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via Festa del Perdono 1 – 20122 Milano – Italy via Roma 171 – 90133 Palermo – Italy info@padjournal.net – editors@padjournal.net

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FORERUNNERS

Gertrud Goldschmidt and Ruth Vollmer

Mathematical Experimentations and the Legacy of Bauhaus Trained Women

Virginia Marano

University of Zurich

Keywords

Women Design, Bauhaus Legacy, Post-War Art, Tactility, Mathematical Art.

Abstract

Gertrud Goldschmidt (commonly known as Gego) and Ruth Vollmer (née Landschoff) were two Jewish women artists that migrated from Germany to America, due to the advent of Nazism. To contribute to their critical reconfiguration, this article explores their important role as women and refugee artists in representing the bridge between modernism and postmodernism in the context of sculpture and decorative arts. Indeed, combining craftmanship and a fascination with mathematical theories revealed through the drawing's complexity, the shape's definition and the value of material, they reinvented the artistic tradition within design approaches. Incorporating aspects of kinetic art, Gego made three-dimensional constructions with which she attempted to challenge the conventions associated with static artworks. Vollmer experimented with wire, steel, and copper mesh to create figural forms that derive from complex constructions of mathematical theories. Even though Gego and Vollmer had no direct impact on one another, they did share the vital New York and they were both influenced by a European avant-garde heritage of Bauhaus and Russian Constructivism.

This article seeks to give a new voice to these pioneering women's artistic discourses, that were extremely inventive in the creation of an experimental design minimalism and a mathematical formalism.

1. Historical Context

In the historical context of post-war America new visual languages attempted to respond to the crisis that has developed in contemporary art. Thus, the temporal and spatial experience of post-minimalism critically began to emphasize the physical process of the artistic ideation and try to invest the sculptural medium with expressive qualities.

The sixties were, in fact, the paradigm of postmodern era, in which the intensity of the creative gesture played a fundamental role in the increasingly experimental practices.

While Europe began the process of dealing with immeasurable trauma of war, exile and relocation, America emerged as the center of artistic creativity.

This was the moment of a crisis, of time, representation, mediums and objects. In 1959, Ferreira Gullar essay *Teoria do não-objeto*

posited the nonobject as the inevitable culmination of the move away from realistic representation in modern painting, while it radically broke with the prevailing emphasis in concrete art on a modernist pictorial ontology that concerned the organization of a painting's constituent elements. (Amor, 2016, p. 3)

In the same years, artists developed a kind of anxiety related to time due to the historical unknowing produced by the very fast pervasiveness of the information age. In particular, chronophobia is described as "an experience of unease and anxiety about time, a feeling that events are moving too fast and are thus hard to make sense of" (Lee, 2006). One of the most influential contribution in a time of worldwide anxiety is the enduring legacy of German modernism. For instance, the echoes of the Bauhaus design were aesthetically present in the pedagogic methods used by female artists in post-war America such as Gertrud Goldschmidt and Ruth Vollmer. The School of Design in Dessau, famous for its multi-disciplinary approach to art and design education, was founded on the equal words of Walter Gropius, who proclaimed in his 1919 *Manifesto* that admission to the school was open to "any person of good repute, without regard to age or sex". Nevertheless, this gender equality remained theoretical. Anja Bauhmhoff stresses these contradictions in *The Gendered World of the Bauhaus:*

In fact, the democratic tradition which is associated today with the Bauhaus was undermined by an ambiguous conception of craftmanship and by a conception of art based on notions of male genius, which differentiated between three categories of art: fine art (*Kunst*), such as painting and sculpture; arts-and-crafts (*Kunstgewerbe*), like pottery and weaving; and handicraft or craftsmanship (*Handwerk*), such as carpentry. Moreover, these categories were themselves gendered: high art and handicraft were male domains, but arts-and-crafts was a female occupation, with comparatively low status. While the first Bauhaus statues, such as its admission policies, explicitly prohibited sexual discrimination against women, the *de facto* Bauhaus policy did just that. (Baumhoff, 2001, p. 19)

Once immersed in Bauhaus theory, women artists and designers connected a new material revolution with a progressist visual expression. Their artistic stories have been denied and

negated hitherto by the old criticism, but in recent years more attention has been dedicated to the historically feminine menaced subjectivity.

2. Post-War Women Artists Battled in the Fields of Making Space

In the anxious post-war time, female artists were trying to build a new feminine history. In order to define a specific artistic creation and a psychological space, they interpreted their existential despair as an empowered form of matrixial resistance. In an intersection between art and history, women artists explored gender dynamics through new material processes that let their shaped objects' investigation find a new spatial and temporal meaning.

To contribute to acknowledge the underrepresented women's voices and challenges, the important exhibition Making Space: Women Artists and Post-war Abstraction held at the Museum of Modern Art in New York in 2017 featured nearly one hundred paintings, sculptures, photographs, drawings, prints, textiles, and ceramic by more than fifty women artists that found their own best achievements between the end of World War II and the start of the Feminist movement. As the title Making space suggests, this exhibition pivoted around the artworks of many women who were working during post-war time and dealing with abstraction as a way of making space within an artworld that was and still is male dominated. The gestural abstraction, usually associated with men artists and based on the rawness and immediacy of their marks, was used by Lee Krasner (American, 1908-1984), Helen Frankenthaler (American, 1928-2011), who invented the soak-stain technique, and

Joan Mitchell (American, 1925-1992). The reductive abstraction in which powerful structure is a matter of reaffirming a new artistic essence has largely to do with the fiber weavings of Magdalena Abakanowicz (Polish, born 1930), Sheila Hicks (American, born 1934), and Lenore Tawney (American, 1907-2007). Furthermore, the space in between painting and sculpture was explored by Lee Bontecou (American, born 1931), Louise Bourgeois (American, born France, 1911-2010) and Eva Hesse (American, born Germany, 1936-1970). The exhibition also featured many little-known treasures such as collages by Anne Ryan (American, 1889-1954), photographs by Gertrudes Altschul (Brazilian, born Germany, 1904-1962), and recent acquisitions on view for the first time at MoMA by Ruth Asawa (American, 1926-2013), Carol Rama (Italian, 1918-2015), and Alma Woodsey Thomas (American, 1891-1978).

Therefore, this group of extraordinary women artists played a very important key role in reinterpreting the constructivist trends of the post-war period through a complex use of mathematics and visual symbols. Specifically, they went back to existing artistic elements from twenties and thirties and in the new cultural and anxious context of the seventies they created their own visual syntax which had been assimilated to American sculpture and feminism with their memories and meanings. The idea of making art changed and turned into an intimate and revolutionary communication of bodily sensuality and feminist subjectivity. A perfect example of this aesthetic change is Alina Szapocznikow, a Polish artist utterly unknown until few years ago. One of her works that can be considered as an object design is her functional and experimental *Lampe-Bouche* (Fig. 1). This work configures itself as a revelation into the disappeared modernisms of post-war Eastern Europe. Szapocznikow had many artistic relations to little known Czech sculptors such as Eva Kmentová (1928-80) and Vera Janousková (1922-2010) who need to be reconsidered within the contemporary representations of femininity.



Figure 1. Alina Szapocznikow, *Lampe-Bouche*, 1966, Coloured polyester resin, light bulb, electrical wiring and metal. Photo by Per Anders Ohlsson, Bonnier Gallery, Stockholm, 2013.

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How many other women have been hidden behind the Iron Curtain that severed East from West in European modernism for forty years? (Pollock, 2013, p. 184)

3. Getrud Goldschmidt and Ruth Vollmer: Definition of a New Mathematical Experimentation

These artistic legacies need to be erased from the historical record and restored to hegemonic cultural memory. So to begin. Gertrud Goldschmidt (Gego) and Ruth Vollmer were two Jewish women sculptors and designers that migrated from Germany to America have rarely been mentioned by art historians. They have received little attention in the context of art historical scholarship until two significant books Ruth Vollmer 1961-1978 (Rottner & Weibel, 2006a) and Gego 1957-1988 (Rottner & Weibel, 2006b) were published in 2006 in conjunction with their German retrospective at the ZKM in Karlsruhe in 2006. The impact of exile and expatriation had implications on their historical underrepresentation. Indeed, their project research was profoundly affected by trauma and traces of memory related to the phenomena of dislocation. The experience of enforced migration they lived has been articulated through an innovative constructivist tradition which reflects upon the new artistic media used in the sixties and the challenging role of women artists in the art world and in the socio-political environment.

They both were influenced by a European avant-garde heritage of Bauhaus and Russian Constructivism and reinvented an "organic constructivism" (Traba, 1977).

Although there is no evidence, besides a small paper with Gego's address found in the Ruth Vollmer's papers part of the

Archives of American Art, that they two were close friends, or that they had any direct artistic impact on one another, Vollmer and Gego did share the vital New York. Furthermore, in the Vollmer's collection at MoMA there is a lithograph by the painter and graphic designer Gerd Leufert, who was Gego's partner from 1952 onwards. Accordingly, this can be considered as a proof of their mutual knowledge.

Ruth Vollmer had to flee her native Germany and finally arrived in New York in 1935 with her husband, Hermann Vollmer, a pediatrician. She began to design three-dimensional modernist window displays for Tiffany, Bonwitt Teller, Lord and Taylor and other prominent New York businesses. Inheriting the traditions of Bauhaus, Vollmer brought the idiom of advanced modern art to the streets of New York City. Thus, she joined the American Abstract Artists group in 1963 at the invitation of Leo Rabkin, who was its president at that time. She brought other younger artists into the group as exhibitors including Sol LeWitt, Mel Bochner, Richard Tuttle. In fact, she was a cherished friend to both Dorothea and Leo Rabkin. Theirs, as Susan Larsen, executive director of the Dorothea and Leo Rabkin Foundation, remembers, was an artistic as well as a social bond of friendship. Vollmer's sculptural works from the 1960s and 1970s combine exacting craftsmanship and a fascination with mathematical

models, such as Plato's philosophy of mathematics and Bernhard Riemann's non-Euclidean notion of space.

She was deeply interested in in the natural sciences and in their application to the arts. According to her formative efforts, the legendary New York gallerist Betty Parsons wrote about Ruth Vollmer "the geometry of space, in an immortal pace, like the power in a flower" (Parsons, 1983, p. 20). She exhibited frequently at the Betty Parsons Gallery, New York, and influenced younger American artists such as Eva Hesse, Donald Judd, and Sol LeWitt.

How can all of this – a lifetime – be squeezed into works of art that are typically small-scale and unassertive? At first the inherited external disciplines were dominant: the constructions of Bach and the Bauhaus: the *Gemütlichkeit* of Euclid. However, nature kept intruding upon the neat world of geometry. (Friedman, 1965, p. 27)

Throughout the fifties, her work "emerged strata by strata as an archaeological excavation emerges" (Friedman, 1965, p. 28) and "took its place among the most compelling and uniquely satisfying works of the late 1960's and early 1970's" (Larsen, 1983, p. 9). In fact, she became a full-time artist late in life.

Unfortunately, contemporary critics at that time "seldom paid attention to her works, registering her individualism through the reductive lens of historical belatedness" (Rottner, 2006, p. 60). As Ann Reynolds points out, "Vollmer's work had rarely been mentioned by art historians and curators even though she often appears in the archives and oral histories of others" (Reynolds, 2006, p. 49). The work she exhibited at Everson Museum of Art in 1974 "suggests that Vollmer is not primarily interested in a final finished product, which may be why they seem so incompletely considered" (Smith, 1974, p. 72).



Figure 2. Ruth Vollmer, *Steiner Surface*, 1970, Acrylic, collection Dorothea and Leo Rabkin. Photo by Karl Steel.



Figure 3. Ruth Vollmer, *Cosmic Fragments*, 1962, Bronze, Jack Tilton Gallery, New York. Photo by Virginia Marano, 2019.

The essence of her work lies deeply in her constructions and architectural objects. Based on mathematical models, Vollmer's *Steiner Surface* (Fig. 2) "dipped in its integument of translucent acrylic, which clings lightly and softly to the ribs of the form, it is just as delicately refined and as seemingly immaterial and object as the Gabo" (Vallye, 2006, p. 101). She employed a geometrical vocabulary transferred into a cosmological realm. For instance, *Cosmic fragments* (Fig. 3), "the Ovaloids, *Walking ball* and *Obelisk* all reflect a modernist equation of art and subjectivity, the kind of surrealist engagement with psychic themes that preoccupied European artists" (Swenson, 2006, p. 96).

Looking more closely at Vollmer's sculptures and photographs, *Obelisk* appears "cartesian and surrealist, architectural and bodily, ancient and futuristic, a phallus punctured with holes, an unwieldy, uneasy object, which even the artist seems to have found difficult to place" (Lovatt, 2010, p. 156). Vollmer's major shift to geometry did not occur until 1963, the same year Rabkin became president of the American Abstract Artists. He remembers:

I told her that she was far, far, far from being a surrealist, that her real angle should have been on geometric forms. And I had a big battle with her. I am very glad that I did. That's when I brought her the first piece of wax (Swenson, 2006, p. 96).

Vollmer made a grapefruit-size spheroid out of wax on this occasion, using strips of the material to build up a rounded shape instead of simply forming a ball. Probably this sculpture can be traced in one of these two photographs found in Vollmer's archives. She threw this first attempt in the trash can, but Rabkin and his wife, Dorothea, salvaged its cast in bronze. In Swenson's words:

Even after turning to the fine-art medium of bronze around 1960, she conceived her viewers as participants, dissolving boundaries between subject and object through staged physical encounters-objects were activated when touched and held, rotated, arranged, and, in the case of *Musical Forest* (Fig. 4), 1961, even played as an instrument. A slippery dual identity characterises her objects from the fifties and sixties: Forms are erotic and abstract, derived from geometry but alluding to the body.



Figure 4. Ruth Vollmer, *Musical Forest*, 1961, Bronze, Dorothea and Leo Rabkin Foundation, Portland (Maine). Photo by Virginia Marano, 2019.

Paradoxically, as Vollmer's sculpture grew more abstract, themes of eroticism and play grew more central.

With her embrace of geometry as a formal vocabulary in the early sixties, the sphere could support multiple readings-while remaining just a sphere (Swenson, 2006, p. 88).

Gego was born in Hamburg in 1912 and raised in a liberal Jewish family of bankers. She studied architecture and engineering at the Technical University of Stuttgart and graduated in 1938. She was influenced by the innovations of the Bauhaus, a creative laboratory of design that operated for over two decades in pre-Hitler Germany. But, in 1939 she had to leave Germany. She moved to Caracas the following year but turned to the full-time practice of art only in the mid-1950s. Incorporating aspects of kinetic art and op art, she made three-dimensional constructions suggesting familiarity with the work of such Venezuelans as Carlos Cruz-Diez and Jesús Rafael Soto, who at that time were living in Paris (Morgan, 2016, p. 146). In 1987, on the initiative from the City of Hamburg, Professor Fritjof Trapp sent to Gego a questionnaire regarding her life in Caracas. This project was entitled Exile and Emigration of Jews from Hamburg. Gego completed this questionnaire several times, but never sent it back to Hamburg. The filled-in questionnaires were found in her estate after she died in 1994. They were headed "Reflections on my origins and encounters in life". Gego used to call bicho her constructions which invade the space as thinking objects. It "signifies in Spanish animal or bug. In Venezuela, bicho is also a colloquial interjection of rejection, and a derived word such as bichero, is used to refer to groupings of different animals or heterogeneous objects" (Amor, 2005, p. 117). Her objects strongly become perceiving elements of a bigger assemblage. The expansion of any cell is infinite and the experience that resonate is a visual wonderment. She used to describe her geometric sculptures made in sixties and seventies as drawings without paper. Gego's interdisciplinary work deconstructs the confinements of space and overcomes the division between the imaginary and the rational. She developed a distinctive style, combining geometric abstraction with her architectural and engineering

education, and used three-dimensional lines that appeared to be in motion in the space as a translation of a projective experience.

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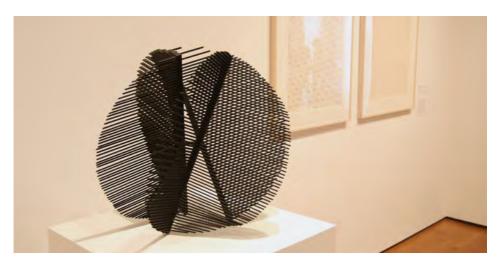


Figure 5. Gertrud Goldschmidt (Gego), *Sphere*, 1959, Welded brass and steel, Museum of Modern Art, New York. Photo by Richard Burghause, 2010.



Figure 6. Gertrud Goldschmidt (Gego), *Reticulárea*, 1969, Aluminum and stainless steel wire, Museo de Bellas Artes, Caracas. Photo by Luis Ricardo Castro, 2008.

She "expanded the line into planes, volumes and expansive nets to engage with the problems of form and space, using light, shadow, scale and gravity in a constant process of discovery" (Le Feuvre, 2017, p. 161). Her work appeared to be in motion, but it is only an illusion created by the movement of the viewer. This effect is especially evident in the *Sphere* (Fig. 5) and developed itself in the complex and intertwined structure called *Reticulárea* (Fig. 6).

It was created at the Museo de Bellas Artes in Caracas in 1969 and consists of an expansive, modular wire grid that transcends time and traverses the space. It enables the visitors to immerse themselves in its vanishing structure that seems to be infinite. This work, made by Gego at the age of fifty-seven, is one of her most radical installations in its "improper use of geometry, its attack on gestalt and organic integrity, its deployment of a deformative matrix and dismissal or proportions, symmetry, and delineation" (Amor, 2005, p. 118). It transcends the apparent exactness of geometry and introduce the *situatedness* as a category. The fragile here seems to be combined with the permanent, and the transparency with the weight. In dialogue with this installation, Gego realized a small series of *Square Reticulareas*.

Among them, there is *Reticularia Cuadrada horizontal 71/10* (Fig. 7), in which she stresses the geometry and mathematical discipline. According to Rina Carvajal, Gego privileges "freedom of experimentation" over aesthetics.

The rigorous technical and scientific precision Gego acquired in her early training as an architect and engineer and the skilled craftsmanship she developed over the course of her career allowed her to explore deeply the possibilities for structural systems and materials, spatial anti modular organization, and the processes of manual labor. She managed to create innovative systems for manipulating aluminum, iron, and stainless steel which allowed her to work independently of welders. (Carvajal, 1999, p. 120)

4. The Legacy of Bauhaus

Gego and Vollmer proposed an alternative and symbolic spatial experience that presuppose a kinesthetic empathy. They were able to reinvent and affirm their own practice in a predominantly male-dominated context. Their work was based on the structural translations of corporeal line, space and volume. Vollmer's mathematical forms and Gego's geometric abstract intricate metal weawing patterns build a visual vibration that explore different optic effects and many levels of perceptual experiences.

The Bauhaus's legacy in both artists formation interact with their compositional creativity. The materiality is crossed by a beautiful distortion that makes these objects and installations divinely repetitive and unique. The repetition is intertwined with the tactility category that denudes the fragility of the work itself. Yet, a tactile bodiliness in their sculptural and residual objects is invoked at the same time that the forms they prefer are intricate and complex.

Vollmer, hence, "designed and made playthings – *tactile sculptures* such as crocodile of corrugated metal and, later, a huge horsehair caterpillar – for the annual Children's Carnivals at the Museum of Modern Art" (Friedman, 1965, p. 28).

06

Gego's familiarity with Bauhaus took shape when she taught at the Architecture school of the Universidad Central in Caracas. Therefore, she contributed to the development of a Basics Design course modelled on Johannes Itten's Bauhaus *Vorkurs*, which has been "transmitted to Gego as verbal knowledge almost certainly by Gerd Leufert, who had been trained as a designer in Germany" (Kyburz, 2014, p. 67). It "applied a neo-liberal pedagogy which was inspired, among others, by the writings of the Swiss pedagogue Heinrich Pestalozzi (1746-1827), the German philosopher and founder of Anthroposophy, Rudolf Steiner (1961-1925) and the Italian pedagogue Maria Montessori (1870-1952)" (Kyburz, 2014, p. 73).

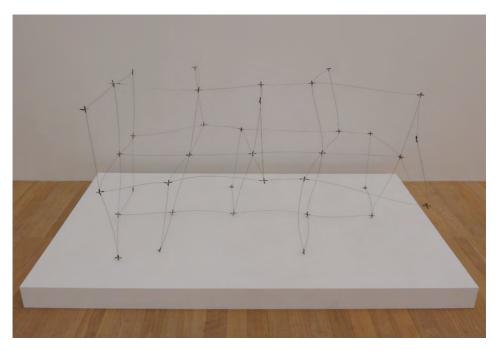


Figure 7. Gertrud Goldschmidt (Gego), *Reticularia Cuadrada horizontal 71/10*, 1971, Steel rods and metal joints, Tate Modern, London. Photo by Helen Sanders, 2016.

Henceforth, Gego introduced concepts such as line, space, volume, form, structure and the basics of spatial representation. There are many pictures from her students that show the Bauhaus-inspired interest in modularity and experiments in tensegrity (Amor, 2016). The University itself symbolizes the perfect integration of the arts, architecture and urban design. It was designed by the Venezuelan architect Carlos Raúl Villanueva and it became one of the most successful architectural building in Latin America.

The covered plaza by Villanueva, the linked Aula Magna auditorium and the latter designed with Alexander Calder define a distinct modern aesthetic model that reminds of the postwar experiments. The influence of Bauhaus's methods "coincides with the inauguration of the *Facultad de Arquitectura*'s new building in 1957, where professors and students alike revolved around the philosophy of the Compisition Workshop" (Auerbach, 2003, p. 407).

In the same years, Gego made her geometric experimentations concrete in *Reticulárea* and her work embodied spatial interconnections, celebrating the variations of nets and knots (Fig. 8). It evokes Alexander Calder's early wire sculptures as well as the Buckminster Fuller's constructive design for the geodesic dome. As Amor writes in her beautiful and deeply researched book *Theories of the Nonobject*,

Gego seems to have been attracted to the aesthetic possibilities of these Bauhaus related exercises and expansive, netlike morphologies of space frames during these years of intense teaching. And given the fact that neither her *Flechas* nor the *Reticulárea* were meant to enclose or cover space as Fuller's geodesic domes did, it is tempting to see Gego's work as a morphological and structural riposte to the German architect Konrad Waschmann's large metal space frames of the early 1950s. (Amor, 2016, p. 182)

Following the Bauhaus, Gego and Vollmer were draftswomen, artists and designers. They reinvented the materials and the structure into a mode of self-empowerment and in new theoretical categories that transcend the modernist trajectory. In fact, the 2019 that marked the 100th birthday of the Bauhaus encouraged to revise the strong gender bias at the base of the Bauhaus school and started to recognize many female members of the school.



Figure 8. Gertrud Goldschmidt (Gego), *Esfera* No. 2, 1976, Wire and stainless steel, Fondation Cartier pour l'art contemporain, Paris. Photo by Barbara Smith, 2018.

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Among them, Anni Albers, Marianne Brandt, Gertrud Arndt, Gunta Stölzl, Otti Berger, Ilse Fehling, Margarete Heymann, Ruth Vollmer, Gertrud Goldschmidt and many others.

5. Conclusion

This article tries to point out the importance of women designers and artists in the post-war time. Among them, Gego and Vollmer courageously defended their own artistic language and empowered new forms of female and Jewish identity. This contribution seeks to promote visibility of female protagonism in design with the intention of highlighting the feminine dimension of contemporary art production and the feminist vision involved.

Finally, this discussion wants to break with the hegemonic narrativity of an art world that continues to be dominated by a male gaze and contribute to an ongoing dialogue about women and design.

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BIOGRAPHIES

Ana Julia Melo Almeida

Ph.D. Student in Design at Faculdade de Arquitetura e Urbanismo, Universidade de São Paulo (FAU-USP), Brazil (research supported by Fapesp). Currently, she is attached to École des Hautes Études en Sciences Sociales (Ehess-Paris) for a doctoral internship. Her current research is concerned with: women's history, gender history, design history, textile artifacts, Brazilian modern design.

ajuliamelo@usp.br

Shujun Ban

Shujun Ban is a lecturer of Department of Product Design at School of Arts and Design in Qingdao University of Technology. She is an experienced and welcomed teacher in industrial design for 16 years, with continuous enthusiasm in innovation and follow-up interactive guidance of teaching. She has taught more than 50 subjects, averaging 360 in-class hours annually. She keeps on exploring interdisciplinary in design and arts, focusing on traditional handicrafts research. She is good at planing, designing and promoting cultural brands. She has self-created a media brand, "Second Air". She is an expert judge of industrial design competition in Shandong Province and an excellent instructor in design competitions and workshops. She graduated from Nanjing Forestry University with a master's degree of Mechanical Design and Theory with specialization in Industrial Design in 2004. She will be a visiting researcher at Politecnico di Milano. banshujun@126.com

Roberto de Paolis

Graduated *cum laude* in architecture at the Politecnico di Milano in 1983, and gained a Ph.D. in Industrial Design in 1996. Assistant Professor at the School of Design since 2001, conducts research in Department of Design, focusing on furniture design, textile design, interior design, and history of design. He has published essays and reviews in magazines, book contributions and international conference papers, and has participated in national and international research programs. **roberto.depaolis@polimi.it**

Umberto de Paolis

After completing his classical studies at the "A. Volta" High School in Como, he took composition at the "G. Verdi" Conservatory in Como, studying the cello and the piano. At the same time he undertook historical, archival and documentary research studies on authors and performers of Italian artistic, musical and performance culture between the late nineteenth and twentieth century, rediscovering and enhancing figures representative of an eclecticism often neglected by official historiographic critics. Since 2012 he has carried out independent research and historical-critical in-depth study for the purposes related to the progress of current research, coming into contact with academic figures of reference in the scientific-disciplinary fields of relevance, conducting research in archives and cultural institutions such as the State Archives in Rome, Bibliothèque National de France in Paris, Patrimoine de la SBM and Archives du Palais Princier in Monaco, Archive of the Teatro Regio in Turin, and The National Archives in London. umbertodepaolis@libero.it

Marinella Ferrara

PhD, associate professor of product design in the School of Design of the Politecnico di Milano. Since 2014 she has been the head of MADEC, the Research Centre of Material Design Culture in the Department of Design. Her researches are mainly focused on design-driven innovation, design for materials (advanced and smart materials), news technologies integration in product and interior design, Future Design Scenarios. With her research, she has made a significant contribution to methodologies of Design for Materials and historiographical work. Moreover, she deals other research topic like the design in Mediterranean countries, gender issues in design and Design History. Co-founder of *PAD. Pages on Arts & Design* journal, since 2011 she has been the PAD editor in chief. Since 2015 to 2017 she has been a member of ADI's executive board, and currently coordinates the technical-scientific committee for long-life professional training of design professionals. Since 2019 she has been a member of the executive committee of *AIS/Design. Storia e Ricerche* scientific journal. Authors of more the 140 scientific publications, she is a member of scientific committee in international conferences, reviewer for international scientific journals, and research evaluator for academic research application in NL and PT. **marinella.ferrara@polimi.it**

Debora Giorgi

PhD, Architect, she is Researcher in Design at the Dipartimento di Architettura of the University of Florence (DIDA-UNIFI). Since 1991 she works on the issues related to Sustainable Local Development and the social implications of the project starting from the Cultural Heritage. For over 20 years she worked in projects in Ethiopia, Algeria, Tunisia, Morocco, Yemen, Jordan, Haiti, with the most important national and international donors WHC - UNESCO, UNCCD, World Bank, European Commission, WMF, AICS... Since 2011 she has been collaborating with the DIDA UNIFI especially in projects around Maghreb countries and in the social field promoting Social Design projects and workshops using co-design methodologies. She is professor of Service Deisgn at DIDA UNIFI, professor of Design for Cultural Heritage in the License Course in DesignS at Ecole Euro-Méditerranéen d'Architecture Design et Urbanisme de l'Université Euro-Méditerranéene de Fès EMADU – UEMF in Morocco and visiting professor in some universities in Mediterranean countries.

debora.giorgi@unifi.it

Melanie Levick-Parkin

Dr. Melanie Levick-Parkin's research is focused on visual communication and design & making practices in relation to intangible cultural heritage, heritage and archaeology, framed by Design Anthropological approaches. Most of her work is about the agency of visual and material language and informed by a feminist lens. She is particularly interested in how gender manifests in/ affects how meaning is made within the public sphere, both materially and visually and how power circumscribes who is able to make meaning and give form in different spheres. She is currently the MFA Design Programme leader at the Sheffield Institute of Arts, Sheffield Hallam University, and also supervises doctoral candidates across Art & Design and for the Research England funded, Lab4living 100 Year Life Project. **m.levick-parkin@shu.ac.uk**

Vittorio Linfante

Art Director and Professor of Fashion Design, Branding, Communication Design, Curation at the Politecnico di Milano, University of Bologna, Poli.design and Milan Fashion Institute. Curator – with Paola Bertola – of the exhibition *Il Nuovo Vocabolario della Moda italiana*, Triennale di Milano (November 2015–March 2016). vittorio.linfante@polimi.it

Cathy Lockhart

Cathy has a PhD in Design and a Graduate Certificate in Higher Education. She has undertaken course and program leadership roles within the Faculty of Design, Architecture & Building at the University of Technology Sydney, Australia, including Industrial Design, Interdisciplinary Studies and Product Design. She has overseen program reaccreditations and renewals to address the global readiness of graduates. Her role as senior lecturer concentrates on introducing design process and methods for first year students; and facilitating industry projects to assist senior students in the transition from education to practice. Cathy worked for many years as a professional designer including her own consultancy business and she is a Member of the Design Institute of Australia. Her research explores the gender mix of the student population in industrial/product design education. In particular, she is interested in the educational experience for students and their transition into the profession.

cathy.lockhart@uts.edu.au

Maria Cecilia Loschiavo dos Santos

Philosopher and Full Professor of Design at Faculdade de Arquitetura e Urbanismo da Universidade de São Paulo (FAU-USP), Brazil. She coordinates the Workshop of Social Design at the Institute of Advanced Studies (IEA-USP). Her work encompasses Brazilian design, discarded products, design, homelessness and recyclable material collectors. closchia@usp.br

Virginia Marano

Virginia Marano obtained a Master's degree in Contemporary Art History at the University of Siena. She is currently in her second year of her PhD at the University of Zurich under the supervision of Prof. Dr. Tristan Weddigen. Her studies are funded by the Swiss Government Excellence Scholarship (ESKAS). Her dissertation topic is on Alberto Giacometti and the

Post-war sculpture in New York. She did a four-month internship at Mumok (2017, Vienna) and a three-month internship at Artipelag (2018, Stockholm) and is a committee member of the Fondazione Centro Giacometti in Stampa. maranovirginia@gmail.com

Anna Mazzanti

Assistant Professor in History of Contemporary Art, at Politecnico of Milano –Department of Design. PhD (Venice) and research fellow (Siena, 2000-2011) her specific fields of research circulate around the XIX to XXI centuries artistic culture, as well exhibitions and relationship between art and design. She has curated various exhibitions including: *Mondi a Milano. Culture ed esposizioni 1874-1950* (Milano, 2015) when she worked about the "thread designers" (Papini, 1923) between the two wars. She studied and wrote about Anita Pittoni, Rosa Menni Giolli, Marcello Nizzoli. She is responsible since 2017 for the group of research D.E.SY (Designing Enhancement Strategies and Exhibit SYstems for the Italian House Museums and Studios) at the Politecnico of Milano.

anna.mazzanti@polimi.it

Marianne McAra

Dr Marianne McAra (PhD, MDES, BA, PG Cert) is the Creative Engagement Research Fellow at the Innovation School at The Glasgow School of Art and works in the areas of youth engagement and creative education. Her research practice is underpinned by human-centred and Participatory Design approaches, with an interest in experimental methods and an expertise working in ethically sensitive research contexts. Marianne teaches and supervises on the Master of Research and Doctoral programmes at GSA.

m.mcara@gsa.ac.uk

Lynn-Sayers McHattie

Professor Lynn-Sayers McHattie (PhD, MBA, BA, PG Cert, FRSA) is Programme Director for Research at the Innovation School at The Glasgow School of Art. Lynn's research foregrounds questions around "crafting futures" in the creative economy. Her research explores craft and textile practices that connect to the indigenous landscape and culture of island communities and the role innovation can play in socio-cultural. She works extensively in the Highlands & Islands of Scotland and S.E. Asia. Lynn is involved in supervising doctoral and M.Res. students whose interdisciplinary inquiries blur the boundaries between addressing contextually located social and cultural challenges and design innovation practice. **I.mchattie@gsa.ac.uk**

Tiziana Menegazzo

Artist and teacher. She lives and works in Turin. She trained in Florence where she graduated in painting at the Academy of Fine Arts followed by a master's degree in Modern Literature, with a thesis in visual anthropology on photography as a mode of self construction. She is currently completing a master's degree in Cultural Anthropology and Ethnology. Always interested in the contamination between different artistic languages, she alternates projects of participatory art, with a particular attention to the female condition, investigated through photography, narration and performance, to a research with an intimate and dreamlike character. She develops her artistic research in the field of gender studies and visual anthropology.

tizianamenegazzo.65@gmail.com

Alfonso Morone

Associate Professor in Industrial Design, at the University of Naples "Federico II" Department of Architecture. Scholarship visiting student at Ecole Nationale Superieure de Creation Industrielle "Les Ateliers" of Paris. He was selected for the 20th "Compasso d'Oro" award, for the section Theoretical Researches and Design Studies, and he gained the Eco_Luoghi 2013 Contest launched by the Italian Environmental Ministry. His research, supported by many essays and writings, is especially concerned with Nature Based Solutions for devices able to face air pollution using natural systems through a combination of plants, phytoremediation mechanisms and bio-filters containing bio-absorbent nanomaterials and in the historical relationship between local manufacturing systems and industrial design. He is leading, as Principal Investigator, the AURA: industrial research and experimental development project for designing a new generation of green & smart

urban furniture supported by the Italian Ministry of Economic Development (2019-2022). In 2017 he wrote *La Fabbrica dell'Innovazione. Gli arredi del Palazzo delle Poste di Napoli 1936*, published by LetteraVentidue, Siracusa. alfonso.morone@unina.it

Susanna Parlato

Architect and PhD student in design at Sapienza University of Rome. Received the bachelor's degree in Architecture at the Federico II University of Naples (2013) and the master's degree in Architecture for sustainable project at Politecnico di Torino (2016). Since 2017 she has been active within the Architecture Department of Federico II University of Naples being design teaching assistant, exam and degree committee member. She has been a research fellow at the CESMA of the Federico II University (2018-2019). From 2018 she started a collaboration with the Fondazione San Gennaro, an organization that promote social innovation, as a member of the ReMade lab research team whose purpose is to experiment innovative technology to recycle urban waste (plastic and metal) on a local scale. Her main research interests are in the areas of design for social innovation, design for territories, design for sustainability.

susanna.parlato@uniroma1.it

Vera Renau

PhD Student in the programme Society and Culture: History, Anthropology, Arts and Heritage at University of Barcelona (Spain). Her doctoral research analyses the process of recognition of a selection of Catalan visual artists of the early twentieth century (1900 – 1930), and thus the operation of Spanish and Catalan modern art system. She focuses on clarify how art value is constructed by the interaction of different intermediaries in the visual arts field: the mechanism of building their reputations, identify phases, protagonists and dynamics that form part of the process, from an interdisciplinary approach. Member of the Gracmon Research Unit – History of Art & Contemporary Design Research Grup at UB, she holds a master's degree in Art History from the University of Barcelona. Her main research lines are art history, sociology of arts and culture and design studies. She has collaborated with cultural institutions as Direcció General de Patrimoni (Generalitat de Catalunya), Modern Art Department at Museu Nacional d'Art de Catalunya or Galleria Comunale d'Arte Moderna di Roma.

Antonio Stefanelli

Architect, PhD student in Philosophy of Interior Architecture at Università degli Studi di Napoli "Federico II". He takes a degree in Architecture at the Department of Architecture of Università degli Studi di Napoli "Federico II" in 2017. He is part of several research group in the same University and he collaborated in the production of scientific publications and published essays and articles in trade magazines.

antonio.stefanelli@unina.it

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