

 Erida Bendo  
PORTFOLIO

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CONTENT



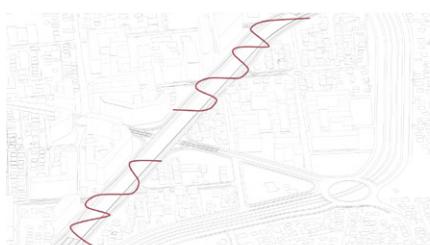
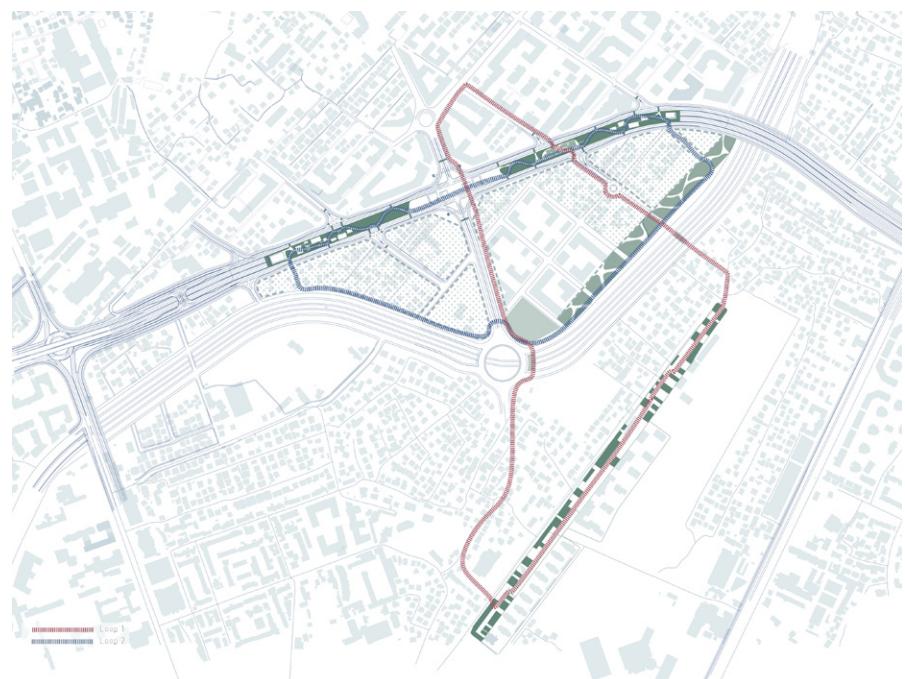
Masterthesis – September 2019  
Polytechnic University of Tirana,  
Faculty of Architecture and Urbanism

## 1. THE RINGROAD OF TIRANA, A LIVEABLE SPACE

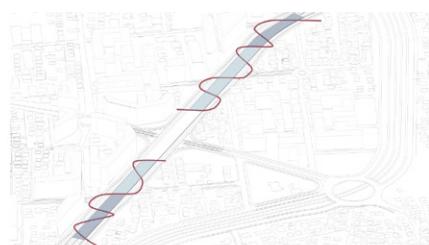
The 5th Ringroad of Tirana has been proposed in the General Plan in 1990, in a time when the city was very different from what it is today, and the proposed area was agricultural land. In this Plan the Ringroad was seen as the border of the city as well.

30 years have passed, and Tirana has been subject of a massive sprawl, with its suburban areas developing informally. The Ringroad now borders a very dense neighbourhood in its outer side, seriously affecting its existence.

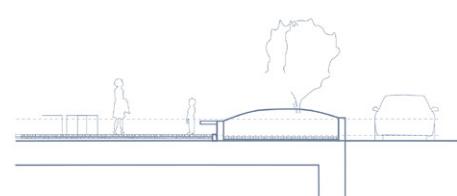
The proposed intervention seeks to ensure the communication between the two sides of the street, at the same time providing public space to this part of the city that clearly lacks it. In a large scale the proposed park is also linked to other systems of public spaces of the city.



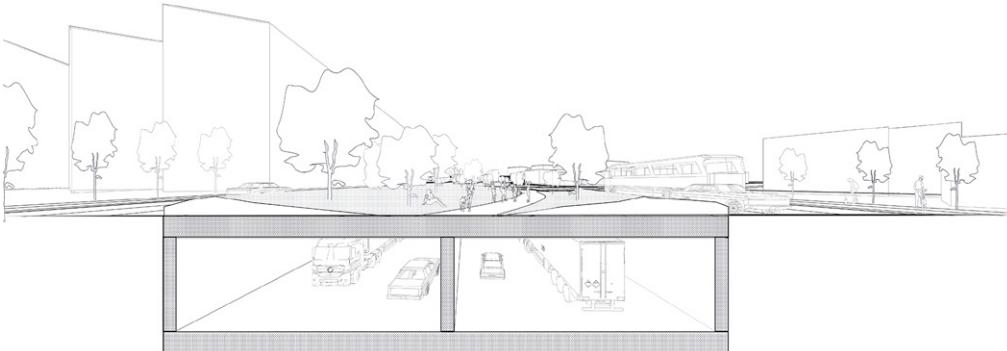
1. Mobility



2. Zoning



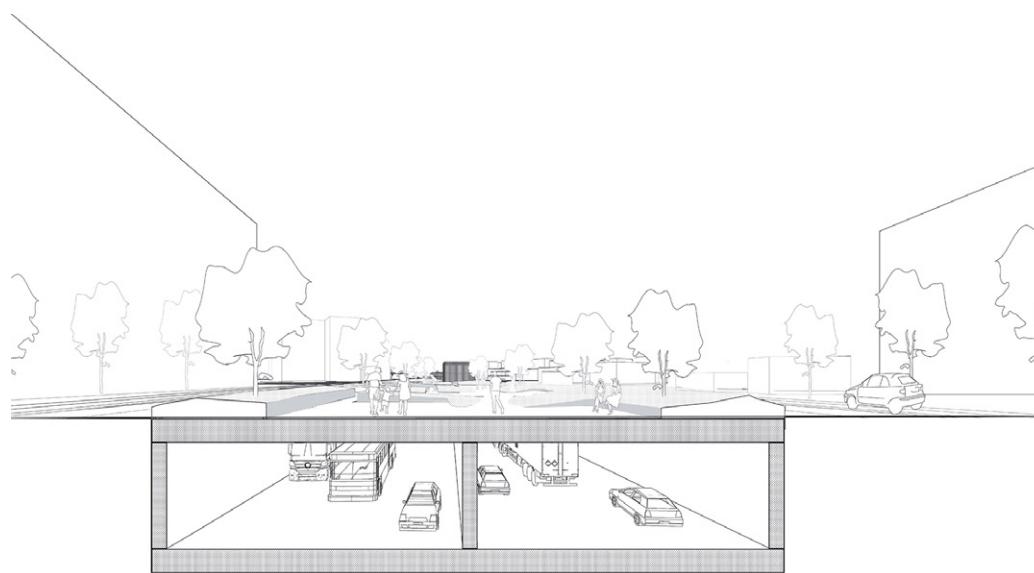
3. Relation to street



Pedestrian flows between the 2 sides of the ringroad become the main forming element for the space. Passages are placed at a distance of 150-200 m.

Zoning is affected by the proximity to the ringroad. In the edges sports activities are placed, while the rest includes quiet green areas.

The boundary between the park and the street is both physical and visual.



The public space takes the form of a linear park, in which two major interventions are made in the points where the park crosses the loops that link it with the other green spaces.

The first intervention will be a community center and a library, functions which confirm the idea of a polycentric Tirana expressed in its General Plan.

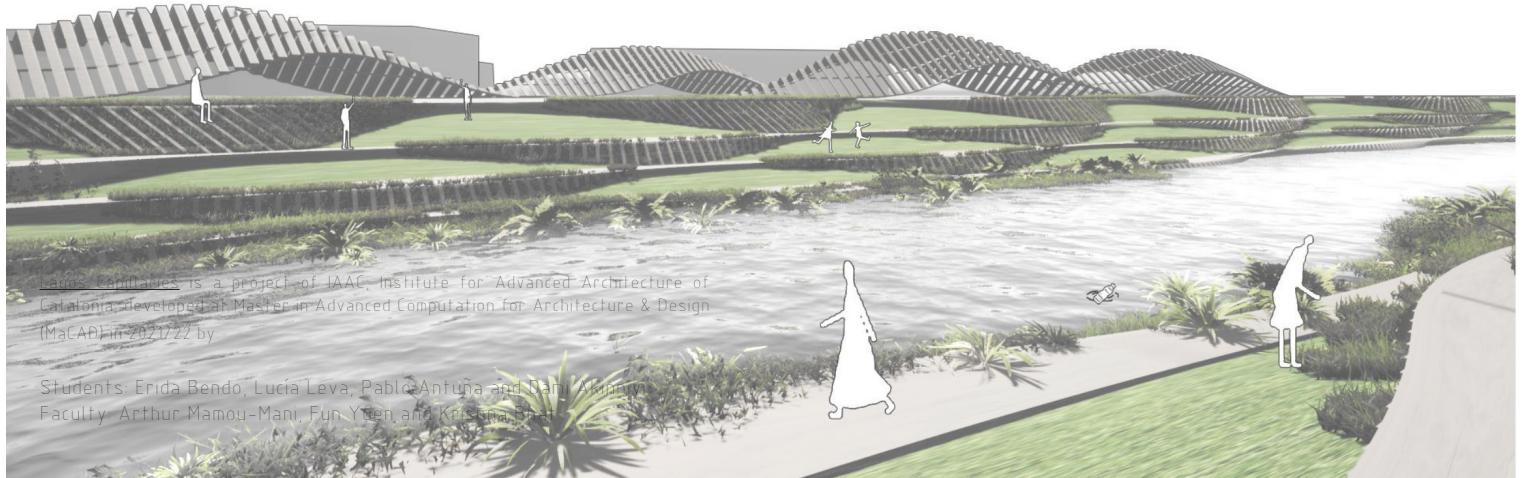
The second intervention will be a local food market, a commercial function but that contributes to the community life. The rest of the linear park is designed in a more fluid way in order to diminish its linearity.

Community center



Food Market





## 2.LAGOS CAPILLARIES

naturalisation of the concrete drainage canals of Lagos:

×responsible for the design of the embankments and pavilions.



Lagos Capillaries is a project exploring the naturalisation of the concrete drainage canals of Lagos, Nigeria, within the framework of rewilding while creating spaces for community integration and productive urban landscapes for farming.

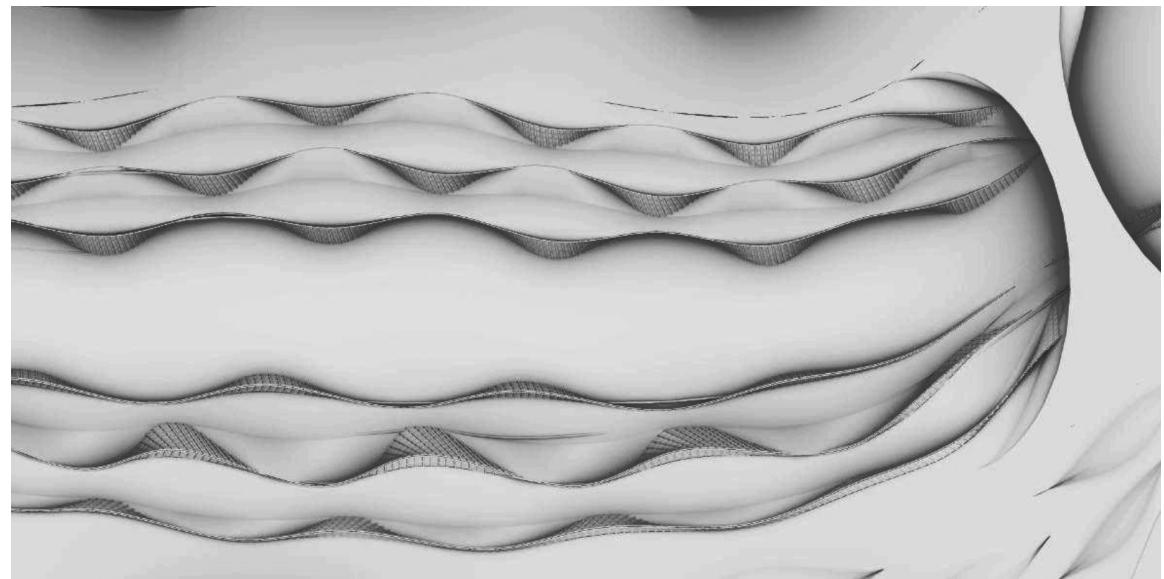
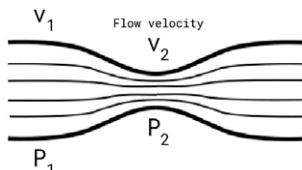


Our first step towards terraforming the canal landscape was to optimise the canal geometry and have it work for our rewilding and community integration goals. We sought to redefine the upper and lower boundaries, and established connections in areas where the canal disconnects communities.

For the upper boundary, we wanted to maximise the setbacks and land area of the canal while minimising its length. With these goals, we ran the canal geometry through an evolutionary solver to find an outline that best meets our fitness goals.

Bernoulli's principles are referenced for establishing the lower boundary.

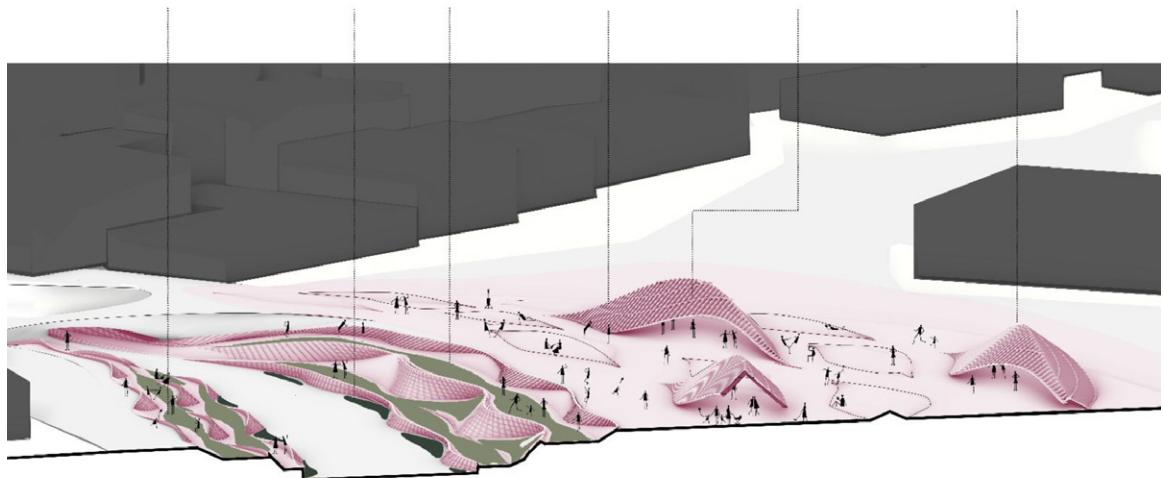
The narrower areas will have higher water velocities and will be water aeration zones and the wider areas will have slower water velocity and lamina flow which will get oxygenated water good for supporting flora and fauna. These narrower areas were planned under the bridges and wider areas in between bridges.



Three key points establish our approach to the canal bed area. Our intervention seeks to structurally reinforce the river banks, allowing spaces for bioremediation and urban farming.

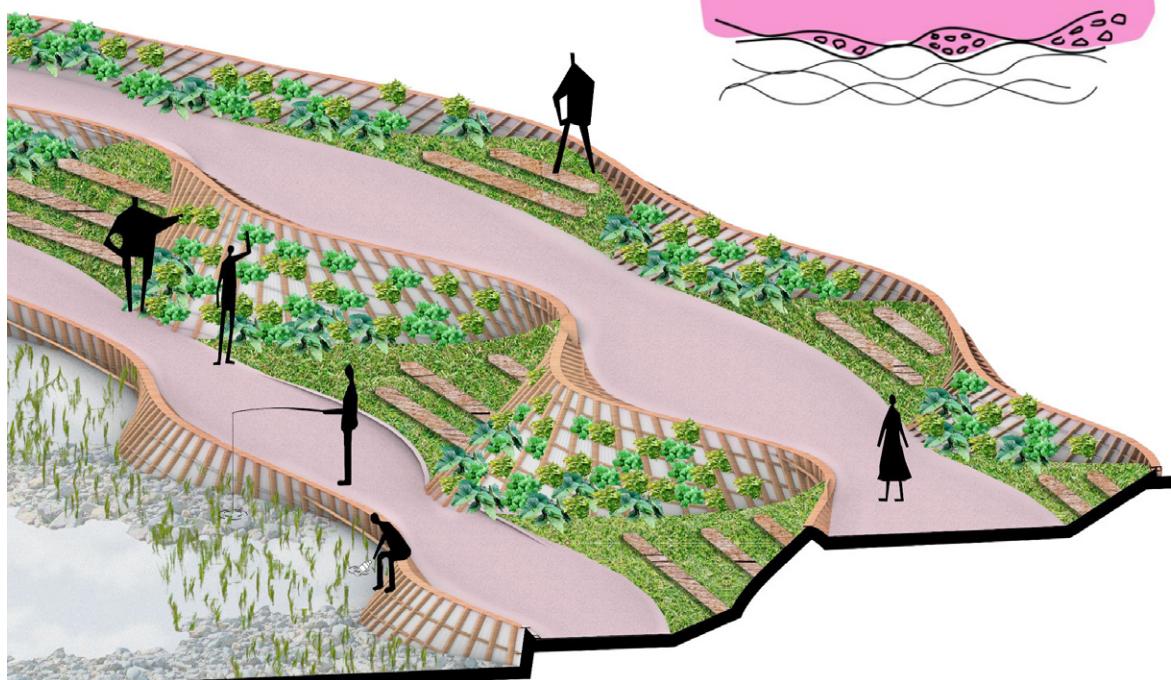
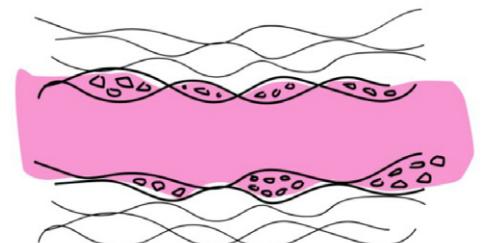
We are inspired by braided river patterns, as a terra forming strategy, organically dividing spaces of different use.

Starting from woven curves a script is further refined into producing curved embankments. A variation which allows appropriate average surface for farming crops and that blends to the scale of the site is selected.



These woven curves, embedded below water level, are a final lattice module for a natural waste filter system. Here, rock boulders are arranged on a gravel bed within this unseen lattice such that waste gets trapped in the spaces between the rocks.

The riverbank becomes a new wetland ecosystem with plant and animal species native to Lagos. It will function as nature's kidneys by removing pollutants from the water. In addition, active bioremediation strategies included bio-attenuation by introducing bacteria and nutrients to mineralise organic pollutants.



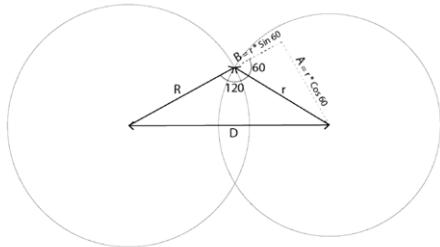


### 3.DREAM BLANKETS

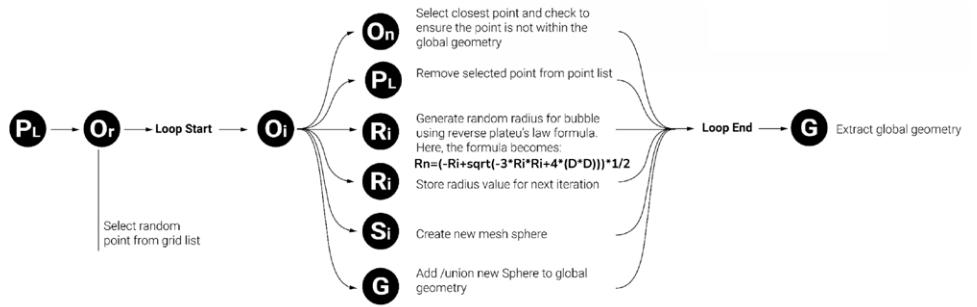
×responsible for the bubble research and optimization processes

## 01 Natural Systems & Computational Strategies Research

### Bubble cluster formation workflow



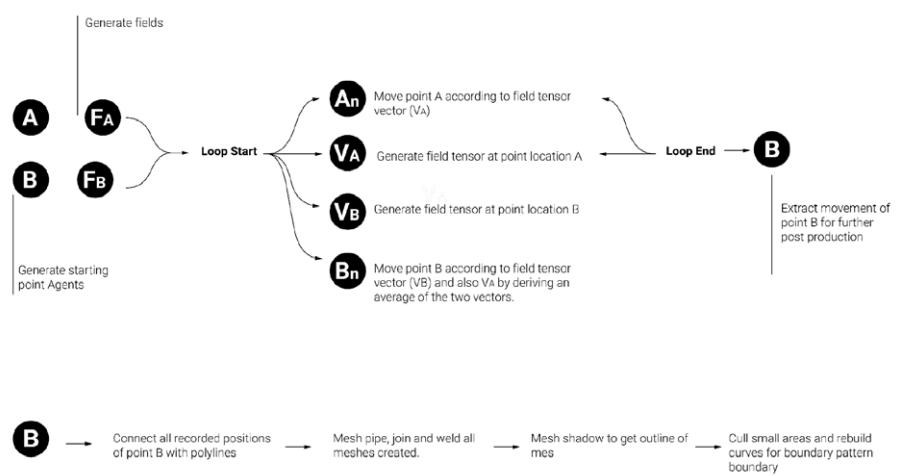
based on the geometric constraints of Plateau's laws for stable bubble clusters



### Self organising system workflow



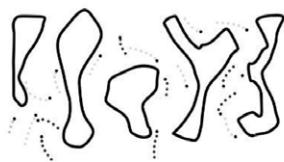
our Reaction-Diffusion interpretation



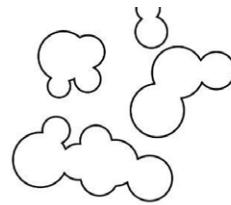
This workflow, employs a direct interpretation of the activator-inhibitor system. We started with two sets of agents moving within different vector fields.



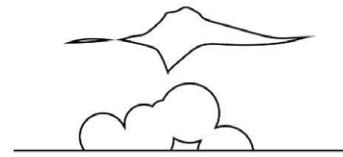
## 02 Design development



01 Generation of maze



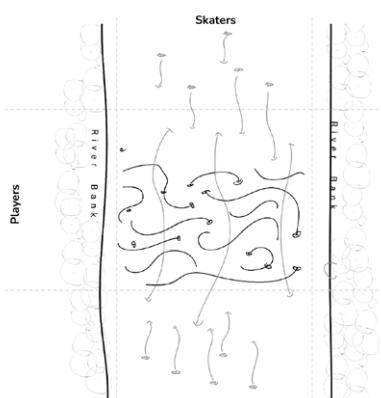
02 Bubble clusters



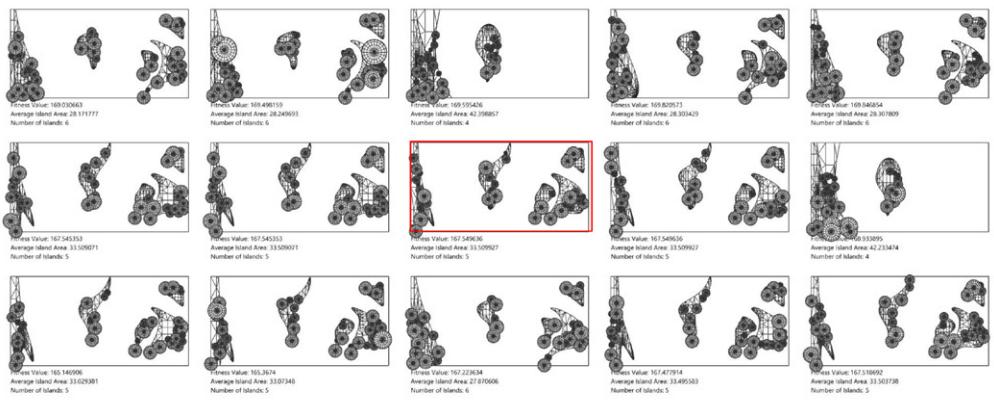
03 Draping through Kangaroo

We will be exploring strategies for form-finding and optimisation of 'warming-hut' pavilions located along the frozen Red River in Winnipeg, Manitoba.

We propose to construct a pavilion which would act as a 'warming hut'. a structure where visitors and passersby can rest and take shelter from icy winds, while playing and skating through in the long winter months of Northern American continent.



To generate the cluster islands for bubbles, we adopted our interpretation of self organising systems where agents A are seen as players and agents B skaters.



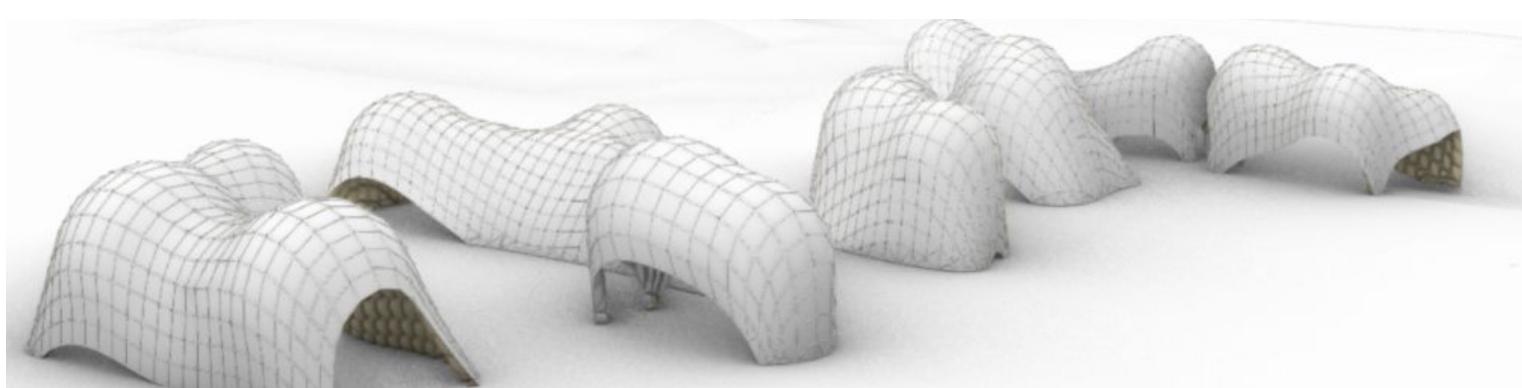
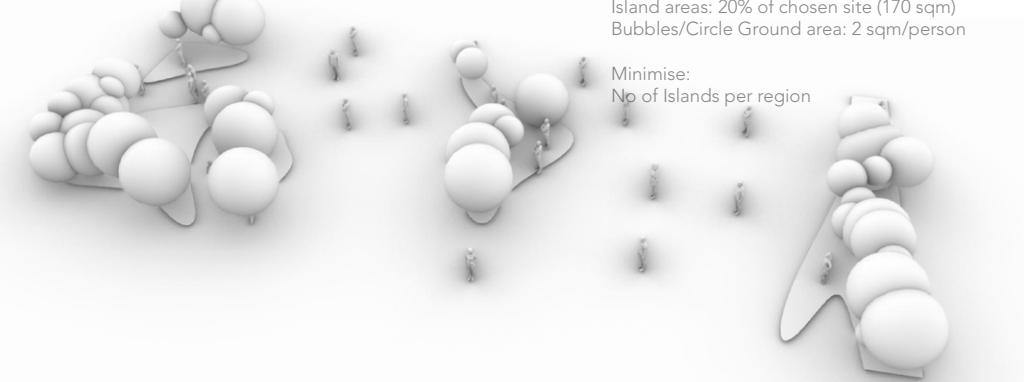
For optimisation, we aimed for the following fitness values

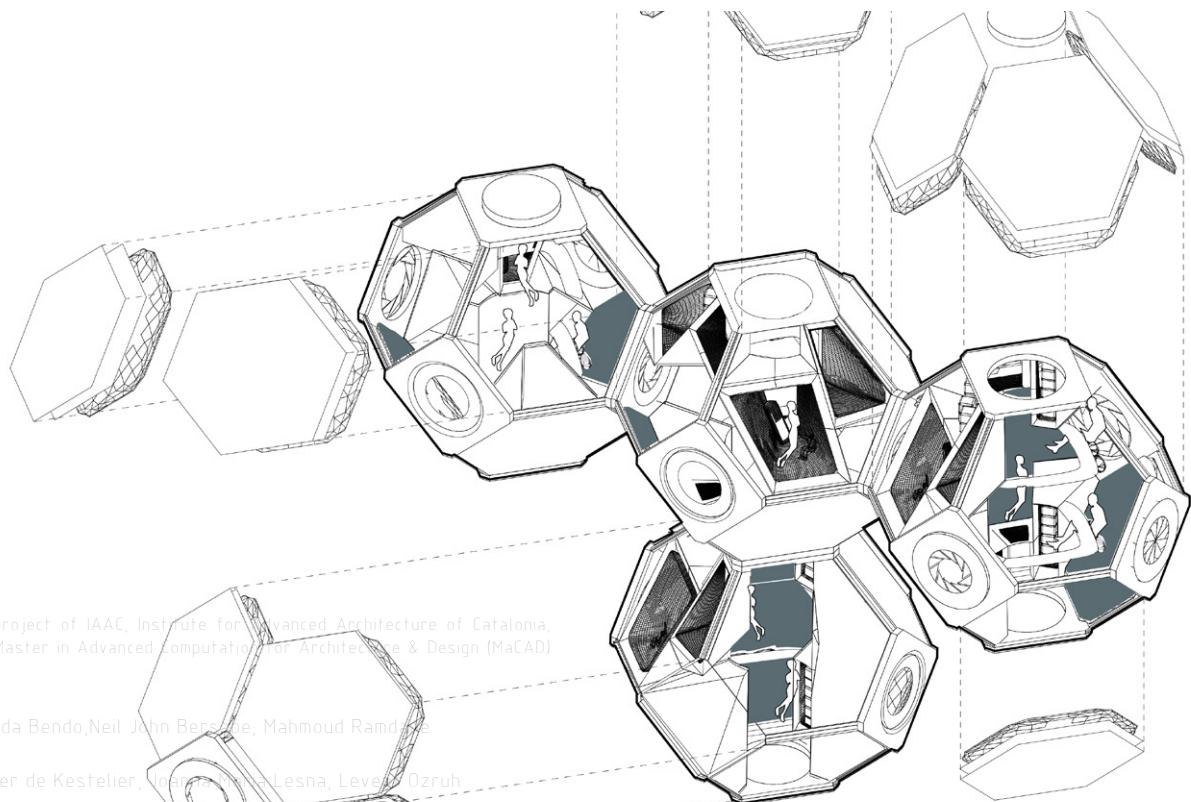
Maximise:

Island areas: 20% of chosen site (170 sqm)  
Bubbles/Circle Ground area: 2 sqm/person

Minimise:

No of Islands per region





Life.Orb is a project of IAAC, Institute for Advanced Architecture of Catalonia, developed at Master in Advanced Computation for Architecture & Design (MaCAD) in 2021/22 by

Students: Erida Bendo, Neil John Bersene, Mahmoud Ramoza

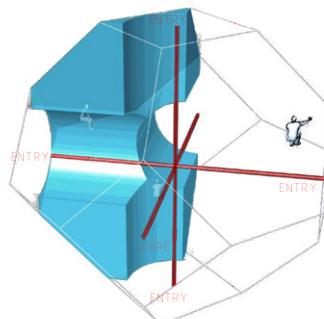
Faculty: Xavier de Kestelier, Joana Maria Lesna, Leyla Ozruh

<https://www.iaacblog.com/programs/life-orb-orbit-living-bimsc/>

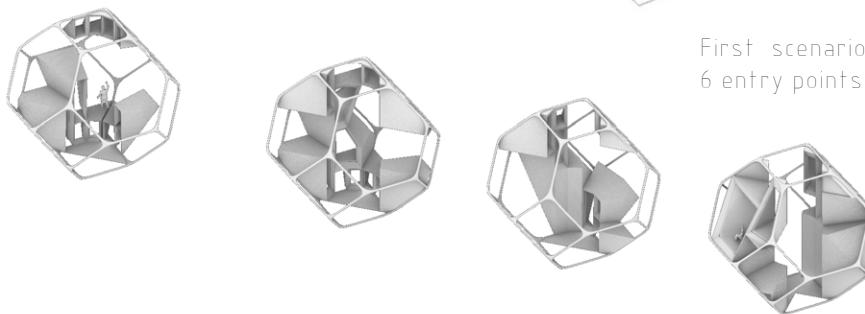
## 4.LIFE.ORB

Living compartments of a space station in the lower earth orbit.

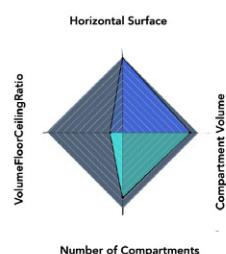
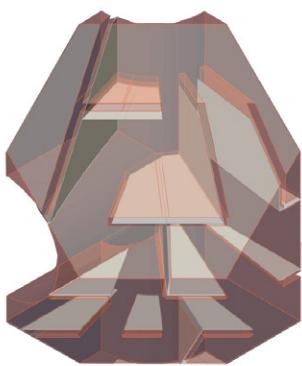
Responsible for the programmatic compartments and BIM documentation.



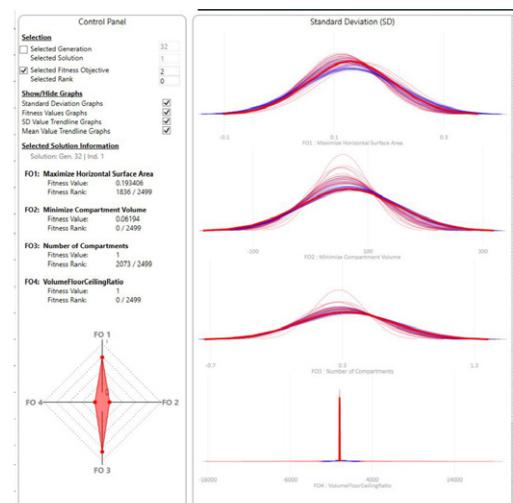
First scenario:  
6 entry points



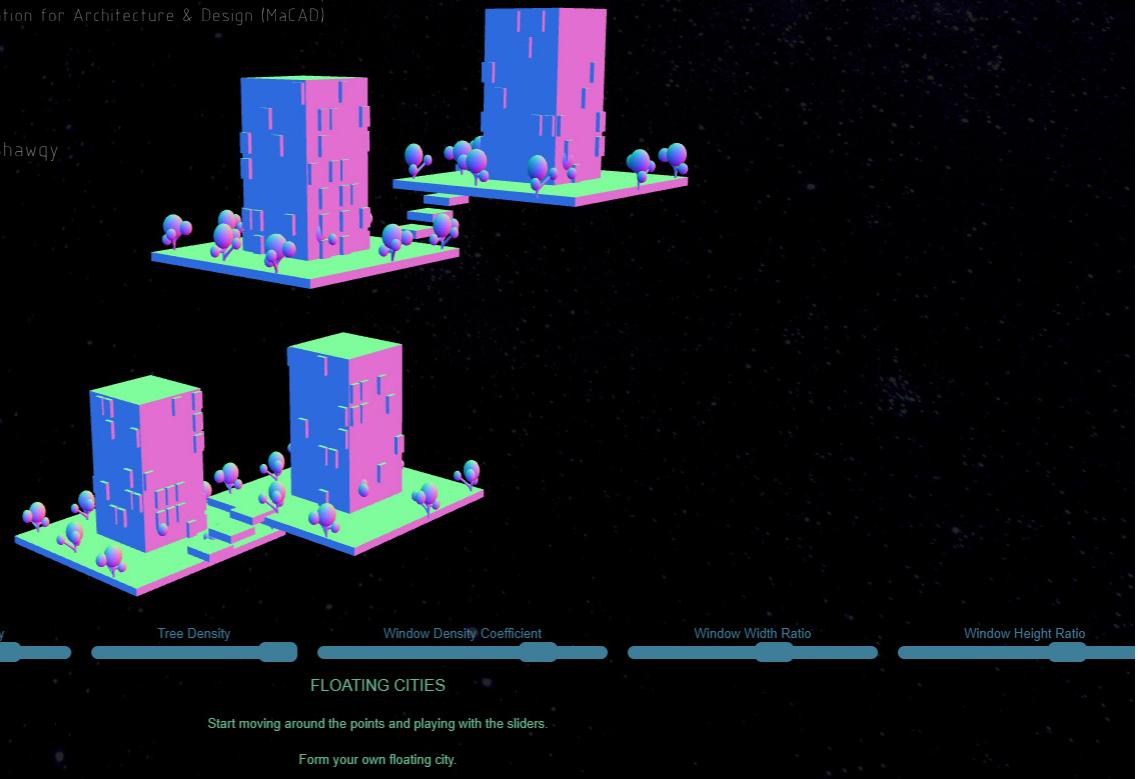
Life.Orb seeks is a living compartment configurator designed for a space station. Based on the ideal volume per person for missions of 5 months and above from the Celentano curve, the user can plug the needed functional units in the octahedronal skeleton, which then are further optimised through an evolutionary solver.



Generation 0 // Ind.13  
Horizontal Surface Area  
Rank: 2478 / 2500  
Fitness Value: 3.270571  
  
Compartment Volume  
Rank: 2241 / 2500  
Fitness Value: 196.675525  
  
Number of Compartments  
Rank: 2148/2500  
Fitness Value: 1  
  
VolumeFloorCeilingRatio  
Rank: 371/2500  
Fitness Value: 1



Students: Erida Bendo,  
Faculty: David Andres Leon, Hesham Shawqi

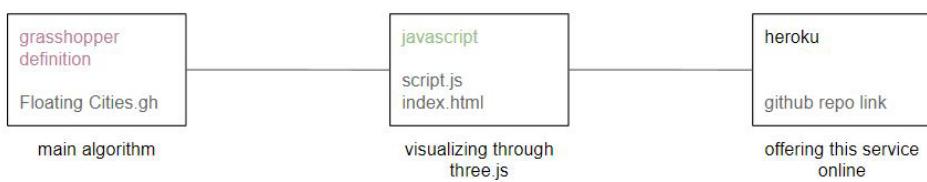


<https://www.iaacblog.com/programs/floating-cities/>

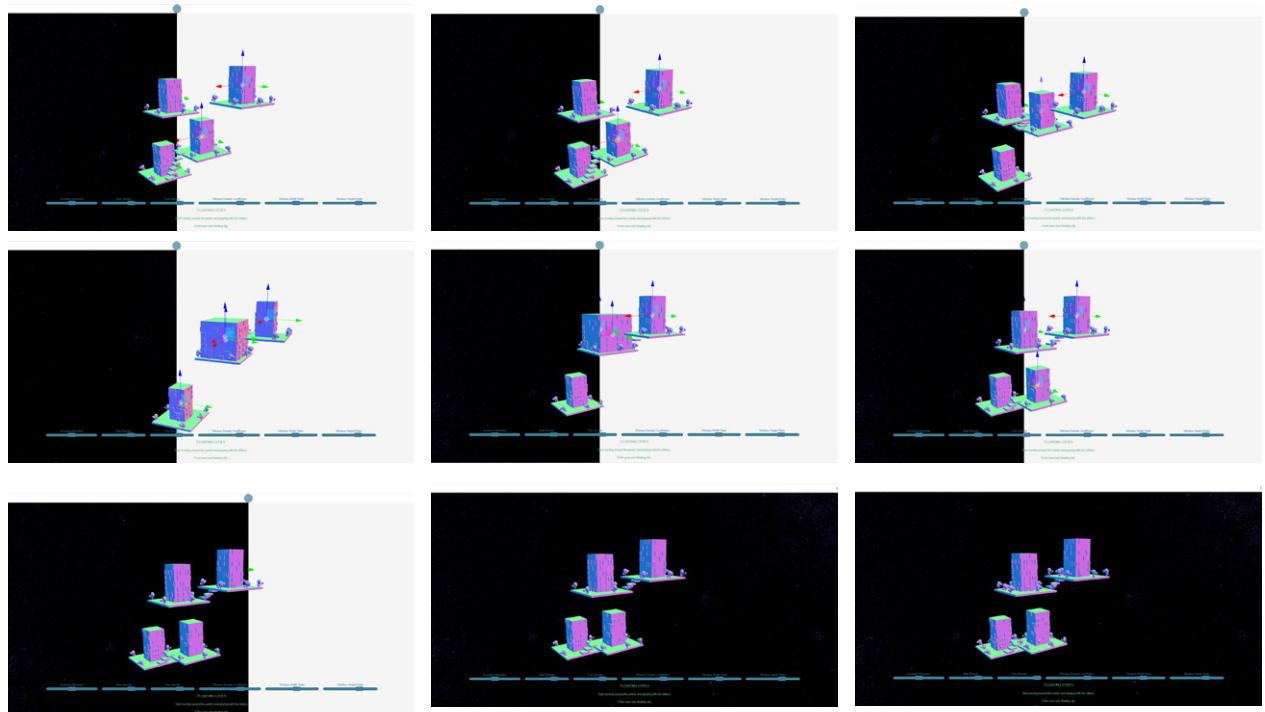
## 5. FLOATING CITIES

Floating Cities is an interactive browser game, intended for users of all ages. Through moving the building blocks and working with sliders, the user is able to generate different geometrical configurations.

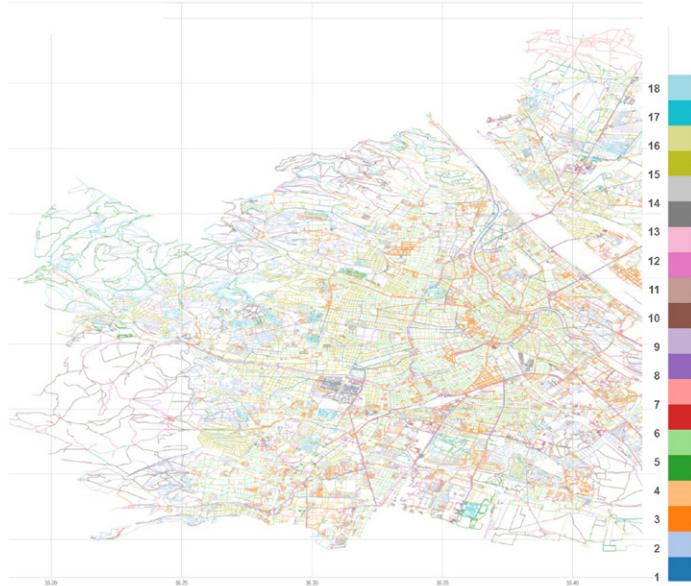
The project was created using Grasshopper3d for Rhino, ThreeJS, Javascript, HTML, and RhinoCompute.



Access to the app  
<https://bimsc22-testproject.herokuapp.com/examples/Floating%20Cities/>

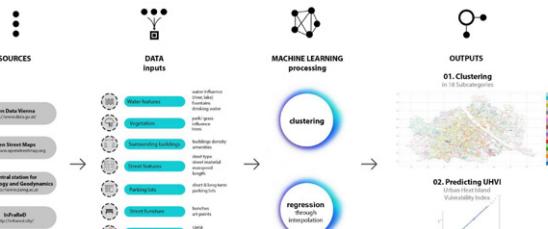


## 6. SOME MACHINE LEARNING APPLICATIONS.



### IDENTIFI

an AI webapp for residents + municipalities to unveil the potentials of their streets.



more info on: <https://www.iaacblog.com/programs/identifiAI/>

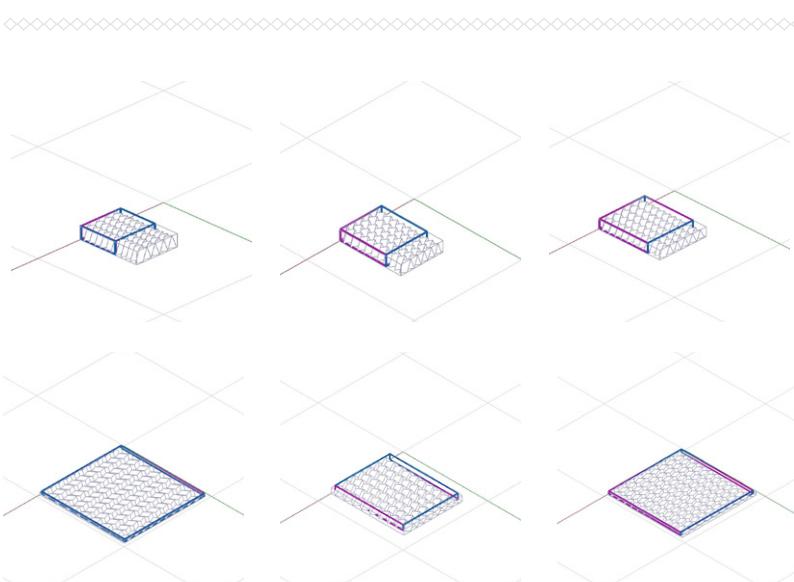


### GENERATED CREATIVITY

The intersection of architecture with artificial design is challenging the notions of creativity and agency.

What if a simple fast sketch can be more than that?

more info on: <https://www.iaacblog.com/programs/generated-creativity/>



### PREDICTING DISPLACEMENT OF ORIGAMI METAMATERIALS

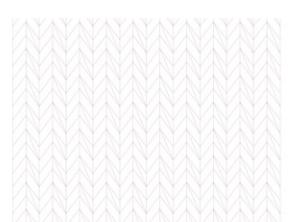
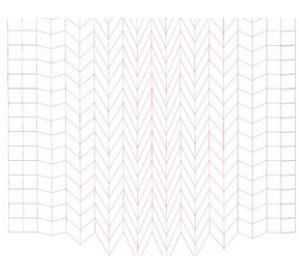
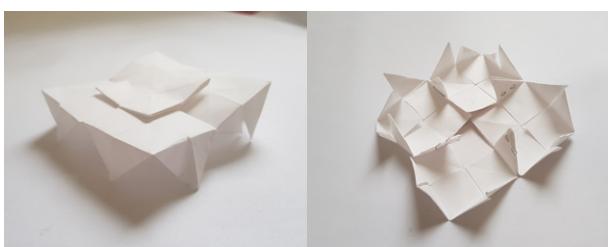
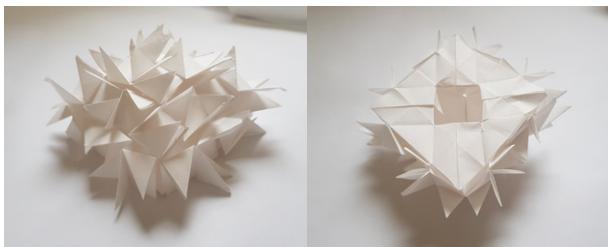
This is a project that explores the potential of machine learning methods, into predicting the displacement of Miura-Ori based origami metamaterials through the use of shallow methods and neural networks.

more info on: <https://www.iaacblog.com/programs/predicting-displacement-of-origami-metamaterials/>



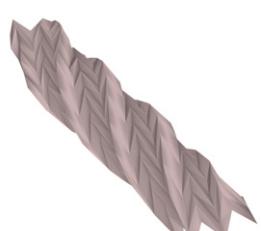
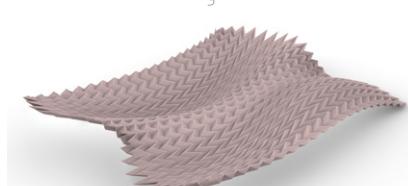
## 7. ORI/KIRI-GAMI EXPLORATIONS.

exploring the potential of creating building blocks out of sheets.  
(easy fabrication - complex geometries)



Crease patterns

Folded state generated in GH



◊ thank you ◊

