Integrating Textiles with Electronic Systems

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ABSTRACT/POSITION STATEMENT

As a textile lecturer and designer I am interested in the intersection between emerging technologies and traditional textile practice. Exploring the structural properties of a fabric and creating potentially new geometries or systems in cloth and pattern are a key interest. Embedding electronics into fabric surfaces has great potential for collaboration and pervasive textile artworks. I would like to apply to participate in The Pervasive Workshop in order to present my own ongoing research collaborations and to open discussions on integrating textiles with display technology. I have little technical experience in electronics however I can contribute to discussions in terms of textile experience. Out of these dialogues potential collaborations and future new works have the potential to arise.

Key Words

Textile systems, e-textiles, thermo chromatic inks, LED light circuits, non woven fabrics, traditional textile constructions, intersections of technology with fabric structures, pervasive textile artwork

INTRODUCTION

Against the current climate of multi-disciplinary design collaboration traditional textile constructions are merging with new technologies. In terms of textile manufacturing some of the most interesting intersections between traditional textiles and technology are happening in Japan. Textile Designers are collaborating with scientists and engineers to produce extraordinary results. Artists find themselves in an age where they can merge two opposites – hand and technology(Wada 2002)

Two key areas have emerged in textiles. Smart fabrics that can resist stains and act like skins to control heat and insulation. Electronic textiles that can be wearable and incorporate small computations within the cloth.. In such cases conductive threads are incorporated to enable conductivity. This can result in fabrics emitting sound, smell and light (Berzowska 2005).

It is against this background that I have made early explorations of hand and technology in my textile work and would like to incorporate more possibilities and outcomes in this spirit of exploration.

Figure 1: *Reticella Lace Series*
Photo credit Paul Pavlou

Background Research Projects

An ongoing pre-occupation in my practice is to create contemporary lace interpretations, (fig.1). The impetus behind this work talks into the integration of technology with traditional textile constructions. Encoded in the process is the tradition of a textile history that is continually responding to creative technologies evolving within each age (Heffer 2007).

The illustrated work entitled *"Reticella Lace Series"* (fig. 1 and 2) is from a solo exhibition of contemporary lace works funded by the Visual Arts/Craft Board of the Australia Council under the category of New Emerging Work. Contemporary Lace is a collection of work that specifically investigates new textile possibilities and configurations. The intention is to create new emerging textile works that combine current innovative technologies with existing traditional craft skills. I am interested in creating a dialog between the old and the new existing along side each other. One informs the other. This interaction of the two creates a new form. Laser technology can be combined with hand-finishing, the drawn and hand painted translated through the digital imaging (Cochrane 2004).

Consequently the Pervasive Workshop could open up possible collaborations in this field. I am interested in adapting this new open work system of lace with conductive threads. I would like to embed electronics in the lace to explore thermo chromatic inks in order to create shifting patterns that respond to heat and touch. Ongoing future textile research projects will experiment with cloth and sound and work with light. These will be linked to the work I have already developed through exploring contemporary lace translations

My investigation into to construction of lace as a new system of open work fabric focuses on the construction of

Figure 2: *LACED Contemporary Textiles*, Solo Exhibition Sheffer Gallery, June 2006

space as a means to identify form. It looks at the interplay between positive and negative, between the interface of the background and foreground (Shepherd 2003). As individuals we identify ourselves by what we are placed next to. We associate ourselves through objects however we also identify ourselves by the spaces we inhabit between those objects (Lynn 2001). We notice the differences between ourselves and other cultures in order to understand our own cultural identity. In this respect the new textile works can be seen as a new place, an intersection between tradition and technology, a third lace.

This new area of research is a major departure from my previous professional textile design practice. Up until now I have developed textile skills and solved design problems within the practical constraints of a client brief. The emerging work is a creative shift that enables me time for research and reflection. Thus it aims not to pursue a technique in a traditional manner but to unravel and question it and in doing so create new work and meaning. The conceptual approach to this work sits outside the original function of the object. Research into lace has fed directly into my lecturing on innovative textiles at the University of Technology Sydney where I coordinate textiles and lecture.

LACE CURTAIN COMMISSION FOR GOVERNMENT HOUSE

In March 2007 I completed a commission to design a contemporary lace curtain for the State Rooms at Government House Sydney, (fig. 3). The project was part of the Historic Houses Trust *To Furnish a Future Program.* The lace curtain is contemporary in its translation and is designed to drape behind the original crimson damask provided by Lyon, Cottier & Co in 1879. The damask was subsequently reproduced for Government House by the French firm Lelievre Lyons. The lace commission has been woven as Nottingham Lace on an hundred year old loom in Scotland. The loom is the only one of its kind worldwide. Linked to a CAD system it is a wonderful living example of technology integrating with tradition and history.

RESKIN THE FUTURE OF WEARABLE TECHNOLOGY

In January 2007 I was selected to participate in the first Australian Wearables Technology Research and Development Laboratory. The lab was called *reSkin*, *The Future of Wearable Technology* and was an initiative of the Australian Network for Art and Technology in partnership with Craft Australia and the Australian National University School of Art and Design. In this intensive workshop twenty two designers, artists, and sound engineers worked in collaboration under the guidance of International and National facilitators. Directions specifically for smart textiles and their application to future design outcomes were played with and explored. This resulted experimental works entitled *Pods,* (Fig.3). This exercise attempted to integrate one of history's oldest textiles, felt, with simple electric circuits and LED lights. The result is a felt vessel that illuminates in the dark (Fig 5 and 6).

Figure 3: The Government House Lace was woven by Morton Young & Borland, Textiles Group, Scotland.

Image provided by Morton Young & Borland

Figure 4: *Pods*, 2007 felt, electrical circuits, led lights, digital prints. Photo credit Paul Pavlou

Future Collaborations

While very simple in its exploration this work forms the basis of new developmental research and a collaboration with artist Danielle Wilde. Wilde explores the poetic in the design and use of interactive and wearable elements and systems. Together we are going to explore embedding LED lights and circuits within nonwoven felt lace works. The intention is to create a felt garment that responds to touch and interacts with the movement of the body.

CONCLUSION

With the knowledge that extraordinary outcomes are emerging in this field of soft computation and electronic textiles I would like to see how this can be adopted into my own practice. As a result of the reSkin Workshop a lot of questions arose in terms of the practical challenges of sources of energy and ways to incorporate electronics into cloth. The Pervasive Workshop will open these discussions with a collective group of specialists that can lead to new collaborations and possibilities in this field.

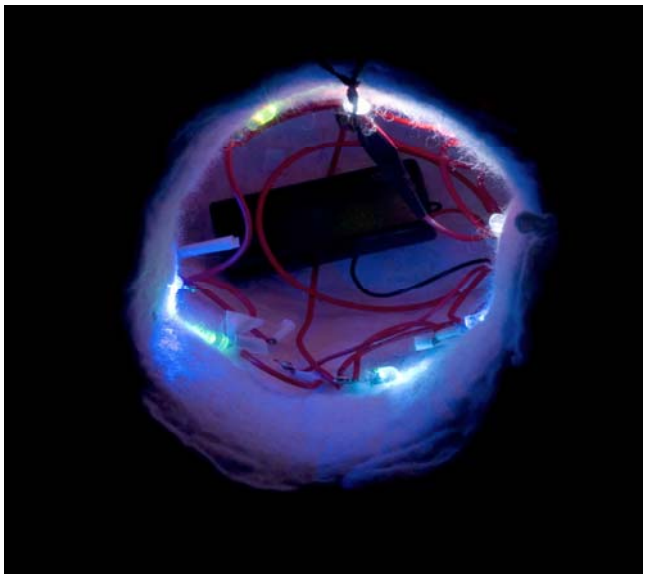

Figure 5: *Felt Pods*, 2007, Felt with embedded LED lights, parallel electric circuit. Photo credit Paul Pavlou

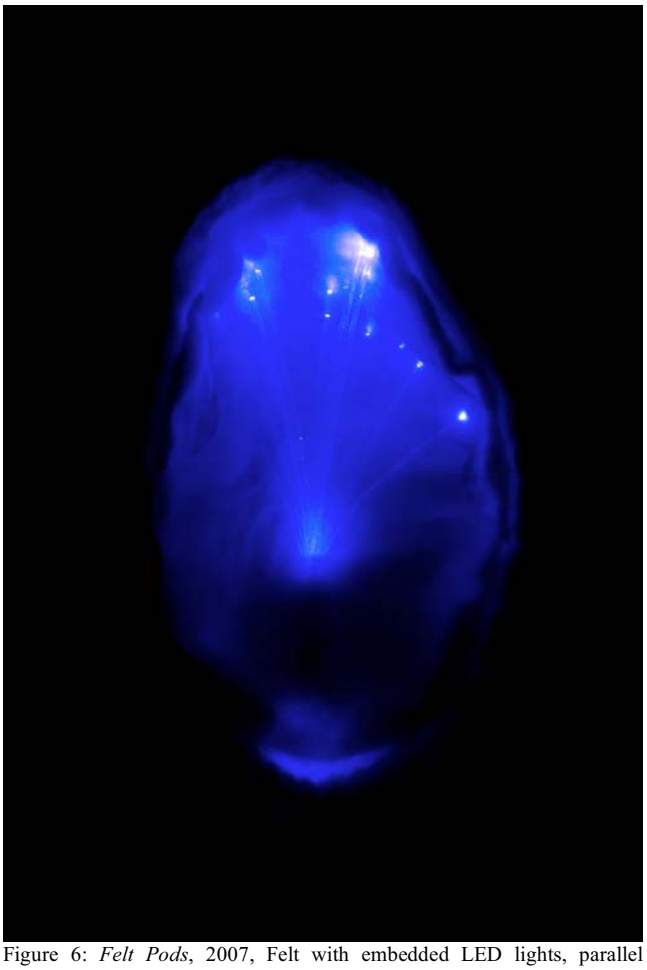

Figure 6: *Felt Pods*, 2007, Felt with embedded LED lights, parallel electric circuit. Photo credit Paul Pavlou

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