

Lecture series

## "Intelligent Fabrication 2023"

### Discrete architecture in the age of automation

June 19th to June 30th 2023.

The yearly international symposium on "**intelligent fabrication**" is organised by the LéaV research laboratory of the ÉNSA Versailles. Each year has a focus on a different approach on current design practices with digital means and what it means for the designer.

Our design practice has progressively been evolving for the past few decades to incorporate **digital design tools**. Simultaneously, digitisation has been infiltrating the **manufacturing world** with an unprecedented speed. Digital fabrication has not only enabled cheaper and faster production but through its democratization, has also brought back the **designer** at the centre of the manufacturing process.

Similarly, **ecology** has finally been piercing through the industry and attracting manufacturers, designers and engineers towards **integrated thinking, optimisation and material knowledge**.

In an attempt to address these topics, it has become common for **teaching** curricula to include "**learning by doing**" as a principle, notably through 1:1 scale construction in addition to scaled models. Consequently, architecture and engineering schools have had to adapt by creating manufacturing facilities within their premises thus creating novel relations between materials, manufacturing and design. These **experimental digital approaches** have had the merit of stimulating the interest of the **research** world towards the manufacturing one and have therefore induced an exchange of knowledge between parties that struggled to communicate.

**Geometry, topology and materiality** can be seen as a common denominator and driver of design between architects, engineers and fabricators. Current tools try to bridge the gap between these protagonists. The symposium explores and questions some of the current developments of (**digital**) **fabrication techniques, low carbon construction** techniques, parametric geometry, discretized architecture, real scale and digital **prototyping** and **the current (digital) tools** (algorithmic design, topology optimisation, parametric design, biomimicry) available for conception. We also put into question the role of these approaches for pedagogical purposes and especially the **experiential pedagogy**. The speakers are academics, makers, practitioners, architects and engineers.

**Klaas De Rycke**

Associate Professor, Bartlett UCL

Maite de conference -chercheur, LéaV et ENSA-Versailles

## Speakers

-Gilles Retsin [associate professor, UCL and Co-Founder and CTO at Automated Architecture]

### **Lundi 19 juin, 14h**

Title: Parts that precede buildings: architecture in large quantities

This year's special guest is **Dr. Gilles Retsin** whose work investigates the topic of 'discrete architecture', digital technologies, automation, digital theory, housing and economic platforms. He is co-founder and CTO/Chief Architect of AUAR Ltd, a UK-based startup building a decentralised micro-factory network for regenerative timber housing, targeting 10,000 net-zero homes per year by 2032. He studied architecture in Belgium, Chile and the UK, where he graduated from the Architectural Association. His design work and critical discourse has been internationally recognised through awards, lectures and exhibitions at major cultural institutions such as the Museum of Art and Design in New York, the Royal Academy in London and the Centre Pompidou in Paris. He has edited books on architecture, computational design and robotics and is also an associate professor at UCL, the Bartlett School of Architecture where he co-directs AUAR Labs, a research lab focused on innovating the full value chain of housing. Gilles has a passion for design, tech, timber, cities, economics and politics.

-Alphonse Sarthout [architect and Founding Partner at Ciguë] (en Français)

### **Mardi 20 juin, 17h-18h**

Title: Expérimentation / Fabrication / Construction

Ciguë is an experimental studio that reconnects architecture with the act of making. Founded in 2003 and based in Montreuil, Ciguë now has a staff of around twenty. At Ciguë we believe that being an architect means doing. Doing with your head (thinking), doing with your body (feeling), doing with your hands (experimenting), doing with others (realising). Far from architecture as sculpture, out of the ground, out of sight and out of reach, our idea of making is expressed in the studio and in the field.

Our studio is not just a place, it's a way of thinking, a gateway to new fields of experimentation, opening the way to the unexpected, the unprecedented, the singular.

-Cedric Hamelin [President of the association Nebraska, Architect and researcher] (en Français)

### **Mercredi 21 juin, 9h**

Title: Construction with straw

Nebraska is an association that has been campaigning for the development of load-bearing straw since 2000, through projects, educational research, training and the drafting of regulations.

-José Sanchez [Founder and head architect at Plethora-Project]

**Mercredi 21 juin, 14h**

Title : Entangled Simulations

Jose Sanchez is an Architect, Game Designer, and Theorist based in Detroit, Michigan. He is the director of the Plethora Project, a research studio investing in the future of the propagation of architectural design knowledge. He is the creator of the video games Block'hood and Common'hood, digital social platforms that aid the authoring of architectural and ecological thinking to non-expert audiences. He is the author of the book "Architecture for the Commons: Participatory Systems in the Age of Platforms" published by Routledge in 2020 and the co-creator of Bloom. He has taught in renowned institutions in the United States and in Europe. He is currently at the University of Michigan, where he is an Associate Professor at the Taubman College School of Architecture. His research "Architecture for the Commons" designs and interrogates social media platforms as tools with the potential to author architectural content in the public domain.

-Mollie Claypool [architect, senior teaching fellow at UCL, researcher and Co-Founder and CEO at Automated Architecture]

**Jeudi 22 juin, 14h**

Title : Automated architecture

I am an architecture theorist, designer, educator and practitioner at The Bartlett School of Architecture, UCL. My approach draws from my expertise in the history, theory and design of automation in architectural production and from my work in practice. I am concerned with the cultural consequences of automation, particularly in regards to equity, inclusion and access in design production. I am co-author of Robotic Building: Architecture in the Age of Automation (Detail Edition 2019).

I am Director of Automated Architecture (AUAR) Ltd ([automatedarchitecture.io](http://automatedarchitecture.io)) and Co-Director of AUAR Labs at The Bartlett School of Architecture, UCL where I have been a Lecturer since 2015. I am Managing Editor of Prospectives, a new open-access journal published by B-Pro at BSA ([journal.b-pro.org](http://journal.b-pro.org)).

-Hadin Charbel [architect, senior teaching fellow at UCL and co-founder of Pareid]

**Vendredi 23 juin, 14h**

Title : Climate w/o crisis

Deborah Lopez and Hadin Charbel are architects and founders of Pareid; an interdisciplinary design and research studio currently located in London, United Kingdom. Their works adopt approaches from various fields and contexts, addressing topics related to climate, ecology, human perception, machine sentience, and their capacity for altering current modes of existence through imminent fictions (if).

They are both Lecturers (Teaching) at The Bartlett School of Architecture UCL in the B-Pro program.

## **Workshop \_ for students from ENSA-Versailles Licence 3**

The workshop under the same title and running from 19<sup>th</sup> to 30<sup>th</sup> of June 2023 will address real scale construction with ... straw. Straw has seen a revival in its use for residential buildings as a low carbon alternative to other construction methods. The workshop will explore the architectural possibilities of using discrete straw-bales as building blocks in combination with AI-based methods such as Image GAN's. To enhance the exploration of possibilities, digital workflows for the design, optimization and manufacturing processes will be employed by the students. Can AI help us design a new future using age-old materials? How can traditional low tech methods be combined and enhanced by new approaches to design and manufacturing? How can calculation methods and digital design be made more robust and closer to real problems by scale 1:1 experimentation?The workshop tries to offer bridges for the gap between theoretical knowledge and 1:1 scale experimentation.

Students will explore parametric modeling via Karamba 3D, a structural analysis tool implemented in the visual programming environment Grasshopper, running in Rhinoceros 3D. In parallel with the digital explorations, they will exhaust the material, test prestressed straw and timber connections to ultimately prototype and assemble a villa with swimming pool. All projects will be structurally evaluated and receive a carbon footprint assessment for optimization during conception.

In parallel, a lecture series will host outstanding academics and practitioners involved in the field of digital fabrication, discretized architecture, low carbon construction methods and parametric geometry.