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FORMERLY INERT MATERIALS ARE BEING WIRED FOR SOUND, LIGHT AND MOVEMENT IN INTERACTIVE AND REACTIVE DESIGNS THAT INVITE USERS TO CONNECT WITH THEIR SURROUNDINGS

Interactive installations consist of at least two components: one that receives data and another that transmits it. The simplest designs use vibration sensors or photovoltaics to directly receive energy and then re-emit it as power, light or sound, but new concepts from international designers and manufacturers take a more sophisticated approach. Billboards and even furnishings are being fitted with cameras that record data about people and objects in the vicinity and relay it to a computer that processes it and responds accordingly: for instance, a table programmed to change colour, chameleon-like, to match nearby objects; or a lamp that brightens as someone approaches. Going one step further, products with capacitive sensors detect small variations in an electromagnetic field, such as the movement of a finger. Deployed at a fine scale in iPhones, the technology is now appearing on such wall-sized displays as Sensacell's modular LED surfacing. On a larger scale, architectural installations collect real-time Internet data – such as regional air quality indicators and local energy consumption measurements – transforming it into light and sound creations that give users insight into the hidden dimensions of their surroundings.

Because the design world is still experimenting with these new capabilities, the resulting systems often appear as one-off installations. However, interactive technologies are increasingly becoming available in consumer products. In both public and commercial projects, the best of the bunch are those where technology is quietly concealed and the material reacts to its environment – as if by magic.
ELSA LAM

Under the cloak of night, a team of well-meaning workers overhauled a flight of stairs in Stockholm's Odenplan subway station. The goal: encourage commuters to opt for a bit of exercise rather than taking the escalator. Resembling a giant keyboard, the stairs were wired to sense the pressure of footfalls and produce piano-like sounds. The guerilla installation was part of a Volkswagen campaign dubbed the Fun Theory, devised by advertising agency **DDB Stockholm** to improve people's behaviour by making the world more playful. The project proved successful on both a local and a global scale: it increased the number of stair takers by 66 per cent, and a YouTube video documenting the experiment received over nine million hits. *thefuntheory.com*

The Living

ENVIRONMENTALLY RESPONSIVE INSTALLATIONS

Invisible forces like air currents and small vibrations translate into visible form in these elegant architectural installations that detect movement, instantly responding to the actions of passersby. Originally designed for specific locations, several of these works have since travelled worldwide.

HeHe Every night for a week in Helsinki, Paris design firm HeHe projected a laser ray drawing of a green cloud onto the vapour flume from the local Salmisaari power plant, like a modern-day Batman signal. Encouraging awareness of energy consumption, Nuage Vert fluctuates in size to show local residents' current levels of electricity use. The next installation is slated for a waste incinerator in Saint-Ouen, a northern suburb of Paris. *hehe.org.free.fr*

The Living, a New York design firm, conceived this outdoor pavilion in Seoul. Transparent roof panels shaped like the Korean capital's districts cyclically light up to map real-time air quality data, from best to worst. Users can also text-message a zip code to receive information on its air quality; this data is incorporated into the installation to gauge public interest in the environment. *thelivingnewyork.com*

ResoNet

ResoNet is a tensile structure stretched between trees like a ghostly spiderweb. A series of sensors captures even the most minute vibrations in the environment – from the brush of a hand to a passing breeze – and triggers embedded LEDs. Originally created by Mark Francis Tynan and William Hailiang Chen for a U.K. art exhibition, the installation is tentatively scheduled to move to Frankfurt in April. *reso-net.org*

FURNITURE AND ACCESSORIES

Tables, lights and other furnishings bring interactive technologies into commercial and domestic interiors. High-end manufacturers such as Artemide are trying their hand at reactive products, while industry giants like Philips are intensively researching future technologies.

Kurz Kurz Design The Senses series combines classically styled lighting with cutting-edge technology. Sensors concealed inside the foot of the globe-shaped and columnar floor lamps trigger a gradual brightening when a person approaches. The illumination duration, detection range and light levels can be individually set, and the lamps come in a range of sizes.
EU *spirit-of-senses.ch*

Artemide Several of the company's contemporary floor and suspended lights are available with the Interactive-Dali system, which incorporates a movement detector and a daylight sensor. This allows for lights to adjust automatically as people occupy a space, or as ambient light levels shift.
WW *artemide.com*

Mongoose Studio's chameleonlike furniture includes the Fuwapica sofa, which reacts to the sitter's weight and produces a colour-coded response; and the RGBy desk, which picks up the hue of objects placed on it and glows in a matching tone.
AS *mongoose.proto-type.jp*

Philips' HomeLab has spent the past decade investigating new ways to incorporate interactive technologies into everyday environments. A recent experiment overlaid shadowy images onto TV programming, offering a sense of social presence in a private environment. For a test run, Dutch sports fans watched a soccer game enhanced by sketch-like images of their cheering friends, who were viewing the broadcast from another room.
WW *philips.com*
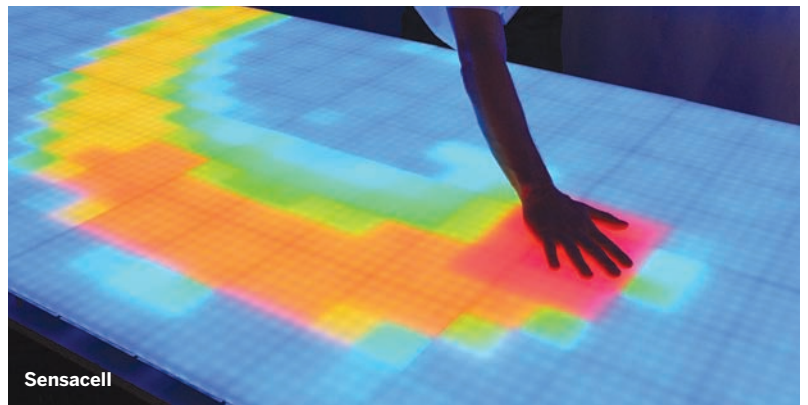
Sensacell

INTERACTIVE WALLS

Often installed in commercial and retail settings, these walls use digital cameras and sensors to detect motion, instantly responding to the movements of passersby.

GestureTek's offerings range from touch-sensitive tables to gaming systems that incorporate the player's video image. One product line, GestureFX, transforms walls and floors into dynamic, animated displays. A camera-driven motion tracking system allows users to interact intuitively with the projected display in real time, creating ripples in virtual water puddles, or playing foot hockey games on illuminated floors. The company handles system installation and maintenance, and offers creative design services to incorporate custom content into the graphics.
WW *gesturetek.com*

Dobpler The Interactive System consists of sensors that capture movement and LED modules that replay it. Covered in safety glass, the units can be tiled in a compact grid, aligned in rows, or arranged in tilted mosaic patterns for such applications as a railway underpass in Sandnes, Norway, where pedestrians see their digital "shadows." Stig Skjelvik, designer of the underpass, says, "Every movement creates a reaction, leaving an impression that the environment keeps an eye on the public."
EU *dobpler.com*

Sensing Places

Sensing Places' projects include everything from digital museum installations that immerse visitors in historical scenes, to building-sized billboards that change with the pulse and flow of nearby traffic. Another of the studio's undertakings, an interactive shop window, is driven by the spontaneous rhythms of pedestrian movement. A wide-angle video camera at the window is hooked up to a computer, tracking the presence, speed and distance of foot traffic, and translating them into choreographed content.
EU NA *sensingplaces.com*

Sensacell This modular system creates full-colour wall and floor surfaces with LED lighting controlled by proximity sensors. The 15-by-15-centimetre units connect to form a giant interactive display that can also sense both small and large physical motions, which automatically trigger visual or sound displays. The network can be controlled by an external computer system, but can also learn to "think" autonomously.
WW *sensacell.com*

In a transit shelter in Berlin, passengers waiting for the bus might casually glance at an Amnesty International poster that raises awareness about domestic violence: a happy, smiling couple above the tag line "It happens when nobody is watching." But when they look away, the image switches; now the man has his fist raised at the woman, who shields her face. A slight time lag allows users to perceive the shift when they glance back. The ad, designed by Hamburg firm Jung von Matt, uses a camera outfitted with eye-tracking software provided by German 3-D video analysis manufacturer Vis-à-pix that detects passersby within a 4.8-metre range. The one-off poster garnered a silver prize at the 2009 Cannes Lions International Advertising Festival. *jvm.com, visapix.com*

WEARABLE TECHNOLOGY

Providing high-tech functionality, today's smart textiles combine safety and aesthetics into seemingly ordinary clothing.

Studio 5050 Inspired by tribal jewellery, the Masai dress creates a soundtrack in reaction to the wearer's movements. Strings of hand-formed silver beads hang from the collar and brush against conductive threads sewn into the fabric, generating a series of sounds with every step. The swooping creation comes in sky blue silk jersey or a white cotton blend made with natural sea algae.
WW *5050ltd.com*

GeekPhysical Design duo Vanessa Carpenter and Dzl Møbius's Celtic knot necklace is studded with red LEDs that pulsate in time with the wearer's heartbeat. A CNC-cut circuit board is wired up to a tiny monitor tucked out of sight. With each heartbeat, the LEDs brighten and fade in a wave pattern reminiscent of glowing embers.
WW *geekphysical.com*

Dow Corning The patented Active Protection System's 3-D textile combines defence and comfort. Under normal conditions, it remains soft and flexible. But upon impact, it instantly hardens into a protective shell. The material can be cut and sewn like regular textiles, and comes in different grades to withstand hits ranging from karate kicks to motorcycle collisions.
WW *activeprotectionsystem.com*
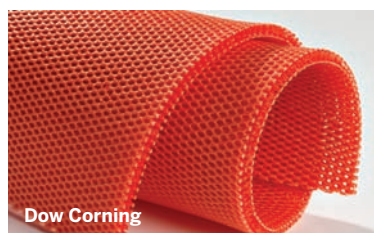
Dow Corning

Gorbet Design's interactive wall adds a cascade of light to a lower-level corridor of Toronto's York University. Eleven glowing channels inset within an angled wall ripple with coloured light. The movement is choreographed to reflect the camera-detected motion of people ascending and descending the adjacent feature staircase, while the colours are determined by real-time financial data from stock markets worldwide: red tones mean the market is plunging, and green ones mean it's surging. Two plaques explain what the hues signify, but the display itself remains deliberately abstract. "Many people will walk by that piece and never know how it works," explains Matt Gorbet. "We like to make pieces they will discover more and more about over time." *gorbetdesign.com***