

FUTURESCAN 4: VALUING PRACTICE

Looking Back to Look Forward: Reanimating Textiles for Novel Design and Manufacturing

Brooks Hagan, Rhode Island School of Design, bhagan@risd.edu

Abstract

In 1949, the Costume & Textile Collection at the Museum of Rhode Island School of Design in Providence, Rhode Island, USA was gifted a large collection of industrial textile samples manufactured by some of the finest export weaving facilities in late 19th century France. These documents — still largely uncatalogued — are a remarkable expression of an artform operating at the highest level. Many of the samples contain industrial processes that have all but vanished from contemporary textile design and manufacturing. Our research group explored and reanimated several of these techniques by using advanced scanning technology and adapting existing loom equipment for new use. The collection of resulting samples was shown for the first time at the *Futurescan 4: Valuing Practice* conference (23rd-24th January, 2019), University of Bolton, Bolton, United Kingdom (UK).

Keywords: weaving; textile; technology; manufacturing; simulation



Figure 1: RISD Museum, c. 1949. Arnold Print Works swatchbook donation.

Introduction

In 1949, the Costume & Textile Collection at the Museum of Rhode Island School of Design in Providence, Rhode Island, USA was gifted a vast collection of industrial textile samples manufactured by some of the finest export weaving facilities in late 19th century France. These documents — still largely uncatalogued — are a remarkable expression of an artform operating at the highest level. Many of the samples contain industrial processes that have all but vanished from contemporary textile design and manufacturing. It is our goal to explore and reanimate several of these techniques.

On the occasion of the RISD Museum show *Repair and Design Futures*, (October 5th 2018 - June 30th 2019) the Virtual Textile Research Group (VTRG) at Rhode Island School of Design examines several of these samples, utilizing the latest computer scanning technology as well as industrial and hand-based techniques to decipher the centuries-old textile constructions. Our process involves adapting machinery and developing contemporary tools (including modeling software that can demonstrate the complexity of the archival fabric and aid in the development of new variants), some of which we have manufactured and shown for the first time at the *Futurescan 4: Valuing Practice* conference (23rd-24th January, 2019) at the University of Bolton, Bolton, UK.

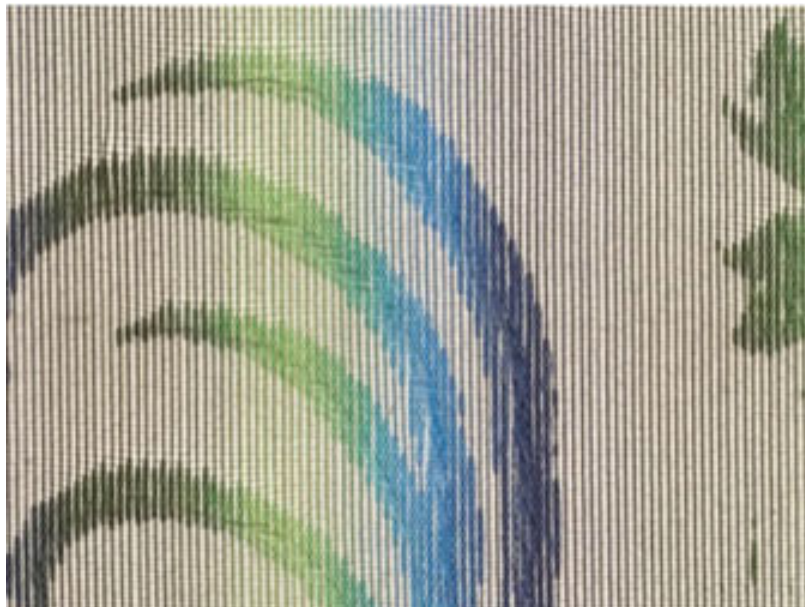


Figure 2: French, 1893. *Figured leno Jacquard with warp stripe*.

Background

The last two decades have seen huge change in the United States (US) textile industry. An inability to adapt to mass-customization and smaller-scale production means that manufacturers have been forced to close, leaving thousands of people out of work, and an entire industry stuck with a lack of innovation. As we move away from a connectedness to the origins of created objects, brand awareness and cache of the image has never been stronger. Sadly, our sense of material quality has never been weaker. There was a time when this rupture did not exist — the samples in the RISD Museum archive represent an entire cultural apparatus developed around conveying novelty in textile technique, construction, color, surface phenomenon, graphics and the exciting potential of the medium. We must question the path forward. We must ask ourselves as designers why we live forever in the now, always peering excitedly towards the future. Has this unquestioning modernist legacy of scale served us so well? Turning to the samples from the RISD Museum, the apparent innovation of almost 150 year-old work suggests not.



Figure 3: French, circa 1880. Three-height cut and looped pile sample with directional brushing, possibly handwoven.

Process

To start, we selected several samples from the RISD Museum collection that were manufactured with a combination of hand and industrial techniques, and at first glance appear enigmatic as to how they were made. Our goal was to uncover the techniques underlying these fabrics, create computational models of their behavior, and attempt to make new samples on both hand and industrial equipment, utilizing what we discovered. It was our intention to demonstrate a path for future textile manufacturing and the vibrancy of textiles that can be designed by industry, and provide a bridge for our knowledge of the capabilities of the medium. Exploration and research into these historical samples allows us to reframe expectations as to what is possible in the field, an approach to the concept of repair that engages industrial and computational equipment as tools for fine craft.

Through this project we seek less to focus upon a moment of wear or mending, the semiotic approach to repair, than to reconnect the end samples with the industrial means of production— and actively jar memory through making to the dormant innovation contained in material. This approach targets how the textile design process might become utilitarian and expressive once again, suggesting the living future of an historical legacy.



Figure 4: French, circa 1890. Looped and cut pile three-wefted Jacquard velvet.

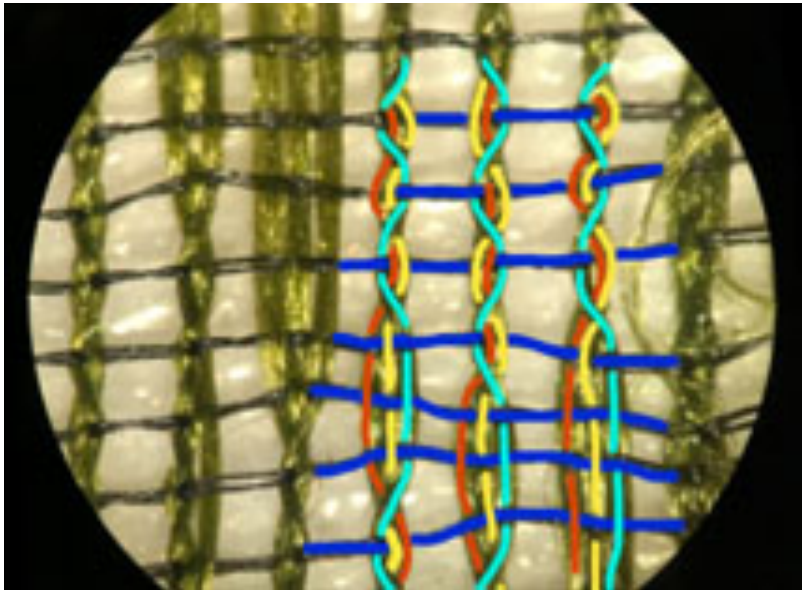


Figure 5: Detail of microscope image tracing leno movement.

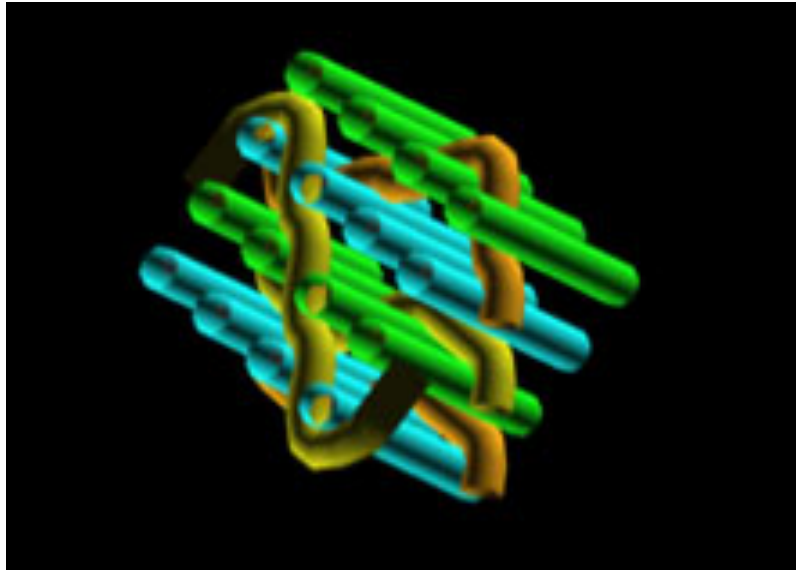


Figure 6: 3D woven block model showing top loop of pile (upper right).



Figure 7: Pile velvet looms at Tessitura Bevilacqua, Venice IT. Image courtesy of Anjuli Bernstein.



Figure 8: 1408 hook Jacquard loom with creel setup for 3D weaving. TEAM Inc, Woonsocket RI.

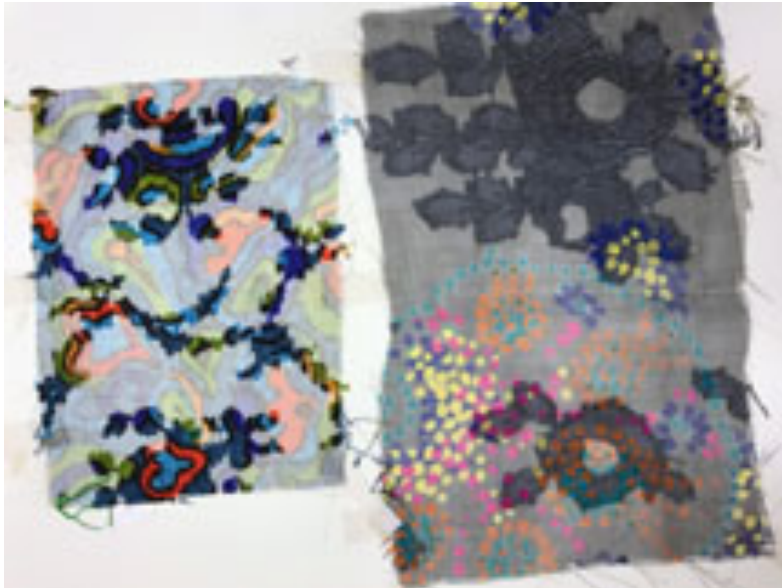


Figure 9: Samples from RISD Museum Costume & Textile Collection showing multi-layer printing and applique.



Figure 10: Creel warp cones, TEAM Inc, Woonsocket RI.



Figure 11: Handwoven velvet, Lisio Foundation, Florence IT. Image courtesy of Anjuli Bernstein.

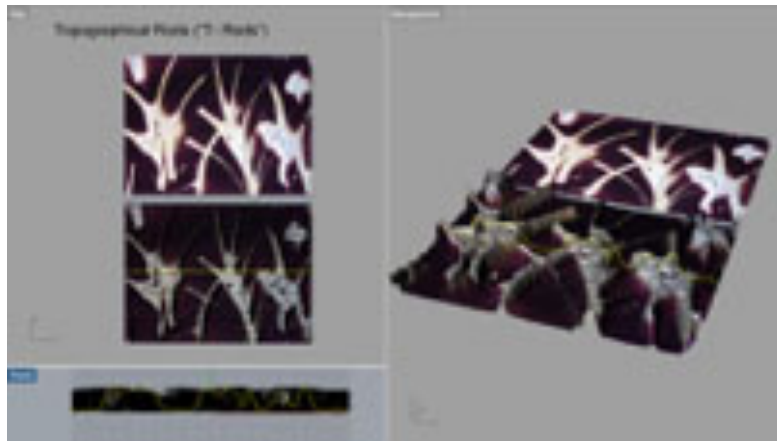


Figure 12: 3D extruded topographical Rhino model divided into slices for lasercutting as loop and cut pile "T-rods". Image courtesy of Joy Ko.

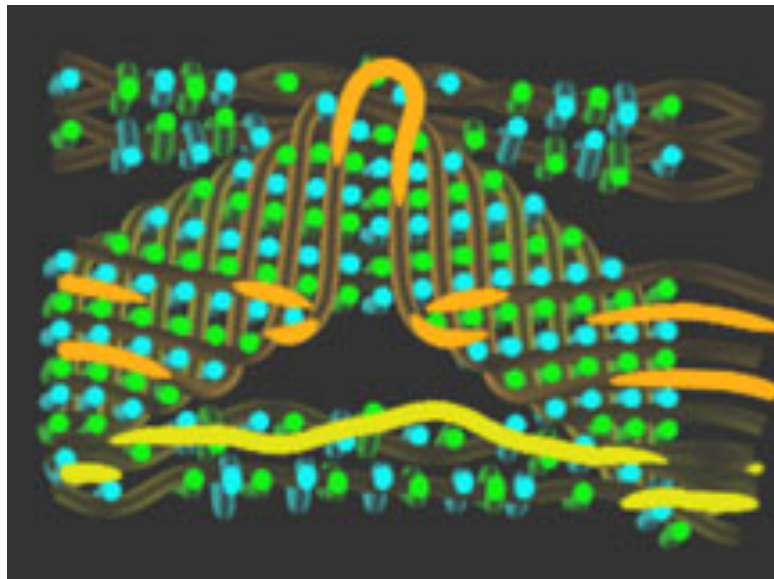


Figure 13: Crenellated 3D woven sample modelled as a cross-section with offline-relaxation predicting directionality and deflection of warps. Image courtesy of Steve Marschner and Rundong Wu.

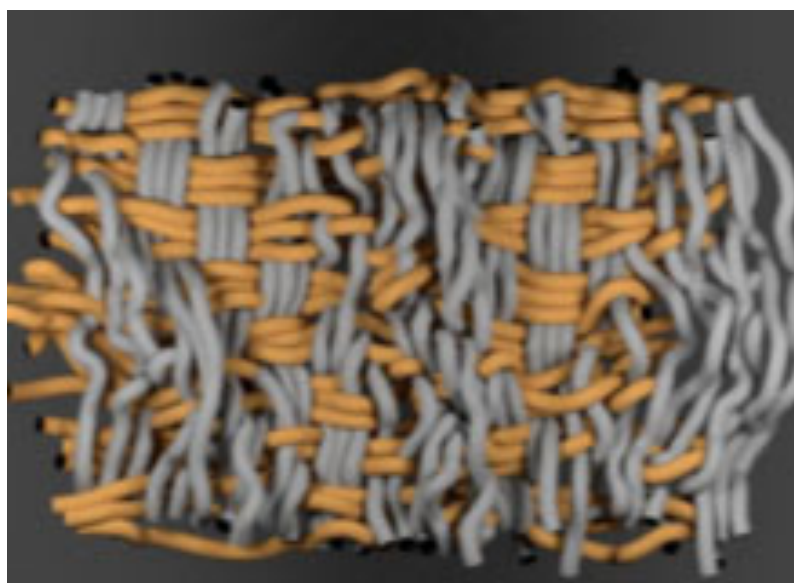


Figure 14: Simulated basket structure with overloaded diameter and density parameters. Courtesy of Doug James, Steve Marschner, Jonathan Leaf and Rundong Wu.

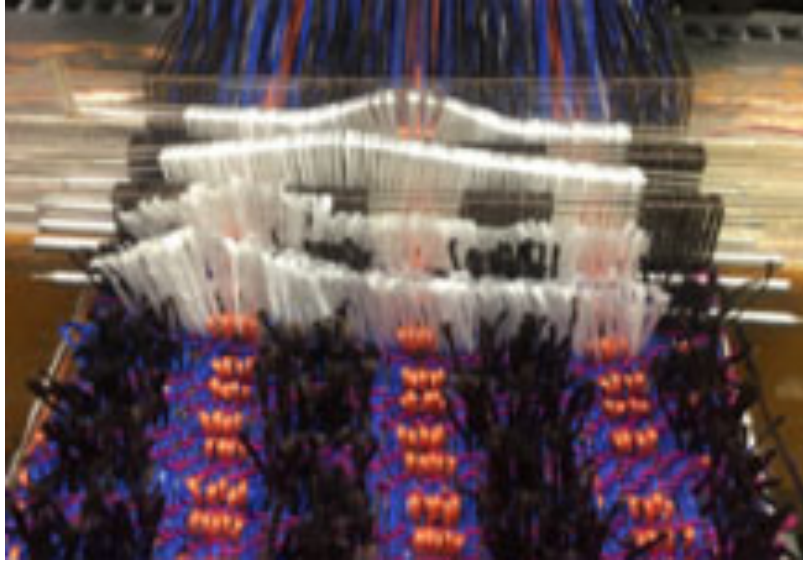


Figure 15: Pile weaving with "T-rods" on 3D warp setup.



Figure 16: Crenellated sample exhibiting distinctive folding tendencies.



Figure 17: Jacquard pile samples: (a) cut and looped pile stripes (b) varied length directional pile (c) cut and looped pile with Jacquard graphics (d) same (e) cut pile stripes (f) looped pile with varied ends and Jacquard graphics. © VTRG 2019. Photos: Emily Holtzman.

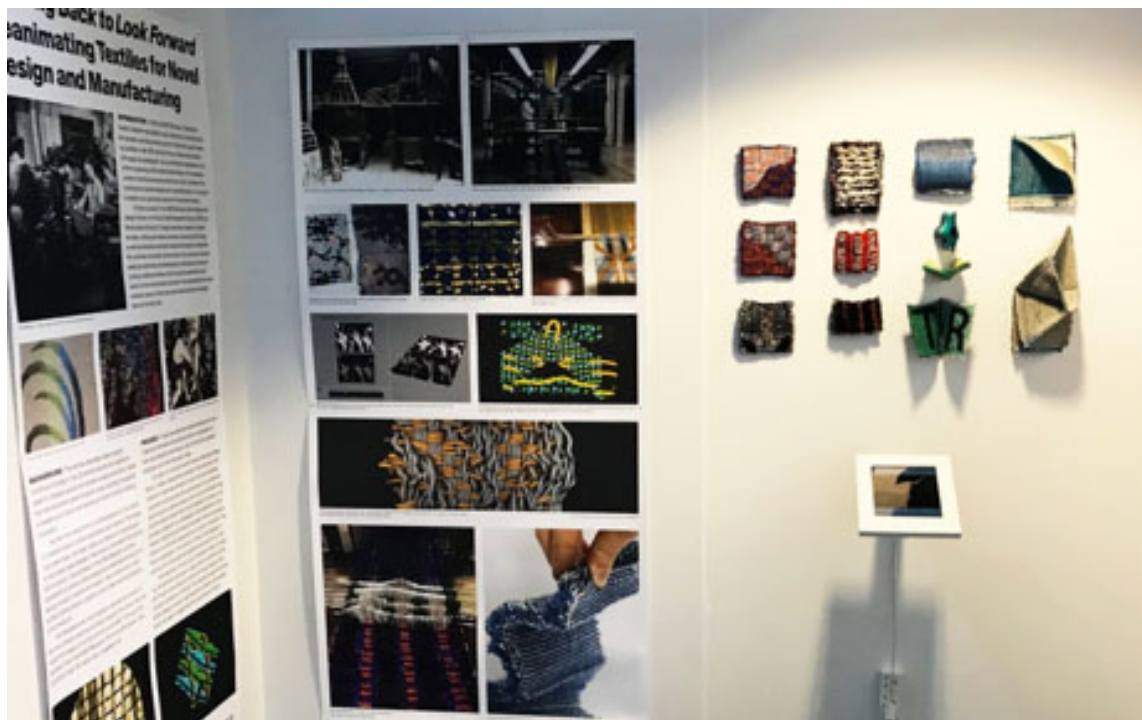


Figure 18: Futurescan 4: Valuing Practice, Bolton, UK, January 2019: Gallery installation view.

Acknowledgements

We would like to thank TEAM Inc for the generous donation of time, materials and equipment and many valuable discussions with Sean Krozner and Steve Clarke. Thanks to Prof. Doug L. James and Jonathan Leaf at Stanford University and Prof. Steve Marschner and Rundong Wu at Cornell University for visualization and rendering discussions and creation of some of the images included herein. Thanks to Alison Huff for her varied assistance. Thanks to Joy Ko, PhD for many discussions and shared pedagogical moments. Thanks to the RISD Virtual Textile Research Group: Anjuli Bernstein, Gabrielle Ferriera, Claire Harvey, Emily Holtzman, Carolina Jimenez, Anastasia Onegina and Emily Robertson.

www.vtrg.squarespace.com

This work is supported in part by the National Science Foundation (NSF) IIS-1513954, and a gift from Under Armour. Any opinions, findings, and conclusions or recommendations expressed in this material are those of the author(s) and do not necessarily reflect the views of the National Science Foundation.

All images copyright VTRG 2018.



RISD Textile Department

[risdresearch](http://risdresearch.com)