

Examining Phalanges: Textile Systems in Sustainable Architecture

Thesis Proposal 2013: Erica Tong

Basic Parameters:

3D Printing
Beverly Gordon
Body
Cecil Balmond
CNC Mill
Etymology
Ecosystem
Extroversion
Fabric
Fashion
Greek Columns
Gothic
Introversion
Iris Van Herpen
Knotting
Lars Spuybroek
Laser Cutting
Lucy McRae
Mies Van Der Rohe
Molds
Modularity
Ornament and Crime
Performance
Proxemics
Pulp Paper
Semper
Sustainability
Tension
Textiles
Textile Systems
Working Culture
Women Who Knit Sea Anemones
Zaha Hadid
Vitruvius

Intro (My Focus Is)

Transfer of

Textiles <-- NO -- Architecture

Textiles -- YES -- > Architecture

"However even the most avid crafts people of today typically think of textiles primarily in terms of their expressive function or their potential for income generation. Few know about the roles cloth plays worldwide in myth or symbolic ritual, or the way it has been used to further political and social power. Few think about all the ways in which textiles impact their own daily lives. In sum, most people are unaware of the wide reach of this subject because they have never had the opportunity to think about the topic holistically."

Beverly Gordon, textile historian

This may be an odd statement to make for the opening of a proposal for an architecture thesis: *fashion, in the traditional sense of daily life, fashion week, and haute couture, has become stagnant and is dying*. The media has begun to take interest and to compile works of diverging designers. These designers have been taking cues from processes used in architecture--primarily parametricism--to re-inform the form and function of fashion (note: a few of these people will be discussed in later paragraphs). To clarify, these divergers are not people who use the fashion term "architectural" as a gimmick to describe what really is architectural mimicry (often, this mimicry is purely aesthetic and has little to do with the actual process). Interestingly, many of these designers refuse to identify with the term fashion designer. Like Lucy McRae (who will be referenced later), they prefer to be identified with concepts of the body as an sensing and responding object within space and call themselves body architects.

In fashion, the catchphrase is that fashion comes and goes--and, more importantly, it often recycles. Similarly, in this current impetus, this resurgence of a more direct connection between fashion and architecture is potentially less comparable to being a fad. It is more comparable to the swings of nature referenced earlier--a solar eclipse of fashion and architecture. Therefore, one can scratch out the initial statement and reiterate that fashion is not dying but naturally returning full circle to the distinct paleolithic connection of architecture and clothing. Although Semper's the connection of textiles to architecture can also serve as a historic marker, during the earlier paleolithic era, close ties of fashion as a primitive shelter, or architecture, and, therefore, architecture as fashion existed. While this current phenomena is at the closest overlapping point since its primordial relationship, therein lies the potential of architecture re-informing its current application of textiles--in *architecture*. In other words, the exchange of knowledge should not just be Zaha designing the Melissa or the nOva shoe, but the clothing, shoe, and textile designers reassessing the current use of textiles in architecture.

"To study cloth was a way to study society"

Beverly Gordon

Intent

I would like to examine the history and etymology of textile systems within the realm of clothing and indigenous shelters not only to re-inform the present application of textiles in architecture but also to assess the potential of applying textile systems to create innovative systems (non-textile) in sustainable architecture. (The research would culminate in a defined project type as site as explained in the next section.)

To clarify, I am not solely interested in textiles as a material. Although I would ideally like to expand the concept of textiles beyond its current applications in installations, showrooms, temporary pavilions, shading devices, or a flexible covering, the research into textiles is not an attempt to gain a greater understanding of fabrics in architecture. Instead, it will be an examination into the systems and processes that humans have created out of their indigenous materials, how they processed the materials, and what instruments and techniques they created to record their reflection of their climate, their culture, and their space. Since the research is systems, the resulting research may not be the best expressed with fabric as a participating material in the final project.

Historically, textiles are inherently less permanent and, resultingly, less documented medium. However, in the process of reevaluating the application of textiles in architecture, there is certainly more merit to textiles than simply being a material that is lauded for its flowing and opaque qualities. If the term “architectural” is used so freely within the fashion world to indicate something with volume and structure, why is “textile” or “fabric” often used to merely indicate as something flowing, draping, or organically dynamic?

The intelligence of Gothic architecture is a good example for this call to arms. According to Lars Spuybroek, Gothic architecture can be compared to the 2D tracery of mathematically complex 3D Norse and Celtic knotwork. The 2D tracery are found as illuminations in their books. Likewise, what is assumed to the layperson to be ornamentation in Gothic architecture is, in fact, 3D tracery. Inverse from the Norse and Celtic process, the 3D tracery is a product of the 2D. In this case, the 2D is inverted as the line, yet this line, much like 3D knotwork, flexibly merges and diverges to distribute forces and sometimes spill out as suggested ornament. Spuybroek states the following:

“in the Gothic, the elements are free-free beforehand, not in the sense of being loose but in the sense of being free to find each other-and when they do, they build; they hold onto each other. We see the most complex relationships: mergings, splittings, crossings, branchings, overlappings: in the Gothic, ornament acts like structure and structure acts like ornament.”

This type of intelligence can be reinstated into applications where the ideas of organic flow or draping are used for purely aesthetic purposes in textiles and fabrics. Hopefully, it will contribute to a more sustainable form of architecture.

Textiles originated with the need to keep the body warm or unscathed or to keep away the sun's rays. Our current "need" in architecture is to continue to solve the issue of sustainability.



Application of this Research

I am proposing a redevelopment of the area of Oakland right after the ravine that secludes Phipps Conservatory from the heart of Oakland. The area is bounded by the streets Parkview Avenue and Bates Street. While it currently sits in the backyard of Phipps Conservatory, University of Pittsburgh, and Carnegie Mellon University, it is silently disengaged. The area's proximity to Oakland's restaurants and businesses along Forbes Avenue and ease of travel from Carnegie Mellon indicates that the area has a future promise as a thriving neighborhood, a sub-Oakland. The point of breakage of this area from the thriving Forbes Ave is currently created by the dead zone of Magee Women's Hospital and the alienating and busy Boulevard of the Allies that streams into a freeway entrance.

1. I propose new commercial and residential architecture as well as experimental/collaborative work spaces. I am not interested in having the output in the project that would reflect the textile research as an a fabric installation or object made out of fabric within the space.
2. I am against using this research for a strictly for retail project since it runs into the risk of being criticized as a branding tool rather than the unmonetized reflection of the inhabitants and culture of the space.

3. Additionally, I am interested in examining how the workplace operates and to redefine its spatial organization through studies into the culture of the workplace and the identity of the individual. I was home schooled throughout 3rd grade to high school and attended public school part time during middle school and community college during high school. This varying range of educational methods and spaces has led me to be interested in the optimized work setting for introverts vs extroverts and ideas in proxemics.

4. I am interested in reintegrating the workplace with the natural environment and perhaps investigating the workplace as a pavilion. I would prefer to not create a high rise with green terraces but to find another expression of a multistory office building. In context of the site, this might indicate a integration of the work spaces with the nearby Schenley Park.

All of this research would culminate in a project reflects the research into the history of textiles and the application of this research into the performance of the workplace relative to the overall work culture and the individual while also addressing sustainable and performative needs.

Proposed Materials for Documenting Research

Preliminary Research- I would like to document the analysis of textiles in various cultures through sketchbooks and create cultural/historical storybooks that are both 2D and 3D in nature as conceptual explorations. The sketchbooks would be mixed media. A single output would be realized with each sketchbook as described below.

Current (and Expanding) List of Textile Systems

- Felting
- Animal/Silkworm
- Knitting
- Knotting
- Loom
- Crocheting
- Cross Stitch
- Hooked Rug
- Quilting
- Maypoles

Note: I am in the process of trying to get in touch with a textiles professor at FIT to gain additional references about textile systems.

Textile Systems Research- While working on the preliminary research documentation, I would

like to create a conceptual output/component--for lack of a better term while theorizing what this materialization may be. (The outcome does not have to be modular since in fashion, it is often only the fabric that is modular--not the clothing itself.) I would like to primarily work **NOT** in textiles. *Instead, I would like to use the CNC router to mill out wooden molds to then vacuum form and into which I would pour pulp paper mixture.* The pulp paper will allow a degree of flexibility for alterations after it has been set.

Final Output- Any methods to best support my thesis; may be fabric or may be something else entirely since the thesis is not about **using** fabric in the final project but to examine textile systems and their application in architecture.

Bibliography

(Towards Fashion) Modern Precedents in the Architecture Realm**Loose Sources**

Anderson Anderson's Camelbackshotgunspongegarden

Source: <http://thefunambulist.net/2010/12/22/small-camelbackshotgunspongegarden-by-anderson-anderson-architecture/>

Description: Expanding plastic celled structure that swallows extra flood water; designed post Hurricane Katrina

Cecil Balmond- *H-Edge*

Description: Ideas of Tension and Modularity akin to textile fabrication

Mies Van Der Rohe- *Barcelona Pavilion*

Description: Fluctuating reading of marble as a solid and non-solid

FOA- *Yokohama Terminal*

Description: Folded plates and seismology

Michael Hansmeyer's- *Columns*

Description: New Greek column design through the non-traditional method of computational design, leading a new method of interpreting and fabricating columns

Books

Agkathidis, Asterios, and Gabi Schillig. *Performative Geometries: Transforming Textile Techniques*. Amsterdam, The Netherlands: BIS Publishers, 2010.

Description: Performative systems using textiles

Armijos, Samuel J. *Fabric Architecture: Creative Resources for Shade, Signage, and Shelter*. New York: W.W. Norton, 2008.

Description: Instances where fabric was used for shade, signage, and shelter

Kubo, Michael. *The Yokohama Project: [foreign Office Architects]*. Barcelona: Actar, 2002.

Description: Heavy influence of textile capabilities with the investigation of folded plates/origami

Krüger, Sylvie. *Textile Architecture =: Textile Architektur*. Berlin: Jovis, 2009.

Description: Views into how textiles are applied in architecture

Loos, Adolf, and Adolf Opel. *Ornament and Crime: Selected Essays*. Riverside, Calif.: Ariadne Press, 1998.

Description: Ornamentation as a degenerative aspect of architecture since it's prone to the whims to the acceptance of a particular style

McQuaid, Matilda., Philip Beesley, and Cooper-Hewitt Museum. *Extreme Textiles: Designing for High Performance*. New York: Smithsonian Cooper-Hewitt, National Design Museum, 2005.

Description: High performance textiles

Moussavi, Farshid., and Michael Kubo. *The Function of Ornament*. Barcelona : Cambridge, Mass.: Actar, 2006.

Description: Secondary source documentation of structural and tectonic systems

Patemosto, César. *The Stone and the Thread: Andean Roots of Abstract Art*. Austin: University of Texas Press, 1996.

Description: History of Andean art, includes textile design

Shyqueriu, Banush. *Ornament and (As) Structure-New Biological Paradigm*. Berlin: Humboldt-Universität zu Berlin, 2010.

Spuybroek, Lars., and Georgia Institute of Technology. College of Architecture. *Textile Tectonics*. Rotterdam: NAI Publishers, 2011.

Description: Shows how designs used in folklore were translated to architecture

Vitruvius Pollio., and Morris Hicky Morgan. *Vitruvius: The Ten Books On Architecture*. New York: Dover Publications, 1960.

Description: Primitive hut and man's need for shelter as a second skin

(Towards Architecture) Modern Precedents in the Fashion Realm

Loose Sources

BLDGBLOG's "Drone Landscapes, Intelligent Geotextiles, Geographic Countermeasures"

Source: <http://bldgblog.blogspot.com/2012/01/drone-landscapes-intelligent.html>

Description: Geotextiles

BLDGBLOG's "Shells, Tubes, Structures, and Minimal Surfaces" On Alexander Kasuba

Source: <http://bldgblog.blogspot.com/2009/06/shells-tube-structures-and-minimal.html>

Description: Intent to abolish the 90 degree angle, to capture daylight, provide terrain

BLDGBLOG's "Not a Grid But a Fleet"

Source: <http://bldgblog.blogspot.com/2012/12/not-grid-but-fleet.html>

Description: Vitruvius implied that first buildings were like "upright Greek loom" and were like textiles of woven materials

Bouroullec, Rowan and Ellie, *Modular Walls*

Source: <http://thefunambulist.net/2010/12/22/industrial-design-walls-by-the-bouroullec-brothers/>

Description: Modular and flexible walls that are made in a variety of materials; primarily used to control space/light/drape

Amy Lawrence Textile Necklaces

Source: www.amylawrencedesigns.co.uk

Description: Small scale knitted necklaces with 10 gauge Santagostino V-bed manual industrial machine; example of how a specific small textile is manufactured

Lucy McRae

Source: www.lucymcrae.net/

http://www.ted.com/talks/lucy_mcrae_how_can_technology_transform_the_human_body.html

Description: Treats most of her work as a projection that breaks the boundaries of body versus architecture versus living piece through the unconventional use of materials. Emotion-capturing clothing with biometric sensors and the output is a new textile, a new expression of culture.

Tags: Ecosystem, new materials, biology versus space

Iris Van Herpen

Source: www.irisvanherpen.com

Description: Realized that the stagnancy in fashion can be revitalized through the methods of fabrication more commonly found within architecture. Primary tool of 3d printing or use of materials in ways similar to 3d printing, deliberately uses body as a canvas rather than the inhabitant of the clothing.

The Hyperbolic Crocheted Coral Reef

Source: <http://crochetcoralreef.org/>

Description: A group used the textile systems to investigate the hyperbolic geometry of sea anemones

Talking Textiles

Source: <http://www.trendtablet.com/4155-talking-textiles/>

Description: Blog with latest textile exhibitions and endeavours

Books

Gordon, Beverly (2011). *Textiles: The Whole Story*

Description: Currently the primary source for the history and etymology of textiles; will hopefully allow me to figure out which systems to focus on

Anni Albers (1957). *The Pliable Plane; Textiles in Architecture*. Perspecta. Vol. 4, (1957), pp. 36-41. <http://www.jstor.org/stable/1566855>

Description: History of textiles in architecture

Blank, Philinda *When the Cows Come Home: Barn Architecture and Changes in Bovine Public Space*. UC–Santa Mio. (Itsabook, NY: Pub Pubs, 2001.)

Description: Useful towards the idea of the culture or function of the space strictly defining the use

Hodge, B., Mears, P., Sidlauskas, Susan (2006). *Skin + Bones: Parallel Practices In Fashion and Architecture*

Description: Investigates the overlaps of fashion and architecture with the focus on how fashion is being revolutionized by architecture

Existing Thesis

Kuustio, Terhhi. *Textile in Architecture*

Source: <http://dspace.cc.tut.fi/dpub/bitstream/handle/123456789/6619/kuusisto.pdf>, Tampere University of Technology

Abbas Hedayat, Abbas. *Inquiry on Interrelationships between Fashion and Architecture*

Source: <http://i-rep.emu.edu.tr:8080/jspui/bitstream/11129/294/1/Hedayat.pdf>, Eastern Mediterranean Univeristy

Finke, Tara. *Architecture and Fashion: Dissonant and Harmonious Dimensions*.

Electronic Thesis or Dissertation. University of Cincinnati, 2008. *OhioLINK Electronic Theses and Dissertations Center*. 29 Jul 2013.

Source: <http://dancingfabric.wordpress.com/page/3/>

Description: Blog that documents a person's work with fabric and architecture

