le laboratoire | artscience labs

press kit

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cumMulus

Design, water in the air

Ciro Najle

Octobre 7, 2011 - January 9, 2012

experience 13

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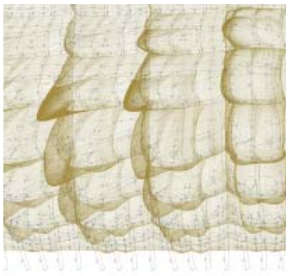
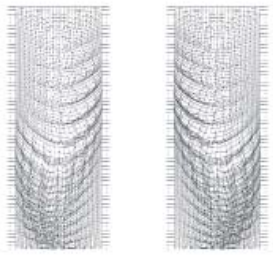
Press release

Le Laboratoire and the Harvard University Graduate School of Design are pleased to sponsor an exhibition by Argentine artist and architect Ciro Najle, a frequent design critic at the GSD, entitled ***cummulus***. From 2007 to 2010, Najle worked alongside engineers, scientists, and water experts in Chile to design fog-collecting nets. Informed by this research, his complex cloudlike installation was developed using computer-numerical technology and constructed using crochet, a material ideally suited to forming complex topologies. ***cummulus***, the moving aesthetic outcome of Najle's creative engagement with the issues of water access and the atmosphere, was first exhibited at the Museum of Contemporary Art in Denver in 2010/2011. The opening for the public is on Friday October 7, 2011.

The ***cummulus*** exhibition reflects a broader engagement of Le Laboratoire; from fall 2010 through summer 2011, Le Laboratoire participated with designers, artists, scientists, and students to explore design solutions to achieving wider and more equitable access to fresh water globally. This effort was supported by an international creative program launched in 2009 (the ArtScience Prize) and overseen by the network of art and design labs founded by David Edwards (ArtScience Labs), of which Le Laboratoire is the cultural center. Today the network includes partners in Paris, Singapore, Dublin, Dhahran, Boston, Oklahoma City, Minneapolis, and The Lab @ Harvard University, in collaboration with the Harvard Graduate School of Design.





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Also on View

Alongside the work of Najle, Le Laboratoire presents select works under development by teams of designers and students from the 2010 ArtScience Labs international creative program. These include a novel, easy to operate, and portable water filter; materials that mimic African fog-collecting insects; and an initiative to support the sustained development of fog collection through the distribution and sale of "fog water."
As part of its partnership with the Harvard Graduate School of Design, Le Laboratoire is serving as the host venue for twelve GSD students' participation in a Paris semester abroad, which includes a design studio led by architect, Anne Lacaton and courses by GSD Professor Antoine Picon, Sébastien Marot and Francois Roche. Works in progress from the residency will be presented to the public over the course of the Ciro Najle exhibition.

About the Harvard University Graduate School of Design

The Harvard University Graduate School of Design is dedicated to the education and development of design professionals in architecture, landscape, urban planning, and urban design. With a commitment to design excellence that demands the skillful manipulation of form and technology and draws inspiration from a broad range of social, environmental, and cultural issues, the Graduate School of Design provides leadership for shaping the built environment of the 21st century.

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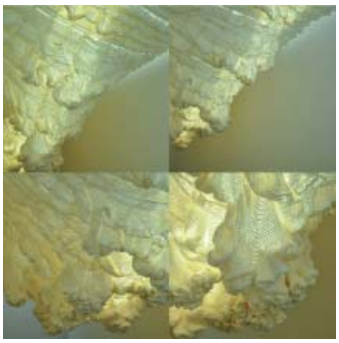

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Biography

Ciro Najle

Dipl.arch.UBA-FADU(hons)
MsAAD Columbia University (hons)


DR.

Architect practicing in Buenos Aires and Visiting Professor at the Harvard University Graduate School of Design, Ciro Najle is the former Director of the Landscape Urbanism Graduate Design Program and Diploma Unit Master at the Architectural Association in London, and has taught at various architectural schools and institutions, including the Cornell University AAP, the Columbia University GSAPP, the Berlage Institute, the Universidad Tecnica Federico Santa Maria, and the Universidad de Buenos Aires.

Director of GDB General Design Bureau, architectural office and multidisciplinary laboratory of research in Buenos Aires, of Mlab Machinic Laboratory in Chile, and previously of MID, Young Architect of the Year Second Prize in London in 2001, his work has been exhibited in various cultural venues including the Prague Biennale of Art and the Beijing Biennale of Architecture, where he was the curator of the London Pavilion.

His writings and projects have been published in Quaderns, Praxis, Esquire, Summa, UR, Plot, Oris, Architectural World, Egg Magazine, After the Sprawl. He is the author of the introduction to the 2G Monographs on FOA and on MGM, designer and coeditor of 'Tokyo Bay Experiment,' and coeditor of the book 'Landscape Urbanism: A Manual for the Machinic Landscape.' He is currently working on his upcoming book 'Material Discipline.'

Info +
www.generaldesignbureau.com

Presentation of cumMulus by Ciro Najle

cummulus is a cashmilon crochet surface prototype conceived as a multiplicity of catenary structures that hang from one another in a cascade that escalates by following the progression of subdivisions 0001-0002-0004-0008-0016-0064-1024. ***cummulus*** follows the principle by which a surface hanging from another introduces a geometrical asymmetry that is only neutralized by the dominance of the gravitational forces that are embedded in the system as an undivided whole. ***cummulus*** attempts both at preserving and at exaggerating this asymmetry from the behavior of the whole, firstly by fixing and secondly by increasing local curvilinearity through the systematic introduction of points in a crochet.


© Ciro Najle

Under such premise, a simple crochet proliferation technique is used, on the one hand, as a means through which an over-determined surface curvature is geometrically constructed and materially ensured. The technique consists of a series of local proliferations of points, going from one to two at those instances where the surface curvature changes beyond the stretching capability of a textile, using material excess to control curvature differentials with precision. Increments in the number of points at each line of the crochet enable an increase in the length of a line as it curves along its trajectory within a surface, in such a way that the textile is indirectly controlled in its global curvature via cumulative local proliferations.

On the other hand, the proliferation pattern is not only used as a means of geometric control but also as a seed to paradoxically lose control through the same means that enable control, thus engendering a consistent mechanism of expression and nonlinear behavior. The exaggeration of curvature via the excessive increment of points in turn produces the emergence of local wrinkles and their distribution across the surface in a consistently variable manner. Such increment is exploited to engender a variety of traits and to articulate an overall cloud-like effect through the control of density. Counter-intuitive rigidity to deformation is produced at a local level, working against any gravitational intuition.

cummulus projects a number of resemblances to well-known natural formations – broccolis, cauliflowers, brains, wombs, intestines, turbulences, etc, but beyond this, it brings about an irreducible semblance of geometric exuberance, thus working as an abstract means of resonance and proliferation of meanings.

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Conversation between David Edwards, founder of Le Laboratoire and Ciro Najle

David Edwards: As an architect interested in experimental forms and materials, what led you to become involved over the course of 2007-2010 with scientists, engineers, and others to develop fog-collecting nets in coastal regions of Chile? Can you describe the nature of this collaboration, and how it led to your ***cummulus*** work?

Ciro Najle: The work we did in the Atacama Desert in Chile was developed in the context of a course I gave at the Universidad Tecnica Federico Santa Maria in Valparaiso, Chile, where I assembled a team we called Mlab, Machinic Laboratory, including a quite diverse group of young architects, including Jorge Godoy, Pablo Barria, Carlos Castro and Cesar Gonzalez, and a large group of students of architecture in their third year undergraduate during a period of four consecutive years. This lab was supported institutionally by the UTFSM, and advised by scientists, including professor of biogreography Pilar Cereceda, Director of the Centro del Desierto de Atacama, and archeologist Horacio Larrain, regional coordinator of the CDA Iquique, and with the intervention of colleagues from other universities, like Rodrigo Perez de Arce from PUC in Santiago, and of other artisans and scientists, like a basket weaver and a cloud physician, who joined our venture by lecturing and giving practical classes during the investigation.
During those years, the studio developed projects of fog collectors in the desert, consisting of complex three dimensional structures that were constructed at the school, transported by bus in pieces, and assembled on site, a desert plateau 700m high in front of the Pacific Ocean, in a camp under extreme weather conditions, usually installing them on hills under wind exposure and facing the sea.

"Often, fog collectors are constructed as pieces"

These structures, which should still be at work up there, consist of experiments on textiles.
Often, fog collectors are constructed as pieces of fabric displayed flat in front of the main wind direction and at a height of between 1m and 5m, depending on the height at which the cloud enters the site. This fabric, usually a very simple mesh, is supposed to capture water in the air in minute drops that stay in-between its fibers. Through the constant accumulation of these drops in every time larger ones, water is channeled down through a system that includes the vertical surface, an open duct at its bottom, and a long hosepipe that takes water into a plastic recipient, sometimes a pool, where it is stored for use or study.

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While the logic of those structures is driven by cheap cost, and efficient capture, circulation, and storage, in favor of establishing an economic system of collection or an effective system of measurement for analysis, our experiments were instead driven by a logic that mixed an intensified performance of capture, distribution, and drainage of water on the one hand, and other performances that, instead of being regarded as superfluous or inefficient, were seen as means of a more complex behavioral material ecology: the performance of the object as a means to irrigate the ground, holding and spreading water with delay, as a means to induce the growth of plants on the surface or within the structure (there are dormant ecologies in the Atacama Desert), as a means of nurturing animals that have been in the past centuries pushed away from the region and appear only sporadically (birds and insects) or as a means of orientation in the landscape, inducing and recreating potential educational purposes, which are considered key to the sustenance of the place as a research center: an instantaneous garden in the desert.

"I have called this Irrational Engineering"

Given these multi-tasking, cross-breeding, and synergetic scientific, architectonic, and artistic desire, we developed these series of textiles structures that, instead of segregating material systems (surface of capture, tube of collection, hose of transport, recipient of storage), integrated all performances in a 'textile machine', where the very fine grain of weaving and knitting is explored in its capability to unfold and sequence those performances, configuring an object multiple and precise in its behavior: a nonlinear system with a completely irrational artistic impact. In other contexts I have called this 'Irrational Engineering', although one could say it is just about how sheer excess creates a behavior beyond the initial premises of a material experiment, which in turn requires artistic and architectural guidance.

However, this agenda, and most of its material techniques, were not developed in Chile for the first time. Their history goes back to research we did at the Architectural Association in the early 2000s and at Cornell in the mid 2000s, following the work of structural engineers Frei Otto, Pier Luigi Nervi, Richard Buckminster Fuller, and Robert Le Ricolais, and of work done by Gaudi in early XX century.

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cummulus is part of this larger project in different levels. It develops further the form finding ethics of Frei Otto's catenary experiments as unfolding of their Gaudi's precedents, this time with an emphasis on what I call 'pattern breeding': the idea that the paradigm of ideal form has been superseded and expanded by the paradigm of nonlinear pattern, and that the essentialist ethics of 'finding' is not sufficient in what one could call a nonlinear artistic practice that proceeds by breeding qualitative difference through the nurturing of quantitative difference in materials. It also explores the idea of developing compounds matter-space, or full space, where an object can be regarded literally as an atmospheric construct: a sort of materialism of the intangible. Thirdly, it works along the line of the textile phylum of architecture: clothes, tents, soft shelters, life-time quilts, self-made fabrics. And finally, it explores the idea that fluids (the environment) and solids (architecture) can become one single complex continuum, a supra-stable medium, both highly controlled and inevitably out of control.

David Edwards: Can you describe why you designed this work in crochet, as well how you conceived and realized the work itself?

Ciro Najle: The piece is designed as a multiple of catenary surfaces hanging from one another in a fractal cascade that iteratively divides a long surface of 12,80m x 3,20m in plan, in 16, 08, 04, 02, 01 parts, until the subdivisions become the smallest unit, consisting of a square patch of 0,20m x 0,20m flat. This iterative subdivision is organized according to the progression 0001-0002-0004-0008-0016-0064-1024, and generates the matrix from which the multiple catenaries hang to generate a multiple of double-curvature surfaces hanging from one another. Crochet is on the one hand the perfect means to construct the complex geometry of these patch-units with material-numerical precision: each line of crochet has a corresponding number of knots, so that the longer the line the higher the number of knots. Therefore, the crochet pattern is initially there to replicate numerically (and therefore to construct materially) the necessary curvature of the catenary surface. For this purpose the crochet is embedded with increments, which locally connect two lines of different length to one another by knotting the knots from 1 to 2 when increasing, from 2 to 1 when decreasing, or from 1 to 1 when staying the same.
Given this 'ideal form' that the crochet pattern initially enables, cummulus is consistently 'inflated' in its numbers, exactly at those points: every time there is an increment of points (positive or negative), this increment is systematically proliferated, so the effect of elongation is increased and the curvature is consistently exacerbated, just as if breeding locally the material potential and energy to configure local hyperbolic surfaces in various counter-acting directions.
Thus the surface, instead of curving harmonically, as if in a form-finding mimicking construction, starts to locally curl in unpredictable directions and intensities, sometimes even pointing upwards. The more the surface needed increments to curve, the more it was exaggerated in its proliferation, and the more it was nurtured with unpredictability in form and behavior.

Thus, the erratic whirls, the curved wrinkles, and the massive convolutions of the material. At those points, the surface starts to host a multitude of sub-behaviors, which only by a numerically controlled excesses challenge the initial premises of an equally numerically controlled formal harmony. And at those points the ideality of the global behavior of the catenary is locally disarrayed by the emergence of counter-intuitive structural behaviors. Crochet is therefore a 'necessary' means of both mimicking and superseding the immaculate essence of a harmonic structural form through the systematic contingency of an excessive material pattern. On another level, crochet works as a medium for grounding a coordinated collaboration between a large group of people, guided by top-down decision-making process of programming, but retro-feeding constraints with the idiosyncratic habits and styles of the people involved, thus guided by both a cascading communitarian-material logic and a cascading geometric-numeric process. The abstract work is thus fed by actual restrictions having to do with the size of knots, the speed of crocheting, the smoothness of the yarn, the availability of material, the coordination of work and the different forms of transportation, communication and notation involved in the making. This process is mostly enabled and guided by the inherent quantitative rigor of crochet as a technical medium.

David Edwards : ***cummulus*** resembles a cloud - or cauliflower. How important is the inspiration of biological-environmental forms & function in your work today - and therefore how linked is your work to science's rapid growth in understanding and reproducing nature?

Ciro Najle : As a consequence of the process of increase and exaggeration, ***cummulus*** unfolds divergent sensorial reminiscences (oppression, weight, burden, lightness, buoyancy, or joy), which are embedded in the material and sometimes contradict one other. A number of figural resemblances to complex natural formations, (broccolis, cauliflowers, brains, storms, wombs, intestines, turbulences), is also embedded, even though most of them are not really deliberate. We prefer to regard them mostly as outcomes that 'naturally' grow out of a process that is embedded of a nonlinear behavior. What is purposeful is this nonlinear ethics, not so much the figural contingency of its resemblances and reminiscences. However I would not say that these outcomes are just 'unpredictable' or 'unforeseen', as their unforeseeability is itself deliberate and wished for, and actually produces forms that one can commonly find at a more abstract level in nature. Such double condition (deliberateness and unpredictability, figuration and abstraction) is, I believe, an evidence of something larger taking place, which I cannot myself grasp. I can only recognize its irreducibility, its bluntness, and its, so to speak, natural simplicity, a sort of archaic exuberance whose achievement actually motivates the fine-tuning of the work at every step, at every decision. When calibrating the numbers we have pursued this difficult condition, and it is here where the work becomes a precise means of intuitively managing its spectrum of meaning.

Crochet et surface hyperbolique par Sara Fery

cummulus, a sculptural work by the architect Ciro Najle, is constructed of a series of crochet panels of varying geometries. Some of the panels are simple and smooth; others unfold into organic, undulating forms that are reminiscent of turbulence, of rapidly escalating fractal patterns, and of mathematical complexity.

The medium of crochet is ideally adapted to recreating the complex surfaces found in nature, an obvious example being the form of the clouds that inspired this particular sculpture. In fact, ***cummulus*** is hardly the first instance of this use of crochet in the world of art and science.

A case in point is the Hyperbolic Crochet Coral Reef that was conceptualized and constructed by the Institute for Figuring and displayed around the world (including the Smithsonian Museum of Natural History in Washington, D.C. and the ScienceLab in Dublin, a fellow ArtScience instituton). A crochet artist involved with the I.F.F. noticed that crochet was a perfect medium for modeling hyperbolic surfaces – and that these surfaces in turn characterized many of the organisms that made up a coral reef. Thus, the Hyperbolic Crochet Coral Reef project was born.

So, then, what is a hyperbolic surface? A hyperbolic surface is one for which, given any arbitrary point on the surface, space is found to curve away from that point in all directions: there is a negative curvature of space. (This is the opposite direction of curvature of what one observes at any given point on a perfectly spherical surface.)

At first, the notion of a hyperbolic surface sounds exotic – but a little reflection reveals that this concept is hardly constrained to the realm of abstract mathematics. Hyperbolic surfaces are everywhere in nature: picture a leaf of lettuce, or a brain coral, or, of course, the surfaces of a cumulus cloud. This in turn is hardly surprising: the extent to which nature follows mathematical patterns has been a source of inspiration for scientists and poets for centuries.

Imagine crocheting a small circle. As you add rows to the circle, if you increase number of stitches each time you go around the circle, the surface will naturally begin to fold. When the rate of increase is constant – say, one stitch is added every two turns around the circle – a regular hyperbolic surface will form.

The versatility of crochet – its ability to form complex surfaces, and the simultaneous strength and flexibility of a finished crochet piece – made it a natural choice of medium for ***cummulus***, which incorporates both flat and complexly curved surfaces, and which embodies the concurrent softness and grandeur of a cloud.

To underline the link between hyperbolic surfaces, crochet, and the surfaces visible in ***cummulus***, smaller-scale crochet models have been constructed from crochet for this exhibit. They were crocheted using different rates of stitch increase: some of them lay nearly flat, while others are coiled tightly into themselves. If one of these hyperbolic space models is unfolded, the inner patterns are revealed, and then the model will quickly snap back into its original structure once released.

Sara Ferry *lives in Cambridge, MA, where she specializes in the development of corrosion-resistant steels for innovative reactor designs and in the study of the material properties of nuclear waste containment casks. She is an alumna of the physics and the nuclear engineering departments at MIT, where she remains as a Ph.D student. Her interests include the future of large-scale clean energy, theater, and the intersection of art and technology. More information on her work can be found at uhliglab.scripts.mit.edu, or seferry.tumblr.com.*

Crochet samples with differents curves by Marguerite Siboni

Marguerite Siboni *is a San Francisco-based product designer and an expert crocheter. She is also an alumna of MIT. where she studied mechanical engineering and creative writing. She strives to utilize the concept of beautiful-but-effective design in all of her projects. More examples of her work can be found at her website, www.margueritesiboni.com.*

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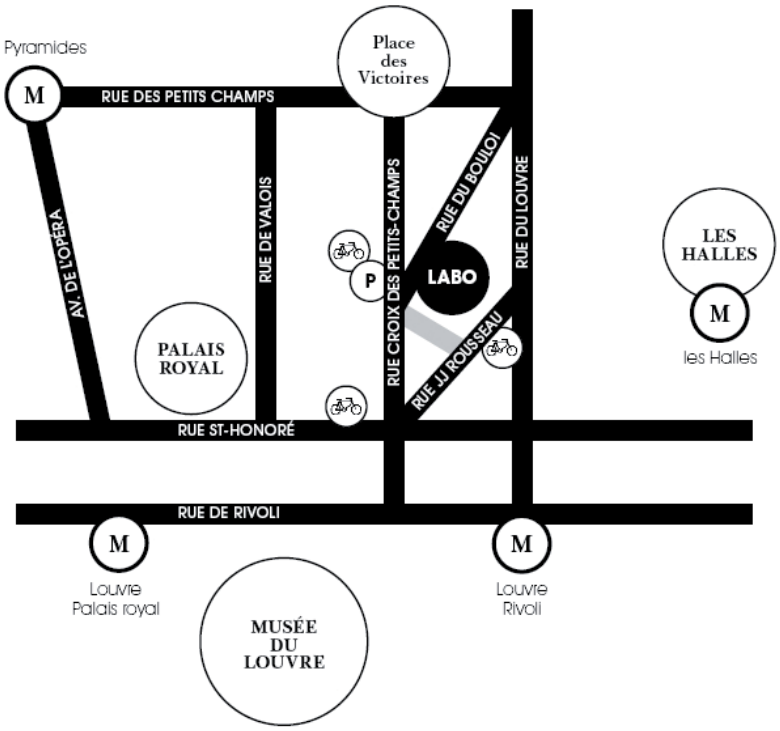

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