

MECHANICAL ENGINEERING | PHYSICS |
PRESERVATION OF THE ARCHITECTURAL
HERITAGE | STRUCTURAL, SEISMIC
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URBAN PLANNING, DESIGN AND
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ARCHITECTURE, BUILT ENVIRONMENT
AND CONSTRUCTION ENGINEERING |
ARCHITECTURAL URBAN INTERIOR DESIGN
| BIOENGINEERING | DATA ANALYTICS
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ELECTRICAL ENGINEERING | ENERGY AND
NUCLEAR SCIENCE AND TECHNOLOGY |
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CHEMICAL ENGINEERING | INFORMATION
TECHNOLOGY | MANAGEMENT ENGINEERING
| MATERIALS ENGINEERING | MATHEMATICAL
MODELS AND METHODS IN ENGINEERING



Chair:

Prof. Alessandro Rocca

DOCTORAL PROGRAM IN ARCHITECTURAL URBAN INTERIOR DESIGN

The Architectural Urban Interior Design (AUID) Ph.D. program promotes research on architectural design, with studies and projects aiming at different scales, contexts, and finalities. Research activities are based on the critical analysis and development of design processes and techniques in dynamic relationships with the urgent questions related to the urban and rural environment and the green, blue, and grey infrastructure. Research is supported by acquiring and elaborating insights and skills linked to contemporary architecture's theoretical and critical horizon. The Program foresees a constant elaboration and discussion of theoretical and operational tools. This dialectic process aims to foster the development of a critical and creative reflection on architectural design, exploring and testing experimental approaches, and delivering autonomous and innovative scientific products to be disseminated through seminars, publications, and conferences.

A relevant point at the center of the cultural scenario of the Program is the relationship with the design activity. In particular, the Program aims to investigate the potentiality of research by design or design-driven research (DDR).

Research by design is a broader concept that includes "practice-based research" and "practice-led research," meaning that we focus on two kinds of research methodologies: research through practice and the other involves research about practice.

The Program refers to the declaration reported in the EAAE Research Charter (2012): "Architectural research is an original investigation undertaken to generate knowledge, insights, and understanding based on competencies, methods, and tools proper to the discipline of architecture. It has its own knowledge base, mode, scope, tactics, and strategies." research by design is defined as "any kind of inquiry in which (...) the architectural design process forms the pathway through which new insights, knowledge, practices, or products come into being. It generates critical inquiry through design work."

The Program is embedded into the Department of Architecture and Urban Studies (DAStU), which hosts more than 160 professors and researchers engaged in an open, multidisciplinary scenario of architectural and urban studies, including every branch of design culture.

The Program offers an intense sharing of knowledge, information, and practices. AUID is a creative, open, multicultural environment where the researchers frequently exchange with the board of professors, other research centers, and doctoral institutions; the Program supports international exchanges, conferences, exhibitions, and research networks. The Program provides opportunities for teaching and tutoring activities, considered an essential research complement, thanks to the close connection with the Polimi School of Architecture, Urban Design, and Building Construction. The Program is part of the Polimi Ph.D. School, which provides the candidates with many interdisciplinary courses, keeping them in contact with the larger Polimi doctoral community. The Program aims to train and prepare highly qualified researchers and professionals in academic institutions, research centers, public administrations, and the private sector in architectural, urban, and interior design.

Eligible students hold a master's degree in architecture or close disciplines and can read, write, and speak English fluently. A background in Architecture is most appreciated, but a curriculum based in Design, Media, History, and other programs related to Art and Humanities is accepted.

The Program is run by a Head, who coordinates all activities. Then, different actors cooperate in the program development. Deputy Heads have specific areas of interest in foreign relations, interior relations, and departmental research assignments. The Faculty Board has the scientific responsibility of all researchers, with a Board of Experts composed of professors and lecturers with bold academic research experience.

An international Advisory Board connects AUID with an extensive global network.

Research topics

The Architectural Urban Interior Design (AUID) Ph.D. program promotes research focused on architectural design, with studies and projects aiming at different scales, contexts, and finalities.

Research activities point at the critical analysis and development of design processes and techniques in dynamic relationships with the urgent questions related to the urban and rural environment and the

green, blue, and grey infrastructure. Research is based on the acquisition and elaboration of insights and skills explicitly linked to contemporary architecture's theoretical and critical horizon. Every year, the Program focuses on specific topics to be explored theoretically and designerly in respect of its general directions. Within the 38th Cycle, starting in 2022-23 academic year, the preferential research lines follow these topics, which be pursued choosing various viewpoints and fields:

- Theory of architecture and architectural Design: reframing premises and goals, with case studies from the past and from the present times.
- Architecture and mass media: how architectural design interacts with political and social issues.
- Architecture as a contemporary narrative: research, criticism, education form an elaborate creative engine of producing ideas, ideologies, fetishism, and critical thought.
- Design driven research: this relationship, carefully investigated in the past years, is a test site for specific Design-driven research applied to different contemporary challenges.

The Candidate will develop a research methodology starting from the lectures and assignments of the AUID courses and the courses of the Polimi Ph.D. School.

Studying the different formats, methods, expressions of research in architectural design, the Candidate will profile a personal methodology considering the specificity of the selected object, the target, the attended results.

The Program considers that design is a relevant and necessary component of any research. Together with the AUID Faculty and the Supervisor, each Candidate will find a specific position between design and research.

Professional opportunities and job market

Educational objectives focus on the deep understanding of a well-selected and defined topic; the main goal is to develop research containing a comprehensive survey of the chosen question, which leads to an original track and output.

The Candidate will acquire the skill to organize a consistent analysis of case studies, formulate a clear proposal for an original approach to a question,

and elaborate innovative strategies and research methods.
The Candidate will be supported to deliver autonomous and innovative scientific products to be disseminated through seminars, publications, and conferences.

Enrollment: Admission requirements

Italian and International citizens are requested to have graduated according to the pre-existing laws D.M. 3.11.1999 n. 509, or to have a Master of Science degree following D.M. 3.11.1999 n. 509, or a Master of Science following D.M. 22.10.2004 n. 270, or similar academic title obtained abroad, equivalent for duration and content to the Italian title, with an overall period of university studies of at least five years.
A Master of Science degree in Architecture is highly recommended; candidates who graduated in disciplines as Landscape, Design, Art, Media, and Communications are allowed to enroll in the Program.
A certified knowledge of the English language is a requirement for admission. Please refer to the Ph.D. School website for details.
The admission to the Program will be established according to the evaluation of the candidates' curricula, motivation letters, and a proposal of a Ph.D. research, which candidates will send contextually with their application to the admission announcement.
A shortlist of applicants may be requested to meet delegates members of the Faculty Board.
The Program welcomes both foreign and Italian students. English is the official language.
Scholarships are available on general and specific themes, following the parameters illustrated in the call for admission. Candidates supported by scholarships of other national and international institutions may obtain a direct access to the AUID Ph. D. program, after the Board approval.

Requirements for the Ph.D. title achievement

The achievement of the Ph.D. title in "Architectural Urban Interior Design" requires a study and research activity of at least three years equivalent of full-time study, focused on the development of a Ph.D. thesis. Ph.D. candidates must earn a minimum of 30-course credits (see paragraph 5.3 below) and regularly conduct studies and research.

At the beginning of the course, the Faculty Board can assign a tutor to supervise and assist the Ph.D. candidate. The tutor shall be a professor belonging to the Faculty Board or the Groups of Experts.
The Faculty Board may assign extra course credits to one or more candidates if they need to complete their preparation in specific topics relevant to their research projects.

Research development

The main aim of all Polimi Ph.D. Programs is the development, for the candidates, of a research-oriented mindset, with expertise and skills in a specific research topic.
Ph.D. candidates are requested to develop an original research contribution. The Ph.D. thesis must thus contribute to increasing the knowledge in the architectural design research field. Besides, it has to be coherent with the general research lines of the Ph.D. Program.
The research results are collected in the Ph.D. thesis, where the candidate's contribution is put in perspective to the research state of the art in the specific research field.
The research develops under the guidance of a supervisor, who supports the candidate in the setting-out and everyday activities related to the thesis development. The supervisor is not necessarily a member of the Faculty Board and may also belong to an institution that is not Politecnico di Milano.
The supervisor can be supported by one or more co-supervisors.
Further activities are encouraged during the Ph.D. path to enhance the candidate's personal skills and research expertise. Candidates must acquire the capability to present and discuss their work in the research local and global communities. Consequently, both the participation in international conferences and the publication of the research results in peer-reviewed journals are supported.
The Program encourages the candidates' research interactions with other groups in their research field, in national and international areas. Research visits of at least three months are strongly fostered, as through them, the candidates may acquire different skills to develop their research work and thesis.
The minimum duration of the Program is three years.

Objectives and framework of the teaching activities

The Ph.D. Polimi Programs and the Ph.D. Polimi School activate teaching forms of different kind and credit value, including courses, seminars, project workshops, laboratories. Teaching activities cover the fundamental research issues (problems, theories, methods), representing the founding element of the Ph.D. Program. Lessons are held in English. Structured teaching activities allow earning ECTS credits.
The Ph.D. School offers courses aiming to train the Ph.D. candidates in soft and transferable skills. These courses' skills and abilities are expected to help candidates across different areas of their careers to respond to the rapidly evolving needs of the global economy and society at large.
The Ph.D. School courses activated for the 2022-2023 academic year will be visible at this link: <http://www.dottorato.polimi.it/en/during-your-phd/>

phd-level-courses/. At least 10 of the 30 credits (ECTS) that each candidate is required to earn shall be obtained through soft and transferable skills courses organized by the Ph.D. School.
The educational structure can include:
- Lectures, training sessions, guided tours, and seminar cycles.
- Seminar activities and individual stages/internships particularly important for enhancing the students' curriculum.
- Individual research driven by a supervisor and discussed with the Faculty Board.
Each learning activity is subject to grading through oral examination and/or the submission of written papers. Detailed programs are available on the Program's and Polimi websites. Programs and bibliographies of courses are available online and will be communicated at the beginning of each activity.

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- *Architectural training. Research on the multiple tracks of architectural education.*
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DESIGN MODELS FOR ARCHAEOLOGICAL HERITAGE. DEVELOPMENT OF AN INTEGRATED, MULTISCALAR AND ARCHITECTURAL TOOL FOR ITALIAN ARCHAEOLOGICAL UNESCO HERITAGE LOCATED IN FRAGILE SITES

Greta Allegretti – Supervisor: Prof. Pier Federico Mauro Caliarì

Co-Supervisor: Dott.ssa Angela Maria Ferroni

The research thesis *Design Models for archaeological heritage* deepens the relationship between architectural project and heritage. Through its development, the research tackles the two main directions of this relationship. On the one hand, investigating the limits and possibilities of architectural project in relation to heritage. On the other hand, by bringing to the surface those questions and needs expressed by heritage in the contemporary age to which only the architectural project seems capable of providing an answer. If we focus on the heritage par excellence – namely the sites on the UNESCO World Heritage List, internationally recognised as having Outstanding Universal Value – it emerges that not even this *élite* of monuments and places is exempt from certain criticalities.

When analysing the system of regulations defined by UNESCO, the buffer zone (a protection area around the site) and the Management Plan (a document that schedules the lifecycle of the site) – emerge as fundamental tools for the protection and enhancement of World Heritage, but also as possible harbingers of negative aspects. What seems to be missing, by now, is

the inclusion of the individual operations in a unitary project, capable not only of highlighting their reciprocal relations, but also of connecting them with the site and its territorial context. In this regard, the architectural project is recognised as being able to hold together all the scales of expression of the heritage and to deepen and explicit those strategies that remain partially unexpressed in the Management Plan and in the uses of the buffer zone.

In order to fill the project gap within the current UNESCO framework, the research decides to confront those sites that seem to suffer most from this lack of design approach. The situations of greatest need are mainly recognised in the case of archaeological sites located in fragile territories. While fragility is interpreted as a condition of the territory but also, and above all, as a resource, archaeological heritage is recognised as particularly vulnerable, for issues related both to its materiality and to its role in contemporary life. In light of the considerations made on the potential of architectural project in relation to the territory, and the particular condition of need expressed by some areas, the thesis defines its

final output in the development of Design Models for Italian archaeological UNESCO heritage located in fragile sites. The Design Model must be developed in such a way as to meet three fundamental requirements (named also identity and operative principles): the model must be integrated with respect to the existing tools and plans for protection and enhancement, multiscalar with respect to the objectives for the territory and the site and architectural, as it must be constituted as a unitary project, which takes shape by unravelling certain design topics. With the intention of developing models that are able to comprehend the peculiarities of the heritage and its territory but may also be useful to multiple sites, and with the aim of reducing



Fig. 1 - View of the Archaeological Area of Agrigento towards the sea (ph. Ilias Nissim).

the variability of the conditions of fragility, a territory profiling operation is implemented. On the basis of the density criterion the research defines three profiles – low, medium and high density – that are analysed regarding their various configurations and grades of fragility.

With the objective to study the three territorial profiles in depth, but also to obtain a concrete, operational and design-based output, the research proposes a methodology of investigation and development articulated in two phases.

The first phase (investigative) aims to provide the theoretical framework on the issues of design of UNESCO sites and archaeological heritage. To this end, the three international Calls for Projects organised by the Accademia Adrianea di Architettura e Archeologia on some archaeological World Heritage sites are selected as case studies: the Call for the Grand Villa Adriana (2018) is associated to the low-density profile, the Call for the Acropolis of Athens (2020, postponed to 2022-23) to the medium-density



Fig. 2 - Definition of the multiscalar approach for the Agrigento territory and archaeological site.

profile, the Call for the Via dei Fori Imperiali (2016) to the high-density profile. From each case study, a Layout of Design Actions is extrapolated for each profile, composed of an agenda of questions about the context, a list of strategies for the profile, a set of suggestions for the compositional and formal development of the projects. The second phase (operational) aims to provide a proving ground for the considerations developed in the first phase. Three sandboxes are identified, one for each profile: "Archaeological Area of Agrigento" for the first profile, "Syracuse and the Rocky Necropolis of Pantalica" for the second, the "Historic Centre of Rome, the Properties of the Holy See in that City Enjoying Extraterritorial Rights and San Paolo Fuori le Mura" for the third. For each of them the research develops, finally, the corresponding Design Model that must be, as anticipated, integrated, multiscalar and architectural.

The architectural aspect, in particular, is implemented through the drafting of a real Call

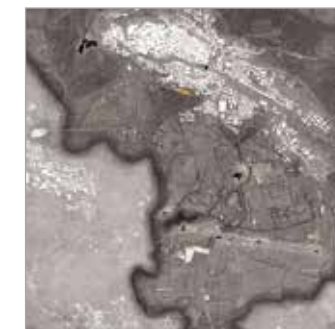


Fig. 3 - Overall diagram of the Design Model of the Call for Agrigento.

for Projects, similar to those of the Case Studies, in which the objectives of each scope are transformed into design topics and relative guidelines. The Call structure, in fact, allows on one hand to collect and provide a set of indications for the site and its territory, and on the other hand to leave the designer with a margin of freedom to unravel the various design themes, which can only take place in the actual design phase, outside and after the elaboration of the Design Model. The design approach is a founding element of the research in terms of content, methodology and objectives. The project, intended both as a process and as a result, gives identity and form to every aspect of the research, shaping its framework, directing its efforts, producing the final output.

ADEQUATE URBAN HOUSING: CASE STUDIES OF NOVEL SETTLEMENTS OF HOUSING COOPERATIVES IN ZURICH, SWITZERLAND

INTERMEDIATE SPACES: ENABLERS OF SOCIAL CONNECTION

Maryam Khatibi – Supervisor: Prof. Alessandro Rogora

The inquiry of this research renders the innovative housing initiatives of new generation of the housing cooperatives of Zurich as a social housing incentive in Switzerland, which in fact portray a context-specific knowledge. Although the discussion of this study lends itself to a local approach, the argumentations are relevant to countries, where Human Right to Adequate Housing and the Sustainable Development Goal (SDG) 11 are adopted as an agenda for urban development. To this aim, the study has investigated the dialectical socio-spatial interactions of the case studies of collective residential settings of settlements of the housing cooperatives of Zurich in the light of key concepts of architecture and urban development. In essence, the concept of the *right to the city* by Henri Lefebvre, the theory of *intermediate spaces* by Herman Hertzberger and the *criticism to the process of mass means of housing* posed by John Habraken have framed the theoretical background of this study.

Housing Cooperatives in Zurich, Switzerland

In Switzerland, which is a predominantly tenants' country, the building collectives that

realize collaborative housing settings play a subordinate role. Accordingly, housing cooperatives are mainly developing affordable living space, supported by the state in the form of interest-free loans, sale and lease of land at prices below the market price in Switzerland. The Swiss experience of new cooperatives, which develop innovative collaborative housing settings is the result of the real state crisis at the beginning of the 1990s in Switzerland and above all in Zurich. Born in 1907, a century-old non-profit housing cooperatives of Zurich engage in developing and testing new forms of urban housing. Accordingly, Zurich owns the largest number of cooperative housing settlements with 43,800 flats on the whole. Concurrently, the emerging new layouts of housing settlements are helped along and legitimized by the support of the cooperative housing model of Zurich as a response to the inward densification strategies of Zurich city, population growth, the available land supply and the the goal of the 2000-watt society in Switzerland. While housing spaces prevail in the current projects of housing cooperatives of Zurich, functions such as services, shops and offices are integrated in order to promote

the functional mix and more efficient use of the territory. Moreover, the contemporary urban society puts different demands on the living conditions and the urban environment. Consequently, the recent diverse forms of households and lifestyles have motivated collaborative housing projects with innovative architectural layouts.

Two Settlements of Housing Cooperatives of Zurich as Alternatives to the Mainstream

Today in Zurich, the renewal of the housing sector is partly because of the revitalization of the housing cooperatives, at the same time that the societal and environmental debates are widely discussed and adopted by them. Zurich city has twelve urban districts, which are called Stadtkreise (City Districts) and the plots of land for case study No. 1 – the Mehr als Wohnen ensemble and case study No. 2 – the Zollhaus complex are located respectively in Districts 12 and 4. Actually, these projects reframe the narratives of the disused former industrial sites and their revitalization and further developments in the context of cooperative housing settlements. As representatives of the future of housing development, the novel cooperative projects have

to demonstrate a high density, more modest apartment sizes, diverse range of typologies, a social mix of residents, dynamic exterior planning, low energy consumption and low greenhouse gas emissions qualities.

Case Study No. 1

The starting point of the Mehr als Wohnen project was the 100th anniversary of the non-profit housing development in Zurich in 2007. The largest cooperative housing complex, Mehr als Wohnen, with more than fifty existing Zurich cooperatives that was working together with the city and the site residents, was constructed from 2007 to 2015 in Zurich North. The special characteristic of the project is the privacy on the one hand and community-oriented on the other. In Building A of the Mehr als Wohnen project, communal character of a shared flat with the possibility to return to small flats is developed. The



Fig. 1 – Layout of cluster apartments, building A, Mehr als Wohnen settlement, Zurich North, Scale 1:400 (Source: Own drawing based on architectural drawings of Duplex Architekten)

cluster-concept apartments in House A by Duplex Architekten, as a representation of a new form of living, highlight the communally used living spaces. Ergo, an average of 35 square meters per person as the reduction of the consumption of private surface area, compared to Swiss average of 45 square meters is allocated for a more ecological lifestyle in designing the layout of the cluster apartments. Cluster apartments, therefore, are defined as housing typologies that combine smaller private flats with communal spaces, creating a collaborative space and lifestyle in which social, design and organizational aspects are incorporated.

Case Study No. 2

The Kalkbreite cooperative engages in innovative forms of living and working in Zurich. The Zollhaus project, realized in 2020 as the follow-up project of the Kalkbreite cooperative is centrally located between the Limmat River and the train tracks in the Industriequartier (industrial quarter) of Zurich. Hallenwohnen (the hall-concept apartment) as

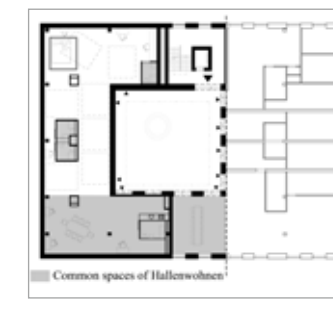


Fig. 2 – Layout of Hallenwohnen (hall dwelling apartment), building A, Zollhaus complex, Zurich center, Scale 1:400 (Source: Own drawing based on architectural drawings of Enzmann and Fischer Architekten)

an innovative housing layout is developed in building A in the Zollhaus project by Enzmann and Fischer Architekten in Zurich. Hall-concept apartment renders dialectics between collective residential and office spaces, in which the physical and social context of housing is defined by its residential community. Hallenwohnen promotes optimal usage of space – be volumized, while its residential space is not separated in zones for rooms, which in turn enables a dynamic process of habitation. The intermediate spaces function as collective spaces, encouraging social connections in these cases.

Outlook

The contemporary activities of the housing cooperatives of Zurich interconnects the professional fields of urban planning and architecture to the local and national policies, and to space as a common interest. Framing the empirical data with theories underlying the study, it can be concluded that design concept for the collaborative housing projects does not stop at the spatial planning phase, rather it continues in an overall process of creating, governance, maintaining and decision-making for contemporary residential communities.

THE ACCESSIBLE FRAME - RESEARCH ON ANCIENT CHINESE LANDSCAPE ARCHITECTURE TOWARDS A PERCEPTUAL INTERACTION PARADIGM

Luyi Liu – Supervisor: Prof. Luigi Cocchiarella

This research is a contemporary interpretation of the ancient Chinese landscape – another spatial creation. The specific research object is a piece of experience of a spatial phenomenon from an ancient Chinese garden. In this research, it is named: *Enframing the Scene*. The study points out that the *frame* in this experience is accessible. This accessibility is different from the isolation of the *frame* in the viewing mode of modern perspective that has been influencing our world since the Renaissance. According to Panofsky's theory, the accessible *frame* may mean another way of viewing, further, another "will to form"; thus, the research approaches to ask what this another way is exactly, and if it is possible to apply it to nowadays spatial design, and how? Quasi-symbolic form analysis of this accessibility here points out that, indeed, there is another way to create virtual space on the two-dimension plane, which is different from the mathematical way of spatial representation dominated by perspective. Further, employing phenomenological hermeneutic to analyse the research object leads the initial investigation to more general issues in contemporary architecture

discourses, such as the whole perception of space – including the tactile and visual both, and more; and the subjective experiences of built space, user-oriented. Ultimately, based on all the studies, this research provides a cognition that, to the more and more heterogeneous society we are living in, it requires a more inclusive space design method for contemporary space design. *Enframing the Scene* offers a specific spatial case provided in response to this demand, and further research indicates that for inclusiveness space design, it should not only on the discussion of methodology, but there may be a shifting paradigm from the ontological level. Before the theoretical demonstration, a narrative of personal roaming experience in an existing space located in a traditional scholar garden was provided. Defined as *Enframing the Scene*, it is a piece of subjective feeling mixed with visual and tactile in a built space. It is achieved by crossing the frame. This sets down the practical foundation of this research and delineates the methodological field of this crosscultural study focusing on – the representation way of space. The initial theoretical part of the

thesis reviewed the discourses related to space representation in the contemporary architectural field. They mainly criticized the spatial expression of linear perspective technology that has been influencing since the Renaissance led to visual supremacy and the overall impoverishment of our built environment. This thesis, furtherly, points out that, in the entire architecture process, there are three kinds of space, the space in architects' minds, the pictorial space that is generally represented by perspective, and the real built space. The current theoretical discussions are separated fragments located at the two poles of the complete architecture chain composed of these three. While only when the integration of these three spaces is discussed could lead us truly approach the essence of architecture as a practical discipline. Thus, the study calls for a whole process of architectural design entirely from architectural conception to user experience, in which how to express space is crucial. The next part is a detailed interpretation and analysis of *Enframing the Scene*, which indicates another way of spatial expression. First, for understanding this

spatial phenomenon, its historical origin was introduced, and the contemporary related research of frame in Chinese landscape has been reviewed here. Second, the study interpreted the relevance of *Enframing the Scene* and Chinese traditional landscape painting. Through two concepts: *flatness*, *frameless*, the consistency of the *frame's* accessibility in the cultural background is provided. It revealed the influence of this "another way of seeing" included in traditional Chinese paintings on space creation, and illustrated this kind of spatial expressing way's symbolic feature. This may lead to another spatial creation paradigm. Next, for application, an ethnographic investigation tried to approach the cultural and philosophical sources that support this paradigm. Meanwhile, phenomenological hermeneutic analysis sets them in comparing with relevant contemporary theories, trying

to sum up certain useful design methods for the contemporary era. The main tracing is through from the ancient Chinese cosmological model to some relevant sentences in *Tao Te Ching*, and to the related painting theoretical texts. One of the major finds of this thesis is that the *frame* in *Enframing the Scene* is accessible; this accessibility is related to traditional Chinese landscape painting, which is brought about by *another way of viewing* and has its cultural foundation. In spatial designing realm, *Enframing the Scene* is one of its specific embodiments. The combination of the relatively public visual experience together with the very personal tactile experience constitutes the subjective feeling of the individual in the *Enframing the Scene* space field. This balanced the public/objectivity and private/subjectivity experience of the built space. That is, in the same

space, the spatial experience of different subjects is *similar* rather than *same*, which is extremely approaching the current heterogeneous society's demand of the inclusiveness for space design. Then, this research discussed that, here, the different individuals' perception has been included in the full spatial design processing, and it produced effects through *perceptual interaction* when using/ appreciating the built space. This *perceptual interaction* is realized in three-dimensional physis space through the distinctness and ambiguity between the visual experience and the tactile perception of individuals. Ultimately, the research reveals that the inclusiveness of the built space embodied in *Enframing the Scene*, achieved by considering the subjective feelings of users during the design process, and by guiding but not controlling the ambiguity between the visual experience and tactile experience. It has its foundation on the ontological level in a way that is different from the philosophy of current architectural design methodology. The essence is to abandon the rigid certainty of rationalism, and instead accept and embrace the differences and uncertainty between individuals. In other words, to achieve spatial inclusiveness, we should not be limited to methodological exploration, and perhaps turning to ontology will help.

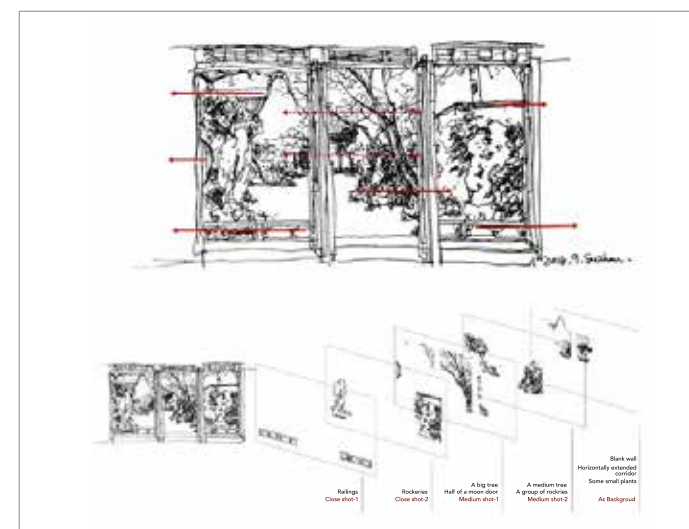


Fig. 1 - Visual habits analysis of the Sketch of *Enframing the Scene* (by the Author)

MONUMENTAL GROUND. INFRASTRUCTURES, CONSTRUCTION SITES, LANDSCAPE

Chiara Pradel – Supervisor: Prof. Alessandro Rocca

In a period marked by climate change, urgent ecological reassessments and overall sociopolitical instability, an understanding of the complexity of landscapes that are primarily forged by human actions, by looking at them through the lens of materiality, seems paramount. Insight on both the abstract/inspirational and physical/operational meanings of materials, can lead one to explore alternative design approaches, framing singular relationships between city, land and wild spaces, identifying new interpretations on materials, their aesthetic qualities and potential innovative usefulness, formulating reflections on low-tech as well as high-tech solutions.

To foster a critical attention to the ground, and in particular to the earthworks resulting from complex infrastructural building activities, has been a central objective of this doctoral research. From the initial observations of some basic, almost banal actions—like dredging, digging, founding, mass grading, sloping, filling, contour bounding, embanking and, most of all, landfilling—the effects of which are often totally implicit in the architectural practice, to the delineation of a theoretical research and the investigation on

main case studies, the attention and imagination have been captured from monumental ground displacements and inert material flows. Focusing on the evolution of those earthworks, which hang between construction and deconstruction practices, the research brings to light a relevant architectural *topos*, that has been renewed and enriched over time: from the shaping of Maya and Inca tumuli made by discarded materials, to the theorization of the ancient meaning of digging the earth inside the *Four Elements of Architecture* by Gottfried Semper, to the reuse of excavated spoils as part of engineered parks (from Lancelot Capability Brown to Hargreaves) and of the architectures of Alison and Peter Smithson or of Le Corbusier, to Land Art and environmental restorations, thanks to the reuse of inert materials, of delta rivers, sea-shores and wetlands. However, despite this *fil rouge* crossing several places and eras, in contemporary times the meaning of earthworks and the role of ground design seem to have become even more urgent. Today, we are indeed transported into a dimension in which the size of the infrastructural oeuvres, the amount of their material flows, and the connectedness of their ecological effects are planetary.

Not only are we shaping and re-shaping the Earth's crust by rail or road-lines, extended tunnels, underground constructions and skyscrapers, but we are also flattening and carving surfaces, sprawling cumuli and heaps, unfurling volumes of earth. Even if these actions can be considered, for all intents and purposes, as (gigantic) landscape operations, it is apparently still difficult, within the architectural practice and theory, to become aware of their centrality and of the needed expansion, in this respect, of the landscape design tasks. In particular, the research focuses on the AlpTransit high-speed railway project, which connects Italy and Germany through Switzerland, and on the realization of the Gotthard and the Ceneri tunnels (1999–2020), that produced more than 34 million tons of excavated materials. The five major AlpTransit ground movements and inert disposal sites, that arose close to the infrastructural construction sites and that have powerfully reshaped several Swiss territories, have been mapped and organized in an interpretative inventory, which constitutes the second part of the research. Therefore, a section of the thesis is more theoretical and profoundly challenges the

meaning of earthworks inside the landscape architecture history and contemporary thinking, making it clear the need to build (and negotiate) knowledge derived, *inter alia*, from the natural sciences, geology and geomorphology and from social, economic and political processes. Interpretative drawings and models, on the other hand, constitute a complementary and (possibly) autonomous part, which lead to a more careful attention on design aspects, envisioning the new grounds' physical sizes and their transformations over time. The soil, after being extracted from the tunnels and relocated inside another landscape, appears as a fluid material that follows the construction activities and is placed between the rigid geometries of the machines, the complex structures of the construction sites, the unavoidable needs of technical-engineering management and the evolving orography of the land that hosts them. It thus releases itself from the consolidated

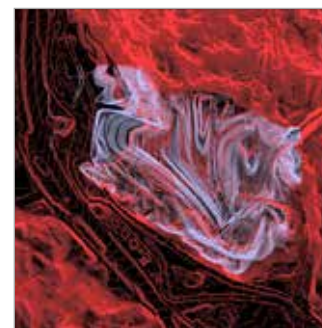


Fig. 1 - *Sigirino Monumental Mountain*, Sigirino, Switzerland. Drawing by Chiara Pradel, 2022. The *Monumental Ground* research envisions past, present and future movements of earthworks arising from large scale construction works, such as the AlpTransit high-speed railway project.

registers of formal evaluation of the architectural language or of the usual dimensional and structural definition of engineering work. Rather, it is more immediate to refer to a sort of arcane primitiveness of the gesture that shapes, distorts, throws and contains at the limit of the dissolution of the figurative or the recognizability of the anthropic gesture. Temporal maps and topological drawings thus try to disengage earthworks from an exclusively technical approach, envisioning the future scenarios of main disposal places with their topographical and “geo-accelerated” transformations. Moreover, the temporal succession of these huge artificial mountains, vertical deposits like giant walls, redrawn topographies, refilled deltas, de-emphasizes the formal properties of the single landscape and foregrounds the overall kinetic material movement. Looking at these earthworks, it is quite impossible to fix a single, unique form, while drawings rather describe a sort of “choreography” of shapes inside landscape, a sequence of significant physical structures that can at the same time be understood as new and ancestral states of space, as monumental anthropogenic morphologies that can be entirely perceived only by a wide, raised-from-the-ground, almost non-human gaze. The term “monumental” immediately refers to the huge dimensions, and directly links these infrastructural landscapes

to the so-called “infrastructural monuments,” but, at the same time, a necessary reversal takes place. Indeed, the monument is no longer (or it is not only) meant as the “primary” infrastructure (or architecture)—the one thought, theorized and, finally, also realized. The attention shifts from the built object, which is already clearly “visible” and which the architecture is intentionally expressed and debated, to less considered artifacts and materials, that usually play a completely secondary role. Finally, the considered earthworks counteract the idea of voids landscapes, understood as empty spaces that are antithetical to the ungovernable growth of the city. On the contrary, precisely those that are considered void areas, are paradoxically filled, submerged and deeply altered, and are inevitably linked to the architectural and infrastructural constructive practices and their exponential rise.

THE ARCHITECTURE OF CONTEMPORARY ART MUSEUM IN SHANGHAI: FROM THE INSIDE TO THE OUTSIDE

Xin Xu – Supervisor: Prof. Pierluigi Salvadeo

After hosting the Expo 2010, Shanghai has clearly positioned itself to become an international metropolis and launched a new round of urban development strategy. A metropolis cannot do without vigorous art museums, and as we have already seen, there has been a spurt of growth and development of art museums in Shanghai during this decade. The number of art museums has been increasing dramatically, and their geographical distribution has been gradually expanding from the center of Shanghai city. Among these museums, contemporary art has been gradually introduced, and more and more contemporary art museums are springing up and developing prosperously in Shanghai city.

As a carrier of contemporary artwork exhibition, a materialized expression of art museum institution, and an important strategy for urban development, architecture of contemporary art museum plays a vitally important role in contemporary art promoting, as well as urban vitality increasing. The design of contemporary art museum architecture is showing a great diversity based on the demands of not only contemporary artworks, whose unique and diverse themes, materials and

representations are requiring more appropriate and flexible exhibition spaces of their own, but also society, as its demands for art museums are no longer just for art appreciation or public education, but for more and constantly changing new social activities.

This research aims at exploring that in the future, what kind of contemporary art museum architecture will Shanghai need. It is a discussion of the roles and related responsibilities of the future contemporary art museum architecture in Shanghai context. In order to derive the future roles and responsibilities, the present roles and responsibilities of architecture in contemporary art museum are deeply explored, which are concluded through the observation and analysis of the current manifestations of contemporary art museum architecture in present context of Shanghai. The main research subject in this research is architecture of contemporary art museum in Shanghai context, which refers to a non-profit institution with contemporary art as its object, with the functions of collection, research, exhibition, public education, cultural communications, etc., legally registered by the registration and management

authorities and open to the public. The contemporary art museums discussed here include both state-owned art museums and private art museums. Moreover, the research would follow two logic lines: philosophy line, which refers that the exploration of contemporary art museum architecture is from phenomenon to essence, and with the transformation of stakeholders' concerns, to a new essence; as well as time line, which indicates that the issue is discussed from current situation and inferred to the future state. In addition, the whole research would be carried in three different scales, namely, in room scale, in building scale and in urban scale, based on *A general theory of architecture* proposed by Wu Liangyong. Literatures about art museum and its architecture design would be focus reviewed and cases of contemporary art museum architecture in Shanghai center area would be collected and deeply analyzed. In the process of data collection and analysis, observation, qualitative analysis, functional analysis and interdisciplinary approach would be applied according to different scales considerations. The future roles and responsibilities of contemporary art museum

architecture would be proposed based on related stakeholders' feedbacks on the current status and corresponding demands for the future visions. And the complexity and contradiction of new essences would also be discussed.

The discussion on the role and responsibility of contemporary art museum architecture would increase the weight of architecture design in the issue of contemporary art museum and make contemporary art museums better used by not only exhibition visitors, but also the public in general sense. And defining future roles and responsibilities of Shanghai contemporary art museum architecture would also become a design guideline and act as a reference in architectural design for more contemporary art museums to be established in Shanghai city.