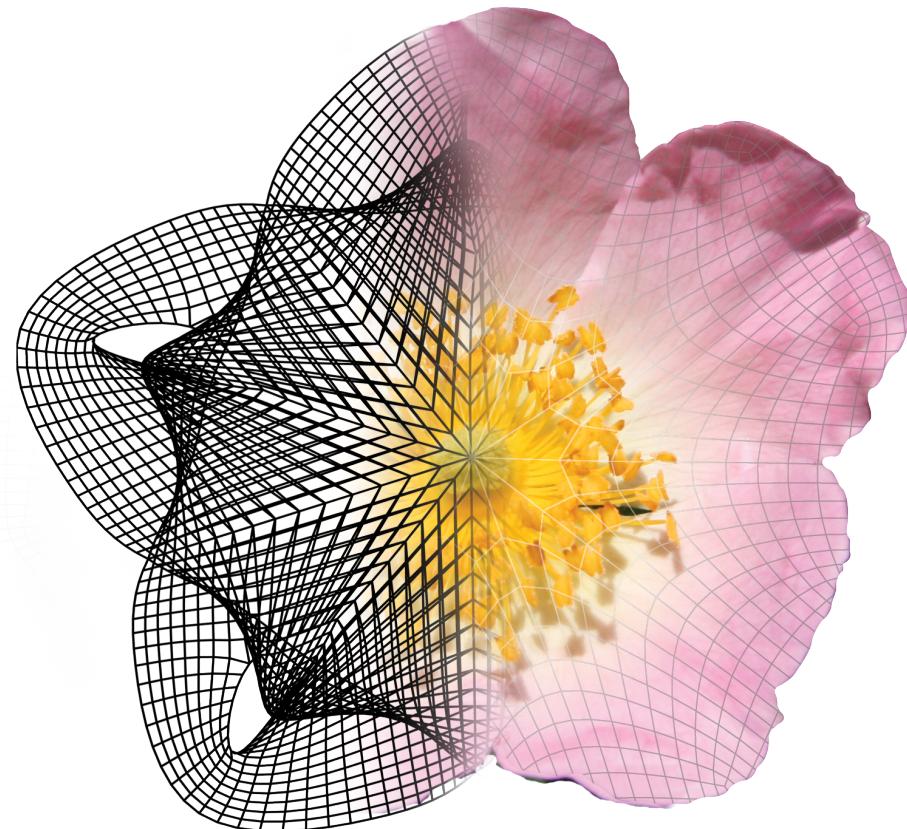
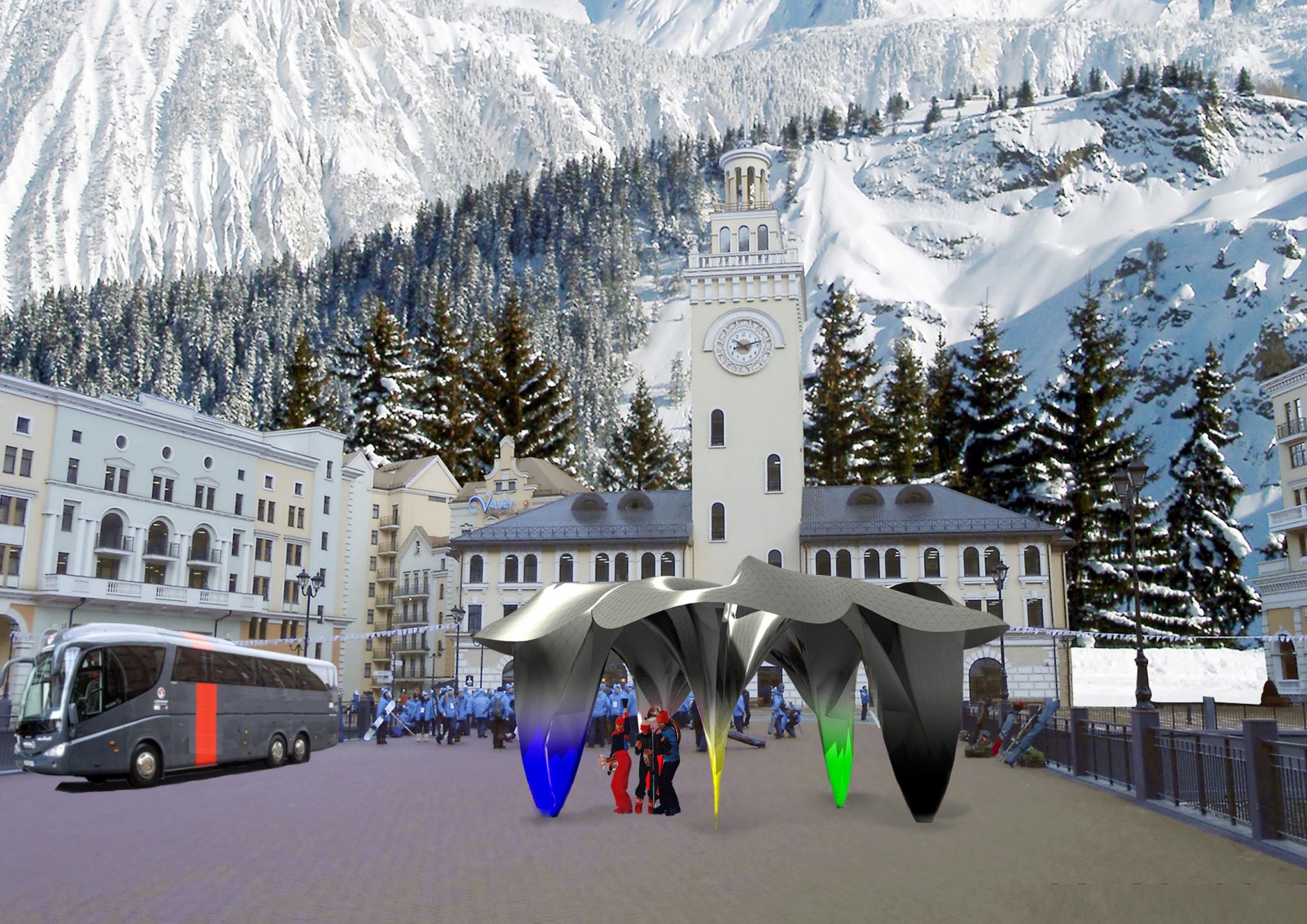


ROSE PAVILION

Architecture by Dimitriy Demin



DEDICATED TO THE XXII WINTER OLYMPIC GAMES



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Rose Pavilion

THE IDEA



THE CONCEPT OF THE PAVILION

The idea for the construction of this pavilion for the XXII Winter Olympic Games in Sochi originates with the emblem of the five Olympic rings familiar to everyone from childhood. Like the Olympic rings, the pavilion is designed to perform five functions for athletes and guests at the Games, each of them with a defined life-cycle. By using the symbolism of the Olympic rings, the aim is to make the pavilion a memorable image of the 2014 Winter Olympics in Sochi, as well as reflecting Russia's national heritage.



TRADITION

Pavilions as an architectural form in Russia go back to the time of Peter the Great, when they were first designed both for rest and recreation and as features in the landscape. The Rose Pavilion is conceived as a continuation of this tradition to celebrate the Sochi Winter Olympics.



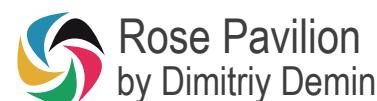
ROSE KHUTOR

The highly attractive winter resort of Rosa Khutor in Krasnaya Polyana – which translates as ‘the Rosa Khutor in the Red Glade’ – was chosen as the appropriate spot for a project which brings Russian tradition up to date with the siting of a modern pavilion in a ski centre, where it both gives protection from the elements and provides interactive online information.



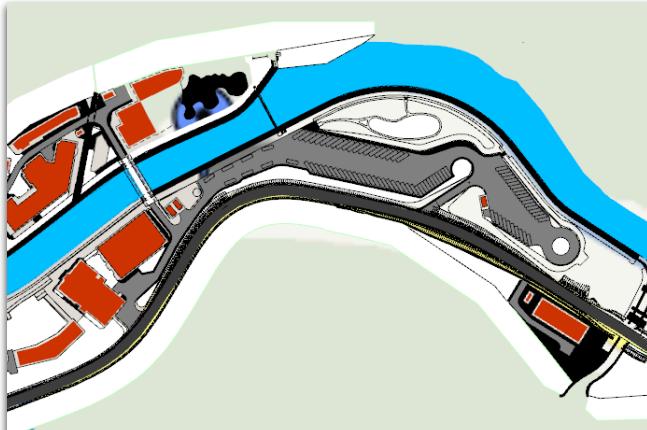
DESIGN

The form of the pavilion was inspired by the natural beauty of Rosaceae Rosa canina – plants of the dog-rose family. These roses have a pentagonal symmetry and double curvature in their petals – features which have been translated through precision engineering into an aesthetically beautiful architectural form.



BUS STATION

The Rose Pavilion is designed to provide a visually arresting and weather-proof hub which will serve as a focal point in providing information about the resort's infrastructure, services and attractions for visitors to the Games.



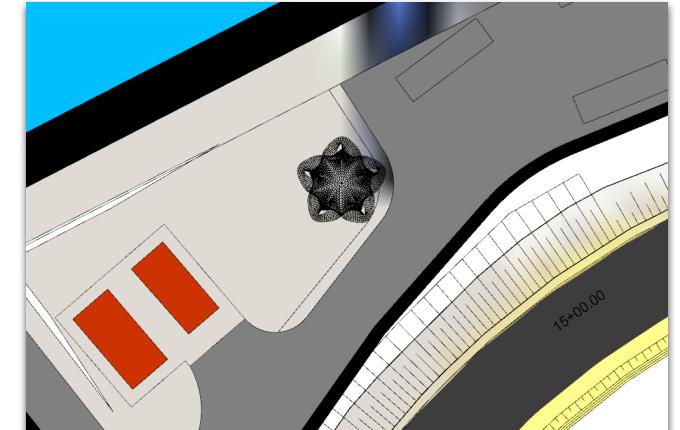
TECHNOLOGY

The final architectural form resulted from an analysis of material properties and engineering calculations, taking into account local climatic conditions.



ROSE

The surrounding mountain landscape and coastal scenery of the River Mzimta dovetail perfectly with the originality of the pavilion's moulded design.



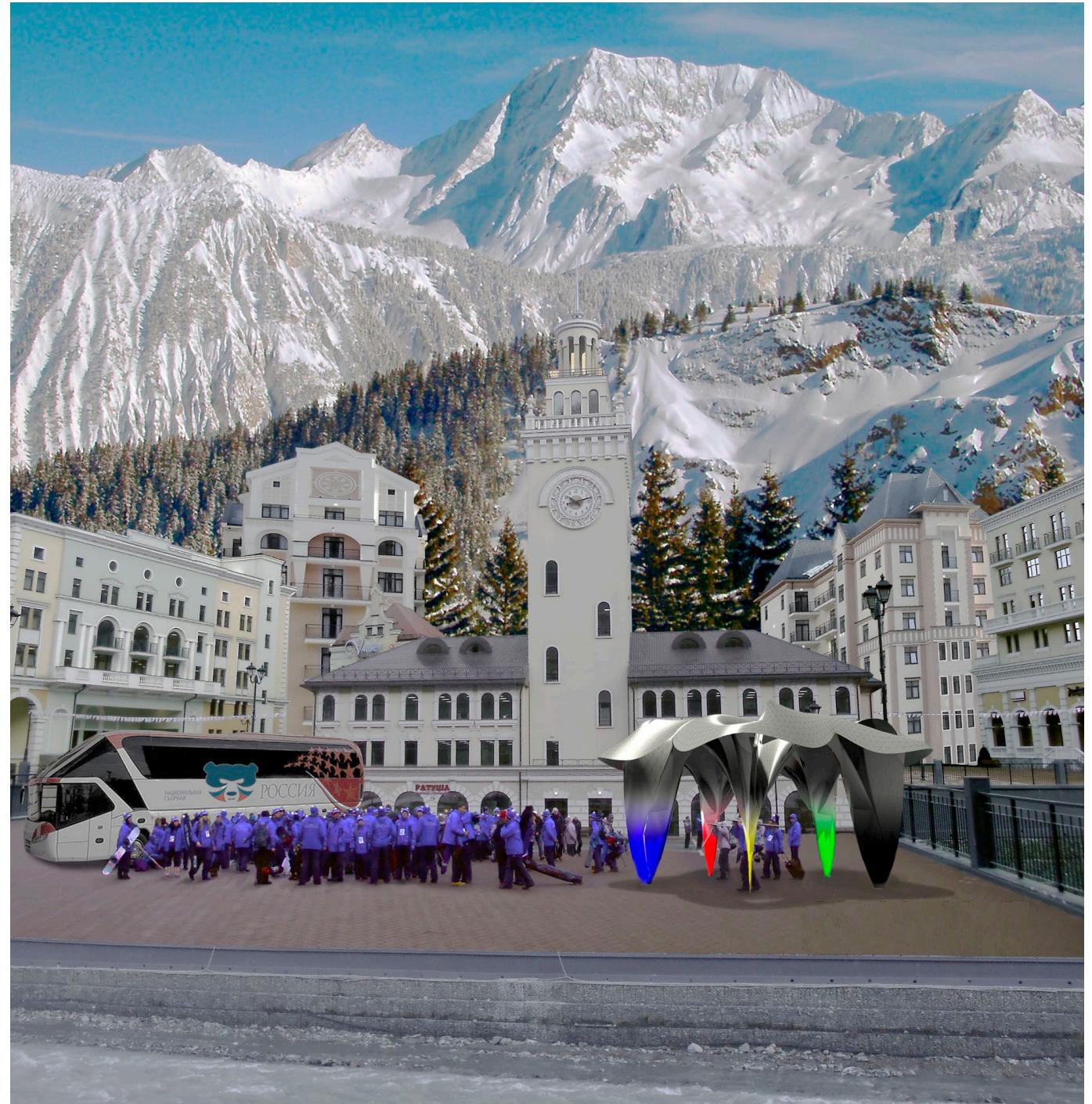
Rose Pavilion



BUS STATION

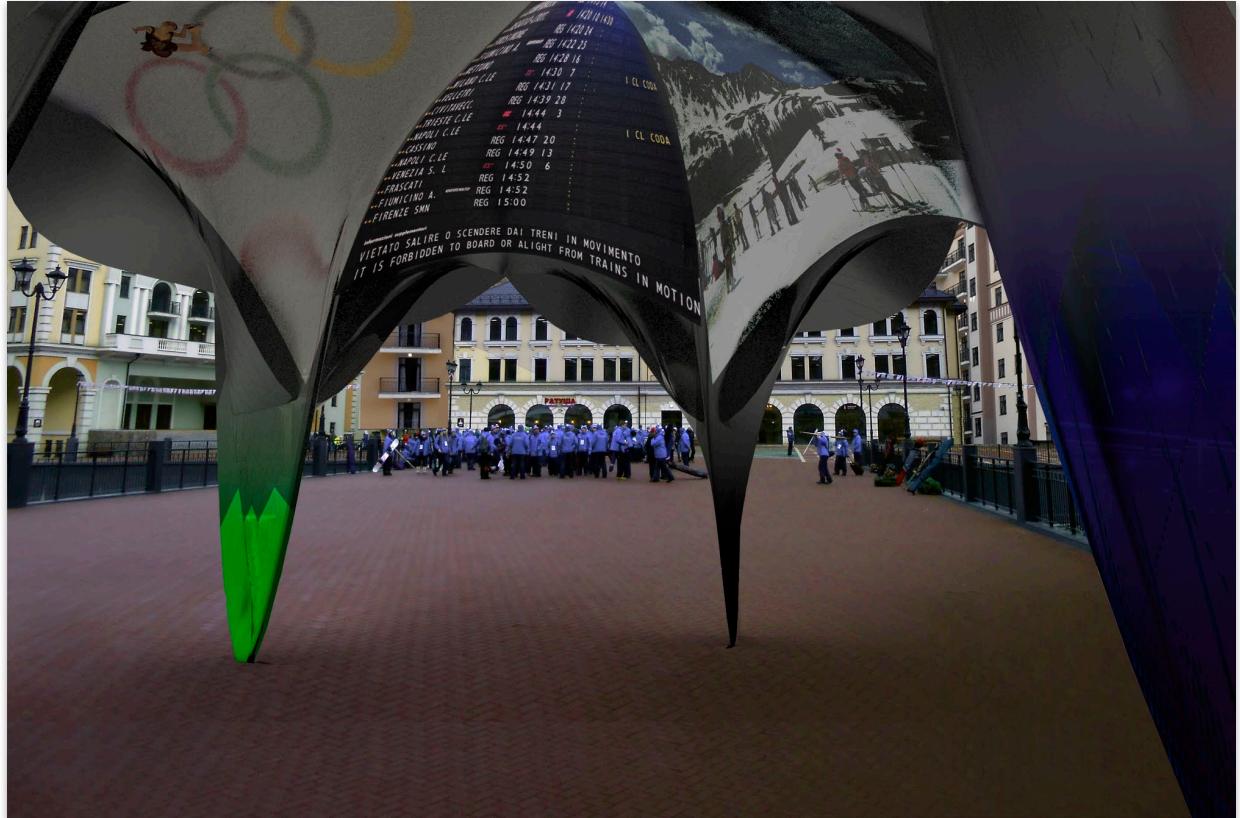
The pavilion is designed to provide a visually arresting and weather-proof hub which will serve as a focal point in providing information about the resort's infrastructure, services and attractions for visitors to the Games.

It is conceived as a public place which, among other functions, will protect visitors from the weather while they wait for shuttle buses. The pavilion's radial symmetry provides optimum spaciousness for tourists or athletes to shelter from the sun or ride out bad weather under its 'petals'.



A CENTRE FOR INFORMATION

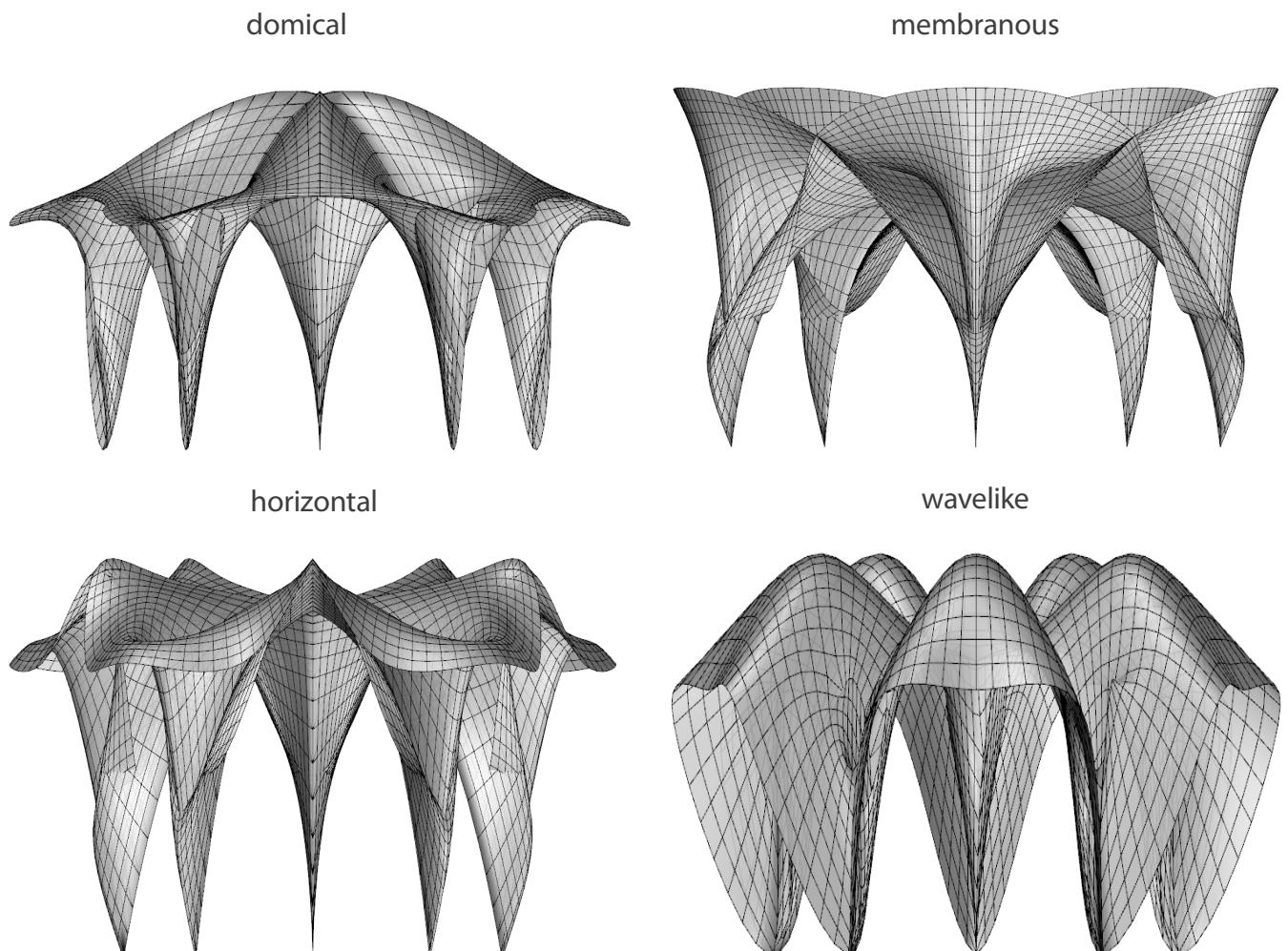
The concept and design of the pavilion will also facilitate access for visitors to information about hotels, services and local attractions, focussing their attention on relevant data as soon as they arrive. Details of ski lifts and the programme of events will also be readily available, and an interactive interchange with mobile devices will be provided. All of this will make the pavilion the 'gateway' to the resort, opening its doors to the visitor.



A TECHNOLOGICAL INNOVATION

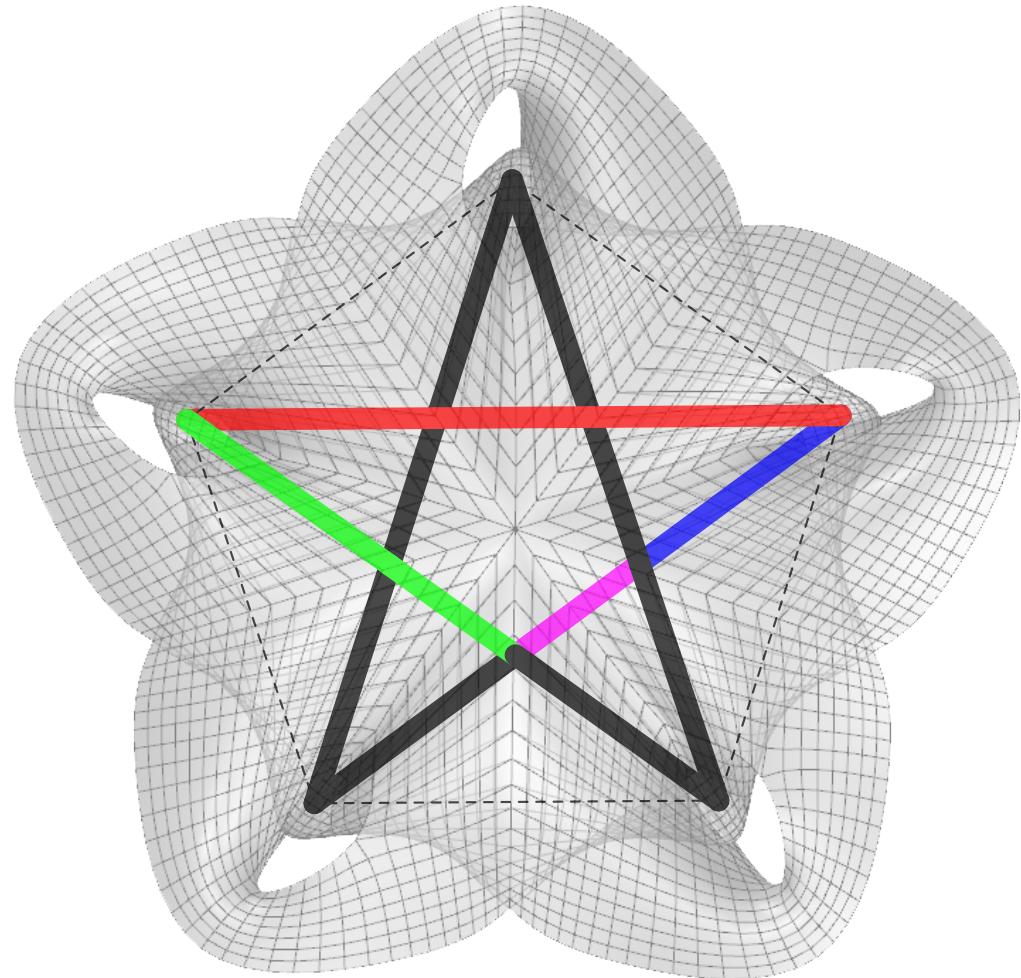
The appearance of the pavilion was devised by parametric design techniques. The final architectural form resulted from an analysis of material properties and engineering calculations, taking into account local climatic conditions. These pointed to a preference for a domed structure in order to minimize the effect of snow loads. Collaboration between architects, engineers and biologists made possible the creation of an architectural aesthetic harmonious with the beauty of the natural environment.

The pavilion has high performance components because of the automation of the design cycle and manufacturing process. This is the result of architectural design being integrated with the use of robots in an innovative way which makes production purely mechanical.



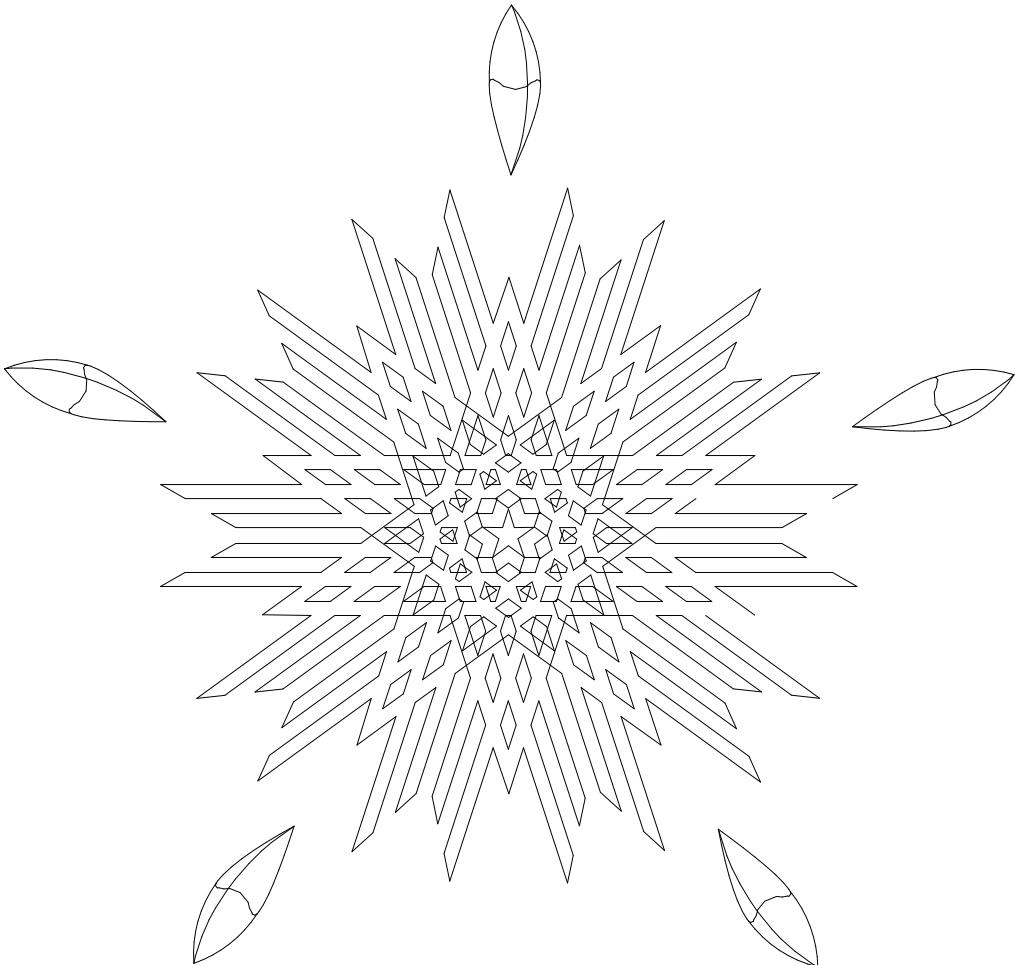
THE GOLDEN RATIO

Despite its unusual bionic shape, the pavilion exhibits the classical proportions of 'the golden rule', which permeate all of its design elements. According to Pythagoras, a regular pentagon represents mathematical perfection, concealing within itself the golden rule.



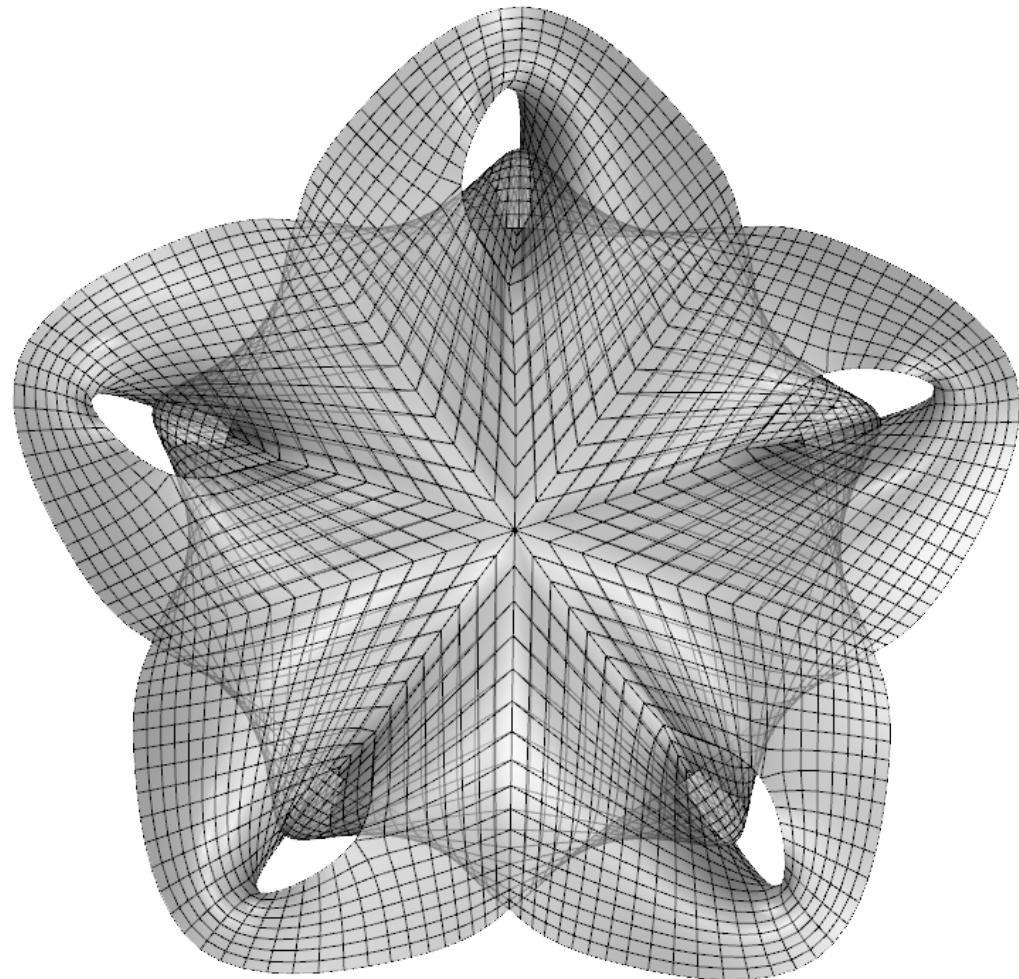
GROUND FLOOR +1,000M

Covering the base of the pavilion is a pattern that mimics the symbolism of the XXII Winter Olympic Games in Sochi. Technologically, this feature is a layer of ultra-elastic concrete (UHFB) which does not need further treatment, paint or other protective coating. The columns of the pavilion can be bolted using prefabricated metal supports. They follow faithfully the radial symmetry of the five-pointed Olympic emblem of a star.



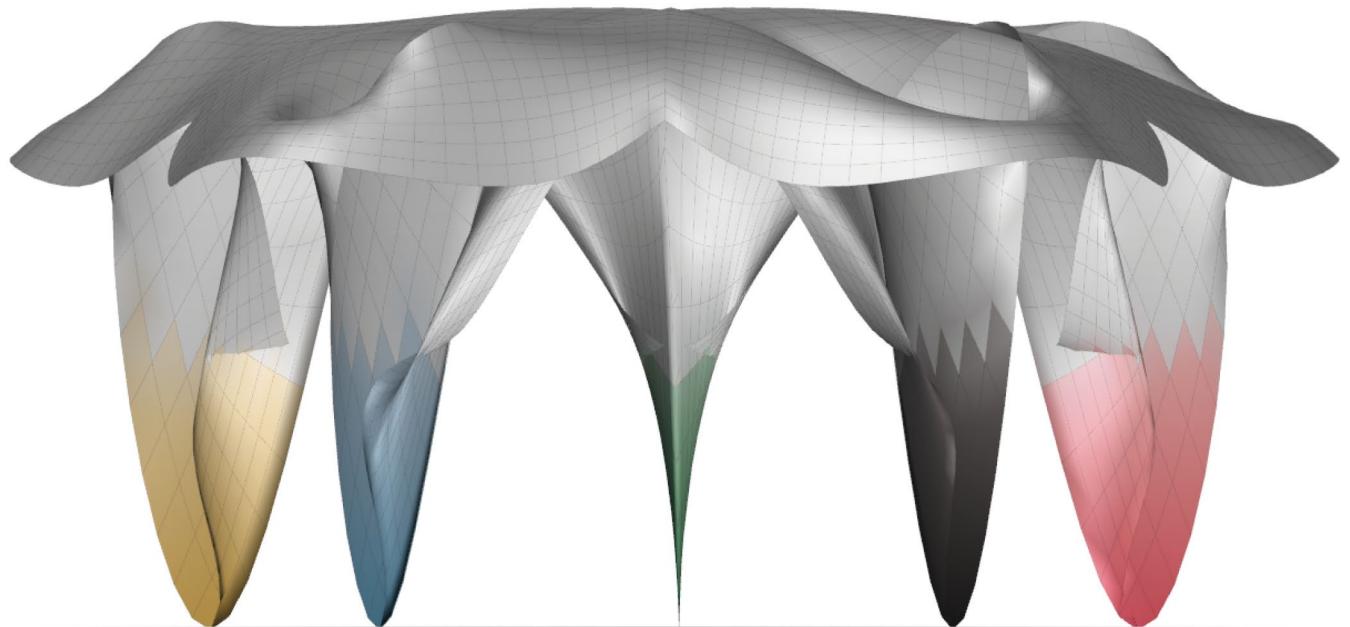
VIEW FROM THE TOP

The petals of the dome of the pavilion are a stylistically converted ornament of the Olympic star, created through a set of parametric design techniques. The holes near each of the five columns were added following the recommendation of engineers who took into account the climatic features of Krasnaya Polyana. They serve to prevent the accumulation of snow and provide a slope down which it can disperse.



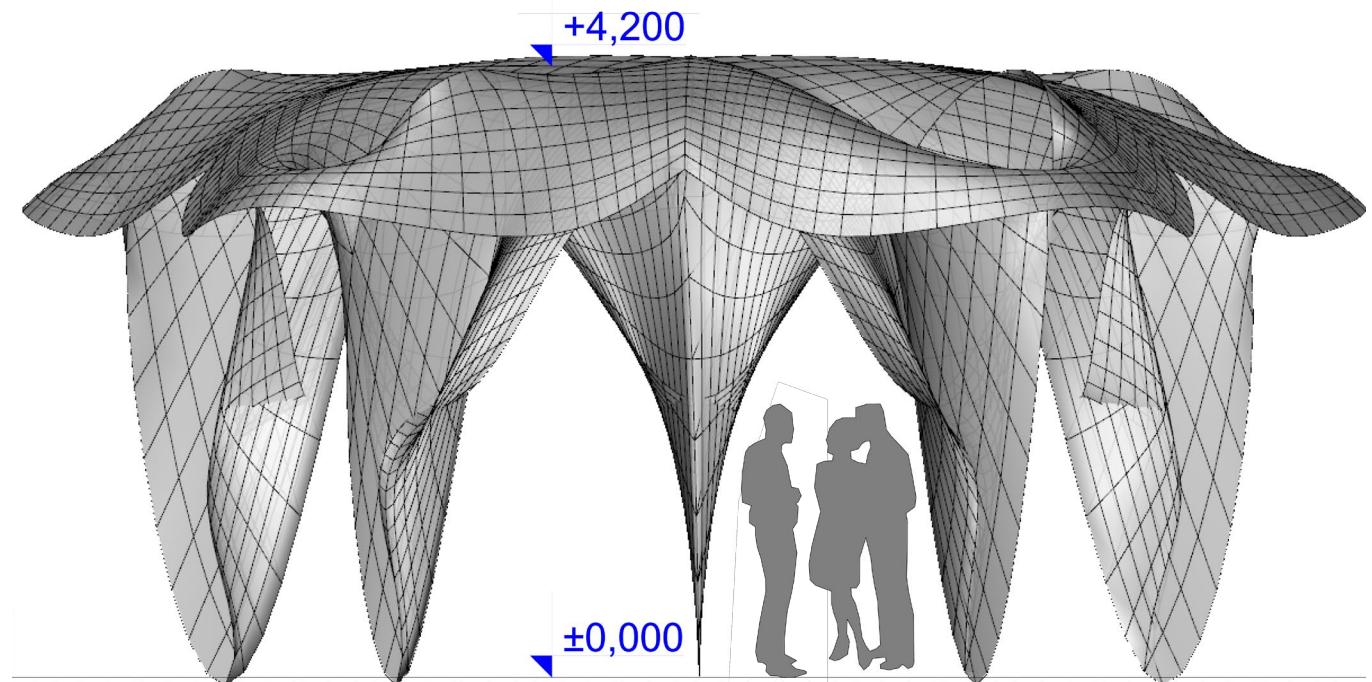
COLOUR SCHEME

The colour scheme of the pavilion is similar to flowers with five interlocking rings in blue, black, red, yellow and green. Giving this Olympic colour reference to each of the columns makes the pavilion a visible, recognisable and more memorable place. The columns and ceiling of the pavilion painted gray are the interactive screen designed for video projections.



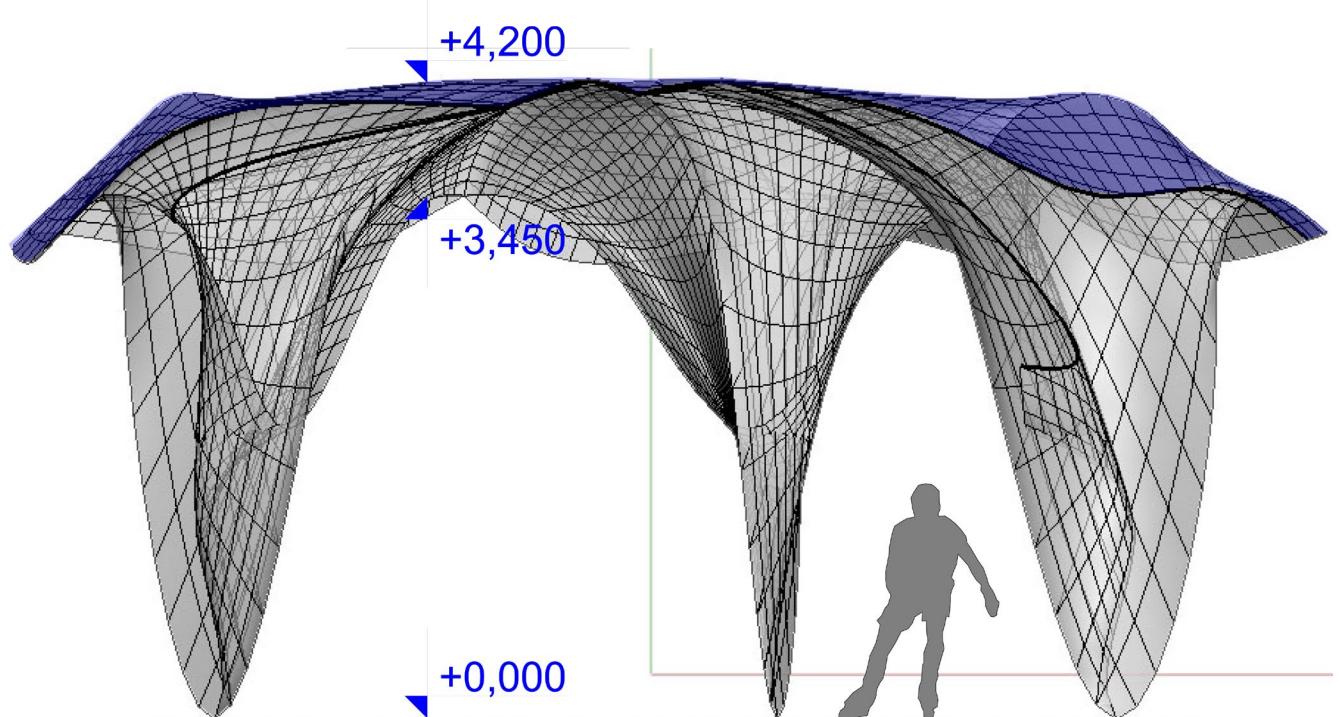
FRONT - FAÇADE

In the tradition of Russian Constructivism, the pavilion puts all its design features on display. Curved metal sheets are welded together or connected by screws and rivets. The aesthetic of Constructivism is interwoven with modern technology, and highlights the golden rule in the proportions between the heights of the columns, dome and the pavilion itself.



SECTION A-A

The structure of the pavilion is divided into two main load-bearing parts, merging harmoniously with each other: the dome and the columns. Both are made of the same material, manufactured by RoboFold. The 3-D modelling and engineering design use computer tools developed by the company Rhinoceros-in, based on the 'Rhinoceros 3D' programme.



Rose Pavilion

THE ARCHITECT





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Dimitry Demin is an innovative architect and engineer with degrees from universities in Russia, Germany and Switzerland. He is also a thinker, writer and film producer in the field of marrying imaginative modern architecture with hi-tech precision engineering to conjure up buildings which are ecologically sound and aesthetically ground-breaking.

Dimitry currently works as chief specialist in parametric engineering for Gartner Steel and Glass GmbH (Permasteelisa Group), and is involved in building façades for some of the world's leading architectural firms.

In both building and research he focuses on integrating aesthetics with high-precision engineering through computer technology, and has a broad perspective which involves collaboration with mathematicians, biologists, material scientists, economists and archaeologists. In philosophical terms, he incorporates a multi-dimensional concept of time as an independent mathematical entity into the aesthetics of architecture.

Rose Pavilion



COMPANIES

Two state of the art international companies – RoboFold and Rhino-in – collaborate in designing, manufacturing and installing the Rose Pavilion. Since 2008 they have used robotic technology to optimize the building of the most demanding precision architectural structures.

RHINO <> DLUBAL

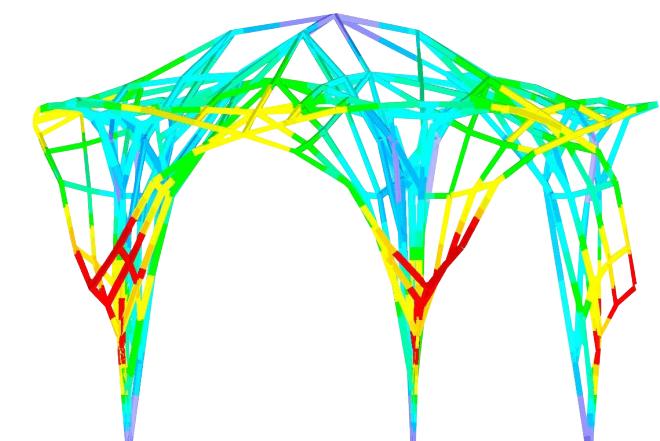
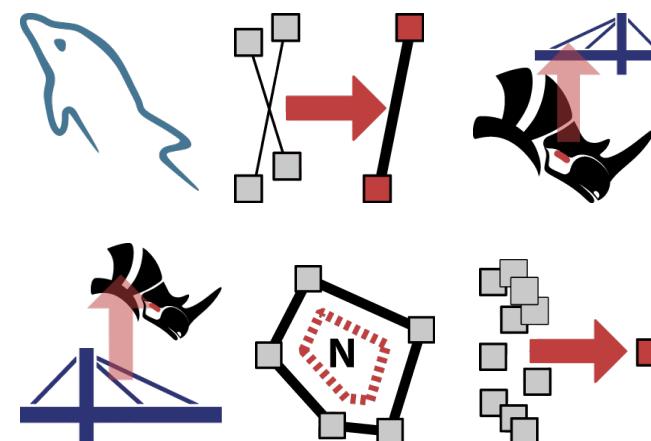
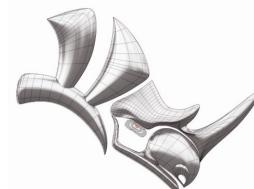
The design of complex structures requires sophisticated computer tools capable of finding the crucial points of interaction between the participants involved. This entails bringing together the input of architects, engineers, mathematicians, material scientists and biologists.

CALCULATIONS

Finite element method calculations have been used to determine the load-bearing capacity of the structure. This influenced the final form of the Rose Pavilion, helping to shape the interpretation of the physical and geometric properties of dog rose petals which inspired it.

ROBOFOLD™

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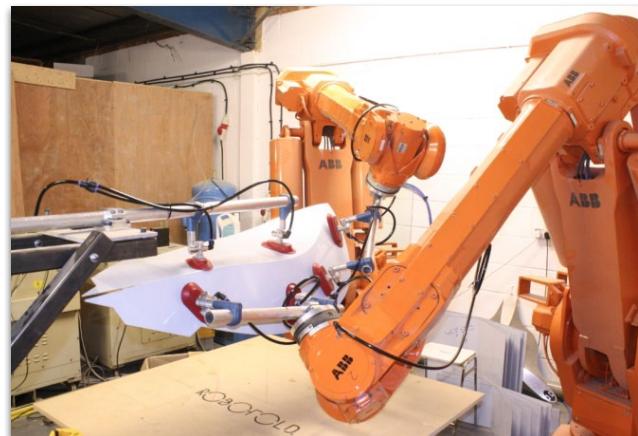
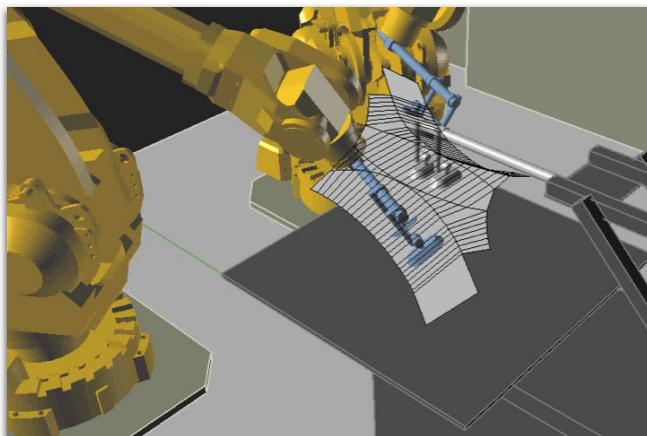


SOFTWARE

RoboFold has evolved its own unique software to control the production of geometrically complex one-off metal structures through the use of robots. The software is made available for the manufacture of a diverse range of building elements.

PRODUCTION

Components of the Rose Pavilion will be made at RoboFold's factory in London, which is equipped with CNC machines and two six-axis robots. These combine high precision with a faithful rendering of the architectural design.



CONSTRUCTION

Component parts of the pavilion will be transported from the factory and assembled on site within a period of two weeks. Installation does not require the use of a crane: scaffolding is adequate. A specialised team of three people can put up the pavilion under any weather conditions.



ROBOFOLD PROJECTS

Together with the world-renowned architect Zaha Hadid, RoboFold was involved in production of the 'ARUM' sculpture pavilion at the 13th Venice Architecture Biennale. In the design and manufacture of 'ARUM' RoboFold's founder, Gregory Epps, used a patented technology employing robots to bend metal in order to create a unique architectural structure: an origami vase made of metal. Full details of Robofold's projects can be accessed on the company's official website: www.robofold.com



Rose Pavilion

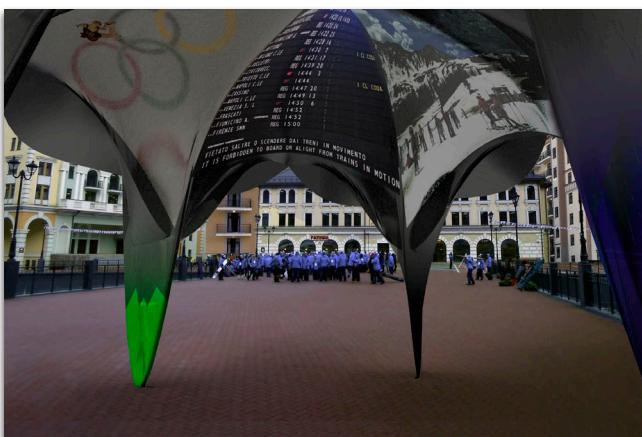


INFORMATION

It is planned to keep guests at the resort informed through printed maps and video projections which appear directly on the structure of the pavilion. Like the flame of the Winter Olympics torch relay, with its firebird feather symbol, the pavilion can 'come to life' when people appear, and display the sights and attractions of the resort in an interactive way.

INSTALLATION

The pavilion's columns and dome will also serve from time to time as an electronic canvas for contemporary artists from around the world. Surfaces coated with a special paint can be used for interactive video games, transmission of musical performances by video, and the projection of art installations.



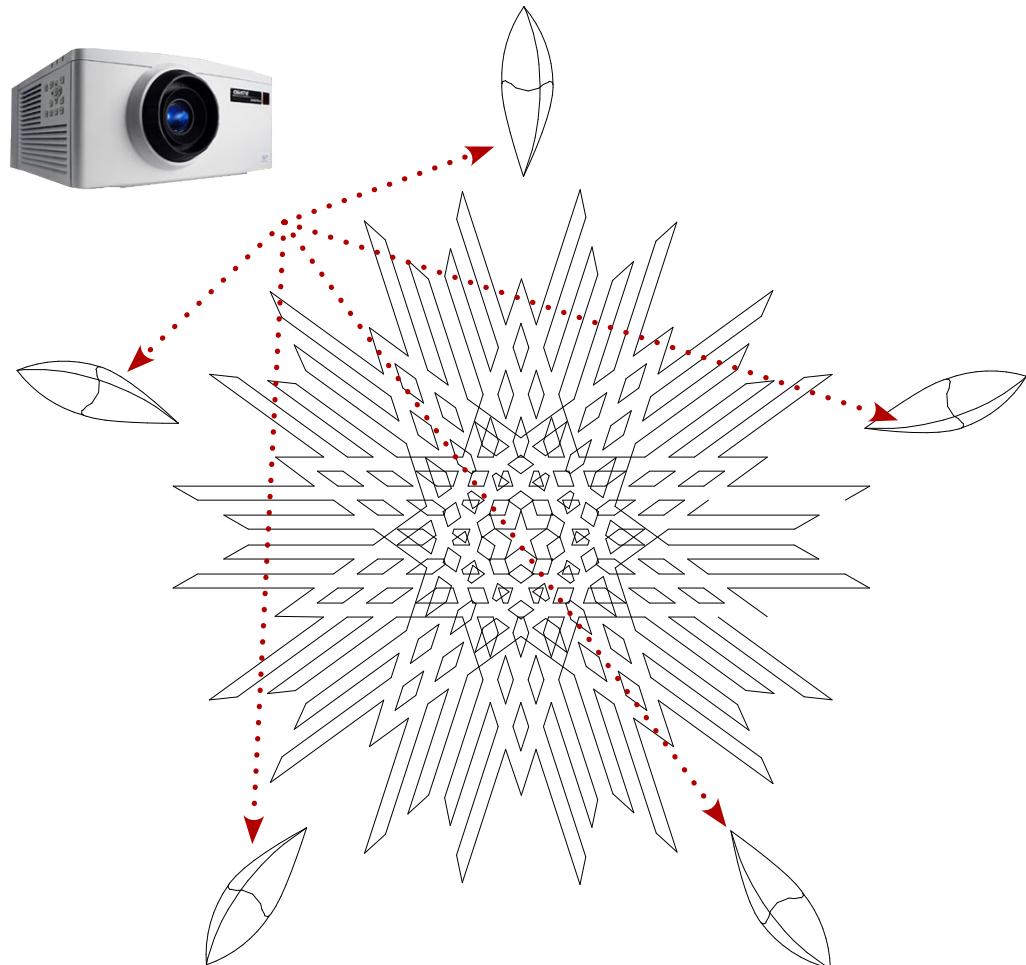
VIDEO-TRANSLATION

For live sports coverage it is envisaged that the pavilion's columns and dome will provide a wide-screen multimedia display, so that guests at the resort can enjoy the excitement of watching the tussle for Olympic medals while breathing pure mountain air.



PROJECTION MAPPING

The Rose Pavilion will become interactive through the use of 'media technology projection mapping', which enhances the spatial features of reality. The columns and dome can be turned into a screen for live shows in both conventional and 3D formats. After dusk the pavilion will have additional LED lighting which requires approximately 10kw of electricity. The power supply can be housed inside one the five weight-bearing columns.



PROJECTION MAPPING

Images and videos are projected onto the surface of the pavilion by five HD projectors with a brightness of 7000-12000 ANSI lumens – adequate for daytime use. The projectors are built into the columns as an integral part of the structure.

