28

PAD

>>DWELLING>> >>>
>>ON >>>>THE>>>
>>MOVE>>>>> >>>>>>>

PAD. Pages on Arts and Design
International, peer-reviewed,
open access journal
founded by Vanni Pasca in 2005

PAD
via Francesco Soave 15 – 20135 Milano – Italy
via Roma 171 – 90133 Palermo – Italy
info@padjournal.net – editors@padjournal.net

Publisher
Aiap Edizioni
via A. Ponchielli 3 – 20129 Milano – Italy
aiap@aiap.it – www.aiap.it

PAD © ISSN 1972-7887
#28, Vol. 18, June 2025
www.padjournal.net

PAD #28 | DWELLING ON THE MOVE

III

RESILIENCE AND SUSTAINABILITY

Amphibious Housing Modules
Sustainable nZEB Solutions for Climate Adaptation

Irene Fiesoli
Università degli Studi di Firenze
Orcid id 0000-0003-4724-286X

Giuseppe Lotti
Università degli Studi di Firenze
Orcid id 0000-0002-8066-5998

Gabriele Pontillo
Università degli Studi di Firenze
Orcid id 0000-0001-5839-7838

Keywords
Amphibious Housing, Sustainable Architecture, nZEB, Biomaterials, Climate Resilience.

Abstract
The project addresses crucial environmental and climate challenges by offering innovative, sustainable, and adaptable housing solutions, specifically designed for fragile ecosystems like the area surrounding Lake Massaciuccoli (Lucca, Italy). The project focuses on creating modular amphibious housing units that seamlessly blend with their natural environment, promoting a resilient and forward-thinking model of urbanization. These housing units are designed with flexibility in mind, adapting to both water and land settings, making them suitable for a wide range of geographic and climatic conditions.
The core of the project lies in the use of cutting-edge biomaterials and IoT-based technologies to achieve the nearly Zero Energy Building (nZEB) standard. These advancements contribute to an efficient, eco-friendly design that reduces energy consumption while maintaining optimal living conditions. The project also addresses the growing demand for sustainable tourism infrastructures that are capable of withstanding extreme weather events. Inspired by the concept of amphibious living, the modular units echo the dual existence of land and water creatures, allowing them to adapt to the ever-changing environmental conditions. This approach emphasizes the temporary and transient nature of our presence on Earth, aligning with the broader ethos of minimizing human impact on ecosystems. The project embodies a vision for the future of architecture that combines adaptability, sustainability, and technological innovation to meet today's and tomorrow's housing needs.

1. Introduction

The *MUTABILITY* project was conceived as a concrete response to emerging environmental and climate challenges, offering sustainable and adaptable housing solutions capable of harmoniously integrating with fragile ecosystems such as that of Lake Massaciuccoli. Located in Tuscany, in the province of Lucca, Lake Massaciuccoli is an ecosystem of extraordinary richness and vulnerability. Its hydrological dynamics, biodiversity, and anthropogenic pressures make it an ideal laboratory for experimenting with resilient, adaptive housing models in dialogue with nature. The choice of this location is deliberate: the project seeks to enhance its unique characteristics through an intervention that not only respects its ecological identity but actively promotes its regeneration through lightweight, temporary, and sustainable infrastructures.

In today's context, marked by increasingly frequent extreme weather events and environmental transformations – as evidenced by the rising incidence of floods, coastal erosion, and sea level rise (IPCC, 2021; NASA, n.d.) – *MUTABILITY* proposes an innovative housing model that integrates resilience, sustainability, and technological innovation.

The project aims to develop a modular housing unit capable of adapting to various environmental contexts, both aquatic and terrestrial, through the use of advanced technologies and low-impact materials. In this sense, *MUTABILITY* positions itself as a tangible answer to emerging housing needs, offering resilient infrastructure capable of supporting forms of sustainable tourism as well (Rosso et al., 2019) (Fig. 1).

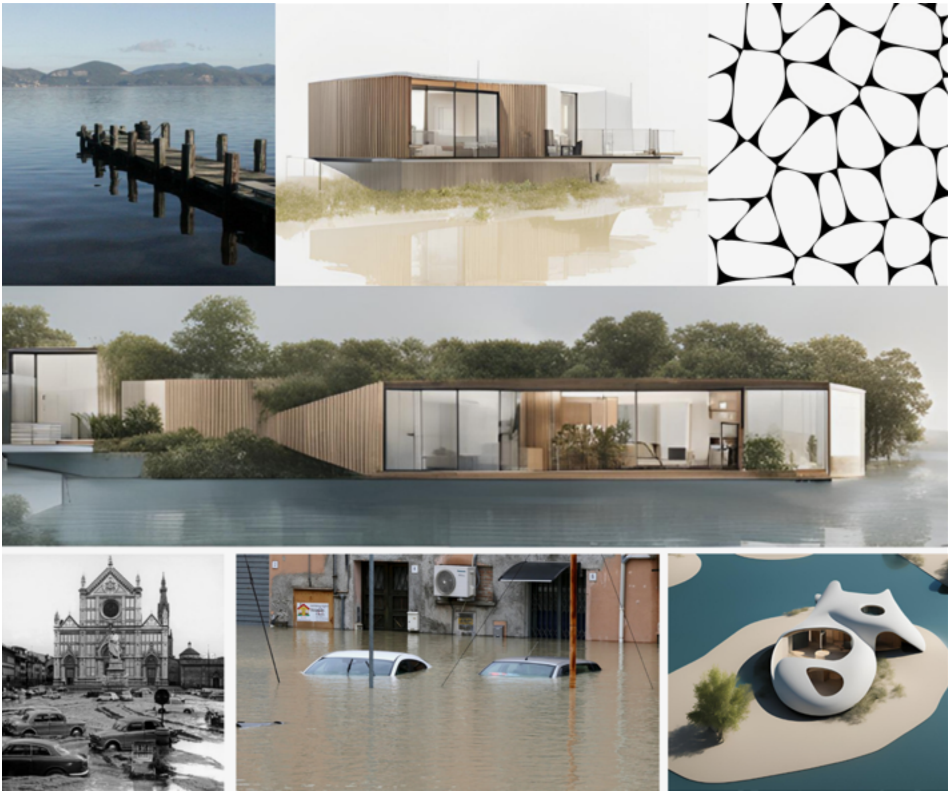


Figure 1. Irene Fiesoli, Moodboard of the MUTABILITY project, including AI-generated images to convey the housing unit concept, inspirational pattern references, and archival photographs of the 1966 Florence flood and the more recent 2023 flood in Campi Bisenzio, 2025.

2. The New Concept of Amphibious Living

MUTABILITY introduces the concept of amphibious living, inspired by the dual life of organisms that adapt to both aquatic and terrestrial environments. The proposed housing units are nomadic, capable of adapting to environmental changes, in line with the principles of adaptability, reversibility, and temporariness. This feature addresses the need to overcome the static and permanent paradigm of dwelling, promoting instead a vision of living as a temporary, dynamic

experience, interconnected with the natural cycles of the territory (Tarrius, 1993; Braidotti, 2013).
The designed structures are based on a highly flexible modular model. The minimum unit – a studio apartment with an integrated technical cell – is composed of prefabricated envelope subcomponents, which can be assembled into different configurations. This modularity allows for high customization of spaces, enabling adaptation to specific user needs and diverse geographic settings. Units can be installed either on water (as houseboats) or on land (as tiny houses), striking a balance between mobility and stability.

The assembly of the units is designed through dry mechanical connections, enabling fast mounting and disassembly even in adverse environmental conditions. Modules can be anchored using steel floating systems with adjustable ballast or, alternatively, secured to floating platforms that adapt to water level variations. From an aesthetic standpoint, the project adopts a neutral color palette inspired by the natural tones of the lake landscape – reed green, sandy beige, deep blue – along with locally sourced materials, to reduce both environmental and visual impact and ensure harmonious integration with the surroundings. The volumes are compact and devoid of protrusions, with matte surfaces and anti-reflective treatments.

The hydraulic system includes integrated rainwater harvesting and filtering for non-potable uses, along with a greywater treatment unit. Potable water is supplied through an integrated tank that can be refilled via a connection to the grid or through mobile delivery, depending on site conditions.

The design draws inspiration from biodesign principles, aiming to build an integrated dwelling ecology where form follows not only function but also the landscape. The architectural solutions are conceived to be lightweight, demountable, and low-impact, minimizing land consumption and promoting short, reversible, and recyclable building life cycles.

A central element of the project is achieving the nZEB (Nearly Zero Energy Building) standard, made possible through the integrated use of innovative biomaterials, smart systems, and IoT technologies (Hernandez & Kenny, 2010). The housing module is designed to operate as an active node within Positive Energy Districts (PEDs), producing more energy than it consumes (Salvia & Reckien, 2019) (Fig. 2).

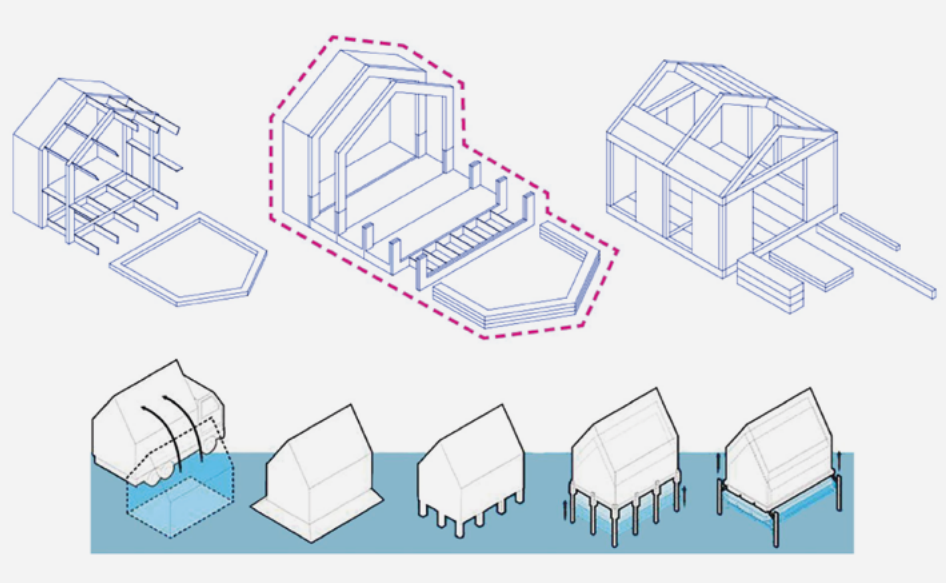


Figure 2. Rosa Romano, technical structural drawings of the housing module and the composition of the external panels, 2025.

The biomaterial used to construct the envelope panels stems from a patented technology developed by the University of Florence – Department of Industrial Engineering (DIEF). It is a composite made from agricultural waste fibers and semi-expanded PLA bioplastic. In addition to being biodegradable, this material enables the valorization of agricultural and industrial waste, following circular economy principles. The production process, implementable with existing industrial technologies, requires no water and avoids fossil-based additives, thus significantly reducing environmental impact.

The smart system ensures real-time monitoring and efficient operation of the housing module. Integrated sensors measure air quality, temperature, humidity, water, and energy consumption, optimizing resources and improving user comfort. IoT solutions also allow the unit to be part of a broader network, turning each dwelling into a connected element of a sustainable urban system.

The prototype's realization stems from a partnership between academic institutions and Tuscan companies in the manufacturing and nautical sectors. The design of the housing concept and modular system, as well as the interior design, is led by the Department of Architecture (DIDA) at the University of Florence. Insulated envelope systems are developed by Arredoline and Espansi Tecnici, in collaboration with the Departments of Industrial Engineering (DIEF) and Agriculture (DAGRI). The floating solutions are designed by Cantiere Navale Tureddi Group, while the smart technologies are provided by V.Y.C. srl – Yachtica.

This ecosystem of multidisciplinary expertise positions the project as a catalyst of territorial innovation, piloting a model replicable at national and international scales (Urbani, 2005).

3. Methodology

The *MUTABILITY* amphibious housing module also fits within the broader transformations triggered by climate change, including rising sea levels and extreme weather events such as prolonged droughts and intense rainfall. These phenomena are creating a highly variable and unpredictable landscape characterized by instability and global urgency. Even at the national level, the effects of this situation are already evident. Recent massive floods in Tuscany are a clear example.

The innovative nature of the *MUTABILITY* project lies precisely in its intention to integrate these housing units into a design process that can be defined as *Emergency Design* or *Design for Resilience*. This design approach aims to withstand the impact of natural disasters and, where possible, to save human lives. It is a path increasingly pursued by young designers around the world, aware of the environmental consequences of climate change. The energy performance of the housing module will be assessed through dynamic thermo-hygrometric simulations aimed at quantifying compliance with current energy efficiency regulations. These include: the global energy demand index of the housing unit, measurable in kWh/m^2 per year; indoor comfort parameters, measurable through PPD (Predicted Percentage of Dissatisfied) and PMV (Predicted Mean Vote) indices; and the thermo-hygrometric performance of the envelope systems used, measurable in terms of thermal transmittance (U-value, W/m^{2}K) and thermal inertia (expressed in hours of time lag). Throughout the entire project, an interdisciplinary approach will be adopted, involving professionals from technical and design-related fields such as architects, designers, engineers, and landscape planners. The expected results are:

a. Design and prototyping of a sustainable, energy-efficient housing module, dry-assembled through prefabrication processes, suitable for creating PEDs in marine environments;
b. Development of biomaterial formulations and prototypes, also considering local supply chains;
c. Implementation of innovative industrial processes based on the principles of the blue economy.

To achieve these results, the methodology underpinning the *MUTABILITY* project is structured in several integrated phases, combining theoretical research, design experimentation, and full-scale prototype development. The first step involved an analysis of the environmental, social, and regulatory requirements specific to the context of Lake Massaciuccoli.

This was followed by a co-design phase with industrial partners and local stakeholders, aimed at defining the functional and performance requirements of the housing module.
The design process adopted an iterative approach, based on environmental simulations, structural studies, and material testing, particularly focusing on the optimization of the patented biomaterial.

The process integrated parametric digital modeling, physical mock-ups, and verifications of the smart systems and technical installations, in order to ensure compliance with nZEB standards and adaptability to different installation scenarios.

Finally, the construction of the minimum housing prototype (a studio unit with integrated technical core) is currently underway, subject to testing in a simulated environment and, subsequently, in situ.

4. Sustainable Tourism and New Housing Models

The prefabricated building sector, closely tied to the construction market, has for over a decade been oriented towards developing dry-assembled, low environmental impact solutions that can be used to create new resilient urban settlements. The history of architecture has, in fact, always been marked by experimentation in the design and realization of prefabricated housing modules intended to respond to emergencies, particularly following catastrophic events or natural disasters.

In recent years, numerous examples have emerged of built environments specifically designed to be resilient to the effects of climate change, promoting new energy models that ensure independence from traditional energy sources. This is the case, for example, of several neighborhoods developed in Amsterdam, such as Ijburg, De Ceuvel, and Schoonschip. In particular, Schoonschip can be considered an innovative example of sustainable urban development, designed as a *Positive Energy District* (PED), that is, an area capable of producing more energy than it consumes.

The project was developed by Space&Matter, a group of Dutch architects and urban designers, in collaboration with various partners and residents, adopting a holistic approach that integrates innovative solutions for environmental sustainability and building-scale energy efficiency. The housing units in the Schoonschip district are built on floating platforms and incorporate advanced technologies to reduce energy consumption and carbon emissions.
Each unit is designed to maximize energy efficiency and resource use, incorporating solar panels, heat pumps, and rainwater harvesting systems. The housing units in this remarkable example serve as a primary reference for the *MUTABILITY* project, which aims to design amphibious housing units suitable for hydrogeologically vulnerable areas located near water basins, rivers, and coastal zones.

MUTABILITY draws inspiration from these experiences to develop a new floating housing module that can be used both in coastal areas – for example, to create new sustainable tourist settlements –and in geographic locations, such as those in the Netherlands, where adaptive housing solutions are required to address the issue of rising water levels.
Beyond construction innovation, *MUTABILITY* proposes a radically new interpretation of sustainable tourism. The housing units, conceived as temporary and reversible infrastructures, are designed for installation in protected natural areas without disrupting their ecological balance. These micro-architectures encourage experiential and responsible tourism, promoting territorial knowledge through slow and environmentally respectful modes of use.

In an era when mass tourism exerts significant pressure on landscapes and communities, the project presents itself as an alternative combining aesthetics, ethics, and sustainability. The interaction between guest, nature, and architecture is conceived as a cultural and pedagogical experience, capable of fostering ecological awareness and a sense of belonging to place. Thanks to their adaptability to extreme weather conditions, such as torrential rains or prolonged droughts, the units are ideal tools for supporting risk prevention policies and climate resilience strategies. In territories subject to seasonal cycles or hydrogeological instability, the floating micro-units offer a viable alternative to conventional buildings, providing temporary solutions that avoid land consumption and preserve the landscape.

MUTABILITY housing units thus become mobile devices for sustainable and conscious living, adaptable to different usage cycles: temporary residences, climate shelters, educational laboratories, ecological tourist facilities, or mobile residencies for artists and researchers seeking tranquil spaces in close contact with nature.
Dwelling expands across time and space, becoming an opportunity for interaction between cultures, environments, technologies, and everyday practices (Ghosh, 2016).

5. Conclusions and Future Perspectives

The most innovative aspect of the *MUTABILITY* project lies in the creation of a housing module capable of operating both on land and water, while ensuring extremely high energy efficiency in line with nZEB (Nearly Zero Energy Building) standards. This goal will be achieved through an original and interdisciplinary approach that combines the use of advanced biomaterials with the integration of smart technologies for optimized energy consumption and indoor comfort management. Another particularly innovative feature of the project is the possibility of installing the housing module within floating micro urban units, which will be assembled to form *Positive Energy Districts* (PEDs).

This will not only allow for more efficient use of space in urban areas but also promote a more sustainable and resilient urbanization, aligned with the principles of the Green Deal and the New European Bauhaus. In the long term, the *MUTABILITY* project aims to be a virtuous example of creative and green design, resulting from the interdisciplinary work carried out by all project partners. From this perspective, *MUTABILITY* housing modules can be considered true "catalysts for change," contributing to the creation of a socially, economically, and environmentally sustainable experience. The *MUTABILITY* project represents a significant advancement beyond the current state of the art in sustainable construction and resilient urbanization. The key features that distinguish this proposal are:

- Integration of advanced building-system management technologies: IoT and smart home systems are used to efficiently manage energy, water resources, and infrastructure within the housing module. This level of automation and intelligent control goes beyond the solutions currently available in the building sector.

- Use of biomaterials and biodesign: the project employs biomaterials derived from natural waste resources, in line with biodesign principles. The adoption of ecological and sustainable materials not only reduces the environmental impact of construction but also offers superior performance in terms of thermal insulation, structural resistance, and indoor environmental quality.
- Modularity and flexibility: the modular nature of the housing unit allows for flexible and customizable configurations, adaptable to user needs and various environmental contexts. This flexibility surpasses traditional construction methods, offering greater adaptability and versatility in housing solutions.
- Holistic life-cycle approach: the project considers the entire life cycle of the housing module, from conception to decommissioning. The use of reversible dry-assembly systems and prefabrication allows for easier installation, maintenance, and disassembly, contributing to a reduction in the overall environmental impact of the building.
- Enhancement of the territory and natural resources: *MUTABILITY* goes beyond the simple construction of individual housing modules by aiming to regenerate and enhance the surrounding territory. The inclusion of floating micro urban units and the promotion of Positive Energy Districts (PEDs) represent an innovative approach to urban planning, fostering sustainable and resilient development.

In summary, the *MUTABILITY* project aims to go beyond the current state of the art in sustainable construction and urbanization by adopting cutting-edge technological solutions, using innovative materials, and applying a holistic life-cycle approach to buildings. This advancement can be measured through specific indicators that quantify the degree of innovation and sustainability offered by the project, specifically:

- Energy efficiency and intelligent resource management: *MUTABILITY* aims to achieve the nZEB energy standard using advanced technologies, the integration of renewable energy systems, and intelligent (IoT-based) management of systems and resources within the housing module. Progress will be measured by quantifying energy savings and efficiency compared to conventional building practices, with a direct impact on carbon emissions reduction.
- Material sustainability: the use of biomaterials and the biodesign-based approach represent a significant step forward compared to traditionally used materials. Progress will be assessed based on the reduction of environmental impact related to the production and use of construction materials, as well as the creation of healthier and more comfortable indoor environments.
- Valorization of material and immaterial territorial values: community engagement and the enhancement of the surrounding territory are key aspects of the advancement proposed by *MUTABILITY*. Progress in this area can be measured through the degree of community involvement in the design process, the creation of local economic opportunities, and the regeneration of natural and urban spaces.

MUTABILITY does not merely propose a technological innovation – it aims to transform the very concept of dwelling, placing the relationship between humans and the environment at the center. Housing is no longer conceived as a fixed and immutable structure, but rather as an adaptive organism capable of evolving in response to changing needs and environmental conditions (Fig. 3).

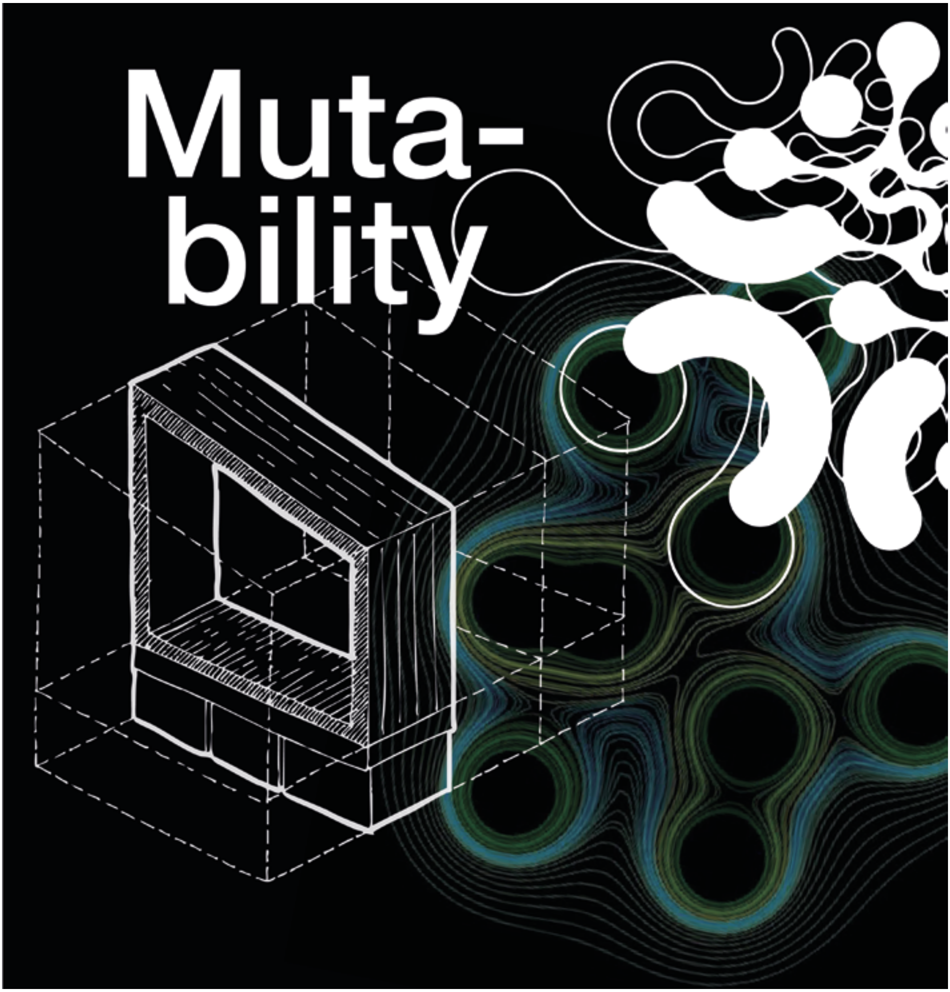


Figure 3. Irene Fiesoli, initial sketches of the housing module concept structure with a background pattern highlighting the project's intrinsic feature of connection with the natural ecosystem, 2025.

In this perspective, architecture becomes a tool for mediating between ecological and social dynamics, contributing to the construction of a new culture of living based on adaptability, transience, and respect for planetary boundaries (Braidotti, 2013).

Preliminary results confirm the validity of the MUTABILITY housing model in terms of environmental adaptability and energy sustainability. Energy simulations and initial tests on the developed biomaterial show efficient thermal behavior and a significant reduction in environmental impact compared to conventional materials. Moreover, the constructive modularity allows for a high degree of configurability, making the system suitable for various geographical and climatic conditions. Tests conducted on the integrated smart systems demonstrated the ability to monitor and optimize consumption in real time, enhancing the quality of living. The collaboration with local companies has also enabled a positive assessment of the model's replicability on an industrial scale. The next steps include on-site environmental tests and a complete Life Cycle Assessment (LCA) of the system.

Thanks to the flexibility of its modular system, the sustainability of the materials used, and the integration of intelligent technologies, *MUTABILITY* emerges as a replicable housing model for fragile territories, promoting best practices in environmental architecture. The project also shows promising market potential, meeting the growing demand for eco-compatible housing solutions from tourists, public administrations, and environmentally conscious citizens.

In conclusion, *MUTABILITY* positions itself as a reference point for a new generation of dwellings that merge innovation and responsibility, ecological vision and positive impact. In a rapidly changing world, sustainable living is no longer just an option – it is an urgent necessity.

References

Braidotti, R. (2013). *The posthuman*. Polity Press.

Ghosh, A. (2016). *The great derangement: Climate change and the unthinkable*. University of Chicago Press.

Hernandez, P., & Kenny, P. (2010). From net energy to zero energy buildings: Defining life cycle zero energy buildings (LC-ZEB). *Energy and Buildings, 42*(6), 815–821. https://doi.org/10.1016/j.enbuild.2009.12.001

IPCC. (2021). *Sixth assessment report (AR6)*. Euro-Mediterranean Center on Climate Change. https://ipccitalia.cmcc.it/ar6-sesto-rapporto-di-valutazione/

NASA. (n.d.). *Global climate change: Vital signs of the planet*. NASA Climate Change. https://climate.nasa.gov/

Rosso, F., Mannucci, S., Ferrero, M., & Cecere, C. (2019). Resilience and adaptation: Constructive characteristics and thermo-energy performance in dynamic conditions of floating and amphibious buildings. In *Colloqui. AT.e 2019: Proceedings of the Congress on Ingenuity and Construction in the Age of Complexity. Urban Form and Architectural Individuality* (pp. 785–794). Politecnico di Torino.

Salvia, G., & Reckien, D. (2019). Positive energy districts: Urban development towards energy transition. *Cities, 98*, 102573. https://doi.org/10.1016/j.cities.2019.102573

Tarrius, A. (1993). *La mondialisation par le bas: Les nouveaux nomades de l'économie souterraine* [Globalization from below: The new nomads of the underground economy]. Balland.

Urbani, P. (2005). *City and territory: Tools and methods*. Gangemi Editore.

IV

BIOGRAPHIES

Giovanna Binetti
Giovanna Binetti is a PhD student in Design at the Department of Civil and Environmental Engineering, University of Perugia. She earned her master's degree in Planet Life Design, an educational track focused on issues of social inclusion and environmental sustainability. She is a Researcher in the field of ecodesign and circular economy, with a focus on designing systems and products that promote responsible use of resources.
giovanna.binetti@dottorandi.unipg.it

Arianna Bionda
Senior Researcher and Professor at Politecnico di Milano, PhD in Design, Architect, Sailor and Yacht Designer. She is involved in research and teaching activities within the Yacht Design and Vessel Design group and the SMaRT Lab, focusing on nautical innovative technologies, materials and interaction practices. She contributes to projects on Yacht Design Digitalization and Design for Sustainability: Industry 4.0; Digital Technologies Onboard; Smart Shipbuilding; Design for Sustainable Material and Technology; Alternative Fuel Vessel Design; Design for Circular Economy, Disassembly and Recycling; Sustainable Social Innovation and Business Model; Design4all. She is Vice-Director of the Yacht Design Specialized Master, Director of the Executive Interior Yacht Design course and Project Manager of the Polimi Sailing Team.
arianna.bionda@polimi.it

Mariateresa Campolongo
PhD in Architecture and Design (Naval and Nautical Design curriculum) from the University of Genoa, with a research thesis entitled Interior Yacht Design, 100 years for 100 interiors. In 2016, she was a courtesy instructor at Florida International University of Miami (USA) and, in 2020, a visiting professor at Beijing University of Chemical Technology (China). She is currently an adjunct professor at the University of Genoa, where she teaches Interiors 1.2 for the Master's Degree in Design Navale e Nautico and Interior Design for the Master's Degree in Yacht Design.
mariateresa.campolongo@unige.it

Aura Escobar Padilla
Grew up in Merida, Venezuela, and has been in the USA for about 10 years. After graduating from the Columbus College of Art and Design in 2017 with a degree in industrial design, she worked for Mycroft AI and Stratos Innovation Group. She is currently part of Milwaukee Tools' front-end innovation team as a Design Researcher, where she applies human-centered research to innovative product development.
auraepadilla@gmail.com

Sue Fairburn
Canadian Design Academic and Climate+ Challenge Fellow. With post-grad degrees in Environmental Physiology (1993) and Environmental Design (2002), her focus is Design for Extremes and Climate Ecologies; bridging body, environment, and society, exploring how environmental extremes – pressure, temperature, air quality – inform conceptual shifts in how we live and share the planet. Her approach to climate resilience is transdisciplinary, applying scenario-based and embodied methods alongside fieldwork, data science, concept prototyping and field testing. For 20+ years, she has developed curriculum on design/research methods, presented at international conferences, facilitated art and design workshops, and led research projects across UK/Europe, Canada, and Africa. Her work appears in journals, book chapters, exhibitions, artifacts, and zines.
sue.fairburn@kpu.ca

Irene Fiesoli
Designer and a Researcher (RTDA) at the Department of Architecture DIDA of the University of Florence (Italy). She has completed her PhD in Architecture (curriculum of Design) at the University of Florence and she is involved in research activities at the Sustainable Design Laboratory (Department of Architecture DIDA, University of Florence, scientific coordinator Prof. Giuseppe Lotti), specializing especially in the sectors of Communication and Digital Design, Strategic Design for and with territorial systems, Sustainable Design and Design for Social Innovation. As a representative of the Department of Architecture, she has followed not only regional Research and Development projects, but also European and international ones.
irene.fiesoli@unifi.it

Pedro Fonseca Jorge
Architect (2001), with a Master in Intervention Methodologies in Architectural Heritage (2006) and PhD in Minimum Housing (2013) from Faculty of Architecture of the University of Porto (FAUP). Master in Product Designer (2017) and in Visual Arts (2021) by the School of Fine Arts and Design (ESAD.CR) of the Polytechnic of Leiria. Researcher on the "Forest-4future" project at the Polytechnic Institute of Leiria - Design and Arts Research Laboratory (2021-2023). Invited Adjunct Professor, at ESAD.CR of the Polytechnic Institute of Leiria (since 2021).
pedro.a.jorge@ipleiria.pt

Laura Giraldi
Architect and professor of Industrial Design, is the President of the Advanced Sustainable Design Master's Program at the Department of Architecture, University of Florence, Italy. In 2017, she founded KYDE – Kids and Youth Design Lab, the first university-based research laboratory in Italy dedicated to design for children and young people, which she currently directs. She obtained the National Academic Qualification as Full Professor in 2020.
She has coordinated numerous national and international research projects focused on product and service innovation, as well as emergency design. She is the author of several publications and academic papers exploring design culture, with particular attention to the communicative aspects of product, fashion, and living design. She also serves as the artistic director of the Lab Museum of Design, where she curates educational exhibitions on various design-related topics.
Her current main research interest is design for the future.
laura.giraldi@unifi.it

Barbara Imhof
Internationally renowned space architect and design researcher. Her work focuses on developing innovative habitats for extreme environments while also exploring forward-thinking approaches to sustainable living on Earth. As co-founder and co-managing director of LIQUIFER Vienna – Bremen, an interdisciplinary team combining architecture, space engineering, and science, she works on projects dedicated to design solutions for resource-constrained environments, material innovation, and new fabrication methods. Since September 2023, Barbara Imhof has been a professor at the University of Innsbruck, where she brings the content and methods of her space-related work into research and teaching at the Institute of Experimental Architecture, specifically in the Department of Integrative Design – with a focus on extreme environments.
barbara.imhof@uibk.ac.at

Mattia Italia
PhD in Design with a Product Design for Innovation background. His work revolves around strategic design, transition design and sustainability. In particular, his research focuses on the study of processes, methods and tools to support companies during sustainable transition through design. At the same time, he is working on projects that aim to support companies and organisations in the assimilation and application of sustainability principles and values. He currently collaborates with the Design+Strategies Research Lab where he works as a designer and researcher involved in European and National research projects. His teaching activities are based on his research, supporting students in the design of sustainable products and services, collaborating both in the School of Design, School of Management of the Politecnico di Milano, but also in the GSOM and POLI.Design Consortium.
mattia.italia@polimi.it

Giuseppe Lotti
Full professor at DIDA UNIFI, Coordinator of the PhD program in Sustainability and Innovation for the design of the built environment and the product system, and President of the Bachelor Degree Course in Product, Interior, Communication and Eco-Social Design at the University of Florence. He has a degree in Architecture from the University of Florence and obtained the National Academic Qualification as Full Professor during the 2013 session. He has strong competences in Design for sustainability and Design for territorial production system. He is the scientific supervisor of research at regional, national and EU levels on behalf of DIDA – Department of Architecture of the University of Florence and before CSM – Experimental Center of Furniture and Furnishing and Accademia Italiana Arte Moda e Design.
giuseppe.lotti@unifi.it

Marta Maini
Adjunct Professor of Transmedia Design and a Postdoc researcher of the Department of Architecture at the University of Florence. She holds a Master's Degree in Design and a PhD in Sustainability and Innovation for the design of the built environment and product system. Since 2017, she has been a member of the KYDE - Kids and Youth Design Lab, specialising in Communication Design, Design for Kids, Design for Emergency and Digital Design. She has actively contributed to internationally funded high-value innovation projects. Her work focuses on addressing emerging challenges, with the aim of making a positive impact on both society and the environment.
marta.maini@unifi.it

Francesca Morelli
Postdoc researcher at the Department of Architecture (DIDA) of University of Florence. She graduated with a Master's degree in Design with highest honors in 2018 and earned a PhD in "Sustainability and Innovation for the design of the built environment and product system" in 2023. She has worked on several national and international projects within the European Union framework at the Kyde Lab (Kids and Youth Design Lab) focusing on the research and design of product systems for children and young people. Since 2019, she has been collaborating with Anna Querci for the Design Foundation and the Design Museum Lab, as responsible for the setting up of periodical exhibitions as well as the development of related communication and digital content.
francesca.morelli@unifi.it

Maria Dolores Morelli
Coordinator of the Bachelor's Degree in Design and Communication, Associate Professor "Industrial Design", Department of Architecture and Industrial Design, University of Study of Campania "Luigi Vanvitelli". National scientific referent of the POT New educational Empathic Design funded project, she coordinates the activities of 18 Italian universities that have educational offer on Design; Scientific Coordinator of the Research Unit of the University of Campania "Luigi Vanvitelli" of the PRIN 2022 project entitled "The Design System in the Southern Italy territories. Scientific Research: jewelry design, ecodesign and typo-morphological and compositional studies, form-design relationship, in-depth analysis of the topic of distribution (oixonomia) needed for the implementation and control of "small-scale" projects.
mariadolores.morelli@unicampania.it

Massimo Musio-Sale
Academic full professor of Industrial Design at the Department Architecture and Design (dAD), University of Genoa. He chairs the Master's Degree program of Design Prodotto Evento. He chairs the following courses: Studio Workshop of Product Design 2 (Master's Degree in Design Prodotto Evento) and Studio Workshop of Design 3 (Master's Degree in Design Navale e Nautico). He has been a researcher for the University of Cassino (1990 to 2000) and for the Politecnico di Milano (2000 to 2005). He has been a designer of yachts and cruise vessels since 1980.
massimo.salemusio@unige.it

Addie Payne Morgan
Designer and strategist based in Salt Lake City, Utah. She holds a degree in Industrial Design from Brigham Young University (2022) and is currently pursuing a Master's in Strategic Design for Innovation and Transformation at Politecnico di Milano.
addiemarenpayne@gmail.com

Xue Pei
Assistant Professor at the Department of Design, Politecnico di Milano. She holds a PhD in Strategic Design for Responsible Business. Her research and teaching focus on the strategic role of design in shaping business and innovation towards economic, environmental, and societal impact. Her areas of expertise include design for responsible business, organisational transformation, and sustainable transition. Currently, she investigates design-driven strategies for sustainability and circularity in the furniture sector.
Since 2016, she has been involved in several European and national research projects (Horizon 2020, Interreg, Fondazione Cariplo) and collaborated with companies in the furniture, home appliances, telecommunications, and non-profit

sectors. Since 2015, she has taught in public and private universities and published in national and international journals, books, and conference proceedings.
xue.pei@polimi.it

Massimo Piccioni
Researcher in the field of nautical design at Politecnico di Milano, Design Department. He has a Master's degree in Yacht & Cruising Vessel Design from University of Genoa, as well as a Bachelor's degree in Interior Design from Politecnico di Milano.
massimo.piccioni@polimi.it

Gabriele Pontillo
Italian Product Designer, currently a Researcher (RTDA) at the Department of Architecture of the University of Florence. He earned his PhD in Environment, Design and Innovation at the University of Campania "Luigi Vanvitelli".
He is currently involved in research activities at the Sustainable Design Laboratory (Department of Architecture DIDA, University of Florence, scientific coordinator Prof. Giuseppe Lotti), where his main focus is on sustainable production systems and processes, parametric design, and new manufacturing technologies.
gabriele.pontillo@unifi.it

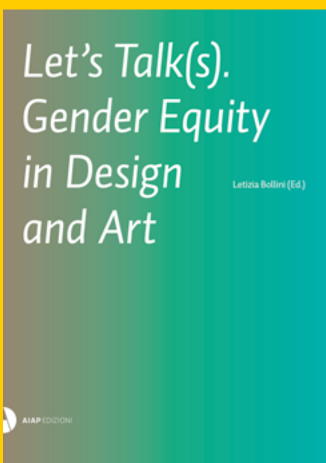
Andrea Ratti
Architect, PhD, and publicist is a researcher and Associate Professor of nautical design and architecture technology at Politecnico di Milano, Design Department. He is currently the director of the Master in Yacht Design, operational manager of the Laboratory for boating (SMaRT-lab), and vice president of the Italian Naval Technical Association (ATENA) Section Lombardy.
andrea.ratti@polimi.it

Ludovico Ruggiero
PhD candidate in Design at Politecnico di Milano, currently conducting an industrial doctoral research in collaboration with Sanlorenzo S.p.A. He is a researcher in the Yacht Design and Vessel Design group and the LeNSLab research group. With a background in Naval and Nautical Design, his work focuses on integrating Life Cycle Design (LCD) principles into yacht design processes to advance sustainable innovation. His research explores circular economy strategies, design for disassembly and recycling, and the role of digitalisation in enhancing the environmental performance and efficiency of yacht design. In addition to his research, Ludovico serves as a teaching assistant for master's and bachelor's degree courses. His work bridges academic research and industry practice, fostering innovation and sustainability within the yacht design field.
ludovico.ruggiero@polimi.it

Benedetta Terenzi
Architect, PhD in Industrial Design, Environmental Studies, and History. She is currently a Professor of Design at the Department of Civil and Environmental Engineering, University of Perugia. Her research focuses on environmental and social sustainability, with particular attention to Ecodesign for the valorization of territories and both tangible and intangible resources. In this context, she investigates the potential of product-service systems across various fields of application, as expressions of Design for Emergency and Design for Change.
Her research and teaching activities also include Design for Kids within the Master's program in Design for Kids and Toys at the Politecnico of Milan, and Jewelry Design in the Master's program in History, Design, and Marketing of Jewelry at the University of Siena. She is the author of numerous publications, including articles, book chapters, and conference proceedings at both national and international levels.
benedetta.terenzi@unipg.it

2025 NEW ITEMS IN AIAP BOOKSHOP!

A Guide to the Funds. AIAP CDPG Summary
The complete Guide to the Graphic Design Archives of AIAP



Let's Talk(s). Gender Equity in Design and Art
A collection of essays offering varied perspectives on gender and inclusion

aiap.it/libreria/

AIAP EDIZIONI

PAD. Pages on Arts and Design
International, peer-reviewed,
open access journal
ISSN 1972-7887

#28, Vol. 18, June 2025

www.padjournal.net

AIAP
associazione italiana design
della comunicazione visiva