

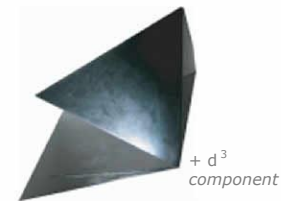
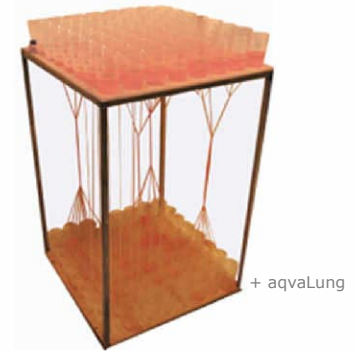
ecoMachines

Claudia Pasquero, Marco Poletto

WE ARE CURRENTLY SPECTATORS OF AN HISTORICAL SINGULARITY WHERE NATURAL EVOLUTION AND CULTURAL/TECHNOLOGICAL DEVELOPMENTS ARE NO LONGER SEGREGATED DOMAINS. THE NATURAL BASIS OF OUR EXISTENCE IS BECOMING HISTORICALLY DETERMINED BY THE ACTION OF OUR CULTURE/TECHNOLOGY.

INTER10 WILL DEVELOP ECO-MACHINES AS PROTOTYPES OF SYSTEMIC URBANISATION, IN RESPONSE TO THIS NEW CONTEXT, WHERE PURE CONSERVATION IS LOSING ITS VALUE AND HUMAN MANIPULATION OF NATURAL ECO-SYSTEMS NEEDS TO BE FRAMED BY A NEW ETHIC OF TRANSFORMATION.

ECO-MACHINES PROVIDE A STRUCTURE FOR THE ORGANISATION AND MANIPULATION OF LOCAL FLOWS OF INFORMATION, MATTER AND ENERGY. PROCESSES OF CATALYTIC CO-ACTION ARE TRIGGERED AMONG SINGLE COMPONENTS AND WITH LOCAL ECOSYSTEMS, DEFINING THE POTENTIAL EMERGENCE OF LARGER INFRASTRUCTURES, OR ARTIFICIAL ECOLOGIES.





fibrous structures
visiting workshop
- prototyping
session 2 -
ITU - Istanbul

Eco-Machines

concept

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method

briefs

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In an age of unprecedented interaction between the natural and the artificial realms we are confronted with the necessity to develop instruments of transformation equipped with an embedded capacity of constant adaptation and self evaluation.

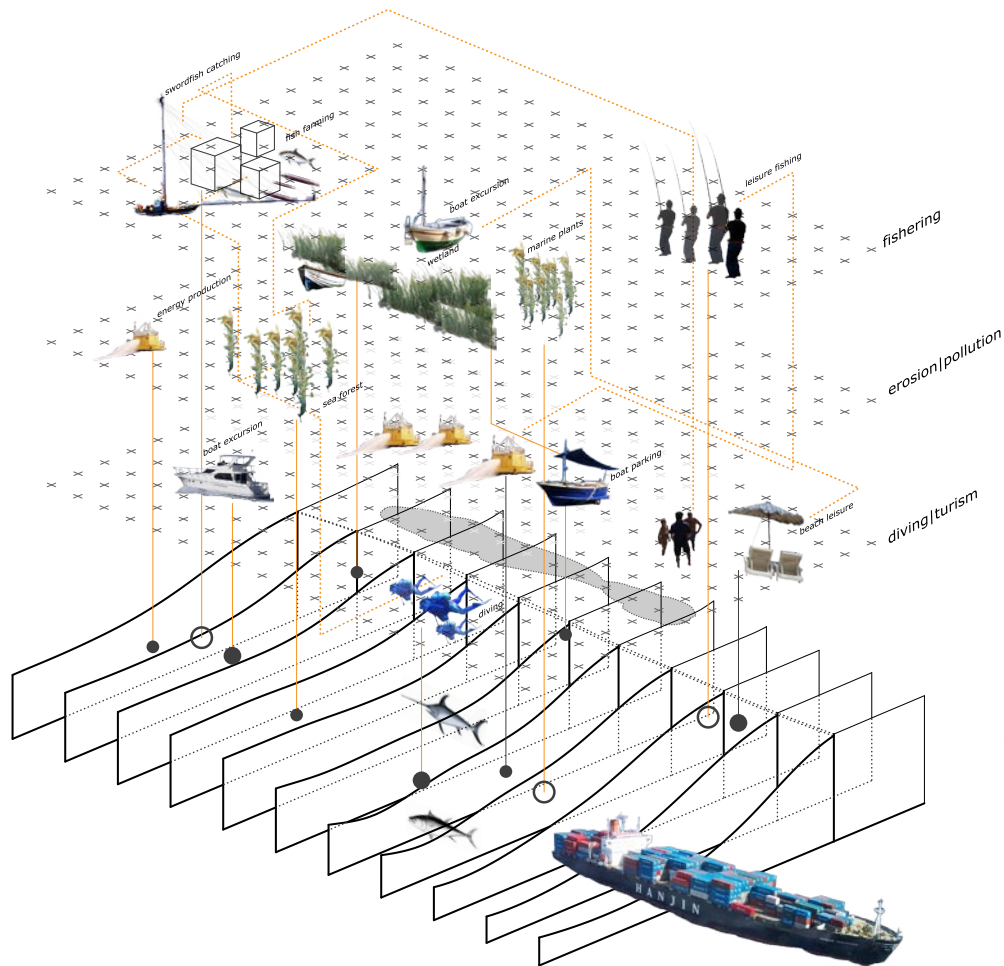
As nature is becoming more and more hybridized with embedded artificiality, the ethical paradigm of natural conservation is progressively losing its value and needs to be replaced with a more adaptive mechanism of management and evaluation of the potential effects of human transformations.

While systemic thinking provides the cultural substratum for an understanding of the relationship between causes and effects in the realm of complexity, the discipline of architecture still lacks operational instruments for the organization of complex material transformations. The Unit work will therefore concentrate on the generation of such instruments, the [Eco-Machines](#), pre-architectonic platforms where technology is embedded in new forms of material life.

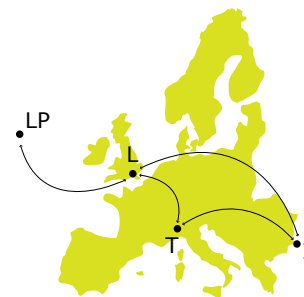
Eco-Machines provide a structure for the organization and manipulation of local flows of information, matter and energy. Processes of catalytic co-action are triggered among single components and with local ecosystems, defining the potential emergence of larger infrastructures, or [artificial ecologies](#).

Eco-Machinic prototypes will differ both from traditional architectural models and from industrial design prototypes: on one side they refuse a purely representational role but rather derive their material definition from a form of direct engagement with the surrounding environment. On the other hand they seek for progressive refinement through an open process where both performances and targets co-evolve and differentiate.

Eco-machines will be therefore both performance oriented, while remaining programmatically opportunistic, and intensely site specific, while still typologically undefined. Eco-machinic prototypes will feature a combination of material prototypes (developed through direct testing) and a strategic manual (developed though on site observation, abstract diagramming and systemic evaluation).



Batimetric Pump
 prototype -
 ICAMP design
 workshop -
 Messina - Italy -
 Summer 2007



SYSTEMIC URBANISATIONS

concept

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Historic processes

The UNIT will start its investigation with specific observations on local cultures where a critical point of development has been recently reached, and a sudden social, economic or environmental mutation is emerging; we are going to investigate complex local systems currently pushed away from their equilibrium by an enlargement of their network of territorial and global connections. The focus will be on local systems with a certain degree of "tradition", i.e. systems with a consistent history of economic, energetic and cultural flows, and related processes.

We will engage with multiple geographic focuses, [London](#), [La Paz in Bolivia](#), [Istanbul](#) and [Turin in the Mediterranean area](#); the common interest lies in their state of turbulent reorganization. London is at the center of an extended global network of creative business and will host events like the Olympic games, La Paz is becoming an attractor in the Bolivian Region promoting massive migrations from the countryside villages, Istanbul is a new emerging global node at the conjunction of two continents and two cultural worlds and Turin is reinventing its prestigious technologic past with a specific re-branding campaign. This conditions offer potential for the development and the testing of our ecoMachinic prototypes, as new models of global collaboration and as catalysts for local systemic re-development.

Hands on

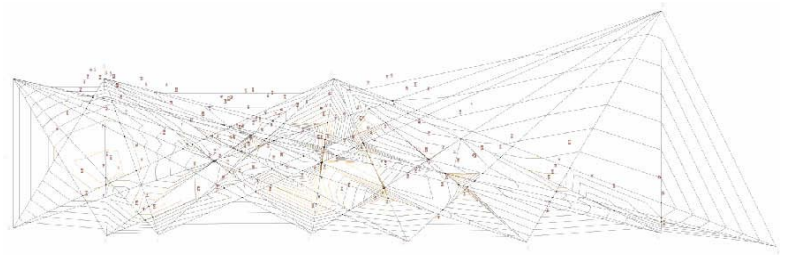
The unit working format will combine an extended digital development platform with intensive hands-on workshop based experiences. The [feedback between digital and physical](#) components will constitute a crucial element in the development of the prototype.

The physical exercise will provide opportunities for tectonic exploration of diagrammatic material organizations and direct experience of the effect produced by dynamic material engagement. The digital platform will allow development of abstract diagramming skills, performance testing and scenario modeling.

The parallel development of the two components will provide the main focus of our methodological production, towards the construction of real ecoMachinic prototypes.

9 PROJECTS PER YEAR

T1.1



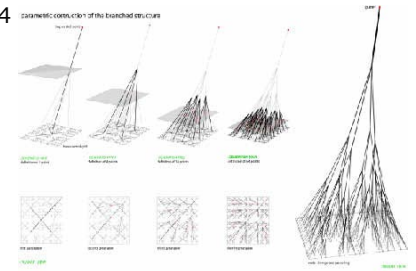
pedestrian network diagram
 Turin
 ecoLogicStudio
 Internship
 Programme

T1.2



lazy flower
 ecoMachine
 worksop
 IAAC - Barcellona

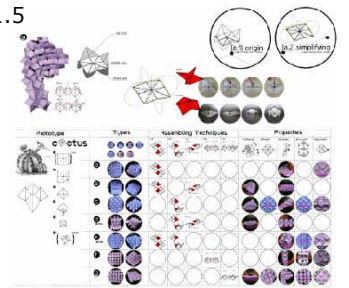
T1.4



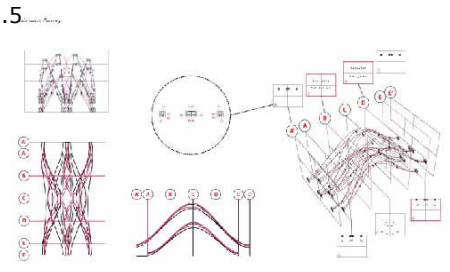
AQUAgarden
 Installation
 construction
 drawings
 Milano

Fibrous
 structures
 construction
 drawings and
 prototype
 ITU - Istanbul

T1.5



T2.5



NeuronField
 ecoMachine
 workshop
 Prototype
 IAAC - Barcellona



T2.4

T2.1



Each student will be facing **8 deadlines** during the first two terms which will constitute single steps towards the development of the final project. Each step submission will be considered as a freestanding piece of work; the students will need to introduce the results both to course mates and external guests or publish them on the web.

This pedagogic strategy has been developed and tested by the tutors in various workshops and courses and grounds its structure on the reality of the contemporary design practice: ideas and projects need to be delivered quickly and be extremely communicative.

On the other end the challenge of the unit is to set up a methodological and conceptual framework that will allow the students to build up a consistent portfolio of both research modules and synthetic ones, capable of giving to the overall work a strong character of experimentation and radical innovation.

The first term will be devoted to the development of the basic ingredients of the Eco-Machines. Each single piece of work will be constituting fundamental background research that will become instrumental in the following terms. From site mapping and diagramming, to parametric modelling, to physical understanding of material systems, to performance testing, to dynamic system simulations, the research will constitute a rich portfolio of machinic components.

The second term will be about the engineering of the Eco-Machinic prototypes. It will start with a strategic understanding and diagramming of the observations derived from the field trip and the definition of the ranges, and rules of operation of the Eco-Machine. A more specific modelling workshop and digital fabrication exercise will follow. The final development of the prototype will end with a series of physical and digital test of its performance and dynamic behavior.

The third term will see a process of actualization, ending with temporary installations of the ecoMachines on pilot sites. The projects will include the simulation of potential patterns of proliferation, defining the nature of the assemblage or new artificial ecology. Within the agenda of the unit no specific restrictions are applied to the final scale or material nature of the Eco-Machines, nor to the programmatic qualities of the proliferated structures.

Term1 "developing eco-Machinic components":

During Term1 students will be setting up the main components for the development of the design prototype and project in Term2 and Term3.

Brief.eM.1.1 - information, matter and energy (weeks 1-3)

The work of Unit10 will start from an understanding of site's dynamics - students will be divided in groups of two and will work as team in creating a first understanding of the area of study. This phase will include two workshops that will allow the students to acquire appropriate mapping techniques and two seminars that will constitute the theoretical and scientific framework for the mapping exercise. The first workshop will concentrate on the understanding of behavioural qualities of dynamic systems, using direct site observation and cybernetic logics as an investigation tool. The second workshop will focus on mapping information, matter and energy flows on sample sites within London and a selected pool of related cities or villages.

workshop.1 - diagramming dynamic behaviour (weeks 1-2): filed work and diagramming exercise on the dynamic behaviour of the river Thames estuary. [Marco Poletto, Claudia Pasquero and Jorge Godoy]

seminar.0 (weeks 1-2): *Cybernetics and the investigation of dynamical systems: EOTM.* [Marco Poletto and Jorge Godoy]

workshop.2 - mapping local dynamics (week 3): spatial and temporal mapping of "local ecologies"; the workshop will focus on developing specific skills for the recognition and capturing of social, economic and environmental local processes. Students will learn processing numeric information as well as specific diagramming techniques. [MP and CP]

seminar.1 (week 3): *diagrams, maps, abstraction and the grid;* the session reinforces the activity developed in workshop on the issue of diagramming as a tool to read site dynamics. The implications and potentials of different types of diagramming will be discussed; finally the grid will be the focus of an historical excursus on its application and meanings for urban design and architecture. [Claudia Pasquero and Ivan Valdez]

seminar.2 (week 3): *On Intensive Thinking;* this session introduces the idea of intensive thought and its relation with the understanding of the site or context. Concept of gradient, self organized structures by means of simple rules and order in the complexity are discussed in the session; the session will terminate with a case study of a specific social dynamic and focus on the components (micro dynamics) that can trigger a real "phase transition" within the system. [Marco Poletto and Ivan Valdez]

Brief.eM.1.1.handout (end of week3): at the end of the two weeks students will present a series of maps combined with strategic and operational diagrams showing their personal approach to the reading of dynamic behaviour

Brief.eM.1.2 - material systems (weeks 4-6)

Material systems will be defined both geometrically and in term of performance. Through the indexing of site-specific metabolic processes we will set up rules for material organization and therefore define the parameters which will be informing/driving the prototype evolution. This prototyping session will consist of a digital as well as physical workshop which will not be conceived as separate entities but rather as a single effort where a continuous feedback between the two realms is established. By embedding metabolic behavior into the parametric geometric model each student will develop a specific material system, capable of intense performance; as a pre-architectonic platform the model will start to operate as a breeding tool, for the engineering of potentials and the development of new models of practice.

workshop.3 - information based modelling: (week 4) the workshop will be focused on the development of 3D parametric modelling skills and related design Logics. Computational and scripting techniques will be introduced with the objective to support the generation of parametrically controlled geometric models. A Paracloud Workshop will be held on October the 23rd and October the 24th by Eyal Nir. [Eyal Nir]

workshop.4 - physical prototypes (week 5): the workshop will focus on the making of large scale physical models of new prototypes, using both manual and rapid prototyping techniques. The workshop will allow the definition of new construction techniques and related technologies and a first material testing of dynamic behavior. [Ivan Valdez and Claudia Pasquero]

workshop.5 - metabolic processes (week 5): the unit will focus on a series of relevant metabolic process which will be investigated and diagrammed. The geometric model will load metabolic behavior and acquire a new specific definition (ranges of variation, rules of engagement, potential input and output). [Marco Poletto]

seminar.3 (week 4): *ecoMachines;* this session will focus on example of ecoMachines belonging to the realm of art and architecture. The focus will be on the investigation of the relationship between the generative technique for the machine, its real physical performance and the perceived effects that it produces on the viewer/user. Featured artists: Daniel Rozin, Olafur Eliasson, and recent work of ecoLogicStudio. [Marco Poletto and Ivan Valdez]

seminar.4 (week 6): *environmental technologies and techniques for the urban landscape;* this session will focus on the analysis of a series of commonly used technologies and will try to discuss their performative core in relationship to their actual physical presence. The session will end with a redefinition of the potential role of bioengineering technologies for the urban landscape. [Marco Poletto and Ivan Valdez]

Brief.eM.1.2.handout (end of week6): at the end of week 6 each students will present a parametric model and related physical material system; some simple behavioral quality will be shown and explained

Brief.eM.1.3 - Urban Ecology (weeks 7-9) Generating and evaluating dynamic behavior will be the scope of this project. Students will develop model of systemic proliferation of their machinic agents and will evolve parallel criteria of evaluation. Dynamic behavior will be understood in its basic components and materialized with a series of simulations.

workshop.6 - agents based simulations (weeks 7): CA algorithms will be used for an intense session of dynamic simulations: each student will define rules of engagement for population of agents which will manifest multiple collective behavior. *[Renee Puusepp and Marco Poletto]*

workshop.7 - testing ecologic processes (weeks 8): the workshop will introduce computational as well as physical testing. Testing will be conceived as strategy of design feedback. Through testing the prototypes will gain definition for their role within the specific urban metabolic cycle. *[Marco Poletto and Claudia Pasquero]*

seminar.5 (week 3): on prediction and the role of simulations; this session will define the philosophical position of the unit within the international debate around environmental prediction and performative architectures. More specifically the intended role of computational tool within the design process will be discussed and referred to their value as instrument of decision taking. *[Marco Poletto and Ivan Valdez]*

Brief.eM.1.3.handout (end of week9): at the end of the three weeks students will have set up a series of scripts and testing techniques which will allow them to structure the relationship between prototypes and the surrounding urban context. The dynamic nature of this exchange will need to be evidenced and potential symbiotic conditions explored. A main Pin-up event will also provide an opportunity for each students to present the results from the work done during the whole term and define a first concept for the definition of his own Eco-Machine.

Brief.eM.1.4 - ecoMachine v.01 La Paz (weeks 10-11) a first ecoMachinic prototype will be built in La Paz (Bolivia) where the main field trip will take place. Students will be mapping local conditions and respond with a public installation which will take place in La Paz new urban park and will be build up in collaboration with local students.

Term2"engineering ecoMachines": During Term2 students will be working on the specific formulation and detailed engineering of their ecoMachines. This term will be divided into 4 main parts which will coincide with handout components of the prototype itself; at the end of the term a main pin-up will introduce the population of machines that will go on site in the third term.

Brief.eM.2.1 - strategic manual (week 1-2) - each student will depoly the mapping and diagramming techniques acquired in the first term to structure an ecoMachine's manual which defines rules and ranges of engagement with the urban metabolism, exposes local interaction with a selected pilot site and specifies larger scaler potential of proliferations. The manual will be set up in the first two weeks of the term and will become subject of constant adaptation and integration in the next term.

Brief.eM.2.2 - engineering the machine (week 3-6) - working in couples the students will develop physical prototypes with advanced behavioral qualities; the machines will be tested in order to establish clear regimes of performance and potential of control/manipulation. A dedicated workshop session in Hook Park will be organized to support the development of this stage of design. The final model will constitute the base for future technical developments and will provide a first architectural feedback for the insertion of the machine in its pilot site.

Brief.eM.2.3 - fabricating the machine (week 7-8) - the machine will be further developed digitally with detailed fabrication drawings. Question of scale and site installation will be considered at this stage as well as local performative conditions explicitly loaded onto the parametric model.

The final submission will be evaluated for its buildability and for its consistency with the overall strategic intentions set in the manual. Co-evolution of the two components, strategic and material, will constitute the core of the design agenda.

Brief.eM.2.4 -testing machinic behavior (week 9-10) - The final part of the term will be dedicated to the testing of the dynamic behavior of the machine. Both physical and or digital means will be adopted and each student will develop his own testing bed and technique. the results will become instrumental in two ways: on one side they will constitute the core of the technical studies report (to be completed in the third term with the results from the performances of the actual machine), and on the other will choreograph the performance of the final ecoMachines of the pilot site.

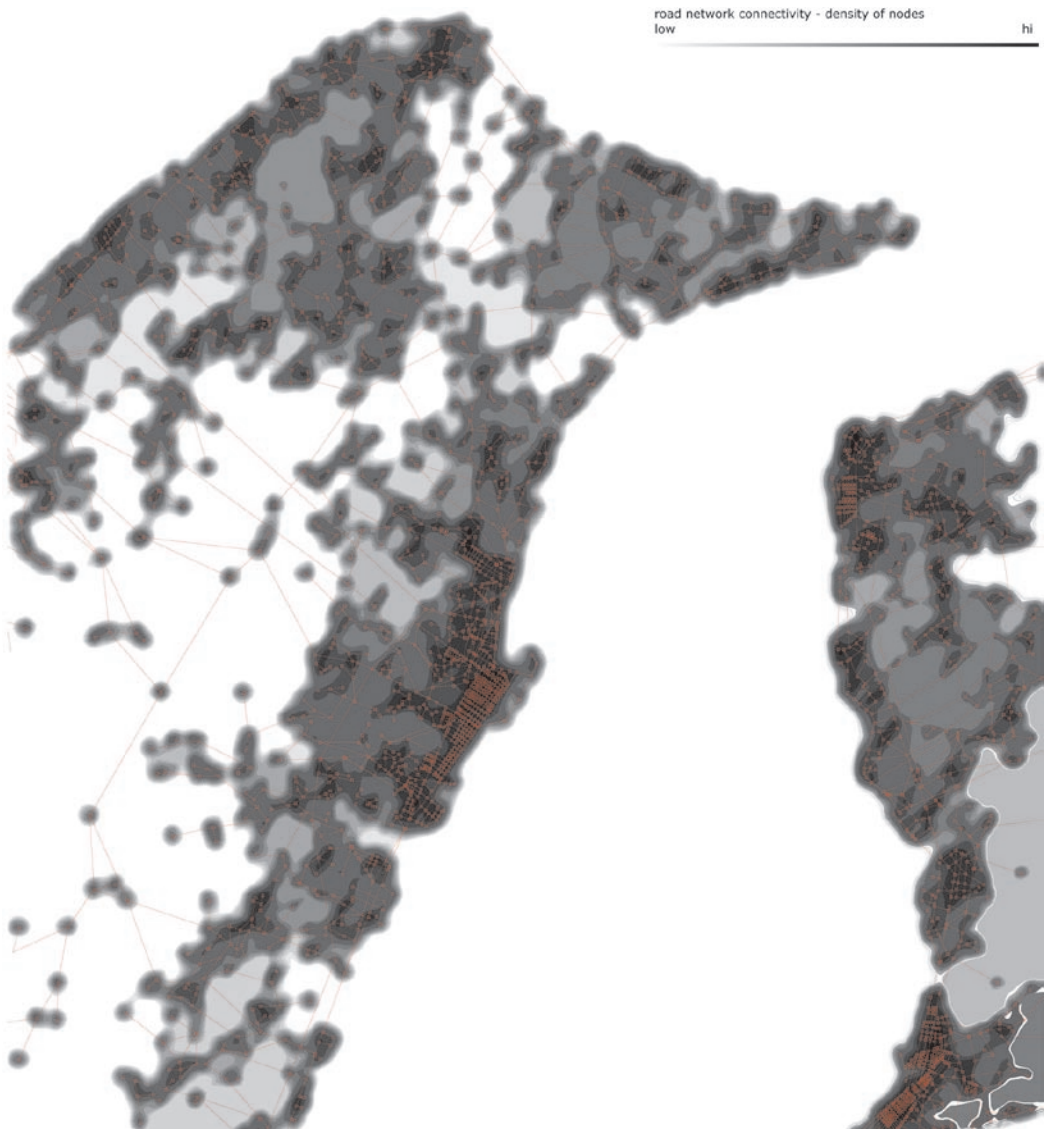
Brief.eM.2.5 - optional field trips (Turin/Istanbul) - the unit will join events taking place in Istanbul (beginning of January) and Turin (Easter). the students participation will not be compulsory and will be subjected to discussion with the tutors. All the students will be able to join the networks related to the events, with potential of building up support for their third term installations.

Term3"actualization": During Term3 each student will finalize his own project/portfolio and TS submission. Moreover students will be divided in teams of two or three people and will materialise the final version of their ecoMachine as a temporary installation on the preselected pilot site around London. The portfolio will include the work produced during the whole year and will organize the information in the following chapters: - site analysis and strategic diagramming - metabolic cycles - ecoMachine engineering - ecoMachine fabricating - ecoMachine testing - actualization and proliferation scenarios. The TS report will be largely composed by the two technical chapters on Metabolism and testing; some student may want to deepen fabrication aspects that could also constitute ground for technical dissertation. The final ecoMachinic installations will be time recorded and their live performances will constitute the core element for the end of year show exhibition.

- concept
- focus
- method
- briefs
- T&T**
- prototypes
- trips
- staff

TECHNIQUES, TOOLS AND TECHNOLOGIES

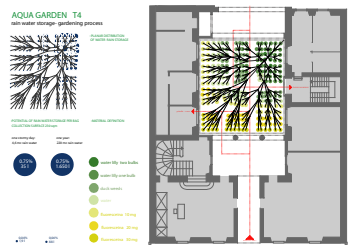
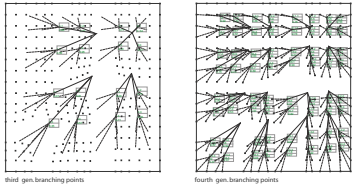
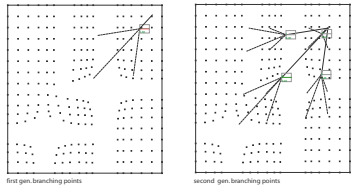
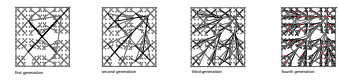
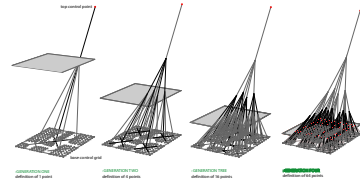
road network density - Messina Region - Italy
ICAMP workshop
summer 2007



The students are expected to learn the basics of digital modelling, graphic representation and physical prototyping from the media courses within the AA. The Unit will organize specific design workshops with two main specific goals:
-developing drawing and modelling techniques instrumental in the formulation of diagrammatic models and proto-architectural organizations
-developing specific digital skills in simulating, testing and evaluating complex dynamic behavior.

The development of this skills will evolve also through collaboration with external guests and supporting staff including ecoLogicStudio, Dr. Eyal Nir of Paracloud, SliderStudio from UEL and will concentrate in the 3 following areas:
-mapping and diagramming techniques
-parametric and computational modelling
-agent based algorithmic scripting.

At the end of the academic year the students are expected to submit a portfolio which will include the specific digital projects where the development of a personal technique of mapping, modelling and simulating / testing will be presented. Techniques could vary in complexity and sophistication but it will be essential to demonstrate their instrumentality in the definition of the final project and Eco-Machine.



AQUAGARDEN by
ecoLogicStudio -
Milano 2007

ECO-MACHINIC PROTOTYPES

The main focus of the unit will be the development of large scale physical models/installations that will become the vehicle for both the testing of the performative qualities of the Eco-Machines and the experiencing of their tectonic and atmospheric effects.

Moreover the combined action of the Eco-Machines will be generating a living statement of the unit agenda, a message that can be directly experienced by the public and by the other members of the school; we will materialize a possible new way of conceiving architecture and the build environment that springs out by a deeper engagement with its material processes and the logic of systemic thinking (applied ecology).

The development of the machines will happen in steps: - in the first term each individual student will develop a first version of a potential material system capable of loading multiple behavioral conditions - in the field trip a group effort in conjunction with the students of the Catholic University San Pablo in La Paz, Bolivia, will produce a first Eco-Machine to be erected in a specific site of the city center - in the second term students will work in couples to engineer a second generation of behavioral prototypes, while in the third terms the final Eco-Machines will be erected as temporary installations in selected sites around London.

The behavioral experiments will become the experiential focus of the unit's end of the year show (together with the digital simulations, fabrication drawings and some of the working models).

The unit will be affiliated to Turin World Design Capital 2008 event and will benefit from the related network of engineering and manufacturing companies.

LONDON ESTUARY, LA PAZ, ISTANBUL/TURIN

A series of trips to different destinations have been planned: these trips offer multiple and different opportunities to test the unit agenda of direct local engagement. We will get the chance to work with local student and organizations and to sharpen our capacity to negotiate “global logics and tools” with specific local conditions.

A first trip to the Thames estuary will be organized at the beginning of the year with colleagues from another London university and will bring us in touch with the reality of natural ecosystems under strong pressure for urbanization. The experience will be used to sharpen our ability to experience and understand urban dynamic systems.

The main unit trip will bring us in Bolivia, La Paz, an extreme environment where urban ecology has some powerful manifestations. In La Paz we will collaborate with the local university (Catolica San Pablo) and we will construct and install an eco-Machine in a specific city borough.

Two more destinations will involve the activity of the unit, Istanbul and Turin. Participation to this trips will not be compulsory but some students may find it interesting or relevant for their project/portfolio.

In Istanbul the project Fibrous Structures, initiated last year by Caludia Pasquero and Marco Poletto (with Nilufer Kozigoglu), will see an exciting moment in January with the construction and opening of a major exhibition in the city center.

In Turin, the events of World Design Capital will kick off at the beginning of the year and will find a first apex during Easter, with an international design workshop. The opportunities will then extend during summer after the end of the academic year.

monorail system
built for the
international
exhibition event
of Italia 61 -
Turin - Italy



unit masters Profiles

Claudia Pasquero was born in Moncalieri (Turin - Italy). She graduated as architectural engineer at Turin Polytechnic in 2000, with a design thesis on the subject of eco-logic housing; after her thesis work she continues researching on the subject through collaboration with Turin Polytechnic and environmental Park in Turin. In 2001 she obtained a bursary to attend the MA environment and energy at the Architectural Association in London. During her MA she started collaborating with ABK and Chora London in the development of new proposal of urban ecology for Kentish Town Junction, London. In 2002 and 2003 she worked for Unshida Findlay and Erick van Egeerat Associated Architects on various international projects including the new BBC campus competition in White City London and the Capital City tower development in Moscow. In 2004, she co-founded, ecoLogicStudio with Marco Poletto, in London, a parametric and ecologic design practice specializing in the development of new models of architectural design production driven by a speculative engagement with the environment, ecoLogicStudio has recently completed its first built project a public library in Cirie' (Turin) and in 2006 has been participating to the London and to the Venice Architectural Biennale with an installation called STEM. Claudia has been teaching and lecturing internationally including the Architectural Association school of Architecture London, The East London University, Turin Polytechnic, The Kingston University (London), UDLA (Puebla, Mexico City), Milan Polytechnic, IUAV (Venice), IAAC (Barcelona), ITU (Istanbul), Bilgi University (Istanbul) and others. Claudia is currently design tutor of the MA on sustainable design at the UEL London - technical tutors of Dip12 at the Architectural Association School of Architecture London and guest tutors at the IAAC. Links: www.ecoLogicStudio.com - <http://blog.tropicalondon.co.uk/> - <http://workshop.arkitera.com/fibrous/>

Marco Poletto is an architectural engineer, born in Turin. He graduated in architectural engineering with honour with a thesis on the design of multipurpose music rooms with adjustable acoustics. He moved in London in 2001, studied at the AA master course in environment and energy, and worked at Battle McCarthy as environmental designer. In 2002 he receives a scholarship to direct a research group on a five months project in Caracas, working on the subject of urban ecology in the informal city. He is consultant for design offices in London and in Italy and he collaborates with the AA master in Landscape Urbanism. In 2004 he founded ecoLogicStudio with Claudia Pasquero, working as designers and researchers. The methodology developed within eLS allows the office to operate at different scales, from product design to urban consultancy, and within multidisciplinary groups. At the core of eLS methodology lays the development of digital interfaces able to process information of different nature and engage with the complex dynamics shaping the urban environment. Marco has been teaching and lecturing internationally including the Architectural Association school of Architecture London, The East London University, Turin Polytechnic, The Kingston University (London), Milan Polytechnic, IUAV (Venice), IAAC (Barcelona), ITU (Istanbul) and others. Marco is currently design tutor of the MA on sustainable design at the UEL London, technical tutors of Dip12 at the Architectural Association School of Architecture London and has been recently running together with C.Pasquero and N.Kozikoglu the Fibrous Structures Workshop (AA/ITU exchange workshop). Recent publications include an article for Cluster magazine, titled "artificial ecological infrastructures", and a contribution relative to the team work within the Caracas Case project (Informal City the Caracas case Prestel NY, 2005).



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unit masters>
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 marco poletto

seminars>
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guests>
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