

Vintersol: Redefining the Relationship Between Architecture and Nature

The Vintersol project is an innovative installation designed by Agustina Alaines (founder of [NAAR](#)) that pushes the boundaries of traditional architecture by merging parametric design with natural principles. Initially created for the 2020 Hello Wood Argentina festival, this installation stands out for its fluid transformation of rigid materials, utilizing 10,000 meticulously crafted wooden cubes to create a dynamic, adaptable structure.



Through its continuous morphology and response to environmental stimuli, Vintersol is a striking example of how architecture can behave like a living system, blurring the lines between nature and artificiality.



A NEW PARADIGM IN DESIGN

Vintersol's origins lie in the challenge posed by the Hello Wood Argentina festival, where participants were tasked with creating wooden structures using specific resources. Alaines took this opportunity to push architectural experimentation further, applying computational techniques to move beyond static forms. [Vintersol's construction process](#) was documented at Hello Wood Argentina's festival in 2020 (*video: Camila Migliore, Rosadina Güere*).

The key to Agustina's approach was translating the concept of voxels—small, cube-shaped units used in digital modeling—into the physical world. These 45 mm wooden cubes were carefully arranged into a ribbon-like structure that stretched 30 meters in length and 1 meter in width.

The installation's cubes were not merely decorative; they played an integral role in allowing the structure to adapt and morph to its environment. By interweaving these cubes, Vintersol could shift positions, expanding and contracting like a flexible fabric.



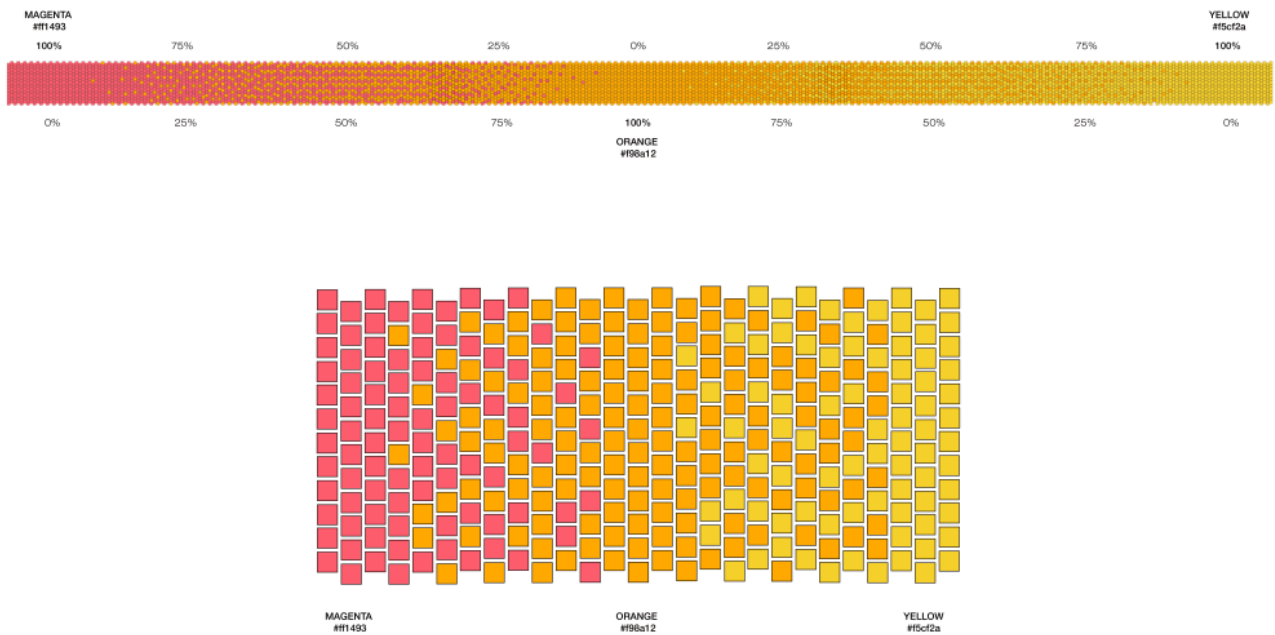
This innovative use of a voxel system enabled the structure to mimic natural behaviors, where a simple component can combine with others to create complex, evolving forms. The interlocking cubes behave much like cells in a biological organism – reacting to external stimuli and continually adjusting to new conditions.

The adaptability of Vintersol was one of its standout features. As the ribbon-like structure contorted and overlapped, it created a wide range of configurations—from shaded areas to experimental furniture, seating, and even micro-spaces that visitors could interact with. The flexibility offered by this design allowed the installation to evolve based on the topography it rested upon, making it highly responsive to both natural and artificial landscapes.

COMPUTATIONAL DESIGN AS A DRIVING FORCE

The creation of Vintersol relied heavily on advanced computational tools like [Rhino](#) and [Grasshopper](#), which were instrumental in simulating design variables such as weight, thickness, flexibility, and color. During the ideation phase, a parametric chromatic study was conducted to guide color transitions across the structure, using a

palette of magenta, orange, and yellow.



These colors were applied to one side of the cubes, while the other side retained its natural wood finish. This allowed for dynamic visual effects as the cubes rotated during assembly, creating subtle highlights and unexpected bursts of color.

In the production phase, each of the 10,000 wooden cubes had to be painted, cut, drilled, and



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Lists and domains were utilized to control the placement and rotation of the cubes, while [Kangaroo](#) was employed to analyze the structure's weight and curvatures, which was crucial in maintaining the balance between flexibility and structural integrity. [Ladybug](#) also played a role in assessing shadow patterns, as the installation's twists and overlays often produced moiré effects—an optical phenomenon aligned with the festival's 2020 theme of “Overlays.”

FABRICATION CHALLENGES & SOLUTIONS

Vintersol's production process presented significant challenges, the most demanding of which was drilling the 10,000 wooden cubes required for the installation. drilling process. Lacking access to automated equipment, the team had to rely on manual drills, making the process time-consuming and structurally vulnerable, as any deviations could cause the interlocking cubes to shift out of alignment within the textile.

To address this, Alaines and her team developed a custom device known as the “3P” (Precision Perforation Path), which greatly improved the efficiency and accuracy of the drilling.



Another major challenge was managing the weight of the completed structure. Although the team had anticipated that the installation would be heavy, they did not fully account for how difficult it would be to transport the 30-meter-long woven form.

During assembly at the Hello Wood festival, the structure was constructed on the ground, but moving it to its intended location proved nearly impossible once completed. Volunteers from the festival joined and helped out, with about 40 participants lifting and transporting the structure.



This experience influenced the design of Vintersol's second iteration, which was commissioned for the [Raimondi clothing store](#) in Palermo Hollywood, Buenos Aires. For this version, the team worked in smaller, more manageable sections of 3 meters, significantly reducing the weight and making it easier to assemble the full length structure at it's final location.



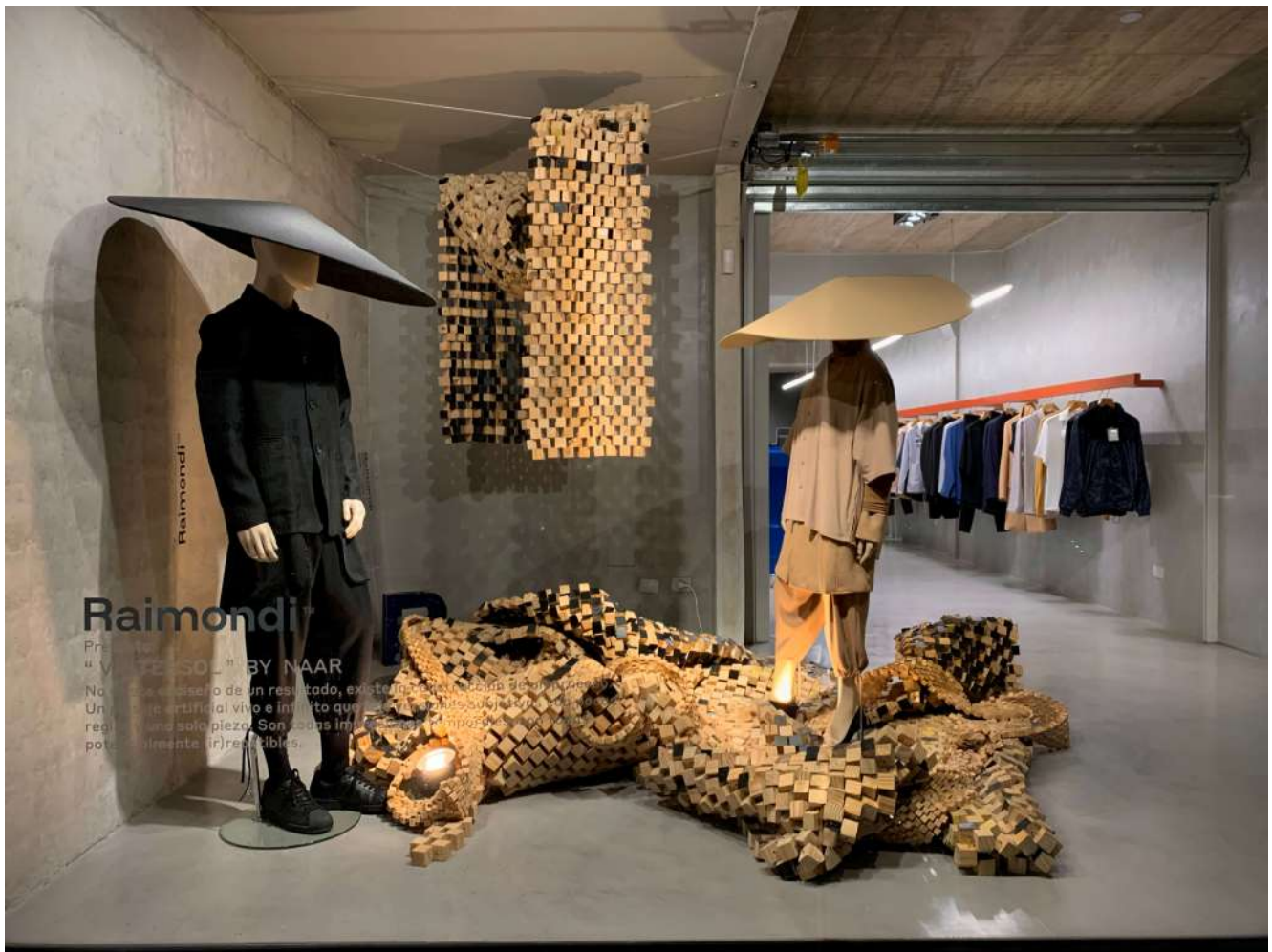
The Raimondi installation maintained the original design philosophy but scaled it down to fit a 6-square-meter space. The majority of the structure was woven with 45 mm cubes, consistent with the original design, while smaller 20 mm cubes were introduced in certain sections to add a layer of complexity, creating finer texture and detail. This choice was not solely for reducing weight but to enhance the visual intricacy of the installation.





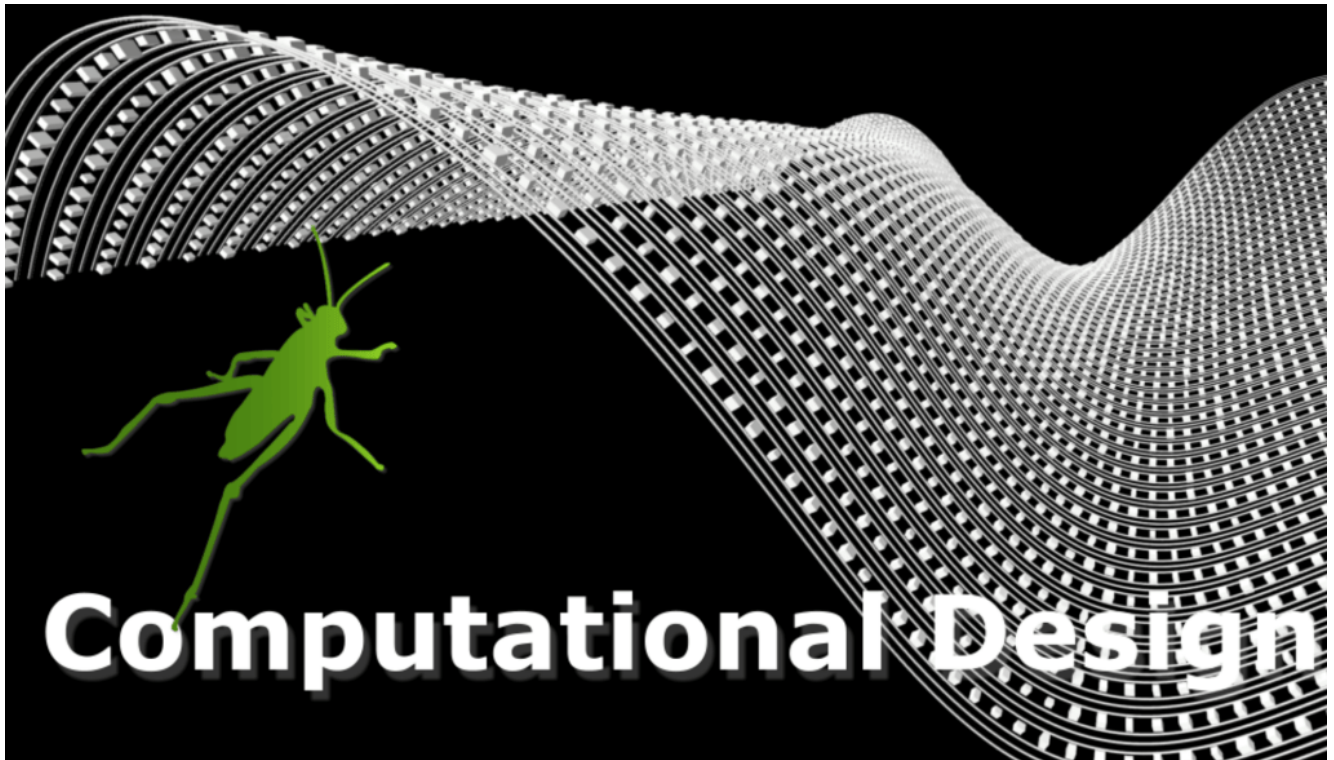
Vintersol 2 was not interactive, but it retained the dynamic, evolving character of the original. A black-and-beige color scheme was chosen to complement the store's minimalist aesthetic, with the rotations of

the cubes creating alternating patterns and rhythms that changed depending on the viewer's perspective.



CONTINUOUS EXPLORATION & FUTURE POSSIBILITIES

Vintersol is not just a one-time installation—it represents an ongoing exploration into the possibilities of merging natural and artificial elements within architectural design. Alaines continues investigating ways to reduce the structure's weight and expand its adaptability by exploring new construction possibilities, such as hollowing out the cubes to decrease mass without compromising strength, or experimenting with alternative materials.



[See Also](#)

[COMPUTATIONAL DESIGN WITH GRASSHOPPER](#)

In essence, Vintersol is a living architectural system, an endless exploration of how built environments can evolve and adapt to both natural and human influences. Whether in a festival setting or a commercial storefront, Vintersol transforms spaces into fluid, interactive experiences, pushing the boundaries of how architecture can engage with the world around it.



As Agustina Alaines and her [NAAR studio](#) continue their work, projects like Vintersol challenge our understanding of the built environment, offering a vision of architecture that is as dynamic, flexible, and adaptable as the natural world itself.

CREDITS

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Vintersol 2, for Raimondi Store

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