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Newsletter #2 2009

Studio Genetic Architectonical Design
BioDigital Architecture Master 2009
Universitat Internacional De Catalunya
Barcelona -Spain

Studio Director : Dr . Prof , Alberto , T Estevez

Studio Master : Prof . Aref Maksoud MAG - LAB



MAG-LAB 2009



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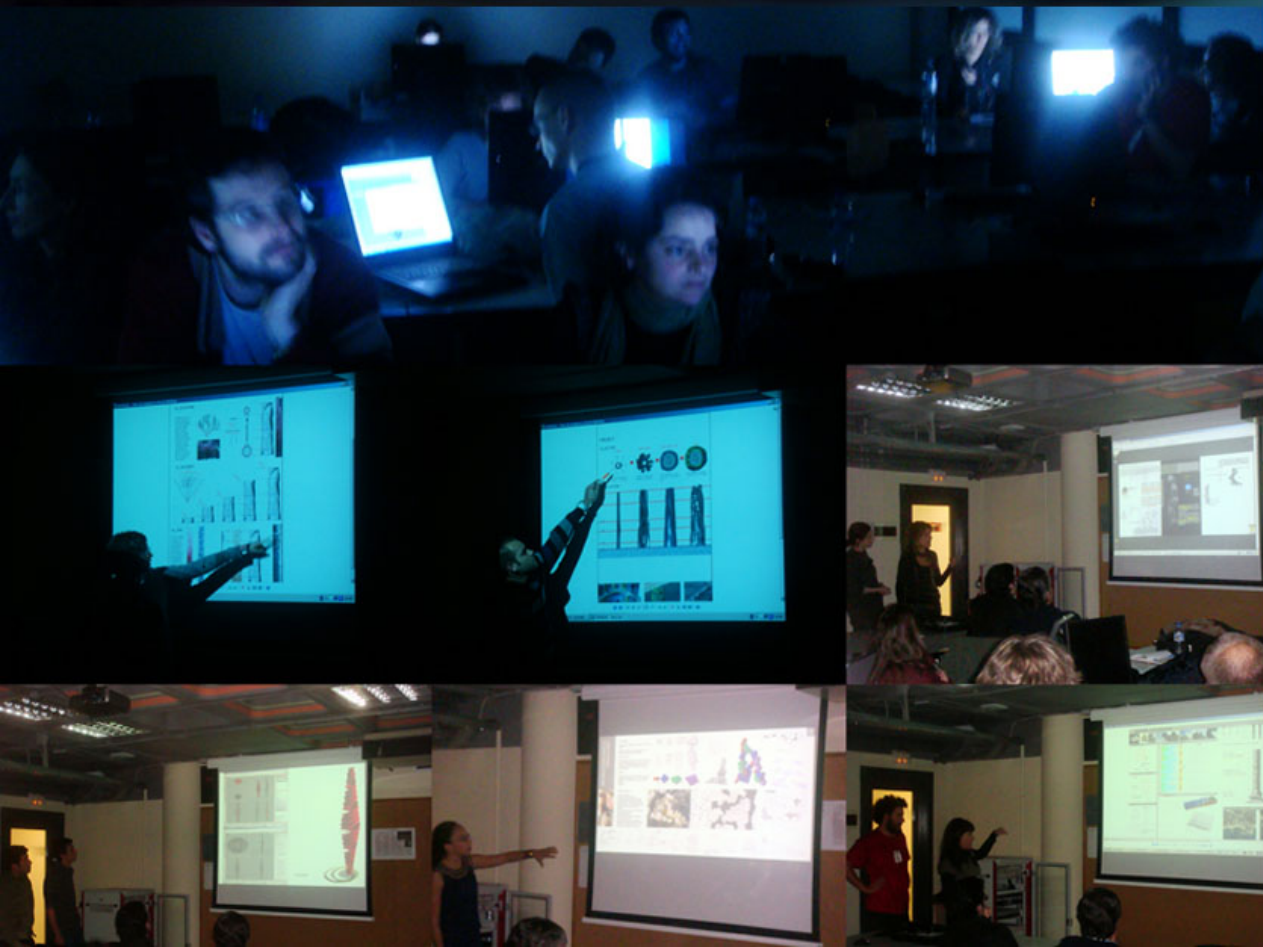


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MAG In BioDigital Architecture Master - Barcelona-Spain

MAG LAB has been invited by Dr. Alberto T Estevez the founder and Prime director of "ESARQ" Escuela Técnica Superior de Arquitectura, Universitat internacional de Catalunya director of PHD and Master Programs of Genetic-Biodigital Architecture, to assist at his studio "genetic and architectural design" and to do information systems studio in biodigital architecture master of 2009, titled "studio Information Systems-Digital Architecture Towards New Architectural Forms And Tectonic" will be on the 2nd February and will be held by Professor Aref Maksoud the manager of MAG LAB a part of the Maksoud Architectural Group. Muhsen Maksoud its' Managing Director is also the Chairman of the Arabian International University of Damascus



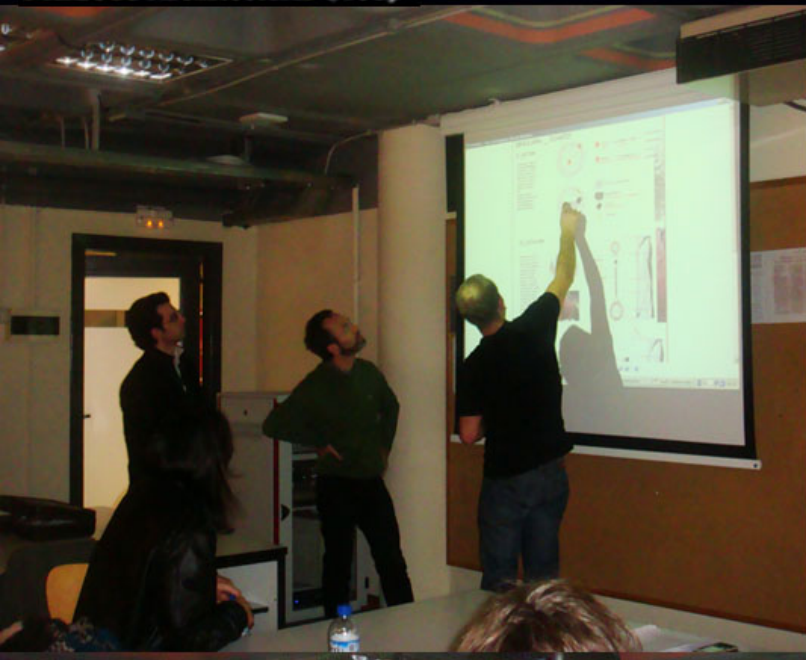
MAG-LAB 2009



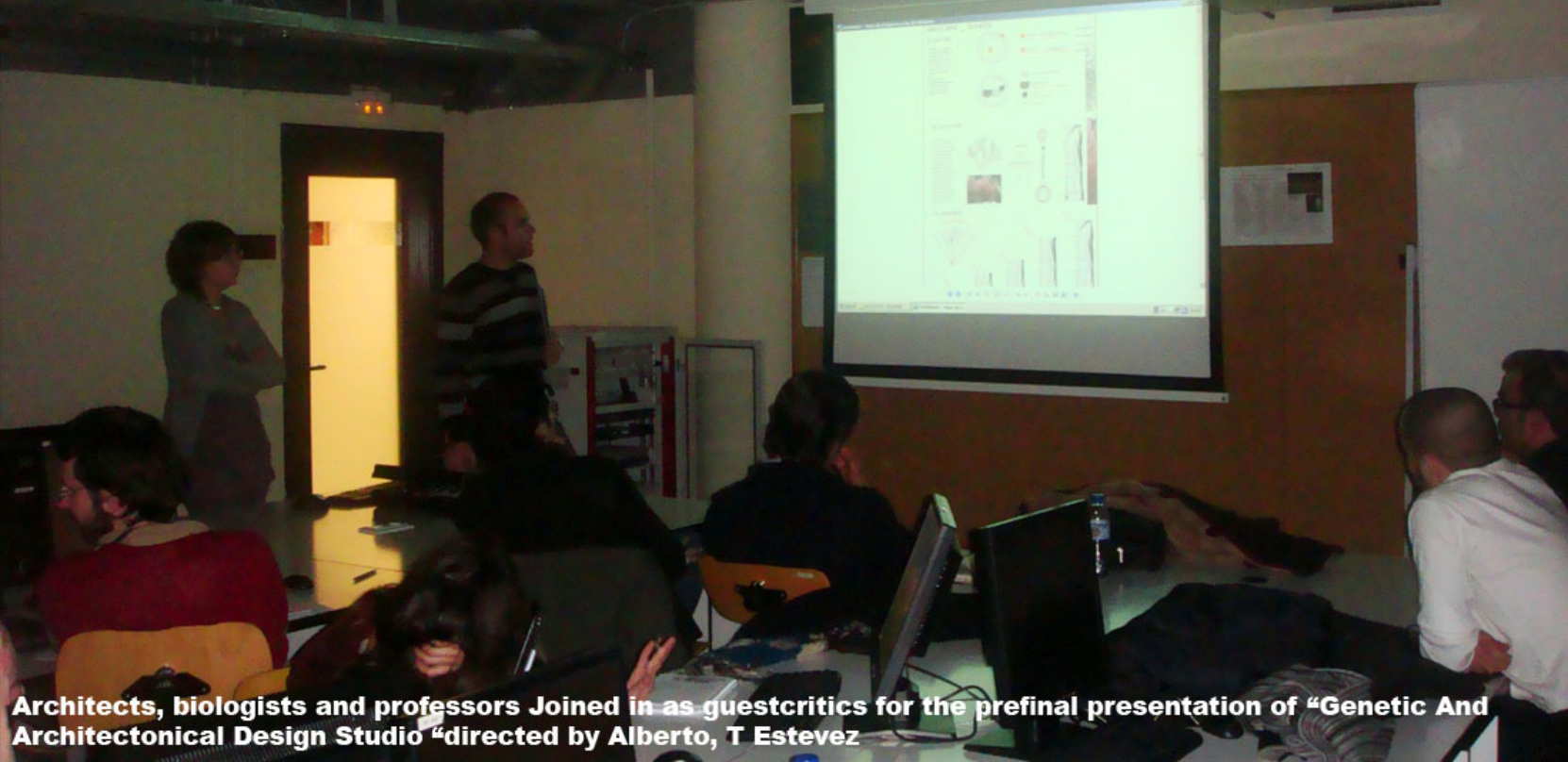
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Alberto Estevez and Arer Maksoud discussed the best developed project in the Prefinal presentation to participate with in EVOLO skyscraper competition



Architects, biologists and professors Joined in as guestcritics for the prefinal presentation of "Genetic And Architectonical Design Studio "directed by Alberto, T Estevez



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Architects, biologists and professors Joined in as guestcritics for the midterm presentation of "Genetic And Architectonical Design Studio "directed by Alberto, T Estevez Studio at the Universitat Internacional De Catalunya"ESARQ" Barcelona-Spain 2009
 Studio director: Alberto, T Estevez
 Studio master : Aref Maksoud



Left To Right
 Prof Viviana Hernaiz
 Prof.Mauro Costa
 Biologist Jose A . Banderinha
 Prof.Aref Maksoud

Guestcritics:Prof : Viviana Hernaiz"architecture compositions and history-ESARQ" Spain - Bolivia
 Prof: Mauro Costa "Portugal
 Prof :Joao Neto "Spain
 Biologist : Jose A . Banderinha "Portugal



Left To Right
 Biologist Jose A . Banderinha
 Prof.Mauro Costa
 Prof Joao Neto
 Prof.Aref Maksoud



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students during the studio had to explore the meaning and background of the project which is the bi-digital architecture research that will take them to a biological thinking and to a development with digital tools



learning from Nature about growing, structure, space and skin / surface / texture: "The big book of Nature" that Antoni Gaudí have refer as his master. Learning from Nature as the genesical, primitive and original lessons for mankind, for architecture, for take advantage for our now fragile world





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After 9 days of hard work the students presented their work to the director of the studio: Prof. Dr Alberto Estevez. It was an enormous program which all of the master students made in nine days.



Works In Progress

Bio digital Architecture Master 2009-UIC-Barcelona
Studio Genetic Architectonical Design



Studio Director: Alberto T. Estevez
Studio Master: Aref Maksoud-MAG LAB

FILTER CITY

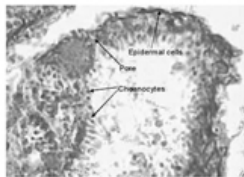
01.1

*Also known as a poriferan, from **PORUS** (pore) and **FERRE** (to bear), is an animal of the phylum Porifera. The body consist of an outer layer of cells, and an inner mass of cells and skeletal elements. Sponges do not have nervous, digestive or circulatory systems. Instead most rely on maintaining a constant water flow through their bodies to obtain food and oxygen, and the shapes of their bodies are adapted to maximize the efficiency of the water flow.

Nelson, Jordan, et al.: 1998, composition of the sponge *Verongia aerophoba* from the Canary Islands, European Journal of Cell Science and Technology, 2002.



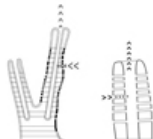
Verongia Aerophoba: mediterranean species



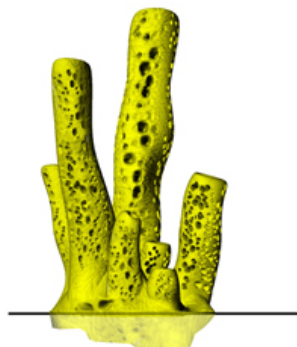
MICROSCOPE VIEW



Ramification process of column structures: growing from a common basis platform.



Air is extracted from polluted areas on the city, purified and inflated on the atmosphere



SKYSCRAPER

- PORUS + ATRIUM: PURIFICATION
- ARTIFICIAL ORGANISM
- CONSTANT AIR FLOW
- CLEANING SYSTEM
- SKIN + STRUCTURE + SPACES
- SPACES INTO MASS



Geometric proportions based on Sponge maximum growth – column like structures with 2-3cm diameter and 15-20 cm high (20m x 100m using)

PORUS + FERRE

ANIMAL

OUTER LAYER OF CELLS + INNER MASS

NO NERVOUS OR CIRCULATORY SYSTEM

CONSTANT WATER FLOW: food, oxygen

CLEANING SYSTEM

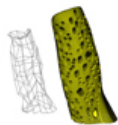
Under water Verongia Aerophoba - Specie that feed on bacteria and other particles in the water, working in a way as a cleaning system.

Out water Building – extracting polluted city air, and by a system of "porous", like in the real sponge organism, inflating cleaned air to atmosphere

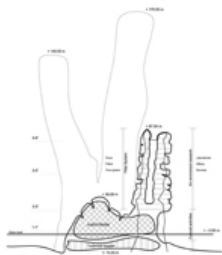
VERONGIA AEROPHOBA

FILTER CITY

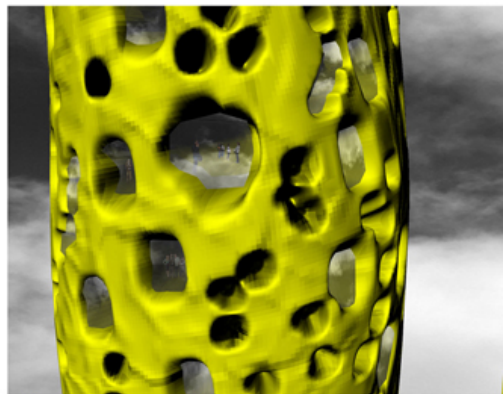
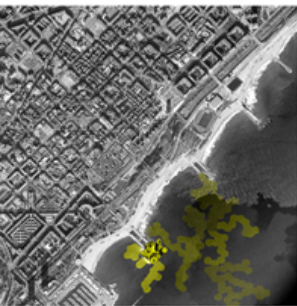
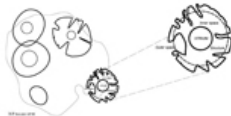
01.2



Structural idea



Program and functional organization



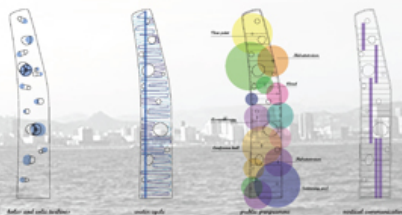
it's warm, it rains
inside and smells
like flowers...



Shardua is a wall, a dense city. On it is finished on one side by the sea, and on the other side by the mountains. It has a lack of green spaces. We would like to give Shardua some more public programmes. For prepared to give in the sea as a plantation which could give more the green at the same time as the succession of Shardua.

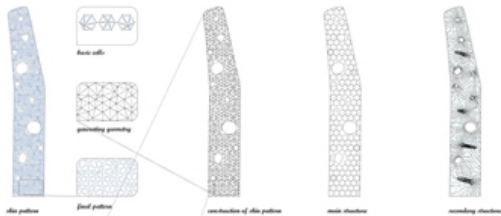


On the way to the sea, the trees are thought as big sea water desalination machines that afford. Shardua with pure water, due to a constant strength. The process of purification of water is done with plants that are located along the water path, so act as a filter of the wall. These plants capture natural gradients among the algorithms.



The building works as a big filter system which picks up and de-purifies energy from the air or water, it picks up air after energy. It allows turbulent wind to flow through the center of the tower, and water bodies get de-energy. These process of constant change of energy is directly related to the different programmes contained in the building.

it's warm, it rains inside and smells like flowers...

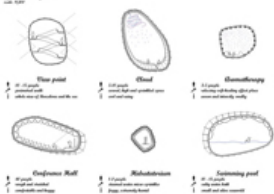


The building has a double structural solution related on one side to the exterior skin made out of a pattern, and on the other side with the baler that go through the tower. The main structure is made out of hexagons and it is located on the side of the building in between two perpendicular layers. The secondary structure is linked to the main structure through the irregular center of the regular hexagons. It follows the geometry of the baler and also holds the tower's traffic spaces.

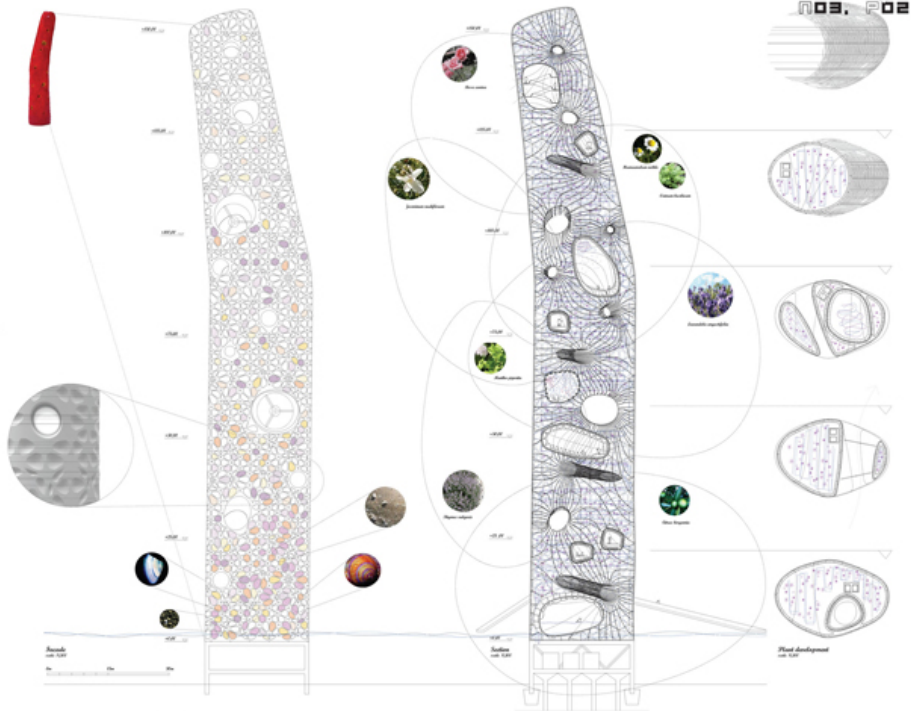
The main structure of regular hexagons with irregular centers configures a pattern which makes connections on the skin, the office use contemporary to rest on them, following the idea of the skyscrapers.



Space Cellulose



The intrinsic programmes are enclosed on isolated cells in between the main disposition system. These spaces get profit of the different material conditions which are generated during the process in order to create different atmospheres on each programme.

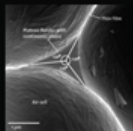


Bubble Tower _CONCEPT



Our first bodily experience of space is as an embryo, in a bubble-like home where nothing is needed.

When we are born and start to move freely, we do not move in squares - intuitive and free movement will not be confined to rectangular shapes - the human body prefers circular motions - as we see in dances. So why live in square boxes. A bubble in water is a well known example of space, not contained by a box. Bubbles in a formation is favored more intricate.



The digital materialization of the concept of bubble formation begins with the arrangement of spheres according to the Plateau's law.

The intersections of the spheres are joined by planar surfaces.

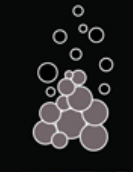
A selection of spheres on the exterior are collapsed and a surface is created by lines intersecting the collapsed sphere.

A resal-solver is applied to the surface of the collapsed sphere. This turns the surface into a minimal surface.

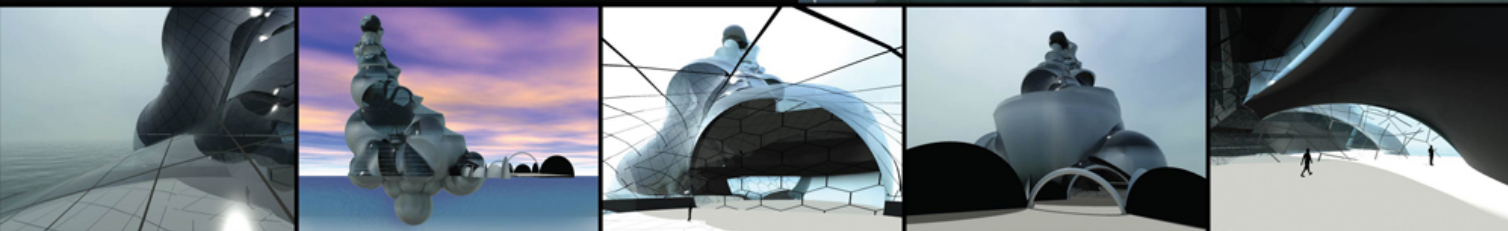


Bubbles always meet in threes, and they do so at an angle of 120 degrees forming an edge called a Plateau Border. Plateau Borders always meet in fours at an angle of $\cos^{-1}(-1/3) = 109.47$ degrees. Bubbles also always form a smooth, minimal surface relative to the enclosed volume.

Due to hydrodynamics bubbles in turbulent water, such as an ocean, will create a dense formation at the point where they arise - such as the end of a straw - and this formation will disperse as the bubbles rise up.



MATERIALIZATION



Bio digital Architecture Master 2009-UIC-Barcelona
Studio Genetic Architectonical Design
Group 4 / Effimia Giannopoulou - Martin Henriksen



Studio Director: Alberto T. Estevez
Studio Master: Aref Maksoud-MAG LAB

La concepción de este proyecto nace con la pregunta de que es lo que queremos representar: la importancia, lo esencial y la presencia del agua en el toda circunstancia, así como en el contexto inmediato de nuestro edificio.
Es así como reconocemos distintas instancias de este elemento y elegimos el movimiento producido por la caída libre de un objeto en su superficie.

Esto genera un movimiento orgánico - continuo y perfecto en cada etapa de su desarrollo, diferentes fases las cuales vectorizamos para descomponerlas en formas reconocibles y geométricas.

Al superponer esas fases obtenemos un movimiento congelado, una FORMA que nos sirve como punto de partida.

El edificio está compuesto por esas 2 partes reconocidas. Una sobre la superficie, que representa el volumen desplazado del agua y la otra que representa el movimiento de la superficie y bajo ella.

La estructura del edificio está compuesta por anillos horizontales dispuestos de forma vertical distanciados entre sí 5 mts, constituyendo así los diferentes niveles.

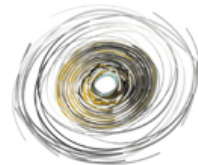
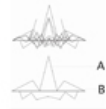
A estos anillos llegan 8 diagonales continuas, dispuestas según el diagrama, las cuales se autoportan a ellas y a los elementos horizontales.

Existe una estructura secundaria, que soporta el revestimiento del edificio, la "piel", coincide en algunos puntos de apoyo con la estructura general, pero es independiente.

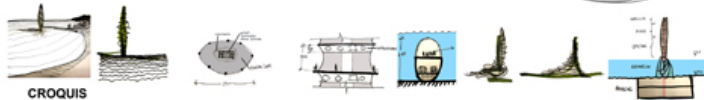
La piel del edificio está constituida por un revestimiento textil preferido para obtener una mayor resistencia y durabilidad, los varcos están constituidos como parte de la piel y están constituidos por elementos transparentes con su respectiva estructura o periferia.



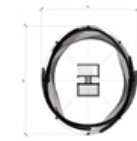
CONCEPTO



DESARROLLO



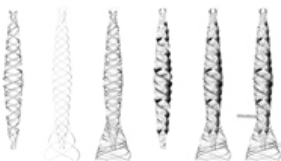
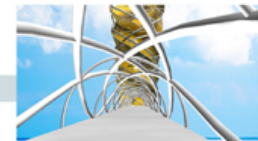
CROQUIS



PLANTA



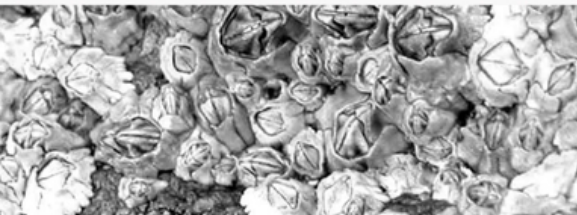
ELEVACION



ESTRUCTURA / PIEL



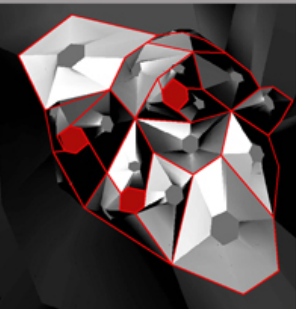
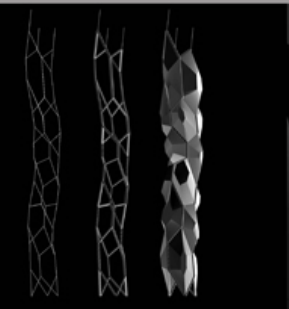
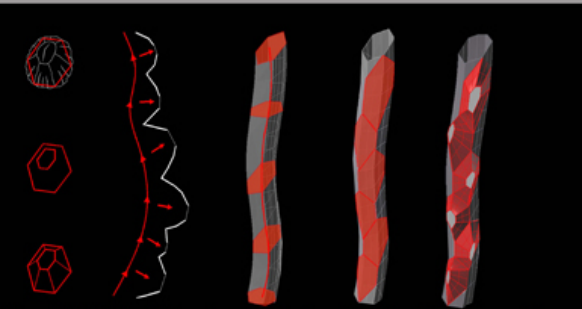
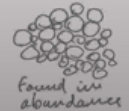
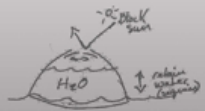
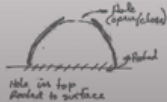
BALANUS PERFORATUS

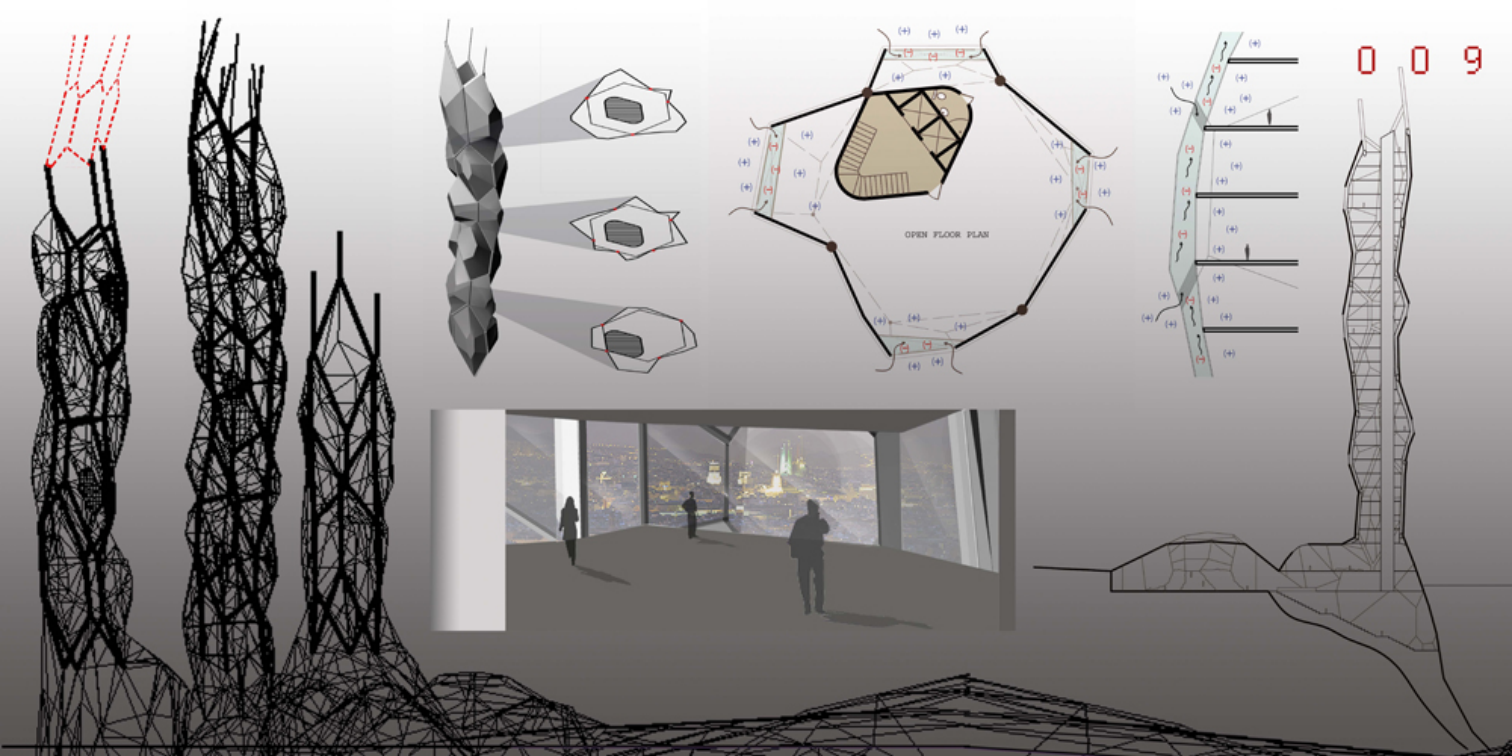


CHARACTERISTICS

- Found in abundance
- Irregular volcanic/conic shape
- Oval opening which closes and holds a small amount of water during high tides allowing them to survive during low tides.
- Sizes range from 1-5cm in height and width
- Composed of a thick structure of 6 plaques
- Rooted to its surface
- Colors: opaque white shell with purple or brown organism inside
- Live organism seen only in the water
- Capable of resisting drought and insolation
- Shell of each made of three layers of: conchiolin (scleroprotein), calcite and crystallized calcium carbonate.

009

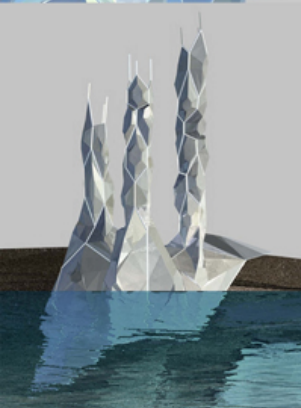
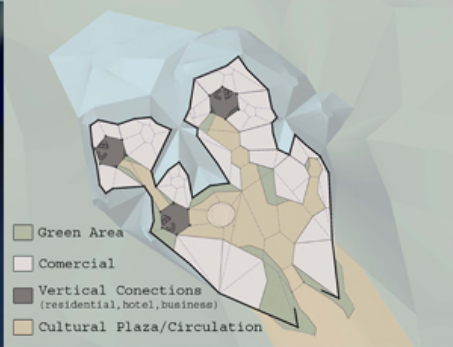
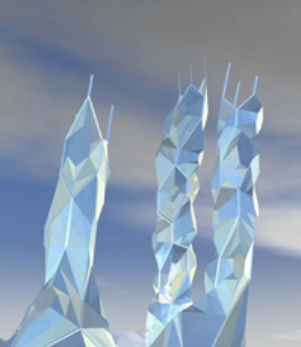




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Group 9 / Axelle Santos - Yonaty Peña - Néilson Montas



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is a city that continues to grow each day with a current population of 15,951 habitants per km2. Recognized as a culturally diverse city thanks to the different nationalities represented, it resembles a city more like New York City than any other. On its ever growing diversity of course. In a very similar way to NYC, Barcelona is limited by its geographical location. Even though both cities still have more than enough territory to grow there is one factor that keeps the life of NYC in only one of its boroughs (Manhattan) and the life of Barcelona in its [Centro]: its livelihood.

People that live/move to such cities have a desire to be in the center of it all. There is little attraction in living far from a few of the things that define your life: work, friends, cultural opportunities, etc. This is one of the main reasons many people choose to live in only one of the 5 boroughs that define the city of NY and in the center of Barcelona. For this reason we have chosen to move our project into the coast of Barcelona.

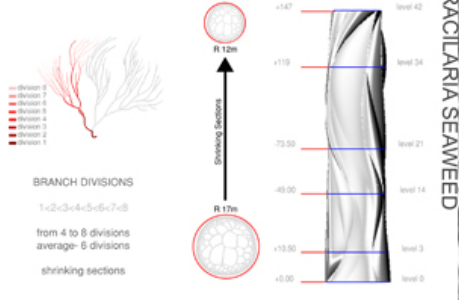
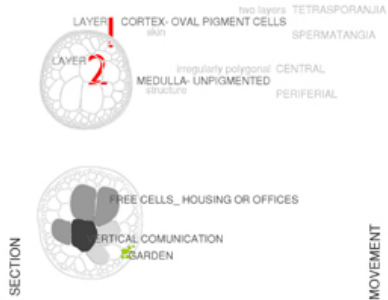
There is an obvious physical limitation to the city caused by its mountains to the North West and by its coast to the South East, and a psychological limitation caused by its inhabitants desire to be a part of the center of the city.

Along with the desire to live in a specific, limited territory, cities sometimes have to look for the need for green spaces. As we can see from the existing green spaces diagram of Barcelona there are very little green areas in the city, with the exception of the mountains to the North West. This is a problem since green spaces are the [lungs] of a city. In a sense, Barcelona is currently a suffocating city with a need to breathe. Therefore, we have chosen to study a type of vegetation that lives in the environment where we will be locating our project. Through the study of the parameters of the seaweed we have emerged the plant as a vertical garden from the sea towards the sky in order to supply breath to the city.

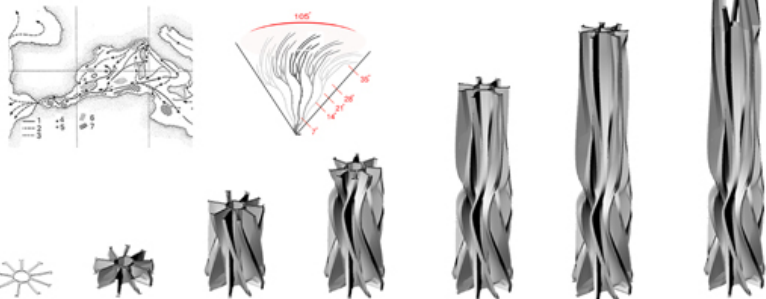
In a similar way to the growth of the seaweed in the rocks of the ocean and its reaction to the environment our building breathes as the rock on which our garden grows, causing a positive reaction on the environment of the city.



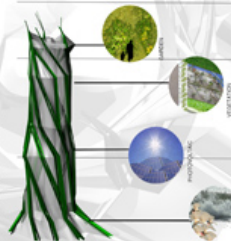
Even though it is possible to grow through the sides of the city, we have chosen to maintain the lower in contact with the center of Barcelona where all the day to day



Gracilaria is up to 46 cm tall, with few to several long branches 0.50-1.4 mm in diameter; branching irregular mostly from lower portion, branches simple, two to eight branches frequently occurring from a single branch apex. Frond in transverse section consisting of medulla of large thin-wall cells, 130x260 μm in diameter, two layers of cells in cortex; transition from medulla to cortex abrupt.



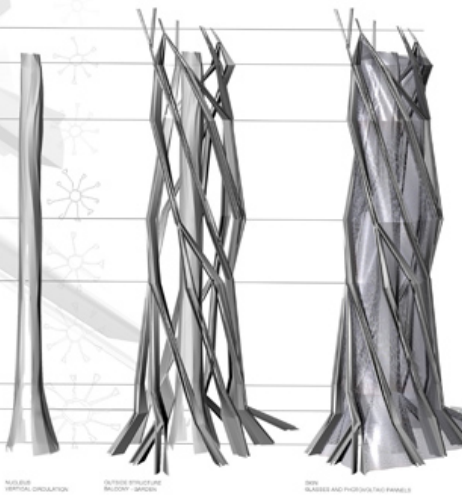
BUILDING SYSTEM



LAYERS



PROCESS



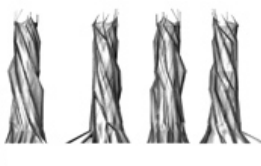
SECTIONS



PLANS



ELEVATION



SITE



EMERGE_10_02

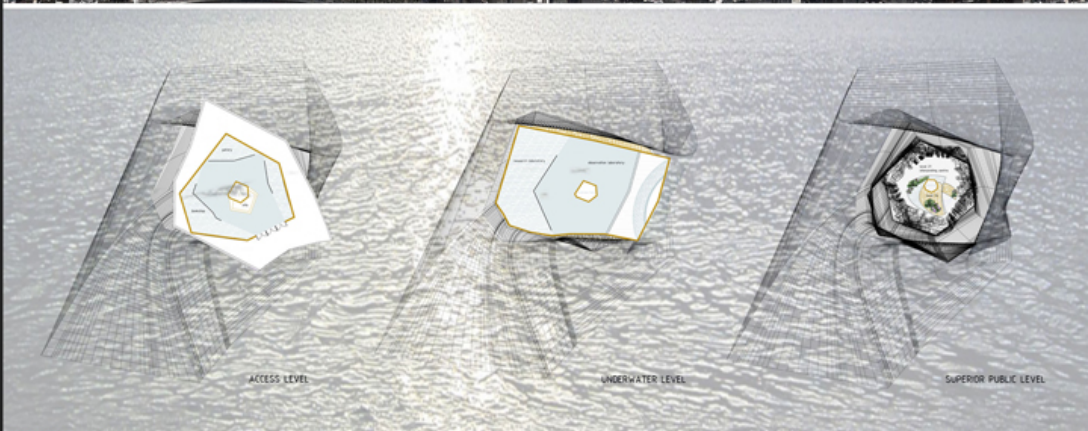
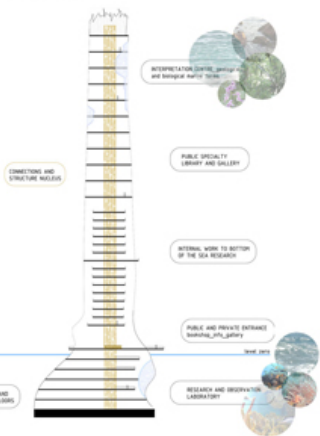
Centro de Investigación de Fondos Marinos

El uso del edificio se destinará al estudio y la investigación de los procesos geológicos y biológicos marinos.

Para la distribución del programa se subdivide la torre en tres partes:

- Nivel bajo el agua: de acceso restringido, en ella se encuentran los laboratorios de observación y contacto directo con el mar. Ocasionalmente puede tener un acceso público.
- Nivel inmediato a la planta de acceso: de carácter privado, alberga los espacios destinados al trabajo interno, así como una posible zona de alojamiento temporal para los investigadores o científicos.
- Nivel superior: de carácter público, es la zona más espectacular, pues en ella el visitante interactúa con el edificio. Las primeras plantas ofrecen una biblioteca especializada y unas salas de exposiciones temporales que cambiarán según las épocas del año. En las últimas plantas el límite entre exterior e interior queda difuso, el usuario lo atraviesa en busca de sensaciones. Techo_Dido_Difate.

PROGRAM DIAGRAM

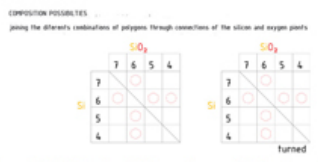
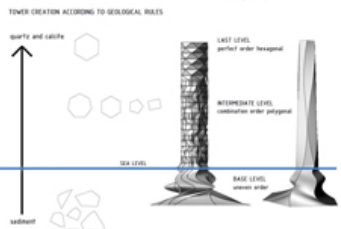
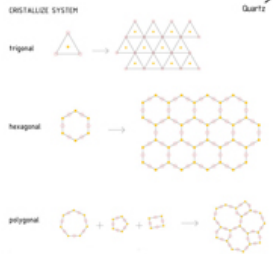


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 Studio Master: Aref Maksoud-MAG LAB



Como punto de partida nos pareció especialmente relevante los inputs que pudiera darnos la ubicación costera del rascacielos.

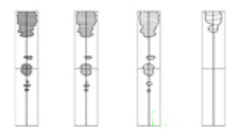
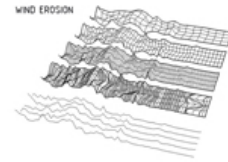
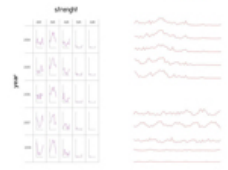
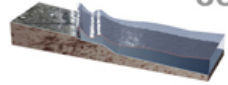
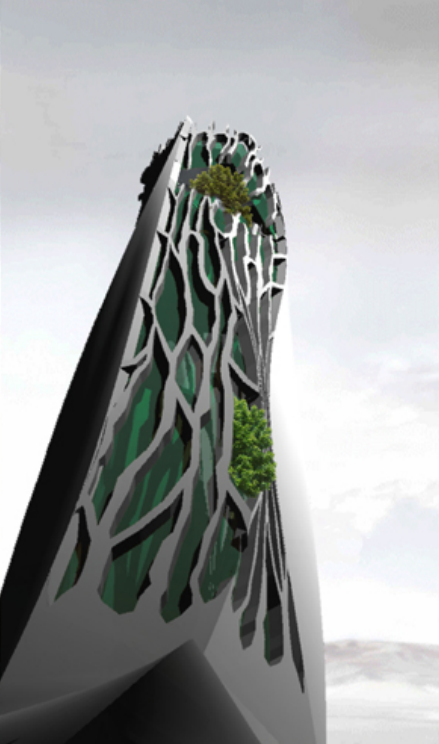
Elemento: la erosión a la que están sometidas las estructuras en las zonas costeras, y la capacidad que tiene para formar y deformar estas estructuras.

Dos son los tipos de erosión que dan forma a las estructuras costeras: erosión hídrica, producida tanto por las olas del mar, como por la lluvia, y erosión eólica producida por el viento y las partículas que arrastra. Ambas tipologías producen deformaciones claramente diferenciables, y entre ambas han configurado nuestras costas siendo el elemento fundamental en su proceso formal.

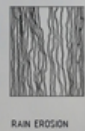
El edificio es un instrumento educativo que permite mostrar los efectos de la erosión. Su morfología inicial se basa en la composición de la roca sedimentaria costera. Está se compone casi en un 30% de roca cálcica (CaCO₃) y en menor medida de cuarzo. Los sistemas de cristalización combinados son la base del volumen original, formando el hexágono (el componente más complejo del sistema) como el último estaban en la secuencia formal del edificio.

En este punto se toman dos direcciones en función de las tipologías erosivas. Por una parte la erosión hídrica afecta el volumen inicial a un nivel externo configurando la estructura perimetral y la piel del edificio.

Por otro lado la erosión eólica afecta a un nivel más profundo, definiendo la espacialidad interna y la morfología final, la que a su vez define el programa en los diferentes niveles. Bajo el nivel del mar son las olas las que erosionan la estructura, el programa subacuático aprovecha estas perforaciones para relacionarse con su entorno.



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RAIN EROSION



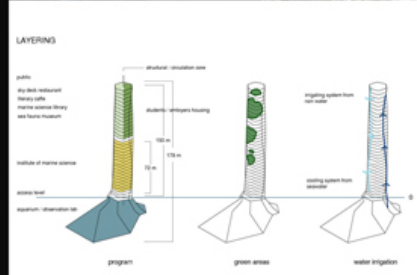
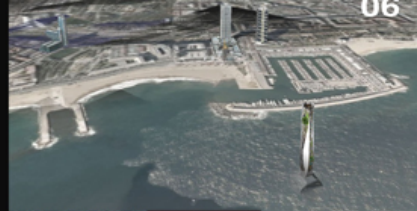
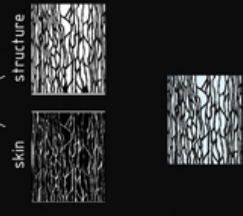
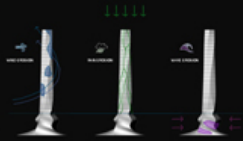
break up in two elements

structure

skin

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Vinculo: El agua recorre el edificio a traves de sus grietas, estancandose en las zonas erosionadas por el viento. Son los puntos de vegetacion.



STRUCTURE
Carbon fiber or ultra-highly colored fiber, graphite fibers or carbon-graphite is a material consisting of extremely thin fibers about 100-1000 nm in diameter and composed mostly of carbon atoms. The carbon atoms are bonded together in hexagonal crystals that are more or less aligned parallel to the long axis of the fiber. The crystal alignment makes the fiber strongly strong for its size. Strong fibrous carbon fibers are bonded together to form a yarn, which may be used for thread or woven into a fabric. Carbon fiber has many different weave patterns, and can be combined with a resin and used to form such as fabric reinforced or carbon fiber to provide a high strength-to-weight ratio material. The density of carbon fiber is also considerably lower than the density of steel, making it ideal for applications requiring low weight.

SKIN
DIB is the acronym for Durable, Intelligent, Multifunctional, Flexible Composite, which is a nanotechnology material. It's a durable, adaptable and transparent plastic material in Teflon. It's an emerging property for architects to know that this resin can be used into a skin, similar like, which manufacturers such as DuPont work in resin. It can be used in sheets or inflated into balloons. Compared to glass, it's 1/3 the weight, it's twice as light, and costs 1/10th the price to install. It's also resistant to heat and cold, with an enhanced 50-year life span, self-cleaning, self-healing, self-repairing, self-repairing, and self-repairing. It's also able to stretch to three times its length without losing its elasticity.