LAPIS
Arts of Sciences Laboratory

Direction:

Nicola Braghieri

Research Team:

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The Art of Sciences laboratory (LAPIS), directed by Nicola Braghieri, investigates the processes of representing scientific thought through figurative tools offered by artistic disciplines. The laboratory's scientific mission is to investigate the role of implicit knowledge derived from analogical practices in the explicit automation of production processes. Therefore, research and teaching activity explores theoretical and practical implications of handcrafting specifically in the field of digital representation (image analysis, synthesis and processing), while developing strong cultural foundations and critical independent thinking. The virtual representation of architecture, city and territory is cast as a humanist discipline that questions the very nature of design and the definition of the architecture discipline.

MAIN AXIS

1.   Analog Design & Composite Practice

The core research and teaching of LAPIS investigates the theoretical and practical implications of architectural design composition applied onto the question of dwelling. The laboratory provides a practical take on the Aristotelian concept of analogy and verisimilitude, by developing a method of analysis and a process for architectural design. The work explores the relations between graphic representation and textual representation on the one hand, and project rhetorics in architecture through the "analogical method".

* *Visions et Utopie*
* *Project Theory & Design Studio*

2.   Architecture Figuration & Digital Fine-Arts

LAPIS' primary objective is to advance digital practices in architectural representation while sustaining a continuous dialogue with the figurative tradition, both in the pictorial pursuit of truth and architectural drawing in its speculative and timeless dimension. A major contribution to this field is the development of a specific operational method for both analysis of artworks and teaching of representational techniques oriented towards the discipline. A central endeavour is the investigation of the theoretical and practical implications of Digital Transition, with a particular emphasis on training present and future architects in specialised fields such as image analysis, synthesis, and processing. Our ambition is to contribute to the discourse on the methodology of representation by redefining the visualisation process exploring the inner dialogue between analogue and digital tools.

* *Architectural Figuration and Representation FIRE*
* *Analog and Digital: Addressing the continuity of architectural drawing practice in the design process - Doctoral Research - Emma Larcelet - (Doc.CH SNSF: https://data.snf.ch/grants/grant/219029)*

The core teaching aim of the LAPIS Laboratory is to train future architects in the specialist field of image analysis, synthesis and processing. Every year, between 600 and 700 students attend the courses run by the Laboratory, which include around 200 contact hours and 100 hours of practical work.

Imagery is a tool fundamental to and indissociable from the architectural design process. Images are not only a graphical representation of design ideas but are also an eloquent means of communicating the shape and the materials to be used in a construction.

3. Vernacular Heritage & Systematic Surveying

Since the 1960s, EPFL has taken a continuous interest in studying the so-called 'non-pedigreed' architecture through the active process of architectural surveying. This extensive research was inherited by the Art of Sciences laboratory (LAPIS) which has since contributed to its valorisation and dissemination.

Through systematic field research, the laboratory aims to develop new synergies between the methods of automatic digital survey and those of handcraft drawing, mostly in the Alpine context. Upon their documentation, these buildings are georeferenced and organised according to morphological, typological and constructive variants in an interactive platform of comparative cataloguing currently under development. Since 2014 fifteen field investigation campaigns have been carried out, involving more than 500 researchers and students in close relation with Federal and Cantonal institutions. The digital representation of buildings and territories is more than ever a process of knowledge rather than a final product. The position of LAPIS is clear; it is only through the reappropriation of this process that architecture will be able to sustain itself. In recent years, operative research has been extended to the 'alpine house' with a focus on the relationship between building typology and urban morphology in rural mountainous areas. Of particular interest are issues concerning representation, archiving and classification of rural heritage in the manuals and popular collections of the first half of the 20th century.

- *Silent Transformations : Study on Alpine architecture*
- *In Quest of Lost Meaning: Vernacular Architecture and the Environmental Awakening*
- *Architectural study and restitution of the Greco-Roman temple of Sobek and Haroeris in Kom Ombo (Upper Egypt)*
- *ENAC Week*
- *Digital Palimpsest: Georeferenced Platform for Swiss Alpine Baukultur*

Transmission & Dissemination

- *Handcrafting Digital Transition (Superonda Lecture Series)*
- *Promenades dans Rome (Conference & Publication)*
- *The Sky in the Room (Exhibition & Publication)*
- *Archives Imaginaire (Digital Atlas for all research topics of LAPIS)*

The LAPIS Laboratory syllabus is multidisciplinary, and aims over time to instill in students the practice of constantly comparing and contrasting manual means of technical expression with digital imaging processes.

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I.   Analog Design & Composite Practice

Ia   Locus Utopico

Architecture, more than other sciences and more concretely than other arts, has been able to produce fascinating images of an everyday future that is particularly radiant and full of hope. The age-old adventure of utopian thinking, between truth and verisimilitude, is conveyed through a phenomenological reading of examples from the fantastic repertoire offered by architectural projects and literary descriptions. LAPIS research and teaching aim to investigate the theoretical and practical implications of image analysis, synthesis and processing within the production of graphic works composed of visions of a utopian world between dream and reality. The paradox and verisimilitude embedded within these works highlight the dialectical and rhetorical power of architecture particularly in today's society obsessed with images as end products rather than means to convey larger ideas.


Allégorie des plumes ou La vêture de Son éminence le douzième prélat d'Amauroto, image de synthése, exemple de travail demandé, FF, 2018

Ib Design Composition & Alpine Habitat (Atelier research)

The laboratory investigates the processes of representing scientific thought by way of figurative tools offered by the artistic disciplines. in the fields of architecture and engineering, the expressive arts are integral to the development and execution of each project, from the moment ideas and concepts take shape to when forms eventually find a framework stable enough to outlast the transitory condition of their construction. Since its foundation in 2013, LAPIS has been actively involved in the study of the typological classification of architecture. In particular, it has carried out extensive research into the

elements and characteristics of bourgeois and rural buildings in the Alpine environment. Nicola Braghieri, PhD in Theory and Method of Architectural Research, leads research activities on the methodology of architectural design composition applied on the paradigm of the Alpine Housing. As a result, this comprehensive study of Swiss architectural heritage inevitably delves into the most critical condition that characterises vernacular buildings today; that of abandonment. This critical condition becomes the premise of LAPIS design studios, inviting the students to critically project the recolonization of neglected Alpine areas.
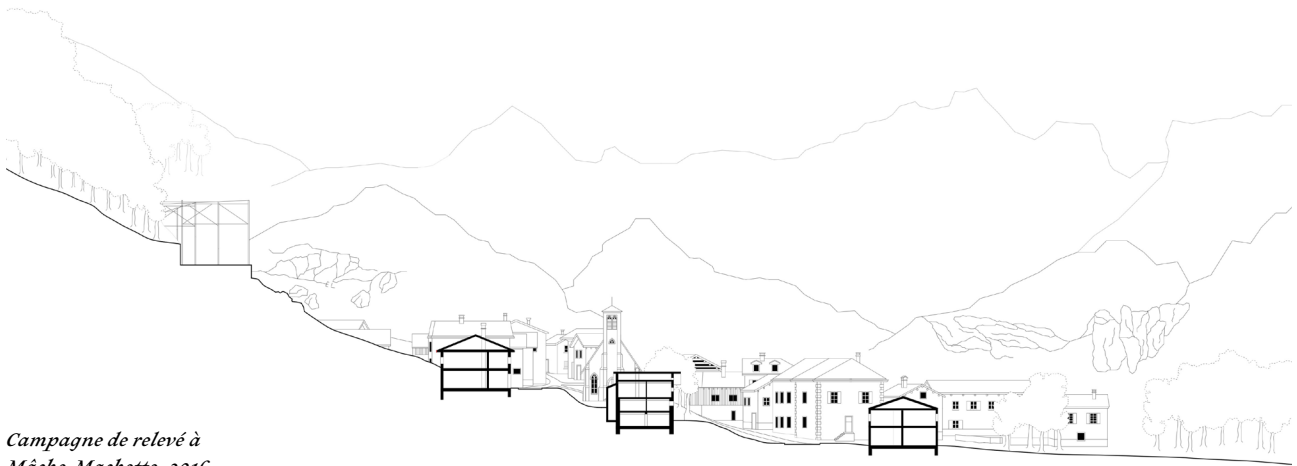
Campagne de relevé à Mâche-Machette, 2016

2. Architecture Figuration & Digital Fine-Arts

2a Physically Based Domesticity

Through the digital reconstruction of selected works by the Old Masters, the Laboratory conducts operational analyses to explore the potential impact of figurative art not only on representation but also on the conception of architectural projects. The aim is to analyse, reconstruct, synthesise, and predict physical phenomena, particularly the effects and practical implications stemming from design choices. This investigation focuses on defining elements that constitute reality beyond the two-dimensional image, including architectural language and spatial relationships, compositional tropes between domestic objects and related viewpoints, and resonance between materials and specific atmospheric conditions. We approach this through decoding the painter's narrative filter, employing an operational critique of art history using a scientific approach. Spanning from reverse perspective to rendering, the architectural deconstruction of the work of art becomes a tool for reading architectural space and built

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form in their historical and constructive dimension. From the domestic interior seen through the eye of the artist, this analytical procedure visually depicts a social history of housing by redefining typological elements and topological characters in dwelling culture. By use of digital model making, Physically Based Rendering softwares, and manipulation techniques alongside traditional "analog" photography of physical models, a dialectic between artistic expression and tangible reality authorial verisimilitude is thus achieved. The outcome of this process is the construction of "verisimilar" representations, plausible depictions of architectural ideas.

Projects :
- *FIRE (2nd year bachelor course, 2013/2024)*
- *The Sky in a Room, domestic landscape and synthetic fine arts (Exhibition, EPFL, 2023)*
- *The Sky in a Room, domestic landscape and synthetic fine arts (Publication, EPFL, 2023)*

FF, Reconstruction and Deconstruction of Johannes Vermeer, the Music Lesson, 2023

2b Analog and Digital: Addressing the continuity of architectural drawing practice in the design process - Doctoral Research - Emma Larcelet

The doctoral research aims to provide a critical reading of the history of computer-aided-drawing practices, questioning the possible continuity of Renaissance representational languages and techniques in the use of contemporary digital tools. It proposes a comparative analysis of computer-aided-drawing experiments in architecture school curricula between 1960 and 1990, in order to understand the evolution of the architectural drawing process. By investigating the relationships between architecture, industry and computation, the current project seeks to situate the technical history of computer-aided figuration in a broader cultural perspective.

Emma Larcelet
Doc.CH SNSF (Swiss National Science Foundation) : *https://data.snf.ch/grants/grant/219029*

3. Vernacular Heritage & Systematic Surveying

3a Silent transformations : study on alpine architecture - Doctoral Research - Patrick Giromini

As a result, this comprehensive study of Swiss architectural heritage inevitably delves into the most critical condition that characterises vernacular buildings today; that of abandonment. The key question arises: how do abandoned buildings coexist in a contemporary built environment grappling not only with severe pollution but also with a profound lack of deeper meaning? In an effort to reply, the laboratory chose a different position. Instead of examining abandonment as something negative, LAPIS addresses it from a productive perspective. In this case, abandonment is not seen as desertion, but as a possibility offered to buildings that have lost their original purpose originating from social and economic contexts that no longer exist. As such, abandonment provides a horizon of meaning to the Alpine territory, away from the ongoing attempts of museumification and monumentalisation that erase all forms of historical continuity.

And it is precisely this question of meaning that stands at the core of the lab's research endeavour. When surveying becomes a tool for studying abandonment as an architectural choice with positive significance, what can we learn from the objects of study? The answer perhaps lies in the relevance of these structures not as static objects but as testimonies of a different process of building. Vernacular buildings are hence no "monuments" but "documents" of a different material culture, with no less if not more importance in the face of profound environmental and social changes.

PG, Abandon comme strategie, 2019

3b In Quest of Lost Meaning: Vernacular Architecture and the Environmental Awakening - Doctoral Research - Vasileios Chanis

The project addresses a central topic in the theory of architecture- the relationship between the notions of "contemporary" and "traditional" in the aftermath of WWII. The period 1945-1972 is largely characterised by the dominion of the International Style as the main paradigm of professional architecture, but it also witnessed unprecedented scholastic research on the study of traditional buildings and settlements. The aforementioned led to the production of a significant corpus of literature that brought the subject of vernacular architecture to the foreground of the architectural discourse of the time. Although vernacular influences pre-existed in pre-war architecture, they were mostly bounded around an abstract myth of origins. In post-war years, research on vernacular architecture acquired a transdisciplinary character closely linked to the emerging notion of "environment", long before its current associations with sustainability. These various interpretations of the vernacular aimed in providing responses to the increasing loss of meaning in the built environment; a loss caused by interconnected issues such as increasing pollution, accelerated modern development, the vanishing of the historic city, and the uncontrolled urban sprawl. The current thesis aims to discuss the intertwined formative years of vernacular studies and environmental design research, before their establishment as official fields of scholarship in architectural academia (late 60s-early 70s). In doing so, the work of carefully selected architects and architectural theorists will be critically approached. Finally, by drawing a direct comparison between the years of environmental awakening and the current emergencies of ecological transition, the doctoral project aspires to illustrate a roadmap for a qualitative shift in the present paradigm of architectural sustainability.

Vasileios Chanis
EPFLglobaLeaders (European Union's Horizon 2020 research and innovation programme under the Marie Skłodowska-Curie grant agreement No 945363)
https://www.epfl.ch/education/phd/ doctoral-studies-structure/customized-curricula/epflglobaleaders/fellows-from-2nd-call/

UNIL-Fondation Sophie Afenduli
https://www.unil.ch/afenduli/home.html

3c Architectural study and restitution of the Greco-Roman temple of Sobek and Haroeris in Kom Ombo (Upper Egypt)

In coherence and continuity with this line of research in Digital Transition for cultural heritage, LAPIS is currently hosting Aurélie Terrier as Principal Investigator of the Ambizione Grant awarded by the SNSF for the proposal entitled Architectural study and restitution of the Greek-Roman temple of Sobek and Haroeris in Kom Ombo (Upper Egypt). The project focuses on the development of innovative methods and techniques for digital surveying under extreme conditions and will straddle three disciplines, the humanities, the arts, and more technical areas (modelling, static analysis, traffic and light analysis, augmented reality, etc.). It is important to point out that Aurélie Terrier's work is part of a chain of research developed by the laboratory in recent years. Specifically, the development of the "architectural survey" of "delicate artefacts" through the interaction of new information technologies and traditional knowledge. The research proposal, specifically focused on the analysis and graphic restitution of large-scale archaeological artefacts, will enable her to develop a new and original approach to operational experimentation in the humanities using the technologically advanced tools made available by the polytechnic school.

Aurélie Terrier
SNSF Ambizione Grant :
https://actu.epfl.ch/news/eight-ambizione-grants-awarded-to-epfl/

Temple of Kom Ombo, Aswan Governorate © Photo by Jeremy Bezanger on Unsplash

3d Systematic Surveying of Alpine Habitat (Semaine ENAC)

Since the 1960s, EPFL has taken a continuous interest in studying the so-called "non-pedigreed" architecture through the active process of architectural surveying. This extensive research was inherited by the Art of Sciences laboratory (LAPIS) which has since contributed to its valorisation and dissemination. Indeed, LAPIS together with the Archives de la Construction Moderne (ACM) holds hundreds of photographs, physical models, and drawings of vernacular buildings, most of which have in the meantime disappeared. Through systematic field research, the laboratory aims to develop new synergies between the methods of automatic digital survey and those of handcraft drawing, mostly in the Alpine context. Upon their documentation, these buildings are georeferenced and organised according to morphological, typological and constructive variants. Between 2014 and today, fifteen field investigation campaigns were carried out, involving more than 500 researchers and students.

Survey campaign at Mâche-Machette, 2016

3e Digital Palimpsest & Composite Rural Heritage

LAPIS aims to operate and reflect on the essence of Swiss Baukultur through the development of an interactive digital platform. The medium is a repository for collected, organised and evolving knowledge that relates to rural 'non-pedigreed' built heritage. It is analogous to a dematerialised 'palimpsest' whose ambition is to assist and guide those working on the territory to make more informed decisions by understanding the

composite and stratified narrative of the Alpine space.
The Digital Palimpsest will endorse the difficult task of geolocating the different mediums produced by the students as well as the research team. This platform aims to be an efficient tool to communicate on what is done within the ENAC, whilst also serving as a pedagogical feature for both the laboratory and the public. Aim and ambition of the research cluster, once the platform has been developed based on the materials collected by our school, is to extend it to the federal level by including in the project the rich collection of surveys carried out by the Swiss Technical Schools (mainly Basel, Berne, Lucerne and Lugano) over the last fifty years. It is also concerned with the representation, archiving and classification of rural heritage in atlases, manuals, postcards and popular collections produced in the last two centuries.

The project encourages critical awareness in the choices of transforming the territory through an interactive, participative and evolutionary tool, i.e. the palimpsest, aimed at all the actors involved in the construction and conservation of the Alpine landscape. The valorisation of 'lesser knowledge' as a cultural horizon by the institutions responsible for planning, development and control of the existing heritage is a key element in the sustainable development of the region.

Christopher Alexander, The Timeless Way of Building, 1979

Archive de l'Imaginaire (Open Source Digital Platform)

The representation of an architectural idea, besides defining the perceptible image of a real object through its figuration, can also reproduce, in a conscious, informed way, real situations or those on the border of pure fantasy, enriching the project with a visionary and idealist energy which pushes it to make progress and surpass itself. The architect capable of imagining knows how to 'see with the eyes of the mind', and can thus picture spaces and objects that express and communicate meanings other than those related to the pure necessity of their use and construction. Imagined architecture is made real by its depiction, that is, by its figurative representation. From the moment when the idea for a construction takes its form, the road to becoming architecture begins. The creative capacities of the human spirit can, in fact, define an architectural idea even in the absence of a concrete object of reference or of a tangible image of it to reproduce. When, though, the product of the imagination, however allegorical or symbolic it may be, however it may allude to a different reality, takes on the semblance of an architectural design, this can be conserved and communicated through a reproducible image. This is the strength of the architectural imagination, and its repertoire can be the most real of all the places in architectural culture.

Maurice Jarnoux André Malraux chez lui, 1953

The Sky in a Room, domestic landscape and synthetiv fine arts (Exhibition, Conference & Publication)

The Sky in a Room, domestic landscape and synthetic fine arts, exhibition.
EPFL, Foyer Archizoom SG 294.22
20.112023 - 8.12.2023

Curation
Filippo Fanciotti

Curating Team
Nicola Braghieri, Reda Berrada

Contributions
Students de Figuration et Représentation FIRE 2017-2023 (images)
Filippo Fanciotti - FF (images et textes)
Nicola Braghieri - NB (textes)
Olivier Meystre - OM (images)

Talk" Building Domesticity" (22.11.2023)
Anja Fröhlich
Elena Cogato Lanza
Talk " Depicting Domesticity" (21.11.2023)
Philipp Schaerer
Pier Vittorio Aureli

The exhibition displays the re-edited studies carried out by the LAPIS Laboratory between 2016 and 2023 in a series of allegorical diptychs laid out in thematic rooms. The left panel is a Reconstruction of the original painting questioning the true essence of the reality represented, exposing perspective corrections, omissions or other choices made by painters to bend all physical and optical phenomena to their own advantage in order to fine-tune their visual narratives. The right panel is a Deconstruction work which in conversation with the Reconstruction, performs variations on the technical elements that characterise it.

Exploring the relationship between interiors and exteriors, LAPIS discourse takes on the Baconian paradigm that knowledge passes through representation by converting the architectural envelope into a scenic machine. A device that questions the domestic, the everyday, the banal, and addresses the narrative role assumed by spatial sequences.

The unprecedented vision that emerges from the images in the exhibition, finally deprived of human presence, offers architecture the opportunity to laconically speak about itself as the narrator and main protagonist, laying itself bare in all its beautiful ordinariness and reaffirming its presence to a public that had mostly ignored it.

The Sky in a Room, exhibition, 2023

Superonda Talks - Handcrafting Digital Transition (Lecture Series)

As architecture undergoes its transition to the digital era, there seems to be a discrepancy with its fundamental mission — the crafting of buildings. At first glance, the abundance of new technologies appears to have widened the gulf between the conceptualisation of a building and the culture of manual labour. Yet, various voices of resistance emerge countering this reality. Yearning for a symbiosis between these seemingly disparate worlds, we pose the following question: How and to what extent can digital craftsmanship coexist with handcraft techniques of architecture?

Programme:

- *Community - Carles Oliver (IBAVI)*
  How can the integration of handcraft techniques in housing projects contribute to fostering a sense of community?

- *Pedagogy - Andrew Freear & Elena Berthel (Rural Studio)*
  In what ways can architectural education be enriched by a situated application of handcraft techniques?

- *Heritage - Ionas Sklavounos (Boulouki)*
  In what manner can traditional handcraft techniques actively maintain cultural heritage?

- *Practice - Daniel Rosbottom*
  To what extent can handcraft techniques be incorporated as a requirement in the contemporary practice of architecture?

Promenades dans Rome — Assembly practices between visions, ruins and reconstructions (Workshop, Symposium, and Publication)

The subject of the conference Promenades dans Rome was the city in its role as an eternal archive of references for the practice and theory of architecture. Understood as a monumental Wunderkammer, Rome contains a marvellous patrimony of fragments ready to be recomposed in new architectures. But it also reveals the ways these fragments have been assembled over the millennia, becoming the largest and most complex work of art in the world.

EPFL school of architecture with the Istituto Svizzero di Roma organised a dialogue with the aim to offer a discussion on critical reading of urban phenomena prompted by the theory

Margaret J.-M. Sönmez, Carole Lévesque, Juan López Cano, Jacqueline Maurer, Vincenzo Moschetti, Vittorio Pizzigoni, Florina Pop, Carlo Prati, Chiara Salari, Koenraad Vos, Maia W. Wellington Gahtan.

of art, in both its written form and the practical dimension of artistic production and manual technique. Scholars and researchers produced an open reflection bringing together the specific contributions of their respective disciplines.

The roundtable addressed issues of Rome as "city built in fragments", "model of additive practice", "atlas of affinities" and "repertoire of analogies" through a dialectical approach confronting history, theory, criticism, photography and architectural design. In this way, the city of Rome simultaneously constitutes the subject of any reflections and, through the history of its representations, its main theoretical and methodological reference. A printed volume was published collecting the material produced during the seminar and all the contributions selected for the final round table.

FF, Ecclesia Triumphans. Ruin as a frame for a discourse on God, 2022.