

Area
08/C1

s.s.d.
ICAR/12

ALESSANDRA ZANELLI

CURRICULUM

VITAE ET STUDIORUM

ACADEMIC QUALIFICATIONS,
RESEARCH AND TEACHING POSITIONS HELD,
PUBLICATIONS AND PATENTS

POLITECNICO DI MILANO
ARCHITECTURE, BUILT ENVIRONMENT AND CONSTRUCTION ENGINEERING
DEPARTMENT

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PART A. GENERAL INFORMATION

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PANEL: **8/C1-DESIGN AND TECHNOLOGICAL PLANNING OF ARCHITECTURE**

SSD: **ICAR/12 – ARCHITECTURAL TECHNOLOGY**

Websites: <http://www.abc.polimi.it/en/teaching-staff/zanelli-alessandra/>
www.textilearchitecture.polimi.it

A01. EDUCATION

1995-1998 PhD in Technology of Architecture and Environment, BEST Dept., Politecnico di Milano (POLIMI)

1987-1993 Master of Architecture, Structural and Technological Specialization, Faculty of Architecture, POLIMI, score: 100/100 cum laude

1982-1987 High school specializing in classical subjects level, Liceo Rambaldi, Imola (Bo), Italy; score: 60/60

A02. PROFESSIONAL CERTIFICATION

1995-now Licensed as professional architect, she is member no. 2016 of Ordine Architetti di Bologna (Bologna Order of Architects).

A03. CURRENT ACADEMIC POSITION

2019 - now Full Professor, Architecture, Built Environment and Construction Engineering Department (DABC), Politecnico di Milano (POLIMI), starting from November the 4th 2019

2011 – now Teaching position: School of Architecture and Society, then named School of Architecture, Urbanism and Construction Engineering (AUIC), Politecnico di Milano, Italy

2015 – now Teaching position: School of Design, Politecnico di Milano

2017 - now Scientific coordinator for Branch 1275-G of the Multi-site POLIMI Lab, which is the part of the Textiles HUB Laboratory. This lab has been approved by the agreement with the relevant Italian accreditation body, Accredia, and as a signatory of ILAC Mutual Recognition Agreements

2015 - now Founder and coordinator of *Textiles HUB*, the *Interdepartmental Laboratory on Textile materials and Polymers* at POLIMI. In October 2014, the POLIMI Rectorate launched a competitive call for the creation of new interdepartmental laboratories. Alessandra Zanelli promoted the Textiles HUB laboratory proposal, which was shared and approved in March 2015 by four departments (DABC as coordinator and

promoter, Chemistry and Material Engineering Dept., Energy Dept.; Design Dept.), and she obtained a loan of 150,000 euros from the university to implement the equipment. In 2016, Civil and Environmental Engineering Department membership was also approved. The Textiles Hub has an expense centre and a management committee led by Alessandra Zanelli (until 2020). The funds have been used to implement the laboratory's equipment proportionally to the co-financing of the individual scientists involved

- 2014 - now** National scientific qualification to be Full Professor pursuant to article 16 of the Italian Law 240/2010.
- 2008 - now** Founder and coordinator of *clusTEX*, the *Multidisciplinary Research Cluster on Innovative Textiles* at POLIMI. The statute of the cluster was approved by the Academic Senate in February 2009 and involves five POLIMI departments (ABC Dept., Chemistry and Material Engineering Dept., Design Dept., Mechanical Engineering Dept. and Civil and Environmental Engineering Dept.). More than 40 researchers and scientists belong to the scientific committee and more than ten scientific research fields are involved.
- 2017 – now** Member of LCTeam (*Life Cycle design Team*) Light Research Unit (coord. A. Campioli) of DABC Lab
- 2017 – now** Coordinator of the TAN (*Textile Architecture Network*) Light Research Unit of DABC Lab

A04. PAST ACADEMIC POSITION

- 2011 - 2019** Associate Professor, Architecture, Built Environment and Construction Engineering Department (DABC), Politecnico di Milano (POLIMI)
- 2005 - 2011** Researcher, Building, Environment, Science and Technology (BEST) Department, POLIMI
- 1999 - 2005** VII Level Technician, Responsible for Construction Labs, BEST Department, POLIMI
- 1995 - 1998** PhD candidate, *Doctoral Programme in Technology of Architecture and Environment*, X cycle, Department P.P.P.E. (later BEST, now DABC), POLIMI
- 1994 - 1998** Teaching assistant for Technology of Architecture Course (4th year) and Technological Culture of Design Course (5th year), POLIMI

A05. FELLOWSHIP AND AWARDS

- 2008** 2nd place, winner of a grant for scientific productivity, BEST Dept. POLIMI
- 2006** 1st place, winner of a grant for scientific productivity, BEST Dept. POLIMI
- 1995** 3-year PhD fellowship, 10th cycle, in Technology of Architecture & Environment, POLIMI

1995 Rejected a 1-year fellowship at the Italian National Research Center, CNR - ICITE, Sesto Ulteriano (Milan) on Innovation in Technology and Construction because it conflicted with PhD fellowship

A06. INSTITUTIONAL RESPONSIBILITY

She has held managerial responsibilities in both her department and school of architecture.

2020 - now Member of the Management Board (Giunta) of Architecture, Built Environment and Construction Engineering Department (DABC), POLIMI, with the role of reference person of Design School;

2017 - 2019 Member of the Scientific Commission of Architecture, Built Environment and Construction Engineering Department (DABC), POLIMI, with the role of leading (with Camilla Lenzi) the *Working Group of Departmental Strategic Project: Regenerating the Built Environment in a perspective of circular economic development*;

2011 - 2014 Member of the Management Board (Giunta) of BEST Dept. (currently DABC); she resigned in January 2013, when the new ABC Department was founded and all its boards were renewed;

2008 - 2011 Member of the preliminary “Research” and “Communication” commissions, working on the definition of the Strategic 3-Year Research Plan at BEST Dept. (currently DABC);

2006 - 2008 Member of the Teaching Commission of BEST Dept. (currently DABC), acting as the reference person for the Science of Architecture Bachelor Course, PoliMi, Milan.

She is also an official member of several graduation teaching commissions for both bachelor’s and master’s degrees.

2017 - now Chair of the 30th Sub-Commission for Bachelor Graduation for the School of Architecture (AUIC), in Milan;

1999 - now Member of the bachelor’s and master’s degree graduation commissions for the School of Architecture, 1999/2000 till now (in Milan) and from 2016/2017 till now (in Piacenza).

She has also held roles on the scientific boards for laboratories in her department, eventually being put in charge of multidisciplinary and cross-departmental research groups in order to promote and develop innovation in the field of textiles and polymers applied to the building sector.

2017 – now Member of the new DABC-Lab Board, POLIMI;

2017 – now Reference person for DABC, representing the Director, at the technical panel on graphene development, with the specific role of leading the Graphene for the Building Sector sub-group. Other relevant members: ANCE, CONI;

2014 - 2017 Reference person for teaching and research activities of DABC Laboratories.

A07. COMMISSIONS OF TRUST

- 2018** Member of the Assessment Commission, 34th Cycle, PhD in Architecture, Built Environment and Construction Engineering, POLIMI PhD School, POLIMI;
- 2017** Vice-President - Qualifying Assessment Board for Architects and Conservation Experts, Italy;
- 2016** Member of the Jury for the Final Defence of the PhD Thesis of Jan Roekens, entitled: *Lightweight structural concepts for disaster relief sheltering*, VUB - Vrije Universiteit Brussel, Brussels, Belgium;
- 2012** Member - Qualifying Assessment Board for Architects and Planners, Italy;
- 2012** Member of the Assessment Commission, 28th Cycle, PhD in *TPQA Tecnologia e Progetto per la qualità ambientale a scala edilizia e urbana (Technology and Design for Environmental Quality at the Building and Urban Scale)*, with the role of evaluation expert for *Advanced Materials* fellowships, POLIMI, Milan, Italy;
- 2009** Member of the Jury for the Final Defence of the PhD Thesis of Cristina Mazzola, entitled: *Esthetical and Environmental Performances of Soft Materials for Architecture*, Politecnico di Milano, Milan, Italy;
- 2006** Member of the Assessment Commission, 22th Cycle, PhD in *TPQA Tecnologia e Progetto per la qualità ambientale a scala edilizia e urbana (Technology and Design for Environmental Quality at the Building and Urban Scale)*, with the role of evaluation expert for *Advanced Materials* fellowships, POLIMI, Milan, Italy.

A08. EDITORIAL BOARDS & BOOK SERIES

- 2017 - now** Member of the Editorial Board of AGATHÓN, the International Journal of Architecture, Art and Design, ISSN 2532-683X (online) and ISSN 2464-9309 (print);
- 2015- now** Supervisor of the scientific content available online at the following website: <http://www.polimi.it/en/scientific-research/research-structures/interdepartmental-laboratories/textiles-hub-interdepartmental-textiles-and-polymers-research-laboratory/> on TEXTILES HUB, the multi-disciplinary textiles, composites and polymers laboratory;
- 2011- now** Supervisor of the scientific content available online at the following website: www.textilearchitecture.polimi.it (last updated: July 2017). This is the website of the TAN group, the Textile Architecture Network research group at PoliMi, which promotes the dissemination of membrane architecture and lightweight structures;
- 2007- now** Supervisor of the scientific content available online at the following website: www.architetturetessile.polimi.it, the Italian site on membrane architecture; it was created as a result of a two-year National Research Project (MIUR PRIN 2005), in order to increase the technical information

available for the designers on textiles used in nautical and other advanced fields and their potential transfer to the building sector;

- 2006 - now** Guest author for outstanding architecture and construction magazines (role covered for a specific section): *Costruire in laterizio* (for Details); *Arketipo* (for Projects); *Costruzioni Metalliche* (for Architecture); *TENDA* (for Textile Architecture) ;
- 2002 - 2010** Member of the Editorial Board of the Book Series “Tecnologia e Progetto”, CLUP, Milan (with M. Bertoldini, A. Campioli, A. Mangiarotti and G. Nardi);
- 2006 - 2008** Member of the Editorial Board of the Journal @BEST – Four-Month Journal of the Building Environment Science & Technology BEST Dept. at POLIMI (with A. Delera, G. Masera, T. Poli) - ISSN 1827-3351;
- 2005- 2006** Responsible for the graphic design and editing of the departmental survey entitled: *Valutazione della ricerca del Dipartimento BEST di Scienza e Tecnologie dell'ambiente costruito (Evaluation of the Research activities at BEST - Built Environment Science and Technology Department)*, edited by Elena Mussinelli, Clup, Milan, 214 pages;
- 2002 - 2004** Member of the Editorial Board of the online Journal *NEHS – Network of Engineering and Human Sciences*;
- 2005 - 2006** Editorial secretary designed by Vice-President Prof. Valerio Di Battista, in charge of organizing the exhibition of the Master’s Thesis Work (first edition) and responsible for the preparation of the relative printed catalogue, *Architecture & Society* School, POLIMI;
- 2000 - 2001** Editorial secretary of the Book Series “Tecnologia e Progetto”, CLUP, Milan (supervised by M. Bertoldini, A. Campioli, A. Mangiarotti and G. Nardi).

A09. ROLES IN SCIENTIFIC SOCIETIES

- 2019 - now** Vice-Chair of the Research Network: *TensiNet - the thematic network for upgrading the built environment in Europe through tensile structures*; starting from September 2019, for 3 years;
- 2009 - now** Associate Member of the Research Network: *LASS - The International Association for Shell and Spatial Structures* founded by Eduardo Torroja in 1959; member of the *WG21 – Advanced Manufacturing and Materials*;
- 2007 - now** Associate Member of SITdA – The Italian Society for Architectural Technology; member of the research clusters on *Production and Building Products* and *Architectural Heritage*;
- 2004 - now** Regional Representative for Italian Universities and Associate Member of the Research Network: *TensiNet - the thematic network for upgrading the built environment in Europe through tensile structures*;

- 2008 - now** Member of the “ETFE” Working Group of the above-mentioned TensiNet - the thematic network for upgrading the built environment in Europe through tensile structures research network. As a member of this working group, she has collaborated on the preparation of the “TensiNet European Design Guide for Tensile Structures Appendix A5: Design Recommendations for ETFE Foil Structures”, edited by the WG coordinator, and published by TensiNet Association in 2013;
- 2008 - now** Member of the “Specifications” Working Group of the above-mentioned TensiNet - thematic network for upgrading the built environment in Europe through tensile structures research network. As a member of this working group, in 2009/2010 she took part in the preparation of the project proposal for CEN/TC250 WG5 Membrane structures. Since September 2017, she has been leading (together with Rogier Houtman) the sub-working-group on Details/Connections for CEN/TC250 WG5 Membrane structures - *Technical Guidance for the Design of Membrane Structures* (see also [A15](#));
- 2012 - 2016** Member of “Sistemi Fotovoltaici Sostenibili”, the high technology district project approved for and admitted to the "Energy and Renewable Resources" strategic sector referred to Regional Council no. IX / 2893/2011 and no. IX / 3084/2012, or as an aggregation of research organizations in paternity with companies, for the purpose of participating in the initiatives of the Lombardy Regional Government and the Italian Ministry of Education and Research (MIUR) to promote, strengthen and create high-technology districts. She was the reference scientist for BEST Dept. (later DABC);
- 2012 - 2016** Member of “MATINT - Materiali Tessili INTerattivi”, the high technology district project approved and admitted to the "advanced materials" strategic sector referred to by Regional Council no. IX / 2893/2011 and no. IX / 3084/2012, or as an aggregation of research organizations in paternity with companies, in order to participate in the initiatives of the Lombardy Regional Government and the Italian Ministry of Education and Research (MIUR) to promote, strengthen and create high-technology districts. She was the reference scientist for BEST Dept. (later DABC);
- 2006 - 2010** In November 2006 she was invited to take part in a task group on *Industrialization in Construction* (TG57) of the *International Council for Research and Innovation in Building and Construction* (CIB). TG57's mandate was to prepare a detailed description of the status, across the globe, of industrialization in construction. She was asked to share her knowledge on reversible and adaptable housing construction in Italy.

A10. SCIENTIFIC COMMITTEES & CONGRESSES

She has been a member of several **scientific committees**, and she has chaired a number of congress sessions:

- 2019/06/03-05** Coordinator of the Scientific Committee, TensiNet Symposium 2019: “Softening the Habitats: Sustainable Innovation in Minimal Mass Structures and Lightweight Architectures”, which will be held by POLIMI, TensiNet Association and Textiles Hub Laboratory, POLIMI, Milan;

- 2018/07/16-20** Member of the Scientific Committee and Reviewer of the IASS Annual Symposium 2018, entitled “Creativity in Structural Design”, MIT, Boston;
- 2017/09/25-28** Co-Chair (with Jianhui Hu and Wujun Chen) of the session: Membrane Structures - Architectural Membrane Structures (Integrated Photovoltaic), Annual Symposium of IASS 2017 entitled: “Interfaces: Architecture, Engineering, Science”, Hamburg;
- 2016/10/26-28** Member of the Scientific Committee, Reviewer, and Co-Chair (with John Chilton) of the session: Sustainability and Life Cycle Analysis of Structural Skins, TensiNet - COST Action TU1303 Symposium 2016, University of Newcastle, UK;
- 2013/05/8-10** Member of the Scientific Committee and Reviewer of the TensiNet Symposium 2013 “[RE]THINKING lightweight structures”, Mimar Sinan Fine-Art Univ., Istanbul;
- 2010/09/16-18** Member of the Scientific Committee and Reviewer of the TensiNet Symposium 2010 “Tensile Architecture: Connecting Past and Future”, Univ. of Architecture, Civil Engineering. and Geodesy, Sofia;
- 2009/09/10-13** Co-chair (with Fabrizio Tucci) of “Product Innovation”, a parallel discussion panel at IV OSDOTTA Summer Seminar on “*Innovation in Research: the challenge and activities in progress / L’innovazione della ricerca: la sfida e l’attività in corso*”, Politecnico di Torino, Turin;
- 2007/04/16-17** Coordinator of the Scientific Committee (with Marijke Mollaert), Reviewer, Editor of the Proceedings for TensiNet Symposium 2007 “Ephemeral Architecture: time and textiles”, Archit. & Society, POLIMI.

She has also organized several **conferences, scientific seminars and design workshops** - at her university and others - where academic and industrial experts are asked, in a perspective of sustainable architecture, to share knowledge and points-of-view on how to innovate design processes, increasingly introducing lightweight building systems and novel concepts of temporary dwellings:

- 2016/03/18** Organization of a multidisciplinary one-day conference: “Dove architettura e ingegneria si incontrano” - Politecnico di Milano, promoted by Textiles Hub Laboratory, and *Associazione dei Tecnologi per l’Edilizia* (ATE), with the patronage of the *TensiNet* Association, *Società Italiana della Tecnologia dell’architettura* (SITdA) and *Ordine degli Architetti della provincia di Milano*. This conference also counted for ongoing learning credits for engineers and architects
- 2016/03/16-17** Organization of two plenary sessions - 1) Networking; 2) Envisioning - during the two-day general meeting of Cost Action TU1303, “*Novel structural skins*”, hosted at Politecnico di Milano, Milan
- 2012/09/25-27** Organization of a 3-day multidisciplinary design workshop: *Novel Sheltering, Second Design Workshop* of WP2, ABC Dept. with Design Dept., European Project S(p)eedkits

- 2012/05/22-23** *Milestone 1: Sheltering & Packaging*, general meeting of the European Project *S(p)eedkits* and organization of a one-week related exhibition, Nardi Exhibition room, POLIMI
- 2010/07/11-22** Conference cycle on textile architecture at Milan Architects Professional Office, with the support of POLIMI, School of Architecture; sponsors: Giovanardi, Canobbio, Serge Ferrari; with the patronage of *TensiNet* Association, the Milan Municipality and *Ordine degli Architetti della provincia di Milano*. This conference also counted for ongoing learning credits for engineers and architects
- 2008/03/13** Coordinator of the seminar “Progettare con le membrane: il Network Europe TensiNet e le ricerche del Politecnico di Milano”, *Forum: Saper costruire l'innovazione dell'involucro*, Cuore Mostra – SAIE Spring, Fiera di Bologna; with the patronage of the *TensiNet* Association
- 2008/07/01** Organization, with the TECTEXCLUB association, of the POLIMI-ClusTEX booth at *Architex, Fair – the II Mondial Congress of Architects*, Lingotto Fiere, Turin. She also gave a speech at a related seminar, entitled “La nuova frontiera dell'architettura a membrane: l'involucro tessile”
- 2007/04/16-17** Organization of the TensiNet Symposium 2007 and a 10-day related exhibition on “Ephemeral Architecture: time and textiles”, School of Architecture and Society, POLIMI
- 2005.04 - 06** Organization of a conference cycle (with I. Paoletti and M. Lavagna) entitled “Projects in Progress”. Invited lecturers: Dominique Perrault (14 April) and Kengo Kuma (13 June).

A11. MAIN RESEARCH THEMES, METHODS AND OBJECTIVES

Starting with her PhD research into *Technology of Architecture and Environment*, she developed a profound interest in the role of **innovation in the construction** sector and architectural language. She began to interpret and continues to interpret **technological design** – understood as a specific technological approach to architectural design - through an integrated and comprehensive set of cultural and environmentally conscious references. Her research methodology draws heavily on the technological approach found in architectural design. She focuses on studying the most advanced production requirements, on the one hand, and the ever-changing needs and cultural requirements of society, on the other.

As she delved more deeply into the **technological design of architecture**, she became increasingly aware of a dual necessity:

- 1) To adopt a **multi-disciplinary methodology to architectural design**, so as to envisage novel concepts of building products and/or architectural elements, which will be able to stimulate new needs, activate disruptive uses and innovate cultural behaviour (*design-driven innovation*);

- 2) To adopt an **experimental methodology to construction design**, so as to transfer the innovative notions from the most advanced industrial sectors in the building sector, taking architectural and technological design beyond its disciplinary limits and approaches (*demand-pull innovation*).

Over the years she has developed the belief that the specific methodology of an architectural technologist leads a researcher to prefer multi-disciplinary and experimental approaches to understanding process and product innovation themes. She has gradually adopted diversified research methods, taking into account differences in scale and context - cultural, environmental, economic and productive. This has resulted, at times, in her adopting methods that are unique in her discipline, sometimes by borrowing them from other disciplines and sometimes by transferring design concepts and methods from other fields of knowledge.

Her scientific production of over 180 products, her theoretical research activity and her experimental work since 2008 reflect the continuous interconnection of the following three main research topics.

Topic 1: Flexible Architecture, Reversible Construction

This first topic has been one of her passions since she chose the topic for her degree thesis, which was entitled *Una tensostruttura mobile per l'abitazione. Sperimentazione dei tessili tecnici nella casa flessibile / A Mobile tensile structure for housing. Experimental application of technical textiles in the flexible dwelling* (supervisors: Guido Nardi and Andrea Campioli; External experts: Giorgio Bensa and Roberto Canobbio). It is the technological design of new concepts of home, capable of multiple transformations over time. She sees the transformability of the dwelling as a research topic linked to the most innovative advances in the spatial, typological and technological flexibility of the Modern Movement and as an opportunity to overcome the Fordism dream applied to architecture, in its current form, and the level of contemporary industrial production.

Over the years, she has continued to work on the issue of **the transformability of building systems** and also their temporariness, understood not as the option to move the building, but rather as having a limited, planned duration over time. She has increasingly focused on the topic of reversible construction techniques that allow the fulfilment of the design principle of technological flexibility over time.

Alessandra Zanelli's focus on **modern dry-assembly construction methods** is partly designed to verify the potential and limits – in Italy – of their use in architecture, both for new buildings and redevelopments. It allows her to experiment with new design approaches for the progressive modernization of housing typologies, in line with the transformations in society, increased worker mobility, emergencies caused by natural and artificial disasters, the management of migratory flows, and so on.

The primary objective of studying the complete spectrum of **temporary housing and reversible construction** is to focus on a design method that takes into account the different durations for which a living space is needed (humanitarian emergency, social housing, temporary work). This new design method can accordingly define appropriate ways for using materials and construction techniques, starting from the knowledge of the useful life cycle of the individual products used.

Nowadays, as innovative production processes are better understood and environmental awareness is more deeply ingrained, the inversion of the construction cycle has become feasible and economically sustainable for the recovery of building components and for the recycling of materials. Architectural Design seldom uses integrated approaches with **typological and technological flexibility**, while Technological Design can push forward these new building concepts as it can adapt to users' needs and, potentially, to changing environmental conditions. The goal of her most recent research is to prove that this hypothesis is correct. The use of technologies that facilitate the reversibility of construction is only a necessary but not sufficient condition to obtain the functional flexibility of architectural space, or to guarantee its technological adaptability over time. Likewise, the **choice of lightweight materials and structures** does not necessarily mean the resulting architectural and constructive system will be visually and physically light in the surrounding built environment and landscape.

Her most recent research on this topic has moved towards experimenting with novel and more integrated approaches of “architectural and technological design”, “components design”, “design to disassemble”, “environmental design” and “kit-based systemic design”. She aims to assess there are no false expectations, prejudices or incongruities between the theoretical assumptions and implementation practices, especially when those innovative building systems are applied for protection, preservation and valorization of delicate built environments and cultural heritage.

The theme of functional flexibility and technological adaptability mainly finds use in applying light and reversible technologies to new concepts of habitability, such that inhabitants can adapt the home environment over time. This is the light in which to interpret her experimental research, technological design and development of “transitional shelter” systems and innovative wall and roof components that are adaptable and can be implemented over time. For example, this is the light in which to see those developed recently during the 7FP European *S(P)EEDKITS* project and, further back, those developed when creating emergency housing systems for Italy (*MIUR PRIN 2000* project).

Topic 2: Innovative Uses of Advanced Materials in Architecture

She also studies advanced materials - in particular textiles and flexible polymeric composites - and their innovative applications in architecture. In this context, her primary objective is to promote the technological transfer of materials developed in more technologically advanced areas of construction and, consequently, to facilitate their diffusion in architecture. Her work is increasingly proving - theoretically and experimentally - that both designers and end users make increasingly broad reference to these materials because they are so high performing. However, their use in architecture has yet to become widely accepted and needs further investigation, using cross-discipline research methodologies. In this context, her studies focus on industrial production chains using advanced technology (especially the technical textile supply chain) and the environmental and performance characterization of these new products, in order to prefigure and test their transferability to the building sector.

On the one side, she focuses on the structuring of technical information for the designer, and, on the other side, she is interested to measure the performance of innovative membrane-based building systems during use (thermal, light, tactile, acoustic comfort) and end-of-life problems (recycling, reuse).

Recent research has also shown technology transfer happens in the opposite direction to above. This involves studying the industrial production of manufacturing sectors where technological progress is slower (in particular the textile, clothing, contract and medical-healthcare sectors), supporting the development of new, higher performance products and studying their application potential in the construction sector (see also part **A13**). This path, developed especially for textiles, transparent film and packaging materials, has enabled her to focus on materials of natural origin and not only chemical synthesis. The goal is to increase the critical nodes of their integrability, durability and maintainability, as well as the performances in use.

She increasingly looks to link her interest in **advanced materials and innovative building systems** with her other two main topics. The methodologies used to implement this transversal link between the themes are sometimes also from other disciplinary areas, but generally come from technological design. She also recognizes great potential in the **learning-by-doing methodological approach** (see also part **A19**). Indeed, she uses this to experiment with new uses of advanced and light materials in the built environment and in new construction for permanent building systems and temporary, seasonal and ephemeral ones. The goal is to understand the limits of applicability and the expressive coherence of these materials given different environmental contexts. She keeps a special attention to the experimental application of ultra-lightweight (metal-free) sheltering systems for archeological site's temporary protection. ¶

Topic 3: Environmental Dimension of Architectural and Technological design

Her focus here is on product and process innovations in the construction sector, especially for lightweight components. She hopes to determine when and if such innovations happen in the architecture sector and, consequently, develop strategies with which these innovations can renew the technological and environmental culture that underpins design. She has explored the tools used to assess the eco-compatibility of building products and a life-cycle design approach, seeing these aspects as salient factors that guide the technical choices made to ensure the sustainability of a building. She views the paradigm of lightness in architectural design as a strategy to optimize the flow of matter in production and construction processes and, therefore, as a key strategy for environmental sustainability and an interesting vehicle for technical innovation and changes in architectural language. For example, in this sphere, technological design and component design seek to minimize the use of primary resources, from the cradle to the grave, and to maximize the efficiency of a building's service life.

In other words, this topic is both an umbrella theme she has often used to find the interconnection of two distinct themes and a programmatic filter to develop an appropriate and environmentally conscious survey methodology for the other two themes.

She started to work on this topic during her PhD in *Technology of Architecture and Environment*, and she continues to deal it. For example, she is co-leader (with Jan Cremers) of the *Working Group of Sustainability and LCA of Membrane Structures* on the COST-Action Tu1303, and she is a member of the scientific board of ABC Department, co-leading the *Working Group of Departmental Strategic Project: Regenerating the Built Environment in a perspective of circular economic development*.

A12. KEY ROLES IN RESEARCH PROJECTS ELIGIBLE FOR FUNDING THROUGH COMPETITIVE CALLS

Over the last ten years, she has been the scientific coordinator for international and national research projects eligible for funding through competitive calls. In her early years, she was involved in various Italian projects, helping her to hone her skills, such that in 2008, she became the principal investigator in the SOFT-PV project co-financed by Fondazione Cariplo. That project was the starting point for the creation of the biaxial tensile test rig and gave her the opportunity to consolidate her young research team. Between 2012 and 2016 she held pivotal roles in two different European 7FP Collaborative projects - S(P)EEDKITS and EASEE - and in another regional industrial research and development project, TIFAIN. Currently, she is working to consolidate and broaden the international research network by participating in COST Actions - TU1303 and CA 17107 - linked to her primary research interests. This will also help her obtain new funding and exploit her previous research results further.

The main research projects co-financed by regional and international institutions (Cariplo Foundation, MIUR, Regione Lombardia, EU) in which she has/had a role as the principal investigator, main representative for POLIMI Partner, and she headed/heads certain specific work areas are detailed below:

- 2018-2022** Cost Action CA17107: *European Network to connect Research and Innovation efforts on Advanced Smart Textiles*, member of the Management Committee Substitute for Italy. http://www.cost.eu/COST_Actions/ca/CA17107
- 2018-2020** POLI-Social Award 2017 (POLIMI 5x1000 Funding Project; project named *West Road Projects; La strada dell'Ovest*; role of Project Manager and leader of WP3; Participated Pilot Projects of Qualification of Public Spaces. <http://www.polisocial.polimi.it/en/projects/>
- 2014-2017** Cost Action TU1303: *Novel structural skins: Improving sustainability and efficiency through new structural textile materials and designs (2013-2017)*; co-leader (with Jan Cremers) of WP2- Sustainability and member of the Management Committee. <http://www.novelstructuralskins.eu>
- 2012-2016** Collaborative Project - Security FP7-SEC-2011-1 (2012-2016): project named *S(P)EEDKITS - Rapid deployable & packaging kits as seeds for self-recover*; role of Principal Investigator as partner POLIMI; leader of POLIMI team; leader of WP1: System design and modularity; co-leader of WP2: Sheltering: design and blueprints. <http://www.speedkits.eu>
- 2012-2016** Collaborative project EeB.NMP.2011-3 (2012-2016): project named *EASEE - Envelope Approach to improve Sustainability and Energy efficiency in Existing multi-storey multi-owner residential buildings*; Member of the WP 4: Retrofitting solutions using textiles and thin insulation materials; https://cordis.europa.eu/project/rcn/102518_en.html
- 2012-2014** Research project co-financed by Region Lombardy - (2012-2014) named *TIFAIN (Tessere Integrate di vetro Fotovoltaico per applicazioni Architettoniche INnovative)*, a research of industrial development on the creation of

- a new kind of OPV integrated-tile for facades; role of Principal Investigator as Partner POLIMI; Leader of WP1 on the Designing of the New Tiles; <http://www.textilearchitecture.polimi.it/tifain.html>
- 2010-2012** Progetto Fondazione Cariplo – Advanced materials: project named *SOFT (Smart, Organic, Flexible and Translucent) – PV. Creation of a Photovoltaic Organic Cell on Fluoropolymeric Substrate to Integrate into Smart Building Envelopes*; role of Principal Investigator and Leader of WP3: Smart Building Component Design and testing; <http://www.textilearchitecture.polimi.it/soft-pv.html>
- 2005-2007** MIUR PRIN 2005 – National funding Project. Project name: *Membrane e scocche per l'architettura diffusa (Membranes and Shells for the Built Environment)*; role of co-leader (with Andrea Campioli) of POLIMI team; http://www.architetturatesile.polimi.it/membrane_scocche/credits.html
- 2000-2002** MIUR PRIN 2000 – National funding Project (2000-2002). Project name: *Tecnologie di intervento per l'innovazione negli insediamenti per l'emergenza (Innovative techniques for the emergency settlements response)*; role of member of POLIMI team.
- 2000-2002** CNR Agenzia 2000 – National funding project (2000-2002). Project name: *Le scienze umane nella formazione dei progettisti tecnici (Human sciences for the training of technical designers)*; role of co-leader (with Marisa Bertoldini) of POLIMI team.
- 1995-1997** She develops her PhD Research Thesis, entitled: *L'inquinamento dei rifiuti nello spazio urbano. Strumenti e metodi per la risoluzione delle patologie legate al ciclo della materia / Waste pollution in the urban space. Tools and methods for the resolution of diseases related to the cycle of matter*, under the supervision of Maria Bottero and Guido Nardi, *Doctoral Programme in Technology of Architecture and Environment*, X cycle, Department P.P.P.E. (later BEST, now DABC), POLIMI.
- 1995** Principal investigator of the submitted and winning research project: *Methodological study for the technical evaluation and the designing process of retractable tensile structures / Studio di una metodologia per la valutazione tecnica e la progettazione di tensostrutture per coperture ad assetto variabile*; she won a 1year-fellowship (starting from March 1996) at National Research Center, CNR - ICITE, Sesto Ulteriano (Milan) on Innovation in Technology and Construction; she rejected it, because it conflicted with PhD fellowship.

Furthermore, she has been submitted a number of research proposals, some of which are still being assessed and others which failed to receive funding . She has also worked on several other research projects coordinated by colleagues.

A13. KEY ROLES IN RESEARCH & CONSULTING PROJECTS

FINANCED ON BEHALF OF THIRD PARTIES

She has been scientific coordination in research and consulting projects financed by third parties. Those activities show that she also continues to apply a multi-disciplinary methodology in consultancy projects, increasingly encouraging cooperation between different departments and scientific disciples. (Where the budget is not specified, it indicates she was not the project manager for that specific project or contract).

- 2018, May** Scientific coordinator of the consultancy contract: **“Verifica della tenuta delle saldature di pannelli tessili con tecnologia I-MESH, mediante prove meccaniche uniassiali a 23°C e al 50°C” (Assessment of welding lines of textile panels made of I-MESH technology, under uniaxial tensile mechanical tests at 23°C and 50° C.)**; Clients: I-MESH s.r.l. and MECCANO SpA, Ancona, Italy. Beneficiary: ABC Department (100%); Results covered by Non-Disclosure Agreement (NDA); Duration: 10 days. Budget: 2,000 €
- 2018, Jan.** Scientific coordinator of the consultancy contract: **“Assessment of the mechanical behavior of some coated-textile for a specific roofing application, through biaxial tensile tests”**; Client: CANOBBIO Textile Engineering, Italy. Beneficiaries: ABC Department (100%). Duration: 5 days. Budget: 3,000 €
- 2018, Jan.** Scientific coordinator of the consultancy contract: **“Verifica della tenuta delle saldature di pannelli tessili con tecnologia I-MESH, mediante prove meccaniche uniassiali a 23°C” (Assessment of welding lines of textile panels made of I-MESH technology, under uniaxial tensile mechanical tests at 23°C)**; Clients: I-MESH s.r.l. and MECCANO SpA, Ancona, Italy. Beneficiary: ABC Department (100%); Results covered by Non-Disclosure Agreement (NDA); Duration: 15 days. Budget: 3,000 €
- 2017, Dec.** Scientific coordinator of the research contract: **“Assessment of the mechanical properties of HALAR High Clarity ECTFE film, through biaxial tensile tests”**; Client: SOLVAY Specialty Polymers - Italian Division, Bollate, Milan. Beneficiaries: ABC Department (90%) and Civil and Environmental Engineering Department (10%); Results covered by NDA; Duration: 6 months. Budget: 10,500 €
- 2017, Sept.** Scientific Coordinator of the research project: **“Sviluppo di algoritmi per la gestione del processo di Form-Finding e dell’analisi strutturale e validazioni sperimentali della tecnologia I-MESH” (Algorithms’ developments for the structural analysis, supported by experimental validation of the I-MESH technology)**; Clients: I-MESH s.r.l. and MECCANO SpA, Ancona, Italy. Beneficiary: ABC Department (100%); Results covered by NDA; Duration: 9 months. Budget: 11,000 €
- 2017, Apr.** Scientific coordinator (with Cinzia Talamo) of the research contract: **“Supporto scientifico e tecnico all’ottimizzazione dei processi e dell’uso delle risorse nelle fasi di gestione del cantiere e di gestione del costruito” (Scientific and Technical Support on the processes management and resources cycles during the phases of building site and building service)**. Client: PESSINA

- Costruzioni SpA, Milan. Beneficiary: ABC Department (100%); Duration: 12 months. Budget: 20,000 € of which 50% useful for a fellowship position.
- 2017, Jan.** Scientific coordinator (with Elisabetta Rosina and Tiziana Poli) of the research contract: **“Studio dell’illuminazione naturale, simulazione e prototipazione di sistemi di schermatura, monitoraggio microclimatico in Sala delle Asse e alter tre gallerie museali” (Study of the natural light, simulation and prototyping of a light screen, and micro-climatic monitoring of “Sala delle Asse”, and three more Museum Exhibition Rooms)**, with the role of leader of the prototyping and optimization of innovative textiles screens. Client: Culture Directorate, Castle Superintendence Area, Archaeological Museums and Historical Museums of the Milan Municipality, Milan. Beneficiary: ABC Department (100%); Duration: 6 months. Budget: 10,400 €
- 2017, Jan.** Scientific Coordinator of the consultancy contract: **“Verifiche strutturali e ottimizzazione del design e del packaging dei prodotti denominati: tenda “PNUTEX-& Archi e “T2-MultiPurpose Tent” in relazione alle specifiche tecniche di UNICEF” (Structural Assessment and packaging and design optimization of products named PNUTEX-& Archi e “T2-MultiPurpose Tent”, in order to follow the technical requirements of UNICEF)**; Clients: FERRINO SpA, Turin, Italy. Beneficiary: ABC Department (100%); Duration: 3 months. Budget: 5,600 €
- 2016, Dec.** Scientific Coordinator of the consultancy contract: **“Assessment of welding lines of multi-layered ETFE panels and Technical Inspection to the Italian manufacturers – Swatch Omega project”**. Client: TAIYO EUROPE GmbH, Germany. Beneficiaries: ABC Department (100 %) Duration: 6 months; Budget: 22,000 €
- 2016, Nov.** Scientific Coordinator of the consultancy contract: **“Optical and Thermal characterization of novel clear and printed foils of ETFE trough measurements and numerical calculation, with reference to different projects (Manama, City Life Milan; Bari, Laktha)”**. Client: TAIYO EUROPE GmbH, Germany. Beneficiaries: ABC Department (80 %) and Energy Department (20%); Budget: 8,000 €
- 2016, Sept.** Scientific Coordinator of the consultancy contract: **“Optical and Thermal characterization of novel clear and printed foils of ETFE trough measurements and numerical calculation, with reference the Façade and roofing system of Imola Project”**. Client: CANOBBIO Textile Engineering, Italy. Beneficiaries: ABC Department (70 %) and Energy Department (30%); Budget: 3,500 €
- 2016, May** Scientific Coordinator of the consultancy research contract: **“Acoustic performances assessment of ETFE multi-layered system and measurements of the sound generated by intense and heavy rainfall, according to the Standard EN ISO 140-18:2006 and ISO 15186-1:2000”**. Client: TAIYO EUROPE GmbH, Germany. Beneficiaries: ABC Department (70 %) and Energy Department (30%); Budget: 18,000 €
- 2015, Nov.** Scientific Coordinator of the consultancy contract: **“Sperimentazione di nuovi materiali polimerici da differenti settori applicativi verso l’architettura e il design di prodotto. Azione 1: predisposizione di un concorso di idee sull’impegno innovative delle gomme” (Experimental study of novel polymers transferred from different application sector to the architectural and industrial design field. Action 1:**

- creation of a Rubber Design Competition), Client: TOVO GOMME, Italy. Beneficiary: ABC Department (100%); Duration: 4 months. Budget: 7,500 €
- 2013, Sept.** Scientific coordinator of the consultancy contract: **“Detailed design and assessment of the main connections of tensile membrane modules created by the artist Toshiko Horiuchi for “Rete dei Draghi” installation, at MACRo Museum in Rome”**; Client: ENEL CONTEMPORANEA. Beneficiaries: ABC Department (90%) and Civil and Environmental Engineering Department (10%); Duration: 3 months. Budget: 24,000 €
- 2012, May** Scientific coordinator of the research project: **“Studio di fattibilità riguardo all’integrazione tra film di PU termoresistente e tessili tecnici e sulle modalità di confezionamento di ferzi a progetto mediante incollaggio”**. Client: N.T.T. s.r.l. Varese, Italy. POLIMI Beneficiaries: Building Environment Science and Technology – BEST Department (now DABC) (80%) and Chemistry Department (20%). Duration: 7 months. Budget: 25,000 €.
- 2012, Mar.** Scientific coordinator of the consultancy contract: **“Sistemi tessili pressostatici e pneumatici: studio delle prestazioni energetiche di differenti soluzioni tecnico-costruttive”**. Client: CANOBBIO S.p.A., Voghera, Italy. POLIMI Beneficiaries: Building Environment Science and Technology – BEST Department (now DABC) (70%) and Energy Department (30%). Duration: 9 months. Budget: 9,000 €.
- 2005** Scientific coordinator (with Ingrid Paoletti) of the consultancy contract: **“Diffusione dell’informazione tecnica e dei dettagli costruttivi del progetto di architettura”**, client: INFOBUILD On-line Portal; Research Coordinator: Anna Mangiarotti, Department BEST (now DABC), Duration: 1 year.
- 2002** She collaborates to the **research project: “Tecniche, tecnologie e scenari produttivi per la realizzazione di edifici con strutture di medie e grandi luci”**, client: CIVIDINI Prefabbricati, Scientific Responsible: Andrea Campioli, Department BEST (now DABC), POLIMI. Duration: 1 year.
- 1997, Apr.** Lead scientist for the **Research Task: “Ridisegno informatizzato, Ricerche del Laboratorio di Sperimentazione dell’architettura 2”**; Research and Editorial Project **“Rielaborazione informatica degli elaborati di progetto di architettura moderne e contemporanee”**, client: AEDITORIA ELETTRONICA Srl; Coordinators: Guido Nardi and Anna Mangiarotti, Department P.P.P.E. (later BEST, now DABC), POLIMI; she in particular was responsible of the research contents edited for a publication on CD-Rom **“Banca Dati per l’Architettura e l’Edilizia”** di AEditoria Elettronica. Duration: 1 year.
- 1996, Oct.** As part-time research collaborator (Oct. 1996 - Oct. 1997), she takes part to the Research Project: **“Rielaborazione informatica degli elaborati di progetto di architettura moderne e contemporanee”** client: AEDITORIA ELETTRONICA Srl, Coordinators: Guido Nardi and Anna Mangiarotti, Department P.P.P.E. (later BEST, now DABC), POLIMI. Duration: 1 year.

A14. EXPLOITATION OF RESEARCH RESULTS / PATENT APPLICATION

She has sought to ensure economic benefits from the main results of her European Research Projects, especially:

- 2014 - 2018** She has led four international patent application processes (see also **B09**)
- 2016 - now** As the lead scientist for POLIMI, she has stipulated a royalties agreement with the Shelter Research Unit of IFRC - International Federation of Red Crosses and Crescent Moons - and FERRINO SpA, an Italian firm. This related to an innovative and original contribution to the **product development of a multi-purpose 48 sq.m. tent** designed by her and her team in the S(P)EEDKITS Project. This development process was mentioned as successful example of innovation between academic, industrial partners and third sector by POLIMI media. <http://www.polilink.polimi.it/en/casi-di-successo/multipurpose-unit-2/>
- 2016 - now** As the lead scientist for POLIMI, she entered into Non-Disclosure Agreement with two firms – PROFLEX SpA (Italian) and MOELLER GROUP (German) - that are leaders in the field of foldable panel production. This related to an innovative and original contribution to the **product development of a flexible textile walling system**, designed by her and her team in the S(P)EEDKITS Project
- 2016 - now** As the lead scientist for the DABC-POLIMI invention of a patented flexible panel, she has entered into an agreement of interest with the Italian Aeronautic Military Sector - Logistic Branch. This related to an innovative and original contribution to the product development of a flexible textile walling system, designed by her and her team in the S(P)EEDKITS Project. Currently, with the Head of the Italian Air Force, together with her colleague Salvatore Viscuso, she has defined the technical requirements and the protocols and the test methodology, and she is starting the field tests to verify the firing resistance and the bullet-proofing of the flexible panel.
- 2015 - now** After signing an NDA with a group of companies interested in making the first working demonstrator of the PV façade (1:1 scale) that she designed and patented (with Nebojsa Jakica), she is currently working on matching the technical specifications with the materials available from the donor suppliers.
- 2008 - now** She has signed several sponsorship donation contracts with leading firms in the technical textiles and membrane structures fields. She always uses the budget received (60,000 € in this last ten years) to organize scientific seminars, and to upgrade the equipment in the testing lab she created.

A15. STANDARDIZATION ACTIVITIES

- 2019 - now** Member of the mirror Group UNI / CT 021 /GL05 on Membrane Structures, the Italian group working regionally on the same topics of CEN/TC250 WG5 Membrane structures - *Technical Guidance for the Design of Membrane Structures*

- 2019 - now** Member of the mirror Group UNI / CT 046 /subcommission 01 on Membrane Structures, the Italian group working regionally on the same topics of CEN/TC248 *Textiles and Textile products*
- 2017 - now** Coordinator (together with Rogier Houtman) of the sub-working-group on *Details/Connections*, CEN/TC250 WG5 Membrane structures - *Technical Guidance for the Design of Membrane Structures*
- 2009 - 2010** As a member of the “Specifications” TensiNet Working Group, she was involved in preparing the project proposal of CEN/TC250 WG5 Membrane structures, a new EU harmonized standard dealing with the structural application of textiles materials and foils; in 2010 she handed over the role of representative for POLIMI-Italy to her colleague Giorgio Novati
- 2000 - 2002** Member of the UNI - *Commissione Edilizia Eco-Compatibile, sottogruppo SG3: Materiali* standardization group (to prepare a Single Italian Standard on Eco-efficiency in the building sector, a subgroup of Construction Materials).

A16. TEACHING ACTIVITIES IN BACHELOR, MASTER AND SPECIALIST COURSES

Since the 1999/2000 academic year, she has continuously held teaching positions in the Architectural Technology field, and taught Building Systems Design, Technological Design, and Environmental Design courses at Politecnico di Milano (POLIMI). She has recently started teaching a single-disciplinary master’s course on Design of Ultra-Lightweight Building Systems, in which she has the opportunity to spread her expertise about advanced materials and to experiment with innovative applications in architecture and construction.

First level (Bachelor’s)

- 2015 - now** Lead professor for *Experimental Building Systems and Components* (taught in Italian language, **Sperimentazione di Sistemi Costruttivi**, 6 credits), Interior Design Bachelor’s Degree, School of Design, Politecnico di Milano, Italy.
- 2005 - 2017** Lead professor for *Construction of Architecture Design Studio* (offered in Italian language, **Laboratorio di Costruzione dell’Architettura 1**, 12 credits), Teaching Module of *Design of building systems*, Science of Architecture Bachelor’s Degree, in Architecture and Society Faculty, then in School of Architecture, Urbanism and Construction Engineering, at Politecnico di Milano, Italy.
- 2010 - 2012** Lead professor for *Environmental Sustainability and Design* (offered in Italian language, with the title: **Sostenibilità ambientale e Progetto**, 4 credits), Teaching Module of *Environmental Design*, Science of Architecture Bachelor’s Degree, in Architecture and Society Faculty at Leonardo Campus of Politecnico di Milano, Italy.
- 2005 - 2012** Taught *Construction System Design* (offered in Italian language, with the title: **Progettazione di sistemi costruttivi**) in Architecture and Society Faculty at Leonardo Campus of Politecnico di Milano, for the following Bachelor’s Degrees: Science, of Architecture and Architecture and Industrial Production.

- 2005 - 2010** Taught *Environmental Design* (offered in Italian language, with the title: **Progettazione ambientale**) in Architecture and Society Faculty at Leonardo Campus of Politecnico di Milano, Environmental Architecture Bachelor's Degree.
- 2005 - 2008** Lead professor for *Fundamentals of Technology* (offered in Italian language, with the title: **Fondamenti di Tecnologia**, 6 credits), Teaching Module of *Technology of Architecture*, Science of Architecture Bachelor's Degree, in Architecture and Society Faculty at Leonardo Campus of Politecnico di Milano.
- 1999 - 2005** Contract lecturer for *Architecture Technology* and *Building Components and Systems* (offered in Italian language, with the titles: **Tecnologia dell'architettura e Sistemi e componenti** in Architecture and Society Faculty at Leonardo Campus of Politecnico di Milano and also in Civil Architecture Faculty at Bovisa Campus, Politecnico di Milano, Italy).

Second Level (Master's)

- 2018 - now** Lead professor for **Construction and Sustainability Design Studio** (10 Credits), Technological and Environmental Design teaching module (6 credits), Architecture and Urban Design master's programme, School of Architecture, Urbanism and Construction Engineering, Politecnico di Milano, Italy
- 2017 - now** Lead professor for **Design and Construction Studio** (10 Credits), Technological and Environmental Design teaching module (6 credits), Architecture – Built Environment – Interiors master's programme, School of Architecture, Urbanism and Construction Engineering, Politecnico di Milano, Italy
- 2016 - now** Main course, **Design of Ultra-Lightweight Building Systems**, master's course available as part of all master's programmes at the School of Architecture, Urbanism and Construction Engineering, Politecnico di Milano, Italy
- 2004 - 2007** Taught *Design of Building Systems*, offered in Italian, under the title: **Progettazione di sistemi costruttivi**. This was a teaching module of an *Architectural Design Studio*, in the Civil Architecture Faculty at the Bovisa Campus of Politecnico di Milano, Italy.
- 2000 - 2012** As a tutor, she was involved in the **Degree Thesis Laboratory**, recently coordinated by Andrea Campioli, and, further back, by Anna Mangiarotti and Guido Nardi; Architecture Master's Programme (offered in Italian), Politecnico di Milano, Italy.
- 2000 - 2008** Guest lecturer on Technological Design and Architectural Technology, for the Technological Design Culture Course, Architecture Master's Programme, and for the Element and Systems Design Studio, Building Engineering Master's Programme, Politecnico di Milano, Italy.

Second Level: High Level School

She has supported and continues to support several deserving students, enrolled in multi-disciplinary innovation projects Alta Scuola Politecnica (ASP – a *haute école* set up by PoliMi and PoliTo), which selects 150 young talented

students per year at Politecnico di Milano (PoliMi) and Politecnico di Torino (PoliTo), and supports them in developing their potential in a multidisciplinary scientific community in the Architecture, Engineering and Design field.

She was the reference teacher for projects coordinated by colleagues at Politecnico di Torino (PoliTo), and she has coordinated two projects at Politecnico di Milano:

- **WaLi - Water for life project** (<http://www.asp-poli.it/wali-water-for-life/>), XII cycle;
- **Flex-Hab: when you suddenly need a house project**, XIII cycle (concluded in September 2018).

Some students from PoliMi and PoliTo decided to further explore what they began studying under her at ASP and have made this the subject of their theses, under her supervision.

Tutoring and Supervising Theses

Since 1994, she has continuously supervised students for graduation work, initially as an assistant to her architectural mentors (Guido Nardi, Anna Mangiarotti, Andrea Campioli and Marisa Bertoldini), and officially from 2005.

The topics she supervised include: architectural technology; temporary architecture; flexibility and adaptability of building systems; time requirement in design processes; demountable and ephemeral structures; non-conventional housing systems, as low-tech solutions for the emergency sector, and high-tech solutions for novel concepts of flexible dwellings.

2005 - now She has been thesis supervisor of more than 140 undergraduate students in Bachelor of Science of Architecture programmes and she continues to follow an average of five bachelor's students per year;

1999 - now She also has been thesis supervisor for more than 130 graduate students in Master of Science in Architecture (60% with an experimental thesis), and she continues to follow an average of two master's theses per year.

A17. TEACHING ACTIVITIES IN POST GRADUATE COURSES

TEACHING AND SUPERVISING AT HIGH LEVEL SCHOOL

She has supported and continues to support several deserving students, enrolled in multi-disciplinary innovation projects Alta Scuola Politecnica (ASP – a *haute école* set up by PoliMi and PoliTo), which selects 150 young talented students per year at Politecnico di Milano (PoliMi) and Politecnico di Torino (PoliTo), and supports them in developing their potential in a multidisciplinary scientific community in the Architecture, Engineering and Design field.

She was the reference teacher for projects coordinated by colleagues at Politecnico di Torino (PoliTo), and she has coordinated two projects at Politecnico di Milano:

WaLi - Water for life project (<http://www.asp-poli.it/wali-water-for-life/>), XII cycle;

Short description: The main objective of WaLi project is to investigate processes of Fog Water Harvesting, with particular attention to the technological, economical and social conditions into the exploration of new architectural and landscape devices that could produce new settlements that represent a future answer to the UN main expected scenarios “*Water for a sustainable world*”. The project aims to experiment new models for the creation of innovative devices which are capable of becoming opportunities for new life cycles, starting from human activities like agriculture and going into environmental actions like reforestation of dry-lands as consequence of irresponsible human activities. The objective is to define strategies, operating assumptions, scenarios, study of feasibility for the development of innovative settlements which are able to become pilot projects or “icons” of a new sustainable approach, attractors of sensible stakeholders, and at the same time, to identify the necessary conditions for the activation of the processes of incremental change of the places which, through the practices of sustainable development, allow the creation of innovative sustainable experimental clusters.

Students team: Lucas Bandeira Calixto, Runze Li, Federico Lorenzon, Sara Miladinović, Gloria Morichi

Principal Academic Tutor: Alessandra Zanelli (POLIMI)

Other academic Tutors: Juan Carlos Dall’Ast, Valter Carvelli, Claudia Marano (POLIMI) and Roberta Ingaramo (POLITO)

External Tutors: Giada Colasante, and Carol Monticelli

External Institutions: Centro del Desierto de Atacama de la Pontificia Universidad Católica de Chile; TensiNet Association, Brussels.

Flex-Hab: when you suddenly need a house project, XIII cycle (concluded in September 2018).

Short description: Nowadays two trends emerge in building development: one is the possibility to create new spaces following environmental changes and users needs, while the other is the optimization of materials for reducing energy consumptions in constructions. The building envelope is the primary subsystem through which external conditions and environmental changes can be regulated. On the other hand, façades are responsible for more than 40% of heat losses in winter and for overheating in summer, due to their low level of adaptability. The project will be concentrated on creating a technology push for a new material. The MadFlex (PCT WO2016120785 A1) is a lightweight asymmetric

composite material panel, having a sandwich-like structure. It exhibits two order-of-magnitude difference in bending stiffness, depending by the direction of the applied bending moment, thanks to a reversible buckling phenomenon of one of its skins: it is flexible, even rollable, on the one side, while it is rigid like a traditional sandwich panel on the other one. In addition, its foam core confers to the MadFlex good insulation properties. The design and development of a novel flexible habitat starting from the potentialities of the new material will face a multiplicity of research needs which will be integrated into a systemic approach.

Students team: Edoardo Marcandelli, Francesca Perego, Roberto Rossi, Eleonora Teruzzi, Eleonora Valle

Principal Academic Tutor: Alessandra Zanelli (POLIMI)

Other academic Tutors: Giacomo Frulla and Enrico Cestino, Marco Perino and Valentina Serra (POLITO); Carol Monticelli (POLIMI)

Reference External Tutor: Nicola Giulietti, Project Manager of Composite Research Srl

Other External tutors: Salvatore Viscuso and Nebojsa Jakica

External Institutions: TensiNet Association, LASS, Rasero-Plastomer Engineering Srl

Some students from PoliMi and PoliTo decided to further explore what they began studying under her at ASP and have made this the subject of their theses, under her supervision.

- Co-supervisor (with Roberto Pagani of Politecnico di Torino) and Politecnico di Milano representative for *Alta Scuola Politecnica* (ASP) for master's theses and ASP-VII Cycle by Marco Maria Pedrazzo entitled *Open Souce Emergency Shelter*. (PoliTo, 2012 December).
- Co-supervisor (with Roberto Pagani of Politecnico di Torino) and Politecnico di Milano representative for Alta Scuola Politecnica (ASP) of master's thesis and ASP-VIII Cycle by Michela Del Bosco entitled: *Sustainable energy development in China and the experience of Europe-China Clean Energy Centre. Application of the Multi-Criteria Analysis method within the implementation of the demonstration project EURUMQI - Lo sviluppo energetico sostenibile in Cina e l'esperienza dello Europe-China Clean Energy Centre. Applicazione del metodo Multi-Criteria Analysis nell'implementazione del progetto dimostrativo EURUMQI*. (PoliTo, 2013 December).
- Supervisor (with Gabriella Peretti and Francesca Thiebat as co-supervisors for Politecnico di Torino) and representative for ASP of master's thesis and ASP-XII Cycle by Lucas Bandeira Calixto entitled: *Water for life: an experiment on fog harvesting for Po valley in northern Italy* (PoliTo, 2018 March)
- Supervisor (with Gabriella Peretti as co-supervisor for Politecnico di Torino) and representative for ASP of master's thesis and ASP-XII Cycle by Gloria Morichi entitled: *Water Skin: Fog and dew harvesting integration in urban environment* (PoliMi, 2018 April).

POST GRADUATE LEVEL: SPECIALIZING COURSES

At time, she has been asked to teach at post-graduate specializing master's courses, and she has managed parallel teaching modules for professionals, which were also offered to PhD students in her department.

- 2017, Apr.** Guest lecturer for “*Significant collaboration and Cross Innovation: Applied research case-studies in a multi-disciplinary background*” as part of Andrea Giachetta and Adriano Magliocco’s jointed academic-professional master’s course of *Sustainable Design*, in IANUA-ISSUGE course of *Science and technologies for Sustainability*, University of Studies of Genoa, Department of Chemistry and Industrial Chemistry, Genoa, 2017 April the 8th
- 2002, June** Lead Professor of “Tecnologie per il recupero edilizio e urbano - laboratorio di progettazione” (Rehabilitation Technologies at Building and Urban Scales), FSE University Master’s in *Riqualificazione architettonica nelle aree della urbanizzazione diffusa* (Architectural rehabilitation for urban sprawl areas), University of Camerino, Faculty of Architecture, PROCAM Department, Ascoli Piceno;
- 2005, Oct.** Teaching supervisor (with Monica Lavagna) of a 3-month professional course that consisted of three main learning modules: 1) Uses of energy in architecture at the building scale; 2) Uses of energy in architecture at the urban scale; 3) Energy design of a building system; Politecnico di Milano; four credits for attendance were awarded to professionals and PhD students;
- 2005, May** Teaching supervisor (with Monica Lavagna) of a 3-month professional course that consisted of three main learning modules: 1) Detailed Design; 2) Eco-friendly innovation in building techniques and materials; 3) CAD Detailed Design of Building Components; four credits for attendance were awarded to professionals and PhD students;
- 2005, Jan.** Teaching supervisor (with Monica Lavagna) of a 3-month professional course that consisted of three main learning modules: 1) Innovative building systems; 2) Life cycle of building components; 3) Advanced Systems for thermal control in buildings; four credits for attendance were awarded to professionals and PhD students.

A18. KEY ROLES IN PHD BOARDS AND PHD PROGRAMMES

She has been a **member of PhD scientific boards** (2005-now) and she has also had other roles of responsibility, supporting PhD Coordinators, and the role of **scientific coordinator for the several PhD programmes**. In this, she has supported the PhD Coordinators both in preparing PhD research and teaching programmes (2001-2007) and in the submission of PhD proposals eligible for funding by the National Research Ministry (*MIUR- Borse Giovani Ricercatori*) on specific topics, such as, Advanced Materials for structural application, Composites and Ceramics, Advanced Manufacturing Techniques for Made-In-Italy: Textile sector, Fashion and Mechanical Devices, Energy Saving in the building sector (2007-2012). She was also the **Delegate of the PhD Coordinator** (2007-2012), working on the preparation of the scientific documentation for the national network of Doctoral programmes in Technology of Architecture. Furthermore, she has been the **scientific coordinator and proposer of several editions of cross-disciplinary and inter-doctoral courses** offered by the POLIMI PhD School for all PhD Programmes (2002- now).

She is a **professor in charge of PhD courses and design workshops**, focusing on innovation in architecture and the experimental application of advanced and flexible materials in the building sector (2008-now). She is also a supervisor for PhD theses (2006-now).

MEMBER OF PHD BOARDS

- 2016- now** Member of the Milestone Scientific Committees of ABC (Architecture, Built Environment and Construction Engineering) PhD Board (Coordinator: prof. Enrico De Angelis) linked to the DABC Research Line 1 - *Advanced Construction Materials and Innovative Building Technologies* and Research Line 3 - *Risk prevention and Emergency management*. Due to this role, she has been taking part to the twice-a year Milestone meetings where PhD candidates are presenting their research advancements to the PhD Scientific Committees. In particular she has been giving her scientific contribution to the Milestone Committee on *Innovative Technologies for High Performance Buildings*.
- 2007- 2016** Member of the *TEPAC (Tecnologia e Progetto per l'Ambiente Costruito) - Technology and Design for the Built Environment* PhD Scientific Board (Coord prof. Anna Mangiarotti 2008-2015; prof. Cinzia Talamo, 2016);
- 2005- 2007** Member of the *TPQA (Tecnologia e Progetto per la Qualità Ambientale alla scala edilizia e urbana) - Technology and Design for the Environmental Quality at the building and urban scale* PhD Scientific Board (Supervisor: prof. Anna Mangiarotti).

SCIENTIFIC COORDINATOR OF PHD PROGRAMMES AND COORDINATOR DELEGATE

- 2010 - 2012** Delegate of the *TEPAC* PhD Coordinator Prof. Anna Mangiarotti at OSDOTTA, the national network of Doctoral Programmes in the Technology of Architecture field;
- 2007- 2012** Scientific coordinator and responsible of both the yearly PhD on-line data survey and the relative submission of a research proposal to MIUR - *Borse Bando Giovani* (National call for young people to get doctoral scholarships on specific subjects) held by *TEPAC - Tecnologia e Progetto per l'Ambiente Costruito (Technology and Design for the Built Environment)* PhD program (under the supervisor of the PhD Coordinator prof. Anna Mangiarotti), dealing in particular with the scientific contents of the research proposal on the following topics: 1) Advanced Materials for structural application, Composites and Ceramics, 2) Advanced Manufacturing Techniques for Made-In-Italy: Textile sector, Fashion and Mechanical Devices, 3) Energy Saving in the building sector;
- 2001- 2007** Scientific coordinator of research and teaching activities' programme offered by *TPQA (Tecnologia e Progetto per la Qualità Ambientale alla scala edilizia e urbana) - Technology and Design for the Environmental Quality at the building and urban scale* PhD program (under the supervisor of the PhD Coordinator: prof. Anna Mangiarotti, 2002-2007; and prof. Guido Nardi, 2001).

TEACHING ACTIVITIES IN PHD PROGRAMMES

She has been proposing and holding several **teaching activities** for Doctoral courses of PoliMi, with the role of lead professor and/or co-leader with other colleagues.

- 2018, Feb.** Coordinator (with Simona Chiodo, Maria Grazia Folli and Andrea Campioli) of the Cross-Disciplinary, Inter-doctoral PhD course *ERST Epistemology of Scientific and Technical Research Guido Nardi 2018 Edition*: “From Knowledge to decision” (February-March 2018; 5 credits), organized by POLIMI PhD School and available to all of PhD programs during the academic year 2017-2018;
- 2018, Jan.** Professor in charge of the Second Edition of: *TEAL-S, Temporary Architecture, Textile Technology, Lightweight Construction: Sheltering Design Workshop*, a multi-disciplinary 2-weeks-intensive doctoral course (4 credits), organized biannually by DABC PhD Program and also offered by POLIMI PhD School as available course to all of PhD programs during the academic year 2016-2017.
- 2015, Nov.** Coordinator (with Simona Chiodo, Maria Grazia Folli and Andrea Campioli) of the Cross-Disciplinary, Inter-doctoral PhD course *ERST Epistemology of Scientific and Technical Research Guido Nardi 2015 Edition*: “Fundamental Concepts in Philosophy of Science” (November 2015; 5 credits), organized by POLIMI PhD school and available to all of PhD programs during the academic year 2015-2016;
- 2015, Jan.** Professor in charge of the First Edition of: *TEAL-S, Temporary Architecture, Textile Technology, Lightweight Construction: Sheltering Design Workshop*, a multi-disciplinary 2-weeks-intensive doctoral course (4 credits), organized biannually by DABC PhD Programme and also offered by POLIMI PhD School as available course to all of PhD programs during the academic year 2014-2015.
- 2014, Jan.** Coordinator (with Andrea Campioli, Monica Lavagna, Cinzia Talamo and Giancarlo Paganin) of the Doctoral Course: *Innovation in Architecture and Construction* (4 credits) and professor in charge for its teaching module entitled *Cross innovation: Architecture, Materials and Techniques*, organized by DABC PhD Programme during the academic year 2013-2014.
- 2013, May** Coordinator (with Simona Chiodo, Maria Grazia Folli and Andrea Campioli) of the Cross-Disciplinary, Inter-doctoral PhD course *ERST Epistemology of Scientific and Technical Research Guido Nardi 2013 Edition*: “Theories and Objects” (may-June 2013; 5 credits), organized by POLIMI PhD school and available to all of PhD programs during the academic year 2012-2013;
- 2011, May** Coordinator (with Andrea Campioli) of the Doctoral Course *IPPA: Innovazione nel Processo e nel Progetto dell'Architettura (Innovation in Architectural Design and Process)* (May - July 2011; 10 credits); organized by TEPAC PhD Programme during the academic year 2010-2011.
- 2010, Apr.** Coordinator (with Maria Grazia Folli and Andrea Campioli) of the Cross- Disciplinary Inter-doctoral PhD course *ERST Epistemology of Scientific and Technical Research Guido Nardi 2010 Edition*: “Humanities and Science” (April-June 2010; 5 credits), organized by POLIMI PhD school and available to all of PhD programs at POLIMI during the academic year 2009-2010;
- 2009, Nov.** Coordinator (with Andrea Campioli) of the Doctoral Course *IPPA: Innovazione nel Processo e nel Progetto dell'Architettura (Innovation in Architectural Design and Process)* (Nov 2009-Jan. 2010; 10 credits); organized by TEPAC PhD Programme during the academic year 2009-2010;
- 2008, Apr.** Organizational Secretary - under the supervision of coordinators Marisa Bertoldini, Maria Grazia Folli and Andrea Campioli - of the Cross-Disciplinary, Inter-doctoral PhD course *ERST Epistemology of Scientific and Technical Research Guido Nardi 2008 Edition*, u (April-June 2008; 5 credits), organized by POLIMI PhD school and available to all of PhD programs during the academic year 2007-2008;

- 2006, Mar.** Coordinator (with Alessandro Rogora) of the Doctoral Course *Massivo vs Leggero: sistemi costruttivi a confronto sul piano linguistico, tecnico e prestazionale* (March - June 2006; 4 credits); organized by TEPAC PhD Programme during the academic year 2005-2006;
- 2006, Apr.** Organizational Secretary - under the supervision of coordinators Marisa Bertoldini and Maria Grazia Folli - of the Cross-Disciplinary, Inter-doctoral PhD course *ERST Epistemology of Scientific and Technical Research Guido Nardi 2008 Edition*, u (April-June 2006; 5 credits), organized by POLIMI PhD school and available to all of PhD programs during the academic year 2005-2006;
- 2004, Apr.** Organizational Secretary - under the supervision of coordinators Marisa Bertoldini and Matilde Baffa - of the Cross-Disciplinary, Inter-doctoral PhD course *ERST Epistemology of Scientific and Technical Research Guido Nardi 2008 Edition*, u (April-June 2004; 5 credits), organized by POLIMI PhD school and available to all of PhD programs during the academic year 2003-2004;
- 2002, Apr.** Organizational Secretary (with Marisa Bertoldini) - under the supervision of coordinators Guido Nardi and Matilde Baffa - of the Cross-Disciplinary, Inter-doctoral PhD course *ERST Epistemology of Scientific and Technical Research, First Edition*, (April-June 2002; 5 credits), organized by POLIMI PhD School and available to all of PhD programs during the academic year 2001-2002.

SUPERVISOR OF PHD THESIS

She has been supervisor of several PhD thesis, and tutor as member of relative PhD Board.

- 2017-2020** Supervisor (with Livio Mazzarella, Energy Dept.) of the PhD Thesis of **Mesrop Adrianssen**, PhD Course in Architecture, Built Environment and Construction Engineering, 33 cycle (with Inter-Departmental grant), draft title: *Characterization of thermo-acoustical behaviour of temporary constructions for emergency and assessment of different scenarios of non-invasive and reversible thermo-acoustic use*, ABC Dept., Politecnico di Milano;
- 2016-2019** Supervisor of the PhD Thesis of **Anna Cantini**, PhD Course in Architecture, Built Environment and Construction Engineering, 32 cycle (without grant), draft title: *Designing for Urban Resilience: the role of interdisciplinary methodologies for evaluating effectiveness of time-based technological systems*, Tutor: Marco Imperadori, ABC Dept., Politecnico di Milano; Scientific Responsible of a one-year fellowship activated during the WRP project;
- 2016-2019** Supervisor of the PhD Thesis of **Carlotta Mazzola**, PhD Course in Architecture, Built Environment and Construction Engineering, 32 cycle (with grant), draft title: *Ultra-Lightweight Textile-Based Structures. Renovating the Design Methodology and the Architectural Language*, Tutor: Andrea Campioli, ABC Dept., Politecnico di Milano;
- 2013-2015** Tutor of the PhD candidate **Salvatore Viscuso**, PhD Course in *TEPAC (Tecnologia e Progetto per l'Ambiente Costruito) - Technology and Design for the Built Environment*, 28° Cycle (with grant by MIUR, sector of Advanced Manufacturing), and Supervisor of his PhD Thesis entitled: *(un)PACK & BUILD. Design and production strategies for rethinking packaging and facilitating the easy set-up of construction elements*, dealing with the role of CAD/CAM interfaces for rethinking a sustainable use of carton and plastics in the field of building sector. final approval: January 2016, Politecnico di Milano;

- 2012-2014** Tutor of the PhD candidate **Nebjsa Jakica**, PhD Course in *TEPAC (Tecnologia e Progetto per l'Ambiente Costruito) - Technology and Design for the Built Environment*, 27° Cycle (without grant), Supervisor of his PhD Thesis entitled: *Performance-Based Design and Optimization of the BIPV Façade Using Computational Framework*, final approval January 2015, and Scientific Responsible of his two-years fellowship that she activated during the TIFAIN project;
- 2011-2013** Tutor of the PhD candidate **Suo Hua**, PhD Course in *TEPAC (Tecnologia e Progetto per l'Ambiente Costruito) - Technology and Design for the Built Environment*, 26° Cycle (without grant), and Supervisor (with Adriana Angelotti, Energy Department) of his PhD Thesis entitled: *Dynamic energy simulation of different pneumatic and air-supported membranes and proposals for energy saving strategies*, final approval January 2014, Politecnico di Milano, Milan, Italy;
- 2011-2013** Tutor of the PhD candidate **Zhengyu Fan**, PhD Course in *TEPAC (Tecnologia e Progetto per l'Ambiente Costruito) - Technology and Design for the Built Environment*, 26° Cycle (without grant), and Supervisor of his PhD Thesis entitled: *OPV (Organic PhotoVoltaic) integrated building components on ETFE membranes*, final approval January 2014, Politecnico di Milano, Milan, Italy;
- 2010-2012** Tutor of the PhD candidate **Roberto Maffei**, PhD Course in *TEPAC (Tecnologia e Progetto per l'Ambiente Costruito) - Technology and Design for the Built Environment*, 25° Cycle (with grant), and Supervisor of his PhD Thesis entitled: *Sheltering in emergency. Products and processes*, final approval January 2013, Politecnico di Milano, Milan, Italy;
- 2010-2012** Tutor of the PhD candidate **Hend Ibrahim**, PhD Course in *TEPAC (Tecnologia e Progetto per l'Ambiente Costruito) - Technology and Design for the Built Environment*, 25° Cycle (without grant); Supervisor of her PhD Thesis entitled: *Fluoropolymer Textiles Integrated PhotoVoltaics: Integrating Organic and Amorphous-si PV into ETFE and PTFE Textiles*, final approval January 2013, Politecnico di Milano, Milan, Italy; Scientific Responsible of the one-year fellowship, that she activated during the SOFT-PV project;
- 2009-2011** Tutor of the PhD candidate **Paolo Beccarelli**, PhD Course in *TEPAC (Tecnologia e Progetto per l'Ambiente Costruito) - Technology and Design for the Built Environment*, 23° cycle (with Grant of MIUR Young Funding, concerning “Advanced Materials for Structural Application”), and Supervisor of his PhD Thesis entitled: “Testing For Designing. Biaxial Testing Procedures Supporting Design, Manufacture, Erection and Maintenance of Tension Membranes”, final approval: January 2012, Politecnico di Milano, Milan, Italy;
- 2006-2008** Tutor of the PhD candidate **Cristina Mazzola**, PhD Course in *TPQA Tecnologia e Progetto per la qualità ambientale a scala edilizia e urbana (Technology and Design for the Environmental Quality at the Building and Urban Scale)*, 21° cycle (with grant), and Supervisor of her PhD Thesis entitled: “Esthetical and Environmental Performances of Soft Materials for Architecture”, final approval: January 2009, Politecnico di Milano, Milan, Italy;

A19. ARCHITECTURAL WORKS, DESIGN COMPETITION AND EXPERIMENTAL INSTALLATIONS

At times in the past, she has combined teaching and research activities with professional work, participating in architectural competitions and collaborating on professional projects under the supervision of Anna Mangiarotti and Guido Nardi. More recently, since she founded the clusTex and the Textiles Hub laboratory, she has promoted *learning-by-doing* activities, involving students and doctoral students in the installation of experimental ultra-lightweight building systems, as well as collaborating with colleagues from other disciplines.

The following selection of architectural work and temporary experimental installations is closely linked to her main research activities.

- 2013 Oct.** Construction site advisor for the **temporary artwork by the artist Toshiko Horiuchi**, MACRo Museum, Rome; co-designer of the interface between the listed building housing the museum and the tensile net of nylon handmade by the artist; duration: three months;
- 2012, July** Prototyping and installation of the **NUAGE temporary pavilion** designed by POLIMI students from the Construction of Architecture Design Studio 2011-2012, at POLIMI Leonardo Campus; supported by Fratelli Giovanardi, Canobbio textile Engineering, Serge Ferrari Textiles, SEFAR, Euro-Tubi and Norda; it was dismantled and packed away after 10 days.
- 2012 - 2011** Design and economic support (DABC 70%, DICA 30%) of the textile-based pavilion which hosts the TEXTILES HUB Laboratory at POLIMI, 14A Building, 9 Bonardi street, Milan;
- 2011, July** Prototyping and exhibition of **10 different textile façade panels** designed by POLIMI students, during 1 month-design competition launched for the Construction of Architecture Design Studio 2010/2011, at POLIMI Leonardo Campus; supported by Fratelli Giovanardi, Canobbio textile Engineering, Serge Ferrari Textiles, PATI films, Top Glass Composite Profile Solutions; Meliar Design, Palladio, and Fondazione Cariplo; the façade panel proposed by the team of competition winning students was chosen to become the reference module for the new textile façade of TEXTILES HUB Laboratory;
- 2010, July** Prototyping and installation of the **SOFT-CUBE temporary pavilion** designed by POLIMI students from the Construction of Architecture Design Studio 2009/2010, Milan Order of Architects, Via Solferino, Milan; supported by Fratelli Giovanardi, Canobbio textile Engineering and Serge Ferrari Textiles; it was dismantled after 2 weeks and installed again at the POLIMI Campus, where now it hosts a student association;
- 2008, Mar.** Installation of the **“Lightweight Construction” booth** at Cuore Mostra – SAIE Spring Exhibition, Bologna Fair, in collaboration with TensiNet and POLIMI, 12-15 March 2008;
- 2008, July** Installation of the **ClusTEX booth** at Salone Architex, II Congresso Mondiale degli Architetti, Lingotto Fiere, Turin, invited by the TECTEXCLUB association, duration: one week.

In the past she has participated in design competitions and, more recently, she has collaborated in the organization of architectural and design competitions.

- 2016** She coordinated the preparation of the competition announcement and organized the launch of the **Rubber Design Competition**, with the support of Politecnico di Milano, and Tovo Gomme SpA;
- 2009** She coordinated (with Luica Collina) the preparation of the competition announcement and organized the launch of the **“Milan Design Camping: the culture of Hospitality” Design Contest**, with the support of the Milan Municipality - Department of Sport and Leisure, Politecnico di Milano and Triennale di Milano, Milan. She also organized a related exhibition and 1-day seminar at Giardini delle Triennale, Milan during the 2009 Design Week, in Palazzina Appiani, Arena Civica, Via Byron 2, Milan, from 21 to 27 April 2009;
- 2007** As a team leader, she participated in the **“Torino Geodesign” International Competition** presenting a project on the theme: Tende / Case popolare di via Parenzo (Community 1); Interdisciplinary Group: Architects, Industrial Designer, Video-maker, Photographer; Participants: Enrico Bassi, Enrico Contino, Valeria Giurdanella, Giovanni Lasi, Alessia Massone, Cristina Mazzola and Alessandra Zanelli; project not classified.
- 2002** As a consultant member specializing in flexible dwelling systems, she participated in the **“Architecture, Urban Development and Sustainable Housing” International Competition**, launched by the International Union of Architects (UIA), the UNESCO and the Federation of Architects Associations of the Mexican Republic (FCARM) integrated by 70 Architects Associations, under the sponsorship of the Government of the state of Guanajuato, Mexico. Designers: Benvenuto Bonacina (team leader), Anna Mangiarotti, and Guido Nardi. Consultants: Vittorino Agazzi, Tiziana Poli e Alessandra Zanelli. Collaborators: Dania Alfieri, Marco Pozzi, Davide Renoldi; project not classified.
- 2000** She collaborated with the **Architectural and Construction Design phases for the realization of a prefabricated pavilion** for the Cardio-vascular Department of the Hospital of Bergamo (lead designers: Benvenuto Bonacina, Anna Mangiarotti, Guido Nardi, amount of the works: 6 billion 800 million of Italian Lire); built project.
- 1999** As a team member, she participated in the **Contest of ideas for the renovation of Villa Edvige Garagnani** and the landscape design of Rural Park of Zola Predosa (Bologna). Designers: Anna Mangiarotti (team leader), Candida Citterio, Maria Giulia Marziliano, Gabriele Nizzi, Tiziana Poli and Alessandra Zanelli; Mentioned Project.
- 1997** As a team member, she participated in **the Contest of ideas for the Housing Settlement in Bergamo-Valtesse**. Designers: Anna Mangiarotti (team leader), Guido Nardi (team leader), Donatella Bollani, Giorgio Grandi, Valeria Gatti and Alessandra Zanelli; Project not classified.

A20. PUBLICATIONS AND PATENTS

(A detailed list follows in Part B)

Starting from the research path she began in 1994, with temporary research assignments, and continued from 2005, as a researcher at POLIMI, and from 2011 as Associate Professor, her scientific products can be allocated as follows:

- 5 books authored;
- 8 books edited by her;
- 33 essays;
- 83 journal articles, of which 8 internationally peer-reviewed and published in the Web of Science network and 36 journal articles in leading Italian architectural journals;
- 59 conference proceedings, of which 8 published in Procedia Journals and referred to the Web of Science network;
- 3 Invention Patents and 1 European Design Patent.

PART B: PUBLICATIONS AND PATENTS

B01. BOOKS AUTHOR

- B AU 1. **Zanelli A.**, Giurdanella V., Superbi G., Viscuso S. (2010). *Assemblage: la libertà costruttiva. Il progetto d'abitazione mediante elementi industriali e kit personalizzabili*. Il Sole 24 Ore, Milano, ISBN: 9788832476590, p. 1-380.
- B AU 2. Bertoldini M., Campioli A., Ferrari B., Grandi G., Guastaroba E., Lavagna M., **Zanelli A.** (2009). *Progettare oltre l'emergenza. Spazi e tecniche per l'abitare temporaneo* Il Sole 24 Ore, Milano, ISBN: 9788832474046, p. 1-159.
- B AU 3. **Zanelli A.** (2003), *Trasportabile / Trasformabile. Idee e tecniche per architetture in movimento*, Libreria Clup, Milano, vol. 14, ISBN: 9788870905687, p. 1-320.
- B AU 4. Mangiarotti A., Zanelli A. (1997), *Strumenti per l'organizzazione tipologica dell'alloggio*, Arti Grafiche Stefano Pinelli, Milano, ISBN: 9788890015144, p. 1-192.
- B AU 5. **Zanelli A.** (1996). *La "manipolazione" informatica dei dettagli costruttivi per l'insegnamento del progetto di architettura*, Arti Grafiche Stefano Pinelli, Milano, ISBN: 8890015101, p.1-96.

B02. BOOKS EDITOR

- B ED 1. Della Torre, Cattaneo S., Lenzi C., **Zanelli A.** (eds) (2019), *Regeneration of the Built Environment from a Circular Economy Perspective*. Series: Research For Development, Springer, ISBN: 978-3-030-33256-3, open access book.
- B ED 2. **Zanelli A.**, Spinelli M.L., Monticelli C., Pedrali P. (eds.) (2016), *Lightweight Landscape - Enhancing Design through Minimal Mass Structures*, Polimi SpringerBriefs, Cambridge, DOI: 10.1007/978-3-319-21665-2, p.1-109.
- B ED 3. Campioli A., **Zanelli A.** (a cura di) (2009), *Architettura tessile. Progettare e costruire membrane e scocche*, IlSole24ore, Milano, ISBN: 978-88-324-7314-8, p. 1-383.
- B ED 4. Bögner-Balz Heidrun, **Zanelli A.** (eds) (2007), *Ephemeral Architecture. Time and Textiles*, Proceedings of Tensinet Symposium 2007, 16-18 April 2007, Politecnico di Milano, Clup, 2007. ISBN: 9788870909326, p.1-420.
- B ED 5. **Zanelli A.** (edizione italiana a cura di) (2007), *Progettare con le membrane*, Maggioli, Rimini (tr. it. di Alessandra Zanelli, Brian Forster, Marijke Mollaert, *Design Guide for Tensile Structure in Europe*, Tensinet Editor, Brussels, 2005), ISBN: 9788838732914, p. 1-380.
- B ED 6. Bertoldini M., **Zanelli A.** (a cura di) (2003), *Tecnica, progetto e scienze umane*, Libreria Clup, **Milano**, ISBN: 9788870906356, p. 1-146.

- B ED 7. **Zanelli A.** (a cura di) (2000), *Ricerche di tecnologia dell'architettura*, Libreria Clup, Milano, ISBN: 9788870904338, p. 1-420.
- B ED 8. **Zanelli A.** (a cura di) (1995). *Progetti didattici 3. Catalogo della mostra dei lavori dei Laboratori di progetto e di laurea dei corsi di Tecnologia dell'architettura II annualità coordinati da Guido Nardi e Anna Mangiarotti nell'anno accademico 1993/1994*, Stampitalia, Milano. ISBN: 8886579004, p. 1-208.

B03. ESSAYS

- ESS 1. **Zanelli A.**, Monticelli C., Viscuso S. (2019) *Closing the Loops in Textile Architecture: Innovative Strategies and Limits of Introducing Biopolymers in Membrane Structures*. in Della Torre, Cattaneo S., Lenzi C., **Zanelli A.** (eds) (2019), *Regeneration of the Built Environment from a Circular Economy Perspective*, Research For Development, Springer, p. 263-276, doi: 10.1007/978-3-030-33256-3_25, open access.
- ESS 2. **Zanelli A.**, Campioli A., Monticelli C., Viscuso S., Giabardo G. (2019). *Novel Textile-Based Solutions of Emergency Shelters: Case Studies and Field Tests of S(P)EEDKITS Project*. In: (N. Aste S. Della Torre C. Talamo R.S. Adhikari C. Rossi (eds), *Innovative Models for Sustainable Development in Emerging African Countries*. Research For Development, Springer, p. 111-122, doi: 10.1007/978-3-030-33323-2_10, open access.
- ESS 3. Viscuso S., Talamo C., **Zanelli A.**, Arlati E. (2019). BIM Management Guidelines of the Construction Process for General Contractors. in: B. Daniotti M. Gianinetto S. Della Torre (eds) *Digital Transformation of the Design, Construction and Management Processes of the Built Environment*, Research For Development, Springer, p. 189-199, doi: 10.1007/978-3-030-33570-0_17, open access.
- ESS 4. **Zanelli A.** (2018), *Le collaborazioni impegnative, oltre la ricerca multidisciplinare*, in: Bellini O. E., Ciaramella A., Daglio L., Gambaro M. (a cura di), *La Progettazione tecnologica e gli scenari della ricerca*, Maggioli Editore, Rimini, p.161-168.
- ESS 5. **Zanelli A.** (2016), *S(P)EEDKITS. Rapid Deployable Kits as Seed for Self-Recovery*, in: Colombo E., Pastore M. C., Sancassani S. (eds), *Stories of Cooperation at Polimi 2011-2016*, PoliScript, Milano, http://www.polisocial.polimi.it/wp-content/uploads/2016/12/libro_bianco.pdf, p.175-181.
- ESS 6. **Zanelli A.** (2016), *Designing with Lightness*, in: Zanelli A., Spinelli M.L., Monticelli C., Pedrali P. (eds), *Lightweight Landscape - Enhancing Design through Minimal Mass Structures*, Polimi SpringerBriefs, Cambridge, DOI 10.1007/978-3-319-21665-2, p. 3-18.
- ESS 7. **Zanelli A.** (2015), *Architectural fabric structures in refurbishment of archaeological and cultural heritage areas*, in: Llorens Duran, J.I., *Fabric structures in architecture*, Woodhead Publishing Limited, Cambridge, 2015, doi:10.1016/B978-1-78242-233-4.00015-2, p. 481-527.
- ESS 8. Giurdanella V., **Zanelli A.** (2010), *Temporary building intended as adaptable and reversible building: a sustainable strategy for housing – The recent situation in Italy*, in: Girmscheid G., Scheublin F., *New Perspective in Industrialization in*

- Construction - A State-of-the-art Report*, CIB General Secretariat. - Vol. 329, Rotterdam, ISBN: 9783906800172, p. 333-356.
- ESS 9. **Zanelli A.** (2010) *Introduzione: Assemblage, la libertà costruttiva*. in: A. Zanelli, V. Giurdanella, G. Superbi, S. Viscuso, *Assemblage: la libertà costruttiva. Il progetto d'abitazione mediante elementi industriali e kit personalizzabili*, IlSole24ore, Milano, ISBN: 9788832476590, p. VII-X.
- ESS 10. **Zanelli A.** (2009), *Introduzione: Campo di indagine e obiettivi*, in: A. Campioli e A. Zanelli (a cura di), *Architettura tessile. Progettare e costruire membrane e scocche*, IlSole24ore, Milano, ISBN: 9788832473148, p. 4-6.
- ESS 11. **Zanelli A.** (2009), *Architettura tessile delle origini: trasportabile e trasformabile*, in: A. Campioli e A. Zanelli (a cura di), *Architettura tessile. Progettare e costruire membrane e scocche.*, IlSole24ore, Milano, ISBN: 9788832473148, p. 8-27.
- ESS 12. **Zanelli A.** (2009), *Informazione tecnica sui prodotti tessili*. in: A. Campioli e A. Zanelli (a cura di), *Architettura tessile. Progettare e costruire membrane e scocche.*, IlSole24ore, Milano, ISBN: 9788832473148, p. 64-71.
- ESS 13. **Zanelli A.** (2009), *Progettare e costruire una membrana: casi studio e interviste*, in: A. Campioli e A. Zanelli (a cura di), *Architettura tessile. Progettare e costruire membrane e scocche.*, IlSole24ore, Milano, ISBN: 9788832473148, p. 192-201.
- ESS 14. **Zanelli A.** (2009), *Gli ultimi dieci anni di costruzioni leggere*, in: A. Campioli e A. Zanelli (a cura di), *Architettura tessile. Progettare e costruire membrane e scocche.*, IlSole24ore, Milano, ISBN: 9788832473148, p. 214-217.
- ESS 15. **Zanelli A.** (2009), *Pelle resistente*, in: A. Campioli e A. Zanelli (a cura di), *Architettura tessile. Progettare e costruire membrane e scocche.*, IlSole24ore, Milano, ISBN: 9788832473148, p. 218-267.
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Milan, 2020 February the 6th

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