

---

# Supernova: Digital Craft

---

**VOLKAN ALKANOGLU**

Georgia Institute of Technology

## SUMMARY

The Super Nova project is an investigation into single surface subdivision and monocoque light weight structures. The project is located at the Speer Atrium in the new Academic Building at the University of Colorado in Denver, Colorado.

The project is named 'SuperNova' based on its very dynamic appearance and assemblage of complex and emergent forms. SuperNova is a definition which describes the forming of new stars, growth, development and interaction. The piece will be constructed of many individual cut aluminum pieces forming a network and dependence on each other. This multi-connectivity forms a closed system which enables structural capacities allowing for both moments of tension and compression.

The permanent installation will be fabricated out of unique waterjet cut and painted aluminum components. It consists of over 1000 individual and custom elements which are connected by powder coated stainless steel rivets.

Assembled like a large 3-dimensional puzzle, the design is forming an elegant, soft and dynamic volume. The formal concept consists of simple ellipses which are scaled and rotated in space and ultimately connected with double curved surfaces creating a maze a-like structure.

The piece was digitally designed using a series of software applications. Starting with a subdivision modeler the form was sculpted to

generate its overall mass similar to analog craft techniques of sculpting with stone or wood. The digital model was then exported into a NURBS software to identify and extract individual mesh surfaces. This process was also used to specify its color and materiality locally. Using a custom script and algorithm the mesh surfaces were then rebuild creating developable surface stripes while adding structural tabs and openings for the connectors.

The stripes were then grouped into larger chunks and prepared for nesting into 4'x 10' sheets of aluminum panels. Each individual nested piece is numbered and referenced back into the digital model to allow easy assembly and identification.

During the assembly process a scaffold will be used to build the installation and hang it from the ceiling and mount it to the wall structure.

To connect the individual components, we have introduced male and female tabs on each piece and will apply painted rivets to hold the pieces together. The series of rivets act as a structural connection while introducing a pattern on the surface. The rivet pattern allows for multiple readings and a playful ambiguity between surface, aperture and transparency.

The material choice of painted and anodized aluminum is based on its superlight condition similar to airplane design. The existing wall and ceiling in the atrium space are only able to hold a limited weight capacity triggering the project to consider a thoughtful solution

regarding its weight. With the use of .25mm aluminum the project has a total weight of only 120 lbs. The work will be both suspended from the atrium ceiling with stainless steel cables and mounted to the wall with a sub-structure to engage all available surfaces of the space. The ambition is to connect the work literally to the building while introducing an appearance of an independent object floating in space.

The colors and tonality of the design is a balanced towards the visual qualities and materiality of the interior context and building. It will be conceived as a precious network in both its sweeping, curvilinear design. The components are designed with extreme control over dynamic, form and spatiality. In daylight the art will appear as a multiplicity of surfaces, unified and solid, offering see through views while passing by. At night, the project will be lit to introduce additional elements of shades and complexity to the design.

The perception of the work creates a dynamic ambiance providing an inspiring experience for all visitors and strong identity for the atrium and building.



PERSPECTIVE VIEW



PERSPECTIVE VIEW