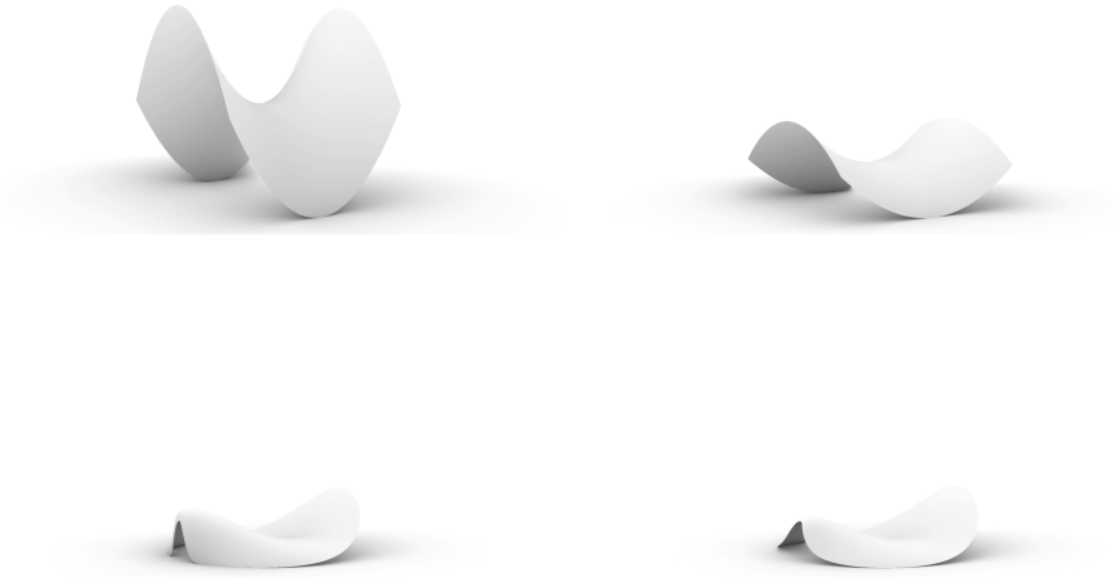
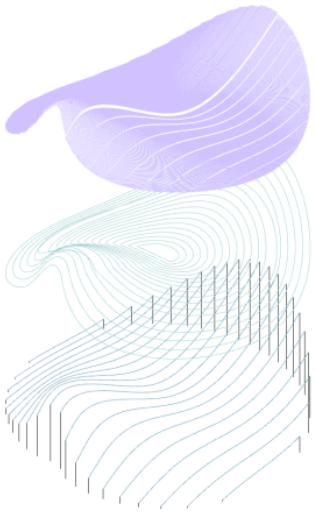
Imagining Sustainable Design: The Longsheng Yoga Pavilion

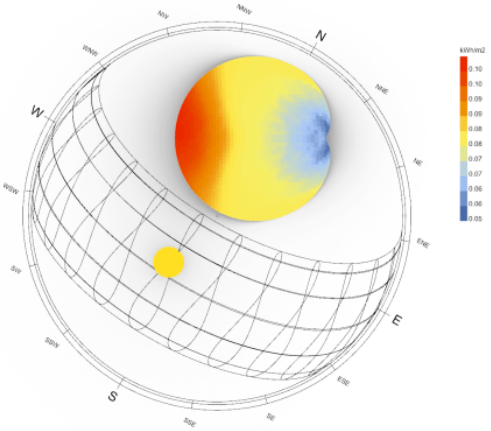
Nestled within the conceptual landscape of the Longsheng Rice Terraces in Guilin, China, the Longsheng Yoga Pavilion is a visionary digital project by Helena Riesenberger, a student at Controlmad, a FabLab in Madrid. This pavilion, although unbuilt, offers a compelling exploration of sustainable architecture.



Riesenberger's design aimed to harmonize with the natural surroundings, emphasizing sustainability and local materials. Drawing inspiration from the hyperbolic paraboloid minimal surface, she crafted a form that responds to the unique climate conditions of Longsheng.

To optimize the pavilion's design, a local analysis of the sun's path was conducted, ensuring that the structure would be well-suited to the environment.

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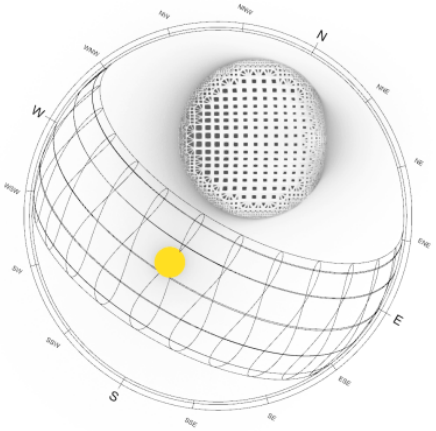
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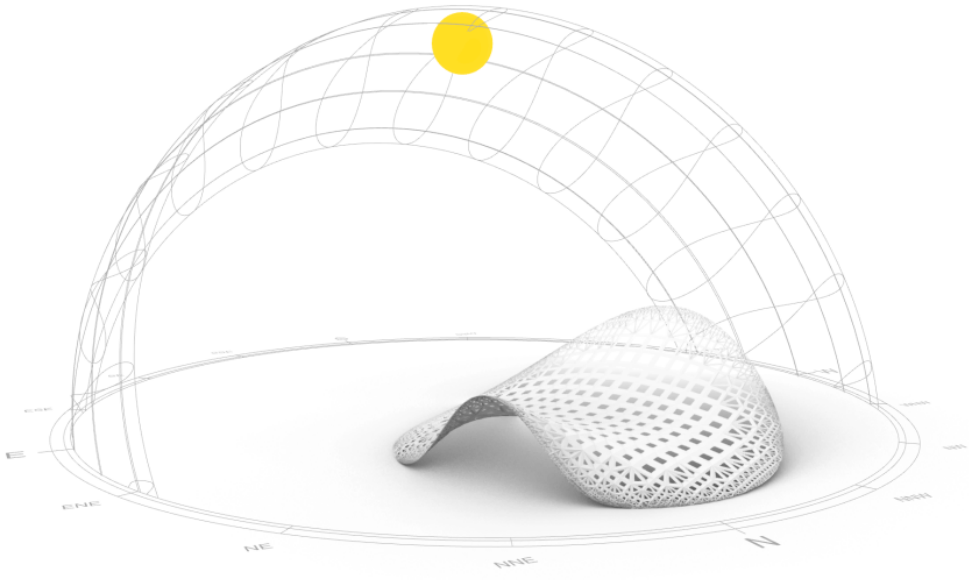
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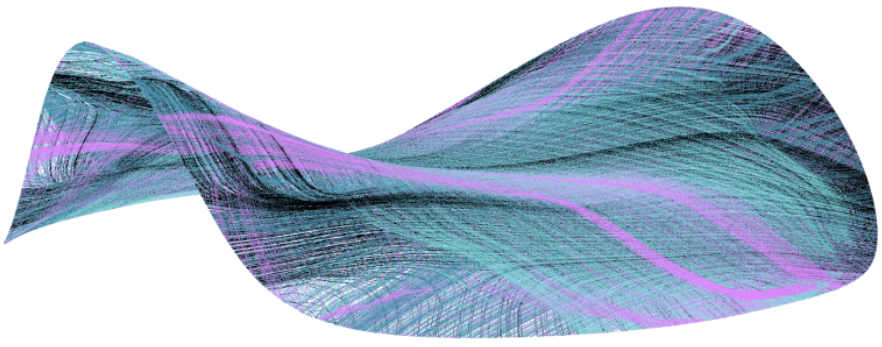
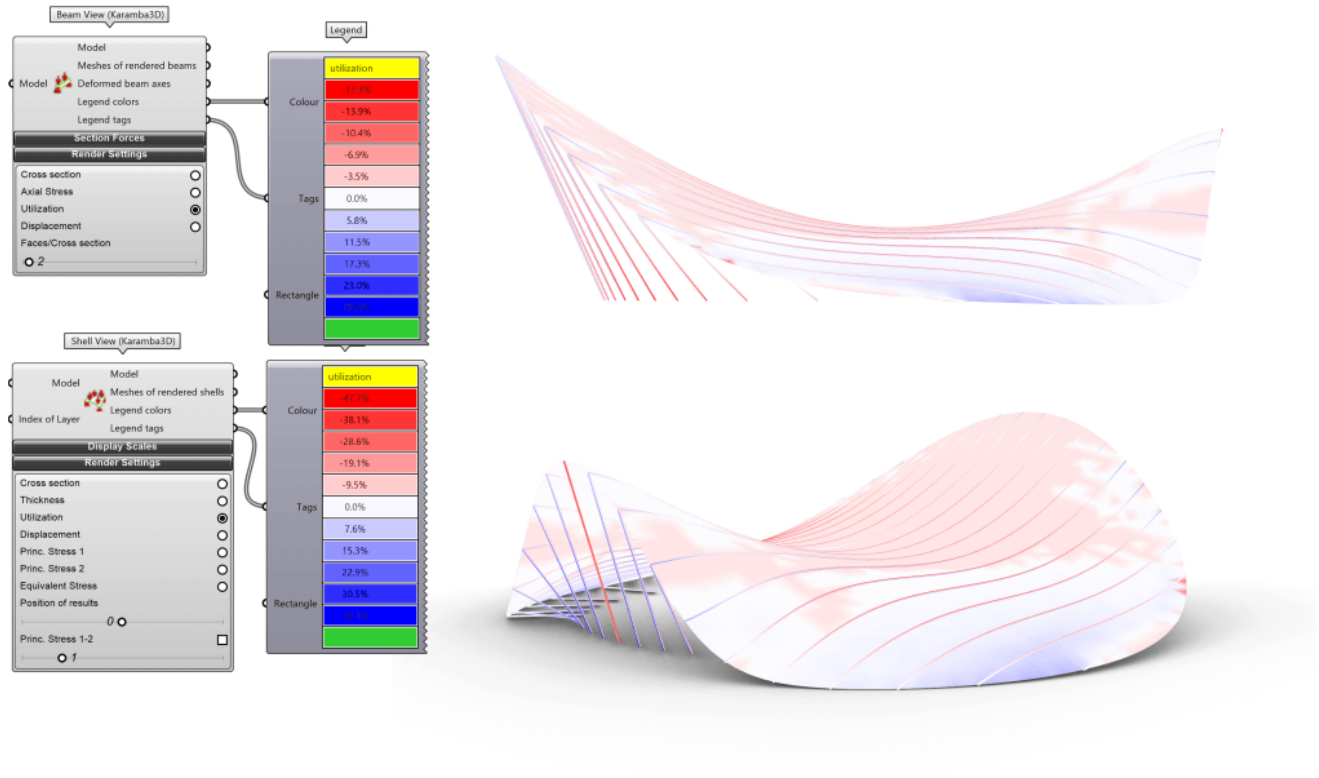
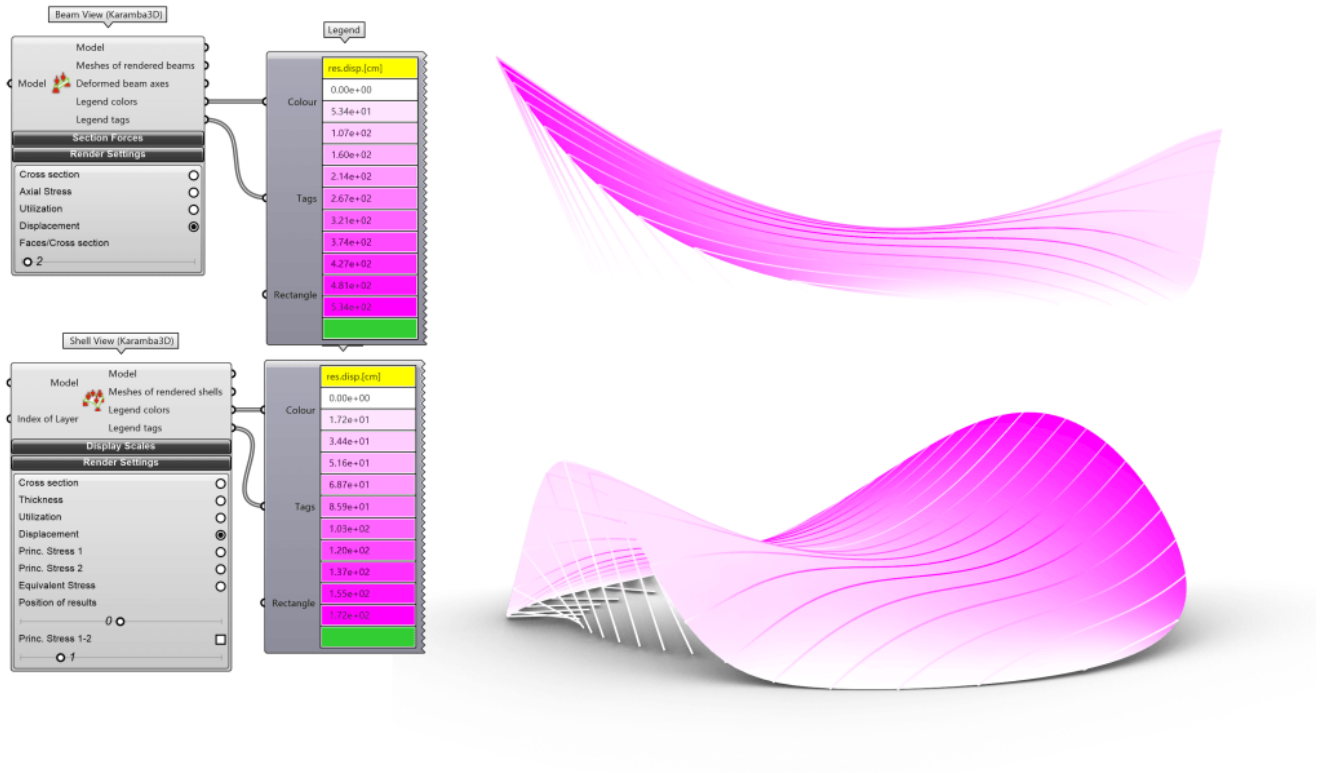


The pavilion’s primary structure was envisioned using bamboo, a material abundant in the region. However, incorporating bamboo into the design presented challenges, particularly because it was not a pre-existing material within Karamba3D, the structural analysis tool used in the project.

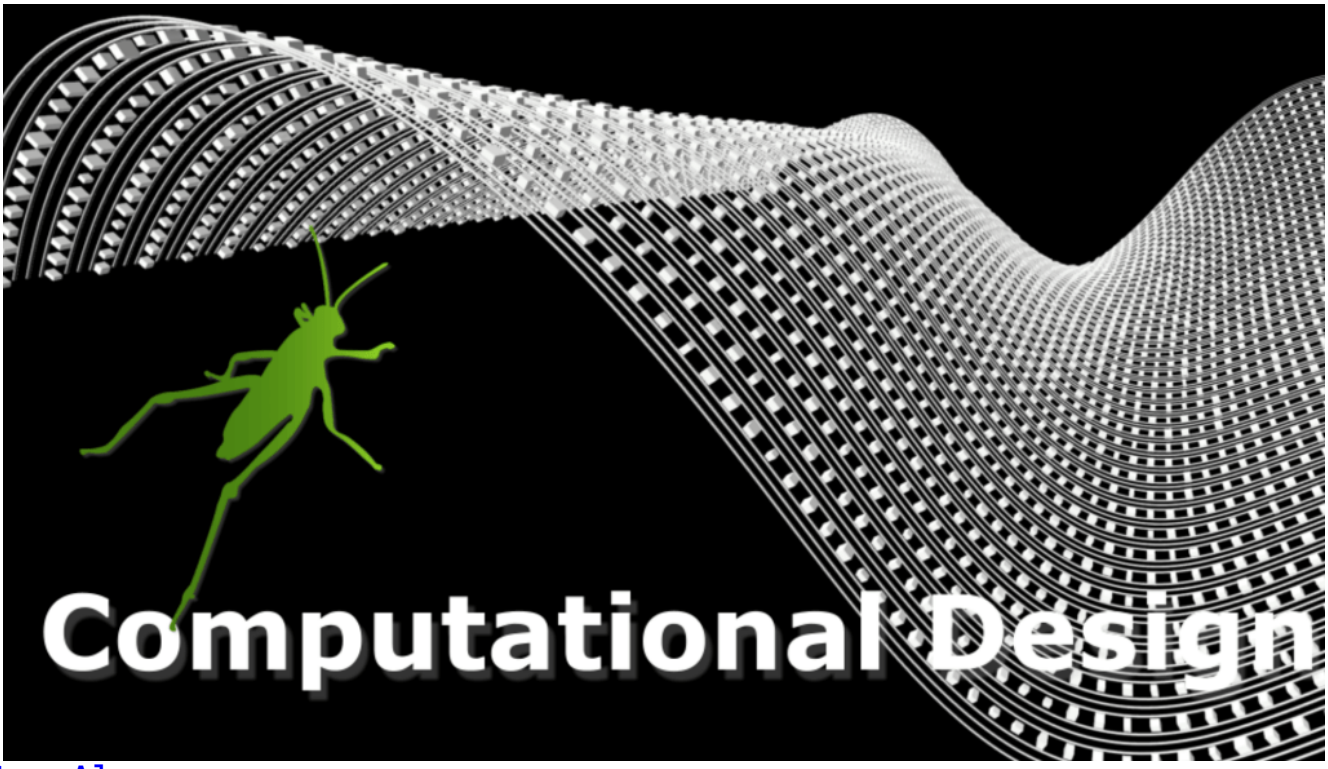
Riesenberger undertook detailed research to understand bamboo’s mechanical properties, creating new material properties within the plugin to accurately model the structure. This approach allowed her to explore how the pavilion could be optimized to use bamboo efficiently.



The design journey of the pavilion was rooted in both mathematical precision and environmental sensitivity. The hyperbolic paraboloid shape, a complex mathematical form, was adapted to the site via Rhino3D and Grasshopper.



These tools were indispensable, enabling deep analysis of the site’s conditions and allowing the pavilion to take shape in a way that was both structurally sound and environmentally responsive.



See Also

COMPUTATIONAL DESIGN WITH GRASSHOPPER

Riesenberger also utilized plugins like Kangaroo and Ladybug to further refine the design, ensuring that the pavilion would be a space that not only respects but also enhances its imagined surroundings.

This project highlights the importance of digital tools in architectural education, particularly in exploring complex forms and materials that might not yet be fully supported by existing software. Riesenberger's work at Controlmad demonstrates how students can harness these tools to create designs that are both innovative and deeply rooted in environmental consciousness.

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