largest structures to date conceived and realised using this method, Conifera reflects a new generation of architecture, showcasing advances in material innovation, technology and creativity.*



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*The installation is formed in modules that shift from a wood and bioplastic composite in the courtyard through to translucent bioplastic in the palazzo's garden. Each bio-brick is made from fully compostable resources printed in the form of interlocking structural lattices, optimising material use and allowing light to permeate the structure as visitors travel through the installation. The result is a journey from the manmade through to the natural world, and from the old to the new.*



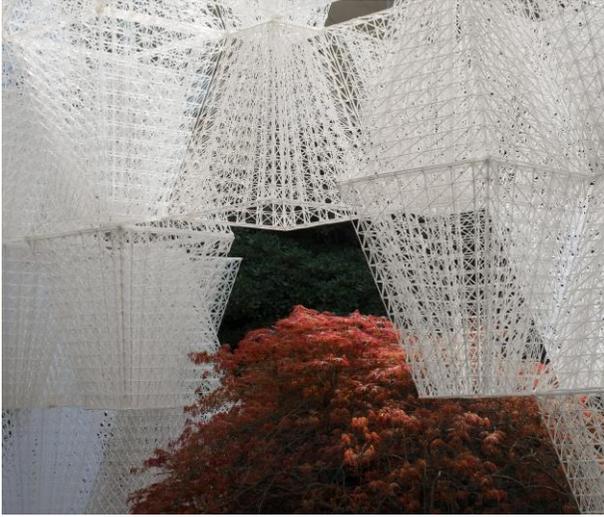
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*Conifera has been conceived in response to an open brief from COS, and through a parametric design process has evolved throughout its conception. The piece vertically integrates design and construction, forming a direct connection from design to build through a dialogue with robotics: the architect is at once designer and maker.*



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*Inspired by patterns within the palazzo's architecture Arthur Mamou-Mani explained, 'the geometry of Conifera comes from the square motif which is very present at Palazzo Isimbardi, through the courtyard to the tiles. I wanted the piece to echo the circular nature of the compostable material and create a journey from architecture to nature in order to showcase how renewable materials, coupled with an algorithmic approach and distributed 3D printing, can create the building blocks of the future'.*



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***GALAXIA, The Temple at Burning Man, Nevada -***  
*The Burning Man Temple is one of the most significant places held annually at the Burning Man festival, a portal for healing, sharing emotional experiences, creating profound connections with one's own self and others and then watching it all burst into flames on the last day.*



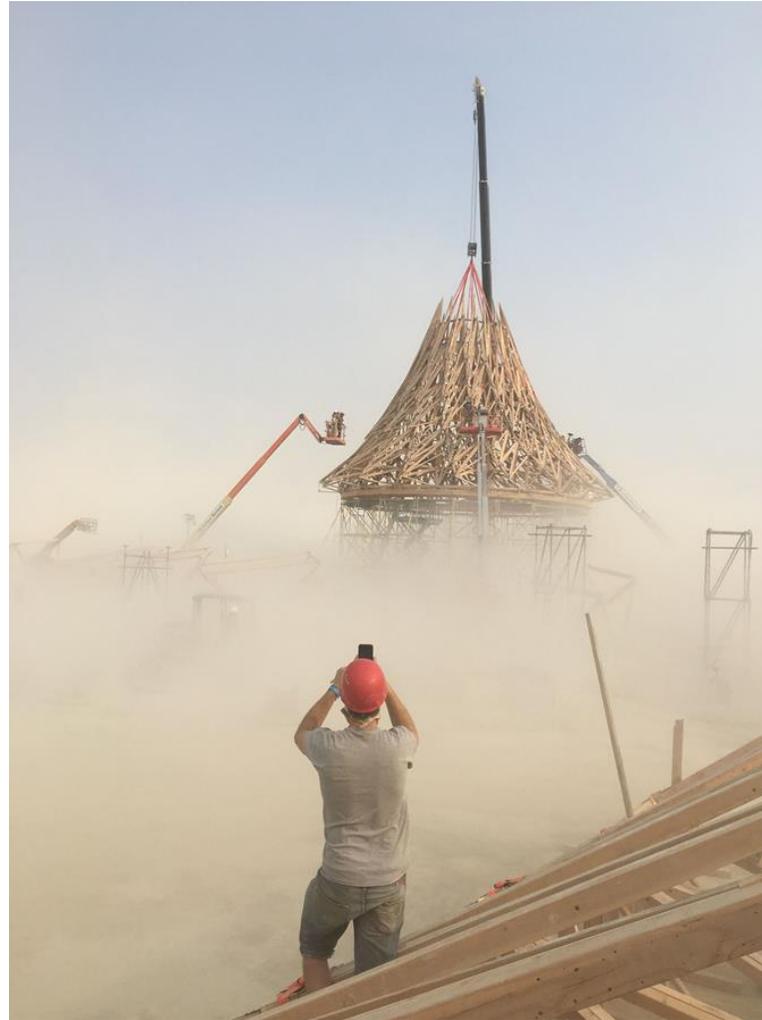
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*The temple is a special place, one for the community to pray, heal and release grief. It is a place for us to cry, together, over our losses, whether it is a loved one or your old self. The temple helps you reflect on these emotions and connects you to every one else in their sorrows and their hopes.*



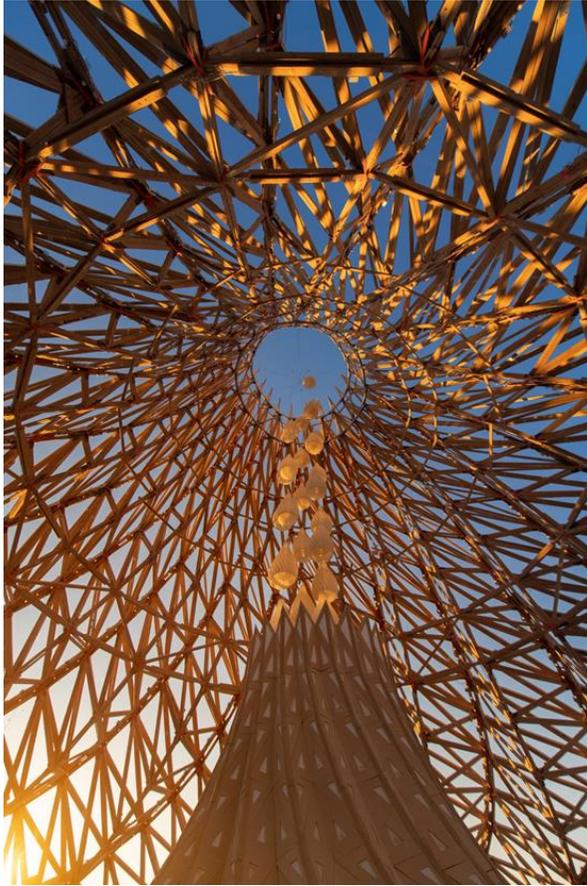
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*Galaxia celebrates hope in the unknown, stars, planets, black holes, the movement uniting us in swirling galaxies of dreams. A superior form of Gaia in Isaac Asimov's Foundation series, Galaxia is the ultimate network, the fabric of the universe connecting living beings into one entity.*



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*Galaxia is shaped of 20 timber trusses converging as a spiral towards one point in the sky. The triangular trusses form different paths towards a central space holding a giant 3D printed mandala, the heart of Galaxia. The timber modules start large enough to hold small alcoves in which people can write in peace. As participants walk through the path, the timber modules lift up and become thinner and thinner towards the sky as people reach the central mandala.*



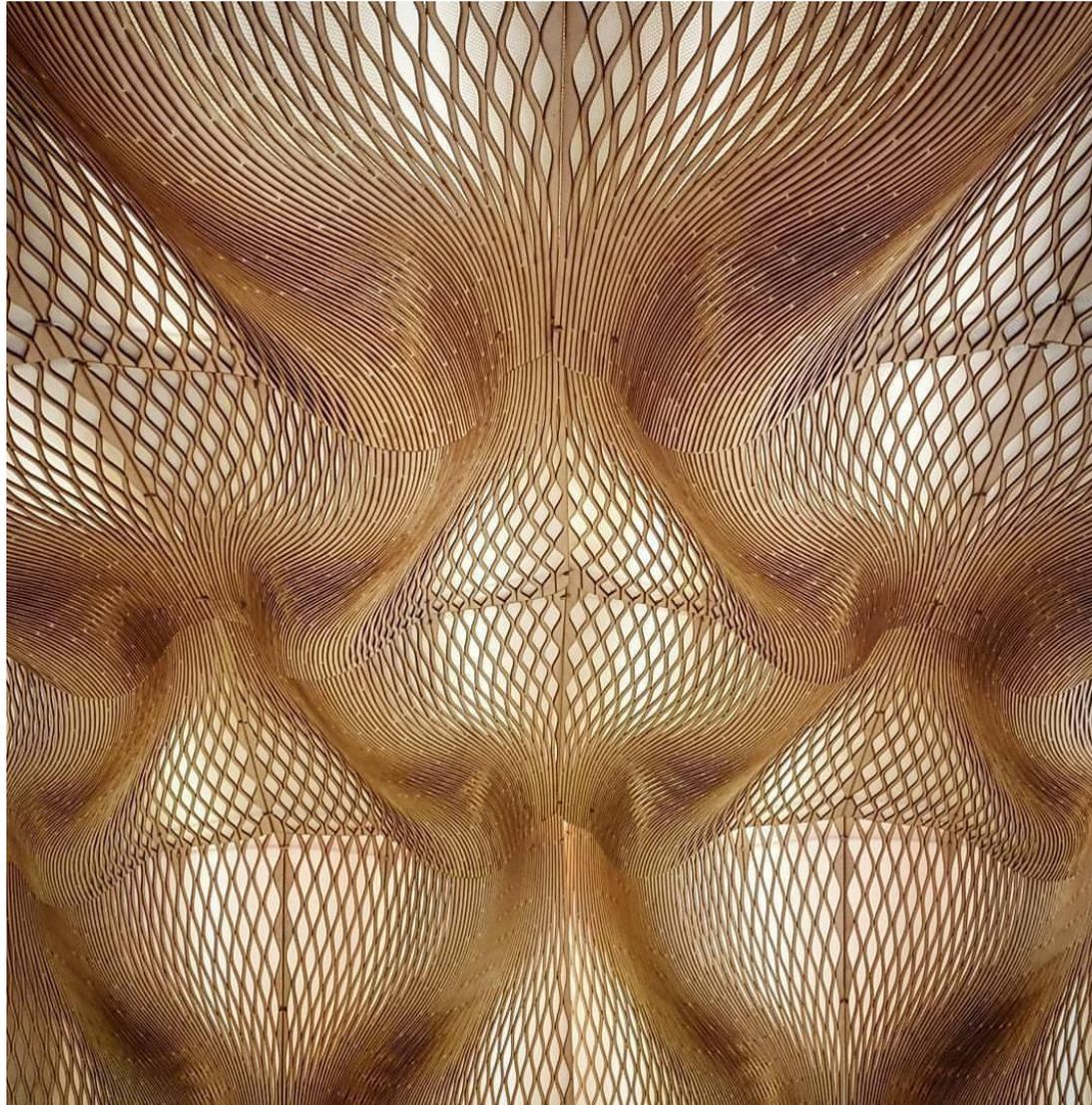
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Galaxia Burning Man Temple 2018



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**THE WOODEN WAVES:** *The Wooden Waves is an architectural installation suspended in the 17 and 71 Newman Street entrance spaces of BuroHappold Engineering's London offices to provide a visual link between the two. This functional art piece celebrates global engineering practice Buro Happold's multiple innovations in the field of complex gridshell and other timber structures and was designed in collaboration with Mamou-Mani Architects and BuroHappold. The structure was made at the architect's fabrication laboratory in London, The FabPub.*

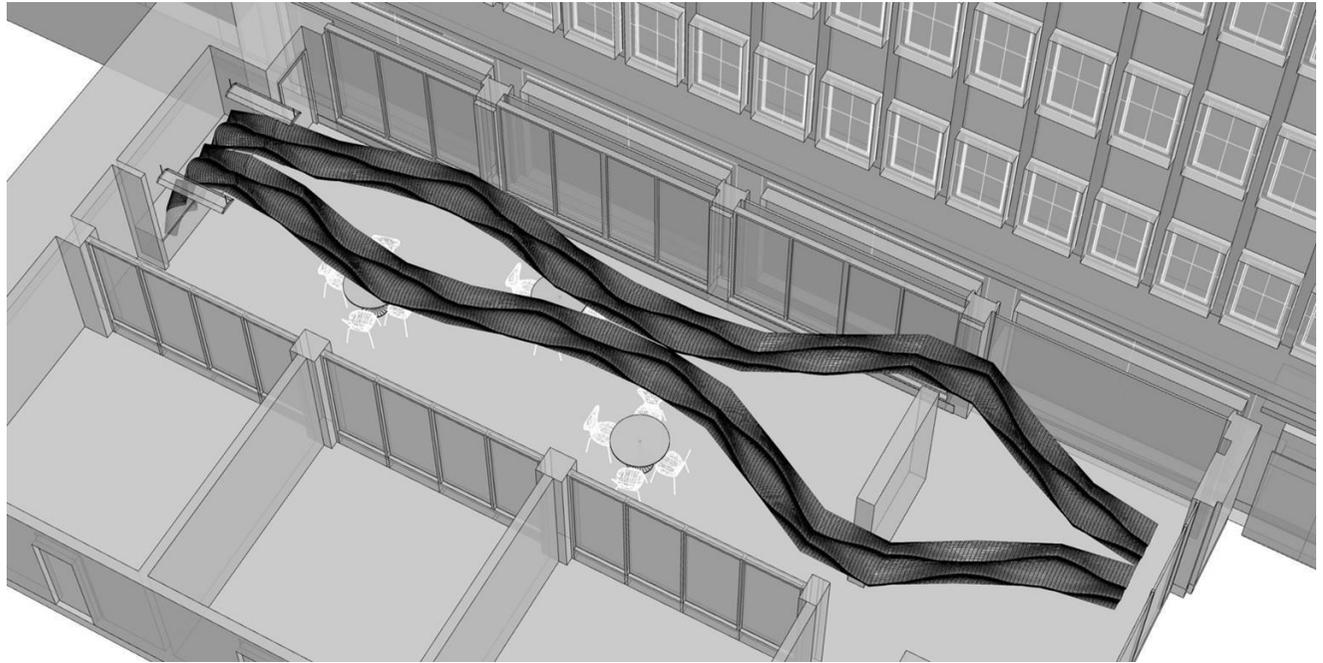
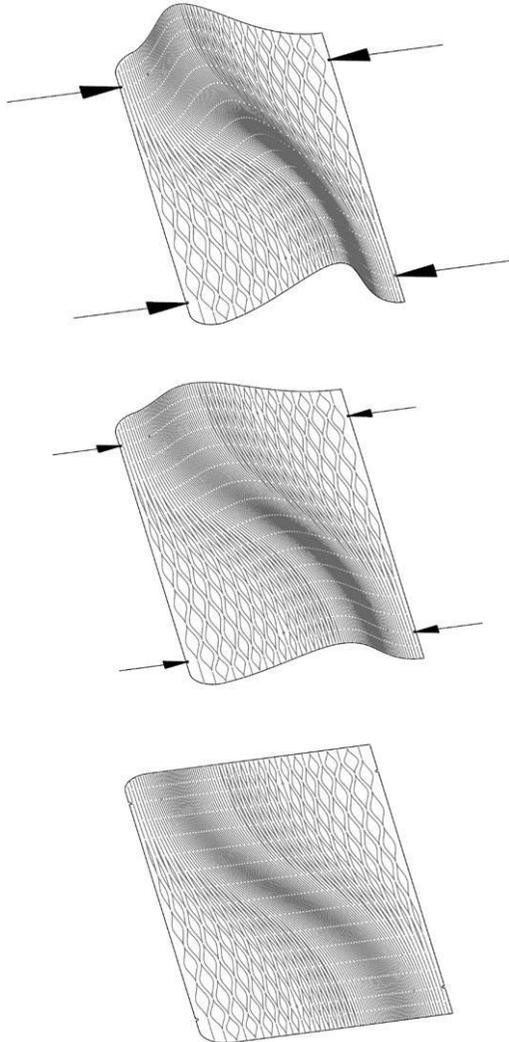
**Materials:** *Laser-Cut Plywood Sheets, Laser-Cut Spacer Fabric and LED Lights*

**Award:** *American Architecture Prize Gold Prize 2016*



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The components of the wooden waves form sinuous streams folded into unexpected configurations through an open-source and innovative digital fabrication technique of "lattice-hinge-formation": this is a parametric pattern of laser-cut lines that alters the global properties of plywood sheets making them locally more flexible and thus controlling the 3d form without significant supporting framework. The lattice hinge method is a development of the traditional timber bending technique, using the kerf (beam-width) of the laser to form torsional springs within the material.



More than a hundred prototypes were tested to inform the digital model and master the curvature of the final piece which forms a seamless, soft and continuous stream.

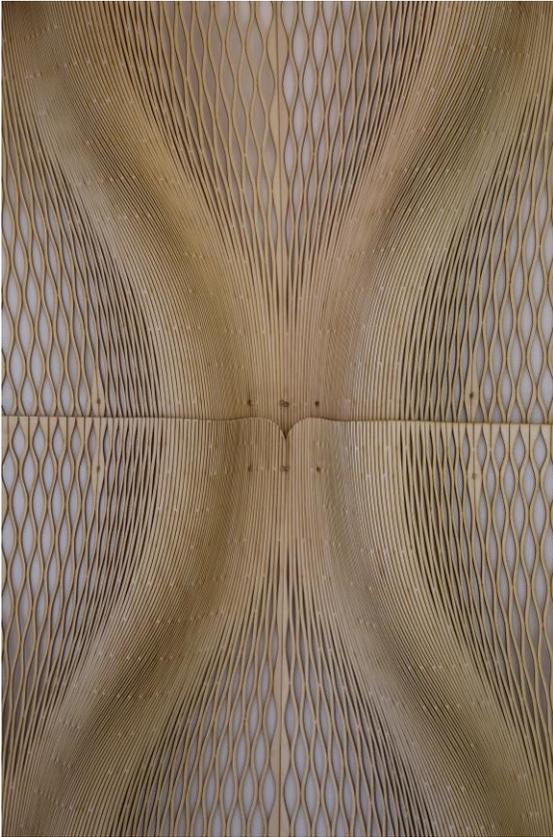
The supports of the modules were generated through a digital process called "Topological Optimisation" in which force flows are assessed and unused material is removed. They hold the patterned plywood sheets in their current forms through a male/female connection requiring no glue.

The Wooden Waves installation makes use of flat, stock plywood from an FCC certified supplier, demonstrating that complex forms may be achieved through application of innovative engineering and architectural technology to a sustainable, transportation-optimised material. The piece is left untreated, showing the natural form of the engineered timber.





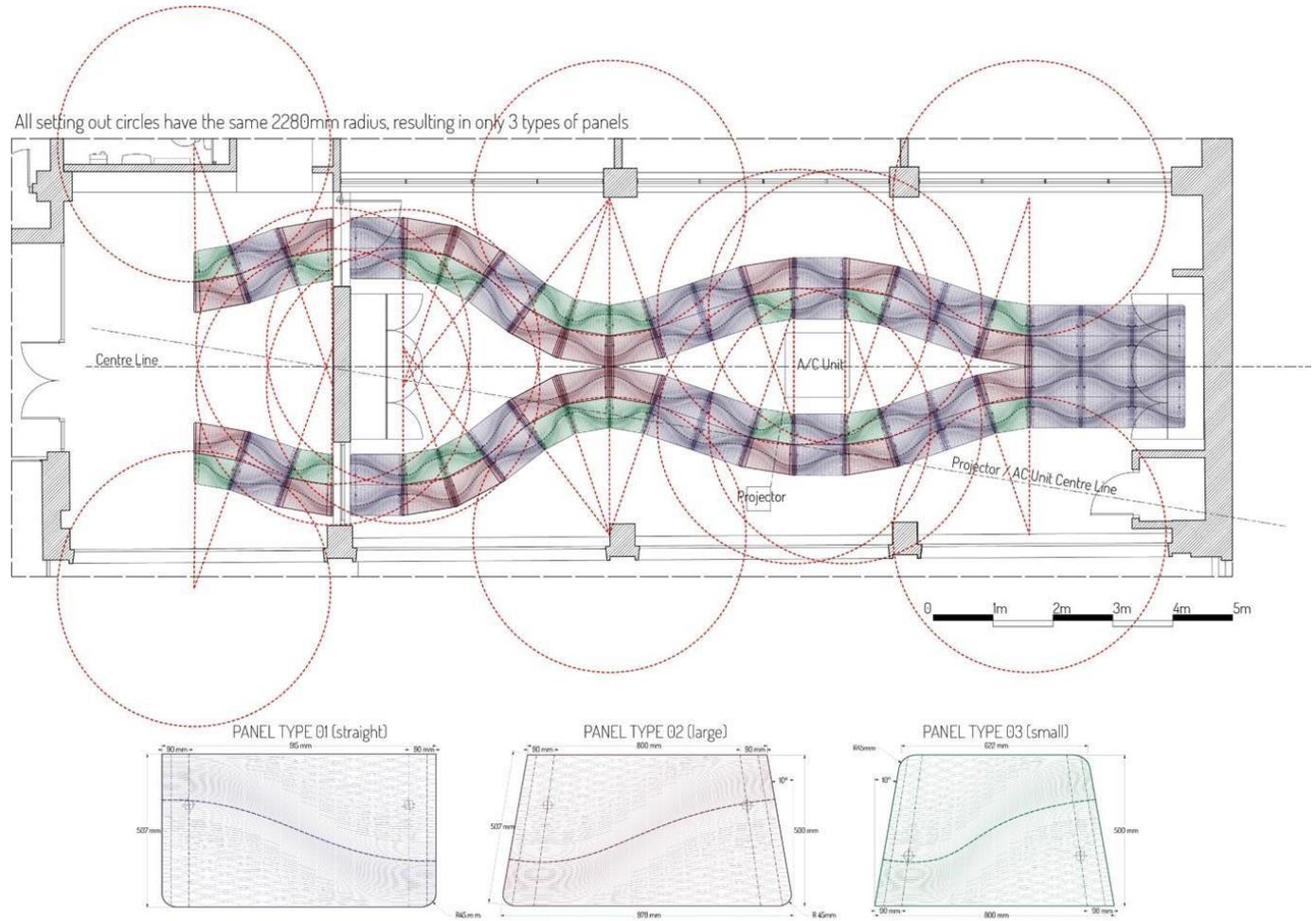
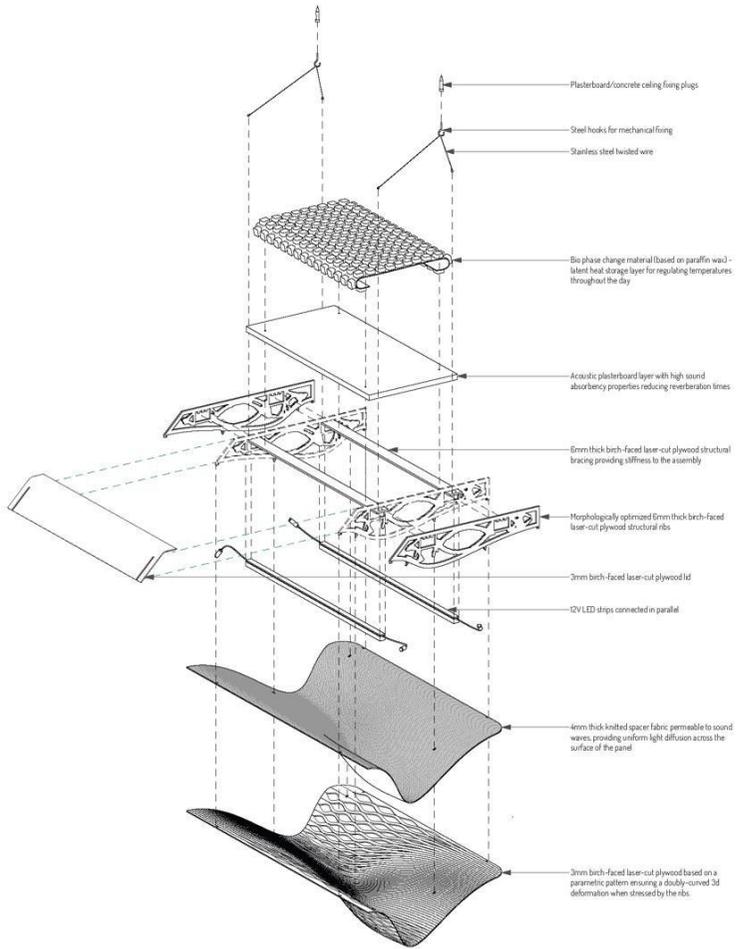
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*Installation of Wooden Waves at Buro Happold Engineering*



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Exploded axonometric drawing of the components creating each one of the panels

The modules diffuse light through the opening of the cuts when bent and also absorb sound and stabilise temperature through acoustic and phase-changing layers integrated into the design.



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The Wooden Waves - Buro Happold - The ceiling Installation at 71 Newman Street - Picture by Bilal Mian ©Mamou-Mani



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**UNIVERSITY OF WESTMINSTER – 29 Marylebone Road Campus –**

*We received Full Detailed Planning Application for the refurbishment of 29 Marylebone Road into a ‘high tech’ business incubator unit for professionals, students and alumni.*

*This project forms a key central part of an ongoing development plan by the University which offers its students ‘best in class’ education linked to a business model which bridges the gulf between education and the business world.*



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### Evolution of Façade

#### STEP 1: Initial Grid

Understanding the initial condition and neighbouring grids



#### STEP 2 Lift

Emphasizing the corner facing Madame Tussauds and Baker Street



#### STEP 3 Movement

Gradually distort the grid to create dynamism and playfulness



#### STEP 4 Offset

Gradually moving the grid outwards to engage with the street level.



#### STEP 5. Panel Size Optimization

Rationalising panel to 3 sizes only



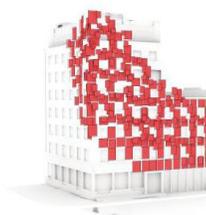
#### STEP 6. 2nd Layer

Creating Depth and scatter more light, softening the grid.



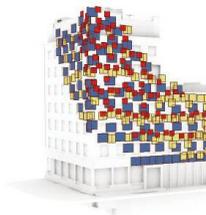
#### STEP 7. Removal + Rotation

Revealing the original facade and rotating the panels to scoop the light in the space



#### STEP 8. Texture

Calibrating a texture to panel types to attract more light using a prism-like cut



— Initial condition  
— design progress  
— optimization



DESIGN OBJECTIVES

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*The University of Westminster has a proud history of research that has impact; academic research that draws from and drives the professions it serves. The recent acquisition of 29 Marylebone Road offers the opportunity to showcase the university's innovative research, enterprise and its rich connections to allied professions and industries. It will provide a cutting edge space and high quality environment to promote this distinctive tradition, to welcome professional partners, alumni and students into an environment characterised by internationally leading researchers and innovative enterprise projects.*



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*University of Westminster - 29 Marylebone Campus visual*



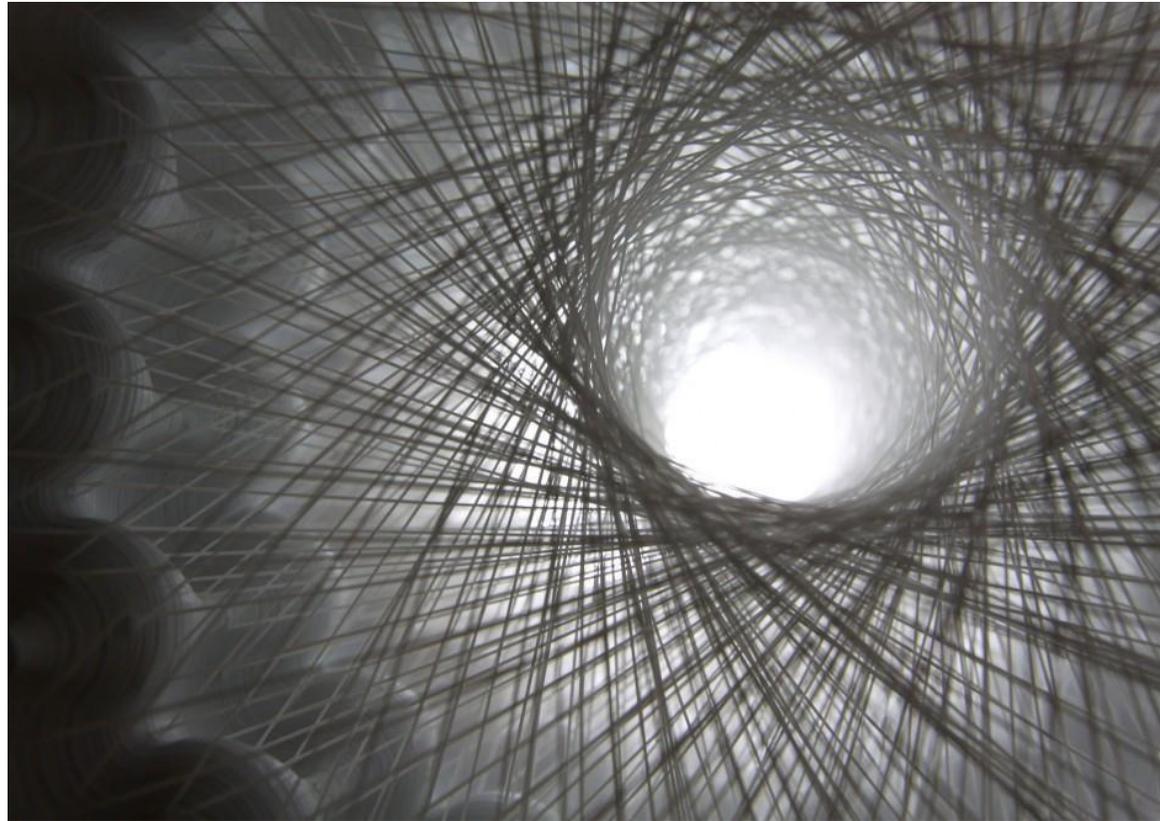
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*University of Westminster - 29 Marylebone Campus visual*



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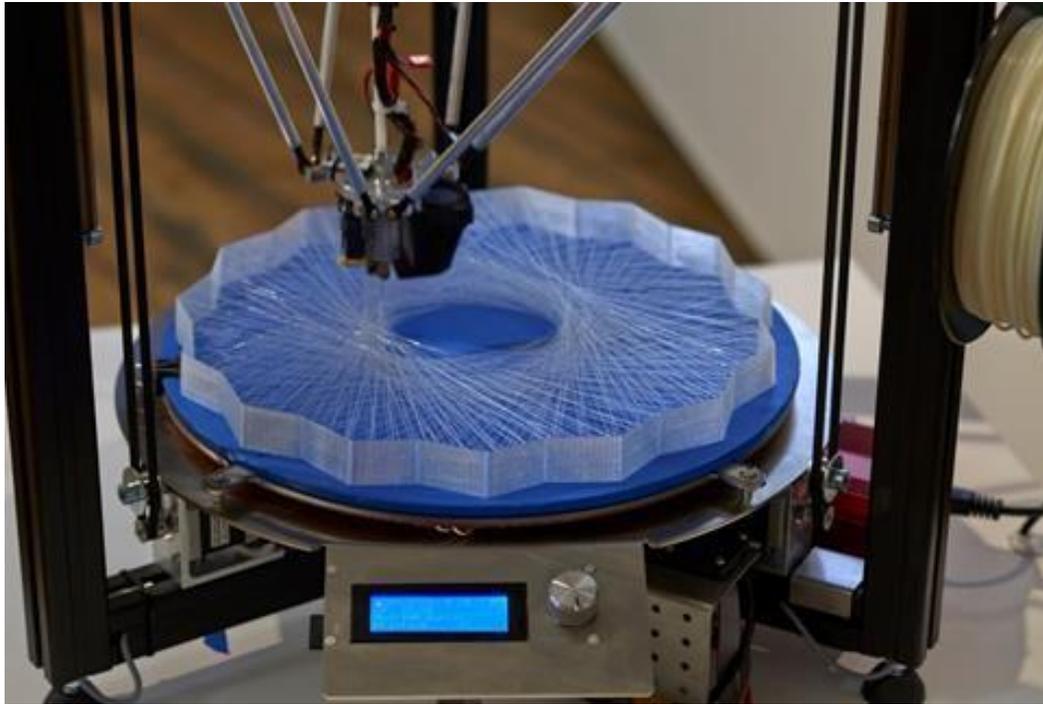


**THE CLOUD CAPSULES:** *Cloud capsule features a series of site-specific parametric models that have been developed by architect arthur mamou-mani with lead collaborator andrei jipa. Described as 'skyscrapers-for-one', these 2 metre high micro-pavilions demonstrate measured changes in the levels of light diffused through their forms. These models are calculated using the daylight simulation software radiance and "silkworm"; an open-source plug-in for rhino developed by a team including mamou-mani. Visitors will have the chance to observe the 3d printer on-site and follow the creation of one of these micro-pavilions throughout the duration of the exhibition.*

**Material:** 3D Printed PLA Bio-Plastic



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Cloud Capsules, 3D printing process



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*3D printed Cloud Capsules*



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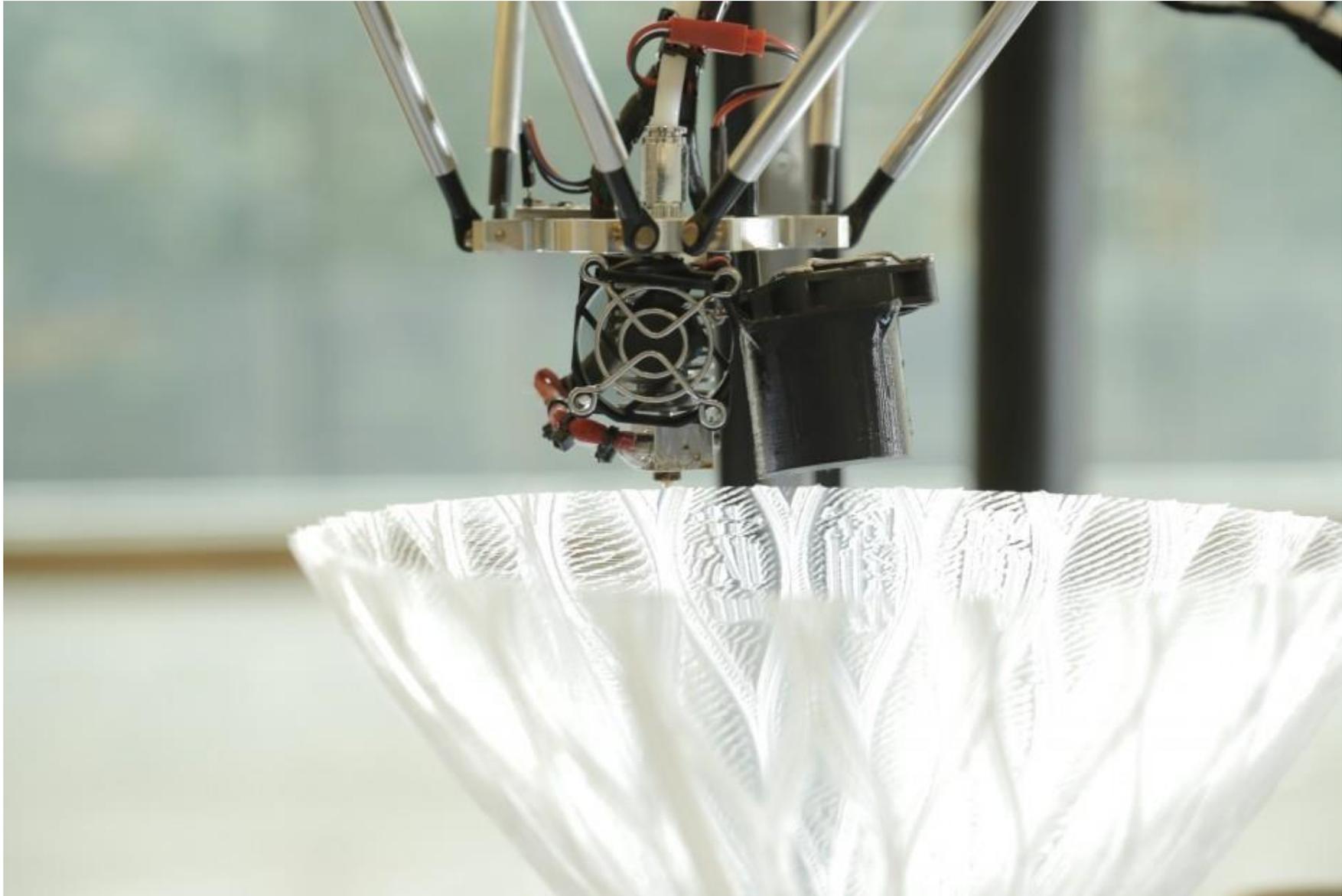


**XINTIANDI 3D PRINTING POP-UP STUDIO:** *The xintiandi 3d printing pop-up studio by Mamou- Mani at xintiandi style, shanghai, is a temporary space to discover the world of 3d printing and the beautiful forms that can be created with this innovative technology. It took place during the shanghai fashion week 2014.*

**Material:** 3D Printed Bio-Plastic, LED Strip Lights



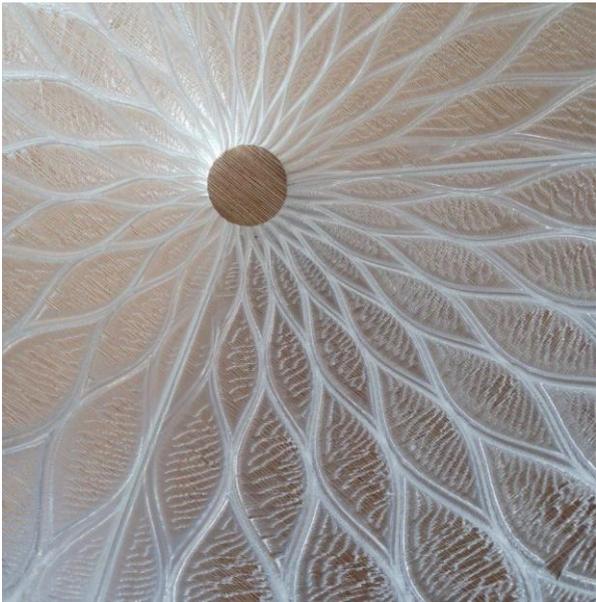
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*Close-Up on the Silkworm-generated pattern*



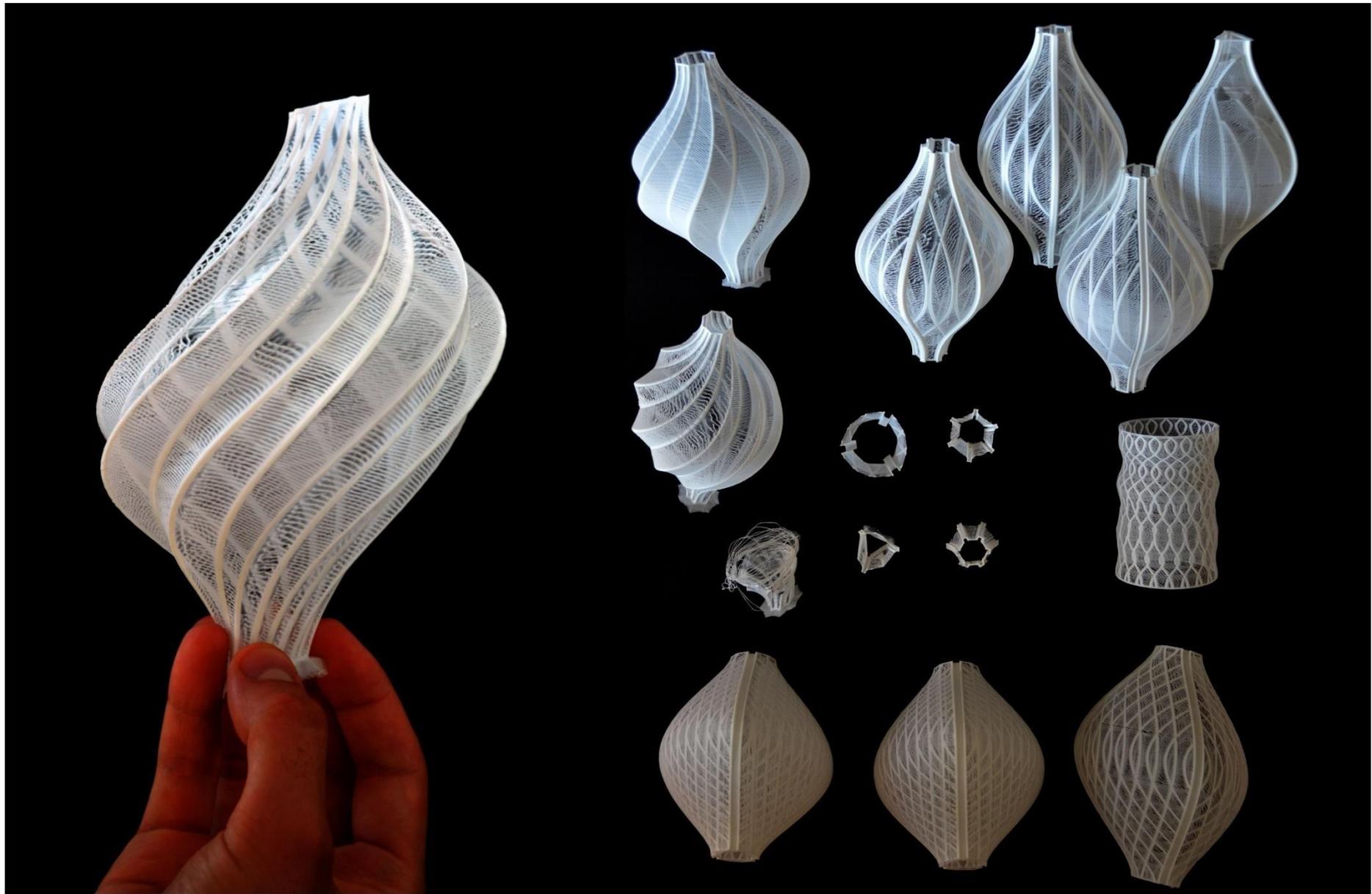
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*Retraction pattern for the Xintiandi 3D printing Pop-Up Store up close, Male/Female Connection details for components*



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*Testing our prints using Silkworm*



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*Close up on the 200 3D Printed Modules at the Xintiandi ©Mamou-Mani*



**THE ORIGAMI TREE:** Mamou-Mani and Arup Associates have collaborated on the creation of a giant sculptural origami piece that activates the store facade of Davidson Tsui, in Xintiandi Style, Shanghai. Customers and passers-by can interact with the installation by posing in the window “Wearing” an oversized architectural “hat” and “dress” that animate the windows and facade of the shop. The curved feminine form of the exterior contrasts with the masculine triangular interior and reflects the notion of duality (ying-yang) in Chinese culture. The installation is part of the RIBA Shanghai Window Display Project 2014.

**Material:** Laser-Cut Colour-Specific Polypropelene



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**THE MAGIC GARDEN:** Installation by Mamou-Mani is part of the Regent Street Windows [Project 2013](#) organized by the Royal Institute of British Architects (RIBA). It has been designed to animate and seamlessly link all the windows of the store with one beautiful, fluid and surreal landscape. With the help of both digital and physical techniques, the architect used a smocking pattern to shape light-diffusing polyamide mesh fabric to maximise its structural qualities and interact with the mannequins. The result reflects the precision of both tailoring and architecture as well as the colour and lightness of the Karen Millen SS13 collection.

**Material:** Colour-Specific Spacer Fabric and Cable Ties

**Awards:** Crown Estate Award Best Window Display



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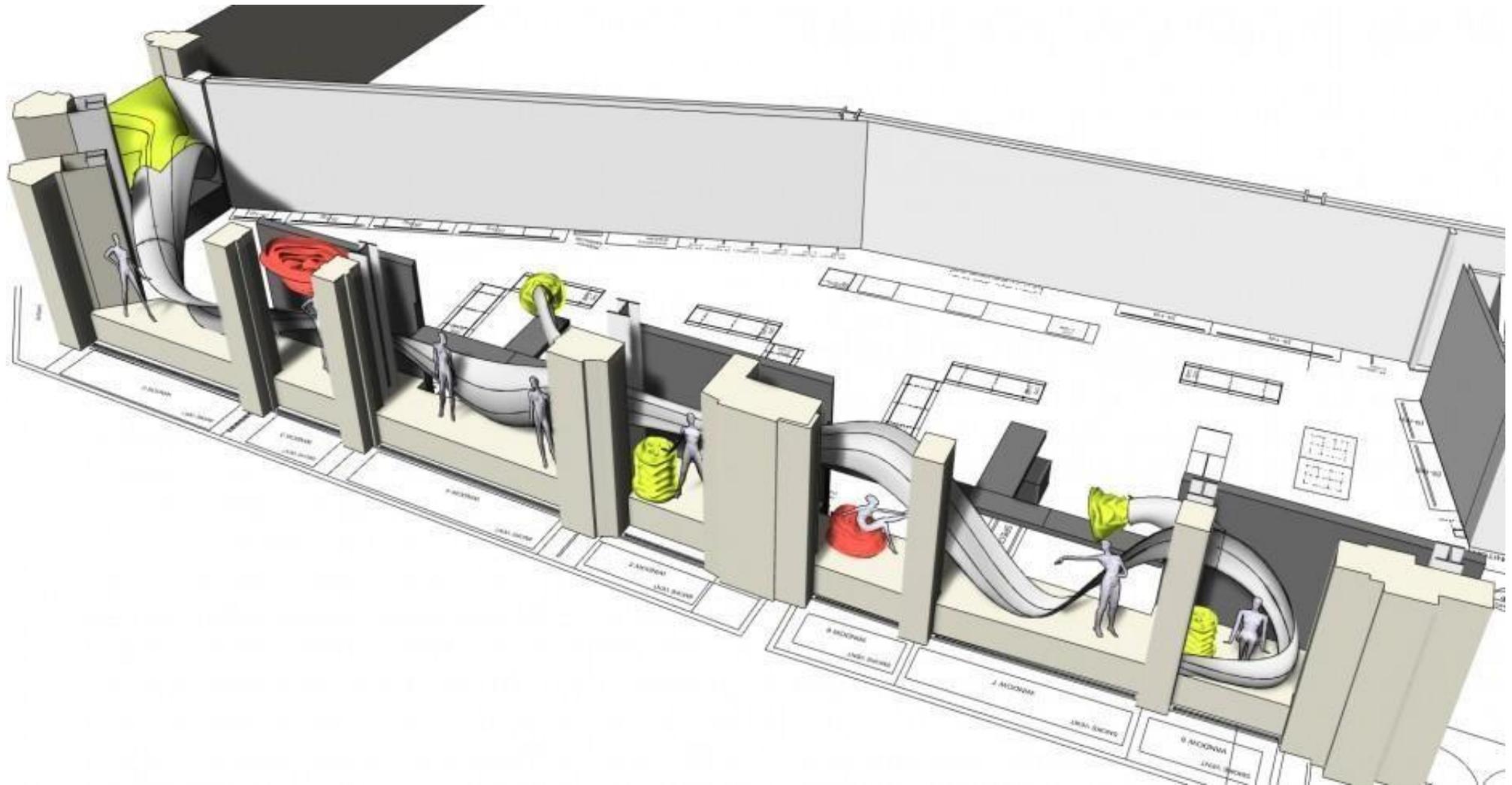
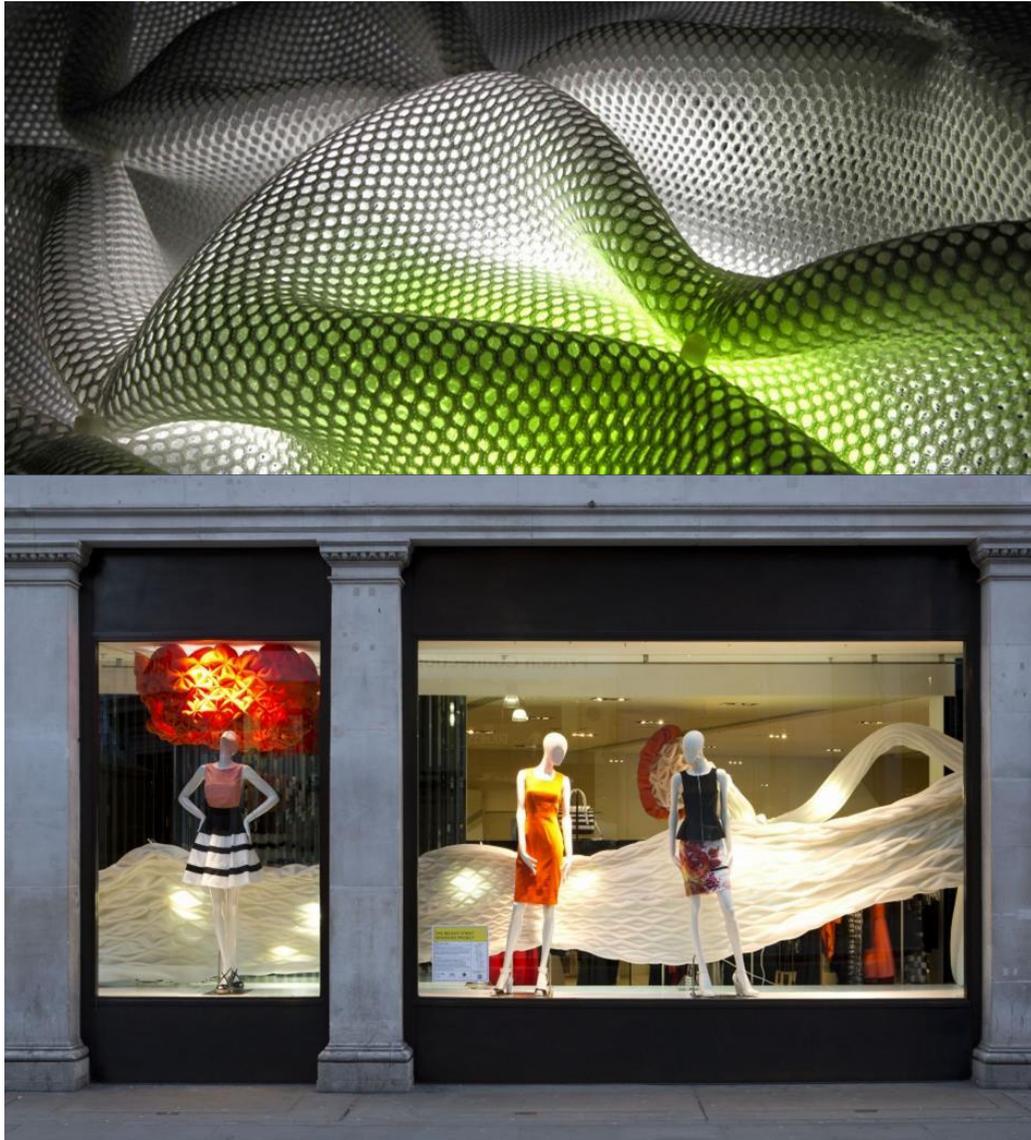


Image extracted from the 3D model of the store with initial studies of the geometry and colours using Rhinoceros 3D © Mamou-Mani



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Picture of the Karen Millen Regent Street Store Windows on Princes Street © Mamou-Mani



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Picture of the Karen Millen Regent Street Store Windows on Princes Street © Mamou-Mani



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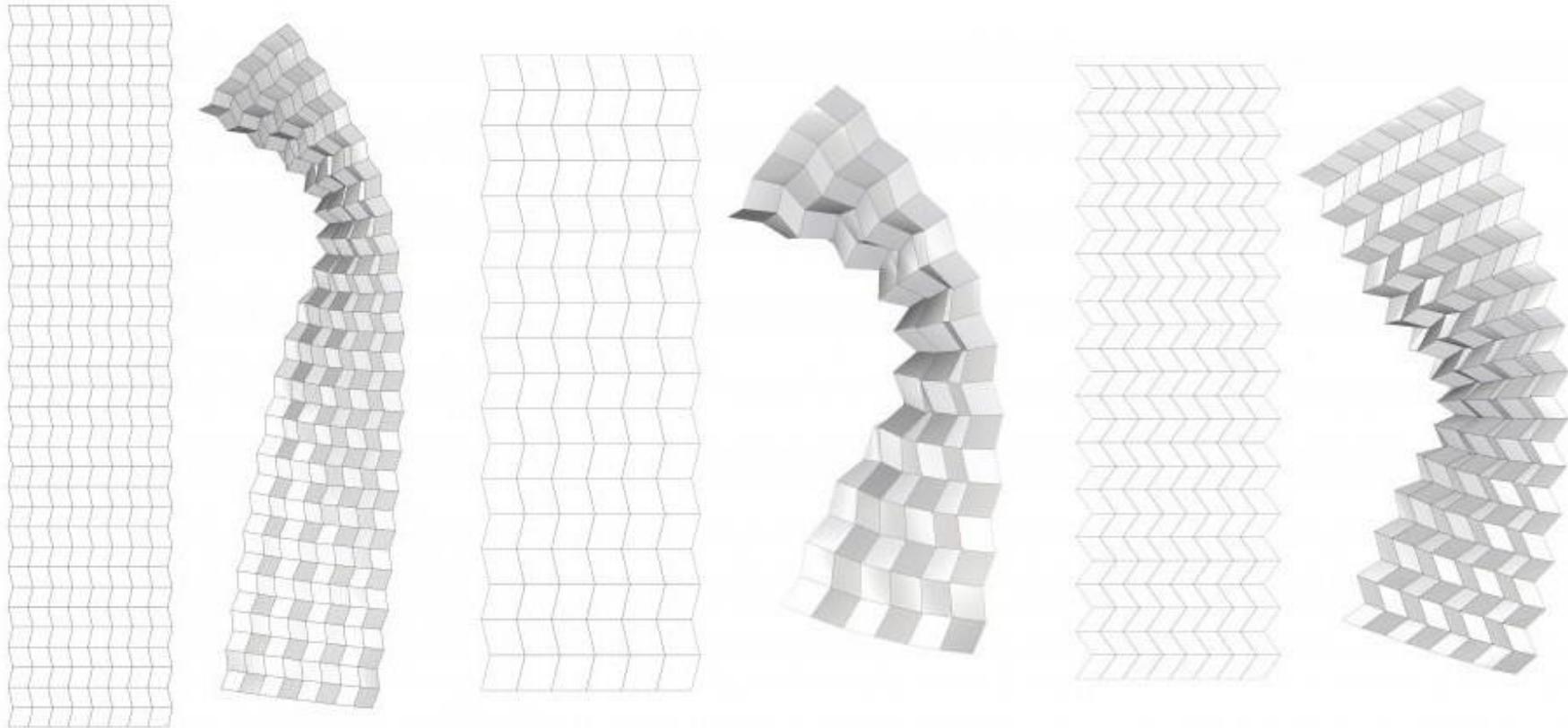


**THE SNOW STORM:** Karen Millen's Christmas Window display is our second installation at the Regent Street flagship store and is a continuation of The Magic Garden. It is made of polypropylene "Miura-Ori" origami strips flowing through the store. Each of the 8 windows is a framed composition using the constraints and variations of the material and folds as well as the posture of the mannequins in order to create a sense of lightness, beauty and magic.

**Material:** Colour-Specific Spacer Fabric and Cable Ties  
**Award:** VM&M Award Best Christmas Display



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Miura-Ori Origami variation in sizes - Karen Millen Xmas Window Display ©Mamou-Mani



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***TANGENTIAL DREAMS at the Burning Man Festival:***

Tangential Dreams is the result of four years of research building projects at the Burning Man festival with our WeWantToLearn.net architecture student group (with co-tutor Toby Burgess and structural engineers Format).

***Material: Dimensional Lumber, Structural Screws, LED***

*Picture by Gurps Chawla*



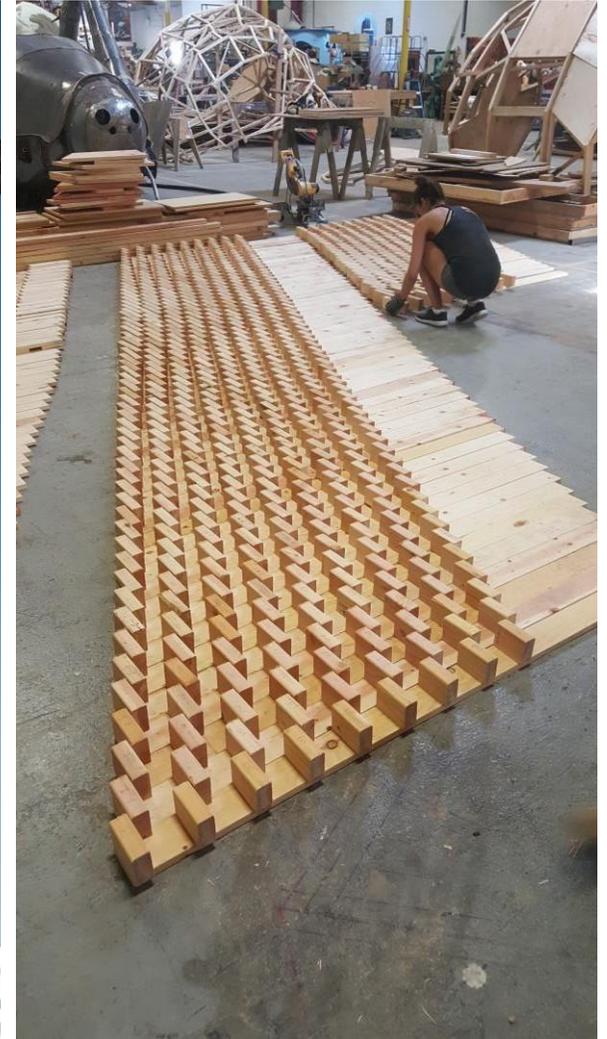
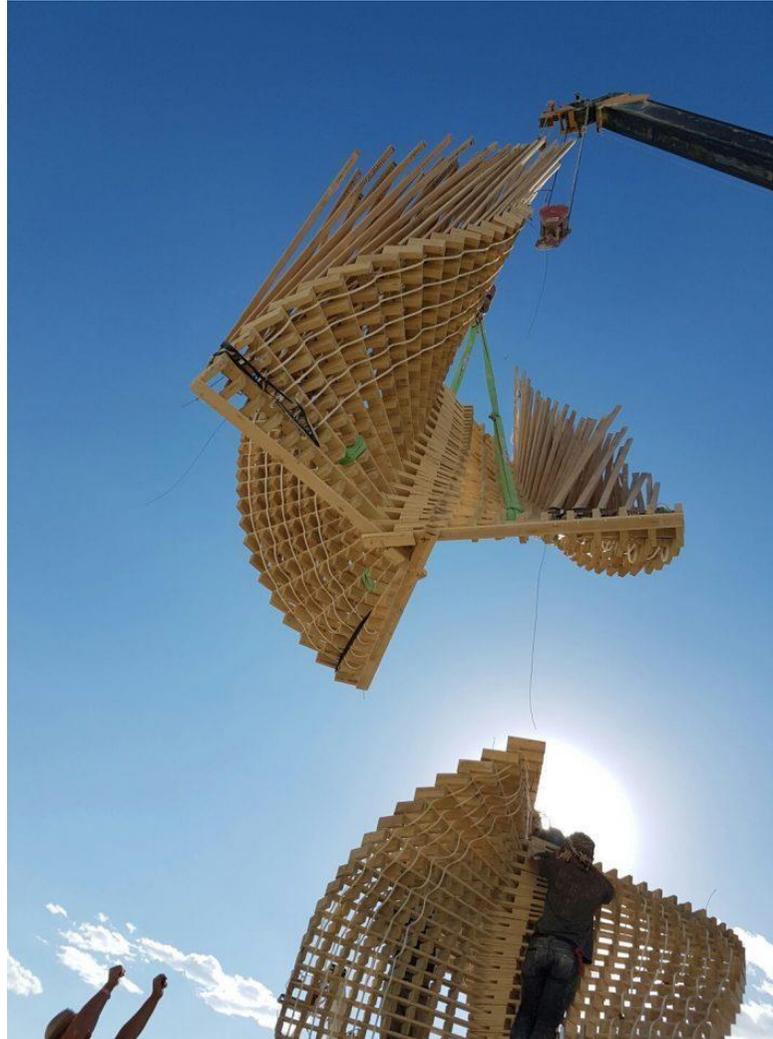
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*Tangential dreams is a climbable sinuous tower made from off-the-shelf timber and digitally designed via algorithmic rules. One thousand “tangent” and light wooden pieces, stencilled with inspiring sentences, are strongly held in position by a helicoid sub-structure rotating along a central spine which also forms a safe staircase to climb on. Each one of the poetic branches faces a different angle, based on the tangent vectors of a sweeping sine curve.*



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*We believe digital tools in design are giving rise to a new Renaissance, in which highly sophisticated designs, mimicking natural processes by integrating structural and environmental feedback, can be achieved at a very low cost. We worked very closely with our structural engineer Format, sharing our algorithms, to give structural integrity to the piece and to resist the strong climbing and wind loads.*