“Where I Stand”

SARAH BONNEMAISON
Dalhousie University

I “grew up” as an architect, in an intellectual context of analysis and interpretation of natural processes as a valuable source of design inspiration. I took this attitude in my own design of responsive lightweight structures and set up an interdisciplinary research laboratory to develop prototypes to create a healthier built environment. Today, I bring this know-how to the creation of interactive exhibitions to open discussions on ways to build a sustainable future by drawing from the past.
The world of textiles is the fastest growing field in architecture and design today. As Matilda McQuaid says in her catalogue essay for the exhibition titled *Extreme Textiles*, “What can be stronger than steel, faster than a world’s record, lighter than air, safer than chain mail, and smarter than a doctor? Hint: it is in every part of our physical environment – lying under roadbeds, reinforcing concrete columns, or implanted into humans.” (McQuaid 11) Textiles, of course, is the answer to her riddle, especially technical, high-performance textiles.

Many designers, artists and architects are creating objects and environments that combine these new textiles with software, robotics and sensors. Whether their focus is clothing or immersive environments, their aim is to make textiles that interact with their users not only in visual or tactile terms, or even by being mobile, but which use digital interfaces to respond in all of these ways. According to Lucy Bullivant, the impact of these textiles “is phenomenological, meaning that the body is able to directly experience its environment in a very direct and personal way” (Bullivant 7). As a result, we are seeing a whole new area of avant-garde design – from clothing to large tensile structures that incorporate the event into the artifact – an approach that is valued by museums striving to engage their publics in ever-more interactive attractions and by manufacturers seeking new markets.

These new designs are the products of interdisciplinary collaborations. Clearly, a reactive or interactive garment or environment requires not just software specialists, designers of robotics, and electrical engineers, but often also materials scientists, chemists, specialists in nanotechnology and biomedical engineering. They explore interactive technologies through creating and adapting clothing, furniture, and the built environment to become communication devices that facilitate personal expression as well as multi-point communication between individuals and groups (Berzowska 32).

The very nature of responsive environments, involving functioning through interfaces that facilitate interaction, is a form of mediation between inner self and the outside world, and it presupposes some kind of event that is not wholly pre-programmed. Input from the real world received via sensors is essential, as are output devices in the form of actuators (mechanisms that transform an electrical input signal into motion), displays and other sensory phenomena to engage with users (Bullivant 9).
As we incorporate technologies into the design of responsive environment, it is important to focus my efforts where it matters and where I can be effective. My efforts are not in a quantitative approach to wellness but rather a qualitative one that attempts to link individuals and social well-being – focusing on developing a sustainable lifestyle and a deeper relationship to nature.

However, designers love to collaborate with specialists and I am no exception. As an architect, I “grew up” in the world of lightweight structures at The Institute of Lightweight Structures (IL) in Stuttgart under the leadership of Frei Otto. The philosophy of the IL was entirely based on Organicism, well anchored in learning from observing nature, from spider-webs to soap film geometries. While in Stuttgart I was fortunate to work in Bodo Rasch’s office with the guidance of Frei Otto on an exceptional design project for 300 umbrellas on the roof of the Great Mosque in Mecca, solar powered and free of cables. A smaller version of the project was realized in 1992 in two courtyards of the Prophet’s Holy Mosque in Medina. (Fig.1) A computer chip triggers each umbrella to close under high winds, so the delicate structures are not damaged. This is an early example of tensile architecture in motion, exploring basic responsive capabilities to address environmental conditions (solar exposure, wind load). (Otto and Rasch 9)

I brought this wonderful passion for in-depth research of architectural lightweight structure to my own research laboratory. From 2008-2011, I joined forces with weaver Robin Muller to design and develop electronic textiles for architecture. With funding from ACOA, we formed the Architextiles Lab, Lab for short. Our goal as leaders of a multidisciplinary team was to design and create architectural prototypes that integrate electronic textiles. (Fig. 2–3) Most research in the field of electronic textiles was for wearable items, like shape-changing and heat-reactive clothing or wearable «soft» computers. The military is a big client for this technology, using for example, communication technology worn next to the body of the soldier. Our designs for electronic textiles focused on a sustainable relationship to our environment, both culturally and technically. They ranged in scale from a curtain, a stage set, and a pavilion. They all explored various combinations of manual and digital craft, from slow tech to high tech. We worked closely with local manufacturers as a way to develop products that could be produced locally in Nova Scotia (Bonnemaison 3).

The prototypes also integrated moving parts. They were as simple as a curtain sliding on a rod, to a complex collapsible pavilion that must telescope,
pivot and fold to shrink to a small fraction of its volume. We learned about collapsible structures from camping tents, folding furniture and retractable objects. Textiles of course, have been valued for millennia for their lightness and portability. To add electronics to these deployable structures, we had to isolate fabric from structure, “skin” from “bones”, in order to avoid damaging wires as the structure unfolded. The results were impressive. But as tex-

Figure 1 Umbrellas designed by Bodo Rash in the main courtyard of the Prophet’s Holy Mosque in Medina, 1992. Image Credit: SL - Rash
tile factories closed one by one all around us the original intent of producing local products eventually vanished and the research funding drew to a close.

So I returned to the world of ideas and history and decided to bring the knowledge developed at the @Lab to create exhibitions that draws the past into the present. Inspired by Ernstor Gadamer’s notion that we make sense of the world through tradition, these exhibitions bring the history of the
modern kitchen for example, into today’s concerns for cultural and ecological sustainability. With live performance and interactive “stations’, visitors could participate in the process. This has been satisfying both for me as designer and for visitors who understand both in their mind and in their heart, the ideas that are presented.

One of these exhibitions was called My Mother’s Kitchen because my research began in the tiny kitchen of the famous Unité d’Habitation designed by Le Corbusier in 1947-1953 where my mother lived. So true to Gadamer’s philosophy, the exhibition presented major sign posts in the development of the modern kitchen linking me, standing in the Unité d’Habitation today, all the way back to the so called Frankfurt Kitchen (1920s), The Frankfurt Kitchen was set as the reference point to all the other designs for servantless kitchens that followed. By weaving the story of this tradition about modernist kitchen design and uncovering why it was so important in social reproduction it allowed us to imagine the future.

I will end by describing briefly some elements of the exhibition that shows where I stand:

A Machine for Living, Frankfurt 1920s

The Frankfurt Kitchen was the focus of an educational film that, according to its architect, Margarete Schütte-Lihotzky, “explains how to use the kitchen” – showing a young woman preparing food, cleaning, and ironing with a minimum of effort in this small space that had cleverly-designed features suited to each task, just as in the galley kitchen of a railway dining car.

The film was projected on a wall of white blocks of different sizes. Using a computer program called mad mapper, the archival footage could be “mapped” onto the blocks for a perfect fit. Sections of the film thereby isolated from the narrative emphasized the important comparative points that were made by Margarete Lihotsky. That way the viewer did not have to sit through the entire film but could understand the high points through collage (Fig.4).

Participatory Design, Tompkinsville, Cape Breton, 1930s

The 11 houses of Tompkinsville in Cape Breton built in the 1930s are a result of
a heroic collective efforts of miners who no longer wanted to rent a company house own their home. With the support of the Antigonish Movement, a blend of adult education, co-operatives, micro-finance and rural community development, a group of men and women found the way to get a mortgage from Nova Scotia’s government, buy land and built houses – their descendant still leave in today. In the following years, Tompkinsville became a model for many other working-class people to organize themselves to built new houses, financed cooperatively.

A simple kitchen table had archival images from Tompkinsville projected down onto four “place-mats” that changed according to when and how visitors sit on the chairs surrounding the table. This uses a motion capture camera. (Fig.5)

The Art Of Living, *Chaise Longue*
By Charlotte Perriand, 1920s

Charlotte Perriand designed her famous chaise longue that we can still purchase today. Alan Macy adapted the chair with airbags and sensors to picked up the
Figure 5  Table of the Tompkinsville kitchen with projections as “place mats”, My Mother’s Kitchen exhibition, 2014. Image Credit: Greg Richardson Photography

Figure 6  Chandelier linked to breathing apparatus, My Mother’s Kitchen exhibition, 2014. Image Credit: Greg Richardson Photography
rhythm of the breath of a visitor lying on it. The data was analyzed and sent to a white textile chandelier hanging above the chair and would respond by lighting up in various colours – reds when breathing in and blues when breathing out (Fig.6).

Unité d’Habitation Marseille, France, 1950s

While housing advocates, resident associations and municipal authorities were debating housing policy in social-democratic Germany, intellectuals and artists in Paris had embraced modernity in wholly different ways.

Artists like Marcel Duchamp and Pablo Picasso explored motion studies, mass production, in provocative work that aimed to unsettle and renew cultural assumptions. This is the cultural milieu of Le Corbusier and his professional collaborators – Pierre Jeanneret, Jean Prouvé and, significantly Charlotte Perriand – designed the first apartment building for collective living called Unité d’Habitation in Marseille, France.
In my mother’s kitchen at the Unité, we re-enacted the preparation of a chocolate cake that was the measuring stick of early Motion Studies to design a more efficient kitchen. We created a nine minutes video of a dancer preparing that particular cake in this particular kitchen designed by Perriand. The video was projected on the rolling furniture pieces that interpret the volumes of the kitchen.

Future Kitchen, the Near Future

Presented as an interactive tool, visitors could design their kitchen of the future by simply moving their body around a white carpet that represented the basic floor plan of the space. Icons would appear and they could place them in space as they wished. This used a tracking software adapted to recognize a human body in motion from above, as opposed to straight on. The icons were meant to generate interest in sustainable kitchen appliances and modes of preparing food such as a solar oven or a terracotta refrigeration units (Fig.7).

References


Bonnemaison, Sarah. @Lab/Architextile Laboratory: Electronic textiles in architecture, (with contributions by Berzowska, Macy and Muller). TUNS Press, 2011.


Sarah Bonnemaison has a doctorate in human geography from the University of British Columbia and degrees in architecture from Pratt Institute and the Massachusetts Institute of Technology. She currently teaches architectural history and theory at Dalhousie University. Sarah is also a writer. Her books include Architecture and Nature; Festival Architecture; and Installations by Architects, as well as numerous contributions to edited volumes and journals. Her passion lies in bringing history and theory to life through interactive exhibitions and installations for performance. Her current research project explores the aesthetic and politics of motion studies in the design of everyday spaces.