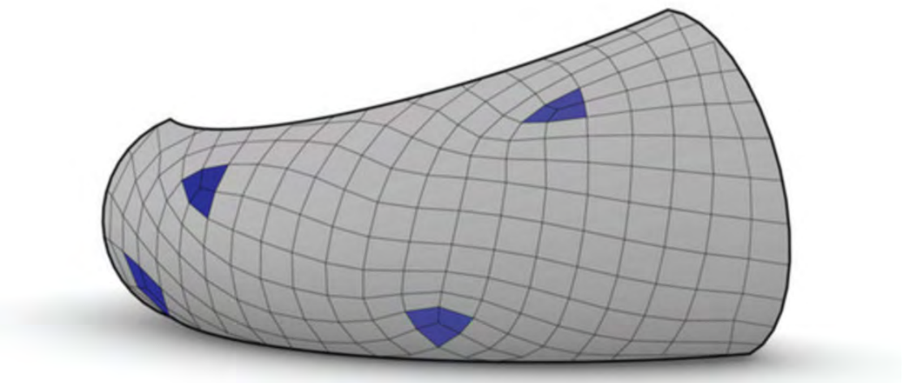
Image By **Andres Flajszer**

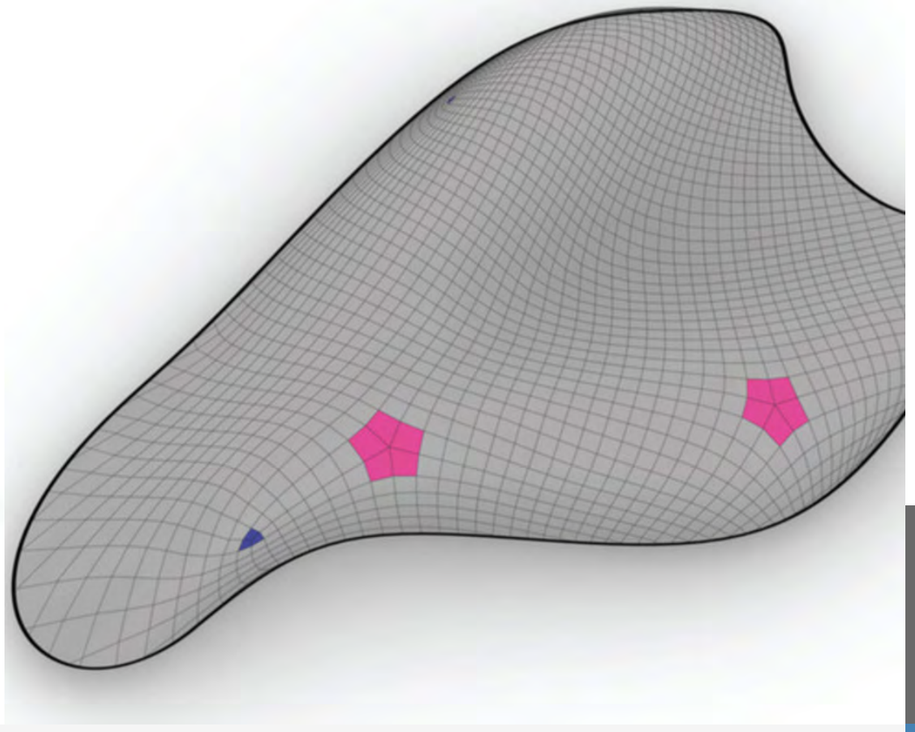
Christian Dimitri

PORTFOLIO 2018

Architecture & Parametric Design

I am Christian Dimitri, I am an optimistic Architect specialized in parametric architecture and computational design. As a self taught computational designer and 3D visualizer, I am able to say that I am familiar with the computational tools available today.





AUTHOR: Christian Dimitri

DATE: July 2018

rhino3d | grasshopper3d | capybara/dodo | millipede

kangaroo2 | VSC | Csharp | python

pandoc/latex | illustrator | photoshop

Planar Quads in Free-Form Surfaces

Architecture geometry: Rationalization technqiues for Planar Quad meshes

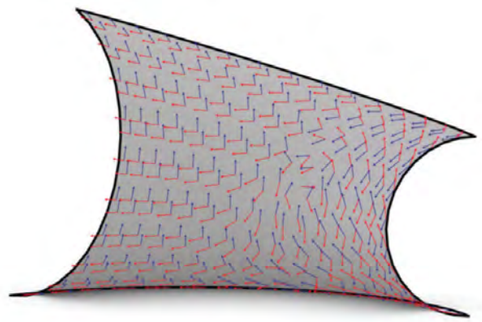
This paper will cover the preprocessing techniques for planar quad meshes in architecture free-form surfaces. As a first step, we will covering the problems and objectives behind *PQ meshes* for construction, their benefits, their metrics as well as thei r goals, considering their constraints for a better optimization of the candidate *PQ mesh*. Secondly, we will explain the sever al preprocessing algorithms that generate a candidate *PQ mesh* ready for optimization. In addition to that, the output will b e optimized according to it's properties qualifying it to be *PQ meshes*. The last-mentioned are based on scientific papers, an d were applied to concrete architectural projects. Combining chapter two and chapter three iteratively, we will be hitting th e last chapter of this paper; generating subdivision method algorithm and a quad planarization in order to have a planar qu ad mesh.

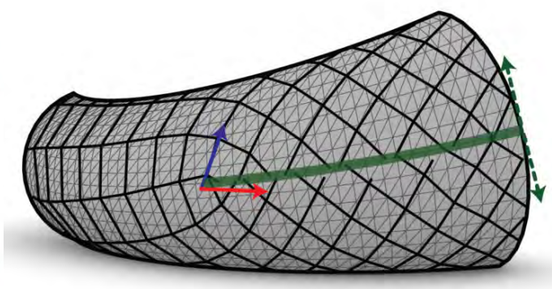
CATEGORY: Parametric design in architecture masters thesis

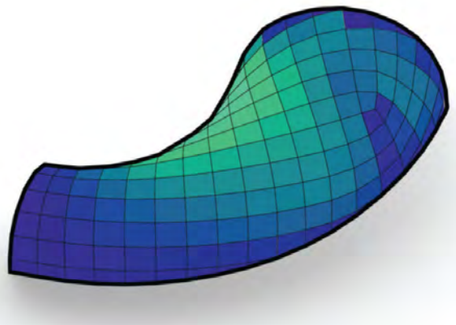
FIRM: MPDA 18 - Universitat Politècnica de Catalunya (UPC)

LOCATION: Barcelona - Spain

SUPERVISOR: Enrique Soriano







free-form surfaces | planarity

rationalisation | aspect ratio

curve networks | conformal mapping

frame fields | subdivision technique

Image By **Andres Flajszer**

Chebyshev Net Triangular Gridshell

Design & construction of a spherical actively-bent gridshell covered by a stretchab le membrane

The aim of this study is to design and build a 6 m diameter dome structure covered by a stretchable membrane; using the previously published work in Chebyshev Net gridshells [Baverel et al.], the introduction of singularity points in the grid desig n [Yannick Masson et al.]. A special case exists when introducing a single valence 3 singularity on the center of a spherical d ome: the bracing of each patch follows the same direction as the rods of its neighbouring patches, leading to the assumptio n that structure and bracing could effectively be the same element. Regarding the design & construction of the membrane, some assumptions had to be made in order to simplify the welding process.

AUTHOR: Christian Dimitri, Martina Fabré, Noelia Rodriguez, Jatziri Rodriguez, Alan Rynne, Martí Sais

LOCATION: Barcelona - Spain

DATE: July 2018

AREA: 28.3 m^2

rhino3d | grasshopper3d | VSC | Csharp

3dsmax | Vray | illustrator | photoshop

CATEGORY: Case study

FIRM: MPDA 18 - Universitat Politècnica de Catalunya (UPC)

LOCATION: Barcelona - Spain

SUPERVISOR: Enrique Soriano, Gerard Bertomeu

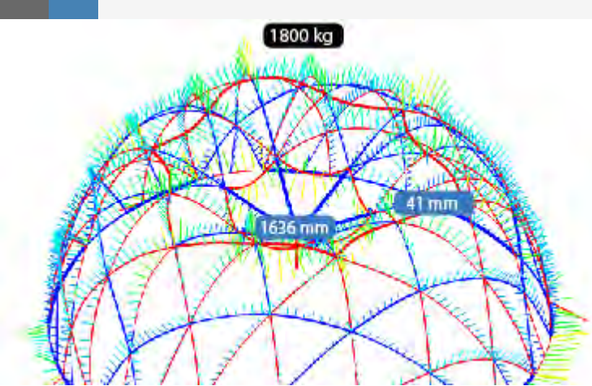


Image By **Andres Flajszer**

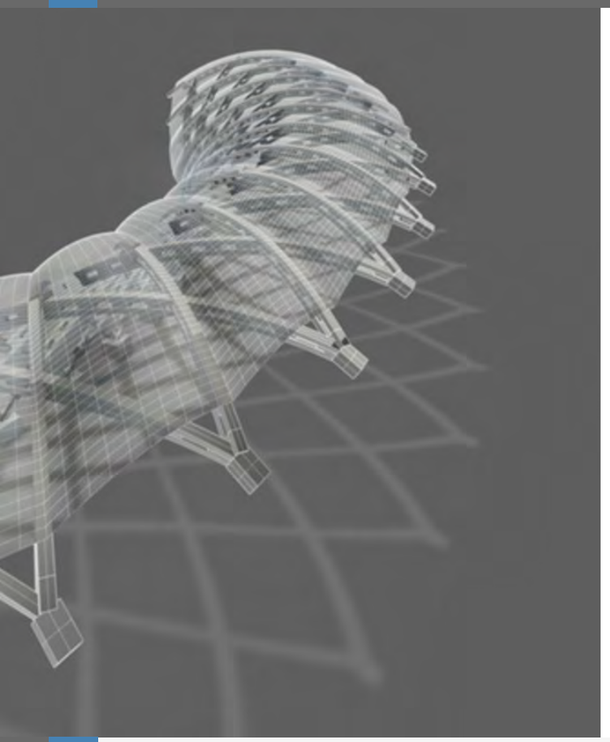
Image By **Andres Flajszer**

elastic gridshell | lightweight structure

temporary pavilion | gridshell bracing

composite materials | spherical domes

active bending | elastic membrane



Geodesic Gridshells: Waitomo Caves Visitor Center

Building systems optimization

This research presents a case study of the Waitomo caves visitor center, explaining the different design strategies going fro m the form-finding and analysis till the optimization of the building system. The final step consists of adapting the same de sign system after collecting the information in the previous step onto a free form surface. The project is a wooden grid shell made of geodesic beam on a toroid. In order to study the project multiple 3D models where made to approximate the real p roject then analyzing and comparing the data between different 3D results.

AUTHOR: Christian Dimitri, Sebastian Sánchez, Orlando Torricos Rachid Naboulsiv

LOCATION: New Zealand

DATE: February 2018

AREA: 1846 m^2

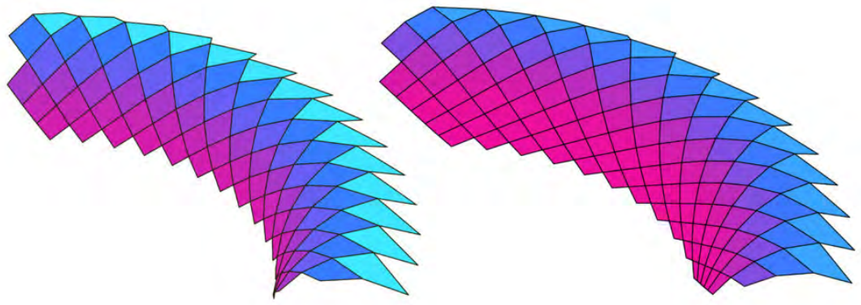
rhino3d | grasshopper3d | InDesign | illustrator | photoshop

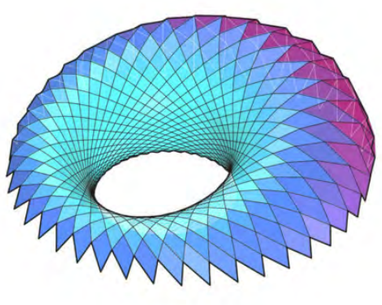
CATEGORY: Case study

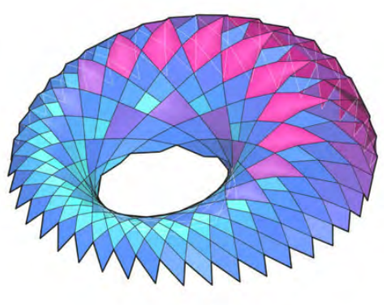
FIRM: MPDA 18 - Universitat Politècnica de Catalunya (UPC)

LOCATION: Barcelona - Spain

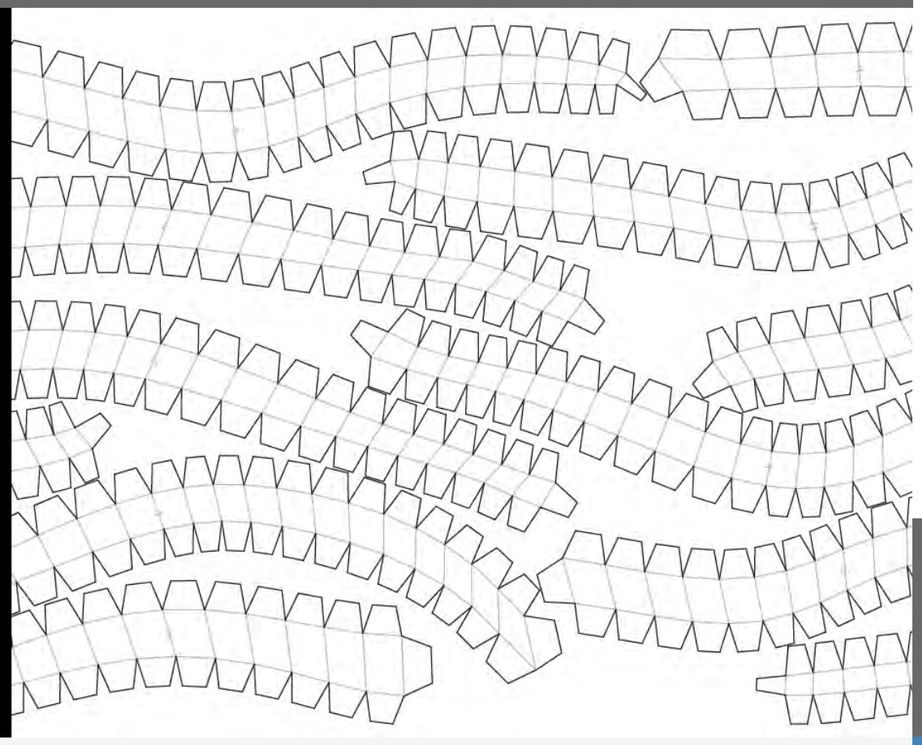
SUPERVISOR: Enrique Soriano, Gerard Bertomeu







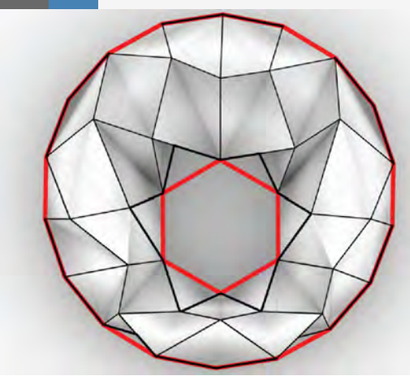
geodesic gridshells | lightweight structure | touristic center | active bending | wood structure | etfe cuchon | system optimization | geometric adaptation

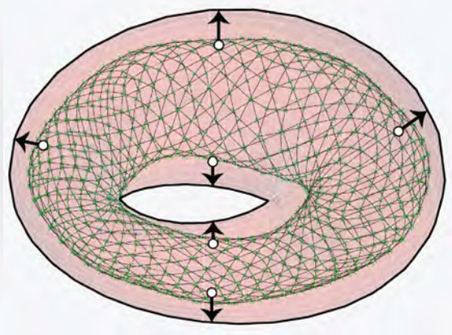


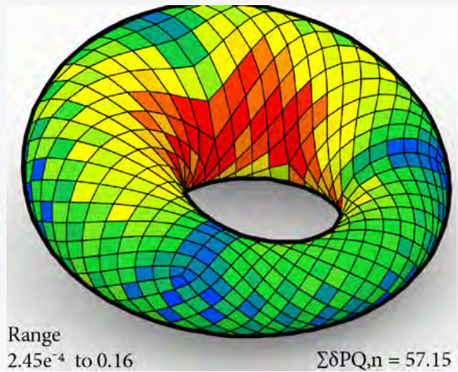
Digital Fabrication 2D Machining: Planar Quad Stripes

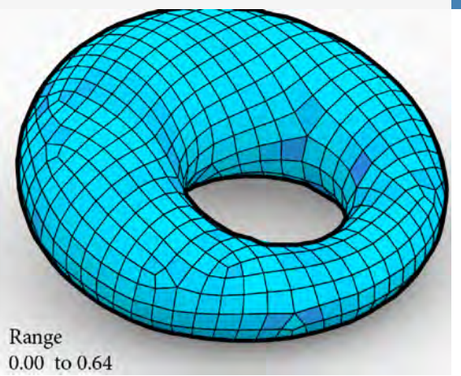
Dupin cyclide rationalization

Polygonal meshes are important representations with a large number of applications in geometric modelling, computer gr aphics, mechanical engineering, simulation, architecture etc. Such representation are based on the idea of cell decompositi on: a complex object is represented with an assembly of simple polygonal cells. In this survey we are going to discuss the ba ckground information of different techniques and algorithms mentioned in the literature for a quadrilateral remeshing. Thu s, we will apply those techniques on a free-form surface called Dupin Cyclide. Therefore, we will introduce the process behin d this paper showing different techniques in order to remesh a free-form surface while respecting it's semi-regularity that d efines it's type. This phase consits of different ways to build a coarse mesh with a regular valence 4 on it's vertex, but with a v ariant number of singularities such as there placement on the mesh. Then we will optimize those meshes to fit them on the Dupin Cyclide. We will planazrize the panels, reduce the henge effect on each of them, and finally analyse and compare the ouputs in order the select the optimal mesh fitting the PQ meshes requirements. After Outputing, the 2D nets have been g enerated and cutted using a 2D KNK machine then built on a small scale.









AUTHOR: Christian Dimitri, Jatziri Rodriguez, Uri Lewis

LOCATION: Barcelona - Lebanon

DATE: February 2018

rhino3d | grasshopper3d | 3Dsmax | illustrator | photoshop | inDesign

CATEGORY: Architecture geometry

FIRM: MPDA 18 - Universitat Politècnica de Catalunya (UPC)

LOCATION: Kaslik, Lebanon

SUPERVISOR: Enrique Soriano, Gerard Bertomeu

dupin cyclide | planar quad stripes | aspect ratio | anisotropic remeshing | top down approach | digital fabrication | rationalisation | 2D machining

Digital Fabrication 3D Machining: Kachigata

Experimenting tool-paths and tool-tips

In the occasion of this task, I had the opportunity to generate a vector field on a surface and generating a mesh following th ese streamlines. This process was based on experimenting tool-paths using the available tool-tips in the factory. This art box shows a contrast between the rounded tool-tip and the sharp one.

AUTHOR: Christian Dimitri

LOCATION: Barcelona - Spain

DATE: February 2013

rhino3d | rhinoCAM | grasshopper3d

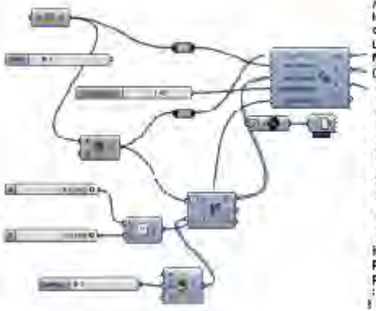
CATEGORY: Digital fabrication

FIRM: MPDA 18, Medio Design

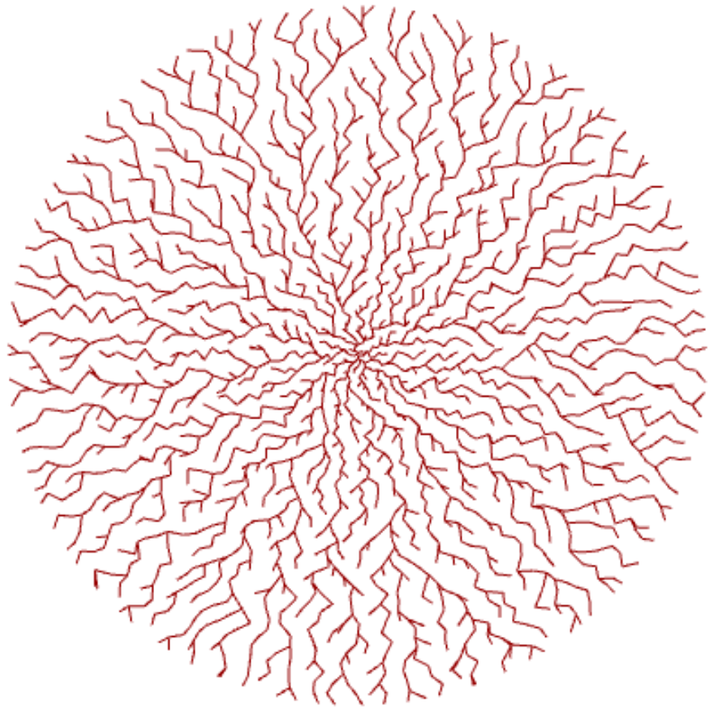
LOCATION: Barcelona - Spain

SUPERVISOR: Enrique Soriano, Gerard Bertomeu, Juan Pablo Quintero

kachigata | CNC machining | digital fabrication | vector field | streamlines | 3D art | sculpting art | toolpath experimenting



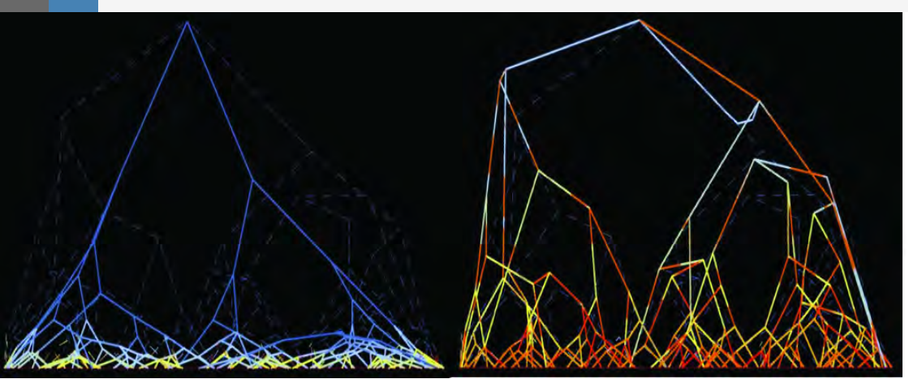
```
// ———— Custom Properties ————
List<Line> growthLines = new List<Line>();
List<Point3d> previousPointsOnCurve = inputPoints;

Curve previousCurve = inputCurve;
int previousPointCount = previousPointsOnCurve.Count;
double tolerance = 0.001;

// ———— Discomatching ————
for (int i = 0; i <= maxIterations; i++)
{

 //offset the previousCurve
 double offsetValue = Math.Sqrt(i + 1);
 Curve offsetCurve = previousCurve.Offset(inputPlane, offsetValue, tolerance, CurveOffsetCornerStyle.Sharp)[0];
 //get points on polyline
 int numberOfPoints = (i + 1) * 2 + previousPointCount;
 double gap = 1 / Convert.ToDouble(numberOfPoints);
 List<Point3d> ptList = new List<Point3d>();
 for (int j = 0; j < numberOfPoints; j++)
 {
  double t = gap * j + gap / 2;
  Print("{0}", t);
  double r = rnd2.NextDouble();
  r = r * ((gap / gapFactor) + (-1 * gap / gapFactor)) + (-1 * gap / gapFactor);
  Print("{0}", r);
  Point3d pointOnCurve = offsetCurve.PointAtNormalizedLength(t + r);
  //search closest point from each point
  Point3d closestPoint = Point3dList.ClosestPointInList(previousPointsOnCurve, pointOnCurve);
  //drawLines
  Line line = new Line(closestPoint, pointOnCurve);
  growthLines.Add(line);
  ptList.Add(pointOnCurve);
 }
 previousCurve = offsetCurve;
 previousPointsOnCurve = ptList;
 :
}


// ———— Output Data ————
A = growthLines;
B = previousCurve;
```

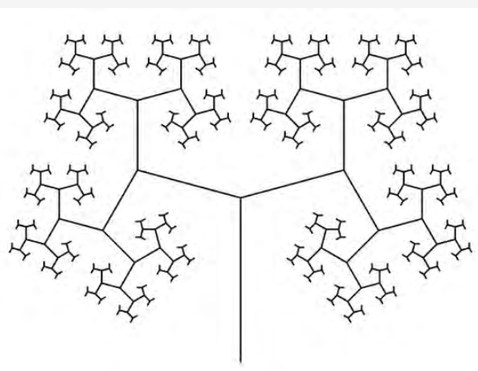


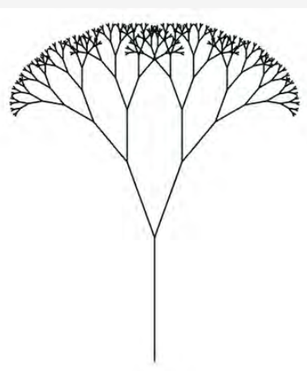
Algorithm in Technology

Scripting and fun algorithm

This section covers a variety of algorithms I scripted. In the occasion of learning programing and algorithms in technology made my obsession in programing grow more. I have been always optimistic about the implementation of the maths in arc hitecture and technology. Since the future hides a lot of secrets rekated to computer and science, I have decided to develop p my scripting skills in order to implement them in architecture and design for construction.







AUTHOR: Christian Dimitri

DATE: April 2018

rhino3d | grasshopper3d | python | VS | Csharp | anemone

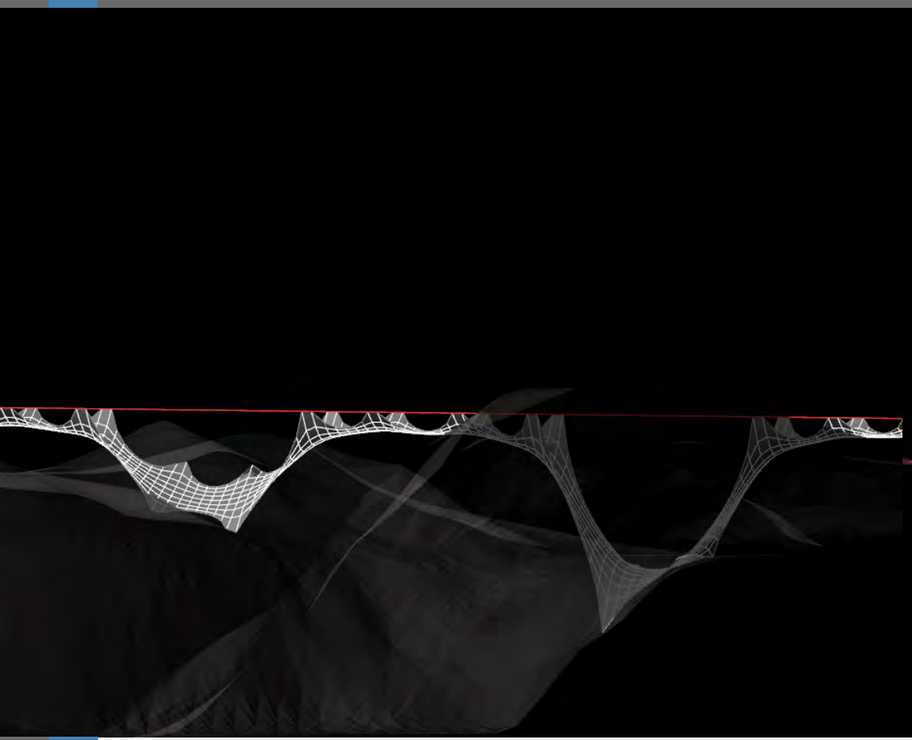
CATEGORY: Programing

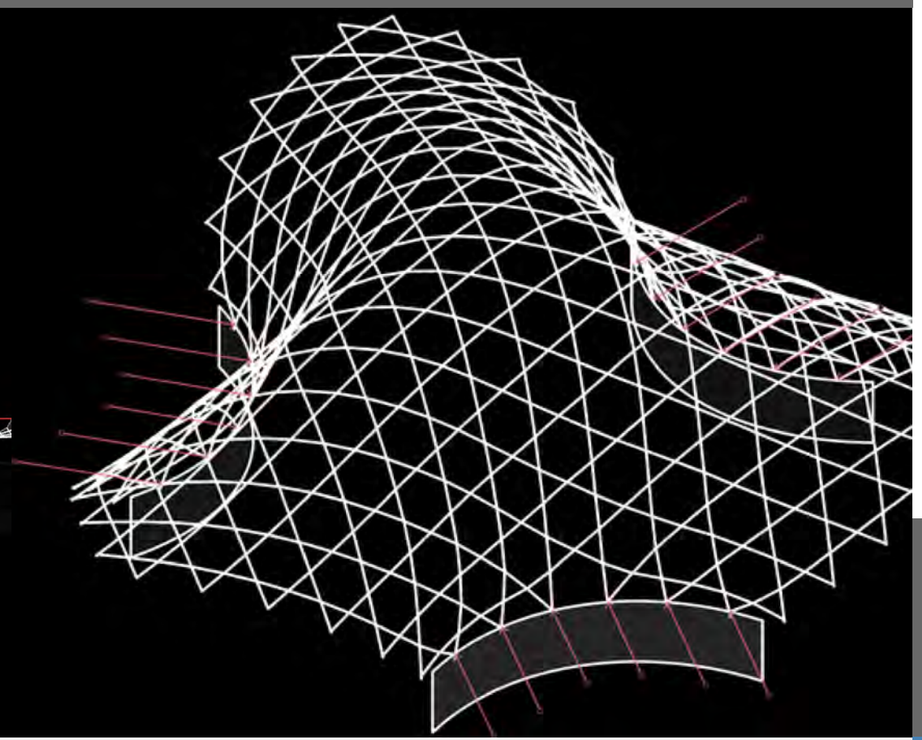
FIRM: MPDA 18 - Universitat Politècnica de Catalunya (UPC)

LOCATION: Barcelona - Spain

SUPERVISOR: David Andres, Enrique Soriano, Ramon Sastre

nature | algorithms | scriting | dendrogram | fractal tree | growth





Form-finding and Structure Optimization

Structure design using grasshopper3d and optimization using Karamba3D

This section will show a set of form-finding algorithms. Thus some algorithms such as the dendrogram is applied on a task t o carry a platform of a uniform load of 150kg/cm2. After this step the curves have been assigned as supports in the Karamba assembly mode. Therefore a set of thicknesses has been optimized using an Evolutionary system engine in order to have an acceptable discpalcement. On another hand, a set of forms have been found using the dynamic relaxation techniques gene rated using kangaroo2 (musmeci bridge of Arthuro Tedeschi, gridshells, etc...) , after that the stress lines and utilization are c omputed using karamba3D assembly mode.

AUTHOR: Christian Dimitri

DATE: April 2018

rhino3d | grasshopper3d | kangaroo2 | k2 engineering

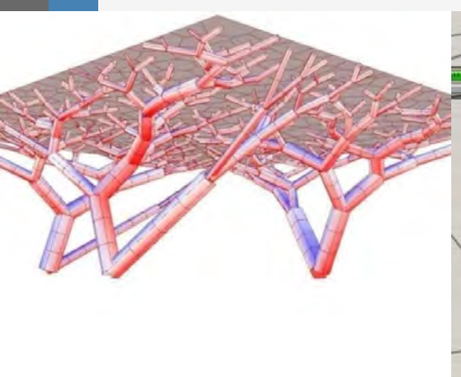
karamba3D | VSC | Csharp | anemone

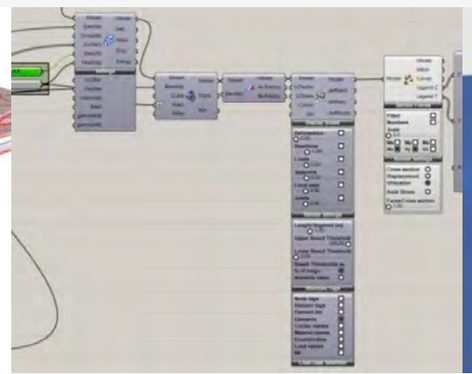
CATEGORY: Building information

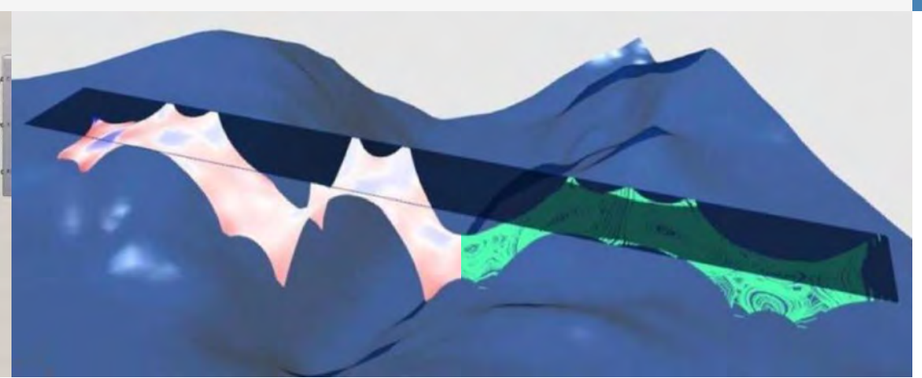
FIRM: MPDA 18 - Universitat Politècnica de Catalunya (UPC)

LOCATION: Barcelona - Spain

SUPERVISOR: Enrique Soriano, Pep Tornabell, Gerard Bertomeu





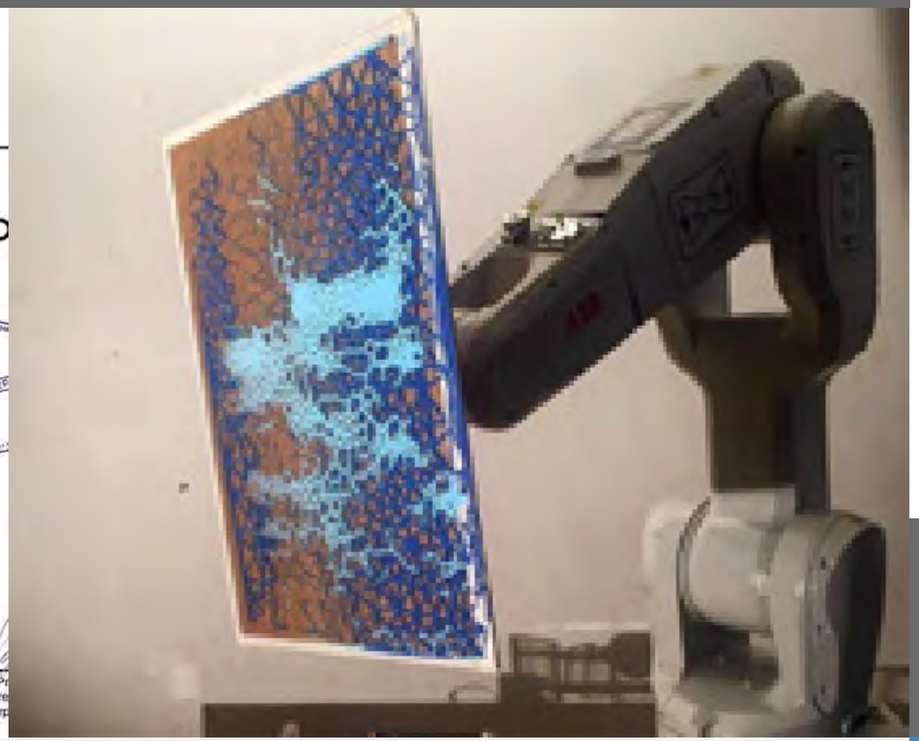


form-finding | lightweight structure

complex structures | algorithm in construction

structure optimization | deflection

max displacement | utilization



AUTHOR: Christian Dimitri, Madeleine Dimitrova, Ben Tay

LOCATION: WoMa Paris - France

DATE: October 2017

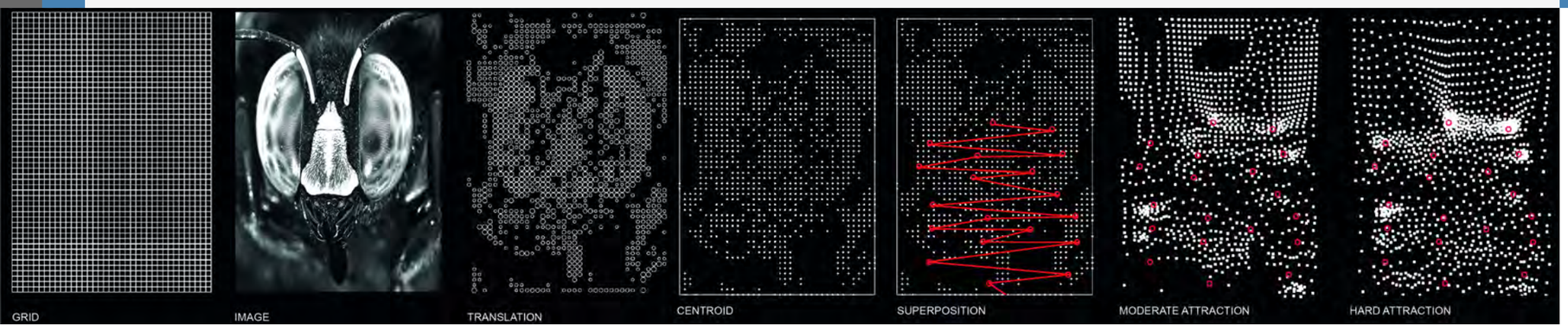
rhino3D | grasshopper3d | anemone | taco ABB

illustrator | photoshop | inDesign

Insection

ARTE ROBOTICA V.01: Computational robotic painting workshop

Insection is a visual representation of the method which an image could be distorted by the sound. The way a subject is per ceived, it is isolated by itself. The aim of the attempt is to produce a final piece of work which should be generated by an im age and a sound and moreover it should be a collaboration between gerative design and unexpectedness of the robot's wor k. This aspect or randomizing the final result gives the possibility of unlimited solutions and interpretations. Initially an imag e of an insect has been chosen and it was associated with the sound of the source. The image and the sound are working to gether in order to complete the perception of the idea about the insect. Insection is an attempt of visualizing the interactio n between these three objective qualities of the subject: word, image and sound. The image of the insect is inserted into th e software and translated into the language of the linear graphic which makes the interaction between an image and the g raphic of the sound wave possible. Afterwards the sound wave and the linear image are put into superposition in order to o bserve the interaction between the two. The sound wave is glitching the linear image metamorphosing it into something n ew which cannot be related neither to the sound wave nor to the image.



CATEGORY: Workshop

FIRM: DesignMorphine, IAAC

LOCATION: Sofia - Bulgaria, Barcelona - Spain

SUPERVISOR: Lidia Ratoi, Kunaljit Chadha

computational design | digital art

dadaist concepts | ABB robot arm

customized tooltip | insection concept

AUTHOR: Fabio Curia, Paul Berger, Julia Merpillat, Axel Imerdis, Nicolas Laurent, Christian Dimitri, Lea Monnot

LOCATION: Nice - France

DATE: January 2018

VS | Csharp | unity3D | 3Dsmax

Vray | illustrator | photoshop

Building-Reality.com

Optimized real estate prototyping solution innovative, immersive, adjustable

Collaborating with the software developers and the founders of the french startup that offers prototype services of building s and renovating real estate through virtual reality experience. The essential element of our product is the ability to experien ce the future, to be immersed in it. Indeed, it provides the answer to a real client need. In today's current market, with the ex isting software, it is impossible to move around inside your building project as you make enhancements or adjustments. Ho wever, with the new Reality Building software, this attractive idea becomes a reality.

CATEGORY: Start-up

FIRM: Building Reality

LOCATION: Villneuve-Loubet - France

CO-FOUNDER: Fabio Curia, Paul Berger

virtual experience | realtime render

real estate | flexible service

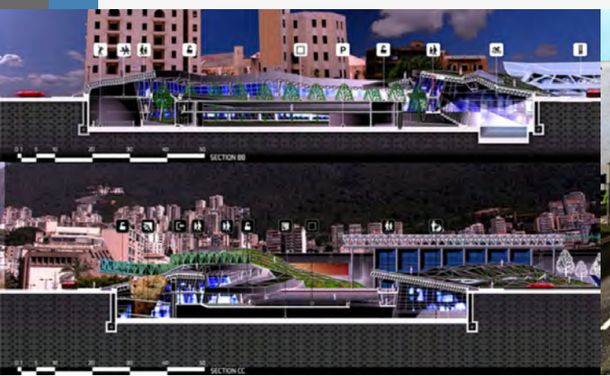
self modification | materials & furniture

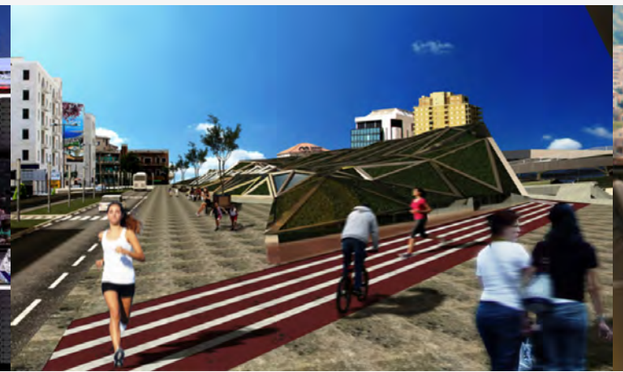
immersive technology | innovative services

Fouad Chehab Stadium: Community Sports Hub

From a municipal stadium to a sports hub

Would the installement of new administrative and sports equipments on site of the Fouad Chehab Stadium supporte d by local investers and sponsors, be a solution for the enhancement of regional collectivity? In the city of Jounieh are dispatched more than ten private sports facilities, offering an average of six activities each. However, existant building the st adium presents four possible choices of activity only. On the other side it is a cultural platform in summer; the Jounieh Inter national Festival is hosted there, along with other festivities for the citizen and the surrounding regions. As shown in the pic ture above, it is clear that the regional radius is not proportional to its present day utility. This is why I developed a conceptu al urban design, exploying the maximum of resources on site, creating an innovative potential upgrade under-estimated sta dium.





AUTHOR: Christian Dimitri

LOCATION: Jounieh - Lebanon

DATE: June 2016

AREA: 30 000 m^2

autocad | 3Dsmax | Vray | photoshop

autodesk 123D

CATEGORY: Architecture masters thesis

FIRM: Holy Spirit University of Kaslik (USEK)

LOCATION: Kaslik - Lebanon

SUPERVISOR: Abdel Halim Jabr

urban design | public domain

sports hub | municipal stadium

public spaces | humanitize the land

city cycling path | green roof

AUTHOR: Christian Dimitri

LOCATION: Sahel Alma - Lebanon

DATE: June 2014

AREA: 7 500 m^2

autocad | 3Dsmax | Vray | photoshop

LRCEMS

Lebanese red cross new center

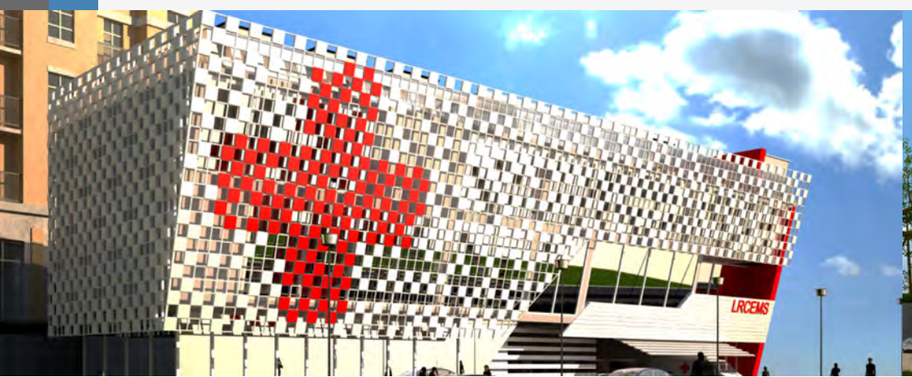
In the occasion of a facade design competition I had the honor to win the first place in the challenge of covering the structu re of new Lebanese Red Cross center. My creativity and my knowledge in digital tools and design drove me to design an ico nic design. The latter is a double skin facade covered with ceramic panels on a metallic chassis. The panels are colored and c ulled in order to express and show the red cross on the main facade of the building. The stairs which embed the verticality o f the geometry is colored in red in that way the center is hilighted.

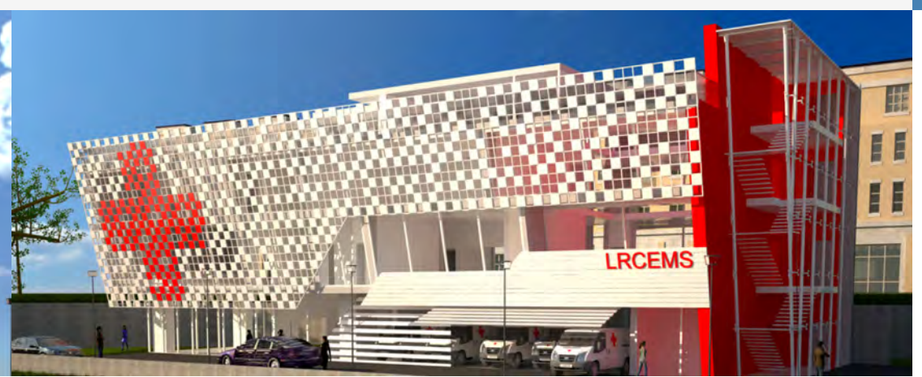
CATEGORY: Facade design proposal

FIRM: BlankWorkshop

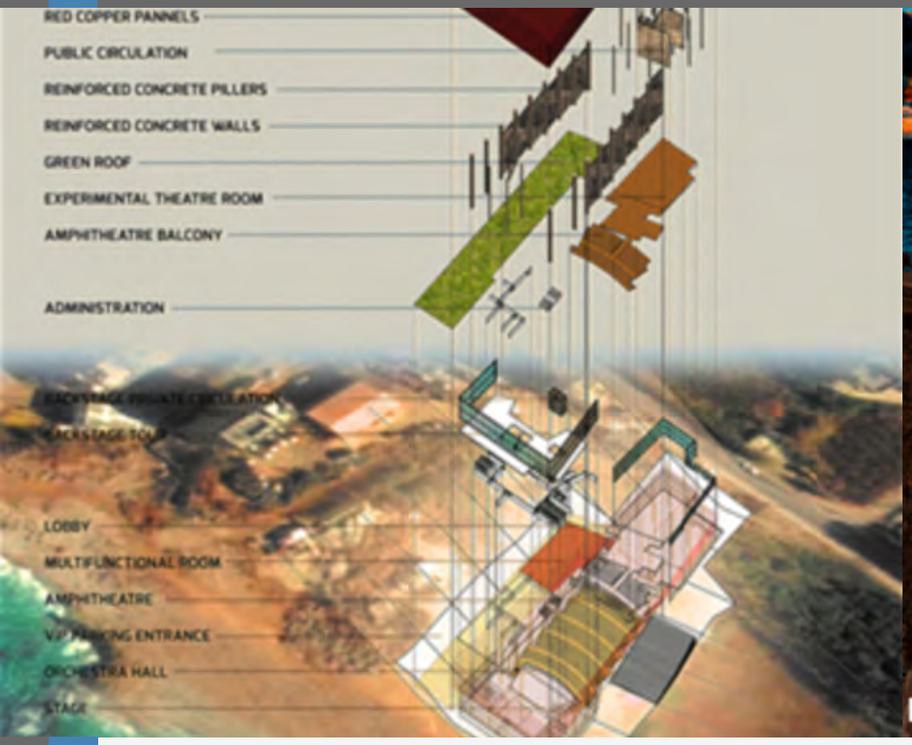
LOCATION: Sarba - Lebanon

SUPERVISOR: Anthonios Rizk, Georges Nicolas





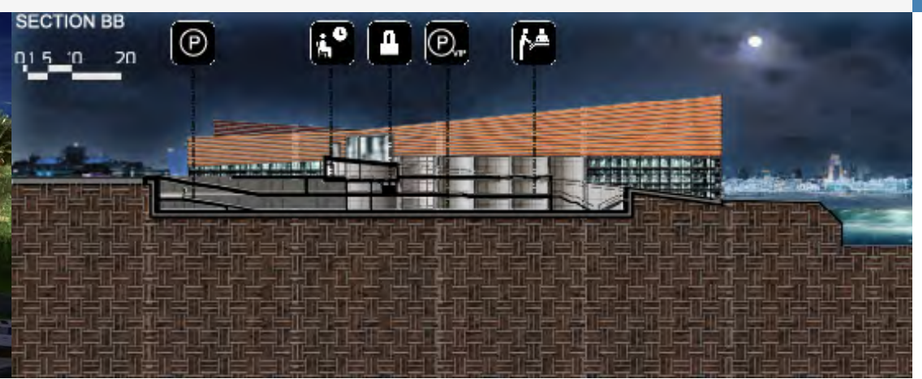
box morphing | red cross | facade design | conceptual design



In between

Cultural and art center

This site is located in north Lebanon, specifically in and old town called Batroun. It is in fact one of the most beautiful settin gs for medditerenean sea scent lovers. Suprisingly, it is one of the oldest cities in the world; Phoenicians founded this boroug h and handed it over to the orthodox, to finally fall into the ottoman's arms. That being said, an architectural stratification i mposes itself, as proof of an umissable clearly heavy cultural bakground. Hereinafter, the university's jury has decided the gi ven subject: Art and cultural center. The building is located at the interface between the sunset by the sea and the city light s. As amazing as it seems, some constraints came along the way. The first and most important one was the matter of flowin g circulation to both major points of site; in other words. I didn't want to reduce the space to a box. Henceforth, the west par t of the building underwent an elevation and widening process, as well as the conception od an opening, giving on a wide v iew sea-side terrace, including an outdoor amphitheatre south, and an eysoothing landscape ensuring pedestrian continuit y towards the architectural promenade-north, with the sea as only scenery.



AUTHOR: Christian Dimitri

LOCATION: Batroun - Lebanon

DATE: October 2013

AREA: 7 500 m^2

autocad | 3Dsmax | Vray | photoshop

CATEGORY: Architecture design studio V

FIRM: Holy Spirit University of Kaslik (USEK)

LOCATION: Kaslik - Lebanon

SUPERVISOR: Fouad Gabriel

stratified cultures | art & culture | mediterranean | old village | new citie | amphitheatre | multi-fucunction space | exhibition space

AUTHOR: Christian Dimitri

LOCATION: Jounieh - Lebanon

DATE: May 2013

AREA: 25 000 m^2

autocad | 3Dsmax | Vray | photoshop

The Heart of the Campus

Sports & health center

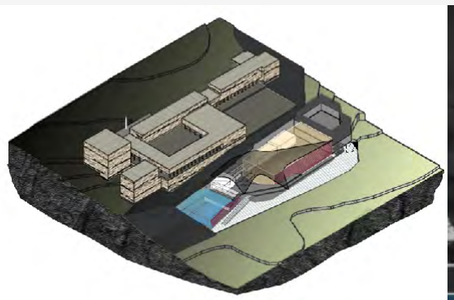
Education and it's various systems hasn't always been what it is today. From a class of two under a tree, to immense metling pot surface, the creation of universities is obviously a big game changer in the upgrade of education as a whole which happ ens to be the literal translation of the Latin word universitas, logically referring to our modern university. Thus the design ap proach was to create the best social environment possible for the university's sports and health center. Situated on Kaslik's main road, the new 25 000 m^2 facility includes competitive and recreational athletic facilities. As a major point to start off, i p ut my entire focus on the inner/outer pedestrian circulation; As it appears on the first graph, I have a located the density poi nts of the pedestrians around campus and have joined them to a focal point situated in the exact middle of the site, therefo re creating safe passages to the sports health center building.

CATEGORY: Architecture design studio V

FIRM: Holy Spirit University of Kaslik (USEK)

LOCATION: Kaslik - Lebanon

SUPERVISOR: Fouad Gabriel



tensile membrane | atrium | pedestrian passages | sports community | youth center | health center | parametric facade | box morphing

Image By **Andres Flajszer**

Work !!! It's just a serious fun ...

You can still visit my website here

Or feel free to contact me at

contact@chrisdimi.me

Made with html, css and Pandoc.

Hosted in Github.