DAMELE WADE is creating an outfit that plays _The Girl from Ipanema_ when she steps out. A bit of a candid, lighthearted version of the song, she admits. A bit of an understated, yes, a bit of a subtle plastic tube with electronics embedded in its core and a white examining cap with a small speaker attached. It’s unlikely to replace the little black dress as the party number in the new future, but it certainly puts the fun back into functional. Amidst snazzy brighter features, meanwhile, his design is fake-but-true than when it gets cold, drawn and twitches in whispers like a chorded cat.

Both were taking part in a workshop at the Australian National University in Canberra that examined the future of wearable technology. A dozen participants from across the globe for a three-week immersion session that brought together computer, electronics, textiles and just-by-creating enthusiasts to a theory of knapsack and circuits, sewing machines and circuit boards. The workshop weaves with fashion forward thinkers getting their heads around electronics basics such as breadboards, circuit boards, and transistors. The clothing dominates the runways across Europe—a concentricated plastic device shaped for its vents to be near a traditional paper dressing pattern.

Wearable technology is in its basic form in a given for the iPod generation but what is coming next goes a lot further than just music players wrapped to our bodies. From tracks that respond to our mood or even our heartbeat, it’s right down to fabrics that can feel sounds. Soft chemical attacks or even stop the bit of fabric to warm, spark, or merge with a soldier’s environment (much of this technology is trickling down from the military).

FROM INBUILT IPODS AND HEATED POCKETS TO SHIRTS THAT RESPOND TO YOUR MOOD OR YOUR HEALTH NEEDS, THE FUTURE OF CLOTHING HAS A HIGH-TECH EDGE THAT CAN BE DOWNRIGHT STYLISH AS WELL.
The future is squishy; garments woven out of, and embroidered with, conductive yarns instead of wires; thermochromic inks that change colour; soft switches; smart textiles, such as Nitinol, with an inbuilt ‘shape memory’; and sensors printed on fabrics. The result: Clothes that don’t just have a practical purpose (inbuilt telecommunications, for instance) but can express some of the inner life of the wearer.

Assistant Professor Joanna Berzowska of Concordia University, Montreal, a facilitator at reSkin, is a self-confessed ‘geek’ who grew up loving electronics as much as embroidery. A stint at MIT’s (Massachusetts Institute of Technology) Wearable Computing Lab – called the Borglab for the Übergeeks that each day navigated the real world like cyborgs with electronics strapped to their heads – led Berzowska to stitch creations such as a dress with a hemline that had a mind of its own and musical pants that emitted a trail of notes.

A wearable computer, she explains, doesn’t need to be a laptop, it can be a small soft thing programmed for a specific job that electronic engineers might overlook. “A fashion application is something that can be stylish or makes you feel sexy and that’s your killer application right there,” she says. Something that turns a pretty shade of pink is good enough: “It doesn’t need to tell you about the weather.” She’s interested in seduction and ways in which the social and psychological aspects of human interaction can be accentuated.

Australia may be lagging behind Europe and the US in this arena but Berzowska has been impressed by the “subtle and poetic” ways the participants in reSkin have used technology to build prototypes. Stephen Barras says it has changed the way he thinks about the things he could do. “Products that capture your imagination and allow you to express your identity – these ideas don’t come out of R&D institutes.”

His shivering nylon fake-fur coat responds to the static found on skin – even at a few metres’ distance. At the moment it may just be a swatch of animated rug that he is sewing with conductive thread (“the nervous system of my beastie”) but it’s a big leap forward from his previous experiment – a heavy leather jacket with a spaghetti of metal wiring spilling out. “The whole surface of the coat is a sensor like the surface of your body. What about a coat that cared about you, that had a

Clockwise from above... reSkin lab in action; Scruffy Scally Scraps, lace far with a textile nervous system, by Stephen Barras and Elliot Rich; Pods, electronic felt, by Cecilia Haffer; Danielle Wilde and hipDisk.

"WHAT ABOUT A COAT THAT CARED ABOUT YOU, THAT HAD A PERSONALITY, THAT WAS HAPPY TO SEE YOU WHEN YOU PULLED IT OUT OF THE CUPBOARD?"
personality, that was happy to see you again when you pulled it out of the cupboard,” he asks.

Among the other prototypes being developed is Leah Heiss’s black silk organza top with a silver ginkgo leaf brooch at its breast. It picks up on the gestures she makes when she is stressed – like putting her hand to her sternum. When touched, the brooch acts as a switch illuminating tiny twinkling fibre optics. “It is about developing an awareness of your own eccentricities,” explains Heiss, “and about enhancing empathy between people and the world.” She sees practical applications in, say, developing non-verbal communication for autistic children. “They can be very beautiful garments so people want to wear them rather than feeling like cyborgs.”

Jeweller Sean O’Connell has personal experience of the need to aestheticise wearable technologies. He is his grandmother’s carer and she will not wear the ugly, chunky, heart monitor she is supposed to hang around her neck. “It is our job to integrate the technology and get acceptance on a personal level.”

But wearable electronics (with the exception of the Burton Amp snowboarding jacket that has soft-switch control buttons built into its sleeve to control an iPod) remain, for the most part, in military or civilian labs. In the new millennium, electronics giant Philips developed its New Nomads prototypes – mostly sportswear or club novelties such as knickers that flashed when the wearer was paged. The company’s 2001 collaboration with Levi Strauss on a jacket incorporating wiring for a phone and MP3 player was not a commercial success. But Levi is persevering: The AFR Magazine’s September fashion issue last year featured Levi’s iPod jeans with remote control and docking station fitted in the pockets – a 2006 collaboration with Apple Computer.

Benzowska admits there are some significant obstacles before wearables become mainstream. She has had meetings with the likes of Marc Jacobs, Chanel and Gap on the possibilities, but they are, she says, “very afraid”. Putting electricity through a garment means it is not then covered by ISO (international standards) legislation leaving the companies open to legal liability if anything goes wrong. Even with small batteries, clothes have to be well insulated to avoid the possibility of a harmless but jolting shock. The potential for mass production is also inhibited by the need to build specialised production lines for small runs and to educate – a problem for industries such as fashion that work on tight margins. One spool of conductive thread costs up to $300.

First things first, though, and Benzoswka says popular acceptance will only be built on the back of good design: “Building a market by building a desire.” The turning-point has been reached, she maintains. “This is the time to start developing products.” Sexy sells, and it is innovative fashion designers such as Newcastle-based High Tea with Mrs Woo (Chinese-Malaysian-Australian trio Rowena, Juliana and Angela Foong) who are intent on making wearable electronics as covetable as their regular designs.

At reSkin, there is the trio’s joint project with artist Keith Armstrong that interprets repressive Chinese foot-binding, using bandages with built-in sensors that can make visible the weight of your tread. They have also stitched an elegant shirt-dress, with hidden electronics, that has pockets that can be heated when you put your hands in them.

There are potential dangers to be aware of, the “dark issues” as Benzowska calls them. She notes that in the US all new mobile phones must, from this year, have a GPS chip. You will be traceable wherever you are. “Once we make smart garments we can be leaving [open] access to personal information and biometric data,” says Benzowska. “Health insurance could be denied if it is detected that you smoke, for instance.” The controversial subject of data mining is figuring in the debate around the proposed Australian Access Card.

Then there is the VeriChip check that can be implanted directly into your skin with various health-care, financial and security applications. It is intended for locating missing children and monitoring high-risk heart patients. If fashion follows, it will play its part in making privacy a thing of the past.