LightWIRE

structurally embedded luminescence

Eugenio Bettucchi[1], Iacopo Neri[2]
[1,2]Noumena
[1]eugenio@noumena.io

OBJECTIVES

The aim of the LightWIRE workshop is to produce a series of physical prototypes to rethink the structural and ornamental aspects of design, steering one to blur into the other. The former is reached by bending plastic rods at specific angles in order to discretize complex morphologies into linear elements, joined together through edge connections. Thanks to this, a second layer of electroluminescent wires can find its paths through the network and add a lighting attraction to the system while embracing the structural core.

SCOPE

Throughout the experience, students will apprehend methods from the digital realm to implement into the physical one. Elements such as material properties and physical constraints will be taken into consideration through digital simulations in order to simplify the fabrication and assembling processes. All this, in a constant iterative loop between design and fabrication, to refine construction details and study possible geometries.

The module manipulation will be coded entirely with Rhino/Grasshopper and the Anemone add-on to simulate system feedbacks. The experience will be structured in sequential steps, going from software understanding, to testing new approaches in order to build an architectural prototype in a 1:1 scale.

EXPECTED OUTCOMES AND SKILLS ACQUIRED BY PARTICIPANTS

Students will have the chance to research multiscalar design languages and complex geometries in discrete environments exploring Computation through physical prototypes and practical crafting methods in a continuous feedback between digital/manual. The final output of the workshop will be the result of progressive study steps in which students and tutors will work side by side.

We believe that the LightWIRE experience represents an interesting example of dialogue between the technological and physical bounds of contemporary design. By physically translating digital considerations into physical, it can become an asset for the Sharing of Computable Knowledge conferences.

SCHEDULE
Day 1
Introduction to the topic: Design investigation + Proposal + Prototyping

Day 2
Prototyping + Assembly + Short presentation

PREREQUISITE SKILLS OF PARTICIPANTS

The workshop is open to all participants, no previous knowledge of Rhinoceros and Grasshopper is required (although an introductory knowledge is welcome). Participants should bring their own laptop with a pre-installed software. The software package needed has no additional cost for the participant

(Rhino can be downloaded as a trial version, while Grasshopper and plugins are free). These software are subject to frequent updates, so a download link to the version used in the workshop will be sent to the participants a few days before the workshop.

LOGISTICS AND TECHNICAL REQUIREMENTS

One Projector/Screen (32" to 40"), Table for 10 students + 2 Instructors, small laser cutter, small 3d printer.Material (estimated budget 500 euro): METACRILATO PIPE (8mm external radius, 5mm internal radius, about 10 meters per participant). ELECTRO LUMINESCENT WIRE (2.4 to 2.7mm, 1 to 3 meter each, 1 kit per person). HEAT GUN (1 every 4 participants). WOOD BOARD (12mm thickness, 50x50cm, 1 every 2 person, used as base for the prototypes). Zip ties, cutter, sand, gloves

BIOGRAPHIES
Noumena
Founded in 2011 by Aldo Sollazzo and Matteo Di Sora, Noumena promotes experimentation in every task, pushing its own boundaries beyond conventional design limits.

Noumena is a collective group focused on design, research and education based in Spain, with nodes in Austria, India and Italy. We investigate between the boundaries of new digital paradigms and design strategies applied to architecture, robotics, and fabrication, through a hands-on and experimental approach. Besides that, we provide external services of consultancy, bringing our skills into other environments, offering our experience on computation and fabrication to external projects.

Noumena leads and coordinates several international events and activities such as workshops, competitions and exhibitions, establishing a networking workflow based on open-innovation. We embrace data-driven design, mixing environmental strategies with computational thinking from urban scale to robotic fabrication.

Eugenio Bettucchi. Eugenio Bettucchi has a degree in Building Engineering and Architecture from Alma Mater Studiorum, University of Bologna, Italy. He developed his thesis focusing on robotic material deposition based on real-time feedback between digital simulation and physical environment. He is a senior designer at Noumena and his interests and skills lie in computational design, digital fabrication and the way of which these systems interact. During his studies, he assisted several seminar and courses as external faculty at IaaC (Institute for Advanced Architecture of Catalonia) and collaborated in many workshops and research projects in international events related to computational and fabrication topics.

Iacopo Neri. Iacopo Neri studied at the University of Florence (UNIFI, Italy) - School of Architecture - and attended a Master in City and Technology at the Institute for Advanced Architecture of Catalonia (IaaC, Spain) after presenting a paper about Swarm Intelligences for crowd-based analysis during the Responsive Cities Symposium (2017, Barcelona). Currently he is studying new areas of dialogue between digital simulations and craftsmanship as computational designer at External Reference Architects (Barcelona, Spain), while he is involved in the organization of international workshops to discuss the role of computer graphics and parametric programming in the field of architecture as a researcher at MTSYSStudio (Florence, Italy).