

20



FASHION  
AND TEXTILE  
DESIGN

RECONSTRUCTION



**PAD. Pages on Arts and Design**

International, peer-reviewed,  
open access journal  
founded by Vanni Pasca in 2005

**Editor-in-Chief****Marinella Ferrara**

Design Professor, Politecnico di Milano, Italy

**Advisory Board****Tevfik Balcıoğlu**

Yaşar University, Izmir, Turkey

**Murat Bengisu**

Izmir University of Economics, Turkey

**Isabel Campi**

Design History Foundation, Barcelona, Spain

**Eduardo Corte Real**

UNIDCOM/IADE, Lisbon, Portugal

**Antonio da Cruz Rodrigues**

Universidad Lusofona, Lisbon, Portugal

**Soumiya Mikou**

Moroccan Design Association, Casablanca, Morocco

**Vanni Pasca**

Italian Association of Design History, Milan, Italy

**Ely Rozenberg**

RUFA, Rome University Fine Art, Rome, Italy

**Mireia Frexia Serra**

Gracmon, Universitat de Barcelona, Spain

**Andreas Sicklinger**

Università di Bologna, Italy

**Fedja Vukić**

University of Zagreb, Croatia

**Managing Editor****Chiara Lecce**

Politecnico di Milano, Italy

**Editorial Assistant****Giorgia Bonaventura**

Politecnico di Milano, Italy

**Editorial Board****Giuseppe Amoroso**

Politecnico di Milano, Italy

**Helena Barbosa**

University of Aveiro, Portugal

**Stefania Camplone**

Università di Chieti-Pescara, Italy

**Roberto De Paolis**

Politecnico di Milano, Italy

**Cinzia Ferrara**

Università degli Studi di Palermo, Italy

**Francesco E. Guida**

Politecnico di Milano, Italy

**Ashley Hall**

Royal College of Art, London, England

**Elif Kocabiyik**

Izmir University of Economics, Izmir, Turkey

**Lia Krucken**

Creative Change, Brazil and Germany

**Carla Langella**

Università degli Studi della Campania Luigi Vanvitelli, Italy

**Giuseppe Lotti**

Università di Firenze, Italy

**Tomas Macsotay**

Pompeu Fabra University, Spain

**Nicola Morelli**

Aalborg University, Copenhagen, Denmark

**Alfonso Morone**

Università Federico II, Napoli, Italy

**Raquel Pelta**

Universidad de Barcelona, Barcelona, Spain

**Daniele Savasta**

Yaşar University, Izmir, Turkey

**Rosanna Veneziano**

Università degli Studi della Campania Luigi Vanvitelli, Italy

**Artemis Yagou**

ICOHTEC, Munich, Germany

**Li Zhang**

Beijing Information Science and Technology University, China

**Publishing Consultant****Vincenzo Castellana**, Architect, Italy**Art Direction****Francesco E. Guida****Correspondents****Amina Aguezny** (Morocco), **Hèla Hamrouni** (Tunisia),**Vesna Kujovic** (Montenegro), **Can Özcan** (Turkey),**Ana Perkovic** (Croatia), **Filip Roca** (Montenegro),**Azadeh Sabouri** (Iran), **Marco Sousa Santos** (Portugal),**Pascale Wakim** (Lebanon)**Reviewers**

Elisabetta Benelli, Murat Bengisu, Cristina Carvalho, Giovanni Conti, Carla Costa Pereira, Roberto De Paolis, Annalisa Di Roma, Claudio Gambardella, Vittorio Linfante, Solen Kipoz, Gabriele Monti, Carla Morais, Dolores Morelli, Martina Motta, Barbara Pollini, Maria Antonietta Sbordone, Andreas Sicklinger, Benedetta Terenzi, June Tolsby, Davide Turrini

**PAD**

via Festa del Perdono 1 – 20122 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

#20, Vol. 14, June 2021

[www.padjournal.net](http://www.padjournal.net)

**0. EDITORIAL #20****Fashion and Textile Design Reconstruction**

by Gianni Montagna &amp; Maria Antonietta Sbordone

**006****I. THEORETICAL OVERVIEW****The Emergence of Sustainability and the Textile and Fashion Design Education**

by Sonia Seixas

**019****New Trend Landscapes: Coronavirus' Long-Term Impact on Fashion and Trend Forecasting**

by Kellie Walters

**039****Metamorphic Fashion Design. Nature Inspires New Paths for Fashion Communication**by Elisabetta Cianfanelli, Debora Giorgi, Margherita Tufarelli, Leonardo Giliberti,  
Paolo Pupparo & Elena Pucci**060****Fashion and Work Organizational Ecosystem: Prospects and Post-COVID-19 Scenarios**

by Sandra Regina Rech &amp; Giovanni Maria Conti

**086****II. SUSTAINABLE APPROACHES****Sustainable Fashion Trend. Enhancing Sustainability in Fashion through  
Visual Communication Media**

by Giulia Scalera

**111****Sustainable Fashion: from Material to Immaterial through Biodesign**

by Chiara Del Gesso

**130****New Advanced Clothes**

by Carmela Ilenia Amato

**152**

### III. PRACTICES & TOOLS

- Can Sustainability be Unsustainable? Paradoxes and Contradictions of a Necessary Evolution** **175**  
by Renato Stasi & Margherita Tufarelli
- Coworkings as Focal Points for the Development of New Models for a Sustainable Fashion: Discourse and Practice** **193**  
by Giulia Bolzan de Morais & Karine de Mello Freire
- Acting Responsibly. Design as a Sustainable Practice for Society** **213**  
by Roberta Angari & Gabriele Pontillo
- The Human Touch. An Ethical Discussion on Sewing Technology in the Age of Digital Transformation** **234**  
by Juliet Seger
- Culture, Fashion and Communication Design in Times of Emergency. Communication and Design Strategies for the Sustainable Improvement of the Fashion and Textile Production in the Indian Subcontinent** **259**  
by Rossana Gaddi & Roberto Liberti

### IV. PROJECTS & DOCUMENTS

- Interview to Moda Portugal** **283**  
by Gianni Montagna & Maria Antonietta Sbordone

### IV. BIOGRAPHIES

- About the Authors** **295**

# Acting Responsibly

## Design as a Sustainable Practice for Society

**Gabriele Pontillo & Roberta Angari**

Università degli Studi della Campania “Luigi Vanvitelli”

### **Keywords**

Hybridization of Skills, Ways of Doing, New Media, Advanced Manufacturing, Online Community.

### **Abstract**

The rapid rise of emerging issues, often linked to the absence of sustainable action, exposes society to unexpected and unwanted risks. Today, more than in the past, this condition of fragility places at the center of the design debate the need to build a critical point of view, concerning some production actions that still accept the inevitability of environmental damage, whose resolution is postponed to pursue economic growth.

Only through responsible action will it be possible to predict the effects and design the remedies useful for reconciling the relationship between human beings and the ecosystem.

In this perspective, it is the convergence between different disciplinary skills that offers a sustainable and effective response to urgency, shortening the supply chain that goes from creation to production of the artifact and reducing the gap between market and consumer. Thanks to the methods of Ethical communication and the techniques of digital manufacturing and prototyping machines, fashion, and more generally the textile sector, could lead to the creation of valuable products considered as communication tools useful for the common good of society, not only in socio-cultural terms but also in terms of sustainability and circularity.

## 1. Introduction<sup>1</sup>

In recent years, a portion of the world has become increasingly concerned about pollution, climate change, and other *permanent* and widespread emergencies that threaten society (Piscitelli, 2019). The growing number of disastrous events, often linked to the neglect of the environment, and which are generating, for example, desertification, melting of Arctic and Antarctic ice, water pollution, fires, as well as the spread of epidemics, are just a few catastrophic events that impose a great challenge for contemporary society, both in socio-cultural terms and linked to the combination of economic development / public health system, in an attempt to manage emergencies (Hu, Zeng & Zhao, 2009).

The great disasters are accompanied by the dustier ones, linked to everyday life and the impact that simple gestures can have on ecosystems.

The worsening of the conditions linked to ecological changes, often due to factors related to the acceleration of economic development that acts indifferently in the stages of the first, second and third world, supported and implemented by poor practices and invasive cultures (Konatè, 2019), highlights the need to adopt radical measures to solve the environmental crisis and reconcile the relationship between human beings and the ecosystem. As Abdoulaye Konatè states “Man must be

---

1 This article was discussed and agreed by the two authors and was written having shared the bibliography, readings, researches and reflections. Gabriele Pontillo is responsible for the in-depth study of the paragraphs: “Digital technologies for a more sustainable fashion supply chain”, “Advantages, disadvantages and potential of 3D printing applied to the fashion supply chain” and “The challenge for the near future: emergency and sustainability management”. Roberta Angari is responsible for the in-depth study of the Introduction and Conclusion, and the paragraph “Between innovation of the supply chain and dissemination of knowledge: ethical communication as a strategic choice”.

able to live in harmony with his environment and this is the only hope for life to be made of happiness and prosperity” (Konatè, 2019, p. 14).

As a reflective discipline, design cannot fail to think on the different aspects of the *great changes* “often sudden, violent and frightening, but also regenerative” (Langella, 2020, p. 31). The starting point consists in the delineation of a globally shared intervention, also based on the greater integration between the artificial and the natural world (Ranzo, 2007): to outline new ways of doing and acting through design, to reverse the production structures and more generally the economy, starting innovative processes and determining identities and values useful for restoring centrality to people and communities, as well as the relationship they have with the surrounding environment (Trapani, 2013).

The recovery of an ethical sense behind the project, which becomes its promoter, can be an opportunity for an economic, social, individual, and collective rebirth, especially if we are confronted with one of the most incisive phenomena of the transformation of every day, based on widespread digitization, on digital manufacturing, on the *Internet of Things* (IoT), on open source and on online communities, which not only constitute the field of experimentation in which the new generations of designers and innovators express themselves, but above all have represented, and still represent, the evolutionary force that is reformulating interpersonal relationships and intangible assets, “recoding the DNA of contemporary objects” (Langella, 2020, p. 32).

The proposal of the contribution explained below is to start from the need to find contact points between the development of advanced technologies and the world of experience, in an attempt to identify a way to be able to integrate the slow times of the earth and those dynamics imposed by progress (Ranzo, 2007). To do this, thanks to the analysis of the logic of consumption that has characterized the last few years, it was possible to identify the orientation of the contemporary production scenario from which to start to trigger possible vectors of change towards future scenarios.

The choice of proposing a methodology based on the convergence between visual communication, and more specifically ethical communication, and the *materiality of doing* (Mari, 2011, p. 112) close to digital manufacturing and rapid prototyping, as well as communities made up of Makers, stems from the understanding of how this relationship can affect not only the quality of the products, shortening the supply chain that goes from the creation to the production of the artifact, but also the relationship that individuals establish with the artifact itself and with the environmental system, demonstrating the need for a less ephemeral and more *anthropological* dimension (Branzi, Linke & Rabottini, 2013) of the project, which moves towards an ecological but efficient reconversion of production systems, attentive to the social production of goods and services responding to new demands and capable of guaranteeing social cohesion, as well as territorial eco-development programs, which favor the sustainable use of local resources and promote the potential of networks (Manzini, 2009, p. 19).



In this perspective, design, thanks to digital - understood as an environment and design technology - and to methods more intrinsically linked to sustainable practices and social innovation, has not only the ability to generate new forms but above all the responsibility to support more promising innovations and direct them towards favorable outcomes, promoting new dynamics of sustainable change, coherent with the new contexts in which it operates.

The definition of Eco-Design, outlined by De Benedetti, Baldo, Foschia, and Rossi (2009, p. 29), and due to the introduction of environmental variables in the product design phase, sees its methodological boundaries expand thanks to the evolution of design thinking and of the entire supply chain, which through new technologies, digital simulation environments, identification of new materials or application of alternative materials, as well as the implementation of communication practices designed to make motivations linked to the production context more accessible to users, determine a significant transformation of the impact on the environment and society of the production of goods and services.

## **2. Digital Technologies for a More Sustainable Fashion Supply Chain**

One of the endemic condition of contemporaneity, is the omnipresent diffusion of digital. What characterize the production system in recent years, it is precisely the ability of digital tools to insinuate themselves into every activity of the production system and daily life. Nonetheless, this drive towards dematerialization is counterbalanced by production possibilities that are expanded in the analog dimension thanks to new

processes and manufacturing methods which for the world of design constitute a vast panorama of possibilities and stimuli. Digital manufacturing through 3D printing, as well as robotics, artificial intelligence, digital co-design platforms, raise the expressive and executive possibilities with which design can respond to daily needs (Langella, 2020).

The same technologies also find application in the fashion sector, in which numerous brands and designers use additive technologies to create prototypes, customized products, and artistic pieces. On the runway, high fashion designers displayed intricate 3D printed clothing and accessories, as evidenced by the collaboration between Stratasys, Francis Bitonti, and Michael Schmidt Studios, whose dress worn by Dita Von Teese was one of the most iconic of 2013 New York Fashion Week (Binns, 2015; Bodhani, 2014; Kurutz, 2013; Reilly, 2014). Other examples are brands such as Continuum that offers customizable 3D printed products, such as jewelry, shoes, and swimwear, Timberland and Nike, that use 3D printers to compare three-dimensional prototypes with CAD drawings (Hindman, 2013).

From this point of view, additive technologies seem to be mainly used to push the frontier of fashion design towards product and system innovation, which thanks also to design software, allow the development of complicated geometries, often sculptural, easily customizable based on requests and measurements of the body of each individual through the use of a 3D body scanner (Zolfagharifard, 2013).

Despite the potential offered by such technologies, seems to be missing the pretext full of meaning useful to reconnect the

consumer with the ecosystem through innovative products and sustainable market dynamics.

In this perspective, the role of designers becomes central to the structuring of possible innovative supply chains that effect a paradigm shift from the classic dynamics of the fashion industry, exploring and applying approaches that create new hybrid skills between traditional designers - eg. creative designer and product development - and maker - eg. mechanical, electrical and computer engineers - predicting what it will be like and how it will live in the near future.

Methods such as automated digital production and distributed production lead to rapid changes in the traditional supply chain, favoring shorter development times, and increasingly intimate interactions with consumers (Amed et al., 2017). This means that the traditional, fragmented and articulated supply chain, as it is based on a complex network consisting of various distinct functions and roles divided between the individual industries involved in the creation of a product, is replaced by a new supply chain becoming the key to allow a reduction in the complexity of the networks, through the identification of a more local production model that guides reshoring opportunities (World Economic Forum, 2017).

The overseas approach which involved the hiring of industries for the development of components or the transformation of materials and substances of components, in other countries, such as China and Vietnam, mainly due to the reduction of labor costs (Sun & Zhao, 2018), gives way to a *local-for-local* approach, in which through the integration of different digital technologies, it would be possible to optimize direct labor,

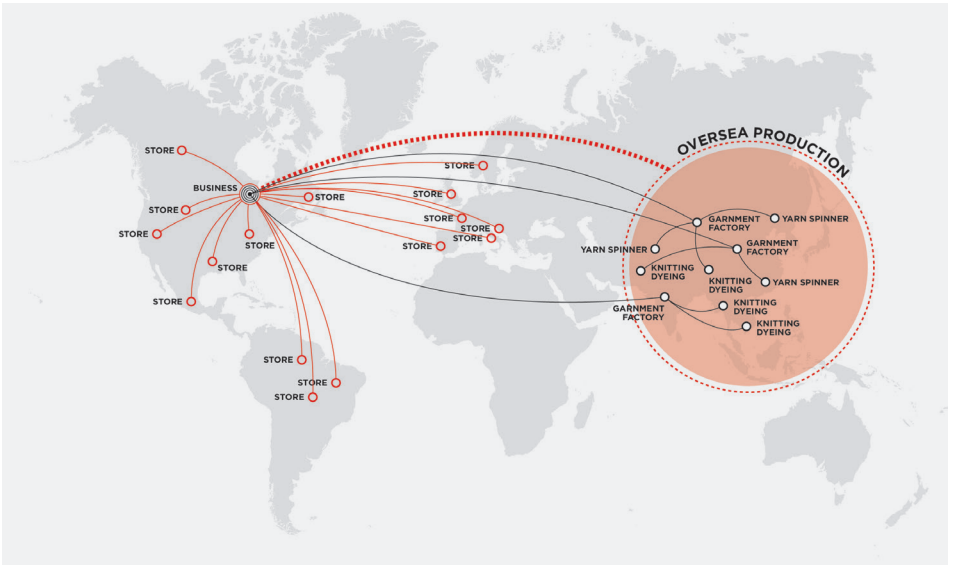


Figure 1. Self-production, Data visualization of overseas approach. 2020.



Figure 2. Self-production, Data visualization of local-for-local approach. 2020.

local resources, and adopt a renewed set of procurement strategies of renewable energy, for a more sustainable, agile, and versatile supply chain. In this way, 3D printing moves production closer to the final consumer and redefines the roles of designers, producers, and users (Sun & Zhao, 2018).

## **2.1. Advantages, Disadvantages, and Potential of 3D Printing Applied to the Fashion Supply Chain**

The fashion retail industry has experienced a tumultuous period in recent years, supported by rapidly evolving technology. Through additive manufacturing, robotics, artificial intelligence, augmented and virtual reality, and other emerging digital tools, fashion is radically transforming, changing the production chain, and getting closer to consumers, who are offered complimentary services and experiences that go beyond individual products (Sun & Zhao, 2018).

While the fashion capitals become digital, we wonder how digital technologies can have a sustainable impact on the production chain, starting from the location of production outlined above, and more generally what are the advantages, disadvantages, and potentials offered by 3D printing applied to the fashion industry.

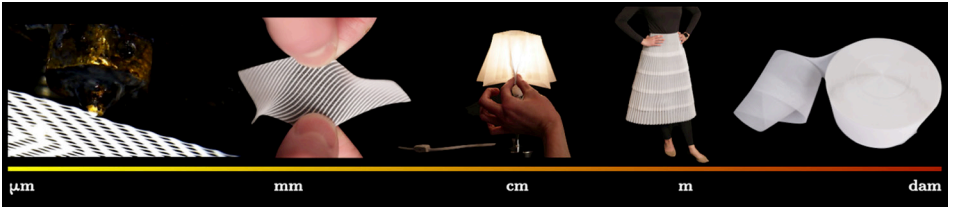
The analysis of the relevant scientific literature highlights how clothing made with the aid of 3D printers are more sustainable than normal clothing (Vanderploeg, Lee & Mamp, 2016) for some reasons, including: 1) reduction of waste raw materials, since cutting the fabric leads to residual pieces (Mau, 2013; Parker, 2016); 2) 3D printing is not only sustainable because it requires fewer resources, but also for the entire

life cycle of the product, it requires less energy expenditure during production, it also triggers changes in the structure of the production chain, shortening it, thanks to more digital and localized supplies (Gebler, Schoot Uiterkamp, & Visser, 2014); 3) some projects, thanks to the material used, can be completely recycled and used again for printing other objects thanks to recycling processes which have little impact in terms of environmental sustainability.

Nonetheless, there are some doubts regarding 3D printed materials, as they may not be comfortable and flexible enough for everyday use (Yap & Yeong, 2014), while optimal materials, such as textile fibers, are still under development (Rosenau & Wilson, 2014).

In this regard, the qualitative study conducted by Perry (2017) precisely on the advantages, disadvantages, and potential of the application of 3D printing to the fashion industry, highlights how there are discordant theories between the target identified for the administration of the survey for data collection. In particular, the findings of the survey highlight that users are more willing to accept 3D printed accessories rather than clothing.

Despite these criticalities, it is the process of creating a product using 3D printing that constitutes the real strength of this technology: the speed in managing and verifying the designed product through prototyping, subsequent modification and rectification, as well as the recyclability of the prototype, and at the same time, the customization of the geometries based on the needs of the end-user are just some of the characteristics of the additive technologies that are useful to the emergence of a scenario that is more attentive to environmental sustainability.



**Figure 3.** Jack Forman, DefeXtile, different applications of printing technique applied to furniture and fashion design. 2020.



**Figure 4.** Jack Forman, DefeXtile, a full-sized DefeXtiles skirt produced in 36 hours in a single print. The skirt was expanded like a telescope to reach its full height. 2020.

### 3. The Challenge for the Near Future: Emergency and Sustainability Management

Based on contemporary scenarios, the academic world highlights two key trends that are focused once on eco-fashion, the other on techno-fashion, which rather than diverge, should have symbiotic relationships (Choi, 2018). In this regard, Scaturro (2008) suggested the concept of eco-tech fashion, which is based on ecological practices applied through new technologies, developing a line of recycled prêt-à-porter clothing aimed at promoting the upcycling process to potential users.

Many experiences conducted in the field of fashion design, and beyond, increasingly consider design practices that are environmentally friendly, ecological, and ethical, integrating these issues into academic design curricula at both national and international levels (Pasricha & Kadolph, 2009).

This is aligned with the fact that already in the early 2000s, the UN had declared the period 2005-2014 as the decade for Education for Sustainable Development, a program in line with the survey on social responsibility in clothing and textiles education conducted in 2002, which reported that 78.2% of educators felt it was important to address environmental degradation, including product disposal and recycling (Dickson & Eckman, 2006). The development and design of sustainable products was therefore already a central issue, and yet today we still find ourselves anachronistically thinking about the same issues, which shows that more needs to be done. Added to this is the fact that not only sustainability but also urgencies and emergencies, place the attention of de-



signers on *responsible action* as a necessary and necessarily shared mode of intervention, as it is capable of overcoming those difficulties that characterize contemporaneity.

For this reason, although conventionally the textile and clothing sector has followed a business-centered model, based on innovation, target market and profit, and study of trends, it is necessary to change the model and include global citizenship skills to counter the global challenges (LeHew & Meyer, 2005). The need to align curricula in design with sustainable education is felt all over the world, as is the social and economic sustainability that should increasingly be intersected in design study courses and design practice, to trigger a systemic change focused on responsibility.

#### **4. Between Innovation of the Supply Chain and Dissemination of Knowledge: Ethical Communication as a Strategic Choice**

When the dialogue on sustainability began in the 1970s, the focus was mainly on solving the problems of waste caused by industrial production. In recent years, however, *environmental thinking* has been dealing with the search for a balance between the sustainable use of economic, social, and environmental resources, while paying attention not to destroy the ability of future generations to meet their needs in a sustainable way (Niinimäki, 2013). The notion of sustainability, therefore, is enriched with ethical thinking based on values, in an attempt to solve *concrete* problems related, for example, to overproduction, to the consumption of non-renewable energy sources, to environmental pollution, also through new design methods and creative solutions (Thomas, 2008), innovative

technologies, as well as through the involvement of consumers in sustainable transformation processes.

In this perspective, visual communication, and in particular ethical communication, provides the paradigm from which to start, for a clearer and more complete transmission of knowledge. As Jacobs and Karpova state, knowledge is represented by the awareness and/or understanding that individuals can acquire through direct experience or the study of a phenomenon (2019), and for this reason, it is closely linked to “know-how and know-why” (Gurteen, 1998, p. 5).

Knowledge can be explicit and tacit (Pellegrino & Hilton, 2012), in the sense that it is possible to choose the most suitable means for their transmission. Explicit knowledge is formally structured, therefore returned through easily accessible dissemination tools such as platforms and digital media, which return more complete mappings for information, both through data visualizations and various types of media content - eg. images and videos. Tacit knowledge, on the other hand, is deeply linked to the experiences of the single individual, it is defined as *subjective intuition* (Nonaka, Toyama & Konno, 2000, p. 7); it is not easily formalized nor can be shared or communicated, but if acquired in a specific context, through observation and practice, rather than through strategic tools, it can be much more internalized by the individual user, as the metabolization of direct experience makes more conscious use possible (Olson, 2000).

In this perspective, knowing a product influences how it is seen by observers see and how they interact with it (Walker,

2009), therefore, feeding new knowledge through the experience linked to innovative fashion products both for the supply chain and for technologies, allows facilitating the user in rethinking and reevaluating the aesthetic qualities of a sustainable product (Brady, 2002), detaching himself from the *fast-fashion* model, which in recent years, although it has had the positive effect of democratizing fashion through the supply of low-cost garments inspired by or simply copied from the latest trends, on the other hand, it has undermined the value of intellectual property belonging to fashion designers, greatly expanded the environmental impact through the use of non-renewable energy sources, and promoted a culture of waste (Brewer, 2019).

Through communication and the transmission of knowledge, it is therefore believed that it is possible to put users in a position to evaluate a product based on certain information: its environmental impact during production, logistics, use, and disposal, also evaluating how the product is manufactured, i.e. in what working conditions and where, and if the company has the production based on sustainability.

In this perspective, ethical communication offers a new way to align industrial production with the transmission of knowledge, intending to allow the understanding of material culture and its consequences, as well as cultivating consumer preferences according to sustainability values (Niinimäki, 2013).

## 5. Conclusion

The culture of the project is now more than ever faced with urgent and emerging issues, increasingly linked to the man-

agement of production chains and the impact they have on ecosystems.

In particular, the global fashion industry must face a series of challenges in terms of sustainability and social responsibility (Chan, 2018), closely linked to overcoming the fast fashion model that generates a series of social and environmental concerns. Intending to outline a new ideology through which to deal with production, it is important to improve business logic, increasing the ethical and social responsibility of companies, also through sustainability initiatives linked to technological innovation, which can help in overcoming inequalities as well as in the improvement of production and conduct standards in the production sector in general and in fashion in particular, on the one hand by shortening the supply chains, on the other by increasing the awareness and participation of consumers starting from the creative process.

The principles of the European Commission related to environmental design (Commission of the European Communities, 2009), would therefore finally find confirmation in a more sustainable fashion supply chain that takes into account the life cycle of the product during all phases: design, production, logistics, retail, use, and disposal. Using new technologies, ecological materials, would lead to a reduction in the use of resources in the creation of more durable, sustainable, multifunctional, customizable artifacts, or even responding in a timely and immediate manner to the needs of users.

Despite the versatility and advantages of these tools in the academic and experimental environments of research centers, again, as highlighted in the previous paragraphs, there is

still a distrust towards 3D printing, motivated mainly by the aesthetic and functional quality of the objects, often still too limited. It is true that the technological advancement, and at the same time of new materials and more performing processes, is rapid and inexorable and soon digital productions will become more and more refined, allowing to produce in an increasingly sustainable and rapid way instant solutions for emerging needs (Langella, 2020).

In light of what has been said, and of the dynamics that characterize the scenario in which converge the environmental threat, the economic crisis, the perception of widespread vulnerability, it is appropriate to ask ourselves how the innovation of processes and products aimed at everyday life, guided by design, from technological innovation, and the diffusion of knowledge through visual communication, can outline a new object scenario, whose peculiarity consists in responsible design action.

## References

Amed, I., Berg, A., Brantberg, L., Hedrich, S., Leon, J., & Young, R. (2017). *The State of Fashion 2017*. McKinsey & Company.

Binns, J. (2015, May 1). *Materials science is the new black: 3D and 4D printing the future*. RIS, Retail Info Systems. <https://risnews.com/materials-science-new-black-3d-and-4d-printing-future>.

Bodhani, A. (2014). From computer to catwalk [fashion design]. *Engineering & Technology*, 9(12), 68–71.

Brady, E. (2002). Aesthetics, Ethics, and the Natural Environment. In A. Berleant (Ed.), *Environment and the Arts: Perspectives on Environmental Aesthetics* (pp. 113-126). Ashgate.

Branzi, A., Linke, A., & Rabottini, A. (2013). *Gli strumenti non esistono. La dimensione antropologica del design*. Johan & Levi.

Brewer, M.K. (2019). Slow fashion in a fast fashion world: Promoting sustainability and responsibility. *Laws*, 8(4), 24.

Chan, J.K.H. (2017). Design ethics: Reflecting on the ethical dimensions of technology, sustainability, and responsibility in the Anthropocene. *Design Studies*, 54, 184-200.

Choi, K. H. (2019). Eco-tech fashion project: collaborative design process using problem-based learning. *International Journal of Fashion Design, Technology and Education*, 12(1), 105-117.

De Benedetti, B., Baldo, G.L., Foschia, M., & Rossi, S. (2009). Dall’LCA all’ecodesign: un metodo pratico per conseguire il risultato. In C. Vezzoli, & R. Veneziano (Eds.), *Pratiche sostenibili* (pp. 29-40). Alinea Editrice.

Dickson, M. A., & Eckman, M. (2006). Social Responsibility: The Concept As Defined by Apparel and Textile Scholars. *Clothing and Textiles Research Journal*, 24(3), 178–191. <https://doi.org/10.1177/0887302X06293031>.

Gebler, M., Schoot Uiterkamp, A. J. M., & Visser, C. (2014). A global sustainability perspective on 3D printing technologies. *Energy Policy*, 74, 158–167.

Gurteen, D. (1998). Knowledge, creativity, and innovation. *Journal of Knowledge Management*, 2(1), 5–13.

- Hindman, N. (2013, May 30). *Continuum's 3D printed clothing offers a glimpse into the future of fashion*. Huffington Post. [https://www.huffpost.com/entry/continuum-3-d-printed-clothing\\_n\\_3093541](https://www.huffpost.com/entry/continuum-3-d-printed-clothing_n_3093541).
- Hu, J., Zeng, A.Z., Zhao, L. (2009). A comparative study of public-health emergency management. *Industrial Management & Data Systems*, 109(7), 976-992.
- Jacobs, B., & Karpova, E. (2019). What do merchandisers need to succeed? Development of an apparel merchandising competency framework. *International Journal of Fashion Design, Technology and Education*, 12(3), 272-282.
- Konatè, A. (2019). La “linea rossa” che si sposta. Il deserto come metafora. In D. Piscitelli (Ed.), *First things First* (pp. 8-15). ListLab.
- Kurutz, S. (2013, December 13). *Taking fashion to a new dimension*. New York Times. <https://www.nytimes.com/2013/12/15/fashion/3D-Printing-Clothing-fashion.html>.
- Langella, C. (2020). Design quotidiano al tempo della vulnerabilità diffusa. *Op.Cit.*, 168, 31-47.
- LeHew, M.L.A., & Meyer, D.J.C. (2005). Preparing global citizens for leadership in the textile and apparel industry. *Clothing and Textiles Research Journal*, 23(4), 290-297.
- Manzini, E. (2009). Prefazione. In C. Vezzoli, & R. Veneziano (Eds.), *Pratiche sostenibili* (pp. 19-24). Alinea Editrice.
- Mari, E. (2011). *25 modi per piantare un chiodo*. Mondadori.
- Mau, D. (2013, July 19). *How 3-D printing could change the fashion industry for better and for worse*. Fashionista. <https://fashionista.com/2013/07/how-3-d-printing-could-change-the-fashion-industry-for-better-and-for-worse>.
- Niinimäki, K. (2013). *Sustainable Fashion: New Approaches*. Aalto University.
- Nonaka, I., Toyama, R., & Konno, N. (2000). SECI, Ba and leadership: A unified model of dynamic knowledge creation. *Long Range Planning*, 33(1), 5-34.
- Olson, G.B. (2000). Designing a new material world. *Science*, 288(5468), 993-998.
- Parker, C. J. (2016). Human acceptance of 3d printing in fashion paradox: Is mass customization a bridge too far?. *WIT Transactions on Engineering Sciences*, 113, 373-380.

Pasricha, A., & Kadolph, S.J. (2009). Millennial generation and fashion education: a discussion on agents of change. *International Journal of Fashion Design, Technology and Education*, 2(2-3), 119-126.

Pellegrino, J. W., & Hilton, M. L. (Eds.) (2012). *Education for life and work: Developing transferable knowledge and skills in the 21st century*. The National Academies Press.

Perry, A. (2018). 3D-printed apparel and 3D-printer: exploring advantages, concerns, and purchases. *International Journal of Fashion Design, Technology and Education*, 11(1), 95-103.

Piscitelli, D. (2019). *First Things First. Comunicare le Emergenze*. ListLab.

Ranzo, P. (2007). Il disagio della tardomodernità e l'individuazione di nuove vie di sviluppo sostenibili. In R. Veneziano (Ed.), *High-low. La logica high-low nello sviluppo di nuovi prodotti industriali* (pp. 9-11). Alinea Editrice.

Reilly, L. (2014). The shift from 3D body scanned data to the physical world. In F. Joseph, M. Smith, M. Smitheram, & J. Hamon (Eds.), *Shape-shifting: A conference on transformative paradigms of fashion and textile design* (pp. 1-18). Textile and Design Lab and Colab at Auckland University of Technology.

Rosenau, J. A., & Wilson, D. L. (2014). *Apparel merchandising: The line starts here*. Fairchild Books.

Scaturro, S. (2008). Eco-Tech fashion: Rationalizing technology in sustainable fashion. *Fashion Theory*, 12(4), 469-488.

Commission of the European Communities. (2009, April 7). *Design as a Driver of User-centred Innovation* [Commission Staff Working Document]. [https://ec.europa.eu/growth/content/design-driver-user-centred-innovation\\_en](https://ec.europa.eu/growth/content/design-driver-user-centred-innovation_en).

Sun, L., & Zhao, L. (2018). Technology disruptions: Exploring the changing roles of designers, makers, and users in the fashion industry. *International Journal of Fashion Design, Technology and Education*, 11(3), 362-374.

Thomas, S. (2008). From “green blur” to ecofashion: Fashioning an eco-lexicon. *Fashion Theory*, 12(4), 525-539.

Trapani, V. (2013). Presentazione. In F. Monterosso (Ed.), *Open Design. Pratiche di progetto e processi di conoscenza* (pp. 9-10). LetteraVentidue Edizioni.



Vanderploeg, A., Lee, S. E., & Mamp, M. (2017). The application of 3D printing technology in the fashion industry. *International Journal of Fashion Design, Technology and Education*, 10(2), 170-179.

Walker, S. (2009). After taste—the power and prejudice of product appearance. *The Design Journal*, 12(1), 25-39.

World Economic Forum. (2017, March). Technology and innovation for the future of production: Accelerating value creation [White paper]. [http://www3.weforum.org/docs/WEF\\_White\\_Paper\\_Technology\\_Innovation\\_Future\\_of\\_Production\\_2017.pdf](http://www3.weforum.org/docs/WEF_White_Paper_Technology_Innovation_Future_of_Production_2017.pdf).

Yap, Y. L., & Yeong, W. Y. (2014). Additive manufacture of fashion and jewellery products: A mini review. *Virtual and Physical Prototyping*, 9(3), 195-201.

Zolfagharifard, E. (2013, August 5). *When science is stylish: Designer uses 3D printing to create a range of accessories that is taking the fashion world by storm*. Daily Mail. <https://www.dailymail.co.uk/sciencetech/article-2384802/Catherine-Wales-uses-3D-printing-create-range-accessories-taking-fashion-world-storm.html>.

V

# BIOGRAPHIES

**Carmela Ilenia Amato**

Italian fashion designer focused on the research of biomaterials and new technologies in the fashion industry for developing new body concepts. I have a Bachelor's degree in Fashion Design and a Master degree in Innovation Design from the University of Campania, Italy. I collaborate with research groups in fashion design, graphic communication, bio-materials and digital fabrication creatively investigating the material throughout develop smart, innovative and sustainable fabrics and assist in the research of innovative technologies and bio design applied to fashion.

[carmelailenia.amato@studenti.unicampania.it](mailto:carmelailenia.amato@studenti.unicampania.it)

**Roberta Angari**

She is an Italian graphic designer. In 2015 she graduated in Design for Innovation at University of Campania "Luigi Vanvitelli". In 2020 she obtained a Ph.D degree in Architecture, City and Design - Design Sciences at University IUAV of Venice with the dissertation "Kono - Analysis and design of a digital archive of visual communication". Main focus of her line of research are data visualization, digital design and digital archive - knowledge acquired during her academic path. Since may 2020 she has a research grant entitled "Scientific Design for Medical Research", with tutor Carla Langella, at the University of Campania "Luigi Vanvitelli" - Department of Architecture and Industrial Design (DADI). At the same Department, she is Teacher Assistant of the course "Visual identity for Cultural landscapes" and "Ethic Communication", both held by Daniela Piscitelli.

[roberta.angari@unicampania.it](mailto:roberta.angari@unicampania.it)

**Giulia Bolzan de Morais**

Giulia Bolzan de Morais Megård, MsC in Design from Universidade do Vale do Rio dos Sinos (Unisinos). Strategic designer and trend researcher.

[giubolzan@gmail.com](mailto:giubolzan@gmail.com)

**Elisabetta Cianfanelli**

Architect and Industrial Design Specialist, is Full Professor at DIDA (Architecture Department) of University of Florence (Italy), Design Campus section. President of the CdLM in Fashion System Design, and scientific director of the DIDA Lab REI (Reverse Engineering & Interaction Design). Her research interests are related to the world of Small and Medium Enterprises concerning the development of new products and technologies applied to design and production.

[elisabetta.cianfanelli@unifi.it](mailto:elisabetta.cianfanelli@unifi.it)

**Giovanni Maria Conti**

Ph.D, Associate Professor, he is currently the Coordinator of Knitwear design Lab – Knitlab of the Fashion Design Degree at the Politecnico di Milano. Founder and Scientific Coordinator of the website/blog [www.knitlab.org](http://www.knitlab.org), he was executive secretary of Fashion Design Degree at the School of Design of Politecnico di Milano, he is Istituto Italo-Latino Americano – IILA expert collaborator in the Pymes Forum for cooperation projects on textile and fashion. He is Director of the Master in Fashion Direction: Product Sustainability Management at MFI (Milano Fashion Institute Consortium) and member of LeNS - International Learning Network on Sustainability.

[giovanni.conti@polimi.it](mailto:giovanni.conti@polimi.it)

**Karine de Mello Freire**

PhD in Design from PUC-Rio. Researcher at the Graduate Program in Design at Universidade do Vale do Rio dos Sinos (Unisinos). Researches Design for Social Innovation and Sustainability. Activist of design and social innovation in projects related to sustainability.

[kmfreire@unisinos.br](mailto:kmfreire@unisinos.br)

**Chiara Del Gesso**

Designer and Phd Student at the department of Pianification, Design and Technology of Architecture of "Sapienza Università di Roma". Her doctoral research investigates the field of new paradigms of material and processes related to the theme of sustainability.

She is conducting her studies at the intersection of Design and Science, in particular related to the application of biologic processes in substitution of the conventional manufacturing processes, in order to exploit their potentiality in terms of new aesthetics, languages and fruitions patterns. She has conducted several department researches and experimentations in the field of biomaterials, obtained from the re-use of organic waste from the agri-food chain, and collaborated as teaching assistant on the topic. She is actually part of the team of the Interdepartmental Center Saperi&Co of Sapienza University.

[chiara.delgesso@uniroma1.it](mailto:chiara.delgesso@uniroma1.it)

### **Rossana Gaddi**

MS in Design and PhD in Design and technologies for the enhancement of cultural heritage at Politecnico di Milano. From 2020, she is assistant Professor at the Department of Architecture of the University "G. d'Annunzio" of Chieti-Pescara. She teaches communication design for the fashion system as contract professor in the inter-university consortia Poli.Design, Milan Fashion Institute (Politecnico di Milano, Bocconi University, Catholic University) and Ard&nt (Politecnico di Milano, Brera Academy).

Visiting Professor at the School of Fashion and Design (SOFD) of the GD Goenka University in Gurgaon (New Delhi, India) and at the EDC Business School (Ecole des Dirigeants et des Créateurs d'entreprise) in Paris.

From 2011 to 2020, she has been a contract lecturer at the School of Design of the Politecnico di Milano and from 2009 to 2018 research fellow at the Design dept of the Politecnico di Milano, developing research on communication for the fashion system and on the relationships between design, culture and territory.

[rossana.gaddi@unich.it](mailto:rossana.gaddi@unich.it)

### **Leonardo Giliberti**

After the three-year course in Bologna in "Industrial Product Design" he graduated at CDLM in Fashion System Design at University of Florence. He is interested in the creative sphere, confronting different expressive disciplines such as illustration, painting, videomaking, DIY, gaming, musical composition and writing.

[leonardo.giliberti@stud.unifi.it](mailto:leonardo.giliberti@stud.unifi.it)

### **Debora Giorgi**

PhD, Architect, she is a 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 Design at DIDA UNIFI, professor of Design for Cultural Heritage in the License Course in Design at Ecole Euro-Méditerranéenne d'Architecture Design et Urbanisme de l'Université Euro-Méditerranéenne de Fès EMADU – UEMF in Morocco and visiting professor in some universities in Mediterranean countries.

[debora.giorgi@unifi.it](mailto:debora.giorgi@unifi.it)

### **Roberto Liberti**

He is Associate Professor in ICAR 13 sector, Industrial Design with lectures in the Design for Fashion at the DADI Department of Architecture and Design Industrial from 2001. He is the coordinator of the Job Placement of the department and for Curricular Internships. In 2018 he obtained national scientific qualification as full professor I level (ssd ICAR 13).

A scientific training gained in the national and international design environment gives him research and strategic planning skills in Design and Design for Fashion, thanks the relationship with supranational research and training institutions as Iacocca Institute of Lehigh University USA; Oxford Brookes University, England; Saint Petersburg University of Technology and Design, Russia; Goenka University, New Dheli, India; Tecnológico de Monterrey, Campus Sonora Norte, Mexico; BIFT Beijing University of Fashion Technology, Beijing, China; ESMOD Japan, School of Fashion Design, Tokyo, Politecnico di Milano.

[roberto.liberti@unicampania.it](mailto:roberto.liberti@unicampania.it)

**Gabriele Pontillo**

He is an Italian product designer. In 2015 he graduated in Design for Innovation at the University of Campania “Luigi Vanvitelli”. In 2019 he obtained a Doctoral Research Fellowship in Environment, Design and Innovation at the University of Campania “Luigi Vanvitelli”.

Main focus of his line of research are parametric design, medical design, and advanced manufacturing – knowledge acquired during his academic path. The Ph.D. course with industrial characterization has allowed him to carry out and consolidate his research activity, as well as at his university, also at the Escuela Técnica Superior de Ingeniería y Diseño Industrial (Universidad Politécnica de Madrid, Spain) and a company from Campania, based in Gricignano di Aversa, to design a system of innovative orthopedic devices through parametric design.

[gabriele.pontillo@unicampania.it](mailto:gabriele.pontillo@unicampania.it)

**Elena Pucci**

A graduate of the CDLM in Fashion System Design, is interested in art, music and writing. She coordinates the virtual lab at DIDA (Department of Architecture) of the University of Florence (Italy), Design Campus section. Currently she works in communication projects of and for CDLM in Fashion System Design. She was involved in “Metamorphic Fashion Design” offering her contribution in the design of environments, as well as in the collection and organization of material.

[elena.pucci@stud.unifi.it](mailto:elena.pucci@stud.unifi.it)

**Paolo Pupparo**

Graduated from the Master’s Degree in Design at the University of Florence, currently a PhD student in “Sustainability and innovation for the built environment and product system design (cycle XXXVI - a.y. 2020/2021). During his research interests concerning the development of methodologies applied to creative processes.

He is currently engaged in the research project: “Design, Art and Business: innovation, strategy and sustainable channels for the creation of value”, which focuses on the analysis and collection of information relating to the mapping of the relationships between Design, Contemporary Art and Companies starting from the Tuscan territory.

[paolo.pupparo@stud.unifi.it](mailto:paolo.pupparo@stud.unifi.it)

**Sandra Regina Rech**

She is an Associate Professor at the Santa Catarina State University (UDESC/Brazil) - Fashion Department; Tenured Professor of the Graduate Program in Fashion (PPGMODA/UDESC) - Professional Master’s Degree in Apparel and Fashion Design and Leader of the Research Group on Fashion Design and Technology (UDESC/CNPq).

She was a Visiting Professor at the Politecnico di Milano (Italy) and was awarded a CAPES PVEX scholarship (2019/2020). She is the Editor-in-Chief of ModaPalavra e-periódico (UDESC), Coordinator of the laboratory FPLab - Futuro do Presente (UDESC), Collaborating Researcher at the University of Lisbon (CIAUD/Portugal), and Integrated Researcher at the Trend-sObserver platform (Portugal).

Her areas of interest are focused on the following themes: Fashion Design, Trend Studies, Scenarios, Consumer Culture, Qualitative Research, Methodologies.

[sandra.rech@udesc.br](mailto:sandra.rech@udesc.br)

**Giulia Scalera**

Designer and PhD, is a Research Fellow at the dept. DADI of the University of Campania “Luigi Vanvitelli”. She is the author of “Il design nella società estemporanea” (2015) and “Open Brand. Nuovi linguaggi visivi per la moda” (2019); two monographs that represent her two main strands of research. One oriented to the study and innovation of design and production models of the design oriented industry and the other to innovation and experimentation, including design, of branding.

Since 2015 she has been teaching fashion and communication design courses at the Accademia delle Belle Arti di Napoli. Since 2009 she has been working as a professional visual designer and in 2017 she is co-founder of the Pluff design studio specialized in visual communication projects of national and international importance.

Among the main projects are the visual identity of the Italian Pavilion at the Venice Biennale (2015) and the creative direction of Milano Book City.

[giulia.scalera@unicampania.it](mailto:giulia.scalera@unicampania.it)

**Juliet Seger**

She is a vocationally trained tailor, clothing engineer and designer. Her academic path at The University for Applied Sciences Hamburg (Clothing – Technology and Management B. Eng., 2019) and The University of Edinburgh (Design for Change MA, 2020) was paired with diverse practical experience in the fashion industry. Following placements in bespoke tailoring and an extensive tailoring training with the HOLY Fashion Group, she worked as technical designer and studio manager for menswear designer Alex Mullins in London and spent one season with Proenza Schouler in New York. For several years she led sewing workshops for children and supported the student sewing lab at HAW Hamburg. Her label PAID VACATION functions as creative platform for contemporary tailoring and made-to-order fashion design. Since Autumn 2020 Juliet is based in Berlin where she works as fashion product developer.

[juliet@paidvacation.de](mailto:juliet@paidvacation.de)

**Sónia Seixas**

PhD student in Design, Fashion and Textile Designer, teacher of subjects related to fashion and textile design through Technological Specialization Courses and Technical Higher Education (level V ECVET), Professional Technical Courses (level IV ECVET) and, Modular Training Certified. Her research interests concern the design in the universe of fashion and textile related to education.

[sonia.seixas@gmail.com](mailto:sonia.seixas@gmail.com)

**Renato Stasi**

He has been involved in the creation of clothing and accessories collections for the fashion segment for almost thirty years, as a designer and responsible for the development of the collection, he has worked for several companies including the LVMH Group, Redwall, Hettabretz. He is an adjunct professor at the DIDA - UNIFI Department of Architecture, in the CDL in Industrial Design and CDLM Fashion System Design. Lecturer at IED, where he is the coordinator of two three-year courses. He has carried out supplementary teaching activities at the Politecnico di Milano for several years. He has held seminars and workshops in various universities. Stasi is Coordinator of the Steering Committee of the Master's Degree Course in Fashion System Design of the University of Florence - School of Architecture - DIDA.

[renato.stasi@unifi.it](mailto:renato.stasi@unifi.it)

**Margherita Tufarelli**

Designer, PhD in Design. Currently a research fellow at DIDA (Department of Architecture) of the University of Florence (Italy), Design Campus section. The PhD thesis, with the title "future heritage and heritage futures. An exploration on meanings of the digitized Cultural Heritage" aimed at investigating the role that the digital archives of Cultural Heritage can have in the contamination between the culture of the past and contemporary creativity.

Her research interests concern the heritage/creativity sphere within the digital evolution; thus, the application, impact and opportunities that lie in the relationship between digital technologies and cultural heritage. She is currently working on a research project titled "Living archive. Disseminating and reusing the Fashion cultural heritage" founded by Regione Toscana.

[margherita.tufarelli@unifi.it](mailto:margherita.tufarelli@unifi.it)

**Kellie Walters**

She is a color, materials, and finishes (CMF) designer at Garmin International and previously at Newell Brands spanning professional experience in consumer electronics and home goods. She is also a published researcher on trend forecasting and CMF trends as well as a published theorist on future aesthetics after artificial general intelligence is created and society heads toward artificial superintelligence. Kellie is focused on the direct impact that social and political events have on future aesthetics and their relationship with the economics of design.

[kelliekaydesign@gmail.com](mailto:kelliekaydesign@gmail.com)



**PAD. Pages on Arts and Design**

International, peer-reviewed,  
open access journal  
ISSN 1972-7887

#20, Vol. 14, June 2021

[www.padjournal.net](http://www.padjournal.net)



**AIAP**

associazione italiana design  
della comunicazione visiva