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First Award
Pulp Pavilion
Ball-Nogues Studio
Since 1999, the Coachella Valley Music and Arts Festival has drawn the rich and the famous to the Southern California desert for a six-day party packed with stunning installations that give the live bands a run for their money. For Los Angeles design firm Ball-Nogues Studio, the event was ideal for debuting a building material it had been developing for years: recycled-paper pulp.

The inexpensive, abundant waste material has been used in everything from disposable drink trays to furniture and sculpture, but Ball-Nogues wanted to go further—much further. “We didn’t begin with a specific architectural objective,” says principal Benjamin Ball, Assoc. AIA. “We wanted to see where the experiments would lead us.”

The studio started with shell structures. After mixing a slurry made from paper pulp and water, they used a homemade pressure sprayer to apply it to objects, tensioned fabrics, and even a Volkswagen Beetle, and then allowed it to harden.
Eventually, Ball says, “we had this intuition that we could spray the pulp over matrices or lattices of string.” By suspending rope between fixed armatures and adding layers of slurry, they could create a rigid, self-supporting structure. The rope gave the composite material tensile strength while the hardened pulp provided compressive strength. Weaving the cordage between fixed armatures, however, yielded the strongest structures. The studio could also produce structures that ultimately are in compression by flipping the entire assembly upside down.

For the 2015 Coachella festival, Ball-Nogues designed a pavilion made of seven 20-foot-tall woven “trees” that joined together in a latticed roof. To ensure their design could endure the highly public venue, they ran multiple failure tests on mock-ups to understand the composite material’s mechanical and structural properties. A finite element analysis of the entire pavilion helped simulate its performance under live and wind loads.

Construction took place near the festival site in Indio, Calif. Seven team members hand-wove jute rope around a removable metal and wood truss to create the initially upside-down trees. From the extensive experimentation and mock-ups, Ball says, “each of our staff became a specialist in a specific rule related to weaving” such as the density, porosity, and rope length within a given part of the tree.

The team sprayed 12 layers of paper pulp onto the ropes. Each layer was dyed with a different pigment, which became an indicator of how many layers each fiber had accumulated. Additional finish coats enhanced the structure’s multicolor effect. Cranes transported the trees from the staging area to the site, where the team flipped and anchored them, and then removed the trusses.

The pavilion was a hit. Covering 1,300 square feet, it offered a shady and joyful respite from the raucous event. After the event, but still at Coachella, Ball-Nogues and their structural engineer conducted
destructive tests with the pavilion to validate the hypotheses of its properties. The pavilion was then sent through a wood chipper and composted.

The project’s innovative design, ambitious scale, and novel use of a recycled material wowed the jury. “The team took a huge risk,” juror Steven Rainville said. “I’ve never seen this before.” Juror Marc Fornes appreciated the studio’s approach to discovery. “It’s fresh and exciting,” he said. “It drives you to go out and do research.”

Ball-Nogues’ co-principal Gaston Nogues says the technique can be used for indoor structures or as a temporary shelter—but only in dry climates, for now. In its current formulation, the composite material would dissolve in a rainstorm. With additives and waterproof coatings, however, it may be possible for future structures to withstand the elements. Juror Joyce Hwang, for one, wants Ball-Nogues to continue their exploration. “I can’t wait to see another project made with the same method,” she said. —C.H.
Judges

French architect Marc Fornes is the principal and founder of TheVERYMany in New York, as well as a self-described connoisseur of computer science. His work focuses on investigating design through codes and computational protocols. He received a master of architecture and urbanism from the Architectural Association School of Architecture in London.

Joyce Hwang, AIA, is an associate professor of architecture at the University at Buffalo, the State University of New York, and the director of Arts of the Prairie, a research and practice firm in Buffalo, N.Y., that confronts contemporary ecological conditions through creative means. She received an M.Arch. from Princeton University and a B.Arch. from Cornell University.

Steven Rainville, AIA, is a principal at Seattle-based Olson Kundig Architects, which he joined in 1996. He is also the director of the firm’s R&D department as well as the founder of Mind Mine, the firm’s forum for crowd-sourced ideas that break down boundaries between industries. He received his B.Arch. from Washington State University.

Credits

Pulp Pavilion, page 104
Client: Coachella Valley Music and Arts Festival
Design Firm and Fabricator: Ball-Nogues Studio, Los Angeles - Gaston Nogues, Benjamin Ball, ASSOC. AIA (project leads/designers); Rafael Sampaio Rocha (project manager); Ricardo Fasman, John Guinn, Fernando Marroquin, Rafael Sampaio Rocha, Forster Rudolph, Corie Saxman, Nicole Semenova, Ethan Schwartz (onsite project team); Andrew Fastman, AIA, Michael Anthony Fontana, Cory Hill, James Jones, Mora Nabi, Jacob Patapoff, Allison Porterfield (support)
Lighting Programming: F. Myles Sciotto
Structural Engineer: Nous Engineering
Omar Garza
Funding: Commission from Goldenvoice
Size: 1,500 square feet

Pure Tension Pavilion, page 108
Client: Volvo Car Italia
Design Firm: Synthesis Design + Architecture, Los Angeles - Alvin Huang, AIA (principal); Filipa Valente, Chia-ching Yang, Behnaz Farahi, Yueming Zhou
Structural Engineer: BuroHappold Engineering
Electrical Engineer: Ascent Solar

Bar Raval, page 110
Client: Grant van Gameren, Mike Webster, and Robin Goodfellow
Consultant and Fabricator: Millworks Custom Manufacturing
Special Thanks: Klaudiusz Kociolek, Gregory Rybak, Nick Savage, CNC Software/Mastercam
Size: 1,500 square feet

Co-Robotics and Construction, page 112
Design Firm: Rust Belt Robotics Group, University at Buffalo, State University of New York (SUNY)

Queen Richmond Centre West, page 113
Client and Funding: Allied Properties REIT
Design Firm: Sweeny & Co Architects, Toronto
Structural Engineer: Stephenson Engineering
Fabricators: Cast Connex, Walters Group
Construction Management: Eastern Construction
Electrical Engineer and Lighting Designer: Mulvey & Banani International
Mechanical Engineer: The Mitchell Partnership
Special Thanks: Michael Emory, Hugh Clark, John Stephenson, Jeffrey Stephenson, Carlos de Oliveira, Frank DeCari, Renato Tacconelli, Tim Verhey
Size: 302,000 square feet

Radical Railbanking, page 114
Design Team: Master of None, Ann Arbor, Mich. - McLain Clutter (project adviser); Sehee Kim (student research assistant)
Funding: University of Michigan Office of Research, funding for Artistic Productions and Performances, 2011; University of Michigan Taubman College of Architecture and Urban Planning
Special Thanks: Syracuse University School of Architecture - Mark Linder

Bands, page 115
Client: Samitaur Constructs - Frederick and Laurie Samitaur Smith
Design Firm: Eric Owen Moss Architects, Culver City, Calif. - Eric Owen Moss, FAIA (architect); Dolan Daggett, Vanessa Jauregui, Nicholas Barger, Zarmine Nigohos, Sean Briski, Raul Garcia, Scott Nakao, Richard Yoo (project team)
Structural Engineer: Arup
Size: 183,000 square feet

Philip J. Currie Dinosaur Museum, page 116
Client: Philip J. Currie Dinosaur Museum
Design Firm: Teeple Architects, Toronto - Stephen Teeple, Martin Baron, Mark Baechler, Will Elsworth, Lang Cheng, Carla Pareja, Gloria Perez
Architect of Record: Architecture | Tkalcic Bongfort
Structural Engineer: Fast + Epp
Mechanical Engineer: Hemisphere Engineering
Electrical and Civil Engineer: AECOM
Exhibit Consultant: Reich Petch Landscape Architects: Sciatti-Miller-Murray LEED Consultant: Enenomol Engineering (now part of MMM Group)
Contractor: PCL Construction Management Fabricators: StructureCraft Builders in collaboration with Fast + Epp
Size: 42,000 square feet

Breathe Brick, page 117
Design Firm: Both Landscape and Architecture, Charlottesville, Va. - Carmen Trudell (primary investigator) Collaborators: California Polytechnic State University, San Luis Obispo (Cal Poly); Tracy Thatcher (consultant); Natasha Schnider, Kate Hajash, Cameron Venancio, Justin Wragg, Jennifer Thompson, Michelle Kolb (student research assistants); Rensselaer Polytechnic Institute - Kaleri Koong, Kyleen Hoover (student research assistants)
Funding: Cal Poly College of Architecture and Environmental Design’s Planning, Design and Construction Institute