

Wear Now!

HIGH TEA WITH MRS WOO
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ABSTRACT

Ours is a photo-essay of the design philosophy and practice of a three-sister fashion design team based in Newcastle, Australia. Our interest in fabrication, textiles and technology in fashion lead us to participate in the Australian Network of Art and Technology (ANAT)'s ReSkin wearable technology laboratory 2007. The lab explored the integration of electronics and new materials into traditional craft practices and design artefacts. Our photo-essay addresses questions raised by Anne Cranny-Francis that came out of that ReSkin experience, as well as general questions relating to our design practice.

KEY WORDS

• design • creative industries • technology • textile • wearable • body • senses



ACF: What attracted you, as designers, to participate in the 'Wear Now' symposium organised by the Australian Network for Art and Technology (ANAT) last year?



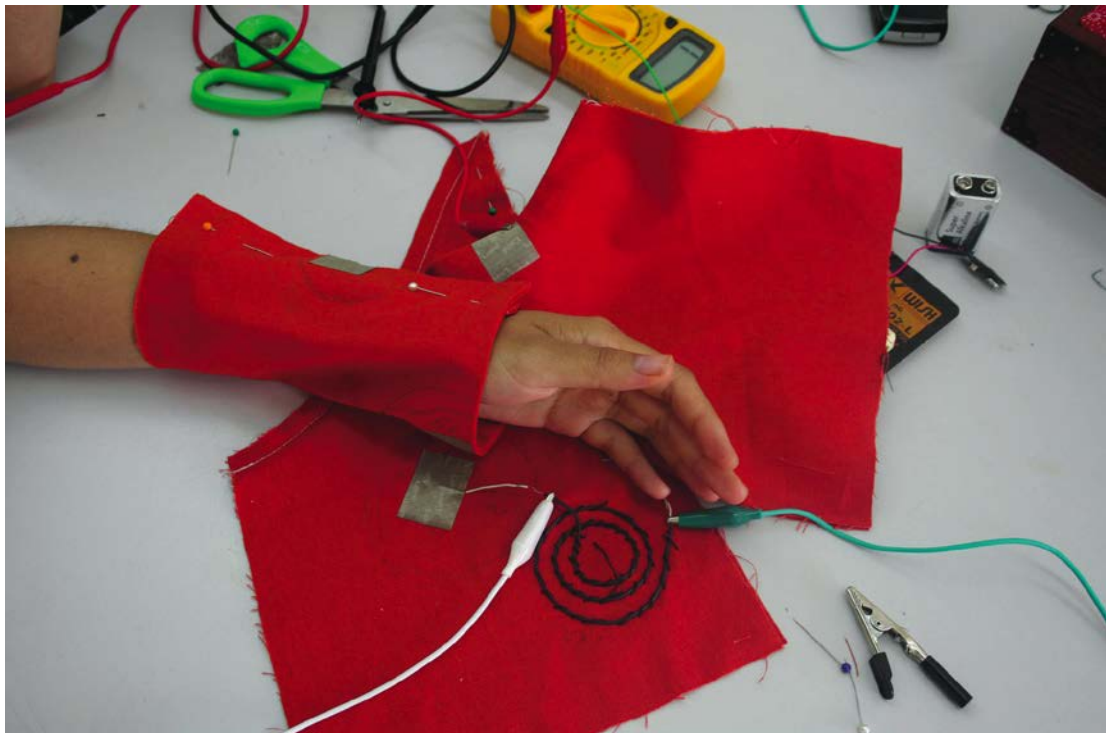
HighTea: When we first heard about ANAT's "reSkin" wearable technology laboratory, we were excited for the opportunity to immerse ourselves in a completely unfamiliar field for three weeks. We were interested in working alongside artists and designers from different creative industries and to learn about the potential practical applications of technology in textiles and clothing, and in our own work and design practice.

Although we operate in the fashion industry, we find inspiration in ideas, processes and experiences from other fields of interest. reSkin proposed an opportunity to broaden our perspective of science and technology and its relationship to art and design.

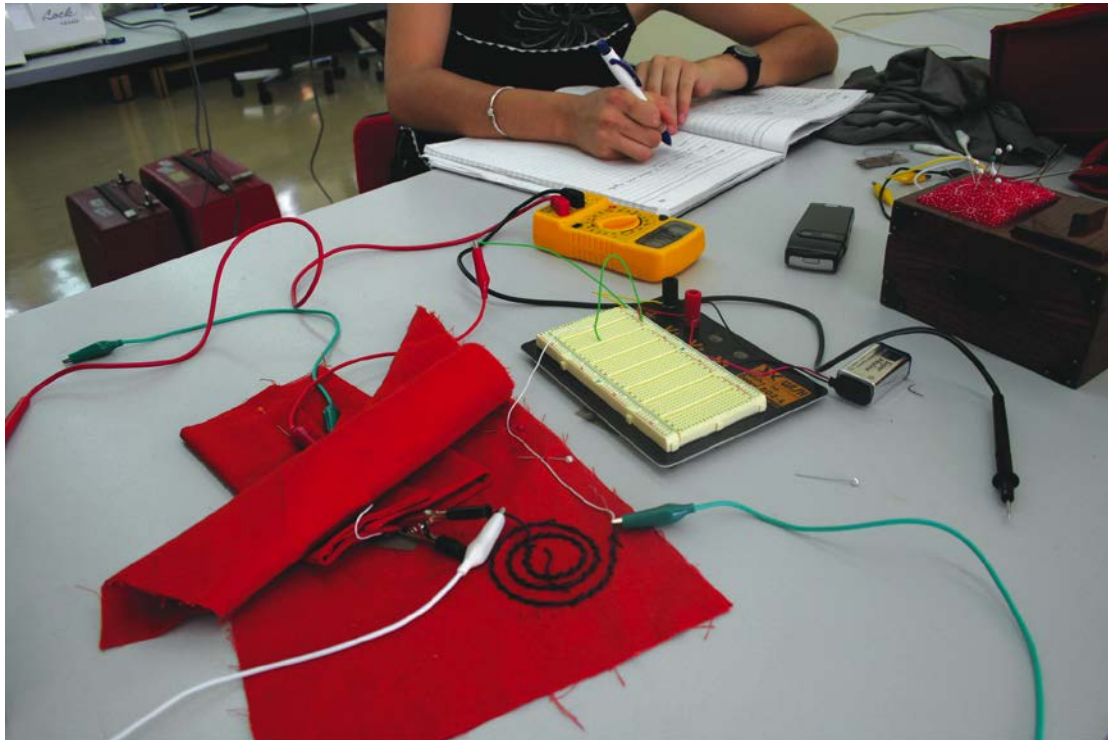
ACF: Had you encountered Wearable Technology before?



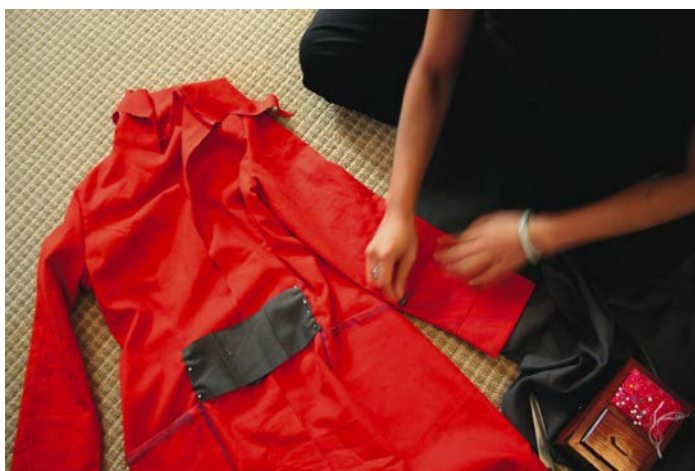
HighTea: reSkin was our first practical experience in the field of wearable technology. We were anxious about our lack of knowledge and experience in computer programming and electronics but excited to acquire a new range of skills and collaborate with other artists. We brought along our portable industrial sewing machine, fabric, threads, needles and paper patterns, while others brought their cables, switches, multimeters, and Arduino boards!



ACF: I think one of your projects was hand-warmers in pockets of a jacket. Can you describe how you went about that?



HighTea: The first week and a half consisted of intensive classes and practical workshops on a range of topics including microcontrollers, programming Arduino boards, basic electronics, introduction to metalwork, computerised Jacquard weaving, screen-printing and creative thinking. The two international and four Australian facilitators encouraged us to explore different mediums of design and form collaborations with each other. Each group was asked to present a project proposal that investigated an idea or form of wearable technology.



As the only participant from the fashion industry, we discovered our approach to the project quite different to the artists and designers from the other creative industries. Having formed a familiarity to

the fast pace, relentless and tight schedules enforced by the fashion calendar and

seasonal deadlines, we were determined to create an achievable brief in the extremely short timeframe of one and a half weeks. The experience of operating a fashion 'business' has also provided us with a greater awareness of the comfort, practicality and pricing of our designs to end-users.



With this in mind, our objective was to develop a garment that incorporated technology within its pattern, shape and construction, which was washable and comfortable. Technology would be assimilated into the garment to demonstrate the obsolescence of the idea of 'wearable technology' as large, bulky, unappealing objects with exposed wires and electronic components, worn on the body.



True to our love and fascination with pockets, we decided on a simple idea of 'invisible warmth', utilising technology to create a heating element incorporated into the pocket and garment construction, powered by a detachable battery pack to allow

for washability. We were excited by the opportunities to integrate metalwork, conductive textile weaving, thermo-chromic ink printing and electroluminescent strips into the garment design but time limitations encouraged us to keep to familiar territory.



Brainstorming, circuit diagrams and mathematical calculations were useful in establishing an electronic circuit from which to base the garment design. We undertook research into the various forms of heating, such as standard resistance wire, nichrome wire, heating pads and blankets etc. We were excited to work with conductive threads and special conductive textiles such as organza, lycra, Velcro and fabric tape to create our soft electronic switches. Our basic calculations of current, resistance and voltage soon discovered a large problem: heating requires high resistance and a high level of current. The total resistance created by our choice of materials and distance of travel to and from the battery pack to the heated pocket needed to have the lowest possible resistance to retain the highest amount of heat. A significant amount of time was spent exploring the different material combinations to

create the soft switches and heating element in order to maximise the heat level with a relatively small battery pack (12V total). Our requirements of “invisible warmth”, washability and user-friendliness limited the size and weight of the battery pack and required all heating wires to be hidden and completely insulated. At many stages, we thought it to be an impossible task! It would have been much easier to place a “Peacock” lighter pocket warmer or a coin-snap pocket warmer into the pocket of our garment without any heating wires, conductive textiles or battery packs!



We found ourselves chasing our tails trying to balance the resistance of our heating element and choice of conductive textiles with the resistance required to create a sufficient amount of heat in the pocket. Our garment design also needed to incorporate a switch to turn the heating element on and off – we finally decided on a soft switch within the sleeve of the dress – once the hand entered the pocket, the switch would close the circuit and initiate the flow of current from the battery pack.

For practicality and cost-effectiveness, we also needed to use rechargeable batteries and determine a way to detach the battery pack easily and safely from the circuit.



With the help of the facilitators, *ANU's Department of Physics*, the shop assistants at *Jaycar* and fellow reSkin participants, on the very last day, we managed to create

invisible warmth for about 20 seconds, until it short-circuited and burnt a hole in the pocket!

ACF: What did you learn from the experience of trying to realise that idea?

HighTea: It was a steep learning curve:

- One and a half weeks is a very short amount of time to complete a project!
- Heating generally requires a high level of current and a large power source (such as from a power point or a dense and heavy battery pack!)
- Conductive textiles generally create high resistance limiting our ability to incorporate conductive threads and fabrics into our garment
- If it rains, what will happen to the garment and the wearer? Are we asking for a lawsuit? (washability of electronic garments is difficult to achieve!)
- Be wary of creating short-circuits when using conductive threads through various layers of fabric
- Four hours to recharge the battery to create less than 10 mins of warmth – not very efficient!

ACF: To what extent did technology and design interrelate or conflict in the project?

HighTea: The simple idea of “invisible warmth” was not easy to achieve. Although our aim was to use technology to create warmth, we found ourselves asking “*is it necessary to use new technology, electronics and create energy to do this?*” Pockets could be warm simply by the choice of material – wool. Upon learning that electrical switches could be soft, we were no longer concerned about the comfort and feel of these “new technology” materials. Also, existing pocket warmer products in the

market would solve all our design issues: “washable”, “detachable”, “convenient”, “invisible”, “re-usable”. So was it just a novelty to create a pocket-warming dress with conductive textiles and electronics? Would it be another invention of useful uselessness?



ACF: Another project had to do with foot-bandages and the use of sensors to map a person's gait. Where did that idea come from?

HighTea: It was a combination of new-media artist Keith Armstrong's interests in exploring human senses through tactile feedback devices with our cultural background and experience with manipulating fabrics on the body, that brought us collaborate on his sensory foot-bandage project "In-Step". The principal idea explores the heaviness of our step as a result of the lightness of our movement on earth. Also inspired by another reSkin artist, Daniel Kojta, who walks on earth in a wheelchair, the work considers how we might release the ground for movement in order to release our movement from the ground. This is achieved by feeling the changing contact points between our foot and the ground when walking. The quality

of walking is felt through a series of actuators within a soft sculpture that is held in our hands, or placed on the body.

ACF: This project seems to focus more on the technology such a device makes available than on its augmentation of an existing piece of apparel. Is that right?

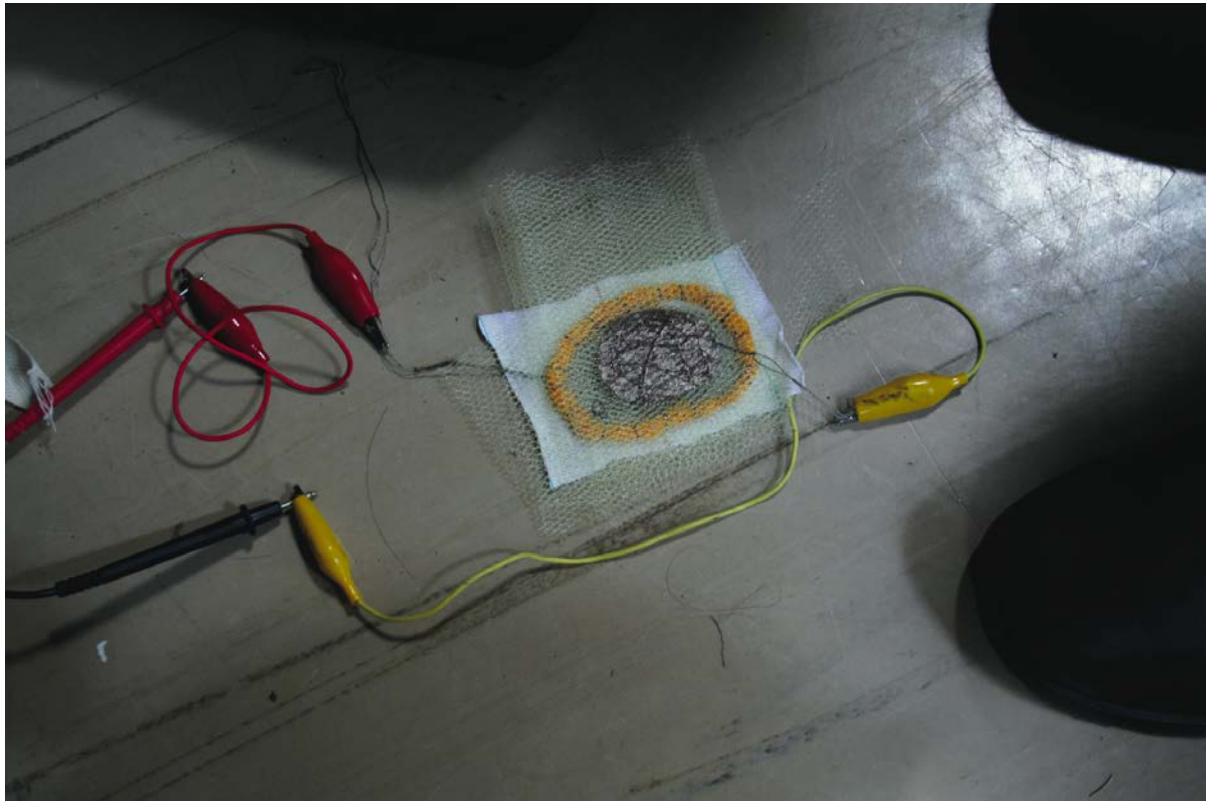
HighTea: This project takes an existing piece of apparel (i.e. a bandage), augmented with technological components and new technology, to enable the human senses to uncover the idea of this work. The technology would not be effective without the apparel or the human body.



ACF: I was interested that you came up with the idea of foot-bandaging, given its history as a form of cultural control. Did you have any thoughts on that?

HighTea: It is the design of a compression foot-bandage, rather than specific cultural implications of Chinese 'foot-binding' that we refer to, however both display limited

mobility and raise concerns about issues of deformity, cultural function and values that are in context of this project. Actually, the bandage was a practical solution for embedding sensors and electronics for our purposes. Our design of the foot-bandage references compression bandage techniques in a figure-eight pattern, overlapping and securing the foot with soft, flexible fabric sensors on the ball of the feet, toes and heel.

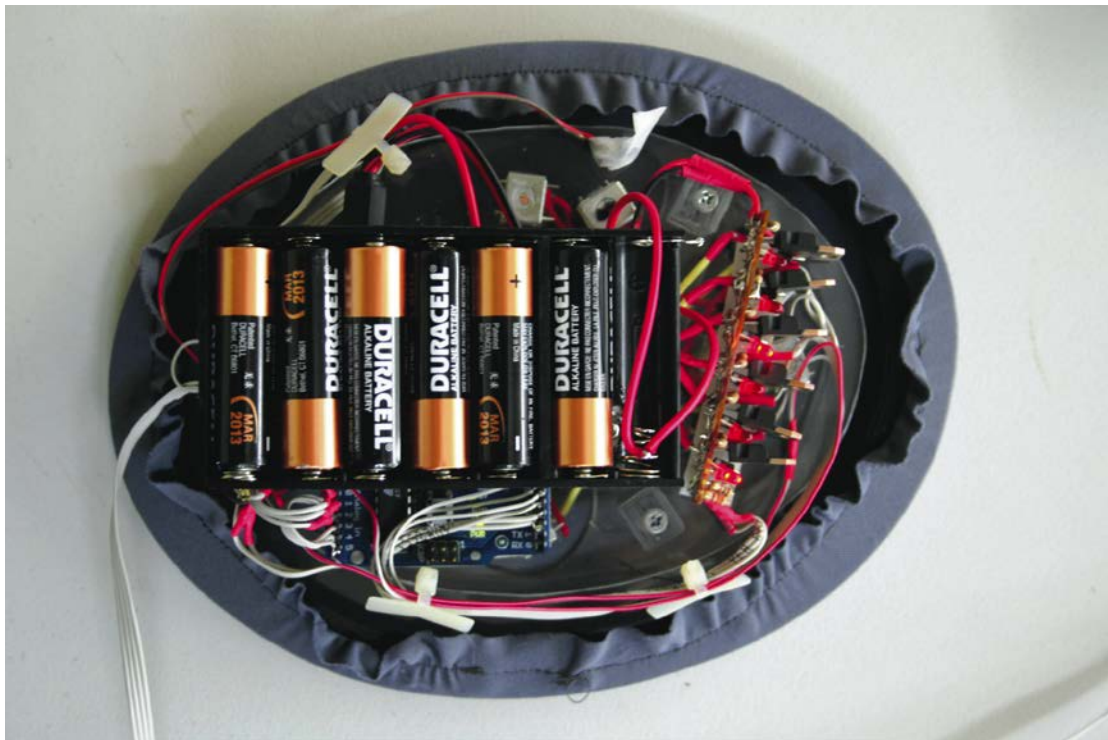






ACF: As designers, what did you think about the possibilities opened up by technology in the workshop?

HighTea: The possibilities opened up by the technology explored in this workshop seem only a drop in the ocean of what is already developed, being developed and already available. Government regulation, legislation, availability and cost of conductive materials and the demand for wearable technology are a few of the major challenges to overcome.



The experience however, has made us more aware of the possibilities of incorporating technology into fashion, but with consideration of:

- Cost
- User-friendliness
- Purpose/necessity
- Comfort
- Practicality/functionality
- Washability

- Safety
- What does technology look like?

ACF: I noticed there was a difference between the idea of technology seamlessly included in garments or decoration, and technology that is highlighted and declares itself. Do you have any thoughts about this?



HighTea: The question of “*what does technology look like?*” raised during the workshop struck a chord with us. Historically, the development of textiles inspires technological advances and fashion has always been quick to embrace, absorb and incorporate new technology. From *Star Trek* uniforms to Andre Courrèges’ plastic androgyny space-age designs to Issey Miyake’s textile technologies to *Bluetooth* incorporated sportswear to US military biometric bodysuits to HUG shirts, designers continually explore the look, creation, expression and meaning of technology and its advancement into the future. During the workshop, it made sense to us for technology, such as electronic textiles, thermo-chromic inks and electroluminescent

strips, to be seamlessly designed into the garment, textiles and decoration. We are now, however, also aware of the appeal of these new materials in the development of a new “look”, new craft, function and decoration. Also, our concern with electronically-enabled garments is its washability and user-awareness. Revealing these “techno” qualities may counter user-carelessness. And there are so many concerns about the facilities and legislation required for the production of electronically-enabled clothing.



ACF: I wondered what you think of the notion that clothing itself is a technology; that we humans already developed this technology for cultural communication, expression, differentiation, so incorporating electronics is a modification, perhaps an augmentation, but not a change in function.

HighTea: If we understood the notion of ‘technology’ as a reference to material objects of use to humanity, then it could be said that clothing itself is a form of

technology. It seems that humans are the only known creatures that voluntarily wear clothing!



In modern society, the simple purpose of clothing as a form of protection, comfort and modesty has changed dramatically. Clothing as a form of religious or social expression, cultural communication and individuality has now been widely accepted as a normal part of society. It would seem that wearable technology would merely be a modification of clothing in terms of fabrication and construction, but we must ask the purpose of such a modification? It is just another form of cultural expression in this new technological era? Or perhaps it may be considered as a shift towards a new purpose for clothing as a second skin, a means to document, analyse, understand and modify the relationship between our bodies and the environment in which we live.

ACF: What senses do you think are addressed and/or affected by wearable technology, and how do you think they're affected?



HighTea: If human senses are defined as receptors of information from inside and outside our bodies, then wearable technology has a vast potential to affect, monitor, enhance, alter and control our human senses and our experiences as human beings.

Wearable technology has already shown to have benefits for medical and military purposes. Hearing aids, heart monitors and smart shirts are common examples of wearable technologies for monitoring and improving our sensory capabilities. One example is the “Lifeshirt”, a computerised vest developed by The University of California, San Diego, that continuously monitors the wearer’s physiological state (hyperactive and repetitive movements, heart rate, respiration etc) and films their behaviour to enhance the understanding of patients with bipolar disorder and schizophrenia.

In terms of external senses, it seems that wearable technologies have succeeded in directly affecting our senses of sight and sound as they are more easily accessible as distance receiving senses. That is, an object/garment can be worn on the ear or across the eyes. These two senses are also most common problem sensory areas for humans. Our senses of taste, touch and smell, however, are less likely to require affecting and may be more difficult to affect through a wearable device. There may be also be a lower necessity to affect these latter three senses.

ACF: Will wearables affect our senses and our perception, our understandings of ourselves and our being?

HighTea: Current wearable technologies have demonstrated their ability to affect our human senses (e.g. hearing aids) and in many instances even provided a new perception of reality. It seems that a strong motivation for the development of wearable technologies is the greater understanding of the human body and its

relationship with the external environment. This has been particularly evident in the development of wearables in the medical industry.

ACF: Have you sensed any problems in the use of this technology for us as embodied social beings?

HighTea: Perhaps the biggest limitation to the extent of wearable technology development will be humans themselves as embodied social beings, “located in a given time and place, active in meeting their own needs in that context, [needing] to be empowered to do so” (Wallace, C. and Abbot, P., “*From quality of life to social quality*”). Perhaps a greater understanding of humans and our being is achieved from stripping back to reveal the body and the person beneath, rather than adding layers of clothing and technology.