Re_Edge City / A Prosthetic Urbanism in the age of sea level rise

IoA
INSTITUTE OF
ARCHITECTURE

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PREMISE

Over the past several years there has been significant discourse across a broad spectrum of stakeholders addressing the significance of climate change and the associated risks relative to human inhabitation especially in dense population centers. Sea level rise, flooding and storms will impact our coastline cities in unfathomable ways. We will see dramatic changes taking place over the next half century as vast populations shift from coast cities inland or elsewhere.

Their once advantageous location on the "edge" between land and sea that provides infrastructure, trade routes, natural resources and recreational values is turning more and more in to an uncalculable threat. Due to this shift the relationship between the cities and their connection to the water have to be reinvented.

At the very same time *Re_Edge Cities*, like all large urban areas, are faced with the pressures of rapid urbanization and have to absorb an ever growing influx of population over the next decades.

Re_Edge Cities have unique yet intertwined histories and identities being linked and interdependent urban entities with diverse but evolving demographics and economies that provide a backdrop for speculative exploration.

The research studio will investigate the overall social, economic, cultural and institutional context of various *Re_Edge Cities* to gain an understanding of the current dynamic at play between physical and non-physical forces and to speculate how their futures might play out.

How can cities face these realities through a speculative investigation of new architectural prototypes based on a resilient approach to rising sea levels and urban growth, based on a coupling of new types of technologies with new programs?

1) WARM-UP TASK

See below

Presentation:
October 16

• PDF - one screen

2) RESEARCH

Students will form groups and each group will pick a city from a list of major coastal cities affected by sea level rise:

• Venice
• NYC
• Tokyo
• Singapore
• Amsterdam
• Miami
• Shanghai
• Hong Kong

The respective *Re_Edge City* will be thoroughly analyzed, considering following aspects:

• DNA/typology of the city
• edge conditions (program, connectivity, urban fabric, etc.)
• future scenarios in the context of climate change/ water rise
• urbanistic forecasts

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© Makani Power, Air-Borne-Wind-Turbine

At the same time the research will investigate trends in new technologies and their possible impact on the future of human habitation, transportation, manufacturing and the environment, etc..
E.g.:

• autonomous vehicles
• IoT
• robotics
• machine learning
• new forms of energy production,
• evolvong sharing econmony
• etc!

Groups will summarize their findings in a two-part research-dossier.

Presentation:
November 6

• PDF - one screen

3) IMPLEMENTATION

Students will revisit their prototypes developed in the warm-up task and combine them with the knowledge gained from the research. Groups will work on a proposal for a master plan and a time line for the development introduced to their respective cities.

Presentation:
Mid-Term in November (date tba)

• PDF - two screens
• Print: master plan in plan (1:10.000, 10x10km=1mx1m cutout)
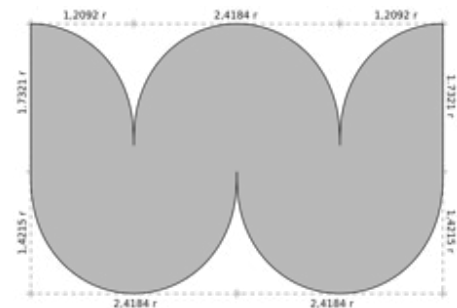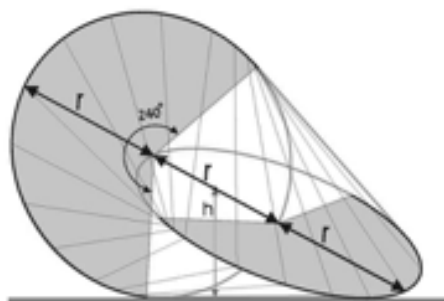• Print: section through a part of the master plan (1:1000, 1km=1m)

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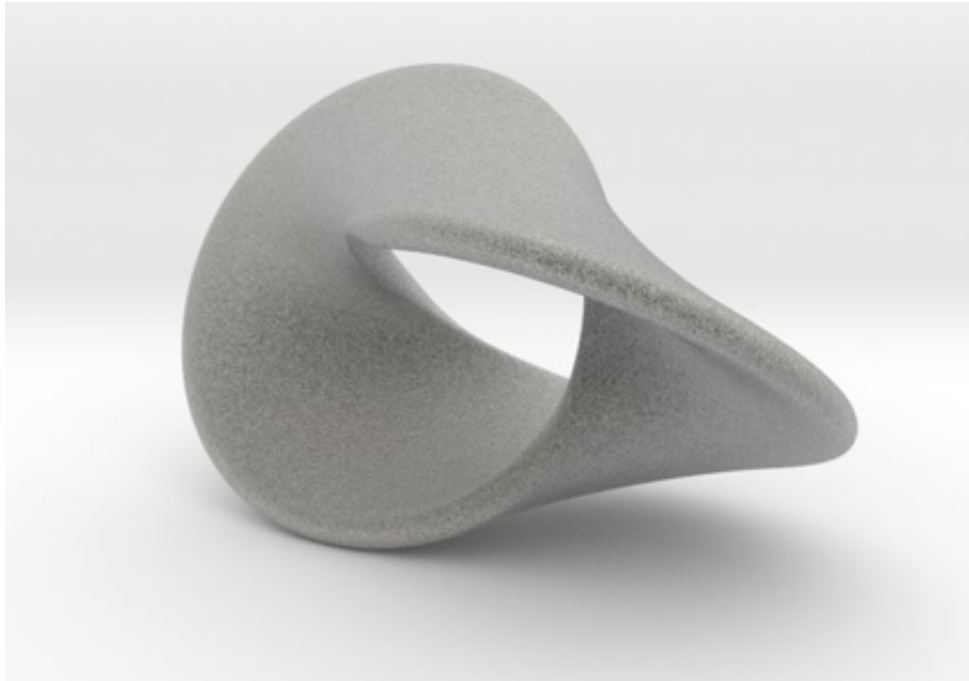
Oloid Strip ® Paadillaa

WARM UP TASK

INVERTIBLE PLATONICS

_THE OLOID

Paul Schatz used his cuboid solids to develop the movements of the Invertible Cube. Rhythmic mobility were to become the basis upon which Paul Schatz was to build his work. One of these objects was the Oloid which is a geometry that describes a rhythmically pulsing movement in a novel way. The Oloid became the object of Swiss Patent no 500,000 as a «device to generate a tumbling motion».

_THE TASK

Following up with the arguments of Paul Schatz, students will have to produce their own novel tectonics.
After 30 years of digital architecture there are still many possibilities for original design but we have to be aware of the long baggage of the discipline and keep a critical attitude to avoid falling in to the usual formal answers.
"Modeling, modeling and modeling". Automation of certain routines in digital design have reduced the role of the designer. There is a value embedded in the obsession of modeling "per se", like a sculptor who carves over and over the same piece until he gets the precise and refined geometry. There is a value to it that can be translated into digital design. We will try some sort of "handmade digital design", meaning we will step back, computer wise, renouncing to many of the standard scripting tools and introducing certain constraints to the software.
Virtuosity through iterative processes which increase the level of expertise.

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_1st STAGE: REVERSIBLE TECTONICS

In the first stage we will try to invert platonic geometries applying Schatz's methodology, meaning we will try to invert platonic solids through diagonally articulated cuts. Keeping in mind the studio topic we will explore the possibilities of transformable geometries. This quality also will be applied to their physical properties combining opposite qualities like permeable-impermeable, voluminous-exiguous, floating-sinking...

_2nd STAGE: MOVEMENT

The technological apparatus plays an important role nowadays. One could argue that the same software produces similar results. That can be true but only in a very superficial understanding of the matter. The goal of the studio is to push students into a level of expertise where formal approaches are not dictated by the medium. The same way that Paul Schatz avoided the two traditional basic movements, rotation and translation, and he worked with the inversion to produce new cuboids, we will build our own tool box or maybe a specific combo of actions that leads us to an unexpected output.
In order to be able to reverse-invert platonics students will be instructed with animation and rigging techniques. These techniques have to be applied to the rhythmically pulsing movements that should be regarded as research by the students.

_3rd STAGE: SHAPING MOVEMENT

Third stage will explore the materialization of the of movement itself. E.g. the Oloid seen as the formal expression of the rhythmically pulsing inversion; "the shape of the action".
Once students have executed the inversion over the platonic solid they we will study the shape that can be crystallized from the movements produced.
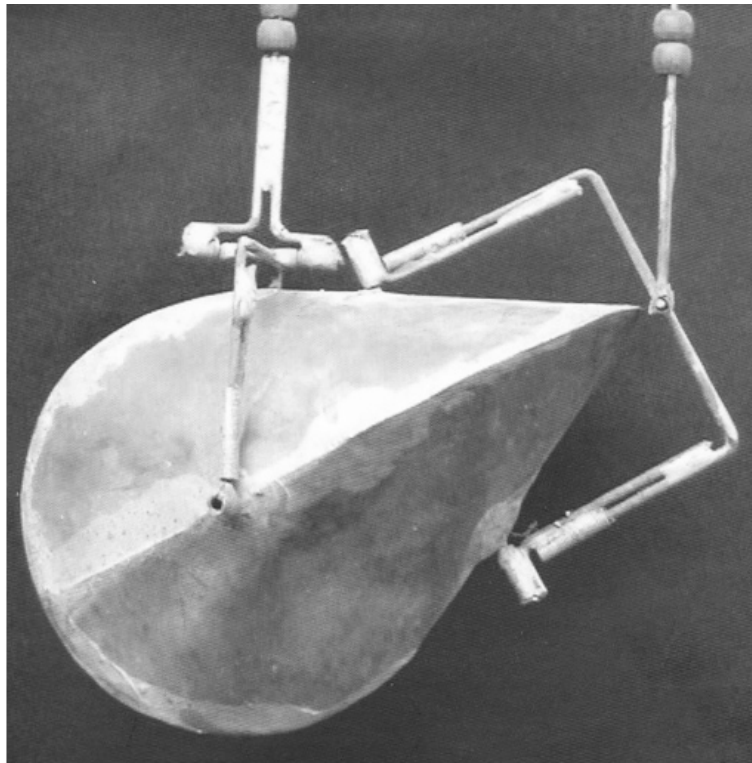
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_4th STAGE:FLUID SIMULATION:

We will check the properties of the outputs in relation with fluid dynamics. Therefore students will be introduced to fluids simulation techniques.

"The Oloid is a proven device that induces circulation/mixing into a body of water or wastewater. The Oloid is extremely unique as it moves water in a way that no other system does. The Oloid is a real time solution for many of the problems currently facing the lake/pond management, wastewater industries, fish farm and zoos/aquariums industries. This system is highly efficient; it operates with fraction of the energy usage of conventional equipment. The Oloid is a versatile piece of equipment allowing it to be installed in numerous ways. In many situations the Oloid compliments existing water treatment equipment, making that equipment operate more effectively and efficiently."

_AGENDA:
Development of a novel design formal language.
Final presentation and discussion of works.

_SCHEDULE:
Start: October 5th.
Pin up presentation: October 16th.

_WORKFLOW & TOOLS:
Projects will be developed in parallel with digital design and physical models.
Student will be introduced in digital design in Autodesk MAYA. Modeling and animation techniques will be specifically taught for this purpose.

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STUDIO HOURS

Mondays
1:30-5:00 pm Pin-Up

Tuesdays
10:00-1:00 pm Tutorials: Maya (basics/Jose)
2:00-5:00 pm Tutorials: Maya (advanved/Jose)

10:00-1:00 pm Diploma Desk-Crits

Wednesdays
2:00-5:00 pm Tutorials: Rhino and Grashopper (basics/Lenia)

Thursdays
2:00-6:00 pm Desk-Crits

ARCHIVING

Part of the deliverables of each semester (studio AND diploma!) is to hand in your archived projects following the folder structure below:

    -00_Full Name
            01_Raw Text (word, text doc)
            02_Digital Presentation (pdf)   *final AND all interim presentations*
            03_Printed Boards (jpeg/pdf 300dpi or vectors)
            04_Renderings/Drawings/Photographs/Diagrams (jpeg 300dpi)
            05_Renderings/Drawings/Photographs/Diagrams (jpeg 72dpi)
            06_Animations/Movies

THANK YOU!