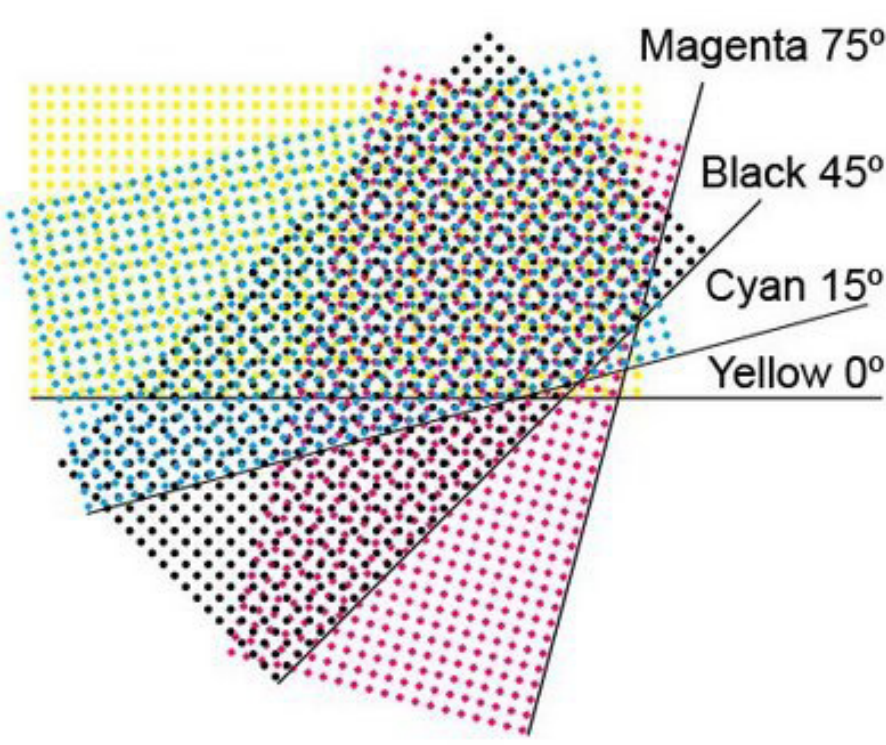
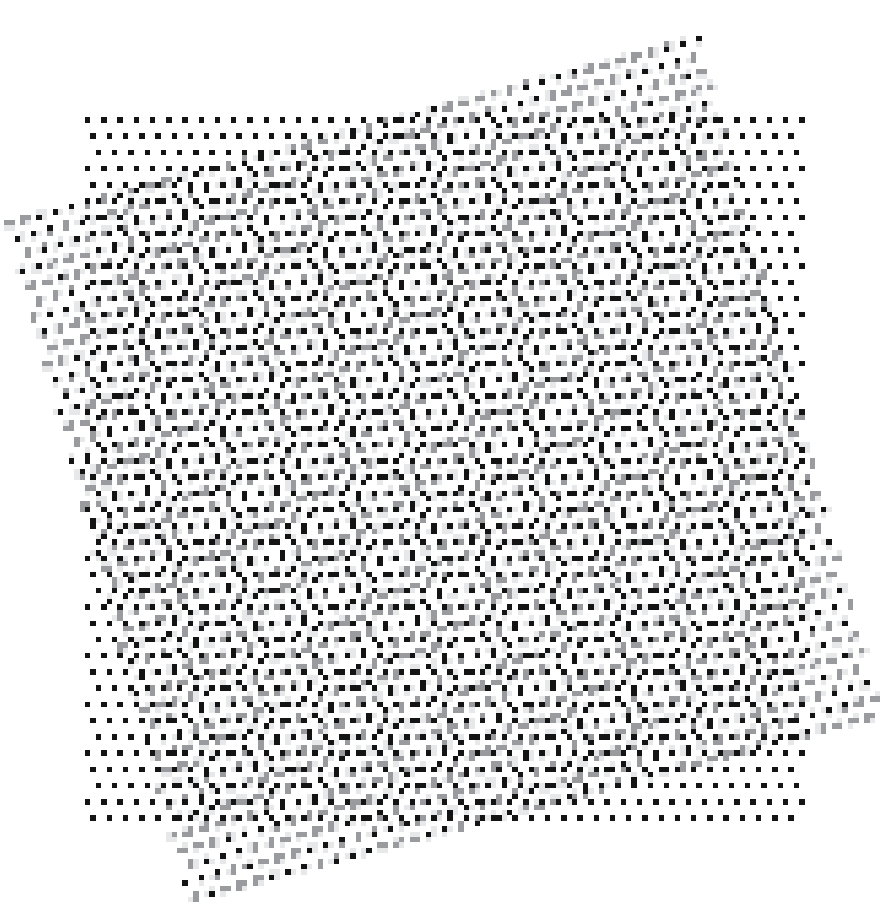
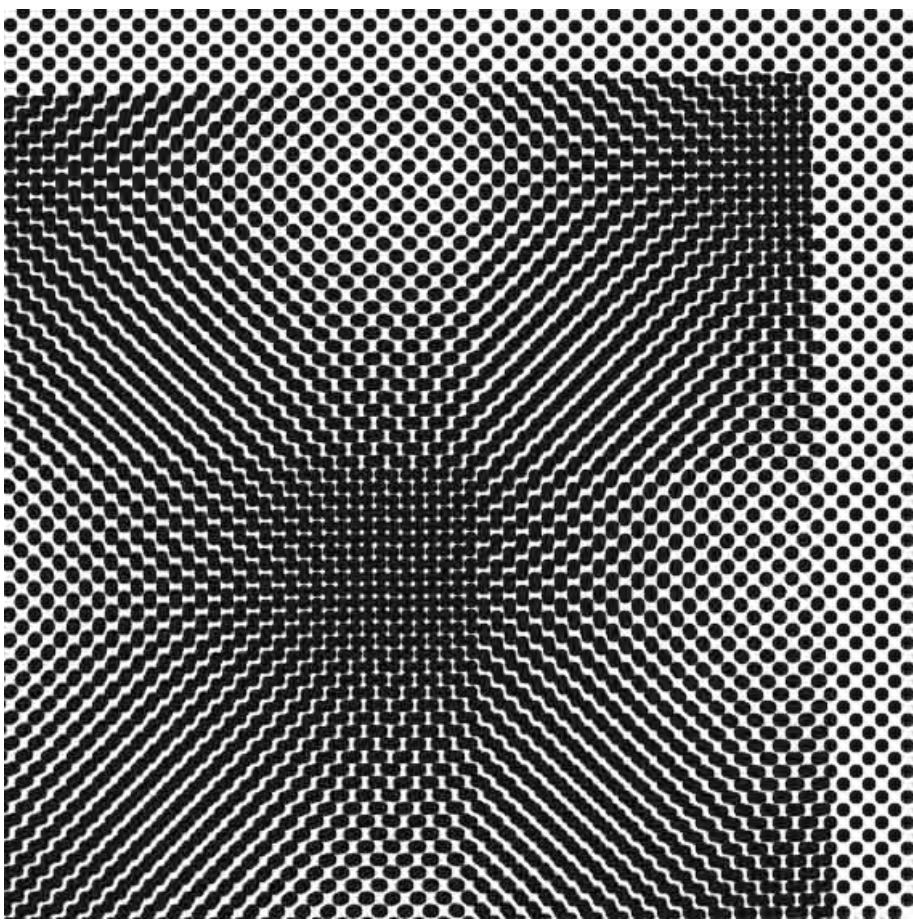


MOBIUS STRIP



PROJECT DESCRIPTION

The ContemPLAY pavilion is a combined steel and wood structure created by the McGill School of Architecture DRS (Directed Research Studio M.Arch) students as a capstone project for their final year. It is part of the course Community Design Workshop and it is designed and built under the leadership and supervision of Maria Mingallon, the Gerald Sheff visiting Professor, in collaboration with F.A.R.M.M. (Facility for Architectural Research and Media Mediation) led by Jason Crow.

The pavilion is meant as a multi-generational artefact that combines the idea of contemplation and play in a single clear gesture. As a socially sustainable public infrastructure that plays with the visual field through form and cladding, it questions the current trend in urban furniture and encroaches in the realm of the abstract sculpture or artefact. The gesture itself is a three dimensional mobius strip which is supported by a triangular truss. The truss is a combination of plywood and steel elements. The cladding is a visual pattern generated to create a simultaneous moiré and parallax effect. As the public approaches and engages with the pavilion, the visual field is modified and interrupted by the interference created by motion and the two layers of cladding. The eye continuously covers the never ending surface of the mobius inviting dynamic motion from the user. Within, a bench anchors the project to the ground, allowing for a center seat in a never ending structure. The light filters through the cladding generating an ambiguous relationship between the notions of inside and outside as well as furniture and shelter.

As you move around the pavilion, new interference patterns are continuously created and destroyed though this mechanism of moiré; thus the pavilion creates a responsive, interactive experience. The simplicity of a half-twist in a ribbon was rendered extremely complex through the doubling and offsetting of the mobius strip: the creation of two surfaces activated the moiré but required strong yet minimal structural solution. Our solution to this complexity was a space frame. To resolve all these design criteria, the moiré pattern and an optimized space frame are generated via customised digital parametric modeling.

INTERFERENCE PATTERNS

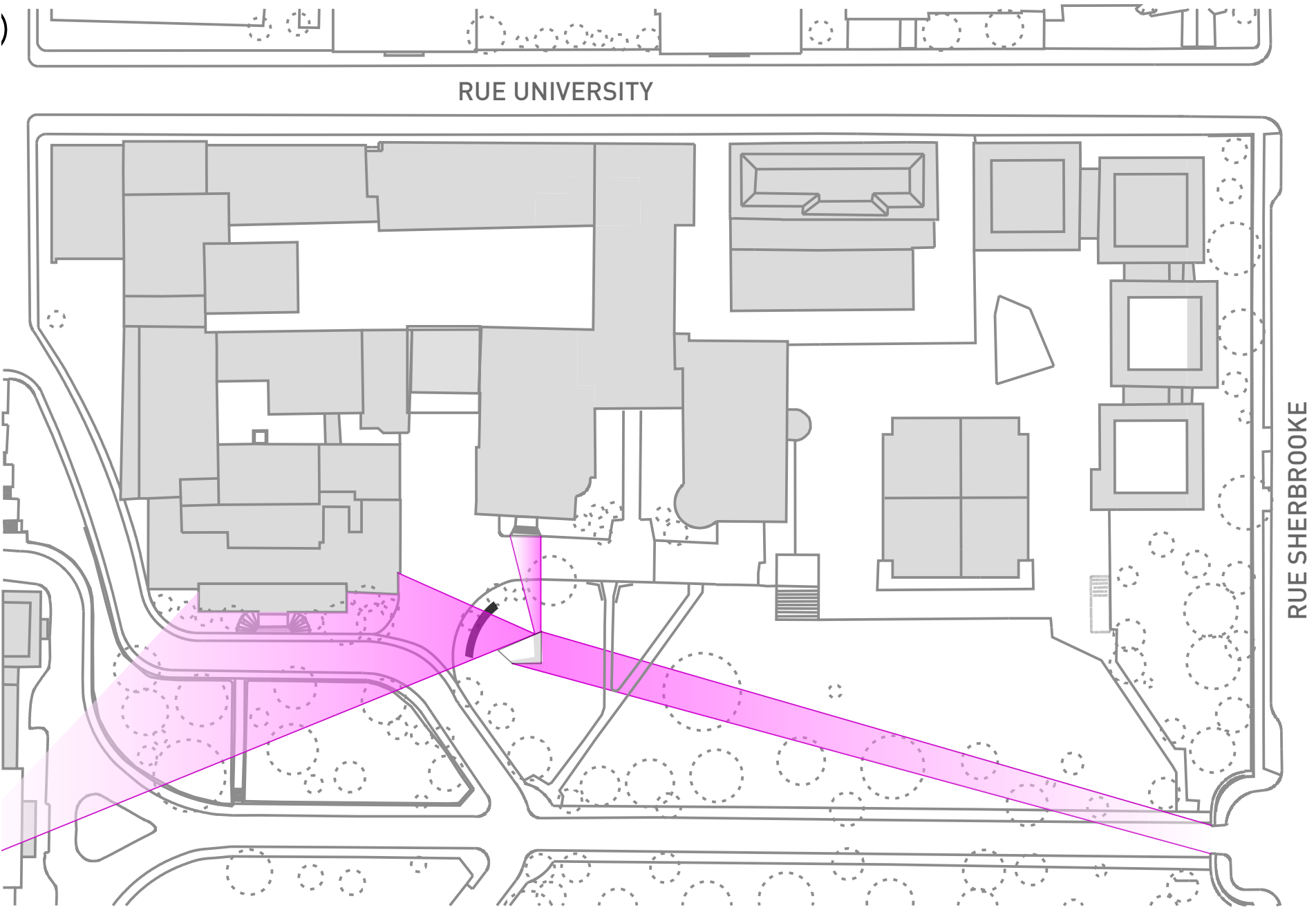
Parallax

Parallax is “the effect whereby the position or direction of an object appears to differ when viewed from different positions.” The term is derived from Greek parallaxis meaning ‘a change’ or ‘an alteration’. The brain uses parallax to perceive depth and to estimate distances to the objects. It occurs due of the different views perceived simultaneously by the two eyes.

Moire Patterns

Moire patterns occur due to the interference of two similar grids overlapping each other. The resulting fringe patterns change with the translation of the grids while the visual interference is interpreted by the mind as a separate image.

MOIRE PATTERN



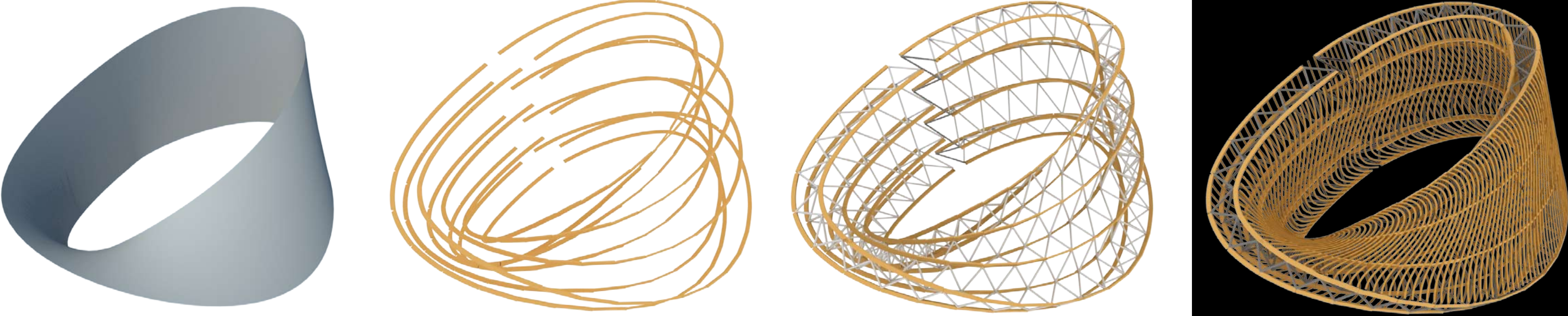
MCGILL UNIVERSITY CAMPUS



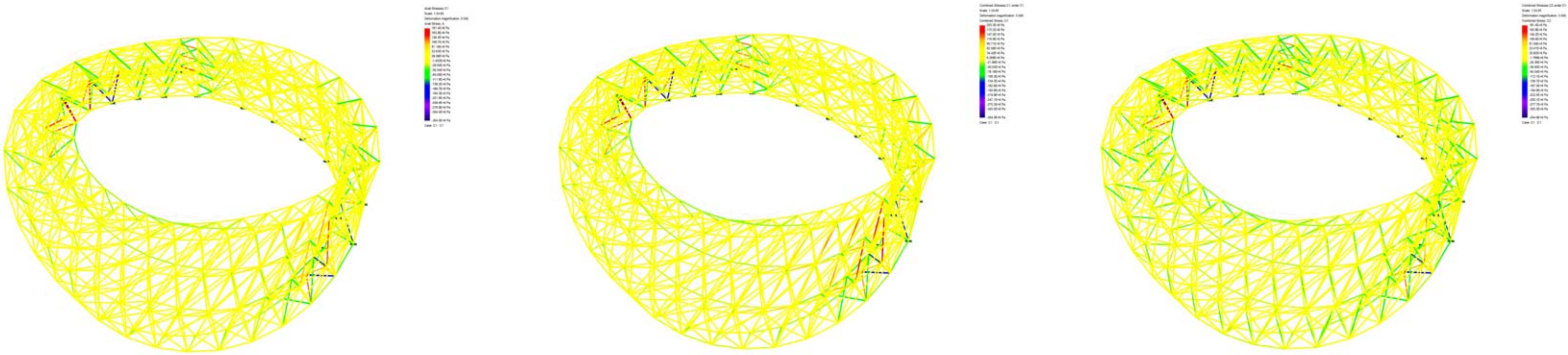
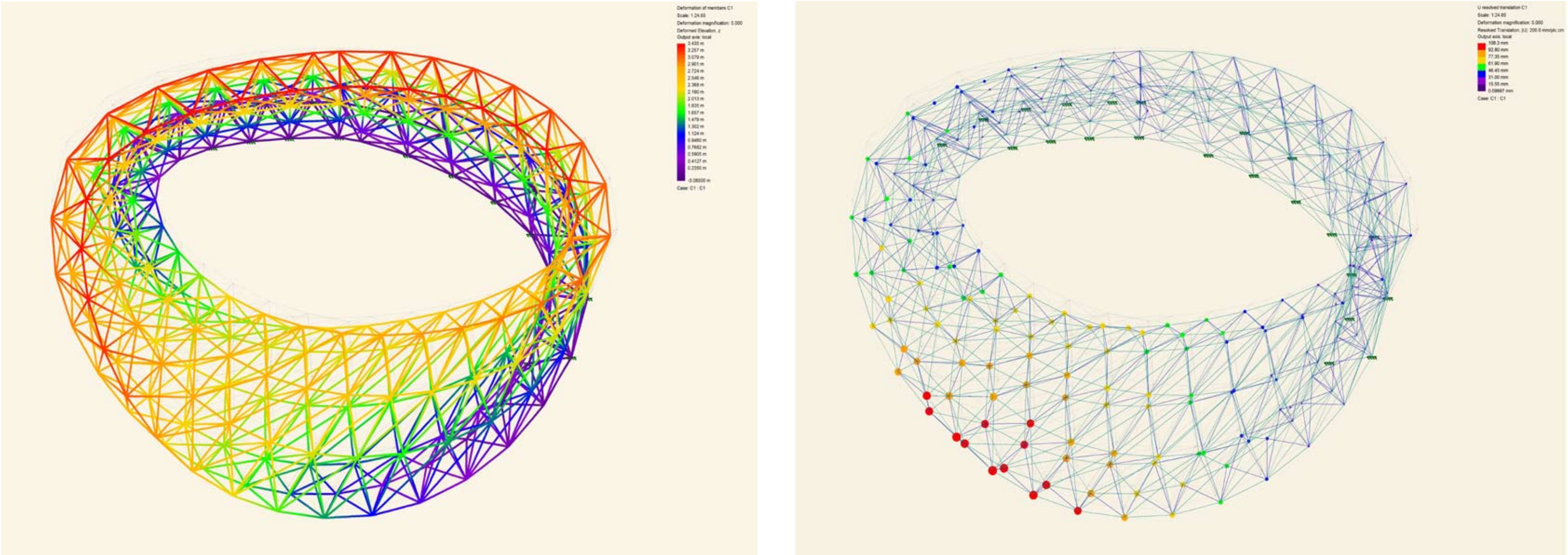
QUATIER DES SPECTACLE - PLACE DE LA PAIX

PAVILION SITING

CONCEPT

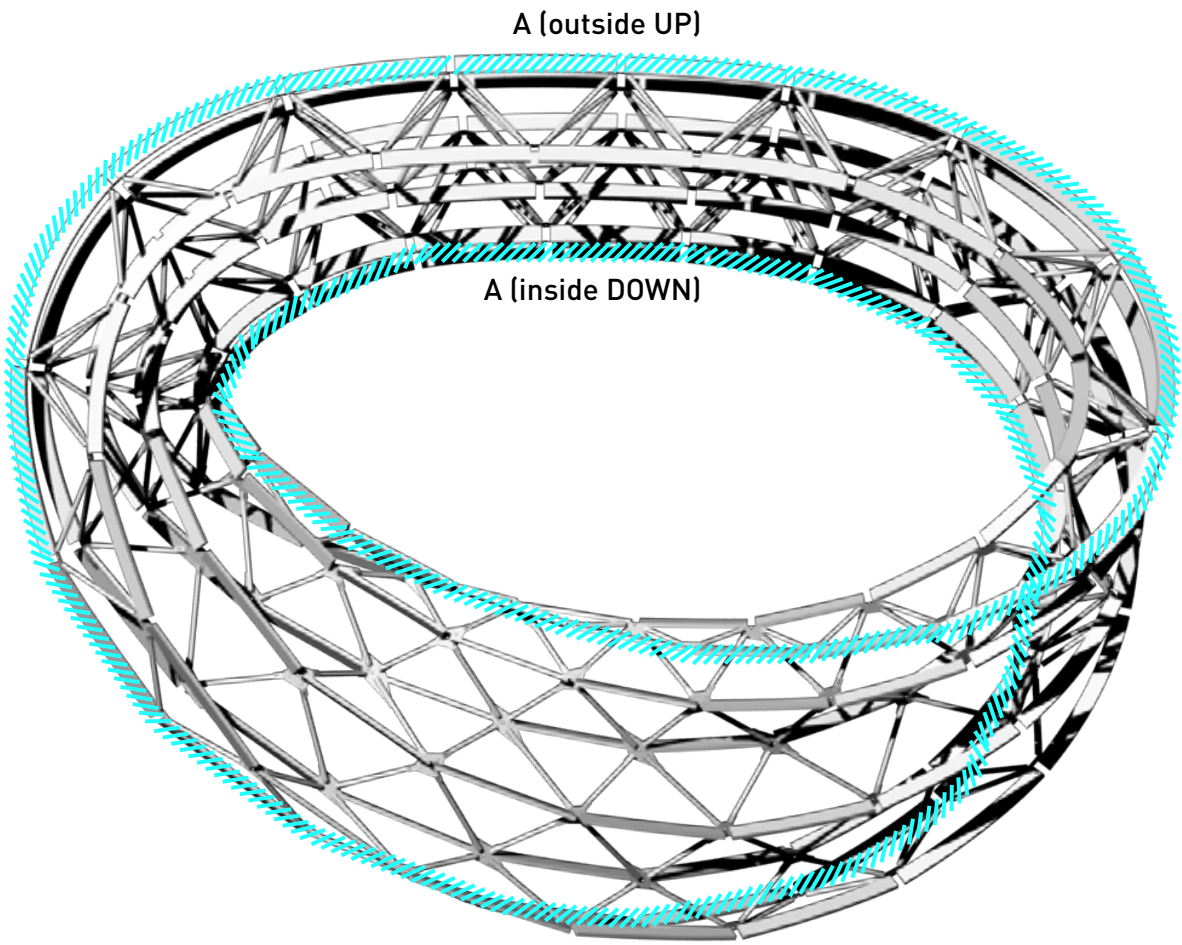


STRUCTURAL ELEMENTS

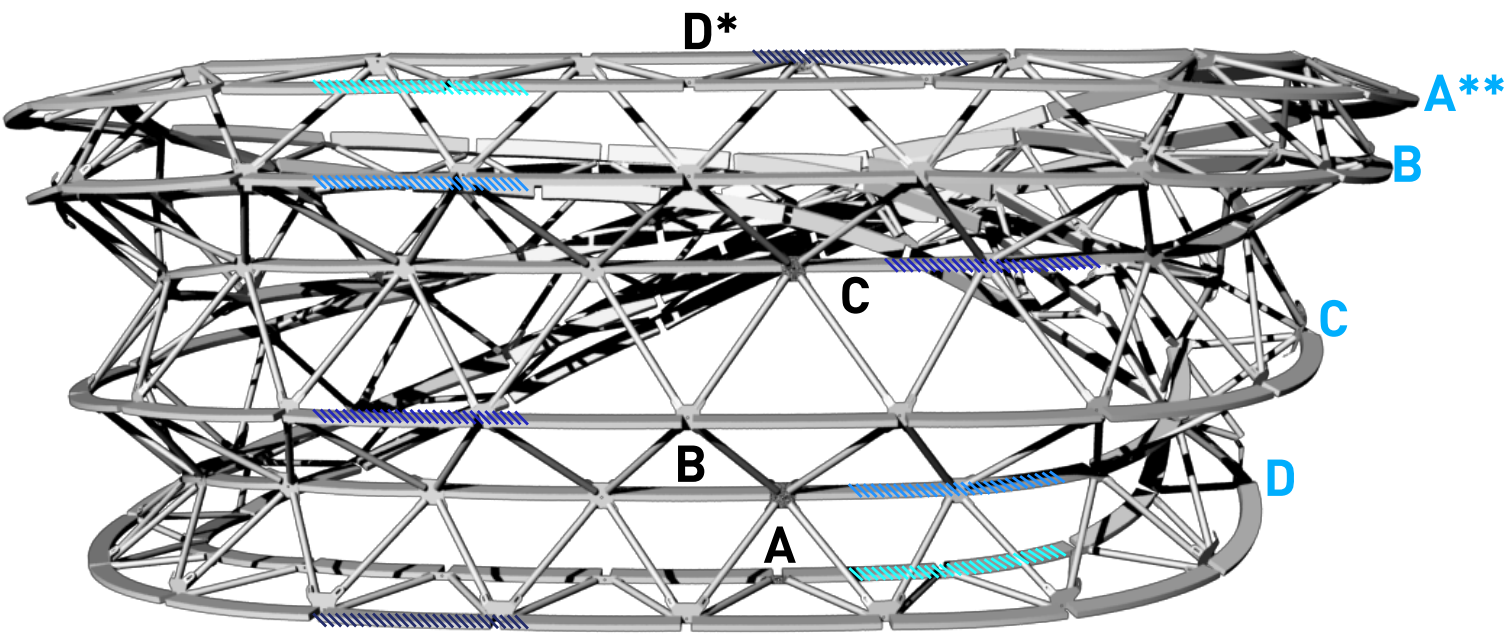


FORCE DIAGRAMS

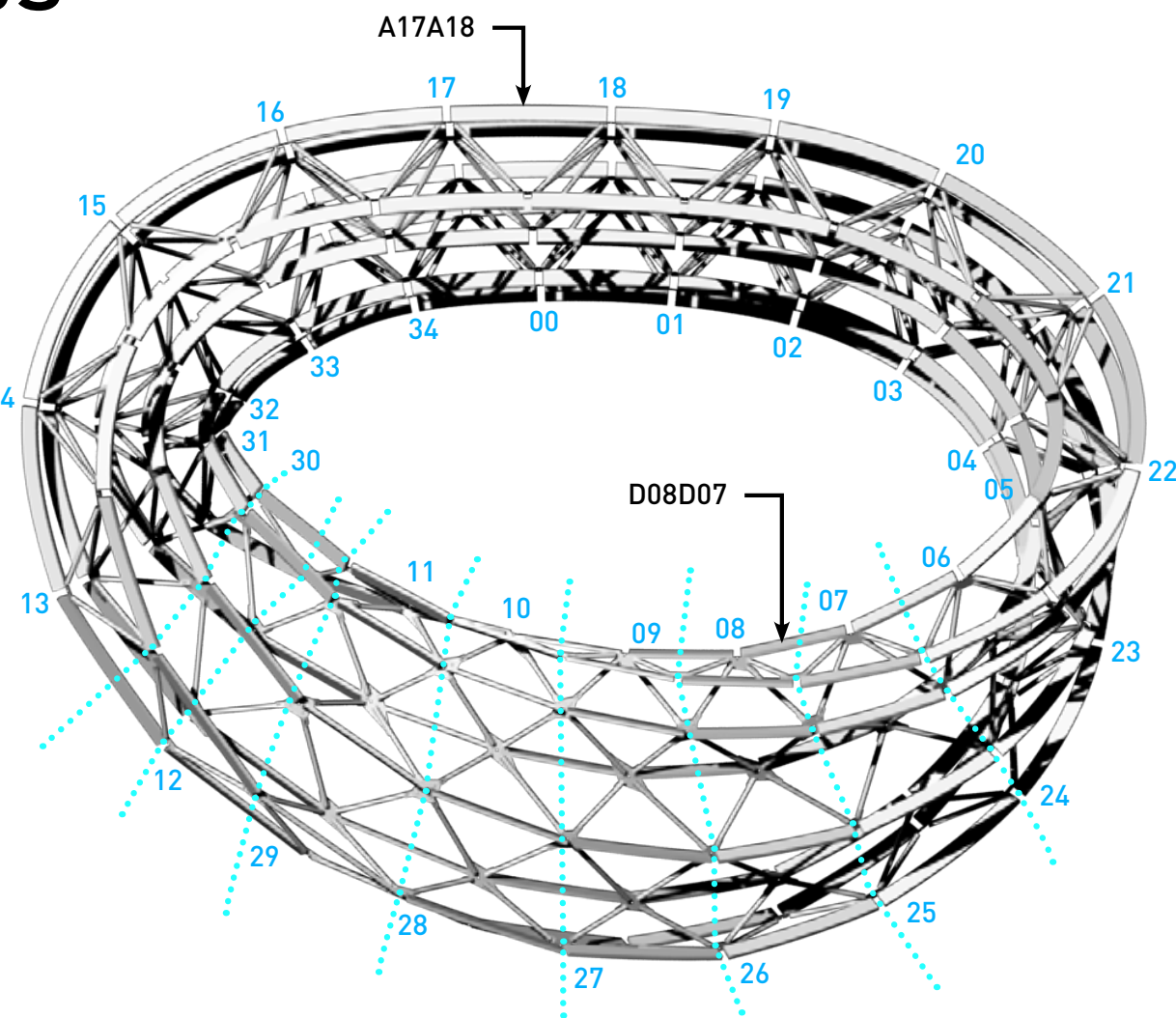
Loops (ribs name)



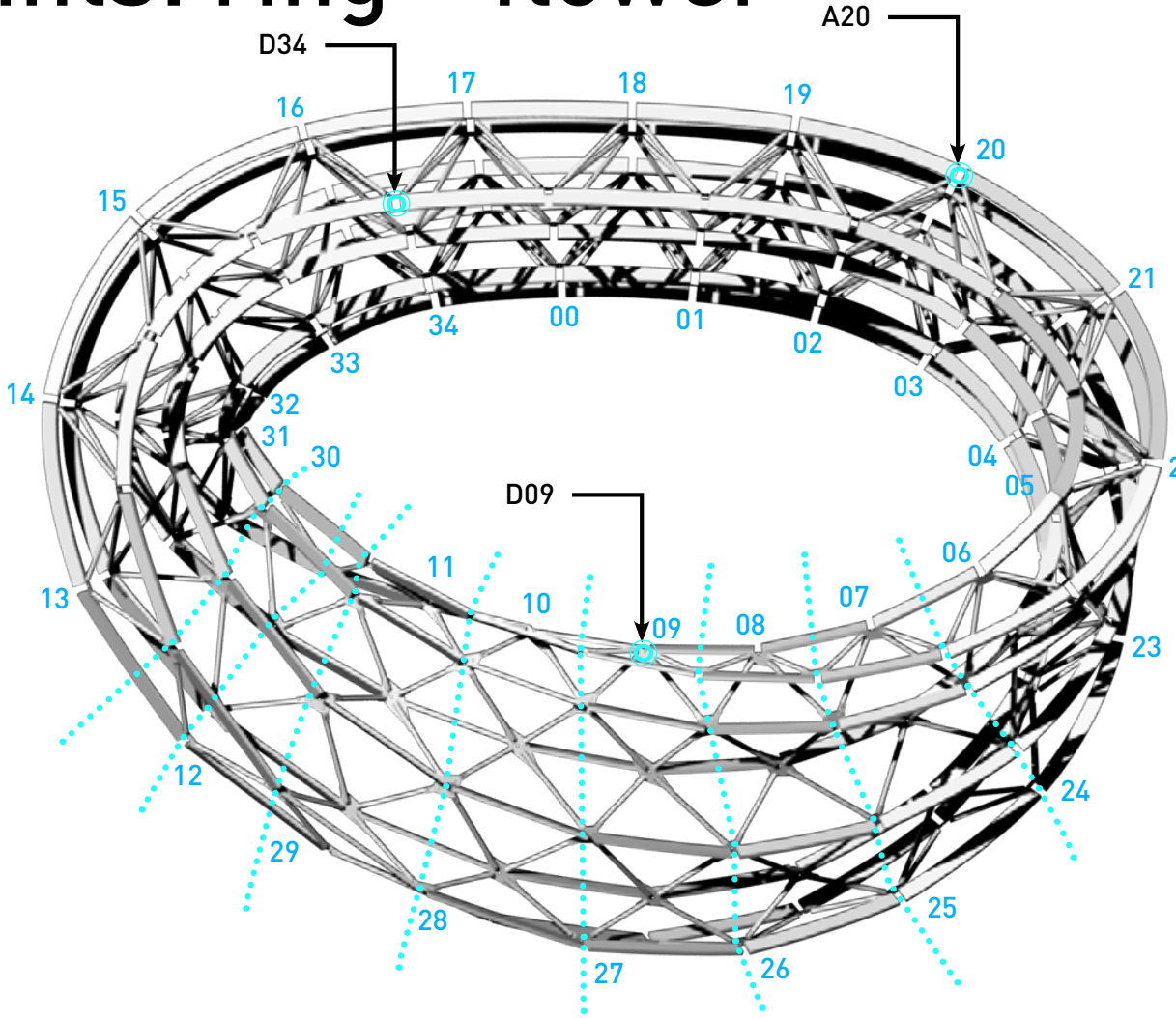
Ribs



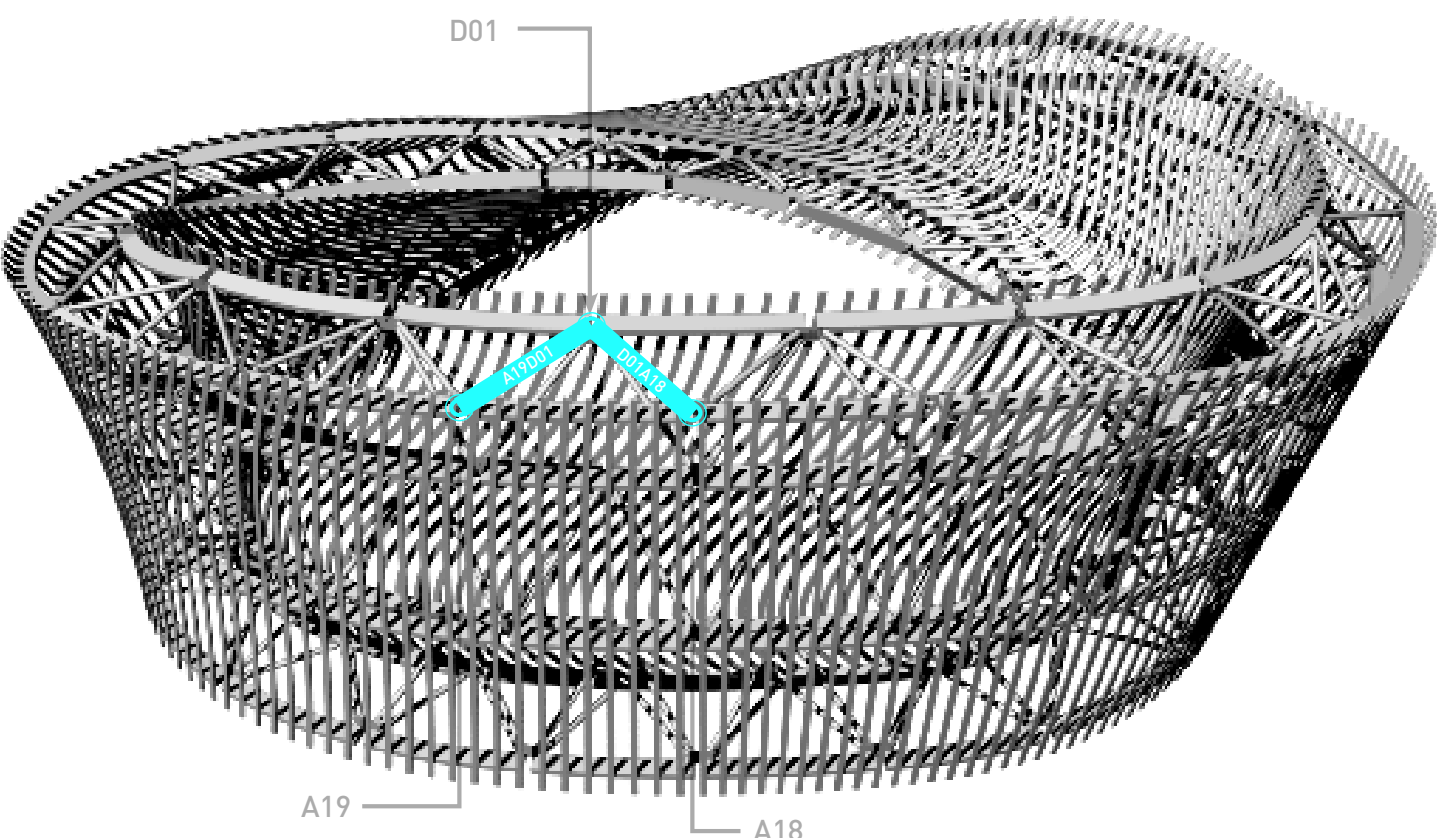
Ribs



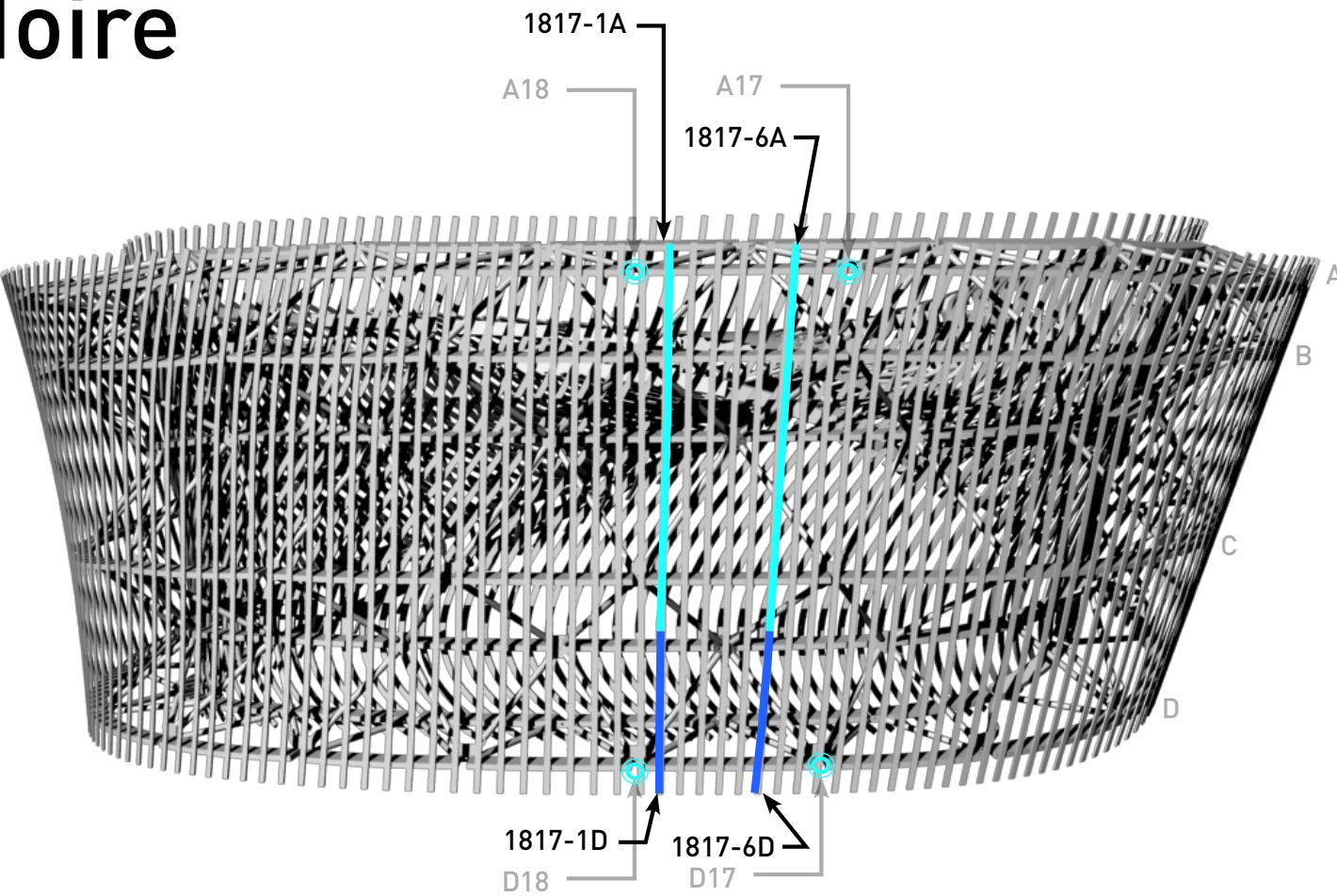
Joints: ring + flower



Tubes



Moire



LABELLING PROTOCOL

PROJECT SITING

The pavilion will be initially displayed on the McGill campus in front of the School of Architecture (Macdonald-Harrington building) in time for the McGill School of Architecture cultural mediations and technology conference during May 18-20, 2011. Following this conference the pavilion will be exhibited on 'Place de la Paix' on St.Laurent Boulevard in Quartier des Spectacles. Ultimately, the pavilion will be donated to a community in Montreal after it has been exhibited.

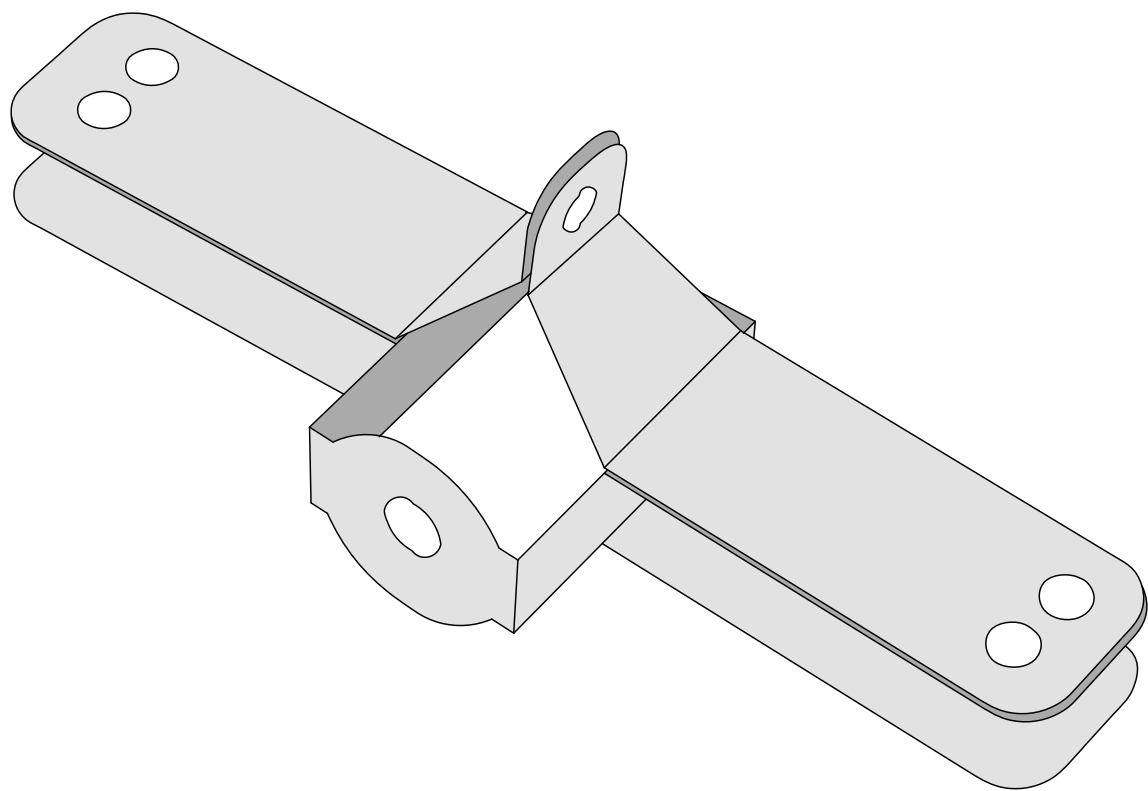
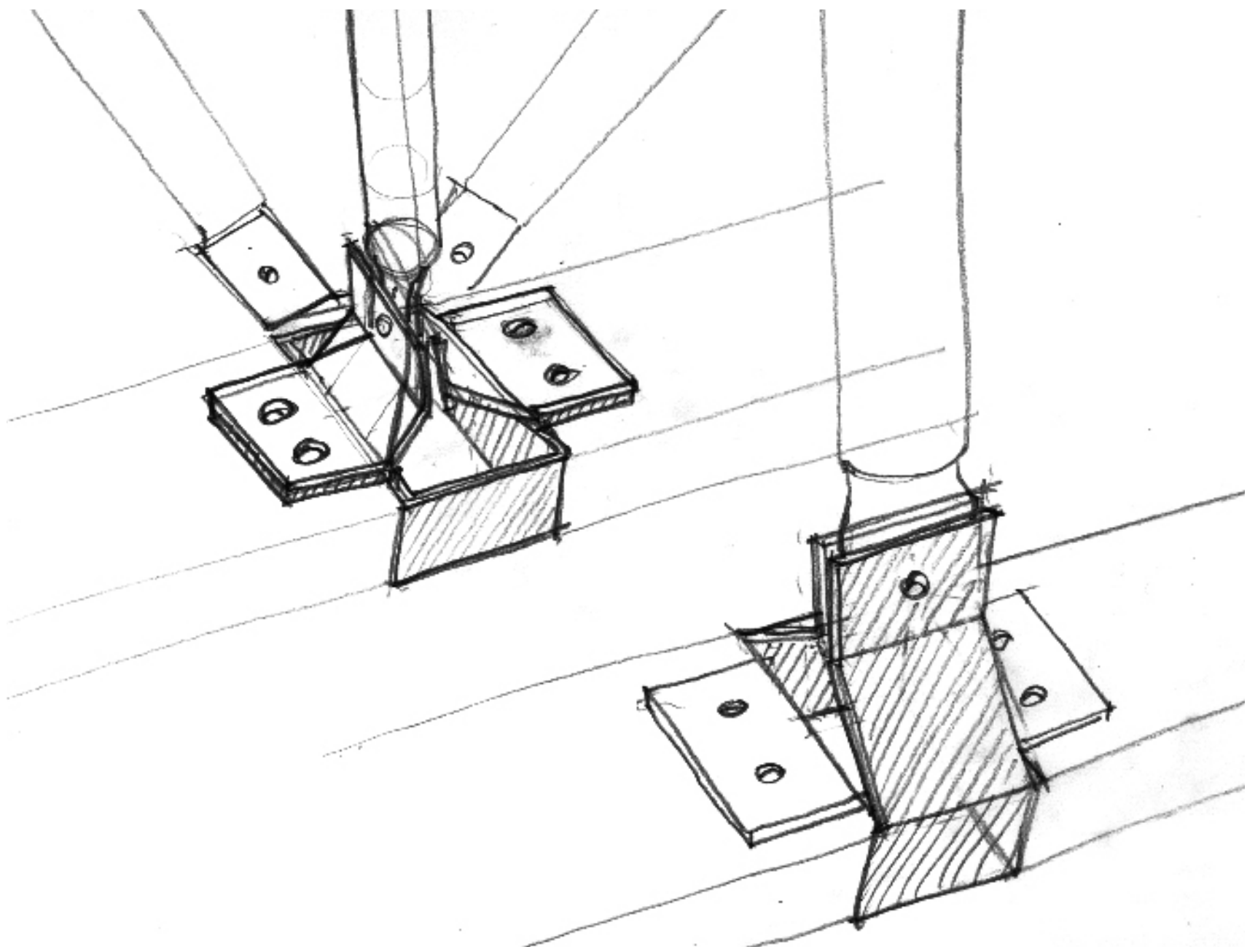
PROJECT DEVELOPMENT

This project initially emerged from a conversation between a small group of students in the Directed Research Studio in McGill School of Architecture graduate program. Through this conversation we established a need to test the theories we have been learning for the past five years and realize a project from start to finish, at full scale. Design-Build projects using advanced construction technologies are commonly done in architecture schools in Europe, such as Architectural Association in London and Stuttgart University in Germany, but which are unprecedented in North America. We began to question "Why not McGill?" In our last year of studies at McGill, we collectively decided to challenge ourselves to work as a team and to showcase to the rest of McGill and other North American Universities the skills and knowledge that we have acquired throughout our studies.

PROJECT GOALS

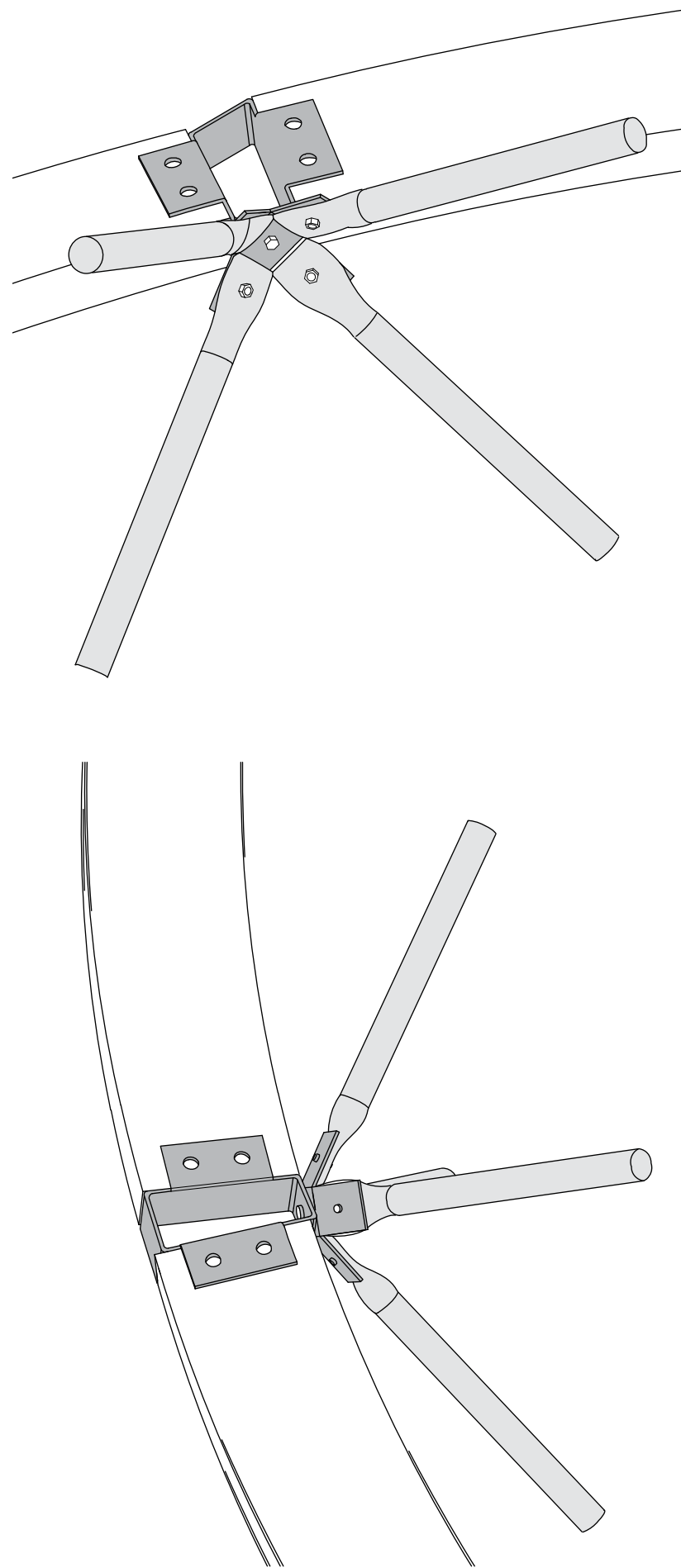
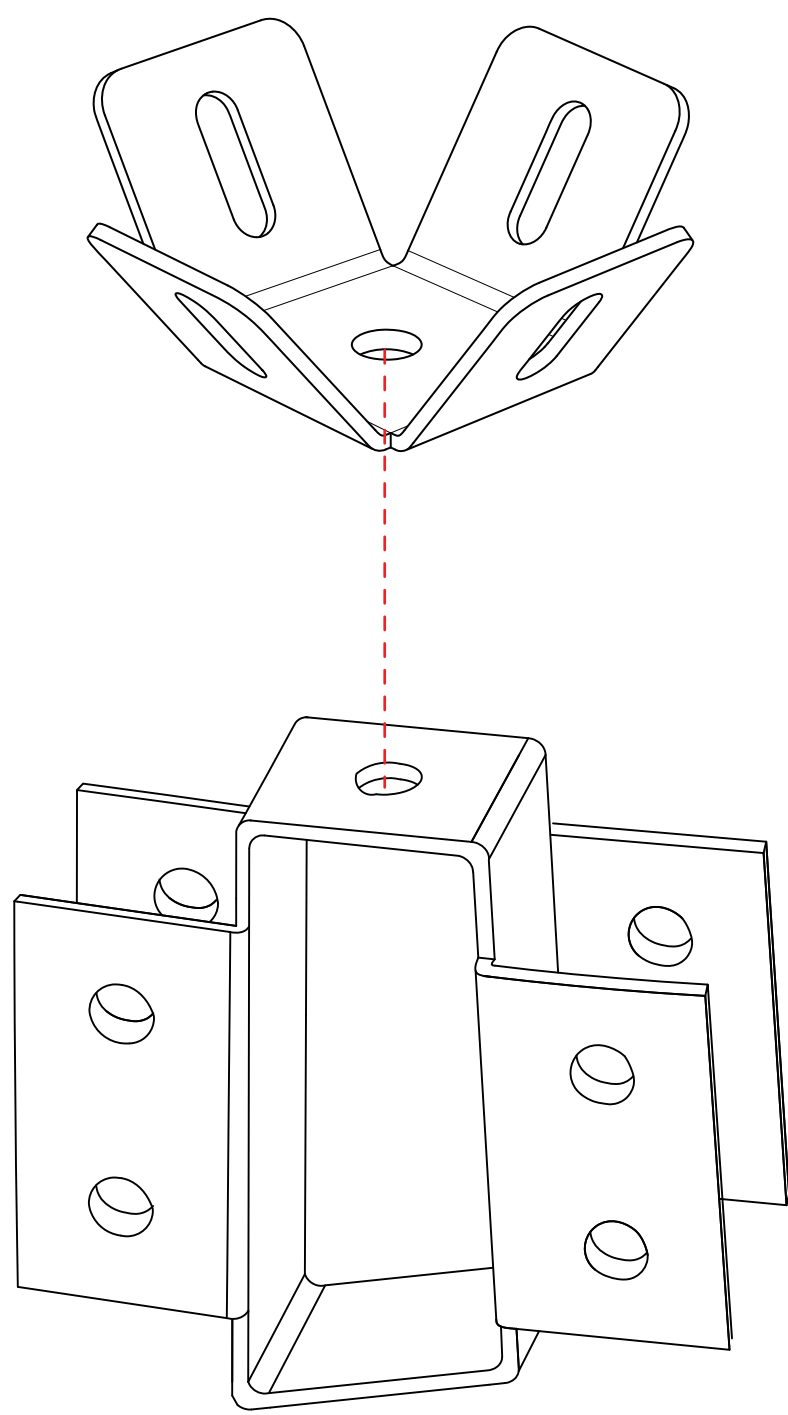
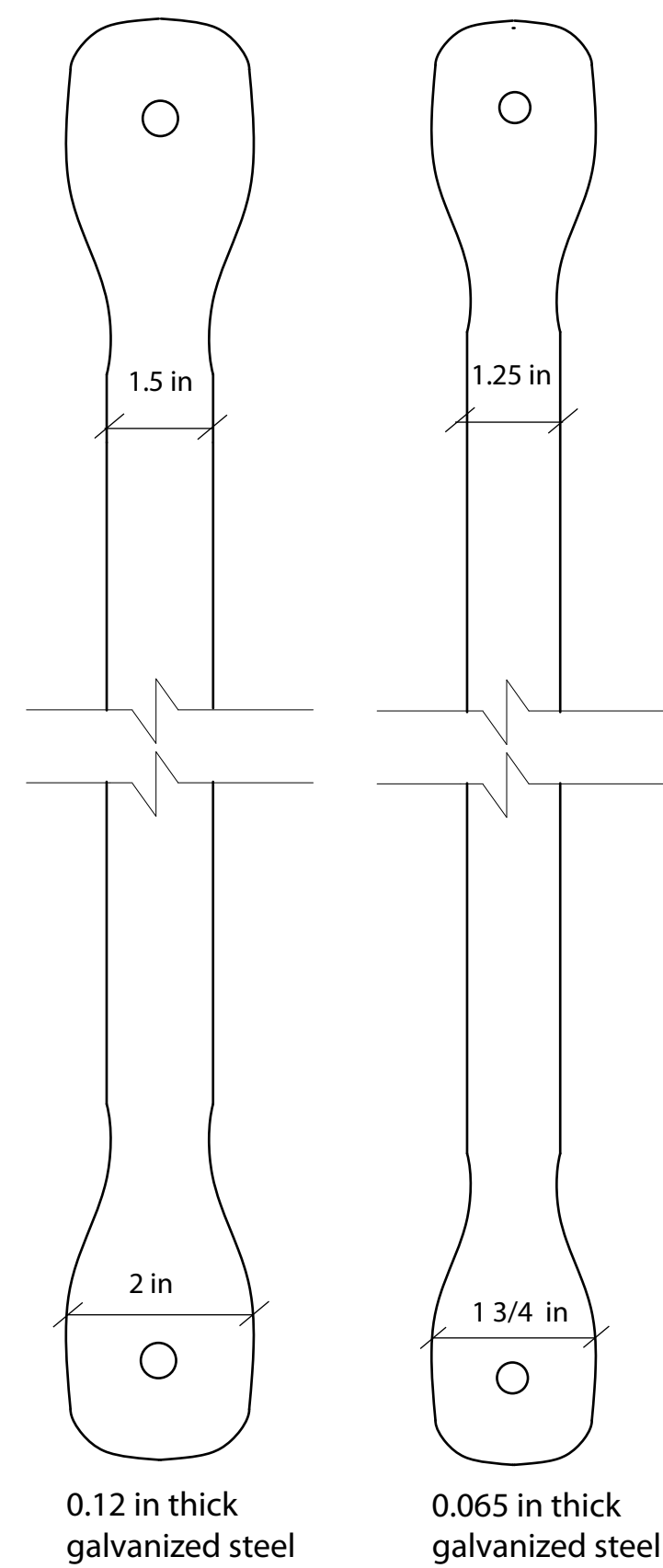
Our goal is to begin to set a new standard for architectural programs that involves making architecture relevant and important within the community. By exhibiting our pavilion on campus during the McGill School of Architecture cultural mediations and technology conference, we will be given the opportunity to engage a greater community of people. The pavilion project is an excellent demonstration of the latest developments in the Directed Research Studio program, exposing advanced construction techniques, digital processes and theoretical approaches to architecture in the public realm.

All of the construction material and manufacturing will be locally sourced and the use of parametric modeling software will allow us to experiment with new technologies that are more efficient and ultimately reduce the amount of wasted material. In addition, the pavilion will have an extended lifecycle in which it will be displayed on campus, then in Quartier des Spectacles and finally donated to a community park.



Tube crimped at both ends

Joint assembly



JOINT DESCRIPTION

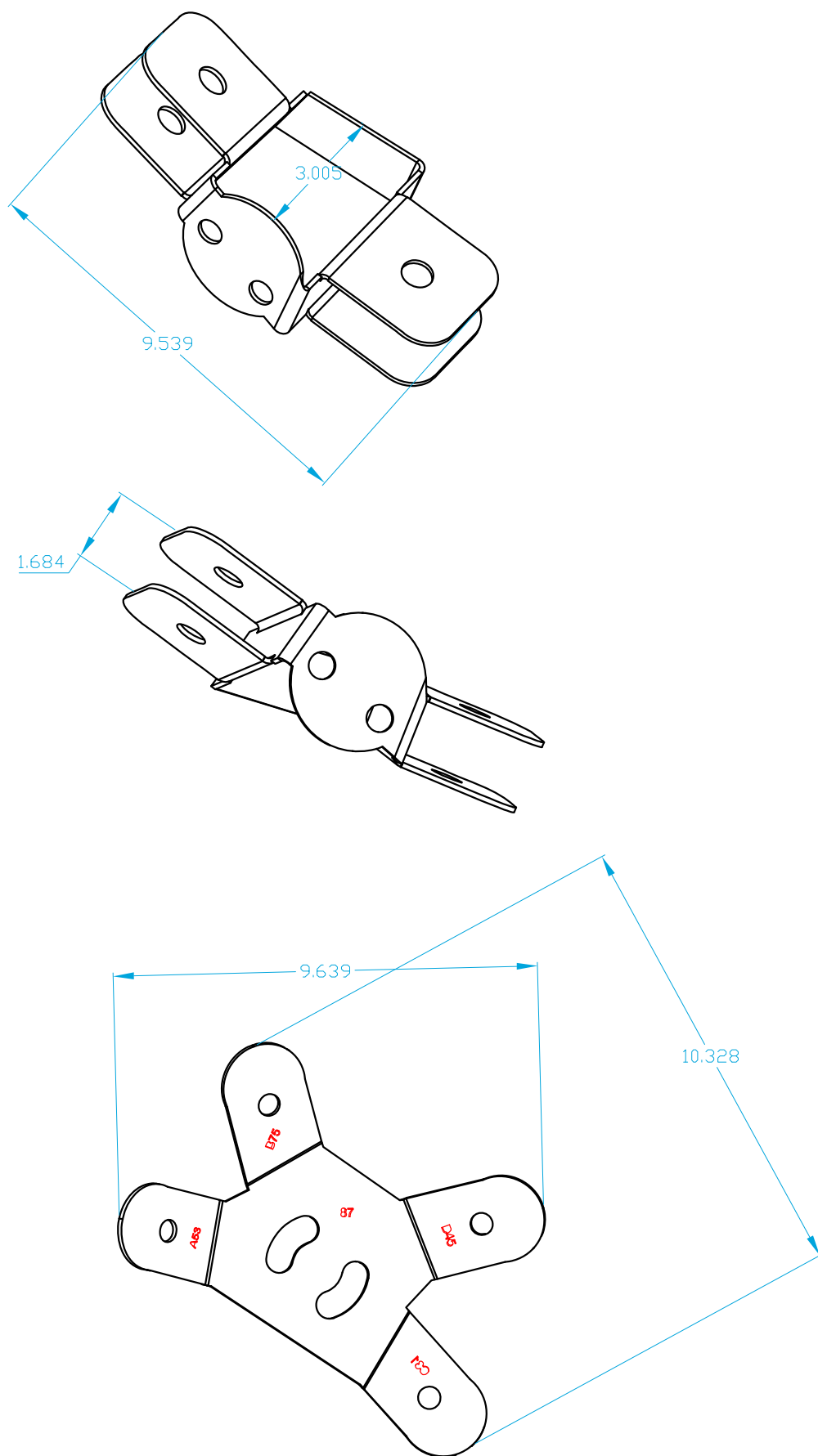
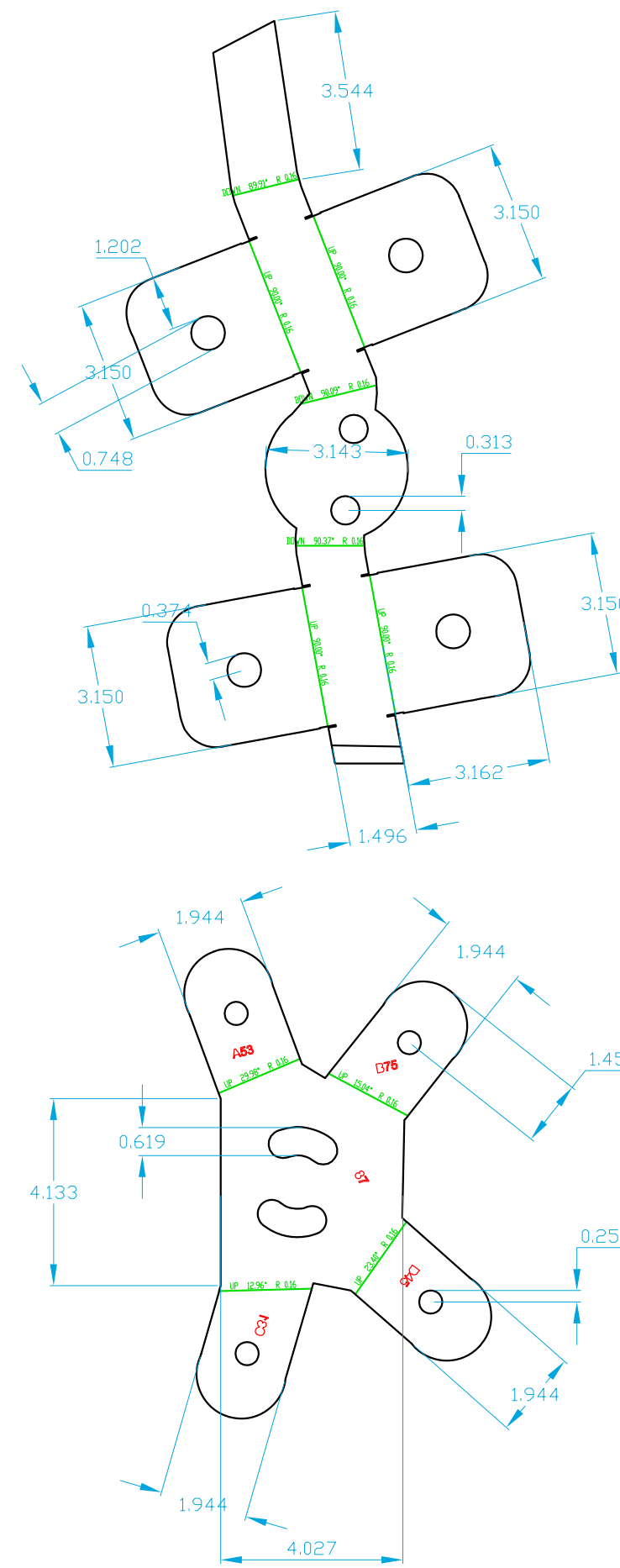
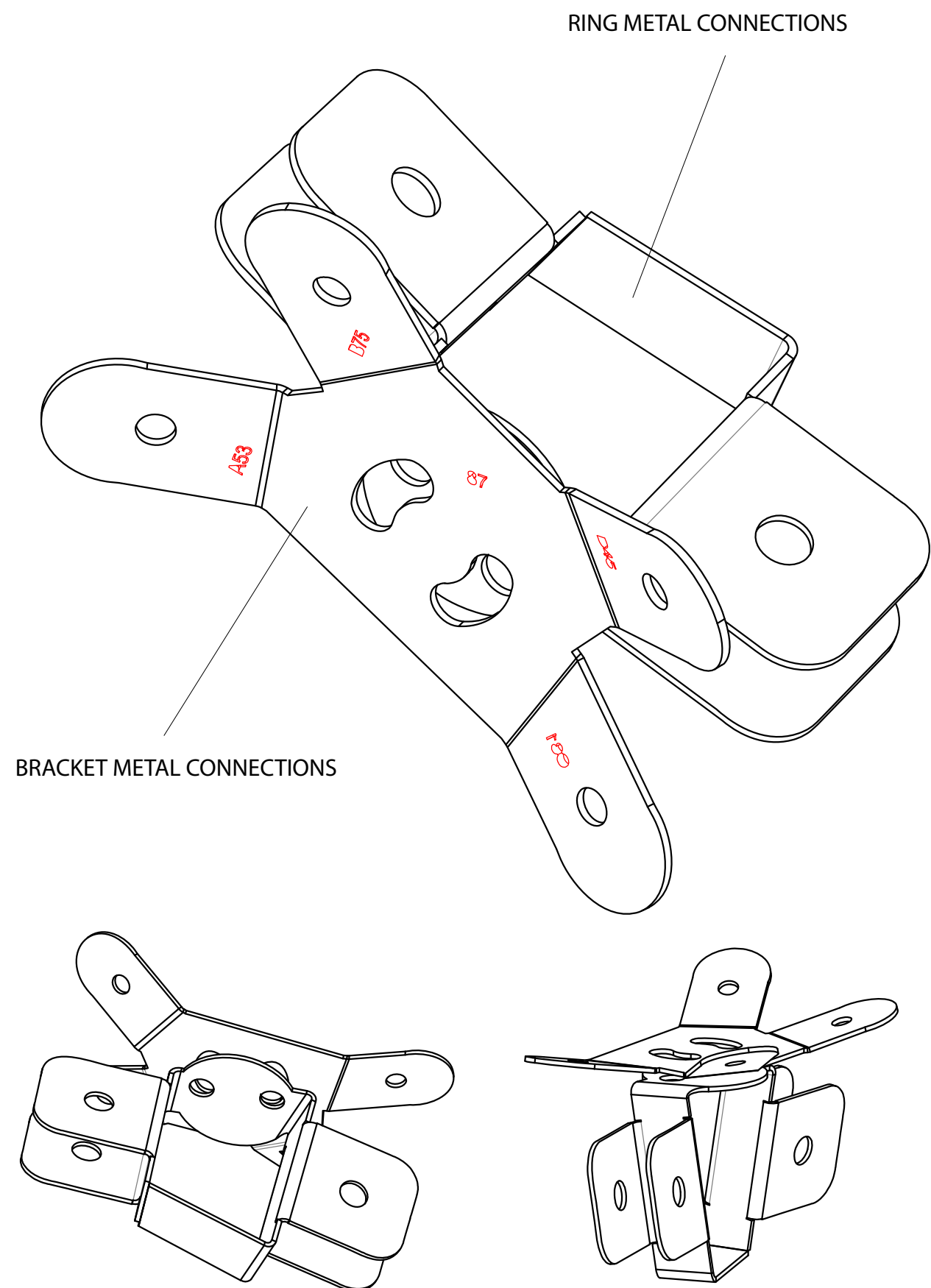
The joints of the multi-layered space frame structure of the pavilion articulate the tectonics of its nodes and are a highly critical component of the overall project . The joints have two main morphologies relating to their distinct performances, one being a “flower” joint and the other being a “ring” joint. The flower joint serves as a connection for the steel tubes of the space frame, whereas the ring joints connect the transversal rib elements that form continuous loops on the pavilion. Both joints are connected together through a bolt passing through their base plates. In addition to these two main components, some of the joints are reinforced by an additional steel tube member which connects several nodes vertically and work in compression at a few critical places in the space frame. These reinforcement elements are structurally independent from the main joint system but work with the geometry of the ring joint.

JOINT DEVELOPMENT

The development and preparation of fabrication drawings of the joints started from sketches and drawings, were refined through the 3D modelling software Rhinoceroes and its scripting plug-in Grasshopper, then going into the manufacturing program Solidworks, then into AutoCAD for final preparations and annotations.

FLAT PATTERN TO CUT RING METAL CONNECTIONS BETWEEN RIBS

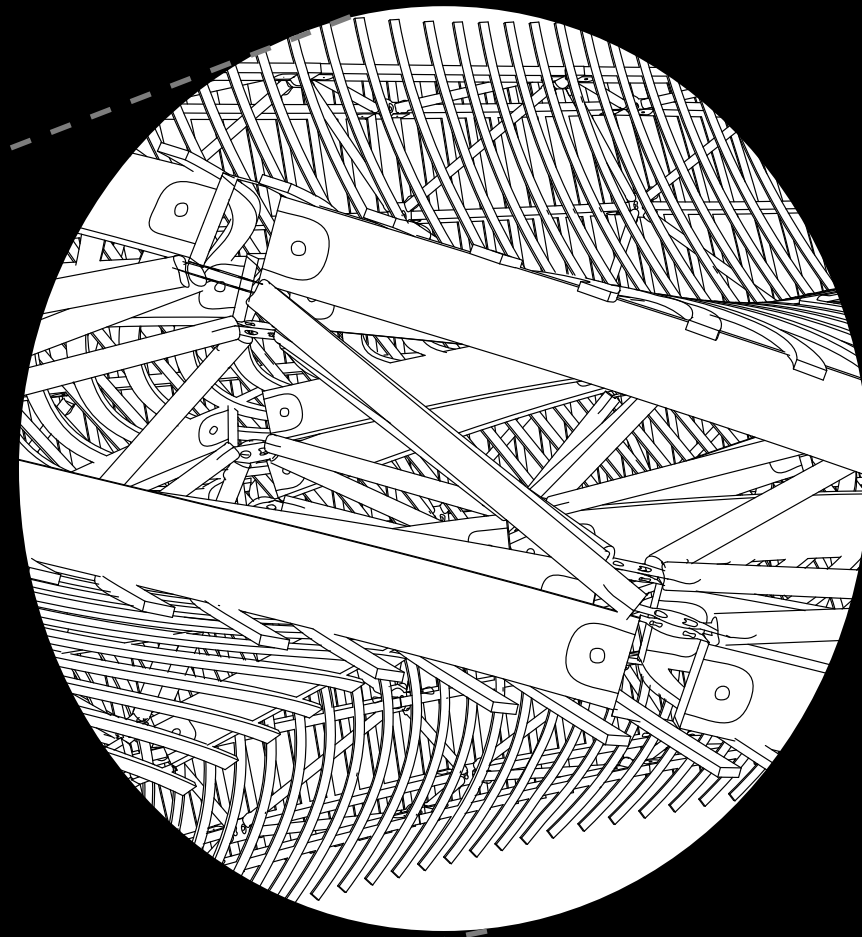
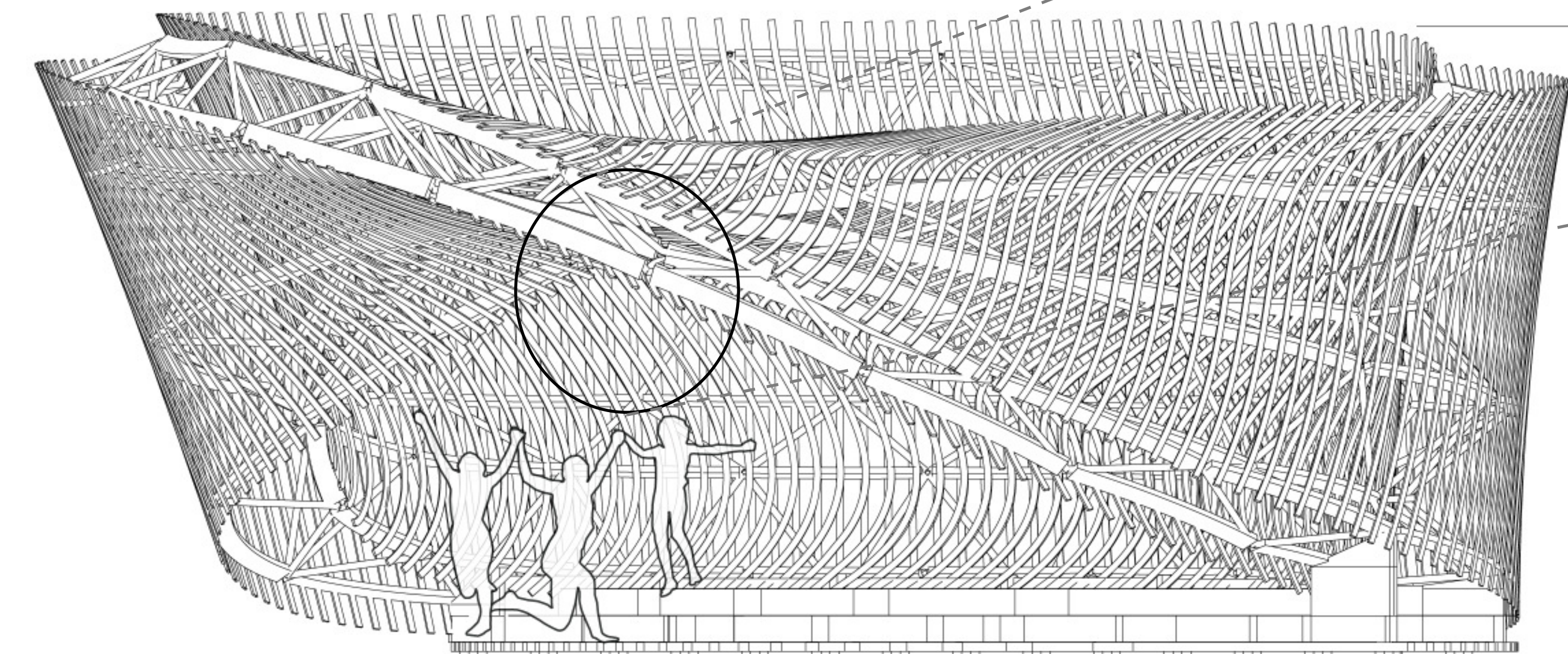
3D DRAWING OF RING METAL CONNECTIONS BETWEEN RIBS



3D VIEW OF BRACKET AND RING CONNECTIONS TOGETHER AT EACH TRUSS NODE

FLAT PATTERN TO CUT BRACKET METAL CONNECTIONS BETWEEN RIBS

3D DRAWING OF BRACKET METAL CONNECTIONS BETWEEN RIBS





RENDER BY DAVID DWORKIND



RENDERS BY DAVID DWORKIND



RENDER BY DAVID DWORKIND

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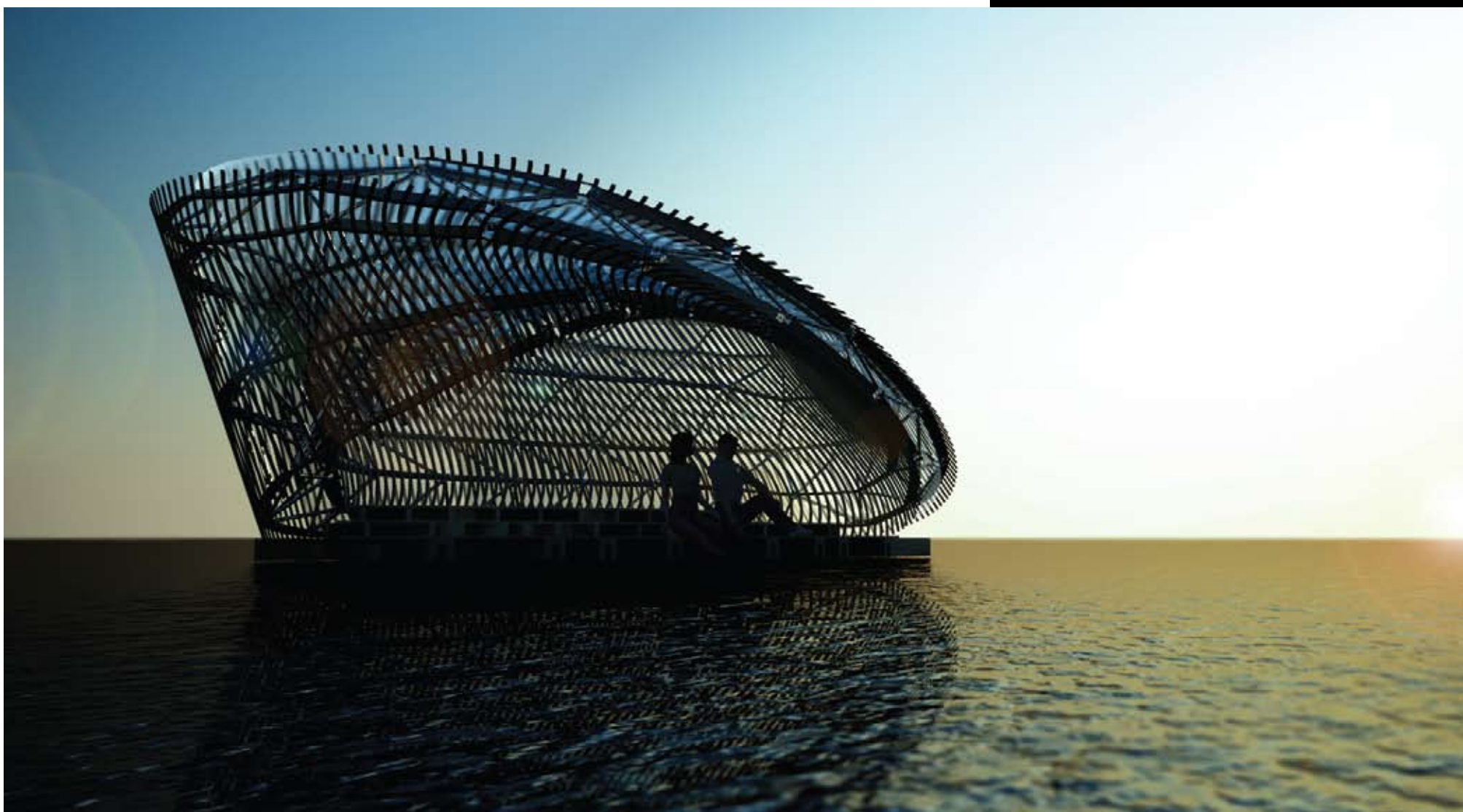
RENDER BY ADAM GAROFALO



RENDERS BY ADAM GAROFALO



RENDER BY DAVID DWORKIND



RENDER BY ADAM GAROFALO

PERSPECTIVE VIEWS



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PERSPECTIVE VIEWS