



MAMOU-MANI

# Making Architecture: A New Kind of Architecture with Digital Fabrication & Parametric Modelling

**Mamou-Mani Ltd**

Architects + Computational Design

499-505 Hackney Road  
E29ED UNITED KINGDOM

+44(0)7910417858  
arthur@mamou-mani.com

Partner Companies and Initiatives:



fabpub



Registered in England & Wales  
Company No. 07753288 – VAT No. 216710237



MAMOU-MANI

## 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”*

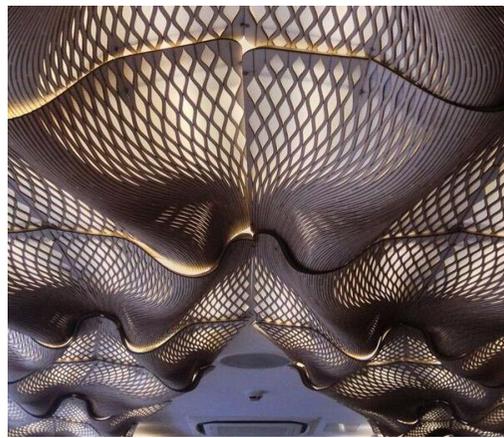
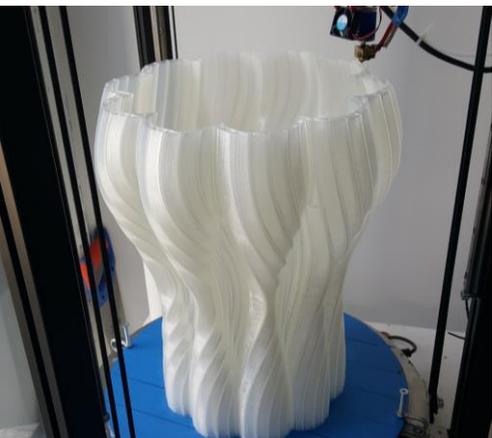
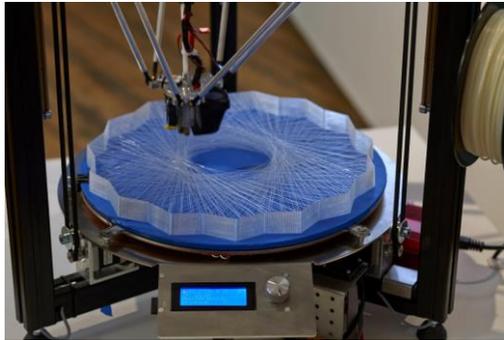
*Stephen Melville, Director, Ramboll Engineering*

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

*Arturo Tedeschi, Architect and Computational Designer*



MAMOU-MANI





MAMOU-MANI



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



MAMOU-MANI



**Arthur Mamou-Mani (AA dipl, ARB/RIBA FRSA)** – [arthur@mamou-mani.com](mailto:arthur@mamou-mani.com) - is a French Architect and director of the award-winning architecture and design practice Mamou-Mani, specialised in digital fabrication and parametric tools. He is a lecturer at the University of Westminster (<http://WeWantToLearn.net>) and UCL-Bartlett in London and a consultant for Simply Rhino Ltd, giving workshops to leading companies such as McLaren Racing, Nike and Foster + Partners on computational tools, form-finding and analysis as well as fabrication. He owns a digital fabrication laboratory called the Fab Pub (<http://Fab.Pub>) which allows the general public to experiment with large 3D Printers and Laser Cutters. Arthur is co-author of the open-source 3D printing plugin Silkworm (<http://projectsilkworm.com>) which was used in the world's largest 3D Printed project, The Vulcan in Shanghai. He is a fellow of The Royal Society for the Encouragement of Arts, Manufactures and Commerce (RSA). Mamou-Mani's clients include BuroHappold Engineering, Karen Millen Fashion, The Burning Man Festival, and Imagination. Prior to founding Mamou-Mani in 2011, he worked with Atelier Jean Nouvel, Zaha Hadid Architects and Proctor and Matthews Architects.



**Maialen Calleja (RIBA Part 1)** – [maialen@mamou-mani.com](mailto:maialen@mamou-mani.com) Originally from Spain where she received her degree at University of Navarra, Maialen received her RIBA part 1 degree at the University of Westminster in London. She has collaborated as interior designer for a studio presentation for Cassandra Sabo designs at Cockpit Arts in London and she volunteered in Africa in the construction of a school. She is an expert at parametric design tools and digital fabrication including 3D printing. Maialen has worked with Mamou-Mani Ltd for three years on a wide range of project including the Flying Leaves and the Shanghai 3D Printing Pop-Up Studio.



**Bilal Mian, MArch II UCL-Bartlett, RIBA Part 2** – [bilal@mamou-mani.com](mailto:bilal@mamou-mani.com) - Prior to working at Mamou-Mani since December 2014, Bilal has worked for Green studios, 5th Studio Architects and Sauer Bruch Hutton Architects. Bilal has also Worked for Solmaz Contractors, collaborating with project architects on tenders and site management. include projects with the following architects: Studio Integrate, Daniel Pettano Architecture, Citizens Design Bureau, 6A Architects, Andrew Paine Architecture, primarily residential projects. Bilal has completed a number of exhibition designs and art Installtions in collaboration with Millimetre Design & The Light Surgeons (video artists and filmmakers)



MAMOU-MANI



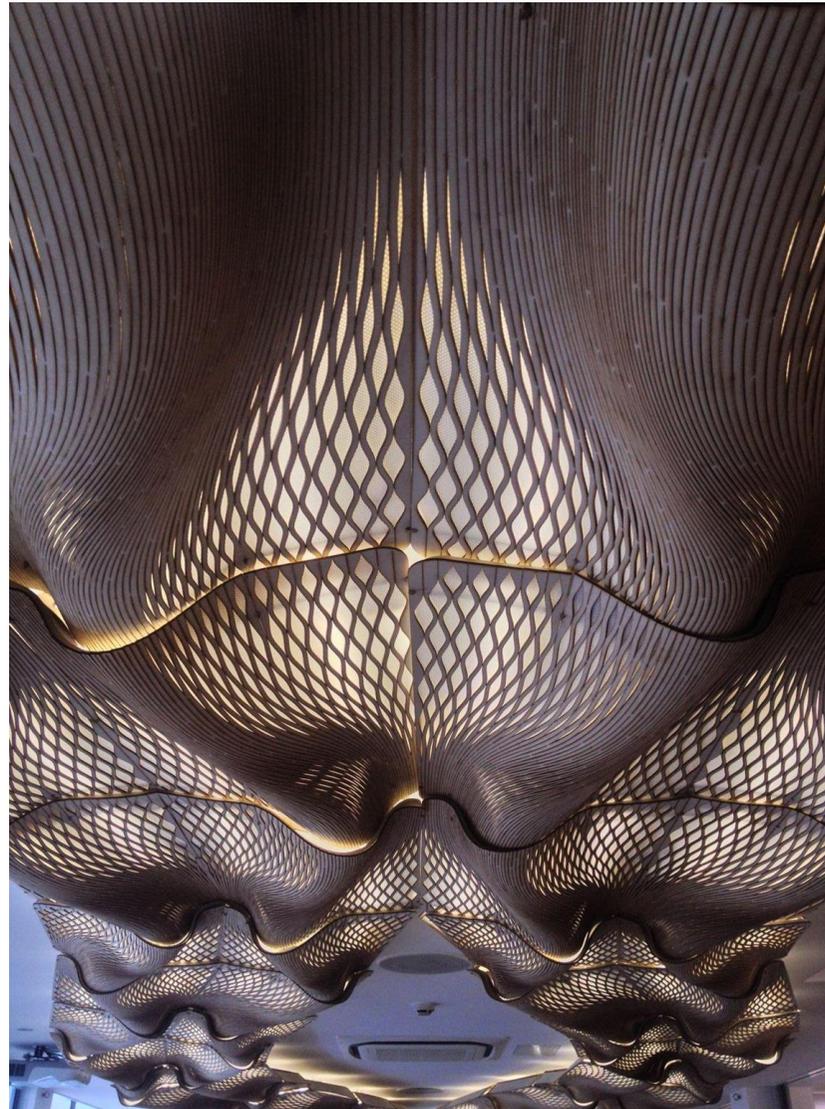
**Ping-Hsiang Chen (AA dipl RIBA Part 2)** – ping-hsiang@mamou-mani.com - Architectural assistant and computational designer specializing in parametric design, digital fabrication and multi-media. he has taught parametric design, 3d printing and digital fabrication in various schools such as architectural association school of architecture, london and Shih Chein university, taiwan. Ping-Hsiang chen completed his RIBA part 1 and 2 at the AA school of architecture and received his MA degree in architecture and digital media at the University of Westminster, London



**AdityaBhosle (AADRL RIBA Part 2)** - aditya@mamou-mani.com - Aditya is an experienced architect and holds a Master's degree in Architecture and Urbanism (DRL) from the Architectural Association School of Architecture in London. His studies were focused on the investigation of spatial, structural and material organisation to develop prototypical design systems. Aditya's research explored the use of spatial printing and robotic fabrication in the architectural design process. Prior to his masters, Aditya has worked as a project architect at Malik Architecture and StudioHAUS in India. He was involved in the planning and implementation of large-scale residential and commercial developments.



MAMOU-MANI



**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 BuroHappold'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.*

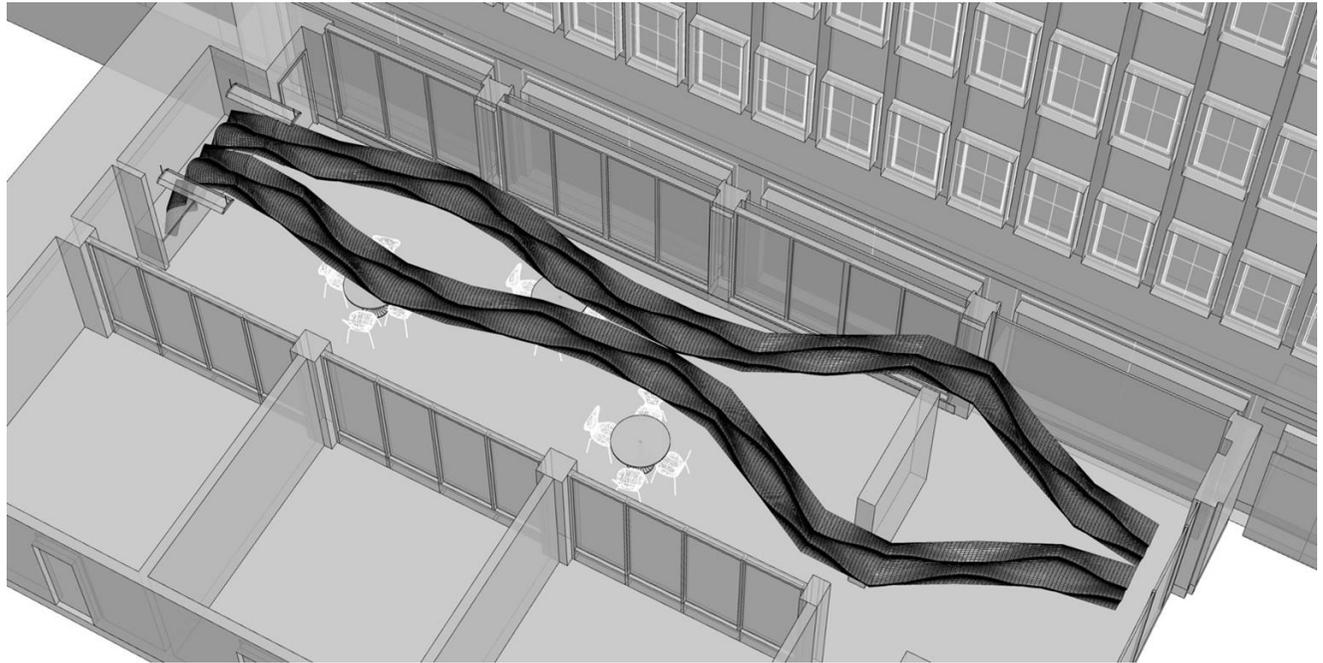
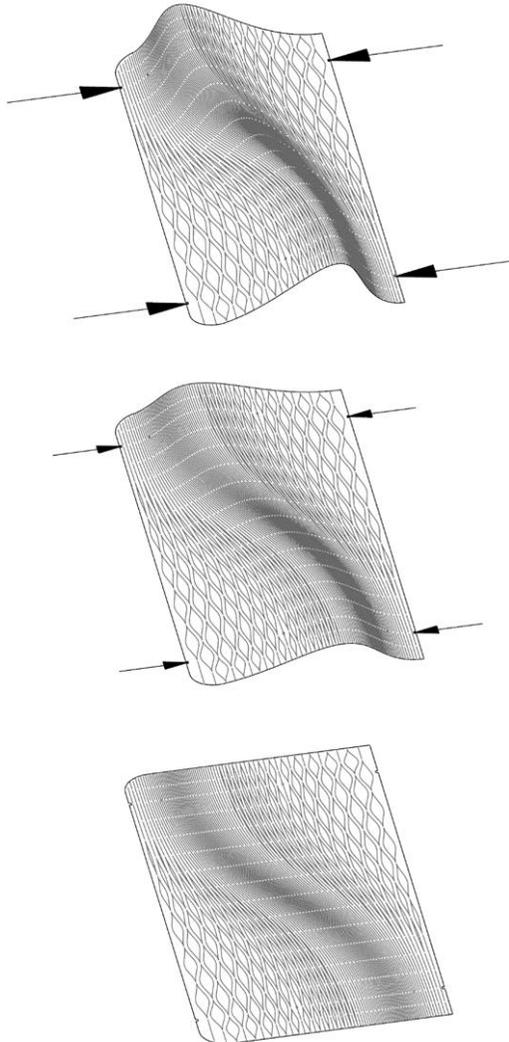
**Materials:** *Laser-Cut Plywood Sheets, Laser-Cut Spacer Fabric and LED Lights*

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



## MAMOU-MANI

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.

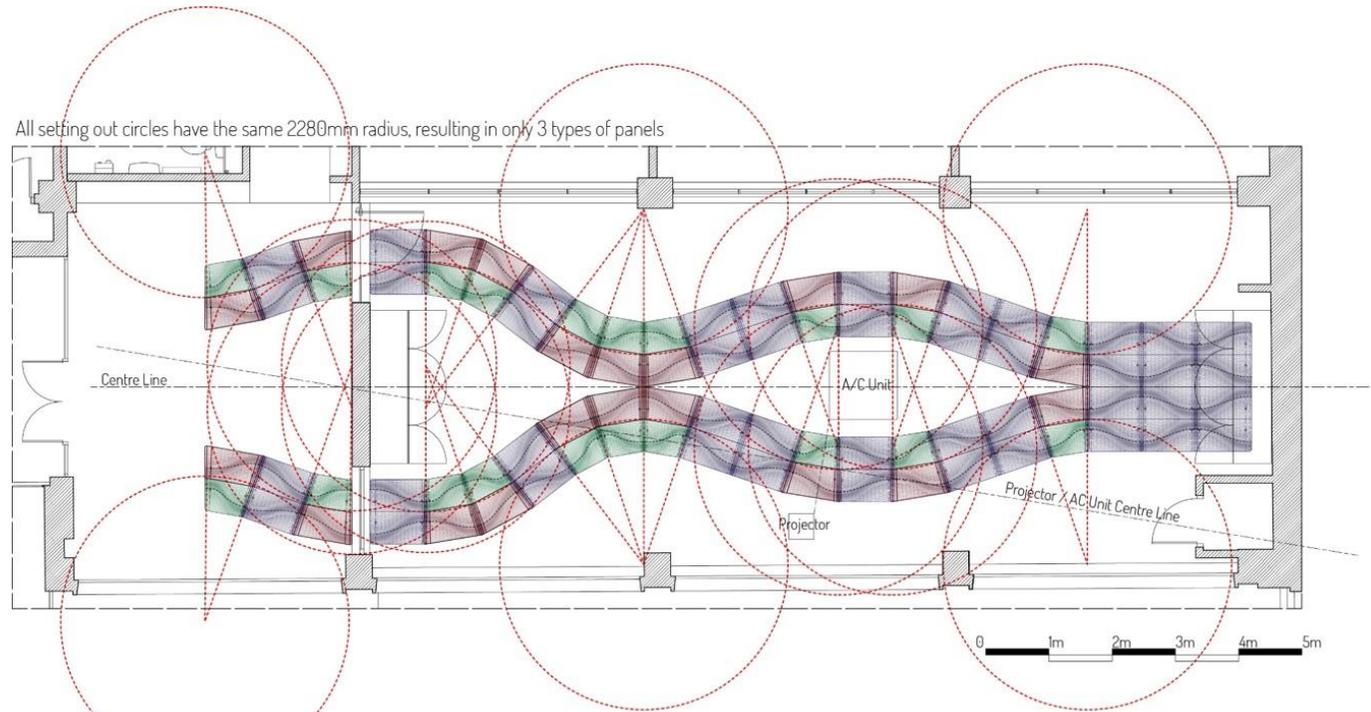
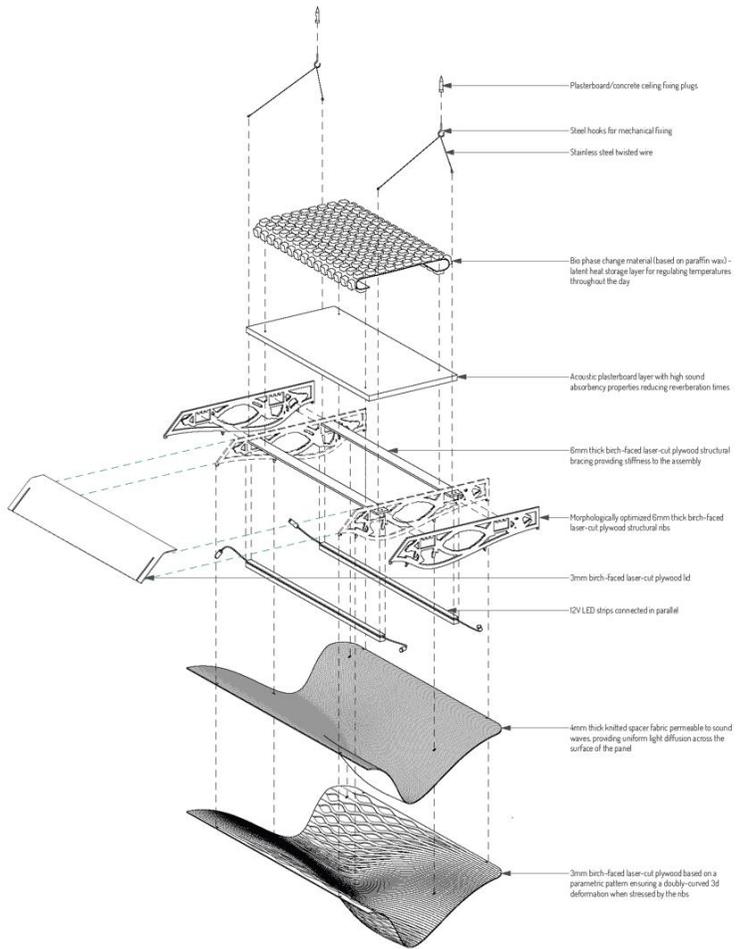
The supports of the modules were generated through a digital process called "Topological Optimisation" in which force flows are assessed and un-used material is removed. They hold the patterned plywood sheets in their current forms through a male/female connection requiring no glue.

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.

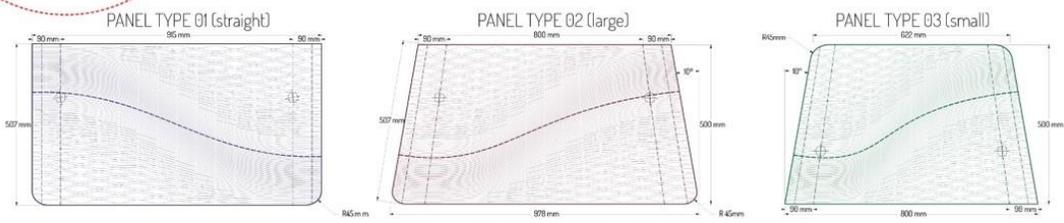




MAMOU-MANI



All setting out circles have the same 2280mm radius, resulting in only 3 types of panels



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.



MAMOU-MANI



*The Wooden Waves – Buro Happold – The ceiling Installation at 71 Newman Street – Picture by Arthur Mamou-Mani ©Mamou-Mani*



MAMOU-MANI



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



MAMOU-MANI



*The Wooden Waves – Buro Happold – Building the project – Picture by Zoe Laughlin ©Mamou-Mani*



MAMOU-MANI

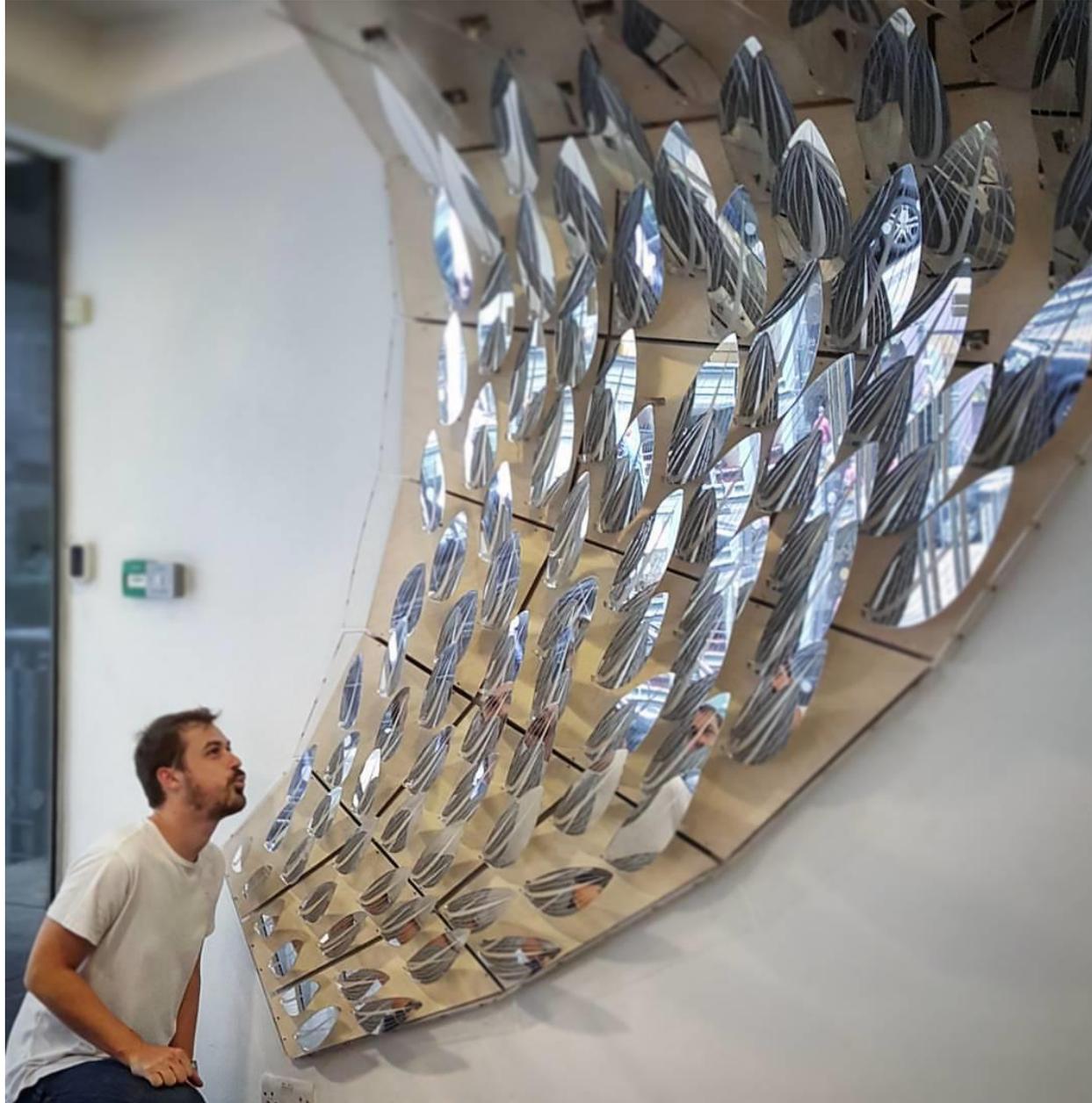


**THE FLYING LEAVES:** Built in the continuation of the [WoodenWaves](#), is our second permanent installation at the London headquarters of the world renown engineering practice BuroHappold Engineering. Made from parametrically defined and laser-cut acrylic mirrors of varying sizes, the leaves creates a view towards the street from the reception desks.

**Material:** Laser-Cut Acrylic Mirror and Wood



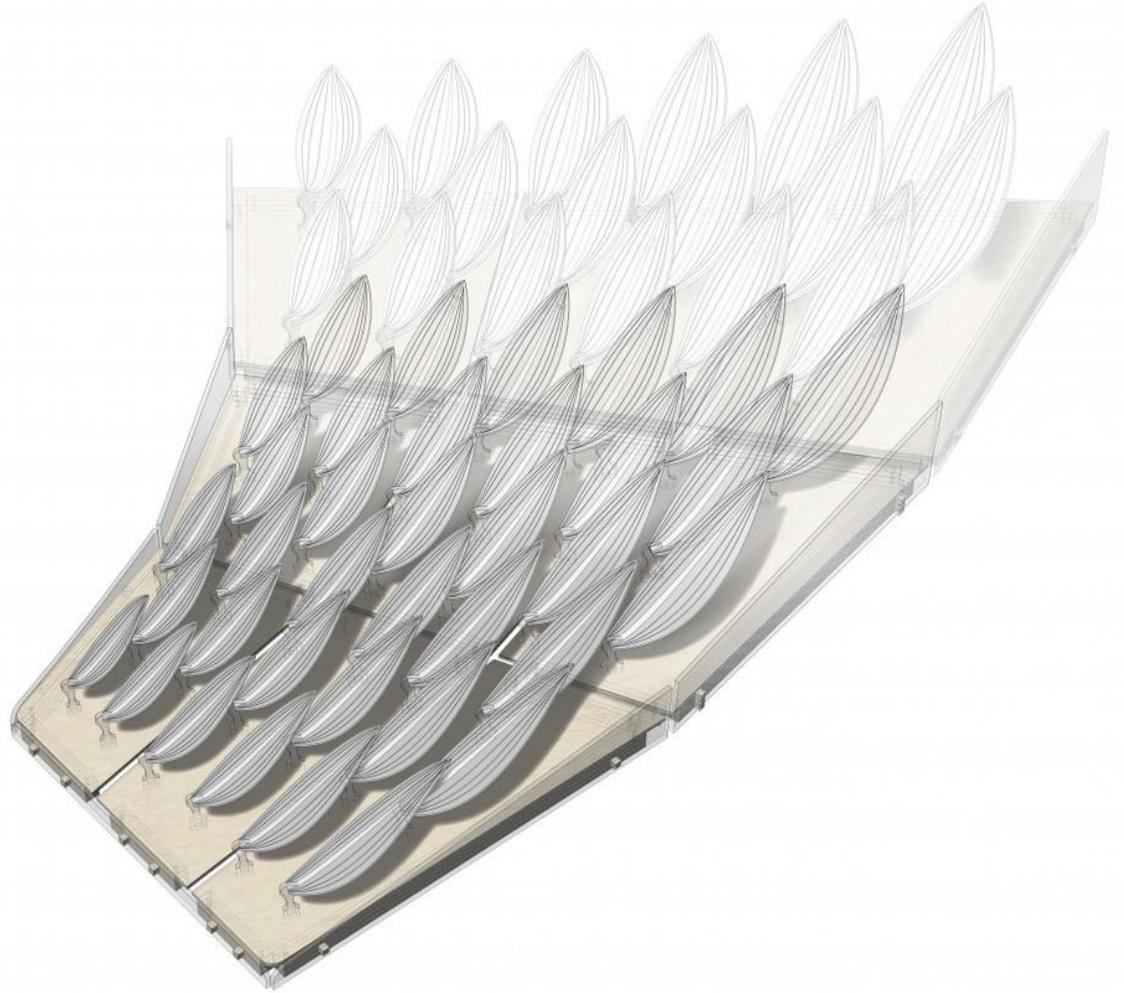
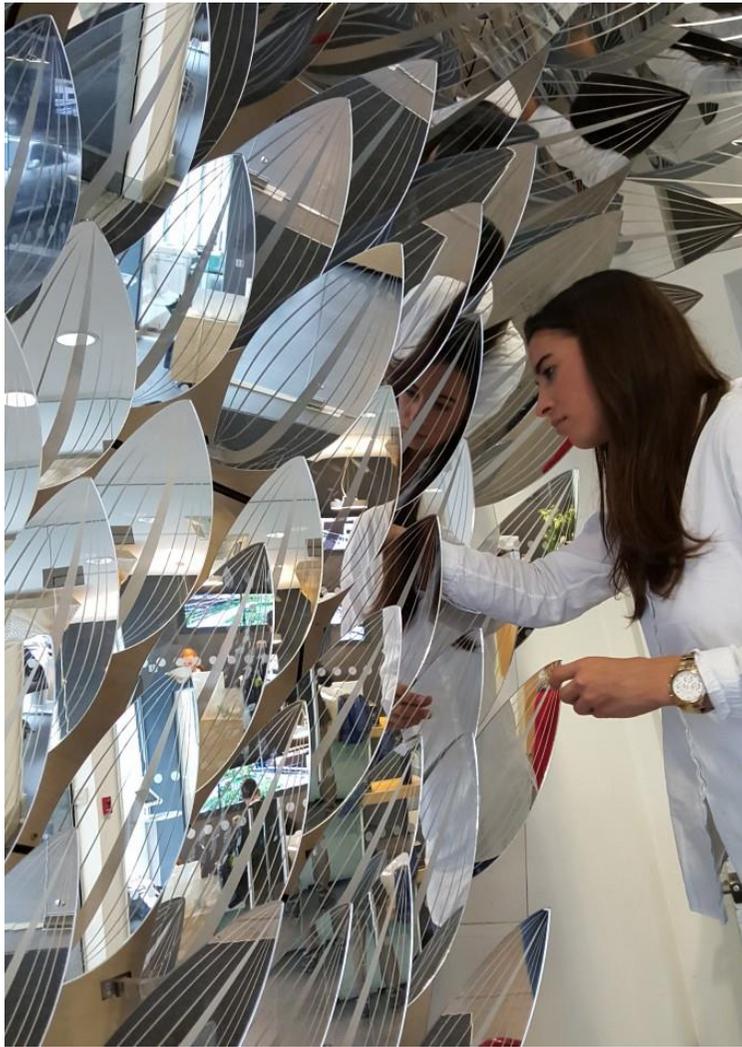
MAMOU-MANI



*The Flying Leaves – Laser Cut Acrylic Mirror Leaves blowing in the wind – Picture and Diagram ©Mamou-Mani*

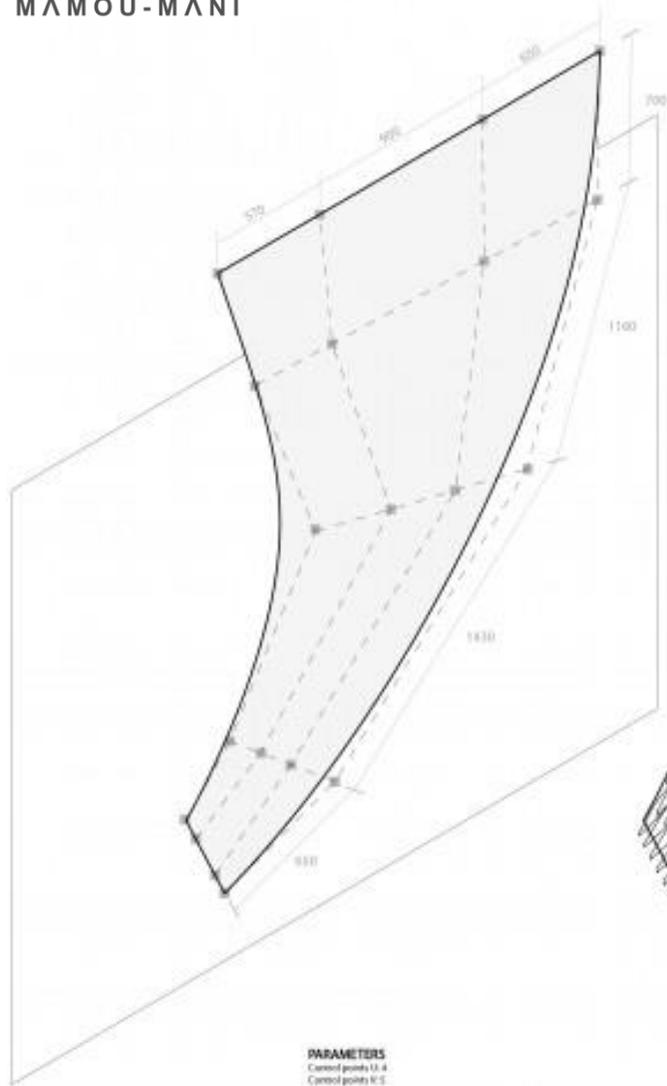


MAMOU-MANI





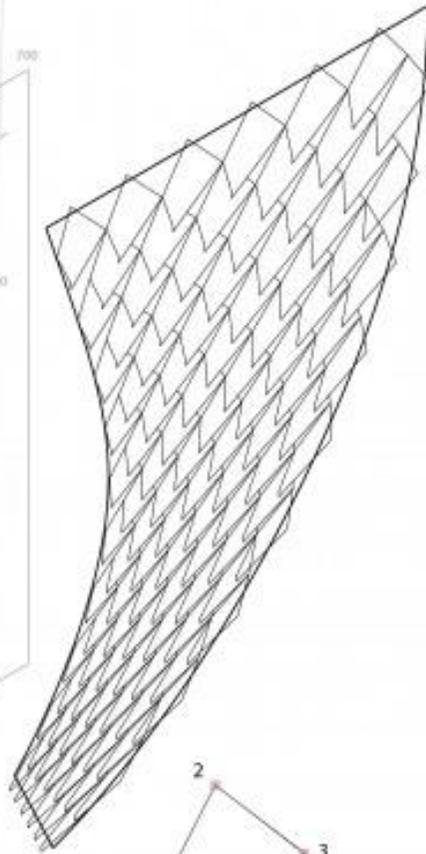
MAMOU-MANI



**PARAMETERS**  
Control points U: 4  
Control points V: 5  
U degree: 3  
V degree: 3

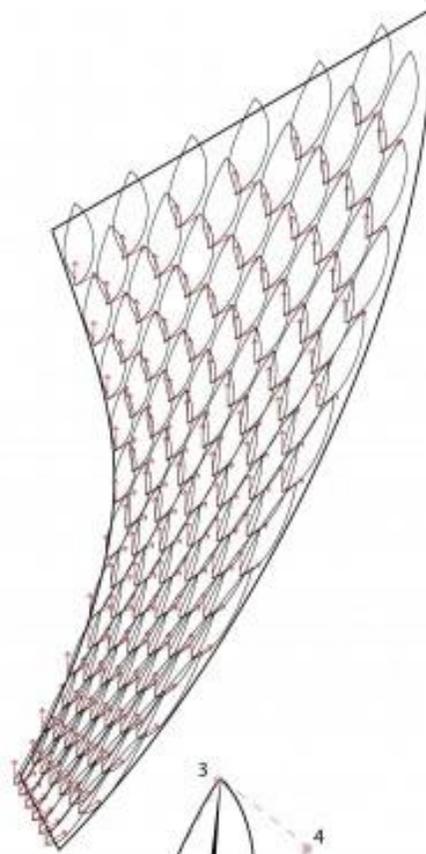
### 1. SURFACE

The location of the control points defines the domain of the surface. (ie: More components will be created if points are brought closer)



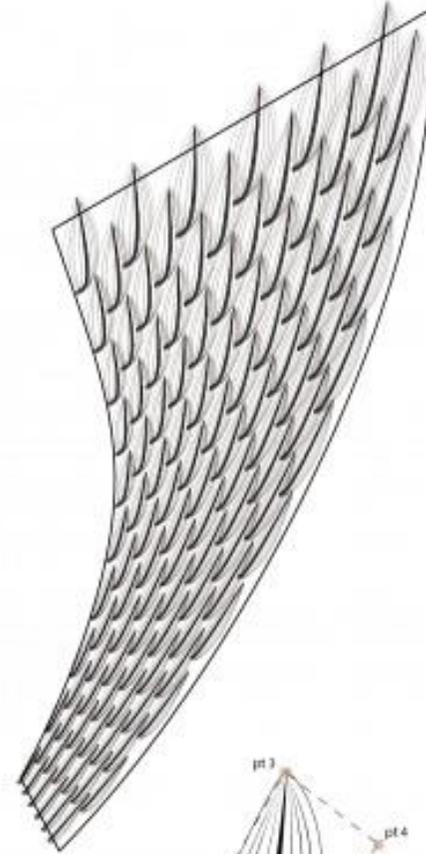
### 2. GRID

A grid of parallelograms is used to create the control points that will after create the leaves. The grid is created from moving point 0 off from the diamond grid.



### 3. LEAVES

A leaf like component is placed in each parallelogram cell.



### 4. VEINS

The veins, scored in the acrylic, allow a better contact with the base support.



MAMOU-MANI

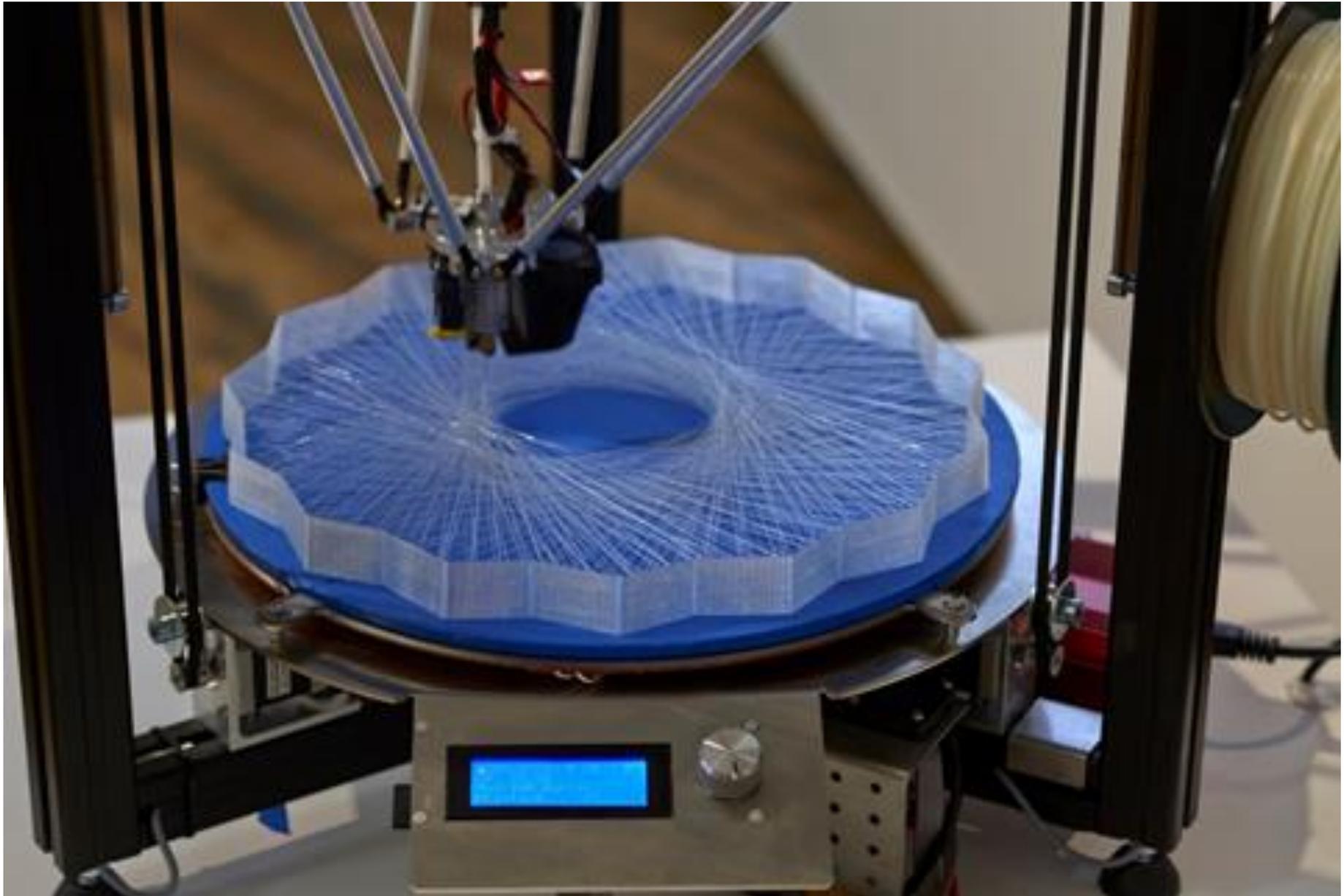


**THE CLOUD CAPSULES:** *Cloud capsule features a series of site-specific parametric models that have been developed by architect arthur mamou-mani with lead collaborator andrei jipa. Described as ‘skyscrapers-for-one’, these 2 metre high micro-pavilions demonstrate measured changes in the levels of 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



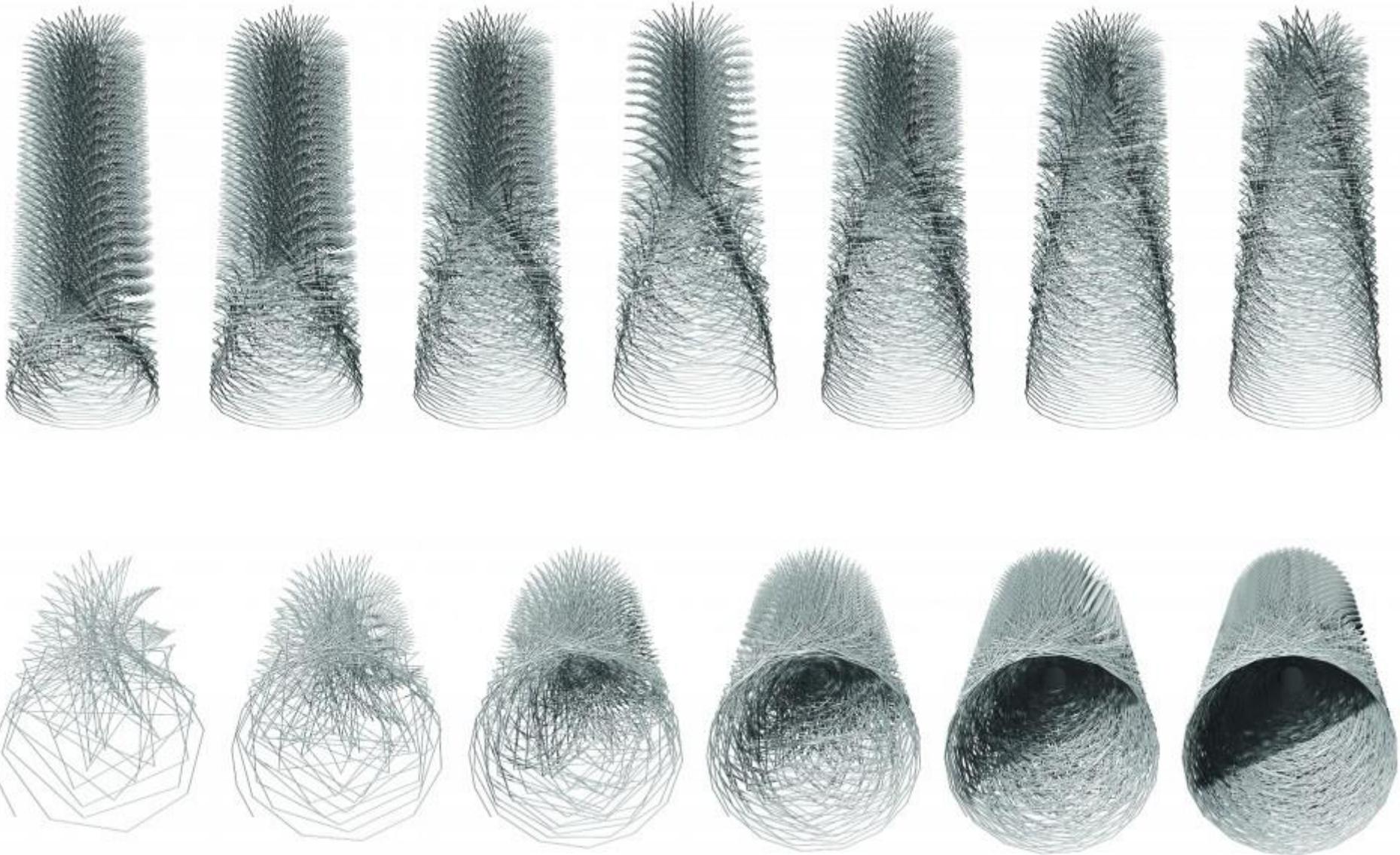
MAMOU-MANI



*Our 3D Printer in action - Cloud Capsules*



MAMOU-MANI



*Cloud Capsule – Diagram showing the variations of density from the parametric model ©Mamou-Mani*



MAMOU-MANI



*Cloud Capsule Close-Up Looking up Column 4 – Picture by Andrei Jipa ©Mamou-Mani*



MAMOU-MANI



*Cloud Capsule General View on the four columns – Picture by Andrei Jipa ©Mamou-Mani*



MAMOU-MANI



*The process of printing prototypes throughout the exhibition – Poster of the exhibition – Picture by Andrei Jipa*



MAMOU-MANI



*Cloud Capsule Close-Up on Column 4 – Picture by Andrei Jipa ©Mamou-Mani*



MAMOU-MANI





MAMOU-MANI



*Glowing effect induced by the scattering of light through the 3D Printed strings*



MAMOU-MANI





MAMOU-MANI

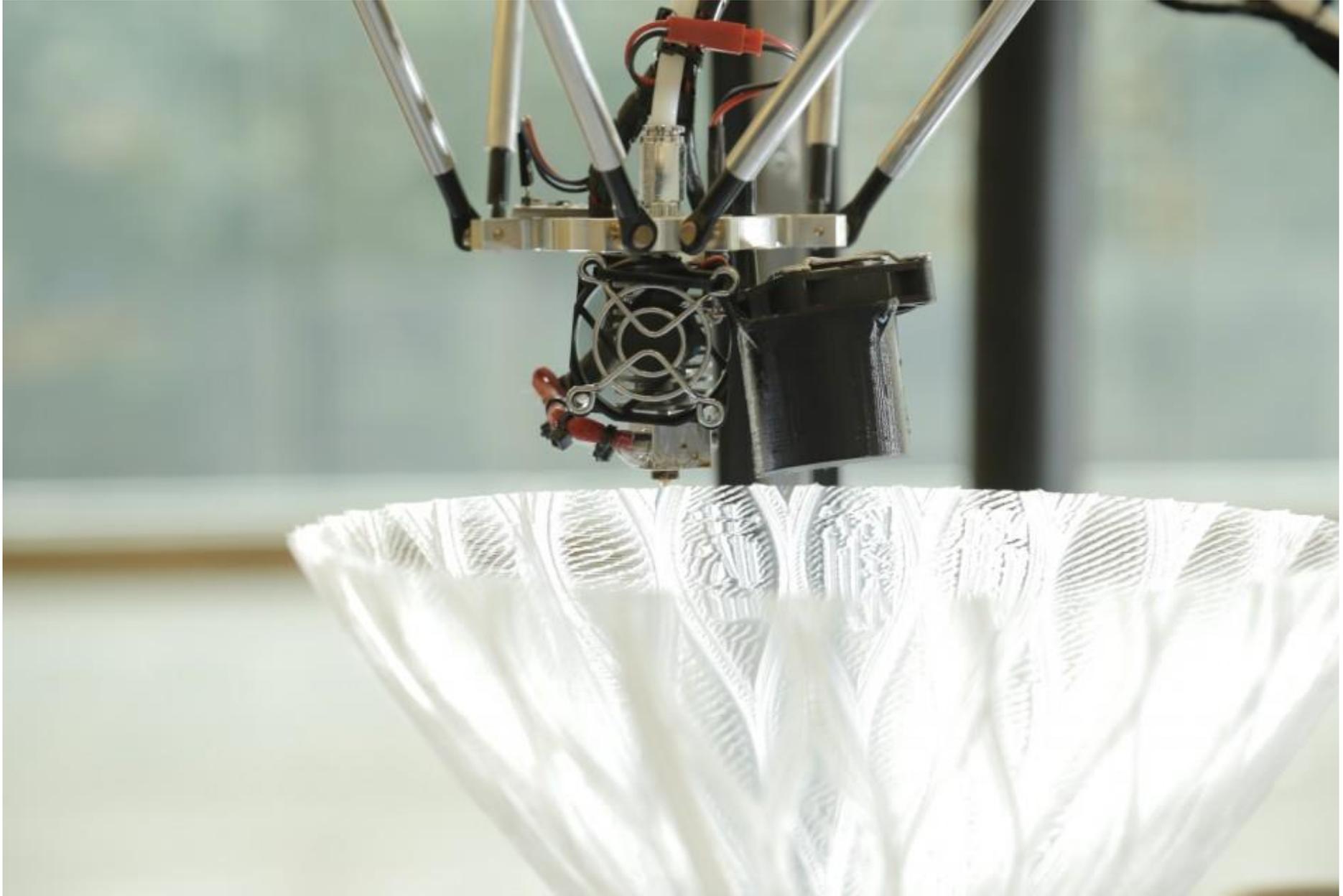


***XINTIANDI 3D PRINTING POP-UP STUDIO:** The xintiandi 3d printing pop-up studio by Mamou-Mani at xintiandi style, shanghai, is a temporary space to discover the world of 3d printing and the beautiful forms that can be created with this innovative technology. It took place during the shanghai fashion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

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



MAMOU-MANI



*Close-Up on the Silkworm-generated pattern*



MAMOU-MANI



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



MAMOU-MANI



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



MAMOU-MANI



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



MAMOU-MANI



Overall view of the 3D Printing Pop-Up Studio at the Xintiandi Mall Shanghai ©Mamou-Mani



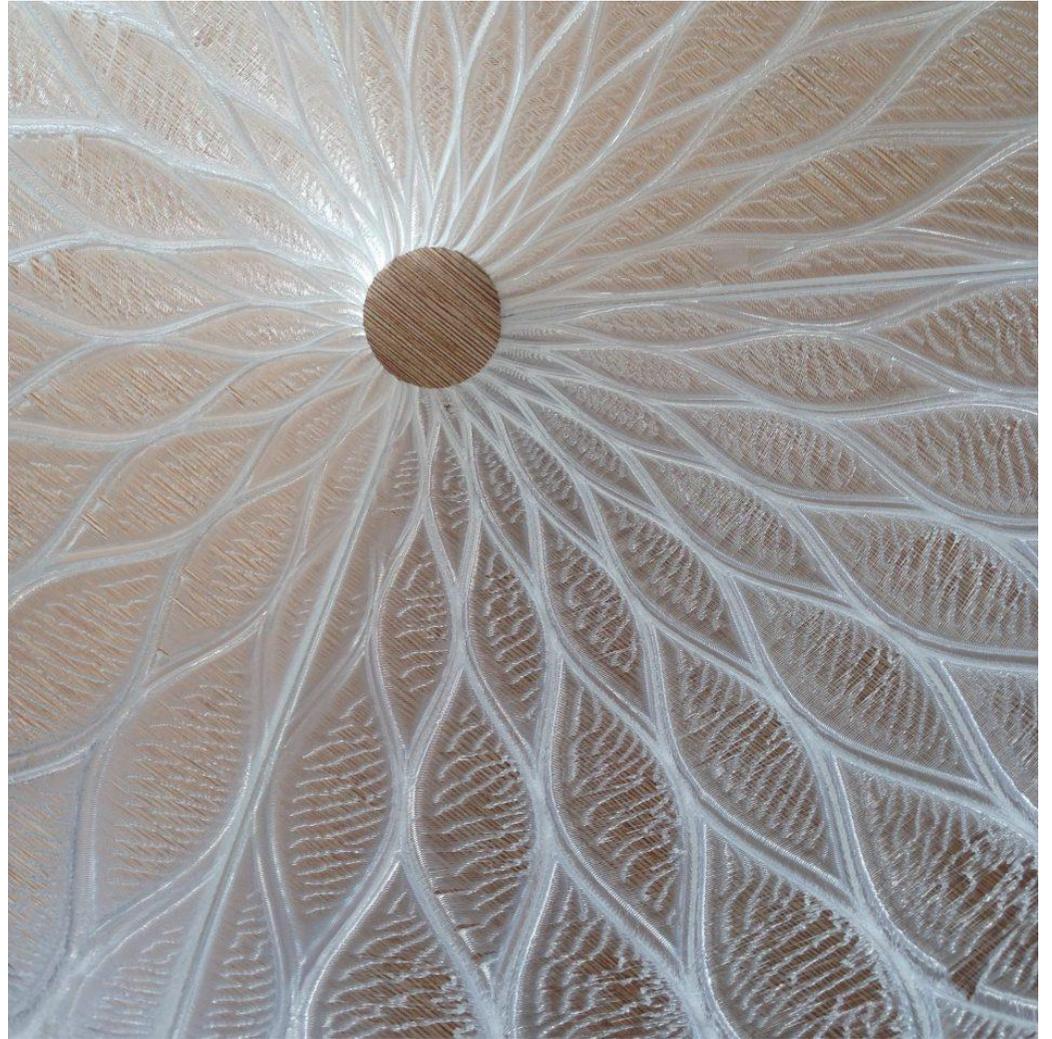
MAMOU-MANI

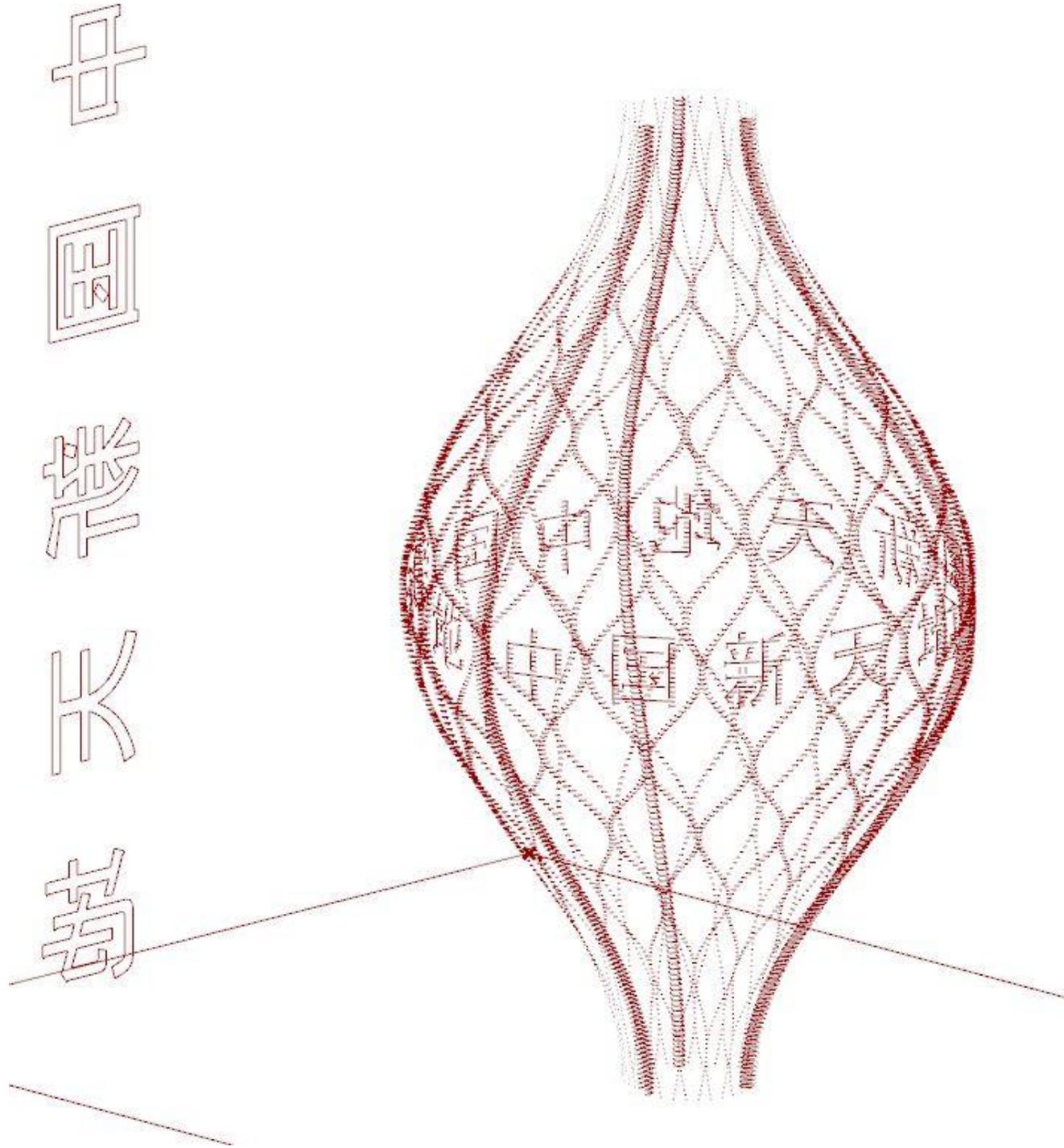


*Giving 3D Printing Workshops to Children at the Xintiandi Shopping Centre ©Mamou-Mani*



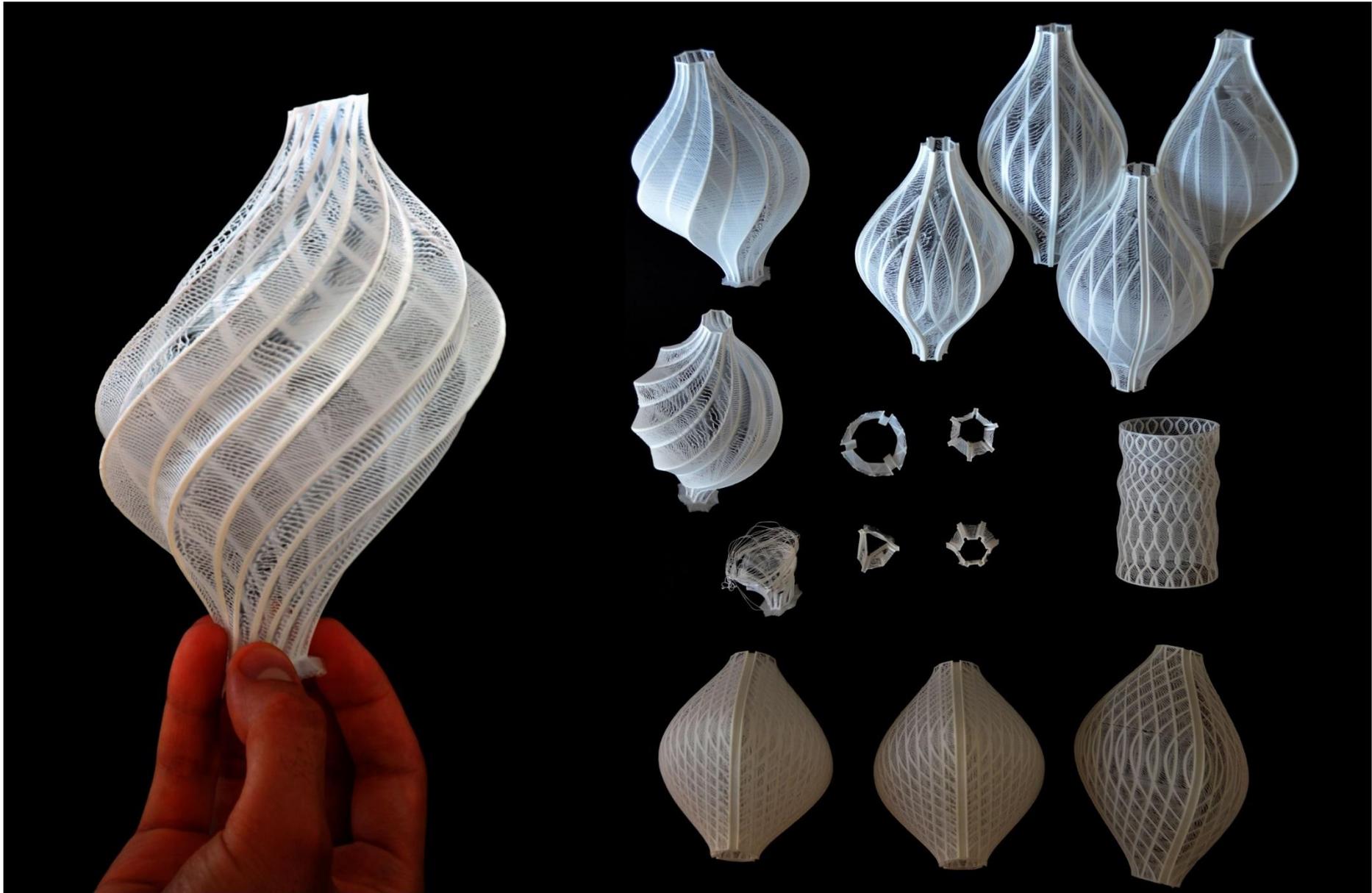
MAMOU-MANI







MAMOU-MANI



*Testing our prints using Silkworm*



MAMOU-MANI



*Male/Female Connection details for components*



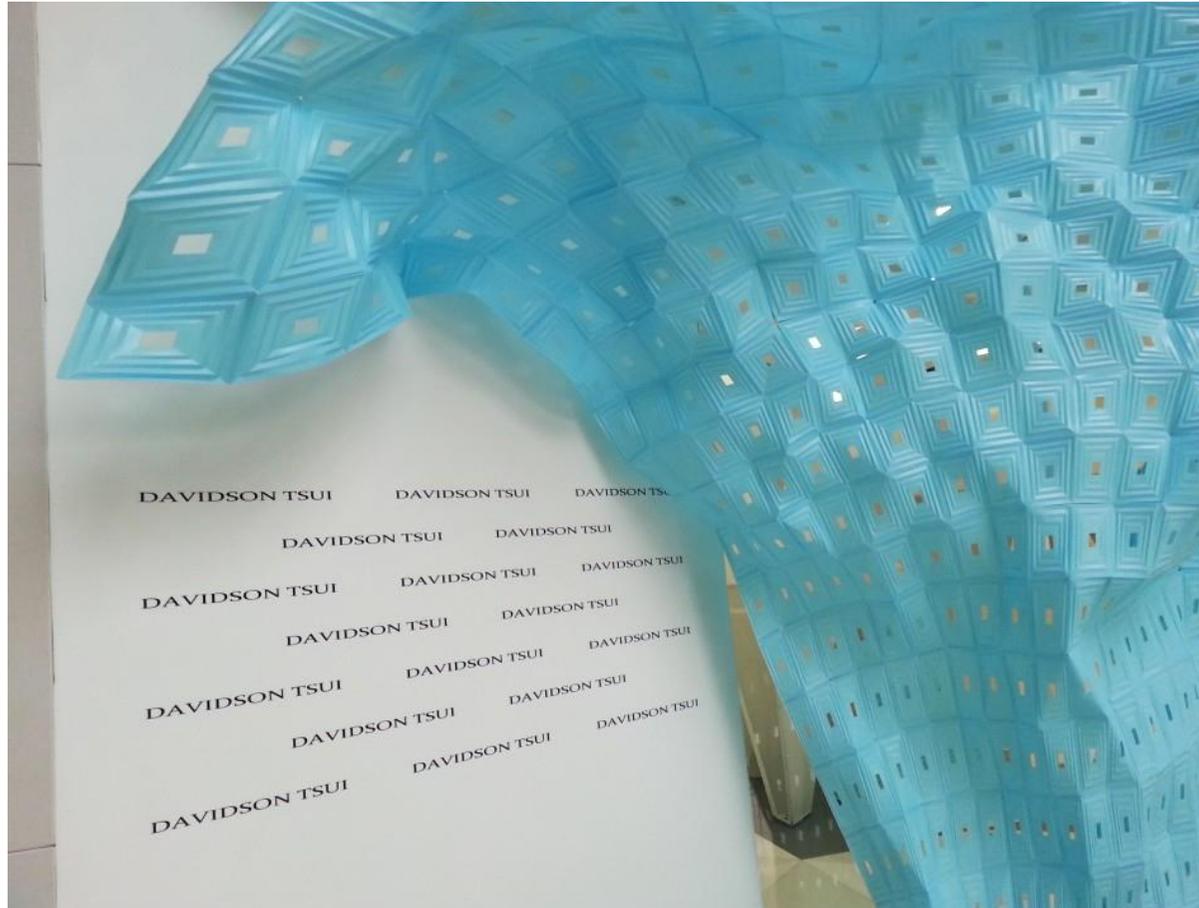
MAMOU-MANI



*A 3D Brick - Male/Female Connection details for components*



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



MAMOU-MANI



Davidson Tsui RIBA Window Display 2014 – Front View with Design Team ©Mamou-Mani



MAMOU-MANI



Davidson Tsui RIBA Window Display 2014 – Side View ©Mamou-Mani



MAMOU-MANI



*Davidson Tsui RIBA Window Display 2014 – View from Inside ©Mamou-Mani*



MAMOU-MANI





MAMOU-MANI





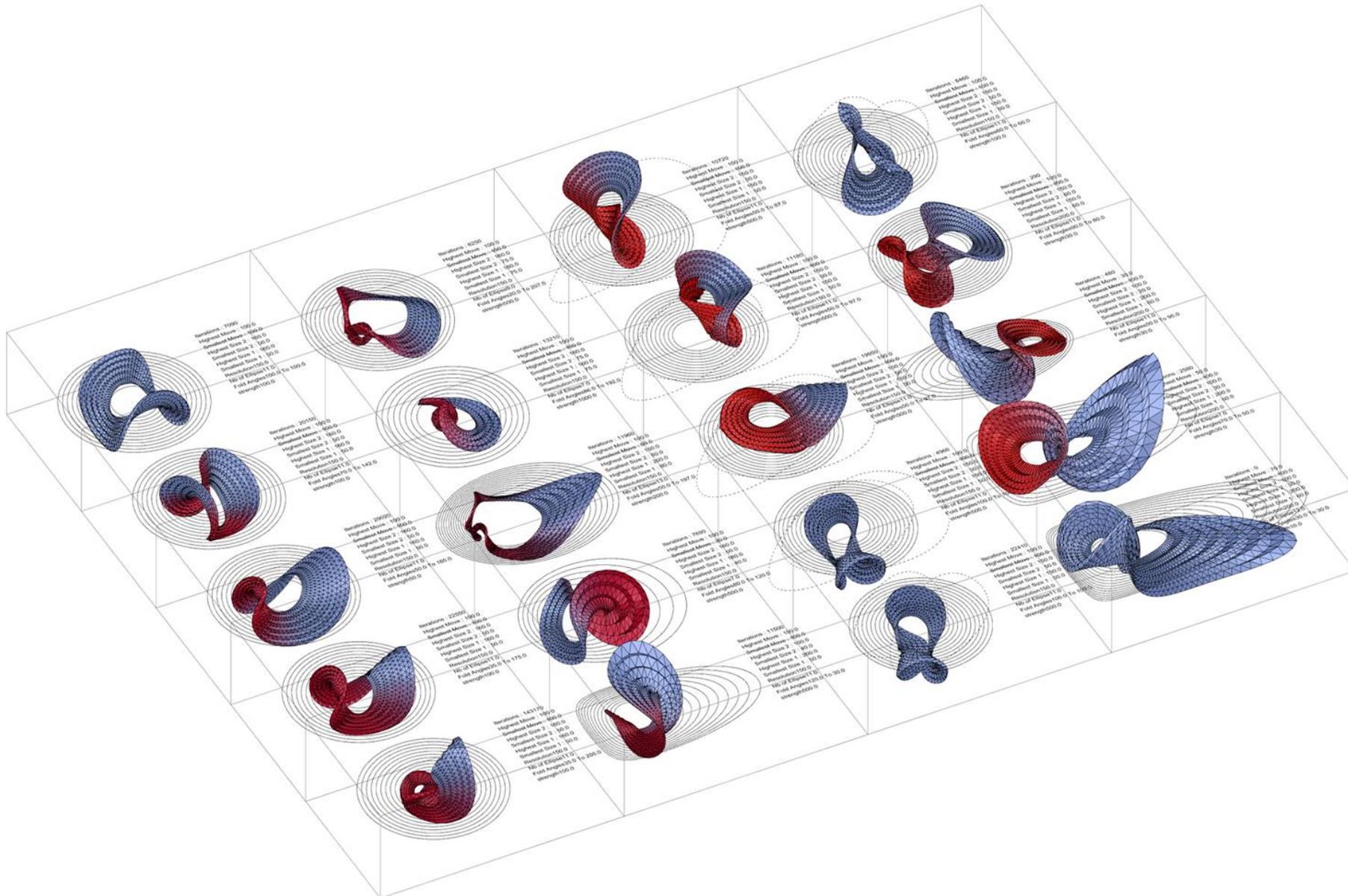
MAMOU-MANI



*Davidson Tsui RIBA Window Display 2014 – Prototype Tests ©Mamou-Mani*

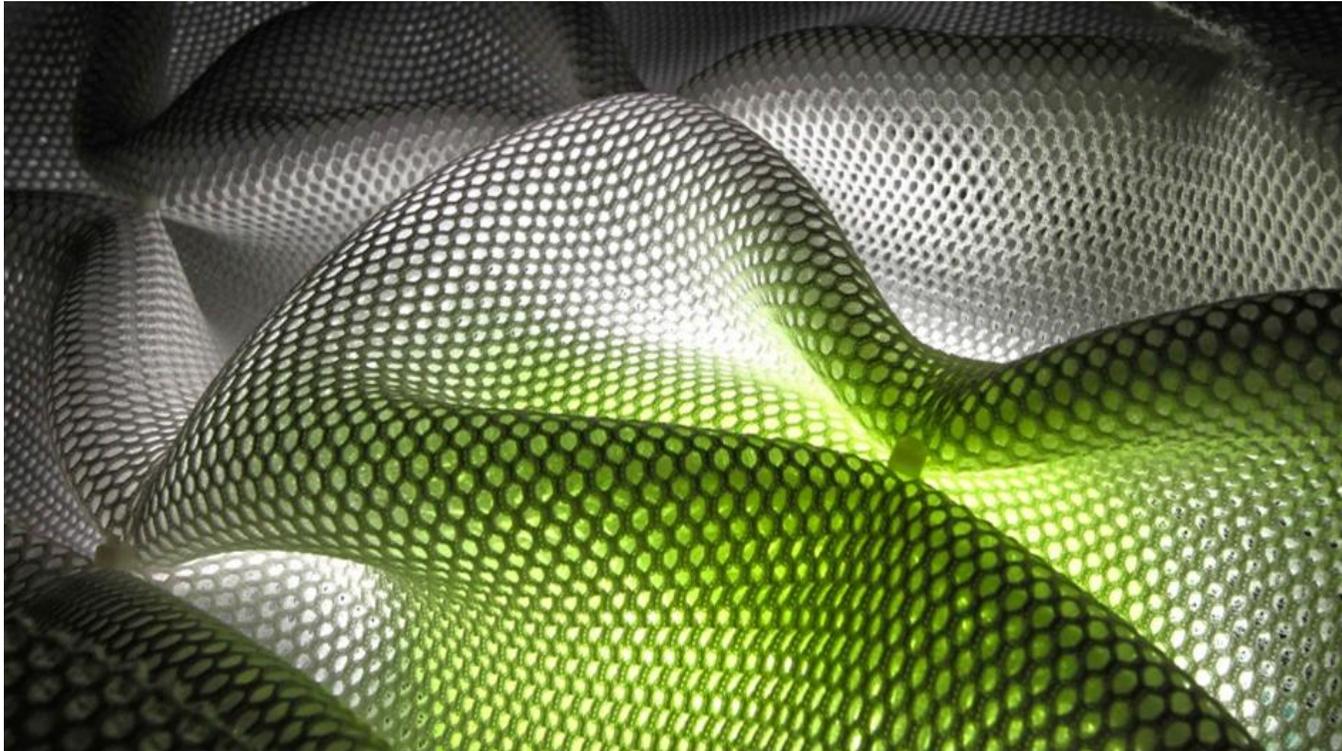


MAMOU-MANI





MAMOU-MANI



**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



MAMOU-MANI



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



MAMOU-MANI

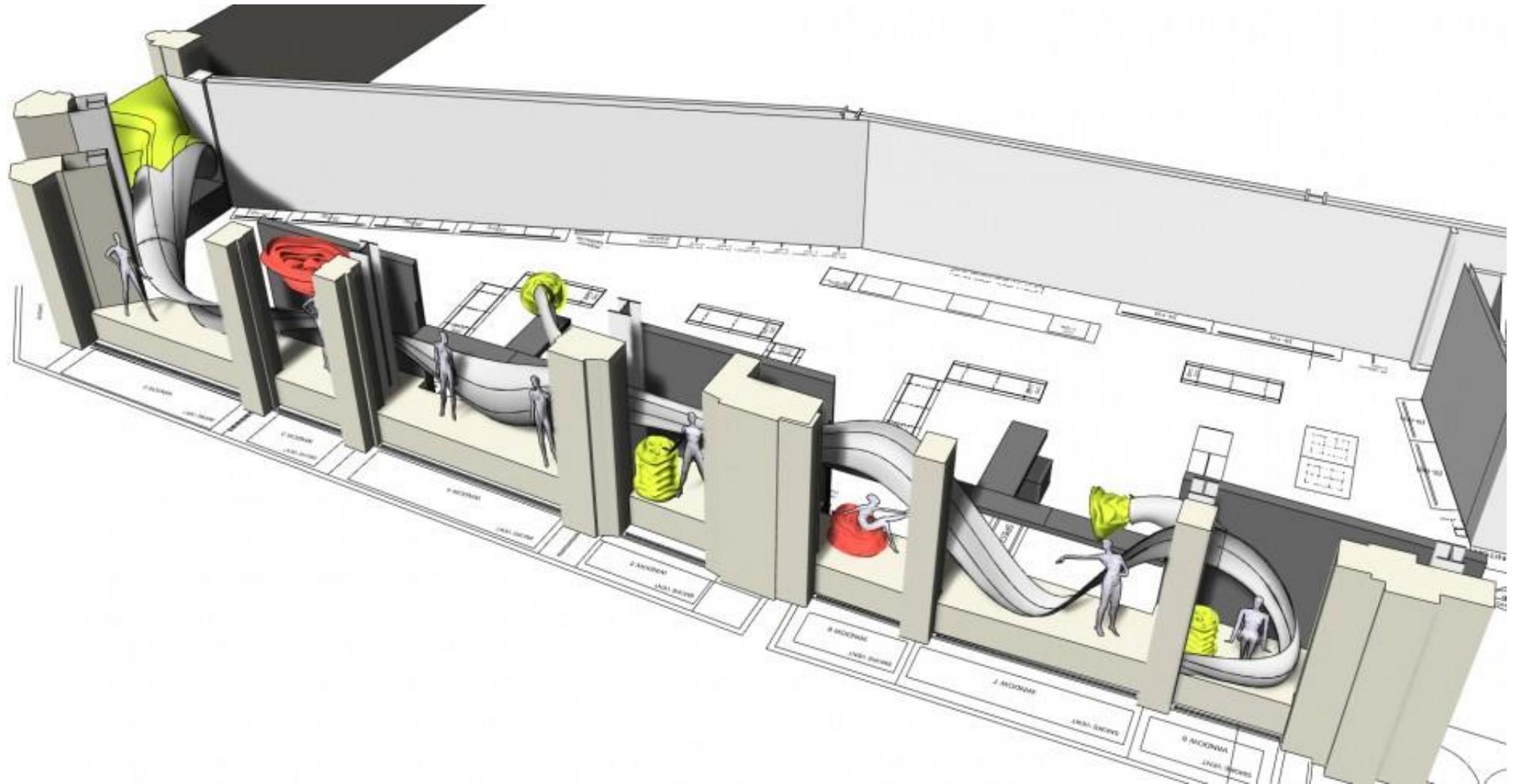


Image extracted from the 3D model of the store with initial studies of the geometry and colours using Rhinoceros 3D © Mamou-Mani



MAMOU-MANI



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



MAMOU-MANI



Night picture of the Magic Garden installation at the Karen Millen Store on Regent Street. Photograph by Agnese Sanvito © Mamou-Mani © Agnese Sanvito



MAMOU-MANI



**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



MAMOU-MANI



*Window #3 of the Karen Millen Xmas Window Display ©Mamou-Mani*



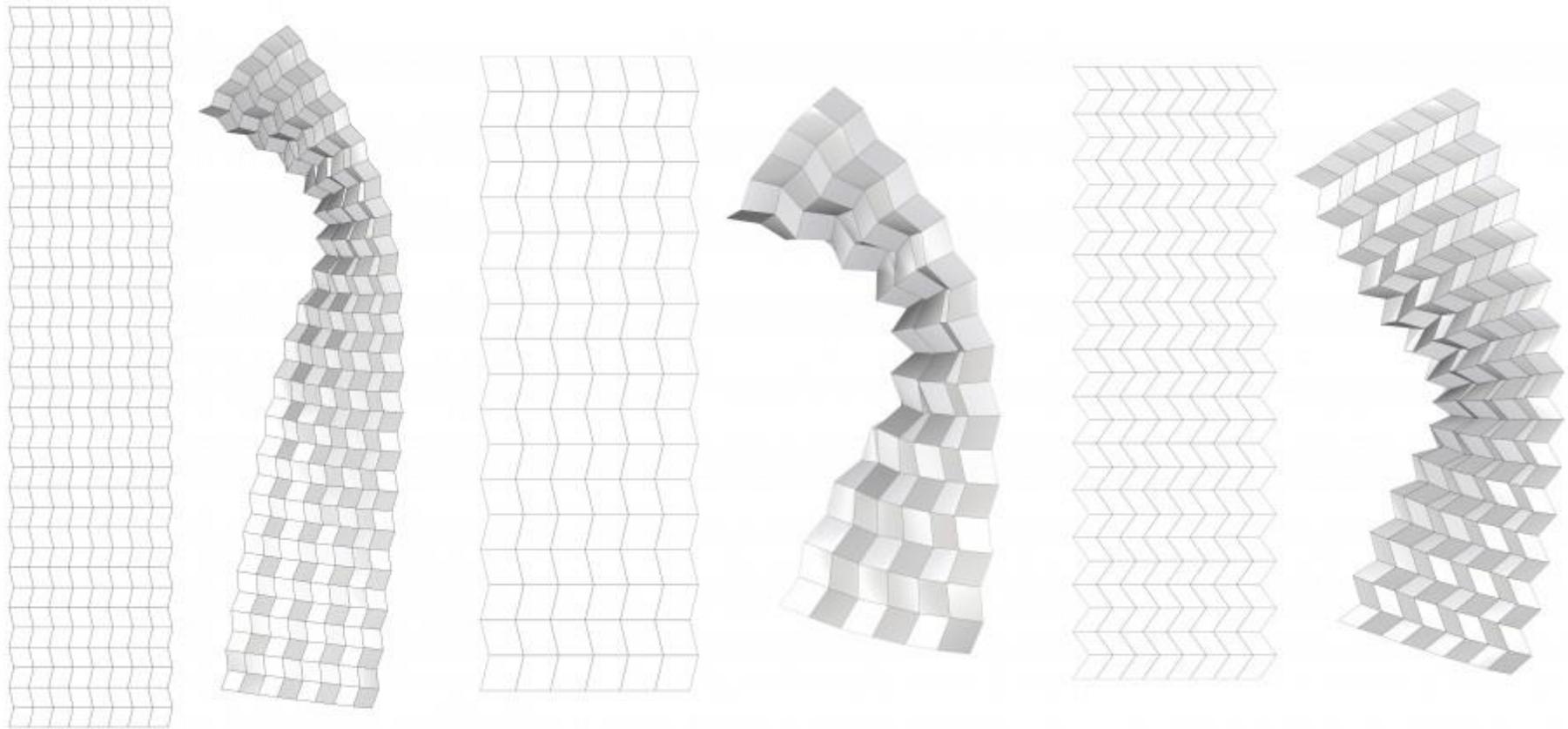
MAMOU-MANI



*Window #2 of the Karen Millen Xmas Window Display ©Mamou-Mani*



MAMOU-MANI



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



MAMOU-MANI

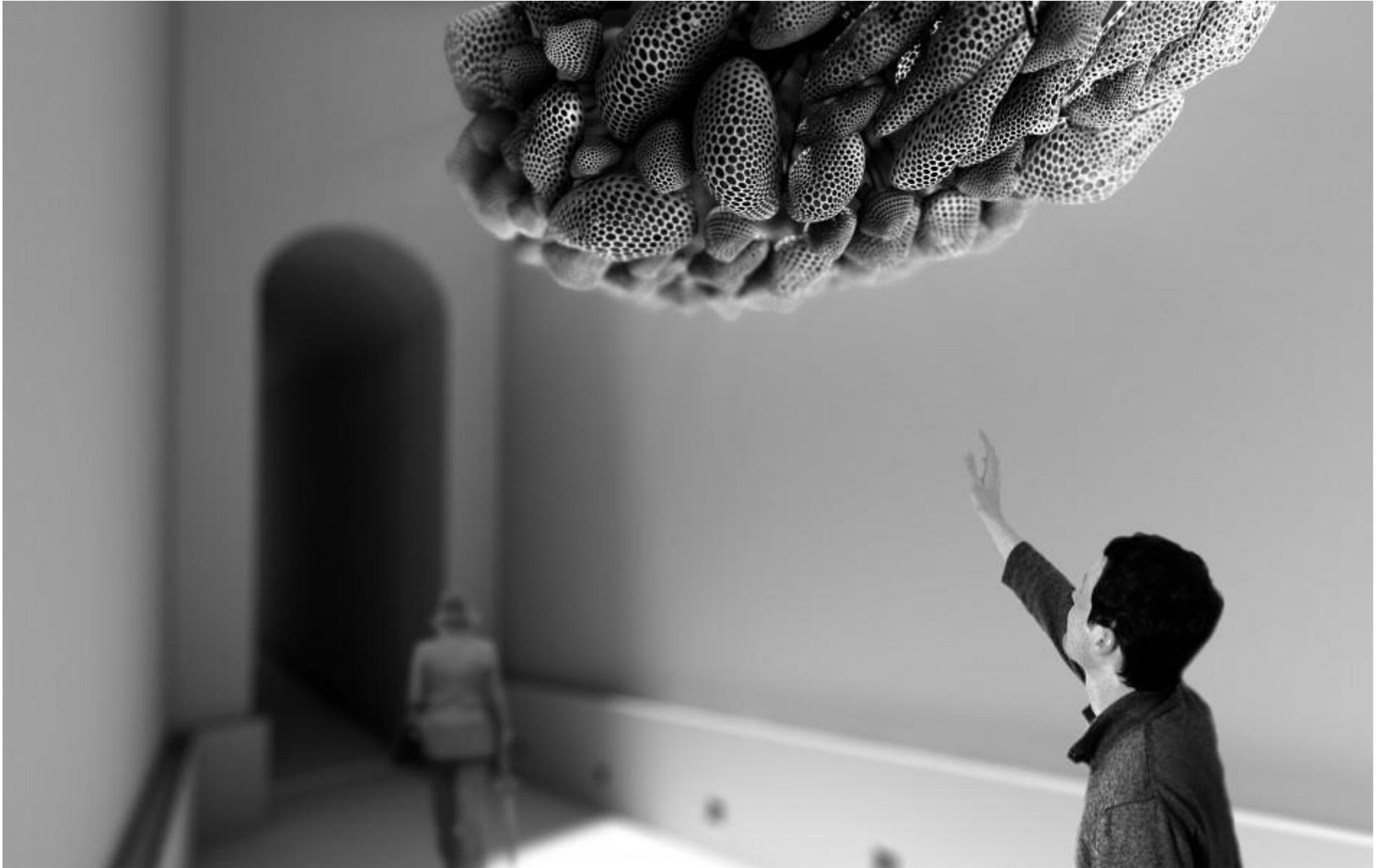


**OVERCAST:** Overcast is an installation for the Gallery 33A at the Victoria & Albert Museum. It was commissioned by the V&A as part of a shortlisted competition on the theme of “plaster”. The intention was to recreate the light scattering effect of clouds using 3D printed plaster. The result is a series of very light 3d printed “cloudlets” tightly assembled around a cantilevering steel structure.

**Material:** Plaster 3D Print with ZCorp



MAMOU-MANI



Above: A day time View of the Overcast assembled “cloudlets” in Gallery 33A of the V&A



MAMOU-MANI



Night time View of the Overcast assembled “cloudlets” in Gallery 33A of the V&A



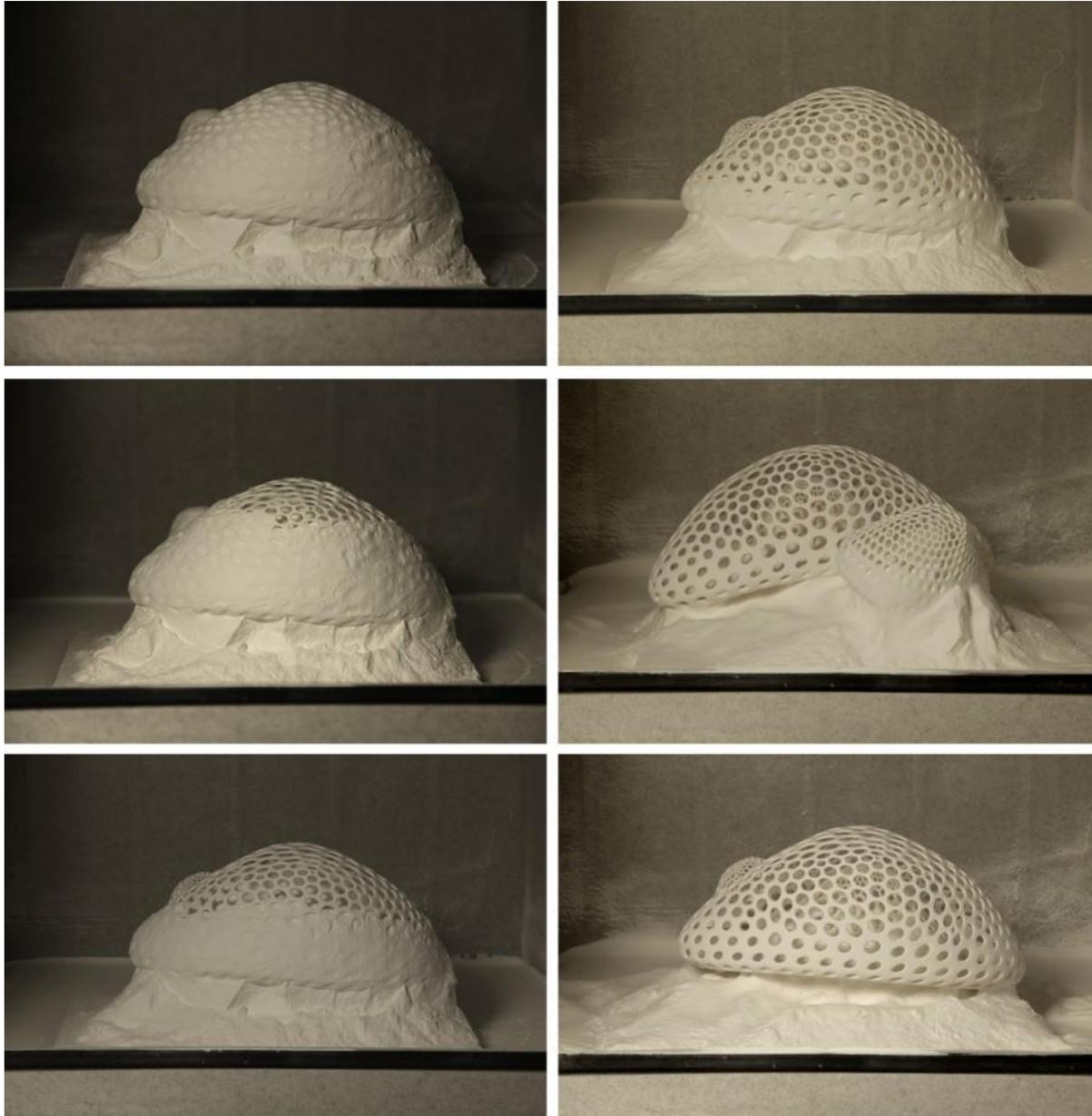
MAMOU-MANI



*Mamou-Mani Guan Lee Overcast Overall Image of 3D Printed Prototype*



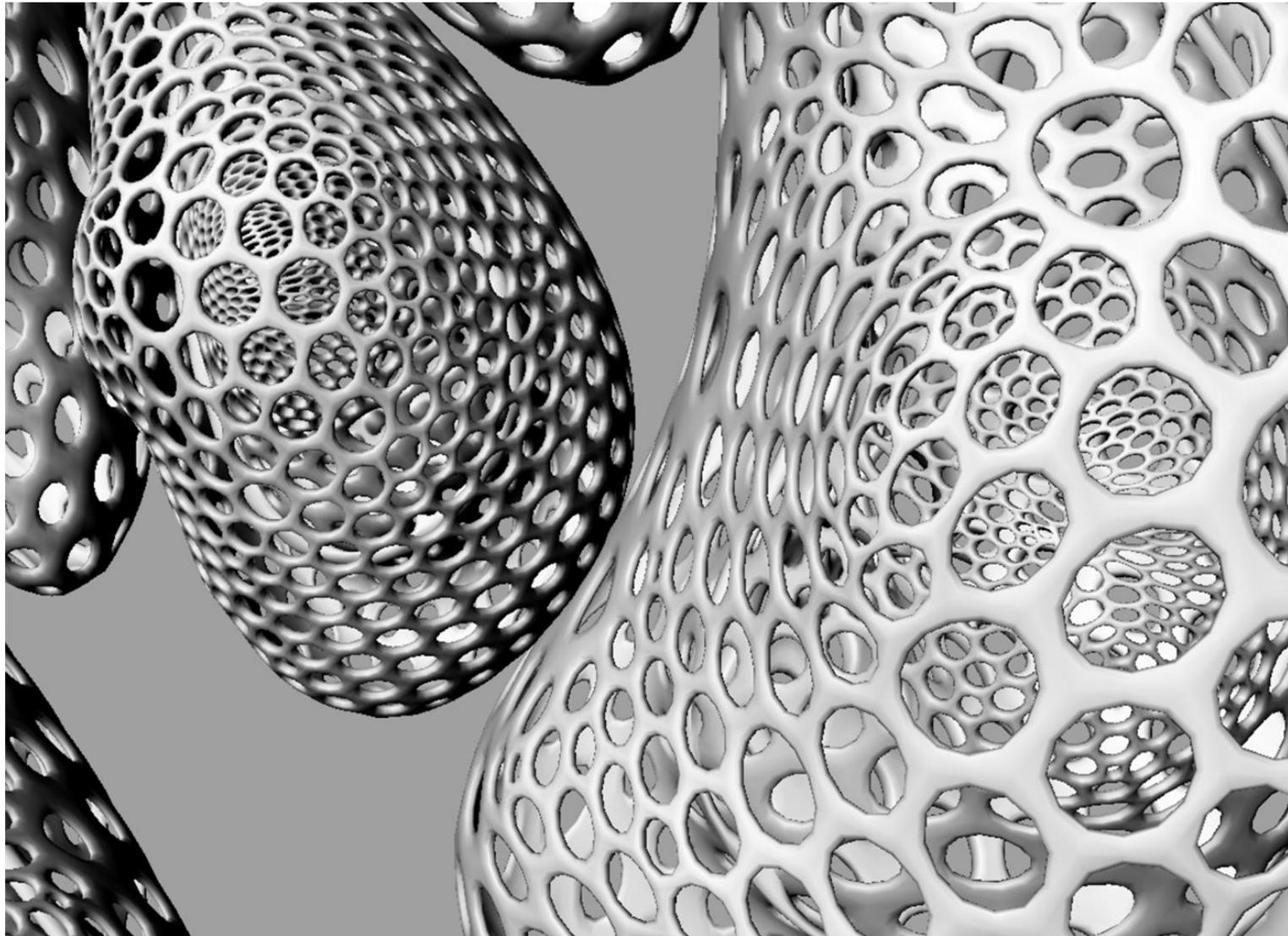
MAMOU-MANI



*Powder Printing Process of emptying the thin shells*



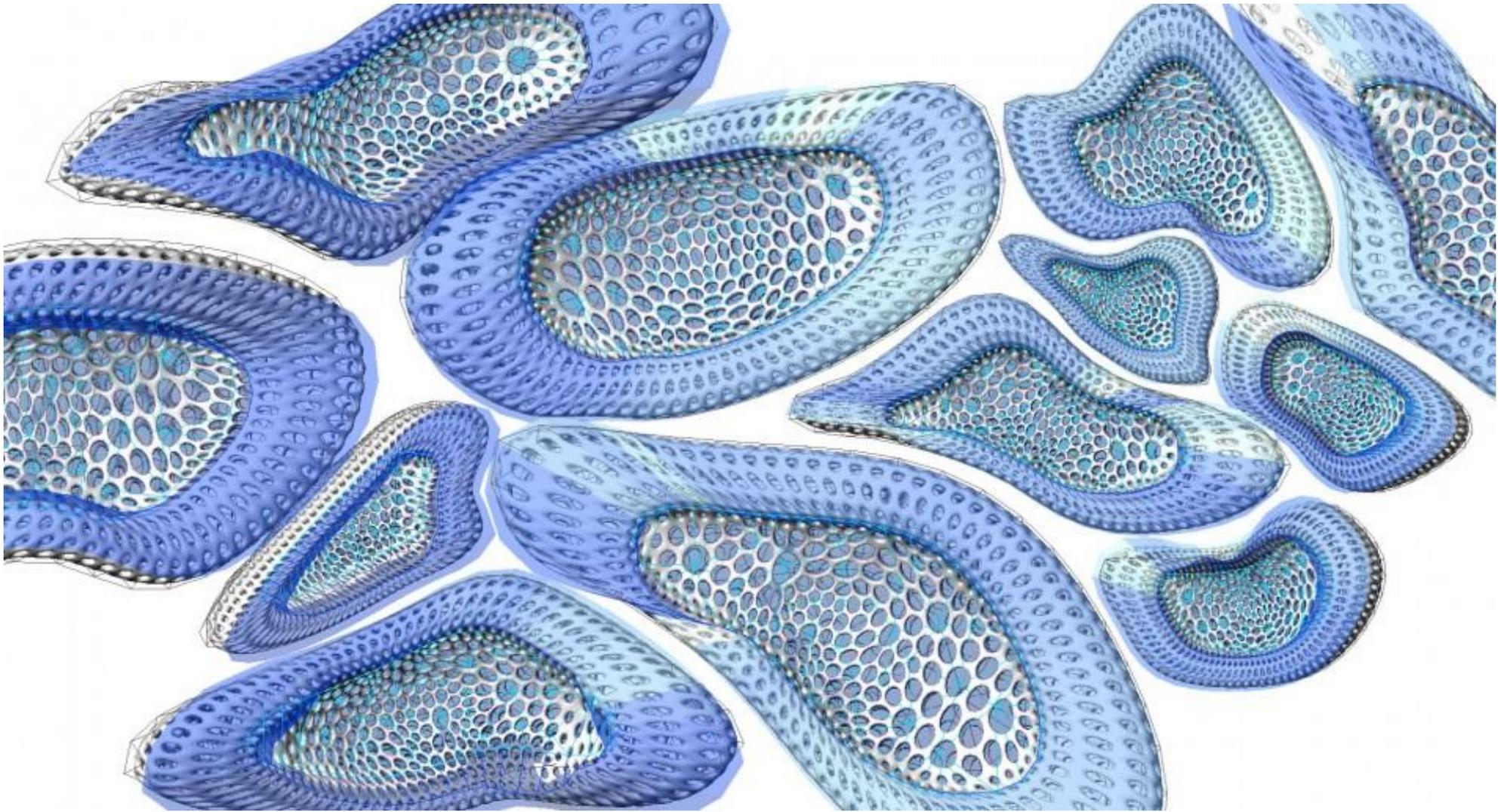
MAMOU-MANI



*Mamou-Mani Guan Lee Overcast PrintScreen of 3D Printed Cloudlets Modules*



MAMOU-MANI



*Process of digital inflation for the cloudlets components to pack with one another*



MAMOU-MANI



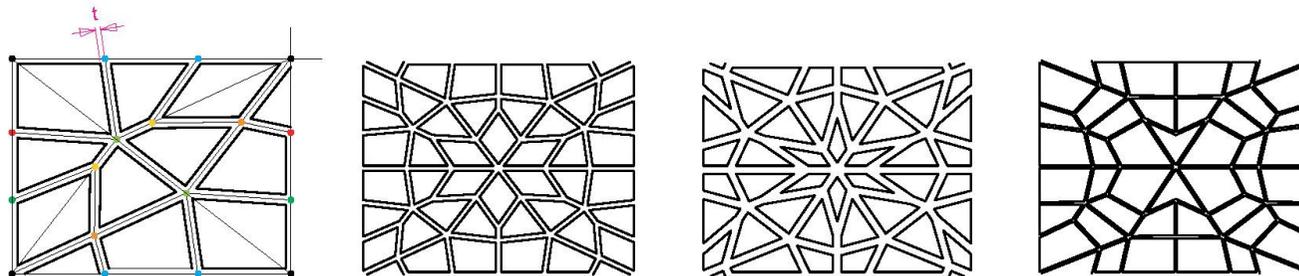
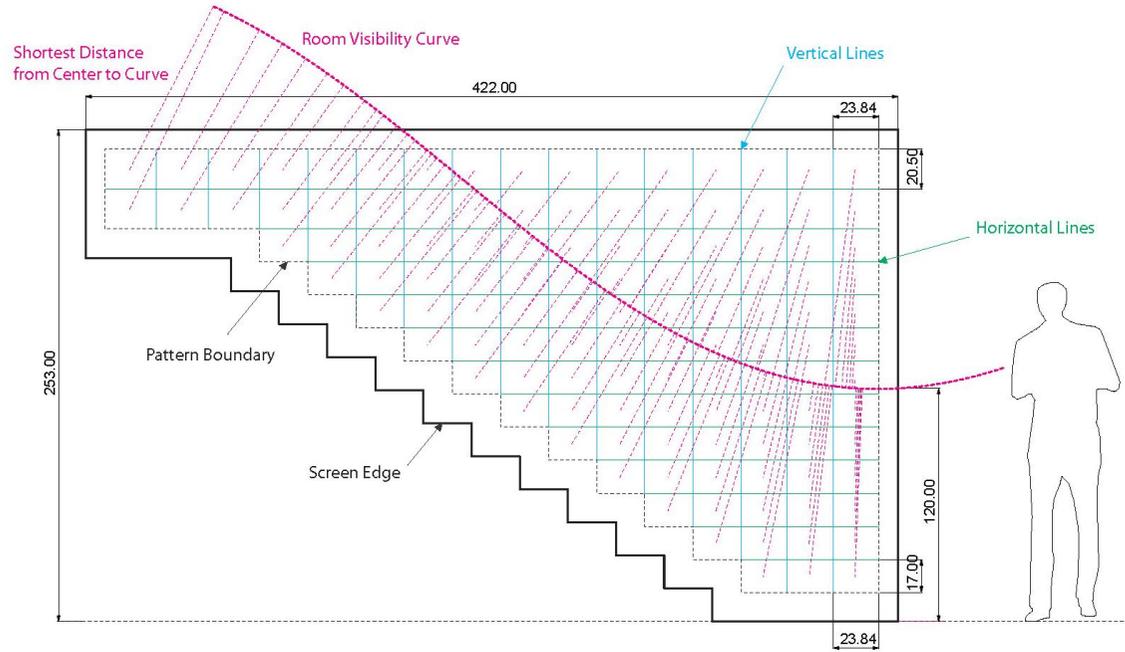
***House in Jaffa:***

*Refurbishment of a traditional Ottoman house listed at the UNESCO heritage list with digitally designed and fabricated Mashrabiya screen*

***Material: CNC cut wood***



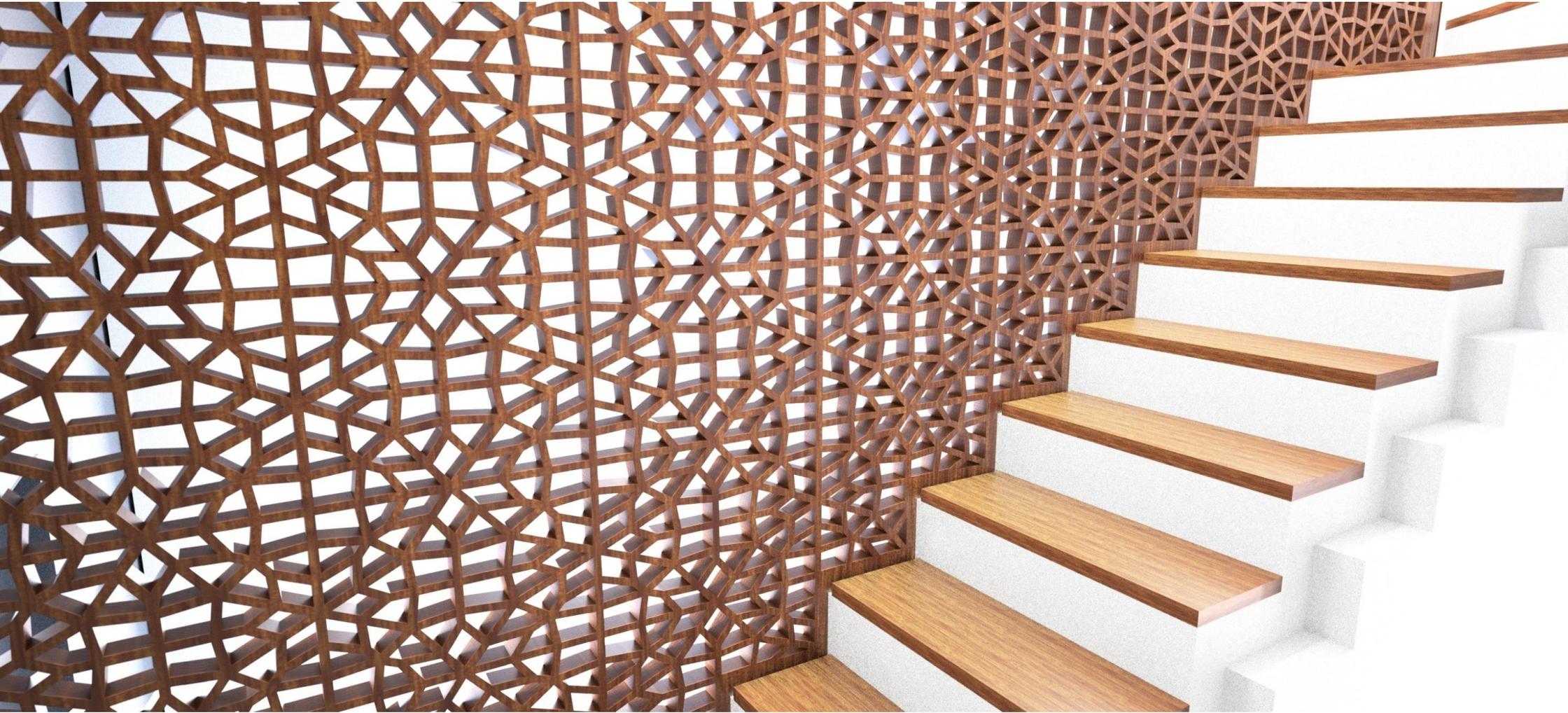
MAMOU-MANI



Horizontal Edge points	0.667	0.781	0.600
Vertical Edge points 1	0.679	0.774	0.658
Vertical Edge points 2	0.439	0.379	0.686
Thickness	0.5 cm	0.8 cm	0.25 cm
Mid Points 1	0.214	0.143	0.342
Mid Points 2	0.387	0.412	0.379
Width of middle geometry	0.375	0.345	0.340



MAMOU-MANI





MAMOU-MANI



*Picture of the Finished Piece ©Mamou-Mani*



MAMOU-MANI



*Refurbishment of traditional Columns and New Kitchen ©Mamou-Mani*



MAMOU-MANI



**FOOD INK 3D PRINTING RESTAURANT:** *Food Ink is the first 3D Printing Food Restaurant in the world. We have designed and fabricated all the furniture for the project, including tables, chairs and plates.*

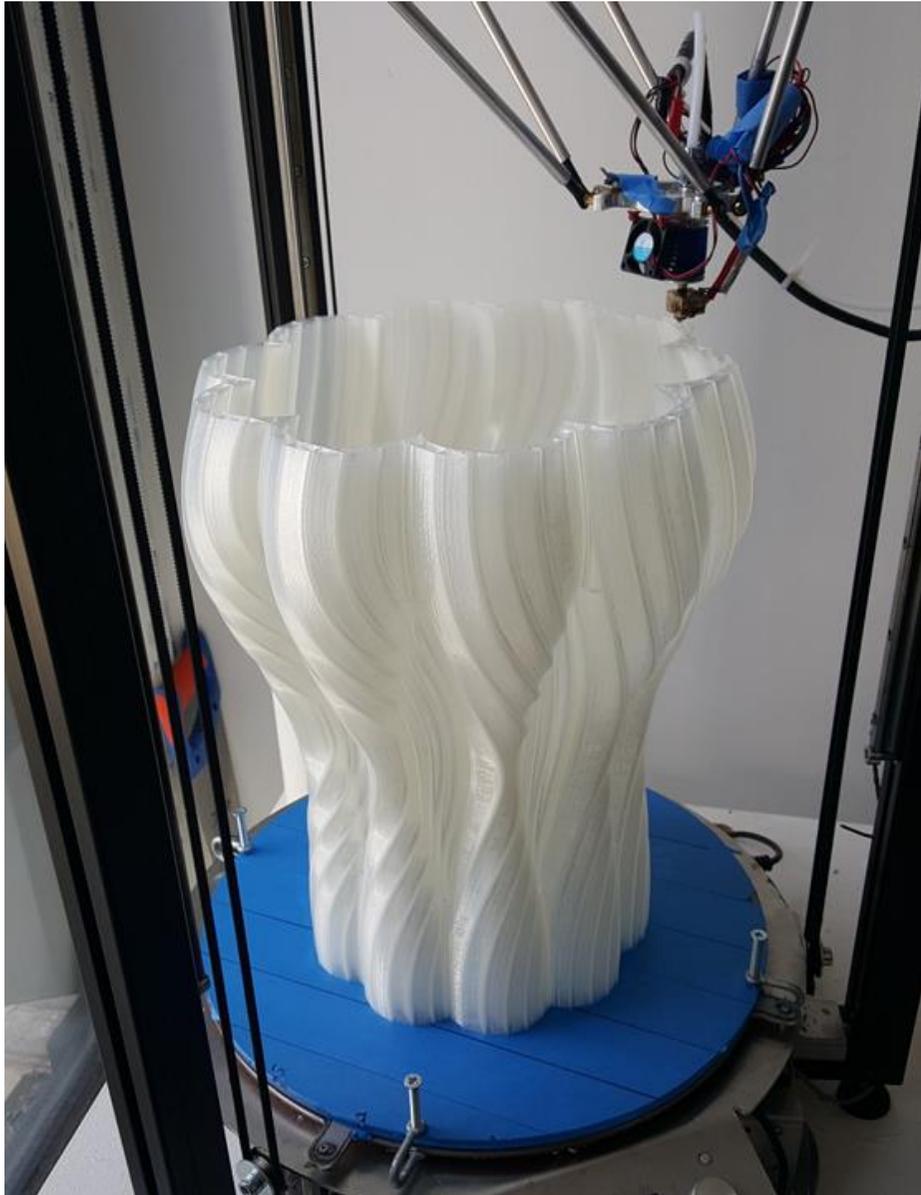
**Material:** *3D Printed PLA BioPlastic, laser cut Acrylic*



Food Ink – A view of the central cooking island with 3d printed tables ©Mamou-Mani



MAMOU-MANI



*3D Print of the smoke stool ©Mamou-Mani*



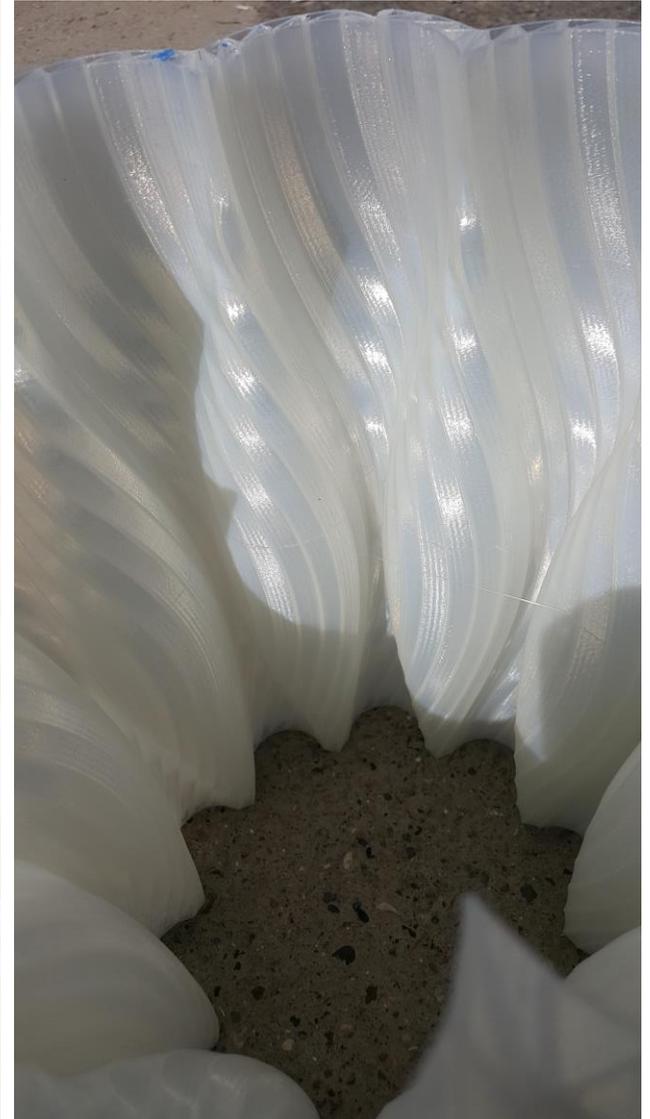
MAMOU-MANI



*Matrix of the 3D Printed Seats ©Mamou-Mani*

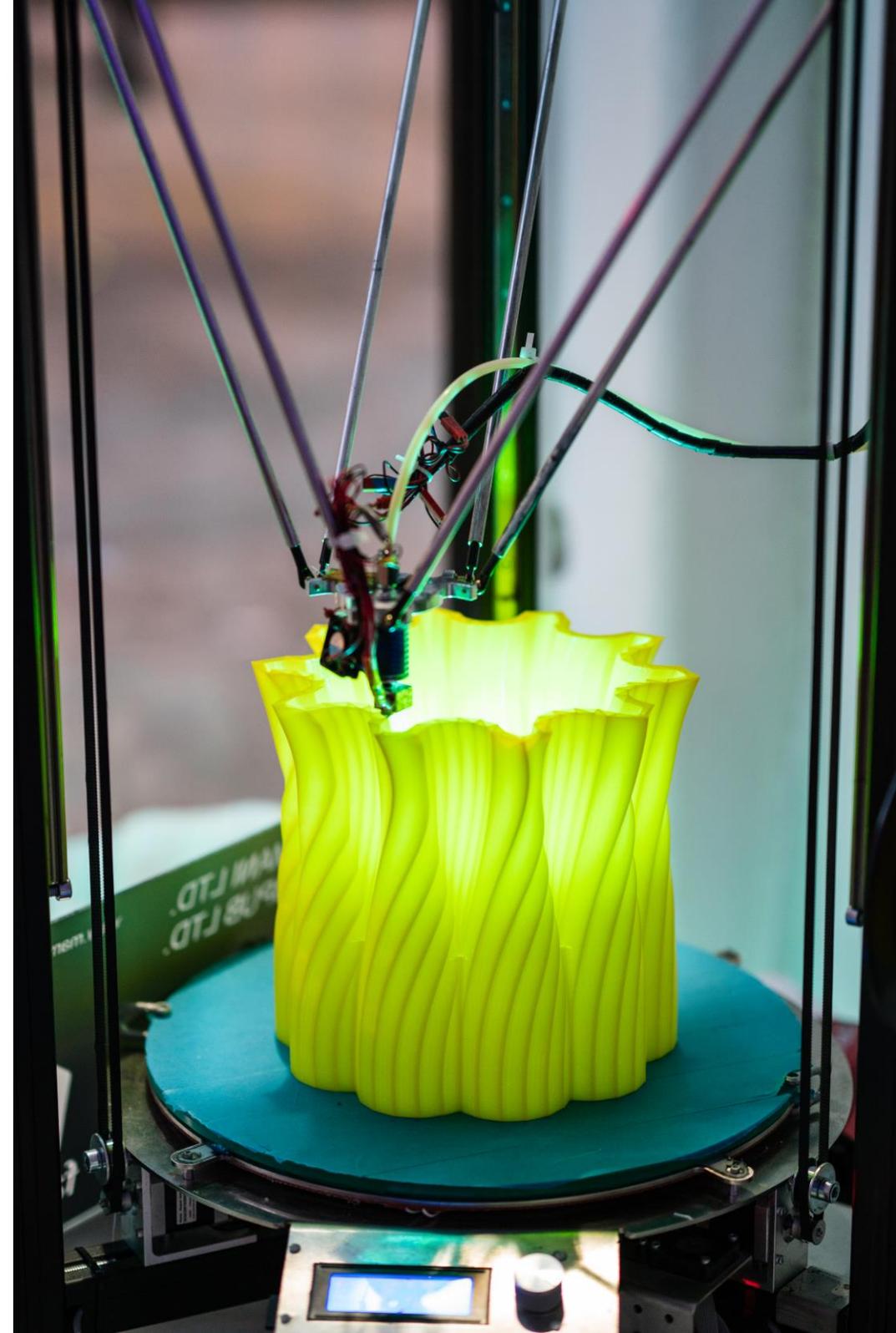


MAMOU-MANI





MAMOU-MANI



*The Food Ink Pop-Up Restaurant – Printing the Seats During the Event ©Mamou-Mani*



MAMOU-MANI



*The Food Ink Pop-Up Restaurant – 3D Printed Vases ©Mamou-Mani*



MAMOU-MANI



*The Food Ink Pop-Up Restaurant*



MAMOU-MANI



***Tangential Dreams at the Burning Man Festival:** The Project is a 7m high twisting wooden tower built from standard pieces of timber. The piece is climbable and lights up at night with an animated rainbow of colours. People wrote inspiring sentences on the piece throughout the festival.*

***Material:** Dimensional Lumber, Structural Screws, LED  
Picture by Gurps Chawla*



MAMOU-MANI



*Tangential Dreams during the day picture by PieterJan Mattan*



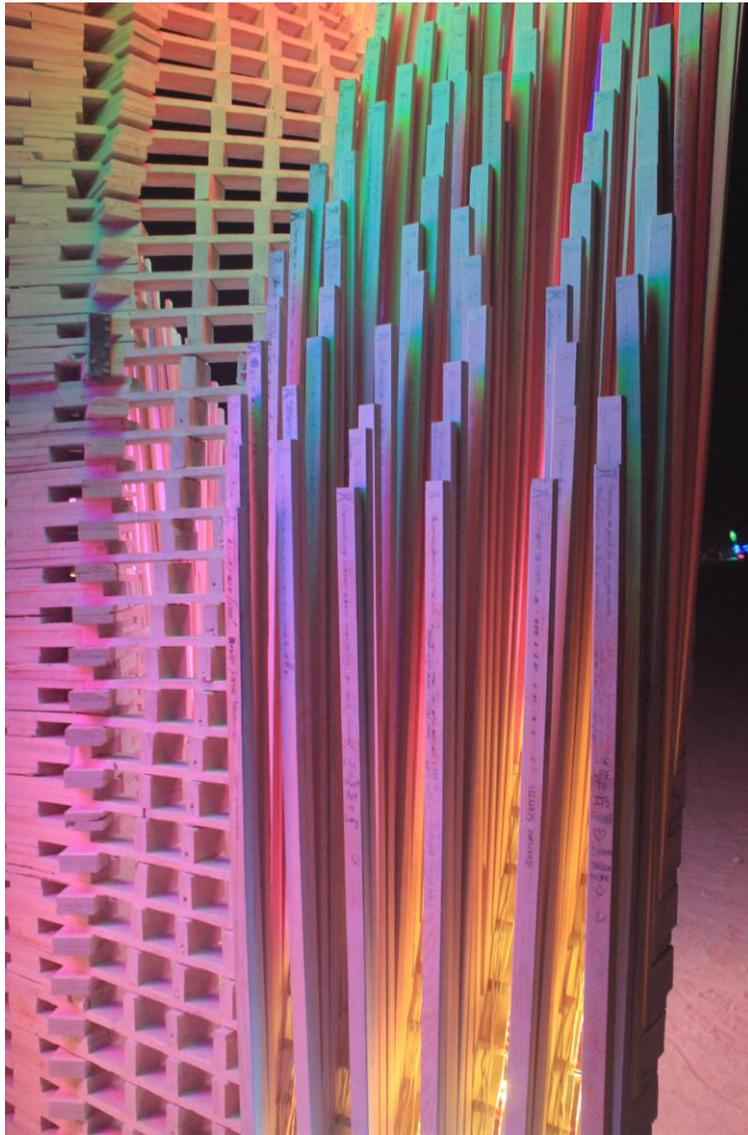
MAMOU-MANI



*Tangential Dreams at Sunset ©Mamou-Mani*



MAMOU-MANI

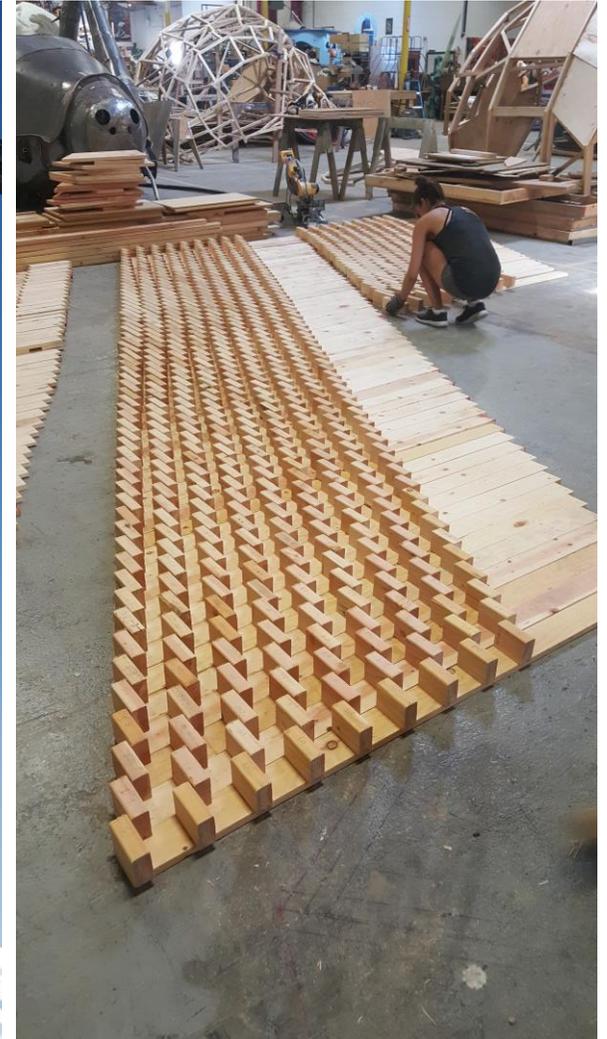
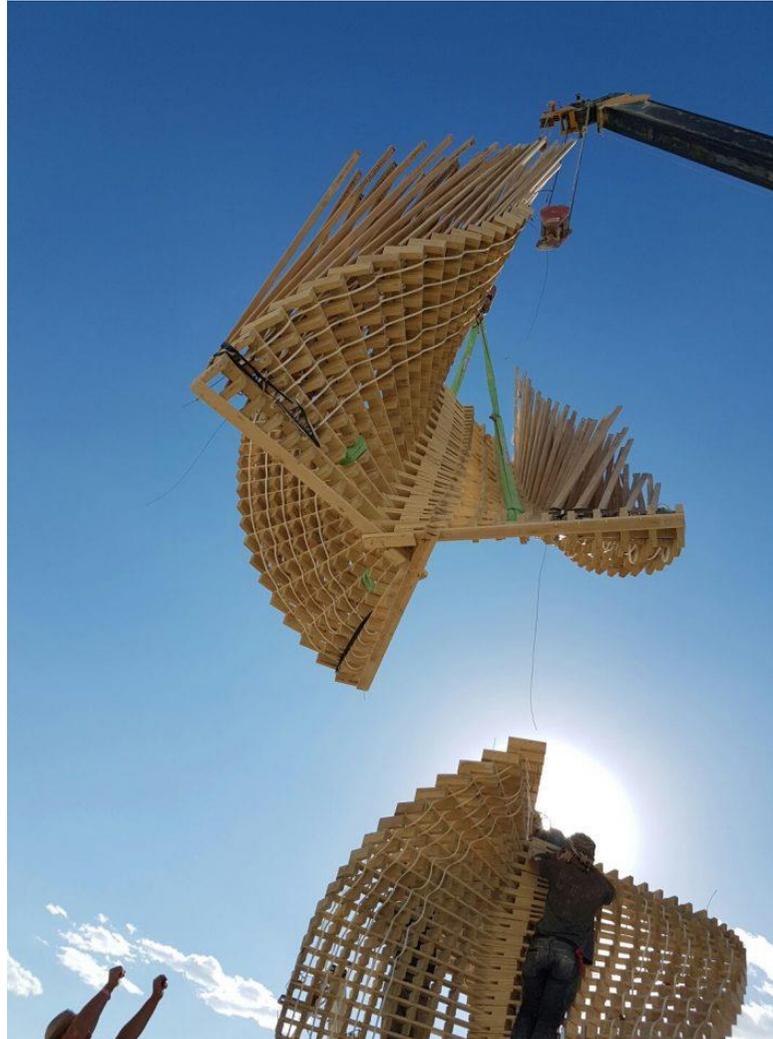


*Tangential Dreams close-up at night ©Mamou-Mani*





MAMOU-MANI





MAMOU-MANI



*The modelling process prior to building the project ©Mamou-Mani*



**MAMOU-MANI**

<http://mamou-mani.com>