

# Exploring Fashion Design through Deleuze's "Fold" Perspective: A Case Study of Blender Software

Yibo Ji, Zhidie Zhu

Nanjing University of the Arts.

## ABSTRACT

Compared to a naturalistic understanding of the world, Deleuze's "Fold" theory offers a more comprehensive perspective on fashion design. This paper identifies and summarizes three key characteristics of his theory within the realm of fashion design: dynamic processes, boundary elimination, and autonomy. Furthermore, it applies these design traits and concepts in creative processes using Blender software.

## KEYWORDS

Folding; Body; Autonomy.

Deleuze's philosophy of the "fold" offers an alternative perspective on clothing and provides a theoretical foundation for design practices in the context of new technologies in contemporary society. It is crucial to emphasize that the connection between Deleuze's "fold" and fashion design is not a mere imposition. Fashion design centers on the individual, with clothing as its object, utilizing appropriate design language to achieve a cohesive dressing experience. Therefore, the significance of the body in fashion design is evident. As Dai Duan and Xiao Yuqiang<sup>[1]</sup> highlight, the body occupies a central role in fashion studies, which should begin with the body and embrace a "situated" concept to fully grasp fashion. Sun Rui<sup>[2]</sup> argues that, within a postmodern context, the aesthetics of the body are constituted by the following elements: the body, clothing, the individual, and society. Xiao Beibei<sup>[3]</sup> illustrates the constructive and expansive nature of Deleuze's "body without organs" aesthetic theory by integrating theoretical characteristics with specific design works. This research adopts the philosophical concept of the "body without organs" as a new research perspective, analyzing the relationship between clothing design and the body while exploring the potential for mutual activation between concepts and designs. In summary, the relationship between Deleuze's philosophy of "folds" and clothing design is not merely a simple application; rather, it expresses the interaction between the body and clothing through design language. His philosophical theory provides a profound theoretical foundation for expanding thinking in clothing design, and there exists a dynamic interplay and integration between philosophical concepts and design practices.

## 1 Interpretation of the "Pleat" Theory in Fashion Design

### A Dynamic Process

For Deleuze, "pleats" represent a dynamic and creative force. I argue that the asymmetry and multilayered wrapping and folding in clothing indicate a Deleuzian state of flow. Deleuze states, "Matter is a texture, a fabric;<sup>[5]</sup> all matter tends to unfold its pleats over great lengths."<sup>[6]</sup> He views Baroque pleats as a dynamic and creative force. By observing Issey Miyake's pleated garments, we

see how pleating enacts dynamism—whether through the dispersion of a central line or the opening to various notches, gaps, holes, and cracks. Such garments can exhibit fluid, ever-changing forms in response to body movement or varying styles of wear. Moreover, contemporary wearable technology enables a visual representation of this process. In Iris van Herpen's "Hypnosis" Autumn/Winter 2019 collection, the final look—referred to by art critics as the designer's most challenging work to date—features delicately arranged lightweight feathers transitioning in size, forming a cyclical pleated silhouette, mechanically crafted around an aluminum and stainless steel framework, fluidly dancing around the body. The designer captures the posture of the body in motion; the body exists as the subject of movement, while the garment echoes that embodiment. We can view the "Infinity Skirt" as a continuous exploration of life's rhythms and a resonant space entwined with all existence.

### B Blurring Boundaries

Deleuze employs the concept of folding to challenge the binary distinction between subjectivity and its internal and external components. Folding acts as an interface between the internal and external, depth and surface, existence and manifestation, effectively dismantling binary oppositions. Issey Miyake's Spring/Summer 2015 collection showcases pleated fabrics that create surprising folds, allowing for multiple ways to wear the garments. The pleating does not present a singular or frontal view; rather, it generates subtle variations of curvature that blur the clear boundaries between the inside and outside of the clothing. Garments can be folded inward or outward at will, or as Deleuze suggests, "folding moves between the external and internal, expanding to either side; folding is divided into pleats that are tucked inside and overflow to the outside." It is within this perpetual movement of inside and outside that the pleats articulate their boundary dissolution and infinite freedom. Similarly, in Yohji Yamamoto's late 1990s works, he does not merely use pleats as surface decoration; instead, he transforms them into pockets, accommodating various accessories for different occasions while linking personal intimacy with the folds of skirts. This innovative use of pleats in fashion creatively connects the body to its surrounding space in a novel manner.

### C Autonomy

The autonomous nature of clothing during the Baroque period featured voluminous, pleated designs where the placement, density, and size of pleats could be adjusted by human intervention. This manipulation granted the fabric a sense of autonomy and fullness, transcending mere decorative effect. As Rudolf Wittkower noted, <sup>[7]</sup>pleats possess a life of their own, independent of the human form they drape. Gilles Deleuze further suggested that clothing envelops the body, enabling pleats to achieve autonomy, free from the constraints of the human figure. Hence, a dual liberation occurs: pleats emancipate from the body, just as the body liberates itself from the limitations of physical garments. Rei Kawakubo's Spring/Summer 1997 "lump" dresses exemplify exaggerated forms, utilizing cotton padding to create tumor-like protrusions at smooth body contours, thereby challenging the fashion industry's traditional reliance on the human anatomy for design. This effort seeks to free clothing from subjugation to the body, <sup>[8]</sup>embodying Deleuze's philosophy on pleats: "Fabrics or garments must liberate their own pleats from the subordinate relationship to the finite body they typically cover." The author interprets this as an exploration of pleats and bodily space, where the wearer inhabits a collective creative freedom in shaping new bodily forms. Through multiple, layered, and asymmetrical drapes and pleats, this approach provokes reflections on new modes of expression and subjectivity <sup>[9]</sup>. Similar to Kawakubo, Iris van Herpen leverages innovative technologies to disrupt conventional design thinking, articulating the philosophy of "pleats" through contemporary materials and techniques. Her work utilizes 3D printing to transform pleats from a two-dimensional plane into a three-dimensional dynamic structure, transcending traditional textile limitations based solely on human morphology. Her inventive designs not only symbolize fashion but also reflect artistic dialogue with bodily space, highlighting the independence of pleats

across time and space. As previously mentioned, Iris van Herpen's Autumn/Winter 2019 collection featured the "Infinite Skirt," which disrupted traditional notions of fashion objectivity through autonomous movement. Inspired by van Herpen's work, Sun Rui, a doctoral student at Nanjing University of the Arts in China, developed the "Organeless Body" series. This collection draws on Deleuze's philosophical concepts, extending parametric algorithms into the realm of design. It integrates various disciplines such as algorithmic mechanisms, morphogenesis, materials science, aesthetics, and ergonomics to address design challenges, employing 3D printing technology to create parametric accessories.

## 2 The Practice of "Pleats" in Fashion Design

### A Experimental Samples Based on Traditional Mannequins

The author distilled three key characteristics of Deleuze's concept of "pleats": curvature, folding, and dynamic form. Through the medium of physical origami, the author conducted experimental attempts to explore the transformation and movement of pleats. By folding a piece of paper and draping it over a mannequin, the author experimented with various shaping effects and wearing methods based on placement (such as around the neck, chest, waist, and hips). Throughout the design process and the presentation of diverse outcomes, the author highlighted the processual nature of pleats and the dissolution of their resultant boundaries. In Figure 1, distinct hat shapes emerge at the neck through various folding and unfolding techniques, while Figure 2 illustrates the same pleat manipulated into different forms on the shoulder, torso, and overall mannequin. Building upon this foundation, Figure 3 investigates the autonomy of pleats, exploring their spatial relationship and artistic forms in relation to the human body.

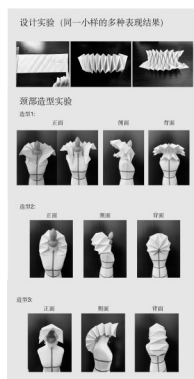


Figure 1 Neck Shape Experiment

### B Implementation of Clothing Sculpting Based on Modern Blender Software

"Pleats" encompass various folds, implying potential fluidity and diverse perceptions of time and space. Through this motion, individuals depart from familiar conceptual territories such as idealized bodily shapes, uniformity, and fixed structures. Consequently, the work necessitates the incorporation of dynamism, anti-binarism, and the autonomy of pleats, which requires the use of parametric soft modeling for correlational design variations. Thus, the author selects Blender software for design creation. The Tissue plugin, commonly used in 3D parametric design, rivals Grasshopper in Rhino and offers greater intrigue in terms of materials and exaggerated forms. The Tissue plugin within Blender provides designers with multifunctional support for parametric design, enabling real-time adjustments of the model's wrinkle size and morphology, thereby allowing for a more accurate simulation of how various materials form these pleats during dynamic processes.



Figure 2 Shoulder, Torso, and Overall Shape Experiment



Figure 3 Combined Overall Shape Experiment

Compared to traditional design methods, Blender not only showcases the instantaneous changes of pleats in the design but also grants designers the freedom to adjust spatial layouts and wearing options, closely aligning with Deleuze's dynamic thought on "pleats."

First, import a female human body model into the blank Blender interface. Press Shift + A to create a cylinder, then move the cylinder onto the model's legs. In render mode, you can visually assess the spatial relationship between the cylinder and the body. Edit the cylinder independently; vertices represent the subdivision of the cylinder's rotating surface and can be adjusted to affect the final number of pleats. Extend the height of the cylinder based on the human model's height to determine skirt length, while keeping in mind that it needs to fit over the body, so delete the upper and lower cross-sections of the cylinder.

Next, create another component, as shown in Figure 4, by pressing Shift + A to build a square plane. Select the surface and enter edit mode by pressing Tab. Use Ctrl + R to vertically subdivide it and scroll the mouse wheel to divide it into three parts. Select the middle rectangle, hold the Z key, and move it upward to create a 3D rectangle. Delete the front and back faces of the rectangle, select the top face, and scale it using the S key, as illustrated in Figure 5. Then, add a subdivision surface to the component, as shown in Figure 6, and adjust the Levels Viewport to increase the number of surface subdivisions. Adjust the Array modifier for quantity and orientation to create a textured plane. Finally, select both objects and load the Tessellate Patch plugin; apply the plane component's texture and shape parameters to the cylinder.

Based on Deleuze's concept of folds, we extract the original cylinder from the human model. We

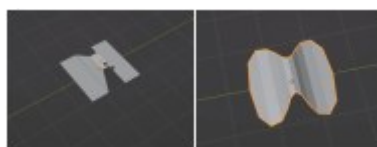


Figure 4 Composition of Material Fundamentals

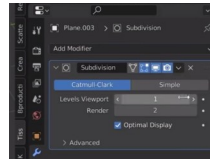


Figure 5 Increase in Surface Segmentation

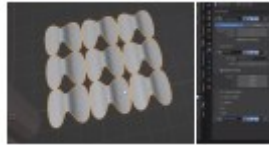


Figure 6 Regulation of Quantity and Arrangement.

add a Multiresolution modifier for sculpting, repeatedly subdividing to refine the cylindrical surface. We then select the model and enter sculpt mode. The F key allows us to zoom the brush, while Shift+F adjusts brush strength. We utilize both tools alongside the left toolbar to sculpt arbitrary shapes on the original cylinder, applying expansion and compression in various directions. The software's 3D view facilitates design from multiple angles, as illustrated in Figure 7. Once the sculpting shape is determined, we return to Object Mode to refresh, resulting in the updated cylinder form. Additionally, increasing the material count enhances the density of the cylinder's folds, realizing the mobility characteristic of Deleuzian folds. To achieve a smoother finish, we apply a subdivision surface modifier to the embedded cylinder shape, completed as shown in Figure 8. The folds exist in varying configurations from both interior and exterior perspectives, adapting with changes in viewing angle. The design allows for different styles based on frontal, lateral, and rear views, effectively eliminating the boundaries of Deleuzian folds as depicted in Figure 9. Finally, we employ Veralight and Real-time Materials plugins for scene lighting and fabric material rendering. Considering the autonomy expressed by Deleuzian folds in garments, I position a single material effect garment atop the human model, primarily for effect demonstration, as shown in Figure 10.

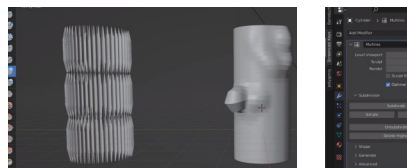


Figure 7 illustrates shape carving

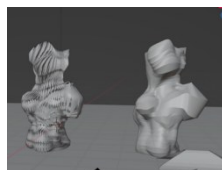


Figure 8 depicts the updated synchronized morphology

### 3 Summary

Although Deleuze's theory of "folds" initially critiques Leibniz's monadology, it has broader implications for postmodern thought. This theory resonates across various design contexts influenced by modern technology, including architecture, sculpture, and even 3D modeling. The

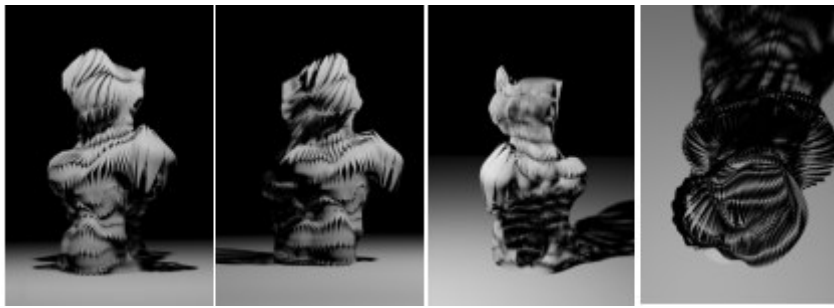


Figure 9 presents the rendering of scene lighting from the front, side, back, and top views

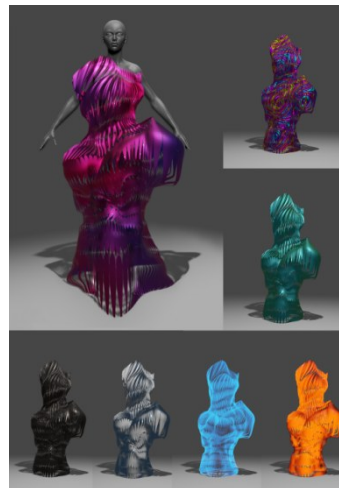


Figure 10 showcases the effects of different materials

concept of folding transcends mere physical manipulation, suggesting the fluidity of bodies, materials, and spaces in an interconnected globalized world. In today's industrial landscape, the fashion design sector experiences significant shifts due to economic, technological, artistic, and cultural transformations. The introduction and innovation of technology greatly accelerate the evolution of fashion design. On one hand, the rapid advancement of smart materials and wearable technology will further dissolve the established boundaries between form and function in fashion design. Deleuze's folding theory not only inspires designers but also provides a profound philosophical foundation for the future of clothing design. Designers can leverage dynamic and autonomous material resources to achieve a fundamental shift from "clothing attached to the body" to "clothing possessing an independent existence." On the other hand, clothing modeled through 3D software utilizes the software's parametric interconnectivity to achieve dynamic transformations. The 360-degree perspective and free rotation feature provide convenient browsing for diverse ways to wear the garments. Clothing can possess an independent space rather than merely clinging to the body. The smooth, flowing, and flexible pleats of the garments reveal how the body converges or expands in relation to the world. The dynamic process, boundary elimination, and autonomy characteristic of Deleuze's concept of pleats introduce new design strategies regarding the structure and form of 3D fashion design, allowing designers to explore possibilities that transcend the garments themselves. Thus, philosophical theory holds significant guidance for design practice, and clothing design may also be understood from the perspectives of representation and symbolism. In addition, the theory of clothing design must evolve along new pathways to address the changes in contemporary fashion design.

## About the Author

Ji Yibo (1975-), male, professor and master's supervisor at the School of Design, Nanjing University of the Arts , Head of the Department of Fashion and Costume Design; Research direction: Fashion design, art design theory and practice.

Zhu Zhidie(1998- ), female, master's student at the School of Design, Nanjing University of the Arts; research direction: fashion design.

## References

- [1] Dai Duan, Xiao Yuqiang. The academic process of integrating body aesthetics into fashion research in my country[J]. Journal of Nantong University (Social Sciences Edition), 2018, (05): 100-105.
- [2] Sun Rui. Concept and Vision: Body in Contemporary Art Design[D]. Nanjing University of the Arts, 2019.
- [3] Xiao Beibei. "Body without Organs" - Research on the Application of Deleuze's Body Aesthetics in Fashion Design[D]. Beijing Institute of Fashion Technology, 2021. DOI:10.26932/d.cnki.gbjfc.2021.000258.
- [4] Gilles Deleuze; translated by Yang Jie. The Folds: A Revised Translation of Leibniz's and Baroque's Styles [M]. Shanghai: Shanghai People's Publishing House, 2021.09.
- [5] Deleuze G, Strauss J. The fold[J]. Yale French Studies, 1991 (80): 227-247.
- [6] Xiao Beibei. "Body without Organs" - Research on the Application of Deleuze's Body Aesthetics in Fashion Design[D]. Beijing Institute of Fashion Technology, 2021. DOI:10.26932/d.cnki.gbjfc.2021.000258.
- [7] Wittkower R, Hibbard H, Martin T, et al. Gian Lorenzo Bernini: The Sculptor of the Roman Baroque[M]. Phaidon Press, 1966.
- [8] Fukai A. Fashion: the collection of the Kyoto Costume Institute: a history from the 18th to the 20th century[M]. Taschen, 2002.
- [9] Smelik A. Fashioning the fold: Multiple becomings[M]//This Deleuzian Century. Brill, 2014: 37-56.