CHICAGO FIELD MUSEUM NATURE CLOUDS PRESS KIT INFORMATION:

Project Description:

Nature Clouds are the world's first and largest freeform 3D printed hanging garden installation for the Chicago Field Museum of Natural History for their 125^{th} anniversary. The project's goal is to bring a missing natural living element in the form of an ever evolving "living reef" to the museum's Stanley Field Hall.

"There is a "natural process" of birth, growth and death; the garden invites us to see that we are apart of this process, a tiny one. Marvelous Nature is creating under our eyes forever, playing endlessly with carbon, hydrogen, oxygen and nitrogen, in a fragile balance. Balance that has been several times broken in the Earth's history. This is why, in the search of coherence within the hall, the installation is situated in the Cretaceous period, by using mainly Ferns and Philodendrons. We are showcasing the Tyrannosaur 's period, the biggest dinosaur ever discovered." - Daniel Pouzet (Nature Clouds Designer)

The clouds are part of a larger environment that includes several life size dinosaur installations. The four hanging gardens or clouds comprised of 3,940 lbs of printed material and steel supports Cretaceous period correct vegetation, hydroponics, lighting, theatrical fog and sound equipment with a combined weight of 12,270 lbs. Each cloud can be raised or lowered as needed within the museum's Stanley Field Hall. The largest cloud also provides an immersive plant environment when lowered for public interaction. The 3D printed parts were created on the world's largest freeform 3D printing robots using a bio polymer as the printing material. The artist Daniel Pouzet and the museum's exhibits group chose this method of construction due to Branch Technology's unique strong, light weight printed method called C-Fab™ that offers ultimate design freedom as a cost-effective solution to traditional steel construction. Due to Branch's C-Fab™ strength to weight benefits is was the clear choice for the installations interaction with the museum's historic ceiling structure.

GENERAL INFORMATION:

Project Facts and Figures:

World's first freeform 3D printed garden
Site location —Chicago Field Museum of Natural History / Chicago, IL
Completed original site installation – May 24, 2018
Program –four independent 3D printed hanging gardens with vegetation, hydroponics, lighting, fog machines & ambient sound systems
Total printed volume – 756 cubic feet. / 21.4 cubic meters
Total number of printed parts – 279
Largest individual part – 12.5 cubic feet
Largest part dimensions – 7.5' x 8' x 4"
Largest part weight – 60 Lbs.
Assembly Dimensions – (2) 20' x 15' x 8' (1) 20' x 14' x 9' (1) 34' x 28' x 19'
Overall printed component weight – 3,940 lbs.
Total weight of steel – 9,650 lbs.
Vegetation & support equipment weight – 12,270 lbs.
Total project print duration: 26 weeks

Project collaborators:

Designer – Daniel Pouzet
Design Development – Branch Technology
Structural Engineering / FEA analysis services – Thornton Tomasetti
Site Structural Engineering analysis services – Goodfriend Structure LLC
Hydroponics & Vegetation specialists – Ambius
Rigging specialists – Chicago Flyhouse Inc.
Plant & Accent Lighting – Grand Stage Company
Architect of Record – The Dobbins Group
Plant & accent Lighting Trussing – Kehoe Designs

About Branch Technology:

Branch Technology has developed a novel method for 3D printing architectural components. At its core, this method combines industrial robotics, sophisticated algorithms, and carbon composite materials to freeform print open-cell structures. This method of 3D printing is called Cellular Fabrication™.

C-Fab™ is distinctive in that it prints volumes as cellular matrices. The open-cell nature allows for efficient builds and endless dimensional form. For architectural application, the matrix acts as a formwork or scaffold to accept traditional building materials. The results deliver a product that is as robust as it is revolutionary.

C-Fab utilizes a patented extrusion head attached to a Kuka Robotics arm. The arm travels along a horizontal track creating an impressive build volume of 3,000ft3 . Specially developed algorithms allow it to translate virtually any three-dimensional design into physical form. C-Fab creates full-scale building components, not models. The process is capable of generating components that are 8' wide by 8' high by 40' long. Each component can be attached to the next, allowing for continuous form and maximum flexibility.

Benefits of a 3D Printed Building using C-Fab™:

Nature Clouds showcases the ablity to liberate the design and construction industry. At the core of this revolution lies C-Fab™ or Cellular Fabrication —Branch's unique 3D printing method in combination with conventional construction technologies. The result is a new method of constructing custom prefabricated components with improved materials strength, lower construction and labor costs.

A major advantage of C-Fab™ is design liberation. Typical construction methods are constraining. Custom complex form is prohibitively expensive and often inconceivable to manufacture. With C-Fab™ cost effective design freedom is democratized for all.

C-Fab™ is built with the same strength and efficiency as nature. As a tree gains strength from trigger pressure, architectural components are 3D printed as a cellular matrix and then filled and finished with conventional materials. This cellular construct offers strengths that are 3-4 times that of wood stud construction.

Other benefits include an inherently zero-waste process. The construction and demolition industry produce about 30% of all waste. C-Fab™ changes this. With a unique method of additive manufacturing, material utilization is constrained to that which is absolutely required. Nature Clouds was designed to be built in modular components of exacting dimensions. We ask not how much can you 3D print, but how little?

Nature Clouds showcased job site efficiencies. Nature Clouds was prefabricated in in a controlled factory environment. Modular components are later shipped to the job site for an assembly process that is as much as 30% faster on-site, 1.7X more labor efficient, and reduces waste by 97% compared to typical on-site methods.