Giles Miller Studio

Plexus Sculptural System

Surface
Architecture
Sculpture

Plexus Sculptural System

Plexus is a binary system which explores density and perspective.

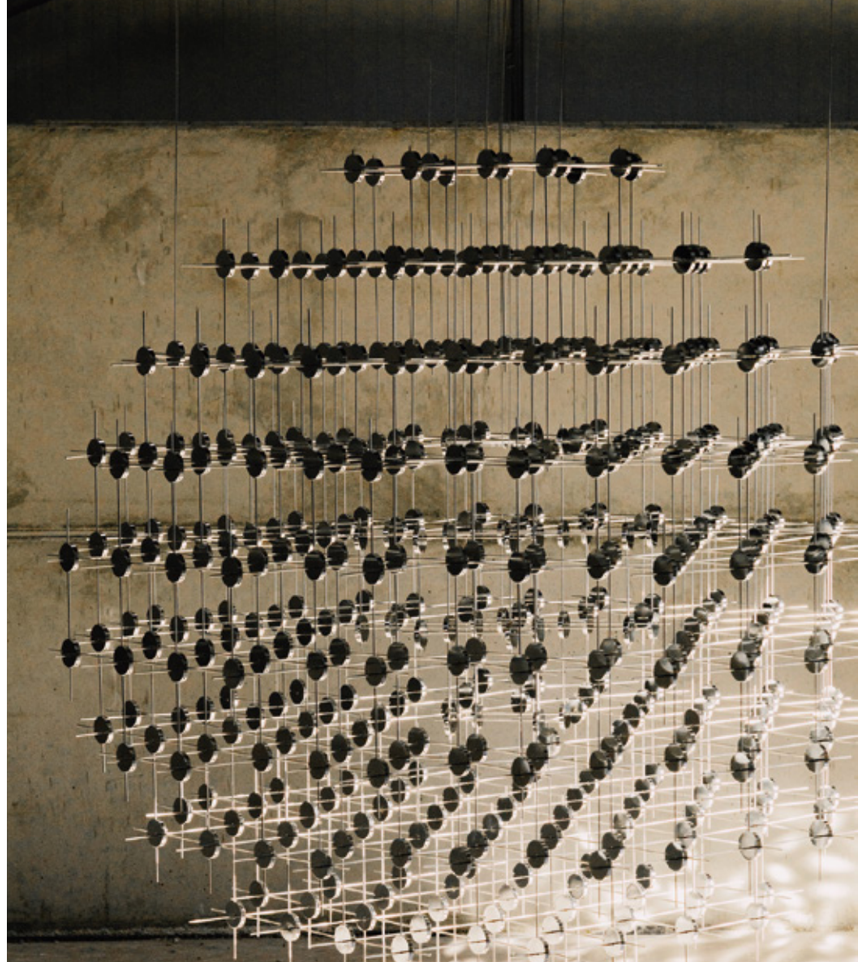
Opposing directional tones are generated through the x/y axis composition, where the two tones exaggerate or understate the structure's mass depending on the viewers perspective.

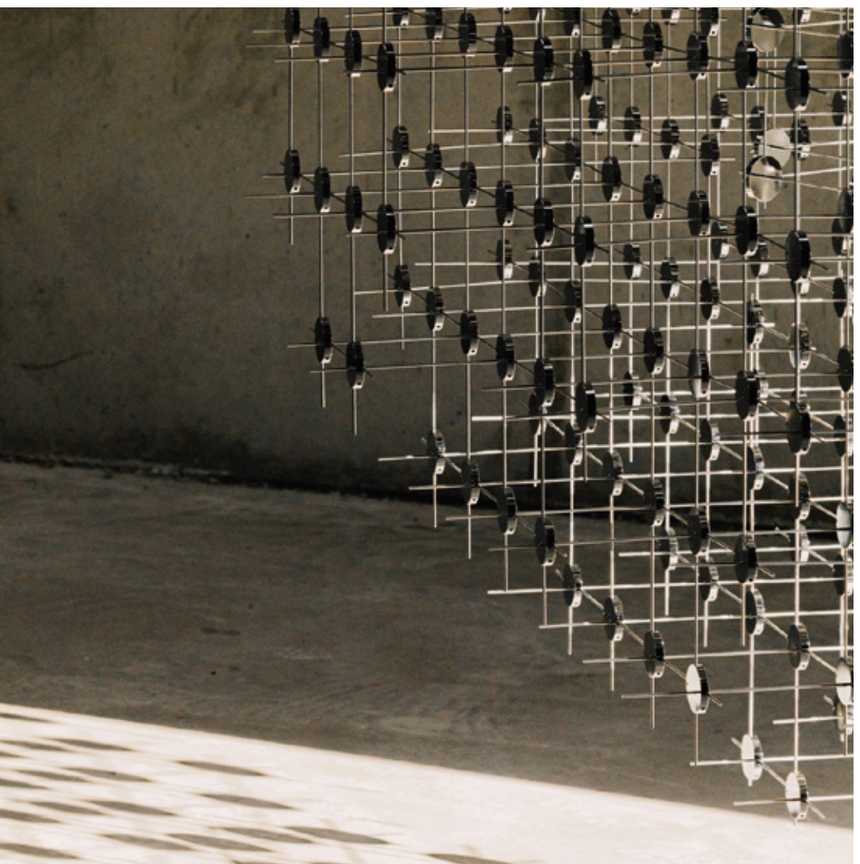
“What Is Hope?”

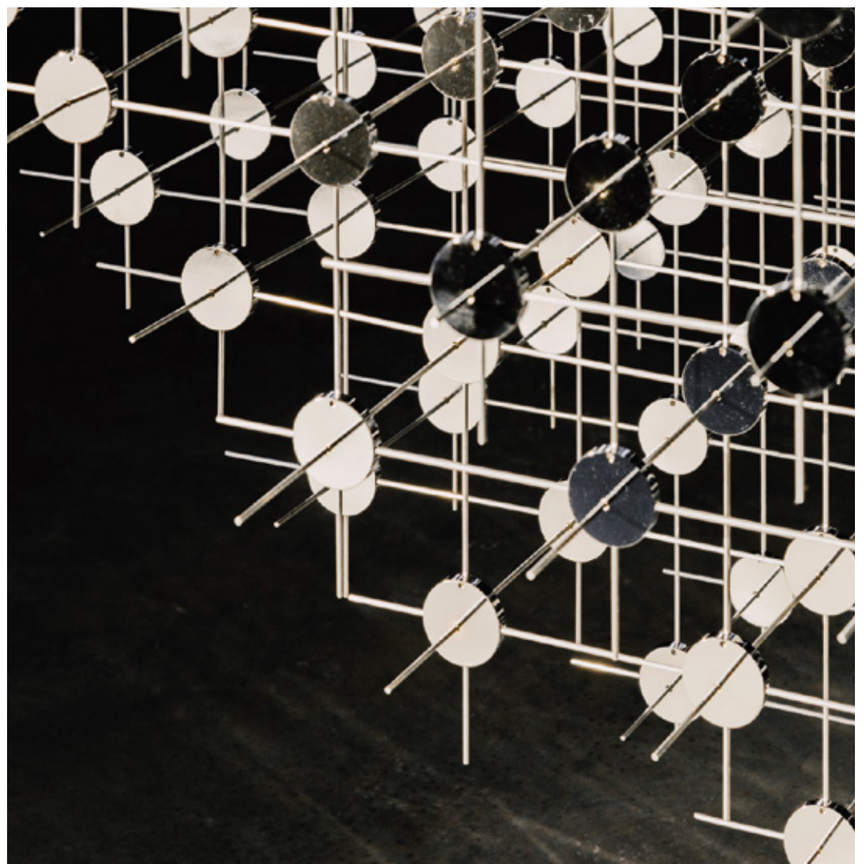
New York

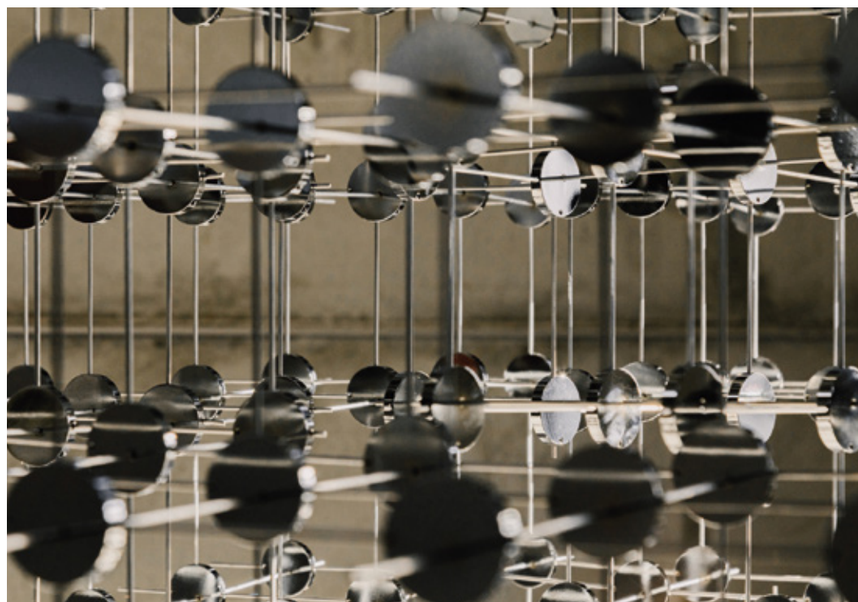
“What Is Hope?” is a spherical sculptural matrix made up of hundreds of cylindrical modules connected by raw aluminum rods. The bulk of the static silver reflective ‘dots’ contrast in direction with those of the central core, which themselves rotate, spinning unceasingly, inspiring optimism and reminding the viewer to hold on to the hope within themselves.

Our studio is honored to have been invited by HDR to contribute to this unique event for DIFFA, who have been combating HIV/AIDS and other important issues for over 30 years.









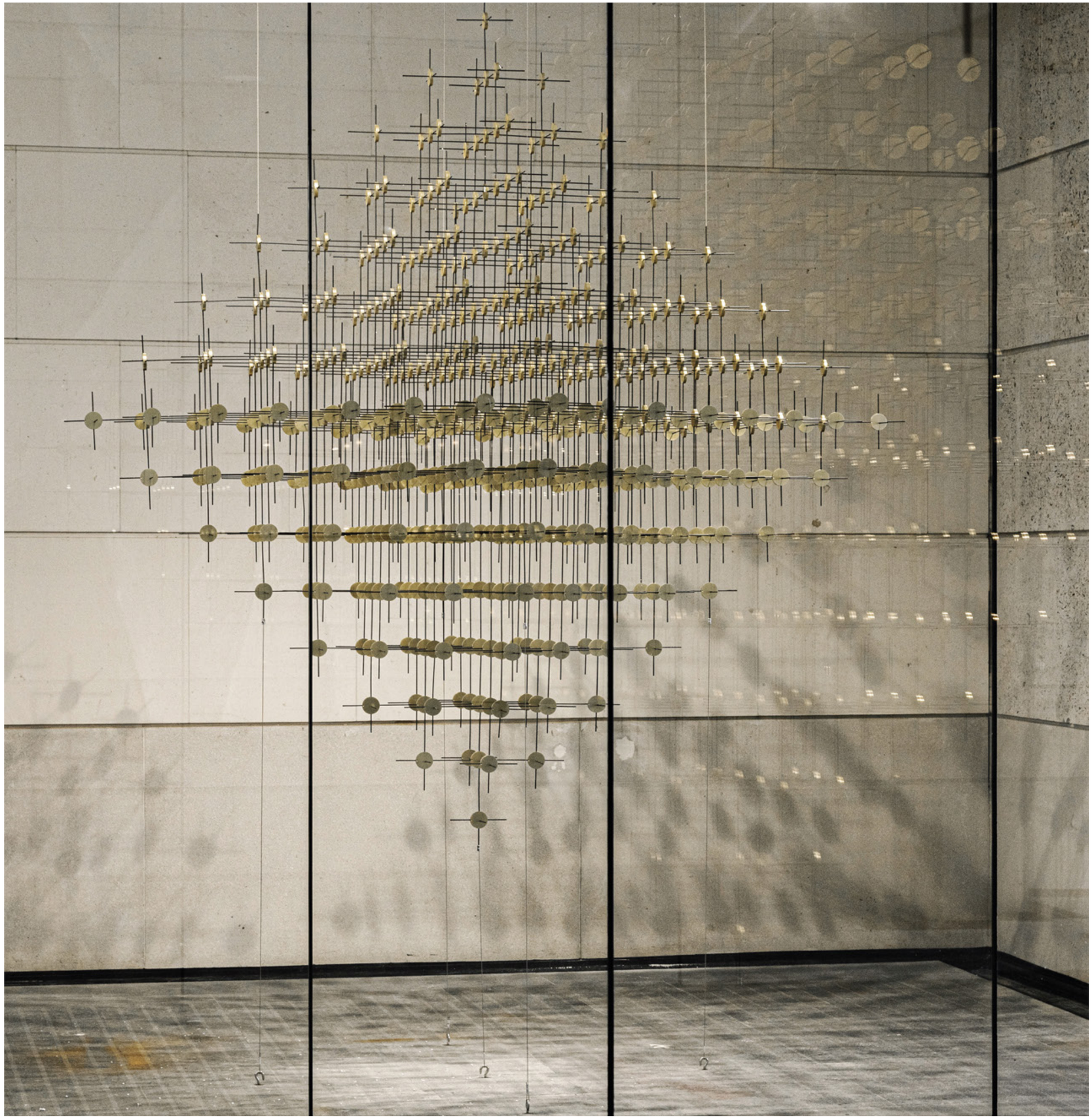
Dual

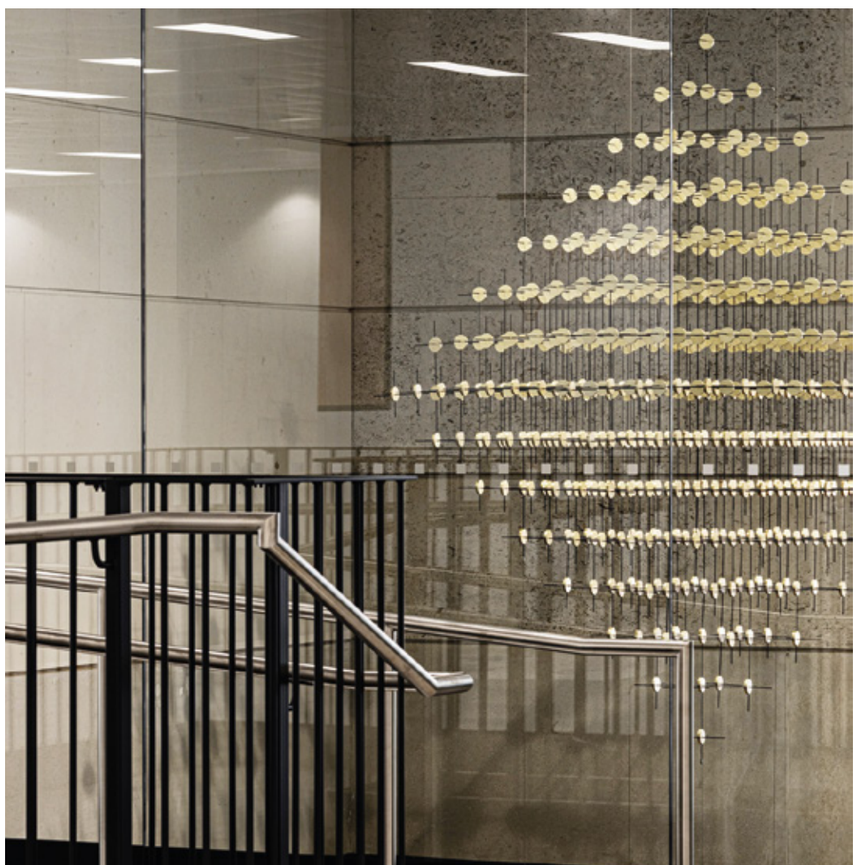
London

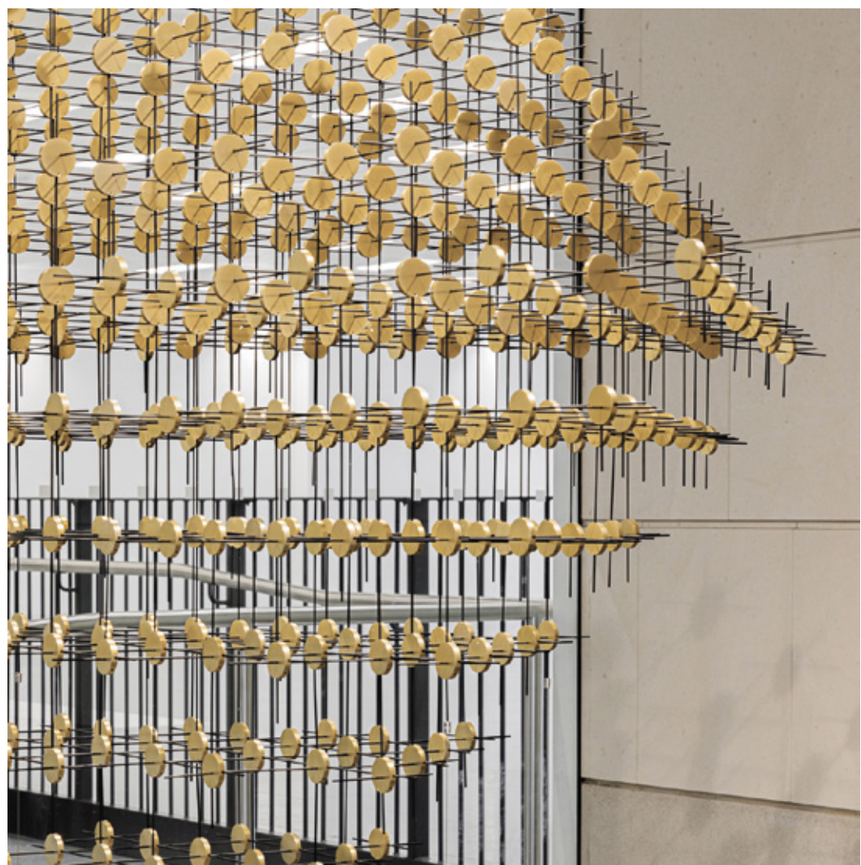
Dual is a structural and material balancing act... twin sculptures hang either side of an entranceway, both intervisible as well as pan-visible by the viewer, who can watch the tonal density of the pieces change as they walk past each of the opposing structures.

Consisting of a grid of 3-dimensional rods held together by 'penny-junctions', the forms manifest as two diamond shaped 'jewels' (with which the name plays) with a subtle variation in their top and bottom halves generated by the directional composition of their junctions.

The piece was commissioned by Zoë Allen of Artistic Statements on behalf of the Mitsubishi Group.

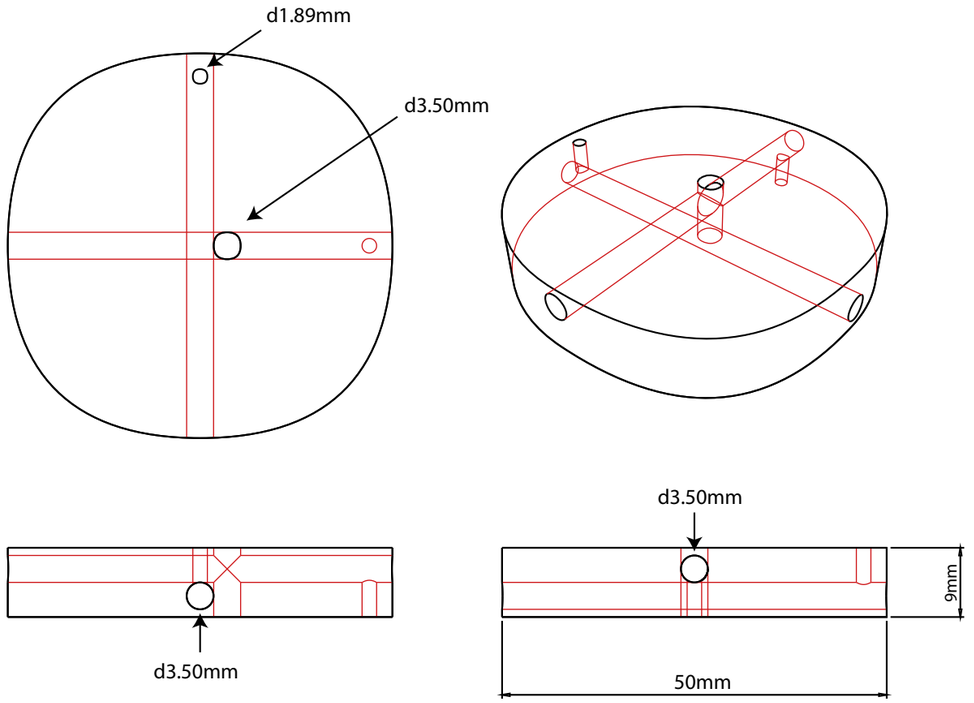






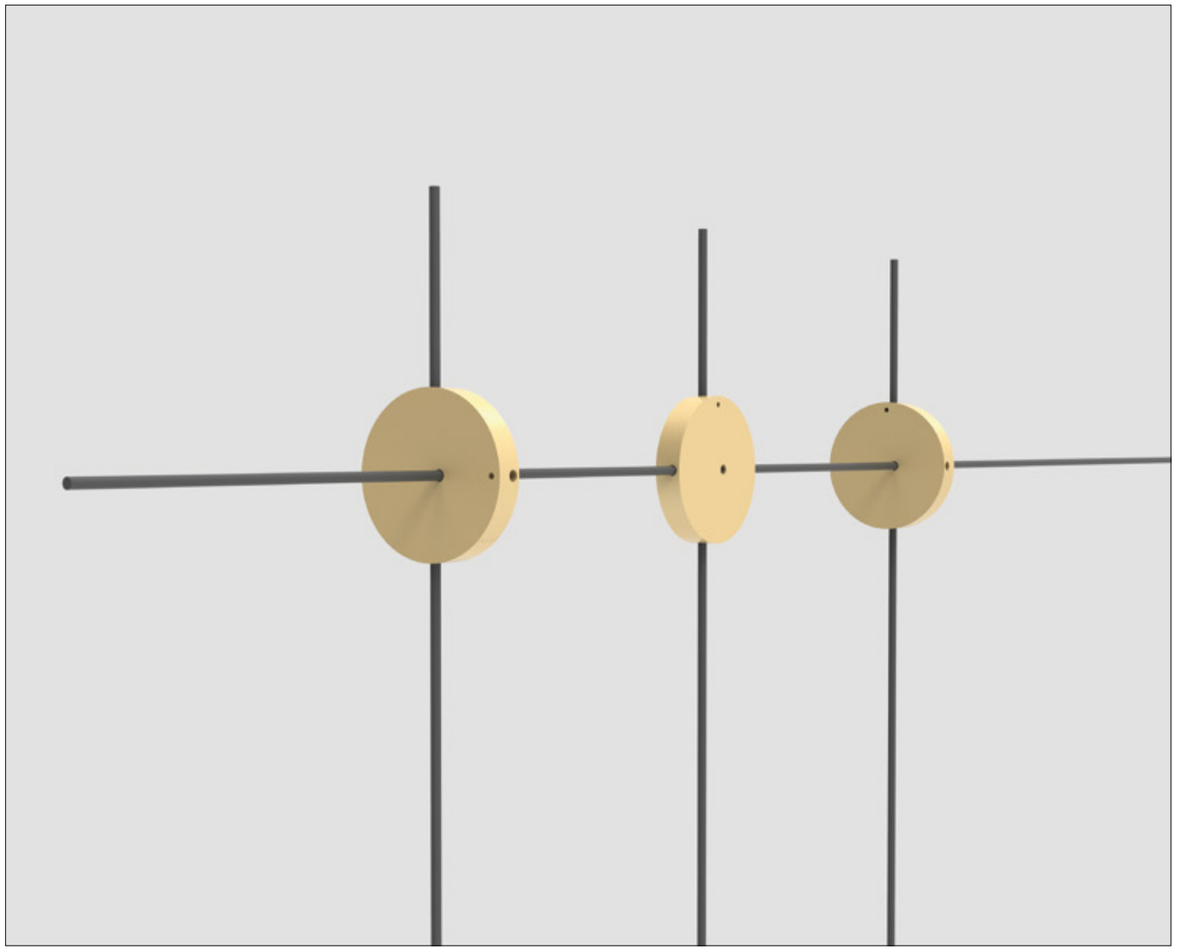
Plexus sculptural system
Case study

‘Dot’ Dimensions (mm):



Red = Internal structure

Example of opposition angles of the ‘Dot’, which is controlled to create the tonal density of the structure :



All dimensions in mm (not to scale) - Bespoke shapes are available (Tooling costs will apply)
Nb. We recommend making allowances for up to 0.5% difference of the dimension given due to material expansions. A level of flexibility on site maybe required.

Giles Miller Studio

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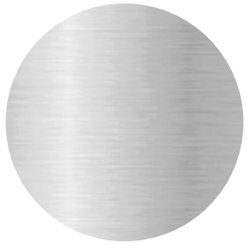
Finish Options

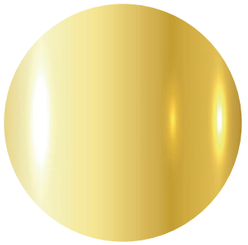
A wide variety of finish options are available. We can look into developing bespoke finishes if required.

Silver

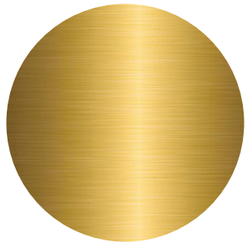


Matt Silver

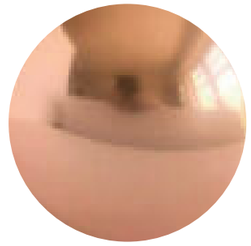
Matt Gun Metal



Gold



Matt Gold



Rose Gold

Matt Rose Gold

FINISH OPTIONS:
Bespoke finish options are available, though sampling phase will need to be factored into the project lead time. Sampling costs may also be applicable.

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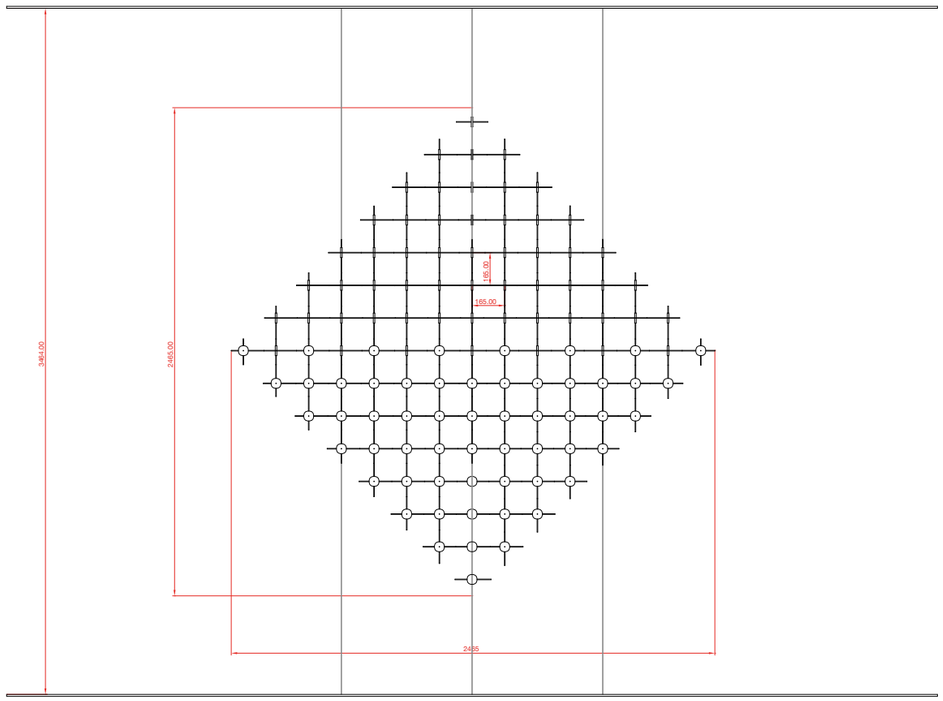
EXAMPLE VISUALISATION OF SCULPTURE FORM EXPLORATION (PROJECT SPECIFIC)



ELEVATION/DIMENSIONS - NOT TO SCALE

The sculptural form, density and pixel orientation will be created (in-line with the client brief) during the design phase of the project.
GMS will provide detailed, project specific design drawings.

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SCULPTURAL SYSTEM

The system comprises 3mm mild steel rods, continuous across the sculpture in x, y and z directions.

At the intersection between the rods, there are aluminium discs which fix to the rods and secure the position of the rods relative to each other

SCOPE OF REVIEW

We have considered only the self-weight of the sculpture and nominal lateral loads.
We have assumed that: -

- Any human interaction with the sculpture will be avoided by management on site
- The sheltered nature of the installation will limit any wind loads on the sculpture

We have assumed that treatment/protection to the steel rods (specified by others) will limit any risk of corrosion to the structure.

VERTICAL LOADS

We have modelled the structure of the sculpture in Autodesk Robot. The self-weight of the rods has been incorporated in the model, together with the weight of the discs (40g per disc), which have been considered as point loads at all of the node points.

5 suspension points have been assumed as shown on figure a)

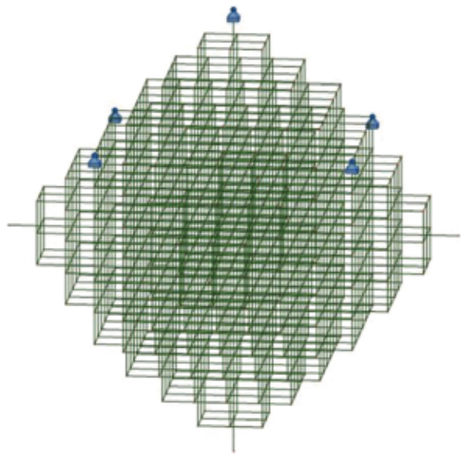


Figure a) Analytical Model

The deflected profile is shown (right). The vertical scale has been exaggerated so that the nature of the deflection can be seen. However the maximum deflection was found to be less than 10mm.

Under the vertical loads from the self-weight of the structure, the elements were found to have stresses significantly below the yield stress of mild steel.

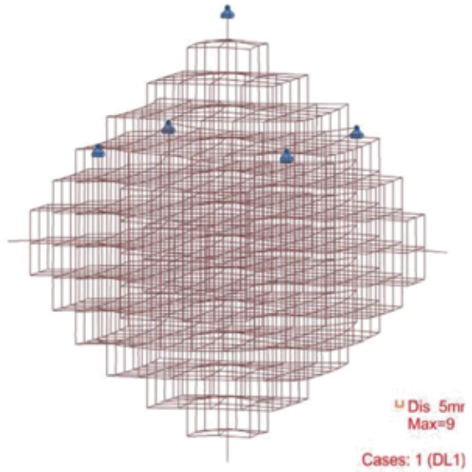


Figure b) Deflected Shape

The overall weight of the sculpture was found to be circa 55kg. Around 45% of this load was carried on the central suspension point, with the remaining 55% shared between the outer four suspension points.

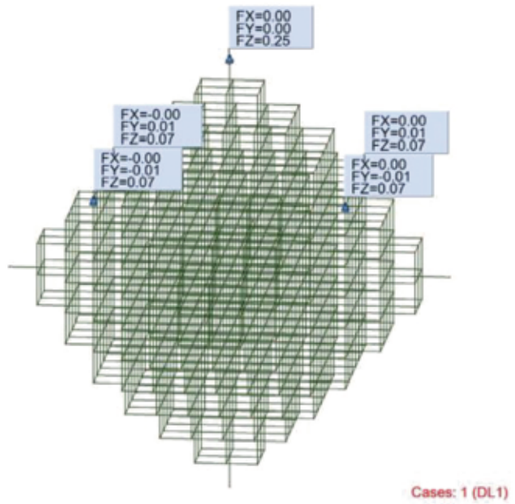


Figure c) Support Reactions under Vertical Loads

LATERAL LOADS

Lateral loads that might be applied to the sculpture would be: -

- Wind load on the discs
- Any nominal horizontal load physically applied to the sculpture

Only half of the discs will be wind loaded at any point, as they orientation of the discs changes by 90 degrees at mid-height of the sculpture. By applying (conservatively) a wind load of 0.5kN/m2, and assuming the lateral restraint from the fixing points, we generated a deflected shape with a maximum of 15mm deflection.

The total horizontal force applied to the structure was 0.42kN

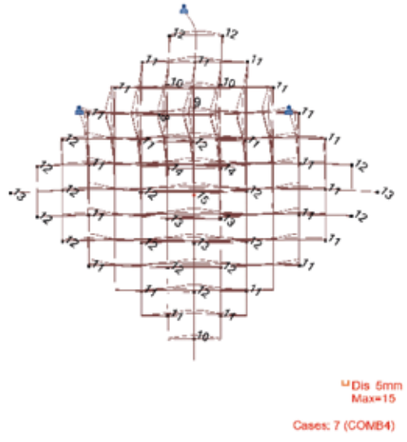


Figure d) Deflected shaped under vertical loads

It is proposed to run the suspension cables through the structure and to the floor below the sculpture. These cables will act to restrain against lateral movement, as shown in figure e). As the cables distort laterally the horizontal component of the cable tension will act to resist any horizontal load W, shown in green.

For a cable Tension of 500N and a Horizontal Load of 420/4 = 105N, the angle A for equilibrium would be 6 degrees.

In reality in normal use the horizontal loads and hence cable rotations will be significantly less.

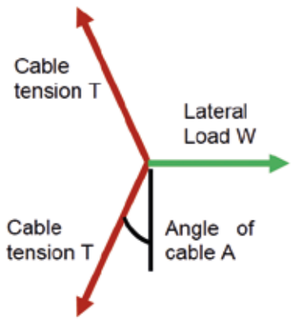


Figure e) Cable tensions resisting lateral loads

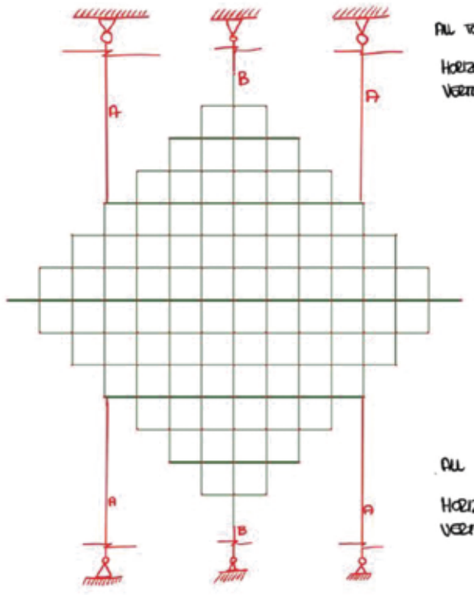
SUSPENSION CABLES

For the suspension cables we would propose the use of galvanised steel cables, such as the Tecni 503.000.020 2mm cable with 7 no. 7 cable cores.

The breaking load of this cable is 2.5kN, with a working load limit of 0.5kN.

The recommended working loads for the fixings are given in figure g) below

We have added an additional factor on these loads to account for loads not being distributed evenly and accidental over tensioning of the cables.



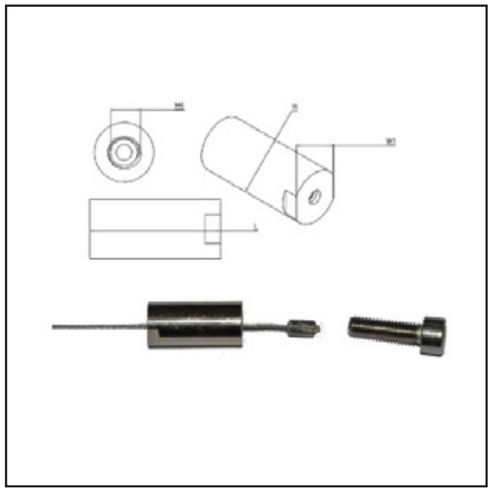
ALL TOP FIXINGS TO RESIST THE FOLLOWING LOADS

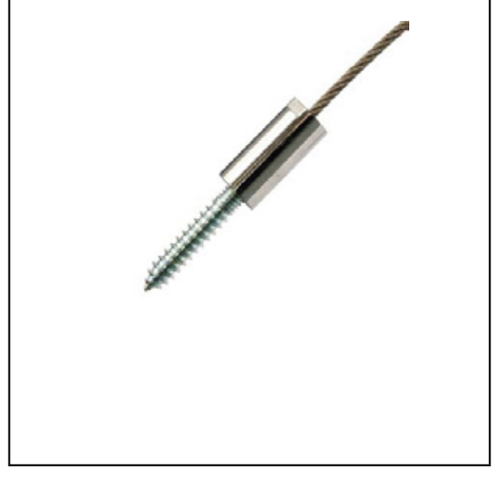
HORIZONTAL = 0.6kN
VERTICAL = 1.0kN

ALL BOTTOM FIXINGS TO RESIST THE FOLLOWING LOADS

HORIZONTAL = 0.5kN
VERTICAL = 0.8kN

ELEVATION A-A





FIXINGS - GMS TO LIAISE WITH ON-SITE ENGINEERS AND CONTRACTORS TO CONFIRM FIXING INTEGRATION INTO SUBSTRATE

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Thank you.

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