AIA PAVILION
GERNOT RIETHER

Photo by Gernot Riether

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ARCH 497
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PAVILION INFORMATION

AIA COMPETITION:
Intervention that brings life to the historic city of New Orleans.

Architect:
Gernot Riether
- Georgia Institute of Technology, Atlanta
- Digital Design Built Studio

Project Team (School Project):
Gernot Riether, Valerie Bolen, Rachel Dickey, Emily Finau, Tasnouva Habib, Knox Jolly, Pei-Lin Liao, Keith Smith, April Tann

Date: 2011

Site Location:
Restored courtyard of a local gallery owned by Arthur Ross, close to North Rampart at 1025 Orleans Street.
New Orleans, Louisiana, USA

Dimension: 18 sqm / 193.75 sqf

Cost: $2,500

Photo by Gernot Riether
CONCEPT

Glowing spherical enclosures sited within the hidden courtyards of the city’s distinctive French Quarter.
320 different PETG cells

Cells are prefabricated and assembled into six larger components, designed to fit into a small truck

Less than 2 days to be installed by Riether and eight students
Pinching and reconnecting the surface used as a technique to increase the structural performance of the envelope.

At strategic locations the skin morphs into bracing and column like systems.

**Structure and building envelop are combined into a single material system.**
Geometry distorts in response to:

specific site conditions;

solar orientation;

programmatic requirements
Water harvesting

Photos by Gernot Riether
Planting
Seating and viewing
**MATERIAL**

Glycol-modified polyethylene terephthalate (PETG)

Category: *Polyester*

Description: PETG is PET modified by replacing ethylene glycol with small amounts of larger molecules for polymerization. The result is reduced crystallization and a lower melting point. PET-G is a clear amorphous thermoplastic that can be injection molded or sheet extruded.

PETG can either be produced from *recycled plastic*, or more pertinent to this location, from *sugarcane*: a plant that has been an integral part of the culture of Louisiana for over 200 years.
Producing PETG from sugarcane: **Bagasse**

**Is the fibrous substance that remains after juice has been extracted from sugarcane stalks.**

It is used as a biofuel and in the manufacture of pulp and building materials.

![Sugarcane bagasse in Hainan, China](image)

A typical chemical analysis of bagasse might be (on a washed and dried basis):
- **Cellulose**: 45–55%
- **Hemicellulose**: 20–25%
- **Lignin**: 18–24%
- **Ash**: 1–4%
- **Waxes**: <1%

Source: gb&d
WallArt, 3D Panels created out of bagasse
Using PETG as a material suggests a **negative carbon footprint**. According to one of its world’s largest manufacturer, “Dow Chemicals” every 0.5kg of PETG produced from sugar cane represents a total gain of almost 1kg of CO² removed from the atmosphere.

Since the **AIA pavilion used 123kg of material**, the production of the pavilion would remove 246kg (= 8,677.39oz) of CO² from the atmosphere.

This demonstrates that producing PETG from sugar cane has tremendous environmental benefits that might make plastic the building material of the 21st century.
The pavilion reflects Gernot Riether’s 5 points that lead to a more environmentally friendly architecture:

1) **Build from bio-materials that can be recycled.**
   Architecture and ground can become one.

2) **Avoid typological thinking.**
   Single systems can be flexible enough to respond to multiple functions.

3) **Combine digital and physical spaces.**
   Digital media has changed our perception, which will also inform physical space.

4) **Mass customize building systems and system components.**
   This will allow for more intense relationships between architecture and other systems.

5) **Let geometry emerge as a consequence of interactions, matter and material behavior.**
   Natural and artificial systems will become indistinguishable.
Using **CNC technology**, each template was cut from PETG sheets, before being **thermoformed** into shape using a neatly designed adaptable mould.
Watch this link:
https://www.youtube.com/watch?v=c8QEcVP_oAU&app=desktop

Details on:
- Different aluminium strips used
- Termoforming techniques used and kit of tools
DESIGN AND FABRICATION: SYNTHESIS OF THE PROCESS

Design software used:
Rhino, Grasshopper, AlphaCAM

Material: PETGs (Structure and Envelop)

Fabrication
CNC: 25 hours machining time
Thermoforming:
Techniques used: drape forming, vacuum forming and draping

Number of pieces: 320

Portability:
The pavilion can be disassembled.
The pavilions cells can be stocked and moved with a mini Truck.

Assembly: Bolt connections.
Assembly time: 2 days

Fabricated at:
DFL, Digital Fabrication Laboratory at Georgia Institute of Technology

Photos by AECCafe
ONLINE RESOURCES


http://www.archdaily.com/137993/aia-pavilion-gernot-riether/

Materials Library: Polyethylene Terephthalate Glycol-modified (PET-G)

Wikipedia: Bagasse
http://en.wikipedia.org/wiki/Bagasse

Youtube: Design, Fabrication and Construction process, video by Gernot Riether and Students
https://www.youtube.com/watch?v=c8QEcVP_oAU&app=desktop

Youtube video: https://www.youtube.com/watch?v=VFQTI5DVhnI

THANK YOU!