Michigan Spring Course  
Francois Roche - New-Territories /

Present

‘mister Lambo S(th)inks’

We will go to Bangkok, to make a concrete ‘Boat’, max 4-5 meters long, in reference to the first Reinforced Concrete production, in 1848, by Joseph Louis Lambo…

This ‘boat’ however will be in Fiber Concrete (possibility to use low emission CO2 recipes) and secreted-fabricated by robot + cement nozzle as a digital-computational research and production. The ship as well is a vehicle, a ‘transport’, to go across… a metaphor (etymologically)… We will produce in parallel a short fiction film, using the boat as a ‘Prop’. The scenario, storyboard, dialogue, cinematography, shooting and pre-editing will be done simultaneously with the digital-computation-robotic production.

This by-cephalous strategy of production-narration will be held by Francois Roche and LabM4 (mindmachinemakingmys) in Bangkok. All productions and previous workshop are visible on page http://www.new-territories.com/props.htm (including the link with press-article, Vimeo movies, Credits, Scenarios)

The course will provide
- Robotic training and robot devices and tooling
- Grasshopper PRC training for Kuka programming
- Kuka RSI (real time sensor interface) training + Arduino Board + Sensors
- Studio of movie production (from storytelling to editing)
- Equipment for recording, shooting, etc. as BlackMagic Camera 4K + Canon 5D markII, Rode professional Micro and so on…
- Space of research and tooling at the location of M4 (A0 Plotter / A3 copy-scan-print / 3D print - ABS wire for models, but also for nozzles parts / Scan 3D Microscribe and Kinect with all software / ….and AC in tropical climate)

**Dates** / one month between 5 May – 26 June

**The Boat references**
- ‘Fitzcrraldo’, Werner Herzog /  
- ‘Dead Man’, J. Jarmush  
- ‘The Boat’, 1921 Buster Keaton  
- ‘Lifeboat’, 1941 Alfred Hitchcock  
- Arthur Rimbaud, ‘the Drunken Boat’  
- Gericault ‘the boat of Medusa’  
- Noah’ Arch / Genesis / May Flower, the Pilgrim….Columbus + Vasco de Gama …  
- Love Boat TV serie / ‘Mutiny of the Bounty’ movie / The multiple ‘Ends’ of James Bond …  
- ‘Le voyage blanc’ (WEISSE REISE) by Werner Schroeter  
- Lampedusa immigrant boats…  
- ‘The Narrative of Arthur Gordon Pym’ of Nantucket, Edgar Allan Poe  
- Radio Caroline’, Pirate radio boat in Essex, England

**Design**
The design of the ‘boat’ is an alibi… a pretext to a storytelling strategy and narrative production. Far from doing a traditional boat with a traditional shell… this one will just have to be floatable… but designed as a Prop, as an Anomaly, even a Rocaille!, a ‘Stone’,…. With the possibility to sink, or to be condemned to the ground, as a trace of its lost potential….
The strategy of design and failure (Fitzcrraldo) is an essential part of the adventure, scenario… and production… technological & absurd…
Tooling will not be used as a propaganda of post-scientism, of positivism (last Acadia) but as the ambivalence between sciences and line of subjectivities, knowledge and obscurantism… expertise and fears… in a kind of Anthropotechnics…and Knowledge, as ‘fiction beyond sciences’, according to the philosopher Meillassoux.

**Estimation Cost for one month /**
- Travel from US  
  900 usd (if booked in advance)  
- Life in BKK  
  10 usd / per days for accommodation = 300 usd for one month  
  15 usd / per night for hotel = 450 usd for one month  
  Participation to production costs (robotic material, construction element…)  
  350 usd per student = 3500 usd for 10 students

**Global = 2000 USD** (including 1000 usd of Michigan participation for each student)

In parallel, we will apply for a grant of 8000 usd, for material and specific tools as concrete pump, nozzle, materials….etc. In case of success it could reduce the student participation to only 200 usd, (what we reasonably forecast).
**Bangkok one month**

To be in Bangkok for one month is the way to discover an urbanism without master plan, an intricacy of slum and condo, in a vertical stacking, with all social classes in contact. It’s also to see an Asiatic country which has never been colonized… excepted for a kind of Japanese arrangement during World War II. Strange, esoteric Buddhism mixed with extreme powerful tradition milk-shaked with technoculture and industry of copies, extremely sophisticated. We will visit some slums, which appear as a kind of counter culture against *worldism* agenda. 10 malls over 100 000 m2 are under construction, 30 towers-condo too, suspended infrastructure free-ways are snaking within the whole city, the sky-train reaches the suburbs over 50 km as a global network… and in the same time High Rise skeleton of abandoned building are becoming the iconic Ruins of BKK…

We are not doing tourism, but we will visit several spots, in & out BKK, industrial harbor island, floating village, traditional fisherman village, slums, abandoned and alive ‘super’Condo… Zoo over Department Store…TransGender area…(*recognized as citizenship gender since XVII century*…), and if possible a natural primary forest, in Thailand (north) or Malaysia (south). Cost of those different trips are not included and will be planned depending of production agenda.

Bangkok is extremely safe and healthy. Thai are comprehensive and adorable. Food is sophisticated and fresh (better than in any part of Asia) and daily life cost is really low (500 thb per day = 12 euros is the maximum for foods, coffee and other accommodation / similar price for Hotel…could be cheaper in shared room in China Town, around the location of the studio)

**University and research lab potentially involved:**

-Michigan robotic department and concrete research (to be checked) if Wes McGee agree… to advice preparation on material as concrete nozzle…

But we have also the possibility to use:

-King Mongkut's University of Technology Thonburi / Prof. ANAK KHANTACHAWANA, D. Eng / Assistant to the President for International Affairs King Mongkut's University / Thailand / we are in negotiation and they are very positive

-Freeform Construction and Engineering, Rupert Soar, President, 90 Julian Road, West Bridgford, Nottingham / UK / [http://www.freeformconstruction.com/](http://www.freeformconstruction.com/)

We are in negotiation and they are both very positive, to help the concrete part (chemistry, pump, nozzle…)

Boats and shells elements in concrete…’supposed to float’ …or not.
Tooling in BKK / R10KRC1100 + nozzles…
Previous works Shops done in BKK

M4 - Upenn University / 9 days in BKK / 2014 / Robotic process – Digital fabrication

M4 - RMIT University / 8 days in BKK / 2013 / CNC computation and digital fabrication
M4 - RMIT university / 10 days in BKK / 2014 / CNC computation and digital fabrication

M4 - Thammasat University / 15 days / 2013 / CNC computation and digital fabrication
(mold) / Craft blowing glass
M4 - North Thailand / International Workshop / 3 weeks / 2014 / Robotic Scenario-Acting!
M4 - Crete-Greece / International Workshop / One Month 2013 /
Robotic research and digital fabrication + Crafting process

M4 - India / One Month 2012 / Digital – Computation calculation / Plotter print scale one /
Craft fabrication
Lab M⁴ / Mind-Machine-Making-Myths / Bangkok
Machines-Robotic Lab Fabrication

Lab M⁴

The Lab M4 begun in 2013. The objective of this investigation is driven by the potential of robotic protocol and production on several researches: behavior, material, design and inventive scenarios. Our strategy is to link the research held for smaller scale prototyping and elaboration of machinist experimentation done this last ten years for testing and developing this knowledge in full-scale construction.

This Lab will acquire a unique movable and repositionable machine that performs several processes of fabrication (smoothing, pouring, extruding, secreting, weaving) which challenges conventional Know-How in construction on several specific situations, towards machinist production and fabrication.

The Lab is a vector of speculation embedded in processes of reality articulating several disciplines (mathematics, programming, robotic design, robotic behavior, chemistry, bio-chemistry, scripting...) as background knowledge for the next generations of architects.

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History

The transformation of tooling through computation has been in development for nearly 10 years in all the prominent schools of architecture and is now proliferating everywhere. It was driven by the objective to control the architectural shape and the processes to develop its emergence, from digital modeling to 3D print, from the first stereolithography, to FDM (fused deposition modeling), to SLS (selective laser sintering).

Yet, this approach of fabrication was reductive largely due to the size of the 3D print machines. and the potential coming from computing was not operative. The limitations found were significant in the scale of production and the non-transposability in the full architectural scale was a handicap to architectural production.

As such, a robotics approach has appeared as a strategic orientation in the last 5 years both in practice and academia. It is considered as the way to re-evaluate the ambition of fabrication, to jump across and reach beyond constructing an over-sized 3D print at the scale of a building.

Impact for architecture

Machines, robotics and fabrication are now becoming one of the main focus of this transformation of “Know-How”, in its global dimension. In academia, we could enumerate 10 architecture schools that have integrated or is starting to integrate in their curriculum a “LAB” or Master Class that is a department for robotic fabrication. The first was ETH in Zurich 5 years ago, followed by some others in Europe. Sci-Arc, Bartlet, Michigan Ann-Arbor, TU Vienna, RMIT, MIT are ones of the Universities that are integrating machines and robotic courses. In practices, for example, New-Territories studio, and a few others, have started this transformation since 2005 (see pictures attached).
Concepts of the Lab (knowledge and Uncertainties)

Our concept is to create a fabrication LAB which which will simultaneously produce ‘shelter’ and scenario including fictional-narrative approach….to mix operative mode with lines of subjectivities, fabrication and storytelling. Similar production done by M4 through computation, since two years (digital and robotic fabrication) are visible http://www.new-territories.com/props.htm, including prototyping shelter and shooting movies based on different scenario.

The hypothesis of this robot could reach several objectives
- Developing specific knowledge in Lab with master and post-professional students
- Creating the potential to physically realize small construction, scale one, as productive innovative research.
- Linking the LAB to specific department of different other school as RMIT, UPenn, (already done) and others, for a permanent feed-back between all of them through workshops, research, prototyping, fabrication…
- Developing a link with Industrial Company (cements, chemistry, bio-chemistry…)

Advantages
- Fabrication full scale
- Elaboration of several protocol of fabrication with the same robot but different nozzles and tips (concrete, bio-concrete, polymers, bio-polymers, aluminum, wood., even clay…with secreting, pouring, casting, folding, extruding, weaving, knitting…behavior)
- Elaboration of design which are absorbing complex shape, complex geometry and technological protocol

Funding potentialities
- Developers and Construction Company
- Software and robotic company (PRC-Kuka already sponsoring the M4 Lab)
- Material Sciences and University co-research and co-production
- Tooling (Tips-Nozzle) company
- Chemistry and bio-chemistry company

Material of LabM4
Kuka 6 axes Robot, R10KR1100 + KRC4 compact controller + RSI (real time sensor software)
3D print UP3d (Australia)
Spindles + Extrusion Drill + Heaters + Wire Cuter + Hand packing nozzles...
Kinect 3d scan, Microscribe 3d scan by point + all Software of scanning
5 Dell computers
Canon 5D markII + BlackMagic 4K + GoPro Black Edition + DJI Drone + all material for Movie, Sound, Light shooting and recording

Cost / Year
Invest the first year 2014
Machine 40k Euros + Tooling 10k Euros per year
Casual invest each year on 3 years
- Lab team / 15K per year for tooling by M4 Lab
- Research of funding to develop scale one production
- Association with Universities for sharing knowledge and developing research and productive Work Shop
Exemples *(from New-territories and others Teams / Architects / Lab)*

From 3D print to robotic fab

Exagon Company / Repositionable robot on laser positioning control / The most sophisticated in term of X,Y,Z work in process and displacement

Olzweg / New-Territories/ Constructive machine / 12 meters high / Stochastic Positioning of glass sticks / France / 2006
Water Flux / New-Territories / 1000 m² / 5 axes CNC machine for full wood fabrication / 2000 m³ / 100 trees / Museum of Ice / Switzerland / 2003
Research “I've heard about / New-Territories / R&Sie(n) – Bherokh Khoshnevis USC / Robot and contour crafting / Self-Organized urbanism / 2005-09


Anish Kapoor / Cement 3D print / 2011
Hypnosis Chamber / New-territories / 6 axes machines / 5 meters H. / 100 m³ / Japan / 2011

Research by Berokh Khosnehvis, USC, USA
Freefrom Lab Loughborough, UK
New-territories / Lab M4 / architects /
François Roche / Camille Lacadée

FR
Guest Research professor in master class at Upenn / Philadelphia
Guest Research professor in master class at Gsapp / 2006-2013
Workshop research courses with RMIT, Gsapp, Upenn...among others
Co-Director of LAB M4 / LLC NYC
President of New-territories / Paris / Bangkok
Co-founder and Principal of R&Sie(n) / Studio of architectural practices / Paris

CL
Guest professor at Thammasat / Bangkok
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