

Case study number: 01/2014

Project Title: Seamless knitwear: singularities in design

Researcher: Dr Amanda Smith

Project Period: 2010-2013

Project Description:

The aim of Amanda's study was to explore the creative options open to knitwear designers using computerized seamless knitwear technologies. A key objective was to investigate three dimensionality of garment shape through a series of practical experiments. Through her experiences as a knitwear designer, Amanda had noted that as knitwear design becomes more mechanised it appears to have had a reductive effect on design itself. Her research indicated that the industry standard systems of manufacturing knitwear was designed for mass-production of symmetrical garments, and currently limited to sequential predetermined movements and standardized forms. Consequently, Amanda's PhD research looked at ways of generating a nexus between technician, machine and designer, therefore increasing design capacity and options.

The project methodology adapted the Shima Seiki knit programming software to produce 3D garments that differed from the basic pre-programmed garments. Amanda worked closely with TDL Knit Technician, Gordon Fraser, to create *Designer Packages (pacs)*, which incrementally added design components into the work. This extensive research empowered the designer to bridge the gap between product, machine, technician and designer, by allowing the designer to create 3D programmes through creating independent packages of software instructions. The methods investigated involved employing the pre-programmed shapes and silhouette templates, adding and incorporating the *Designer Pacs* into the standard shapes to create original designs, which used lace structures to emphasize the design lines.

The initial garment experiment used the basic tunic as a starting shape and through using partial knitting (flechage) on one side, it deformed the rectangular shape into a curve which, when worn on a body was reinterpreted in movements around the body, its materiality increasing, causing it

to drape and fold, opening to a play of signifying possibilities.

To alter the basic tunic shape, a new *Designer Package*, or *pac*, had to be introduced, initially developed by the knit technician. The imagery for where the *pac* will be used was drawn on the overall, front and back two-dimensional images at the compressed-garment stage of registration. These then become the areas of movement, caused by directional forces being introduced to the basic form. Next the *pac* was registered through a 'Package Development' process and the new *pac* is incorporated with the others to make up the basic garment structure.

A series of garments were developed, all based on the basic sleeveless tunic shape and using a variety of wedge shapes placed on the garment using two packages developed by the technician. Through this experimentation, a range of points-of-inflection was trialled. Each garment was developed, knitted, analysed and incrementally altered. With each garment, improvement notes were taken and garments placed on mannequins to observe the lines, proportion and the way that the garment draped. In this way a shape lexicon was developed. With each variation, a series of differentiated modulations were elicited, creating a contextual order of differences, building a signifying system of meanings.

This research, investigating materiality of the garments through asymmetry, involved original documentation and study of controlling internal processes of the knit machine. This re-introduces tacit knitwear knowledge from the hand into a controlled knit environment. This project investigated in great depth the idea that seamless knitwear processes, recognized as mass-production tools may be rethought as design innovation processes for three-dimensional assemblage. This facilitated a design-led rather than a production-led understanding of innovation. The thesis outcome was a collection of knitwear garments, each of which was unique though iterative; as a collection with repetitive difference. Engaging with the computerized design capability of the Shima Seiki seamless knitwear system, Amanda's research opened critical approaches to an understanding of design, technology, garment, surface and form.

Conference Papers:

Smith A., Joseph F., Kalyanji J. **New Dimensions in Knit**, 16th IFFTI Annual Conference, Bunka Gakuen University, Tokyo, Japan 2014

Smith, AE. **Harnessing the Haptic in Mass-production Seamless Knitwear Technologies**, 8th International Conference on Design Principles and Practices and the Design Principles and Practices Knowledge Community, Vancouver, Canada, 16 Jan 2014 - 18 Jan 2014

Smith AE, Smith M. **Past, Present and Future: A Haptic Approach to Mass-Production Seamless Knitwear Technologies**. Making Futures 3, Plymouth, UK, 26 Sep 2013 - 27 Sep 2013. Making Futures 3 Conference, 27 Dec 2013 (Conference contribution)

Smith AE. **Seamless Knitwear: Singularities in Design**. Thesis type: Doctoral Thesis. Supervisors: Jackson M, Joseph F. AUT University, 18 Dec 2013 (Thesis/Dissertation)

Interesting and Relevant links:

Mandy's doctoral thesis can be viewed online at:
<http://hdl.handle.net/10292/5761>

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Images:

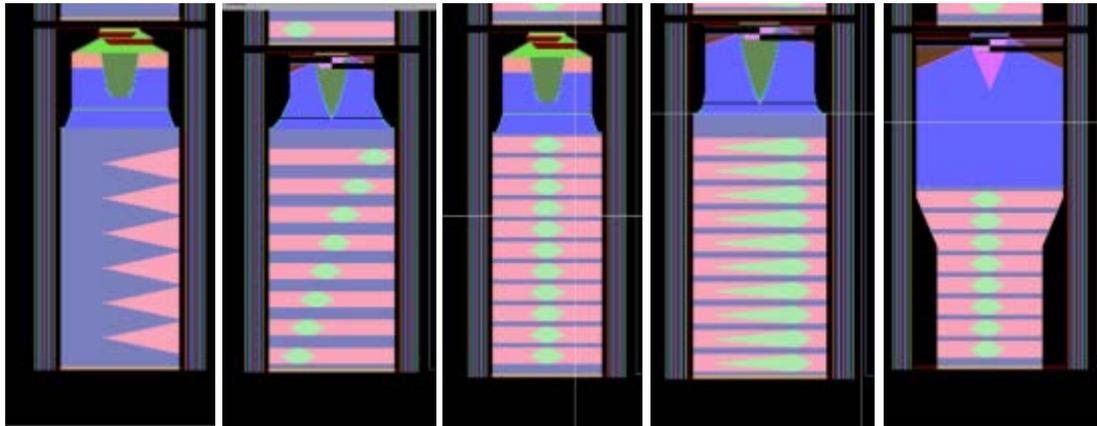


Figure 1: Smith, A. (2013). Five tunic designs each with a different use of one of the two developed 'packages'. Source: 'Knitpaint', Shima Seiki Manufacturing.



Figure 2: Smith, A. (2013). First of garments developed using the tunic pre-installed shape with added designer pacs.



Figure 3: Smith, A. (2013). Final collection of three dimensional garment forms, with stitch structures emphasising directional flows. Photo by Hughes E.