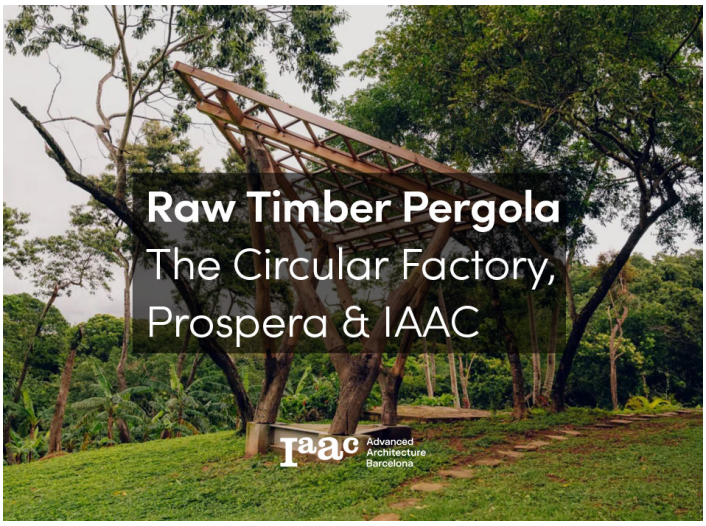

RAW TIMBER PERGOLA

Posted on October 7, 2025 by Dima Fadel

Categories: expanding design practices, Formats, IAAC, Low Density, Project, Prospera, Technology and fabrication, The Circular Factory, Topics

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A robotic timber construction prototype redefining architecture in the tropics, developed by IAAC's Robotics Lab, The Circular Factory and Prospera.

On the Caribbean island of Roatán, where the tourism economy has long pushed construction toward imported and unsustainable practices, a new kind of architectural prototype has emerged—one rooted in local forests, built with robotic timber construction, and powered by collaboration.

Led by IAAC's Robotics Lab and developed in partnership with The Circular Factory and Prospera, Raw Timber Pergola is a research project that rethinks how we build. It fuses local craftsmanship,

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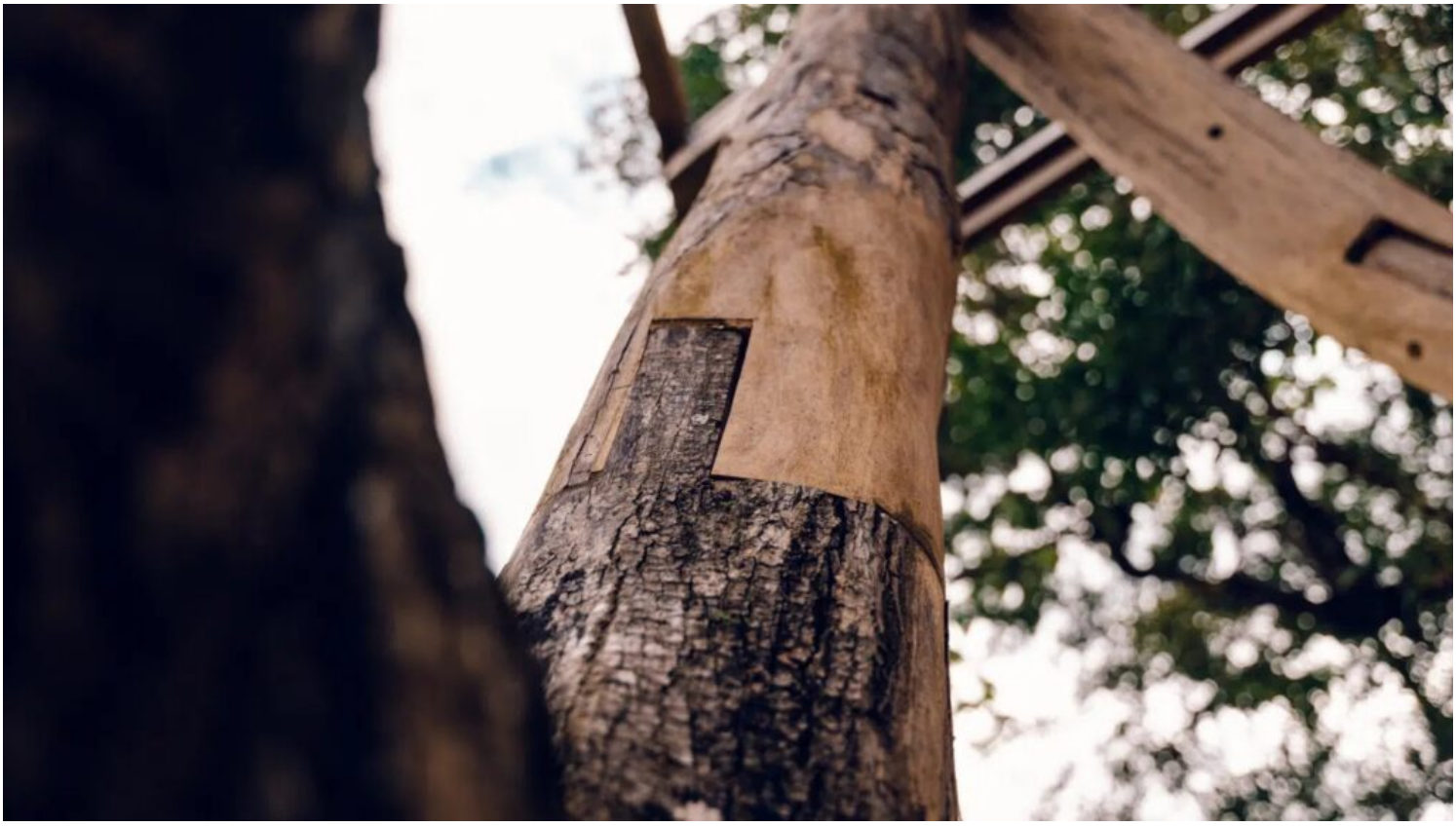
computational workflows, and digital fabrication into a contemporary structure designed for tropical climates and resource-conscious futures.

Local wood, global tools

The structure begins not with blueprints, but with trees. Laurel trees, scanned by drones on the island, became the raw material for a design process guided by computation. Forks, short segments and irregularities—typically discarded—were incorporated into the architectural logic, reducing waste and maximizing identity.

The digital-to-physical workflow leveraged a flexible robotic timber construction system: two robots on tracks, a custom holding device, and an adaptable toolpath driven by the natural geometry of each tree. The structure was completed with a palapa-style roof built by local craftspeople.



Prototyping architecture in three stages

Over the span of a year, the project moved through three stages:

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1. **Research** — understanding local materials, tools and constraints.
2. **Prototyping** — robotic tests with similar machines and wood back in Barcelona.
3. **Fabrication** — a two-week full-scale build at a newly launched micro-factory in Roatán, involving local workers, IAAC students and faculty, and students from USAP (San Pedro Sula).

The final result: a 5-meter-high timber canopy covering 20m^2, assembled from five laurel trees and seven irregular forked elements. Built with only 50 hours of CNC time, and weighing just 500 kg, it now serves as a shaded resting space for the Prospera community.

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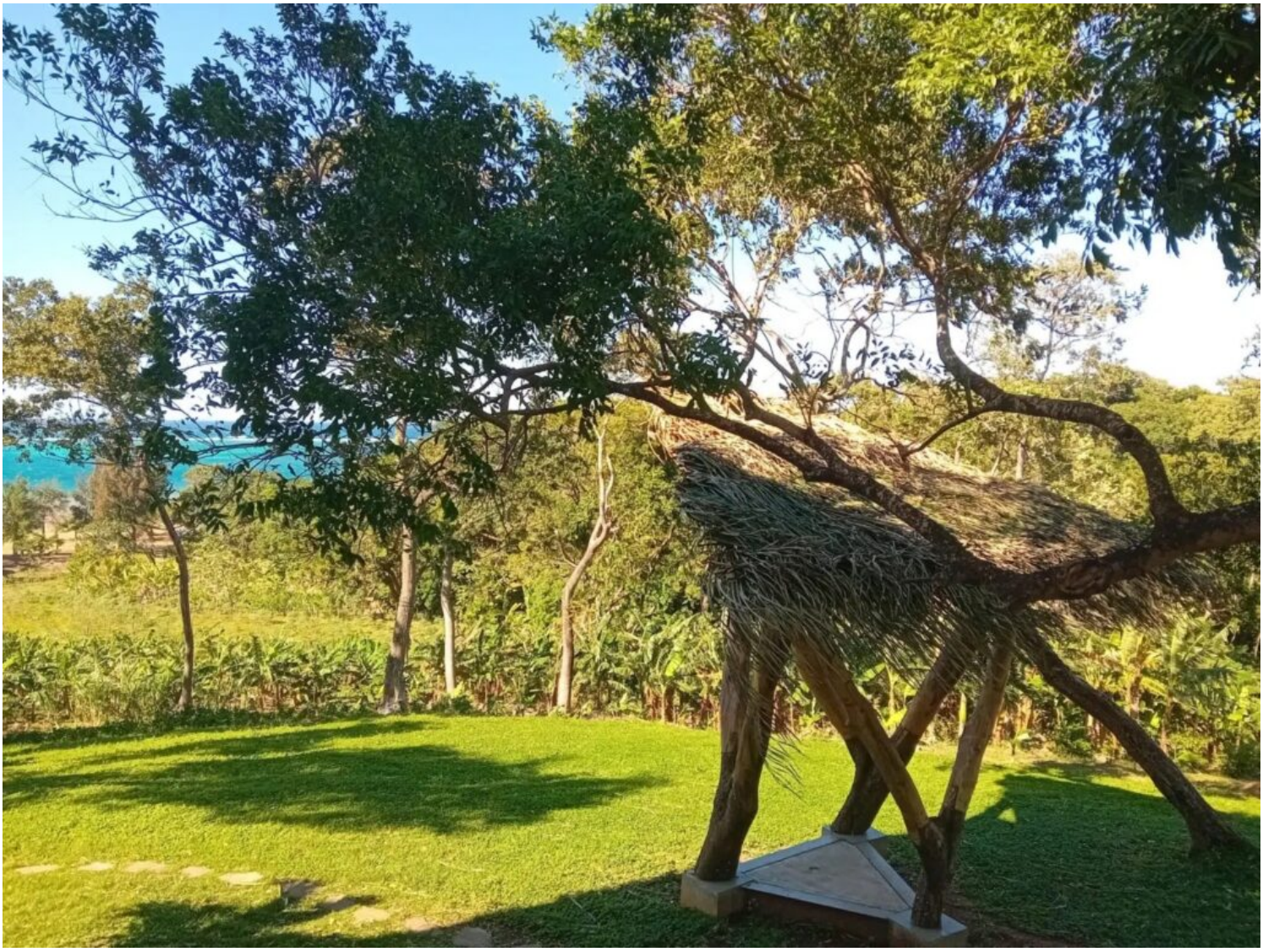

From research to real-world impact

Raw Timber Pergola is a prototype for a different kind of architectural future. One that connects environmental care, digital craft, and community empowerment.

Developed under IAAC's Robotics Lab—a key research line focused on robotic timber construction and material innovation—the project reflects the applied, hands-on learning model at the core of IAAC's pedagogy. It also involved students from the Master in Robotics and Advanced Construction,

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who joined the Roatán workshop to fabricate, collaborate and rethink what it means to build.

If you want to explore the kind of innovation that merges nature, computation and full-scale making, learn more about the Master in Robotics and Advanced Construction.

Designed by IAAC and engineered by CODA, the pavilion exemplifies advanced timber construction, featuring over 1,000 CNC-milled wooden components meticulously assembled with 5,000 screws. It showcases IAAC's expertise in transforming flat elements into complex curved forms, a technique previously explored in projects such as the Fab Lab House.

Fabricated and assembled in collaboration with Tallfusta, the pavilion also benefited from the hands-on involvement of MAEBB student volunteers, reinforcing IAAC's commitment to integrating real-world applications into its educational programs.

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