

ARCHITECTURE HERITAGE and DESIGN

Carmine Gambardella

XVI INTERNATIONAL FORUM

Le Vie dei  
Mercanti



**WORLD HERITAGE and KNOWLEDGE**

Representation | Restoration | Redesign | Resilience

**ARCHITECTURE HERITAGE and DESIGN | 2**  
Collana fondata e diretta da Carmine Gambardella

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**Conference report**

300 abstracts and 650 authors from 36 countries:

Albania, Australia, Benin, Belgium, Bosnia and Herzegovina, Brasil, Bulgaria, California, Chile, China, Cipro, Cuba, Egypt, France, Germany, Italy, Japan, Jordan, Kosovo, Malta, Massachusetts, Michigan, Montserrat, New Jersey, New York, New Zealand, Poland, Portugal, Russia, Slovakia, Spain, Switzerland, Texas, Tunisia, Turkey, United Kingdom.

160 papers published after double blind review by the International Scientific Committee

## Preface

*In the present era, technologies are becoming increasingly important in helping and supporting man in research, knowledge and production activities, almost as if they were smart prostheses. With the theme of the XVI Forum "World Heritage and Knowledge", I propose to the International Scientific Community to debate and establish a comparison of knowledge carriers to communicate methodologies of good practices adopted and experiences in the use in the protection, conservation and safeguarding of cultural heritage and landscape as well as in the design of the "new," that, adopting in the building processes and building construction Innovative Building Modelling, can realise a non-contemporaneity of what has the same date (Giulio Carlo Argan) respectful of the values of the pre-existing, legitimate because it participated ex ante and monitored becoming all its ethical, aesthetic and performance connotations.*

*With the Internet of things, for example, sensors that are used to produce data autonomously that widen the processes of knowledge on all levels, from the territory with its infrastructures, to the environment, to the artefacts entering into the body itself of their physicality, or, in the case of the new, building the project as a prediction throughout physical consistency.*

*Nevertheless, the use of new technologies allows for economies of scale, both temporal and economical, not only for the surveying and representation of the built and the territory in the analysis phase but above all for the management of the resulting data that makes the design activity of the restoration of the historical heritage and landscape or of the newly constructed in a single process no longer divided into steps but also unitary in concrete constructions and the realisation of the works, in the intermediate checks, in the testing, in the monitoring and in the programmed maintenance.*

*In conclusion, it is indispensable for the scientific community to highlight how technologies, without a responsible attitude that commit man's choices and knowledge in dealing with and planning appropriate responses to the issues and needs of the collective, can create a deception that unfortunately materialises with the subtle persuasion of uncontrolled astonishment that overwhelms the imagination.*

*Carmine Gambardella*

*President and Founder of the Forum*



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## Architectural Representation: a Tool for Urban Regeneration The Colour Plan of Egadi Islands

**Angela Alessandra BADAMI**

Department of Architecture, Polytechnic School, University of Palermo, Italy

[angela.badami@unipa.it](mailto:angela.badami@unipa.it)

### Abstract

The Egadi Islands, at the western end of Sicily, preserve a peculiar architectural and environmental heritage. The work of people – related to tuna fishing, stone extraction and agriculture – has created, over time, an exceptional landscape.

The nature, colour and texture of the local stone have given shape to a traditional architecture that, today, risks to disappear and to be replaced by new anonymous buildings. Furthermore, the pressure of tourism threatens to damage this delicate balance established, over centuries, between people and environment.

Therefore, the Local Administration decided to adopt a Colour Plan to manage the inevitable processes of territorial transformations. The Architecture Department of the University of Palermo and the INBAR (National Institute of Bio-Architecture) collaborate with City Council to define the Guidelines of Colour Plan.

In this process, the architectural representation is used as a fundamental tool for analysing, understanding, interpreting and communicating the specific characteristics of the landscapes. The language of drawing is indispensable for the relief of architectures, traditional colours and connections with the landscape.

Also, the local population has been involved with augmented reality applications, meetings and debates to implement the principles of participatory planning. In particular, young people, middle school students, high school students and university students were asked to express, with their drawings, the perception of the current landscape and expectations concerning the desired landscape.

**Keywords:** Colour Plan, Participatory Planning, Architectural Representation, Augmented Reality and Nanotechnology, Egadi Islands



Fig. 1: Favignana Island. Florio tuna factory, now a tuna fishing museum.

## 1. The Colour Plan for Egadi Islands

The cultural dimension of the development promoted by UNESCO requires that cultural policies of preservation and enhancement of identity enter, in a structural way, in the model of development of local communities. With this aim, the Colour Plan of the Egadi Islands express cultural and ethical ideals aimed at preserving and recovering the historical image of landscape, through which the identity of the territory and its inhabitants is expressed.

The presence of the Colour Plan on the agenda of the Town Hall of Egadi represents an important manifestation of an executive political intention; the local authority, takes on the institutional commitment of the protection of landscape. Desired consequence is the development and strengthening of the individual and collective awareness of the importance of developing a culture of quality and legality as a tool to fight consumption and degradation of the territory. To this purpose, the Town Hall has started an experimental project, entrusted to the SUAP-SUE Special Office [1] under the scientific advice of the National Institute of Bio-architecture (Trapani section) and of the Department of Architecture of the University of Palermo, which develops, as Third Mission, the use of scientific research to contribute to the social, cultural and economic enhancement of the society.

The Colour Plan intends to orientate the development of a particularly sensitive territory, identifying in the conservation-maintenance or recovery of the constituent factors of visual identity a determining factor to protect and nourish the historical identity of places.

This cultural approach to the dynamics of urban transformations is also a significant strategic choice capable of triggering significant economies linked to tourism, the most important sector of the local economy. Moreover, important jobs are recovered by involving a niche workforce related to historical architecture (cabinet makers, stone cutters, carpenters, smiths, potters, artists, etc.). Far from celebrating 'Arts and Crafts' as another folkloristic event, it would open the way to new significant economies for local development.

The Colour Plan is an operative planning instrument that implements the UNESCO Recommendations on the historical urban landscape [2], the objectives of the Code of Cultural Heritage and Landscape [3] and the indications of the Territorial Rehabilitation Plan of Sicily [4].

The indications of the Plan are set on the following principles:

- preservation of the values of the urban landscapes of the archipelago and reconstruction of degraded landscapes;
- environmental compatibility, in terms of explaining the links between architectural, material and chromatic characterization of the built and geolithological and mineralogical nature of the territory;
- cultural enhancement and technical updating, in terms of recovery of traditional techniques, technological updating, improvement of energy efficiency and durability performance;
- social sharing, with the launch of participatory processes capable of arousing the appreciation and shared vision of the city and territory;
- ease of implementation, providing indications for the landscape compatibility of maintenance and new interventions, aimed at simplifying public and private management [5].

## 2. Landscape, Architecture and Environment of Egadi Islands

The entire archipelago of the Egadi Islands is subject to landscape constraints due to the high value of its constituting elements, that are configured in their entirety as Cultural Heritage.

The landscape of the islands of Favignana, Levanzo and Marettimo is the result of a long process of transformation of nature by the setting communities and clearly expresses its identity and history. Alongside the very high naturalistic values of the marine environment (the marine protected area of the Egadi Islands, with its almost 54,000 hectares, is the largest in the Mediterranean Sea) and the terrestrial environment (woods, beaches, inlets, caves), urban settlements complete the picture of the island landscape (fig. 1).

The traditional architecture of the islands is closely related to the territory: building materials come mainly from the bioclastic calcarenite quarries of Favignana. It is a compact stone of light beige-golden colour, easy to work, well suited to build constructions [6]. Limestone dominates the natural landscape and gives an indelible imprint to the human landscape, creating a particular continuity between nature and culture, urban and rural environment [7]. Extracted since the fifteenth century until 1950, it was partly used on site for the construction of urban settlements, but mostly exported for the construction of numerous buildings in Trapani and Tunis, the reconstruction of Messina after the earthquake of 1908, the restoration of historic-monumental buildings such as Palazzo Steri and Palazzo Abatellis in the historic centre of Palermo (figg. 2-5). The most important building complexes of Favignana are made with building blocks of calcarenite, including the Palazzo Florio and the tonnara (figg. 6-7) which, with its 32,000 square meters, has been the economic engine of the islands for more than a century [8]. The calcarenite powder, a quarry residue, was also used as an inert for the preparation of mortars and plasters, conferring the characteristic light beige-golden colour to the urban landscapes of the urban settlements.





Fig. 2-5: Favignana Island, calcarenite extraction quarries.



Fig. 6-7: The tonnara building (designed by architect Damiani Almeyda) was built using local calcarenite.

### 3. Main Risks for the Historical Architectural Heritage of the Islands

Atmospheric agents, including the strong wind, the marine aerosol and the summer sunshine, are particularly aggressive in the Egadi Islands and are the main factor of deterioration for the facades made of calcarenite (fig. 8). In the building tradition of the islands, the walls were protected with seasonal maintenance works such as shale, veils and paint based on lime and calcarenite powder, obtaining various shades of light-golden-beige which, unlike whitewash, do not produce dazzling effect when illuminated by the sun. The plasters that are used today instead of traditional techniques, as well as elements unrelated to the materials and the local colour, are attacked by rising damp that causes their detachment. Recently, the use of plinths to attack the ground of buildings, made of marble or other materials not conform to tradition, has spread; this solution does not solve the problem of rising damp, instead worsens the damage and ruins the traditional urban landscape.



Fig. 8-10: Main risks in Egadi Islands: wind erosion and marine aerosol; introduction of colors extraneous to tradition (white, blue); partial maintenance and transformation of the facades according to the property regimen.



Fig. 11: Favignana Island, fishing village. Geometric surveys of some significant contexts of urban settlements by students of the high schools for Surveyor "Duca Abruzzi-Libero Grassi" of Palermo and "G. Caruso" of Alcamo.

The facades are repainted following generic indications (white plaster, blue fixtures) (fig. 9) that are foreign to local tradition. In particular, some buildings in Art Nouveau and Déco style are now disfigured by the use of colours that are extraneous to the architectural tradition of the early twentieth century.

Representing the most important economic income for the islands, tourism is of a great importance. However, it also represents one of the most threatening factor that risks to alter the same feature it is attracted by: the beauty of landscape. Freestyle renovation of residential buildings for touristic accommodation facilities, not appropriately guided by specific rules, is altering the historical urban landscapes with incompatible add-on from the stylistic and chromatic point of view.

#### 4. Architectural representation for Urban Regeneration: an instrument for restoration, redesign and resilience

To write a draft of the Colour Plan of Egadi Islands, a Multidisciplinary Laboratory (directed by the writer) was set up at the Department of Architecture of the University of Palermo. The Laboratory has conducted specific technical analyses in the three major islands of the archipelago.

The theme of colour has been addressed not only for colour palettes; indications have also been elaborated for the following: the different properties of building materials, construction techniques, the correct laying of materials, energy saving, the biocompatibility of building materials, the recycling of building debris. At the same time, traditional extraction and processing techniques of building materials were also taken into consideration: their recovery was guided by recent data of scientific research, in order to start an innovative and environmentally sustainable building / maintenance process.

The architectural representation (reliefs and graphic-chromatic representations of the existing, design proposals with the selection of specific colour abacuses, simulations in augmented reality) has been the indispensable guiding tool for the development of this process.



#### 4.1. The Work of Analysis

An experimental methodology was adopted for the work of analysis. Architects, urban planners and experts in architecture technology were gathered together by elderly residents of the islands (depositories of local culture) and young students (the future generations to whom the outcome of the Colour Plan is destined to).

151 students participated in the workshops, divided into groups and objectives:

- the students of the middle school "A. Rallo " of Favignana produced two drawings: the first represents what their homes look like; the second how they wish their homes to be (figg. 12-14);
- the students of the high schools for Surveyor "Duca Abruzzi-Libero Grassi" of Palermo and "G. Caruso" of Alcamo carried out the geometric surveys of some significant contexts of urban settlements and of typical architectural typologies of the place (fig. 11);
- the students of the artistic lyceum "R. Salvo" of Trapani redesigned the architectural scores and represented the colours of the Art Nouveau and Déco buildings in the islands (figg. 15-17);
- the students of the Master's Degree course in Architecture of the University of Palermo have re-elaborated the analysis material with project proposals inspired by the original colours of the settlements.

#### 4.2. The practical experimentation of nanotechnologies and innovative products for the building industry

Thanks to the participation of the company Heres, a company specialized in the production of mortars for the restoration of historic buildings, an operative workshop was held in Favignana on innovative technologies and reconstruction techniques of masonry covering mantles, with specific considerations of the material, atmospheric characteristics and of the typical degradation factors of the territory.

The laboratory analyses carried out on the materials and sea water of the Egadi Islands have allowed to develop specific mortars that can be made with local raw materials and able to withstand the risk factors thanks to the use of nanotechnologies.

Some prisoners of the Favignana House of Detention were involved in the workshop, in order to train them as potential future workers and teach them skills of technical-practical applications of the Colour Plan.



Figg. 12-14: Drawings of the students of the "A. Rallo" middle school on the theme "My island, my home: how it is and how I wish it was".



Figg. 15-17: Drawings by the students of the artistic high school "R. Salvo" of the architectural details.

### 4.3. Methodology adopted

Three methodological approaches were developed, applicable to the whole archipelago, and separately applied – experimentally – as follows:

- the "contexts" approach was developed for the island of Favignana;
- the approach for "overall perspectives" was developed for the island of Levanzo (fig. 18);
- the approach for "particular buildings" was developed for the island of Marettimo (fig. 19).

The analysis methodology was divided into the following phases:

- analysis of the historical evolution of settlements and of the structure of urban centres with the identification of weights and measures of urban systems;
- identification of contexts in visual interrelation with respect to urban settlement;
- identification of recurrent architectural types;
- description of the current status and characteristics of the context; description of the critical issues detected; description of the characteristic chromatic and material elements; graphic rendering through photographic straightening, geometric and chromatic relief of the prospects facing the context;
- drafting of the rules of intervention and project proposals for the single context through description and graphic representation, aimed at a preview of the effects resulting on the context from the application of the rules;
- cataloguing of building units and design standards for sample buildings;
- cataloguing of building units and design standards for particular buildings (buildings in Art Nouveau or Déco style or featuring particular architectural features typical of Egusan construction).

### 4.4. Construction of the Abacus of Colours and Intervention Rules

The colour abacus reproduces a chromatic range of reference taken from the study for contexts and proposes the colours of the local building tradition. This is not a mandatory colour choice, but a reference palette.

The colours are indicated through three formulations: description of the inert that gives the colour in the case of plasters based on soils or stones; RAL code in case of glazes or painting of decorative details of the facades; CMYK code for all the colours used (this code will allow to reproduce the colour in printed documents, the owner willing to modify its own property will thus be facilitated in the production of documents for authorization) (fig. 20).



Fig. 18: Levanzo Island, waterfront of the settlement. Urban analysis and approach for "overall perspectives".



Among the rules of intervention [9], below is a selection of indications elaborated according to the architectural typologies and the traditional colours:

- for the unplaster walls made with regular blocks of calcarenite obtained from the Favignana quarries (so-called "Tufo di Favignana"), as ordinary maintenance, the appearance of the original material must be maintained by the cleaning of accumulated dirt and subsequent protection with appropriate treatments, as specified in the Guidelines;
- for already plastered facades that have colour ranges from chromatic-white to yellow-ochre-light-gold, as routine maintenance work, it is necessary to use plasters prepared according to local building tradition, obtained with a suitable granulometric selection of aggregates coming from several quarry residues of the so-called "Tufo di Favignana"; it is necessary to unify the facades of the single building units, regardless of the ownership regime; it is opportune to differentiate between different colours belonging to the same colour range, the neighbouring building units that present a different register of architectural scores, in order to return an ordered sequence of the rhythm of the openings and finishes;
- for the already plastered facades that present colour ranges from brick-red to the different intensities derived from the use of the "cocciopesto" plasters in different percentages, as ordinary maintenance interventions, plasters obtained with suitable granulometric selection of aggregates coming from the "cocciopesto" must be used, respecting the original colours or different colours yet belonging to the same colour range;
- for facades that have structural or decorative elements in exposed stone, these elements must be kept in their appearance; as routine maintenance, cleaning of accumulated dirt and subsequent protection with appropriate treatments, as specified in the Guidelines provided;
- for the facades that have decorative elements in relief or with scores of different colours, these elements must be kept as important witnesses of the local constructive and artistic tradition; it is necessary to provide for their restoration, although the conditions in place allow to recover the original image and colours, avoiding in any way historical fakes;
- for the fixtures, maintenance interventions of the traditional type with wooden shutter are foreseen. From an analysis carried out on different cases, the treatments of wooden frames with opaque enamel painting in the dark green and dark brown colours were prevalent in Favignana and Marettimo. In Marettimo, the painting of the fixtures in light blue has been recently introduced and its use is not recommended in order not to alter the traditional urban landscape. In Levanzo, wooden window frames have been treated with opaque enamel paint in the light blue colours, a chromatic element that distinguishes the urban landscape and therefore its use is suggested. In the fishing village of Favignana, have been detected treatments of wooden frames with enamel paint in the different colours of the paint of fishermen's boats (blue, green, brown, yellow in different bright shades), chromatic factors characterizing the visual identity of the village; the use of a specific colour range indicated in the reference sheets is envisaged;



Fig. 19: Marettimo Island. (Arial – 9 pt, Lower case letters – Left aligned – Number style 1, 2, 3).

- in the Egusan building tradition, the rainwater collection was done by channelling the flat roof surfaces to the cisterns built below the road level through channels made of clay material placed in the inner corners of the cloisters or close to the facades. In keeping with the traditional configuration, the downspouts must have the least possible impact on the facade. Therefore, the white water drainage ducts may be inserted in the internal cloisters or in special cavities inside the masonry work and pass under the road level inside the building unit served by a white water collection network. The pluvial waters, where it is not possible to include them in the masonry work, can be built in adherence to the external masonry. They must follow the architectural pattern of the facades and be allocated (vertically) along the connecting lines between the building units. The downspouts can be made: in copper up to a minimum height of 2.00 m from the ground, with a cast iron end up to the road level; in clay with a functional diameter, as similar as possible to the diameter of traditional downspouts, and painted in the same colour as the facade; alternatively, in pvc and painted in the same colour as the facade;
- for house numbers, a design solution has been proposed, in line with the recent indications of the PRG (green 'ramina'), which is integrated chromatically with the colours suggested for the various components of the elevations;
- particular attention has been given to plant furnishings as aesthetic and functional additions to the urban space. The traditional use, found particularly in Marettimo, to plant vines in the ground, through holes made on the sidewalks and protected with ceramic pots open at the bottom, enriches the urban landscape; contributing, in summer, to the mitigation of heat along the roads and on buildings thanks to the shading of the leaves; in winter, the cyclic loss of leaves ensures greater brightness and warming of buildings thanks to solar radiation; in addition to the functional aspects of the vine, the fruits can also be appreciated.



Fig. 20: Favignana Island, Vittorio Emanuele street. Analytical-proactive elaborations: analysis of the current state of the buildings, definition of the intervention rules, selection of the colour abacus, design simulation.





Fig. 21: Application of augmented reality realized for the Color Plan of the Egadi Islands.

#### 4.5. Augmented Reality

In order to make the purpose of the Colour Plan more easily comprehensible to the wider audience of users, an augmented reality application has been developed (Fig. 21). The application, developed for smartphones and tablets, allows anyone with a device to frame the facades of buildings and preview design solutions; in this way, the intervention rules and the selection of colours from the Abacus of Colours can be visualized.

This will allow individual owners, or designers, to make in advance assessments on the choice of colours consistent with the urban context, thus contributing to the recovery and maintenance of the historic urban landscape.

### 5. Participatory Planning

The landscape is a cultural heritage to be safeguarded respecting its original characteristics through the constant care of all those who live and enjoy it. Therefore, the maintenance of landscape is the key word on which the conception of the Colour Plan was set up, an instrument at service of the individual citizen, to make actions consistent with the values of the environment, whether natural or constructed, and shared with the community.

Starting from the principle of a broader active and collective participation in the planning processes, the followings have been called to participate to the preparatory work: from Public Administrations to Citizens, from Scholars to Students, from local economic Operators to Companies specialized in the building maintenance.

A staff of 151 students (from the Middle Schools to the University) enthusiastically collaborated on focusing the generative principles of the Egusan landscape, thought its investigation and drawing, by expressing opinions, criticisms and wishes. Their drawings, surveys and different landscape readings, analysis and design solutions with different chromatic simulations were shown to the citizens of the Egadi Islands in the City Hall, in an exhibition launched by a "Participated Event" (fig. 22).

The whole community was invited to take an active part in the preparatory work of the Colour Plan, presenting suggestions and proposals, in order to develop shared guidelines for the care and maintenance of the landscape of the Egadi Islands.



Fig. 22: Participated event and exhibition of the analysis works for the preparation of the color plan of the Egadi Islands. Favignana, City Hall, 14 March-14 April 2018.

## 6. Purpose of the Colour Plan

The outcome to be achieved is to contribute to the formation of a detailed plan shared, in the first place, with the community established in the territories of the Egusan archipelago; the plan is consistent with the protection activity carried out by the Superintendence for Cultural and Environmental Heritage, which is responsible for the territory.

The purpose of the Plan is to interpret the basic characteristics of the identity of the places: the Intervention Rules direct the interventions on the built to restore an image of the urban landscapes consistent with the imaginary perceived by the local population; the rules reproduce techniques and practices that draw on the deep roots of tradition, in the wise use of local materials.

The Colour Plan contributes to the maintenance / construction of the landscape, which in this context is intended as a grafting between the conservation of natural, human and historical components and the generation of new landscape qualities that can respond – consistently – to the needs of contemporary society.

The Colour Plan of the Egadi Islands, in the wake of the most recent addresses of UNESCO, is a solidly technical, ambitiously social, convincingly ethical and therefore eminently political operation.

[1] DPR 380/2001. One building text. Establishment of municipal offices for administrative simplification. SUAP: single point of contact for production activities; SUE: single point of contact for building.

[2] UNESCO, *Recommendation on the Historic Urban Landscapes*, Paris, 2011.

[3] DL 42/2004.

[4] REGIONE SICILIANA, Assessorato dei Beni Culturali, Ambientali e della Pubblica Istruzione, Dipartimento dei Beni Culturali, Ambientali ed Educazione Permanente, Centro Regionale per la Progettazione e il Restauro e per le Scienze Naturali ed applicate ai Beni Culturali. *Piano di riqualificazione territoriale della Sicilia*, Palermo, 2005. Plan drawn up in compliance with the provisions of the government bill of the "Plan of the Colour of Urban Decor and Landscape for the cities, the seaside and mountain villages of the regional territory", elaborated in 2003 by the Region of Sicily.

[5] DPR 31/2017. *Regulation identifying the interventions excluded from the landscape authorization or subjected to a simplified authorization procedure*. The Decree provides for the exemption from the obligation of landscape authorization, for buildings subject to landscape restrictions, for particular categories of intervention; in particular, the reconstruction of the facades in the Municipalities equipped with the Colour Plan. The Colour Plan consequently assumes the responsibility to regulate the interventions so that they are compatible with the maintenance of the original features of the local landscape.

[6] LA ROCCA, Teresa. *Gli indistinti confini*. Palermo: Medina, 1995.

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[9] Cultural assets, referred to in Articles 10 and 11 of the D.L. 42/2004, are excluded from this regulation.

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### **CARMINE GAMBARDELLA**

UNESCO Chair on Landscape, Cultural Heritage, and Territorial Governance; President and CEO of Benecon SCaRL Research Centre on Cultural Heritage, Ecology and Economy (Consortium of five Universities: University of Campania “Luigi Vanvitelli”, Pegaso University, University Federico II of Naples, University of Salerno, University of Sannio). Pro-Rector at the European Polytechnical University, EPU. Professor of Drawing at the Pegaso University and at the University of Campania. President of the International Forum of Studies ‘Le Vie dei Mercanti’ since its first edition in 2003. Honorary President of the Italian Committee of the Nation Fulbright Sector on Cultural Heritage Sustainable Development, Urban Planning, Architecture and Management of UNESCO World Heritage Sites. Editor and Founder of the series “Surveying is/or Project” and “Knowledge Factory”, “Architecture, Heritage and Design”. Component of the Scientific Committee of International Class A Magazine ‘Abitare la Terra’/ ‘Dwelling on Earth’.

During his academic career he has covered various roles including the Pro-Rector of Institutions, Academic Senator, Member of the Board, Director of the Department of Architecture and Industrial Design Luigi Vanvitelli, Dean of the Faculty of Architecture Luigi Vanvitelli, Director of the Department of Culture of the Project, Director of Doctoral School in the Discipline of Architecture, Coordinator of the PhD in Protection, Safety and Representation of the Environment and Structures and Territorial Governance, Coordinator of the PhD Program in Surveying and Representation of Architecture and the Environment, President of the Course Degree in Industrial Design. He has also been scientifically responsible for noteworthy national and international research project. He is author of numerous scientific papers on the important issues of the surveying and representation of the built and natural heritage.



- UNESCO Chair on Landscape, Cultural Heritage and Territorial Governance
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