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As an artist and designer, I created works of art by actively researching, reflecting, experimenting, and producing projects which embodied theories, methods and processes of both practices. Additionally, my work utilized research from numerous disciplines, which include art, craft, furniture, fashion, graphics, mathematics, and architecture. I strived for the user/viewer to experience not only a physical connection with my designs, but to also have an emotional engagement with them.

My research aimed to enhance the image of the upholstery trade by examining the design possibilities of the craft. Much of my process extended apparel fabric manipulation techniques to the upholstery and structural systems of furniture in order to reveal the potential of transferring the methods from fashion to furnishings. The techniques informed the design process through the introduction of alternative approaches to upholstery manipulation, sewing, and patterning. The method helped to transform two-dimensional flat upholstered surfaces into three-dimensional upholstered forms.

I categorized my early experimental works as one-of-a-kind. However, I explored streamlining my processes of making in order to investigate other methods of construction. Additionally, I researched how fusing furniture design and traditional millinery processes allowed for small batch reproductions of my works. Ultimately, my approach gravitated toward balancing handcraft techniques with digital methods of fabrication.

FABRICATING FORM: GENERATING THREE-DIMENSIONAL UPHOLSTERY AMID EXPERIMENTS IN PROCESS DRIVEN DESIGN

by

Felicia Francine Dean

A Thesis Submitted to the Faculty of The Graduate School at The University of North Carolina at Greensboro in Partial Fulfillment of the Requirements for the Degree Master of Fine Arts

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Approved by		



To my parents Frances and Alphonso Dean, each of you encouraged me in your own way throughout my academic career. From day one, the positive reinforcement you provided me regarding my academic achievements was pivotal in establishing my future educational accomplishments and dreams. I hope that I may continue to make you both proud. This journey was not only for me, but also for the both of you.

APPROVAL PAGE

This thesis written by Felicia Francine Dean has been approved by the following
committee of the Faculty of The Graduate School at The University of North Carolina a
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CHAPTER I

INTRODUCTION

The concept of three-dimensional upholstery emerged from my experience with the trade of upholstery. While studying the skill at my local community college, I noticed a lack of artistic expression and creativity in the application of textiles to furniture systems. As a result of the observation, my thesis research examined upholstery fabrication as a site for design and innovation for the 21st century and beyond. During the development of my work, I set out to challenge traditional ideas regarding the appearance of upholstered furniture surfaces and the role of highly skilled tradespeople. The work serves to spark new interest in the field of upholstery and lead to a greater realization of the role that skilled tradespeople can play in design development. In turn, the design hypothesis is that the resulting body of work will inform the furniture design industry of the possibilities of design innovation by furthering the exploration of upholstery as a design element.

My research investigated the possibility of generating three-dimensional forms and surfaces for upholstered furnishings by incorporating surface relief construction methods from fashion design sewing and patterning techniques. These apparel design approaches are referred to as fabric manipulation techniques. My treatment of the applications positioned upholstery fabrication beyond a two-dimensional manufacturing

procedure by exploring its potential as a design element and artistic process. The result was a collection of work which embodies both functional and sculptural form.

My creations developed from an artist's and designer's mindset and processes. I drew parallels between art and design by referencing their ways of thinking, fabrication techniques, and research methods. I adapted a design approach which blends the expressive, creative, imaginative, unknown, and experimental with the technical. Additionally, the majority of my discovery originated from in-depth experimentation with traditional construction methods. I experimented with unlikely materials and fabrication processes, while combining traditional and technological fabrication practices.

I merged technology and craft to develop projects that respectfully balance both avenues of furniture design. My work represents how traditional ways of making and technological advancements in fabrication inform one another during design development. My manner of making stresses the significance of hands-on research, project reflection, craftsmanship, and technical construction processes in regards to the evolution of the work, the direction, and the designer.

CHAPTER II

REVIEW OF THE LITERATURE

The foundation of my literature review was primarily based on designer precedents. I analyzed their works from photographs within literary publications. Additionally, I referenced imagery published on the official websites of the designers and highly regarded online industry web pages. The works and designs discussed in the thesis may be viewed at the corresponding citation location found in the *Image Resources* for *Reference* page of this document.

Furniture Studies: Fabric Manipulation Processes

Patricia Urquiola

During the beginning of my literary research Patricia Urquiola's works stood out as some of the only furniture designs that incorporated a sewing manipulation technique into the upholstery design process. Urquiola worked with the Moroso furniture manufacturer to produce both seating series entitled *Smock* and *Antibodi* (Moroso, 2013). The Moroso (2013) website article, Smock: Smocking Stitch Design, notes how the embroidery technique used for the *Smock* chair's upholstery construction merges craftsmanship with industrial fabrication methods. The site's *Antibodi* brief, Antibodi: The Aesthetic Order of Blossom, speaks of how the chairs encompass a three dimensional upholstered surface created from the manner in which the fabric was patterned and sewn (Moroso, 2013). The *Antibodi* summary describes the non-padded

seating forms as embodying a graphic structure. Her approach varied for each of the series, yet achieved similar dynamic reliefs. The works displayed evidence of the vast creative potential within sewing and patterning processes for generating three-dimensional upholstered surfaces and forms.

Aqua Creations

Ayala and Albi Serfaty are the principals of Aqua Creations, a Light and Furniture Atelier based in Tel Aviv, Israel (Aqua Creations Ltd., n.d.). The Aqua Creations catalog commented on Ayala design's as functional art pieces, which are handmade by skilled artisans (Serfaty & Aqua Creations Ltd., 2011). In the catalog, Albi Serfaty described their products as "...art pieces that function as design objects" with an upholstery constructed as if it were a haute couture garment (Serfaty & Aqua Creations Ltd., 2011, pg 4). He also discussed how the works they create for residential and commercial clients include one-offs, limited editions, site-specific, and handmade products.

The design I discovered to be most influential consisted of objects within both the light and furniture collections of the company. Aqua Creations 2012 catalog referenced the *Morning Glory* floor lamp as whimsically elegant, exotic, and highly stylized (Serfaty & Aqua Creations Ltd., 2011). The catalog imagery illustrated a pleated sheer fabric as part of the lamp's design. As a result, the light from the object filters through the layered material, varying values of the fabric's hue and reinforcing the relief of the textile surface. In addition, the company's literature showcases the three-dimensional surface of *Bubbles* and *Anana* furniture stool pieces. The descriptions explain how the works used

patterning and hand stitching methods with lycra and microfiber fabrics to create the surfaces' volume.

Inga Sempé

Inga Sempé worked with Ligne Roset to produce the *Ruché* sofa (Gross, 2012). On her website, Sempé (2010) described the furniture's upholstery as a quilted mattress that drapes over a slender wood frame. Additionally, she defined the sewing technique as a "...cross-hatching of interrupted seams" (Sempé, 2010). In 2012, Gross identified the *Ruche* sofa's sewing fabrication method as an automated machine process produced by Ligne Roset for Inga Sempé. This precedent revealed itself as one of the only which incorporated digital fabrication within the construction of the upholstery's design. Ultimately, the study was the starting point for my understanding of the potential to transfer my manual fabric manipulation techniques to a digital process.

Crafted Systems

Founder Aurelie Tu of Crafted Systems paired with the YWCA women's shelter to establish a skills development, empowerment, and creative outlet program for creating their handcrafted products (Crafted Systems, 2010). The Crafted Systems website features the product results of the collaboration, which is a range of home furnishings, lighting, and accessories (Crafted Systems, 2010). The vessel forms exhibit a three-dimensional textile surface. The Crafted Systems (2010) Our Product notation, describes their objects as uniquely woven natural felt, which innately provides a textured relief

surface. Thus, it appears the patterning process and the material selections are imperative to each design's final form.

Elena Salmistraro

The website of designer Elena Salmistraro showcases a collection of vessels entitled *Cover Vase_Origami* (Salmistraro, n.d.). The site's description of the project shares Salmistraro's construction process of working with paper-like fabric, Jacroki that retains the folds of origami patterns. The *Cover Vase_Origami* summary, notes the concept of interplay between volume ansd shape to spawn a shaded third dimension of the material and surface. Based on the product images, it seems the light material colors reinforce the three-dimensionality of the surfaces while the relief recedes back into a two-dimensional plane with the dark hues. The high contrast of light and dark to dramatize highlight and shadows reveals more of the vessels' three-dimensional exterior.

Furniture Studies: Experimental Processes

Florian Schmid

I looked at the work of Florian Schmid because of his material choice for a hand stitching process. Schmid's website documents his series *Stitching Concrete* in which he uses concrete canvas to construct various seating forms (Schmid, 2014). The project summary describes the material as soft, yet sturdy like concrete, UV resistant, waterproof, fireproof, and durable. Also, it mentions that once the concrete canvas has been saturated with water, the material hardens it within 24 hours. The Concrete Canvas website clarifies the original intent of the material by specifying it for the production of

Concrete Canvas Shelters (Concrete Canvas, n.d.). However, Schmid's work skews the visual language we associate with cloth as a material by using the concrete canvas as a structural material (Schmid, 2014). From Schmid's project and process I saw the potential of challenging the normal perception of concrete. Concrete is typically identified as a cold, hard material, but Schmid's work helped me envision crafting an illusion of a much softer and plush surface by using fashion fabric manipulation techniques.

Marcel Wanders

The experimental works of Marcel Wanders intrigued me from the moment I laid eyes on his designs. In the book *Ultra Materials*, writer Michele Caniato (2007) notes many of Wanders' views on design. The author uses Wanders' words to emphasize his design approach as a risk-taker who dares to runs blindly and never gives in to failure. The overall user experience he strives to create is one of wonder and the unexpected (Caniato, 2007).

Caniato (2007) quotes Wanders on his belief of creativity and experimentation being his profession. These ideas radiate from Wander's designs because of his incorporation of progressive fabrication techniques that draw from historical styles (Wanders, n.d.). The words of his biography reinforces the designer's primary goal of bringing together the user, designer, and craftsperson in order to infuse a humanistic quality back to design. Wander's achieves these objectives in such works as his *Knotted Chair* and *Crochet Chair*. The *Knotted Chair* fabrication includes the crocheting of carbon fibers, resining the woven material, and suspending the form to dry (Wanders,

n.d.). The *Crochet Chair* entails a similar process of applying an epoxy resin to harden the form's crochet fibers (Wanders, n.d.). Marcel Wander's experimentation with materials and processes led me to reevaluate ways in which I could add an ingredient of surprise to my designs by blurring the associations users make with the elements and fabrication techniques.

Studio Hausen

Joscha Brose and Jörg Höllge are the founders of Studio Hausen (Studio Hausen, 2012). On their website, the Textile Moulded Chair: Making Furniture with a Textile Mould section describes how Brose created the *Textile Moulded Chair* from a process that redefines the method of mold making (Studio Hausen, 2012). The project description explains Brose's approach as inflating and filling a textile form with polyurethane foam in order to achieve the chair's shape and structure. The inclusion of foam into the fabrication process always fascinated me. The precedent was very descriptive about the process, which I felt could be beneficial to any experiments I might conduct with foam as a material.

Yael Mer & Shay Alkalay

The *Pleated Pleat* collection by designers Yael Mer & Shay Alkalay utilizes the fashion design's fabric manipulation method of pleating (Mer & Alkalay, n.d.). Through my online research I identified Yael Mer and Shay Alkalay's fabrication process for developing three-dimensional seating forms. The website of Mer & Alkalay (n.d) includes a project brief of their *Pleated Pleat* series. The collection's visual and written

summary demonstrates the designer's use of pleating Tyvek and pouring expandable foam into the seats' cushion cavities to achieve voluminous forms.

Louise Campbell

Author Folkmann (2010) addresses the concept of aesthetics in design. His reasoning for the discussion is to unveil how appearance and form evoke aesthetic dialog that test experience, and how form may dictate our comprehension of designs. Aesthetic qualities may be derived from a designer's underlining meaning in his/her work (Folkmann, 2010). He discusses how Louise Campbell demonstrates this in the construction and form processes of her chair designs. The author notes that the forms of the chairs are not led by the function of them, but rather by the concept of a two-circle structure. Instead, he concludes the aesthetics are in the communication of her ideas through her materials, construction, and craftsmanship.

Folkmann's description of Campbell's works sparked the underlining idea of the potential to ignite an emotional interaction between the user and the furniture design, based on the visual language of communicating the concept (Folkmann, 2010). On Campbell's website the description of her *Very Round* chair identifies 3d laser cutting as the fabrication process (Campbell, n.d.). After reading the article and discovering her construction method, I began to question how a digital process could evoke similar emotional responses from a user as it would if he/she interacted with a handmade object.

Fashion Studies

Issey Miyake

My search for fashion designers who created garments epitomizing volume led me to discovering the work of Issey Miyake. In *The Cutting Edge: Fashion from Japan*, Editor Louise Mitchell (2005) showcased Miyake's *Minaret* dress. The garment utilized a pleating method which allowed the dress to collapse and lay flat (Mitchell, 2005). My analysis of the design found the composition to be balanced by the smaller horizontal pleats opposing the large horizontal ones. In addition, vertical color contrast and variation in the pleating scale reinforced the exaggeration of the form. Miyake's method of delivering volume into his designs fascinated me. He successfully applied a constructed playfulness to his sophisticated *Minaret* design.

Alexander McQueen

It was only natural for me to reference the work of Alexander McQueen in my research. In my youth before I could define the essence of my creativity, I experienced a televised runway show of McQueen's showcase *La Poupéé* Spring/Summer 1997.

Thumbnails of the show in *Alexander McQueen: Savage Beauty*, which eloquently depicts the fashion design legacy of McQueen, reminded me of the event (Bolton, Frankel, & Blanks, 2011). Viewing the runway show was a turning point for me as a creative. The theatrical presentation of the runway environment and garments engrained an everlasting impression on me and set the stage for my imaginative sense of design.

Iris Van Herpen

In an interview with mariankihogo.com, Iris Van Herpen (2010) describes her work as being a mix between history, fantasy, and the future. Her material choices fuse together "...old and forgotten techniques - with innovation..." and references of the world to come (Van Herpen, 2014). Her unconventional apparel fabrication materials included 3D printed polymers, heavy-duty leather, vinyl, plastics, and metal (Van Herpen, 2010). Her manner of fusing digital and analog methods of fabrication appealed to me for my later research investigation of streamlining manual construction process.

Sandra Buckland

The online Modabot Interview with 2007 Hyeres Fashion Winner Sandra Backlund, states that Backlund's inspiration comes from traditional handcraft techniques (Backlund, 2007). The Backlund (2014) website depicted several material processes she utilized for her designs which created volume and fabric reliefs in her designs. Knitting was illustrated as one of the primary methods she introduces in the construction of her works. However, she also transformed her designs with the origami-like techniques she applied to fabrics.

Amila-Hrustić

In 2010, Dezeen showcased the fashion designs of Amila Hrustić's. The author focused on the design of her *Plato's Collection*. The article referenced the conceptual nature of the fashion series as one which draws from the geometry of Platonic solids such as the cube, icosahedron, octahedron, tetrahedron, and dodecahedron. The three-

dimensional geometric forms were created from paper and then applied to fabric in different compositions (Dezeen, 2010). The components appeared to contribute to the depth of the surface reliefs because of the ability to layer and nest the three-dimensional objects. In addition, the variation of scale and composition within the works appeared to add to the dimensionality of the designs.

Sewing Techniques

Critique

During my initial investigation of how to create volume, form and dimensionality with fabric sewing and patterning techniques I was limited to only my upholstery knowledge of channeling and tufting methods. My decision to reference fashion design approaches for apparel fabrication steered me in the necessary direction. Fortunately in the Fall 2011 semester at the University of North Carolina at Greensboro, Professor Melanie Carrico, in the Department of Consumer, Apparel, and Retail Studies (2011), invited me to a product design studio critique on fabric manipulation construction methods for fashion design. I gathered a wealth of knowledge from the review about how the sewing techniques aided in generating textile three-dimensional surfaces (Department of Consumer, Apparel, and Retail Studies, 2011). Also prior to the critique, Professor Carrico provided me with literary references for the techniques. The experience of attending the review was a pivotal turning point in my research. The critique guided me in re-envisioning the fabric manipulation techniques as upholstery sewing and patterning design processes.



Figure 1. Images 1 & 2 of Projects from Fabric Manipulation Critique. Dean, F. (2011, February 8). Projects from Fabric Manipulation Critique. Presented at the University of North Carolina at Greensboro (UNCG) Course APD 443-01 Product Design Studio III: Creative and Experimental Design, Greensboro, NC.

Books & Techniques

Three texts navigated me in learning how to sew and pattern various fabric manipulation techniques. They included *The Art of Manipulating Fabric*, *Shadowfolds:*Surprisingly Easy-to-Make Geometric Designs in Fabric, and Pattern Magic. The most influential of the books was *The Art of Manipulating Fabric*. The text by Wolff (1996) acted as a resource for me to understand how to sew the methods and the patterning sinvolved in the processes. I strengthened my hand stitching skills through practicing the techniques with felt fabric. From the Shadowfolds book by Rutzky & Palmer (2011), I learned the Twist technique which I delved deeper into investigating for my Knotty chair design. The Pattern Magic text by Nakamichi (2010) offered a completely different design approach to creating volume in apparel. The other references focused primarily on gathering the textile through hand stitching together points that were drawn on the fabric. In contrast, Nakamichi (2010) illustrated techniques of generating volume in

fabrics with cut and sew patterning methods. My analysis of all the literary sewing techniques enabled me to reinterpret the patterns in different scales, fabric medium, and configurations for my furniture designs.

Craft Theory

Author Howard Risatti (2007) underlines many aspects of craft theory. He compares craft and art, stating that craft fulfills human physiological needs, such as being able to sit on a chair and drink out of a glass. While art is said to fulfill human emotional needs. Risatti writes that both are functional, but function differently. Craft provides a physical function to the user, while art functions more as a communicator from the artist to the beholder (Risatti 2007). What distinguishes craft from art is not the material used, but the function the object implies (Risatti 2007).

Risatti (2007) also compares craft and design. Originally the word design was used to reference something like a pattern configuration on a ceramic bowl. However, it has transitioned into the definition of an act that is performed by a designer (Risatti 2007). Risatti argues that design is limited to the ideation and conceptual stages, while craft additionally includes the physical construction phase. Therefore craftsmanship includes "...thinking and making, visualizing and executing...", a back and forth dialog (Risatti 2007, p. 169). We live in a society where the population is driven by overconsumption (Risatti 2007). Thus, creating demand for mass production (Risatti 2007). As a result design is limited to the ideation and conceptualization, and the construction process is no longer craftsmanship but workmanship, because someone else's hands and mind are executing the designer's vision (Risatti 2007).

CHAPTER III

METHODOLOGY

Building a Body of Work

As I developed project after project, my research extended into an investigation of various objects. Though my thesis work initially focused on chairs and seating, I felt it was important to develop a more diverse body of work, expanding the fashion design sewing and patterning methods into fabrication techniques for a range of three-dimensional forms and surfaces. I reevaluated the concept of upholstery and the types of objects associated with it. My reflections led me to investigate other fashion design methods that create volume and form. As a result, I created a body of work that transforms both the common definition of upholstery and the application of textiles to objects into a contemporary design approach for furniture, home accessories, and sculpture.

My body of work spans five projects that incorporate my investigation of fashion fabric manipulation processes in order to create three-dimensional forms and surfaces for interior products. The works were explored digitally and by hand, through sketches, 3D modeling software, analog machinery, computerized fabrication equipment, experimentation with processes and materials, or hand construction methods.

The creation of my body of work stemmed from my practice of gaining knowledge through the active process of making. The ideation, design development, and

product fabrication phases included reflection and analysis of the works' directions. As a result, each project informed the design investigation of the next or previous product exploration.

The Collection

Cocoon

<u>Approach</u>

The design methods for the *Cocoon* chair evolved from focused research on fabric manipulation techniques employed in the fashion apparel industry (see Figure 2).

Through the use of composite construction materials, capable of being sewn and patterned for furniture in the same manner as for fashion, I addressed the integration of a chair's structural and cushion system. Through the assembly of composite materials, I investigated these systems in the ergonomic composition of Harry Bertoia's, *Bertoia Diamond Chair*.



Figure 2. Cocoon Chair

During design development, I considered the potential of sewing fiberglass for the chair's structure. After further exploration of fiberglass and sewing techniques, I concluded that utilizing a smocking hand-stitch method to sew fiberglass pushed the boundaries of the material because the approach produced a truss-like seating support system. In addition, the cushion system and fiberglass-supporting frame could be integrated through layering the materials and hand-stitching them in unison.

Precedents: Fashion

Early on in my investigation, I spoke with Professor Melanie Carrico of the Department of Consumer, Apparel, and Retail Studies at the University of North Carolina at Greensboro. I communicated my intention of creating voluminous three-dimensional forms and surface for furniture to Professor Carrico. She provided me with fashion literary and design resources that enabled me to understand and learn the apparel methods of constructing such forms, which she categorized as fabric manipulation techniques. Also, I was fortunate to attend her Product Design Studio III: Creative and Experimental Design classes' critique of their handmade fabric manipulation studies (see Figure 3).



Figure 3. Images 3 & 4 of Projects from Fabric Manipulation Critique. Dean, F. (2011, February 8). Projects from Fabric Manipulation Critique. Presented at the University of North Carolina at Greensboro (UNCG) Course APD 443-01 Product Design Studio III: Creative and Experimental Design, Greensboro, NC.

In order to understand the possibilities of generating forms through the use of textile altering sewing and patterning methods, I referenced the work of Sandra Backlund. She is a fashion designer who creates volume and form in many of her garments. The triangulated blouse within her *Ink Block Test* collection not only displays a peaked three-dimensional surface, but also a variation of scale as it relates to form. This example made me reevaluate my approach to the scale of the patterning. It helped me progress from learning technical processes to understanding the diverse surface implications of a pattern's scale on the final form.

<u>Precedent Studies – Furniture</u>

Designer Patricia Urquiola's work was influential in my development of the *Cocoon* chair. Her *Smock* and *Antibodi* seating collections reinforced the successful potential of my research to achieve a sewn three-dimensional textile surface for furniture. These two series are ornamented with three-dimensional fabric forms. The folding and

sewing technique utilized in the *Antibodi* seating series gives volume to the raised petal composition. The *Smock* chair incorporates a fashion smocking and embroidery sewing method, which draws the fabric together, resulting in a relief surface (Moroso, 2013).

<u>Precedent Studies – Furniture</u>

The *Pleated Pleat* collection by designers Yael Mer & Shay Alkalay utilizes the fabric manipulation method of pleating (Mer & Alkalay, n.d.). The designers combined the folding technique with Tyvek and expandable poly-urethane foam to create three-dimensional seating forms (Mer & Alkalay, n.d.). My response to their worked developed from being only about an inquiry of their treatment of the surface relief into an evaluation of the processes they used to achieve the final design. Their process led me in my exploration of the materials within my works. By referencing their work, I realized the implications it made about Tyvek possibly being a non-permeable material. Ultimately, Tyvek was a component of the composite material makeup of the *Cocoon* chair.

Sketches

I created digital and hand sketches for the development of the *Cocoon* chair stitch pattern. I sketched new and tested patterns in order to document and evaluate them (see Figure 4). The process allowed me to analyze which techniques were successful. The digital sketches were diagrams. After I hand-stitched mockups of various sizes with distinct pattern scales and geometry, I produced a final digital layout for fabrication.



Figure 4. Sketching Patterns for Cocoon

In addition to the sketch patterns, I delved into exploring the possibilities of digitally rendering a three-dimensional model of the *Cocoon* chair. Instead of using the computer to control how the final object "should" appear, I worked in reverse. I let the physical making process govern the appearance of the finished product's sewn surfaces. While I worked on completing the project, I investigated multiple ways in which 3ds Max might aid in the development of a digital model of the chair (see Figures 5). 3ds Max is a 3D modeling and rendering program used within the furniture design industry. The intent was not to use the program as a driver for the design, but rather as a vehicle from which I could create marketing material to easily present the furniture with numerous textile options and within different environments. My study of 3ds Max

revealed the importance of NURB (Non-Uniform Rational B-Splines) modeling, which is an industry standard generating non-rigid forms within a digital environment.

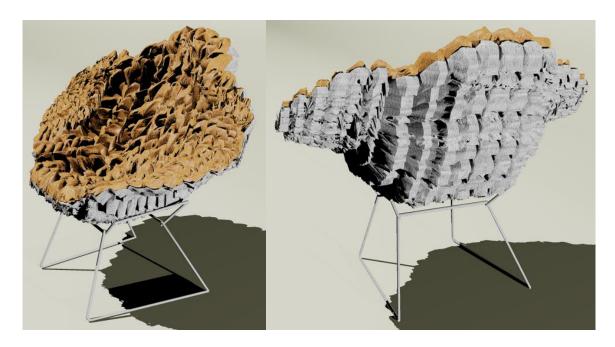


Figure 5. 3ds Max Renderings of the Cocoon Chair

Mockups

I began producing machine and hand-stitched mockups of various fabric manipulation techniques. I referred back to the student precedents from the Product Design Studio III: Creative and Experimental Design critique I attended. In addition, I gathered information from the texts *Shadowfolds*, *Pattern Magic* and *The Art of Manipulating Fabric*. Those texts guided me in understanding how the fabric manipulation techniques were created and the terminology of the processes.

The mockups I produced seemed promising for the production of three-dimensional upholstered forms and surfaces. However, some had more potential than others. I

realized more complex forms could be obtained by changing the scale, geometry, and layout of the precedent patterns. The smocking pattern proved to be the most successful because the fabric began to take on a curvature based on how close together the pattern was stitched (see Figure 6).



Figure 6. Various Sewn Scales of Smocking Pattern

Once I completed all of the smaller scale mockups, I moved on to determining how I would achieve the shape of the final form. I chose to develop the final chair with the smocking sewing method. Through my sewing explorations, the process proved its ability to create curved planes that could conform to my mold surface of the *Bertoia Diamond Chair* precedent. I dimensioned the seat of the Bertoia chair to determine where the fabric would be required to bend or contour. From these measurements and my knowledge of how much the pattern gathered the fabric during sewing, I generated a diagram detailing the pattern layout and geometry (see Figure 7). I produced a felt fabric full-scale mockup of the seat. After the construction, I revisited my pattern diagram and made adjustments to the layout. I based these updates on how the full-scale mockup took

shape to the Bertioa seat form (see Figure 8). The revised diagram provided the pattern sewing instructions for the composite material construction of the final *Cocoon* seat.

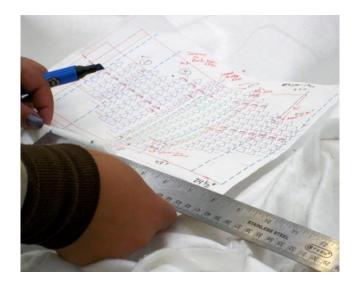


Figure 7. Auto CAD Diagram of Cocoon's Mockup Pattern



Figure 8. Full Scale Mockup of Cocoon in Felt Fabric

Fabrication

The scope of the *Cocoon* project revolves around the investigation of a newly envisioned fabrication process and not the final chair form. Thus, the form was created

"in the style of" and derived from attributes of the *Bertoia Diamond Chair*. The approach signified the potential for future development of seating based upon the fabrication of specific composite materials. The undertaking allowed for a much more thorough examination and development of the construction process.

The cushion system and fiberglass-supporting frame were integrated through layering the materials and hand-stitching them in unison (see Figure 9). The layered materials included one fabric, one Dacron, one Tyvek, and two woven fiberglass layers. Tyvek's ability to block moisture characterized it as the most reliable barrier for the fabric not to absorb the resin. Dacron was incorporated to sustain the malleability of the materials while providing cushion and minimizing the thickness of the layered materials.



Figure 9. Stitching Together Layered Materials

After patterning, cutting, and stacking the materials, the pattern diagram was drawn on the fiberglass side; all points of the diagram were hand-stitched, then drawn together with twine, and knotted. Before stitching the materials together, the top layer of

fabric was sewn vertically together in three sections. The fabric was not large enough to span the overall approximate 8' X 10' size of the pattern layout. Therefore, I was extremely conscious of where I placed the seams of the fabric when I produced the pattern construction diagram. I placed the seams in locations where the pattern would tuck into itself when stitched and gathered. Once the composite materials were stitch assembled, the form was draped over a *Bertoia Diamond Chair* frame and resin was applied to its fiberglass exterior. Once dry, the Tyvek was cut away from the edges of the seat. Then, the fiberglass back was sanded, sharp points trimmed, primed and painted. Since the fiberglass back had a grainy finish, a textured paint was layered under a final white satin finish coat to achieve a uniform look.

A diamond chair Bertoia chair base was modified to fit the new material construction of the *Cocoon* chair. Additional metal was welded to support the front and back of the seat. The base had a swooping arch at the back, which one screw passed through and threaded into a toggle nut hidden within the seat's inside back. The underside front of the seat rested on two metal rods that fit between the folds of the fiberglass.

<u>Analysis</u>

During the development of *Cocoon*, several challenges arose throughout the investigation. The first was determining how the finish edge of the materials would terminate. As I worked, I decided the corners of the fabric would be backed with another layer of coordinating textile and would later be tacked with twine to the fiberglass (see Figure 10). My future investigations into the fabrication process will reevaluate the

possible practices for successfully finishing the combined material edge. Secondly, I learned about the stretch of the woven fiberglass material. When machine sewing edges together, the woven glass lengthened. This was because of the nature of the medium to conform around objects it would normally be molded over and the excessive amount of pressure from the foot of the sewing machine onto the material. The occurrence did not present any problems during fabrication. However, prior knowledge of such a potential change in the material size would have prevented less waste.



Figure 10. Cocoon Edge Treatment

The process developed for and used in the construction of the *Cocoon* chair identifies possibilities for an extreme restructuring of future seating compositions by integrating their material organization and fabrication. Hand-stitching fused the upholstered soft supporting system with the structural network. Ultimately, utilizing a smocking hand-stitching method to sew fiberglass pushed the boundaries of the material because the approach produced a truss-like seating support system.

Knotty

Approach

While designing and fabricating the *Knotty* chair I learned an enormous amount about design and myself (see Figure 11). Since my previous project *Cocoon* focused more on the creation of an original fabrication technique and less on the object form, many of the *Knotty* design development stages were new to me. Also, some of the fabrication processes I explored and used were unfamiliar to me. During the designing and making phases of *Knotty*, I gained knowledge on the full scope of project development.



Figure 11. Knotty Chair

The ideas regarding concept, form, and fabrication were ever-changing during all the stages of production. My original concept defined the upholstery as more of a skin to

the structure, as skin is to the human body. Therefore, I viewed them as two systems, an external and an internal. My first vision was to have the upholstery zip away from the seating's structure in order to reveal the beauty of what was hidden beneath it. Also, I initially discussed the possibility of appropriating such fabrication processes as injectable foam. In the past, the *Up* seating series by Gaetano Pesce fascinated me with its construction method of molding foam (Vitra Design Museum, n.d.)

In order, to determine the validity of my design decisions, I constantly evaluated, reflected, and questioned the direction of the project. When I began a self-engaged design dialog with my work, the answers as to what my next steps would be were always clear and sound. The making process was a time for me to create my work and begin to develop and define who I am as a designer. Therefore, the nurturing aspect of project development becomes very personal and a representation of me through my work. During the making phase, I spent an enormous amount of time understanding the materials based on my physical interaction with them and their response to my experimentation. As a result, if what I completed the first time proved unacceptable to the integrity of the design, I reevaluated and corrected any issues.

<u>Precedent Studies – Fashion</u>

I gathered numerous precedent studies from fashion designers Iris Van Herpen, Sandra Buckland, Amila Hrustić, Alexander McQueen, and Issey Miyake. However, I narrowed down the studies to two specific works, one from Van Herpen and the other from Buckland. The criteria for refining my selections included: my evaluation of the amount of sewing used for the fabric manipulation techniques in the works and the

amount of volume the methods afforded the forms. Though some of the precedents weighed heavily in one criterion over the other, it was necessary for the chosen designs to meet both for the parameters of the thesis topic.

Her website biography Iris Van Herpen: Normal Rules Don't Apply describes her as a designer who values the exchange between craftsmanship and innovation (Van Herpen, 2014). Her works push the boundaries of form, volume, fabrication, and traditional societal standards of fashion apparel. The concepts and ideas she explores in her works were directly related to attributes I envisioned my projects encompassing. My evaluation of her garments led me to incorporate a dress design from her *Radiation Invasion* collection as one of my precedent studies for the *Knotty* chair. The silhouette of the *Knotty* chair was inspired by the shapes and movement of line used in the design of the *Radiation Invasion* dress. Van Herpen's design fit the parameters of not only my thesis research, but also paralleled the design values I set on my work.

I referenced Sandra Backlund's designs because the fabric manipulation techniques she introduces created volume and form. The online Modabot Interview with 2007 Hyeres Fashion Winner Sandra Backlund, states that Backlund's inspiration comes from traditional handcraft techniques (Backlund, 2007). She described her designs, such as in the *Ink Blot* collection, as "...a three dimensional mind map" (Backlund, 2007). For the design of *Knotty*, I drew inspiration from the origami style dress in her *Blank Page* collection (Backlund, 2014). Additionally, one key perspective Backlund stressed in the 2007 interview was the importance of paying attention to the mistakes and ideas during the process in order to move forward. I adopted these words of advice during my design

exploration. The approach proved to be valuable for the design and construction of the *Knotty* chair and my future projects.

Sketches

During all phases of the design development and fabrication of *Knotty*, I utilized hand sketched visualization tools. As with my *Cocoon* project, I hand sketched on vellum paper and in my journal. Using a roll of vellum paper enabled me to spread the sheet out and evaluate all of my preliminary sketch ideas for *Knotty*'s chair form. The method was an excellent way to see how the design was evolving, how it needed to change, and what the next steps were in the design development.

As seen in Figure 12, the design of *Knotty* took on many forms from start to finish. The forms developed from a general idea of an organic style chair, to a refined shape based on my Iris Van Herpen *Radiation Invasion* fashion precedent. First, I worked by drawing two-dimensional views of what I perceived as the chair's shape. In order to visualize some of the drawings as three-dimensional, I began shading some of the two-dimensional shapes. When I focused on my fashion design precedent for the chair form, I still worked initially in 2D, but from geometry I pulled from the patterning within the design Iris Van Herpen's dress. Then I created axonometric drawings and began to develop a form that accounted for all views and perspectives.

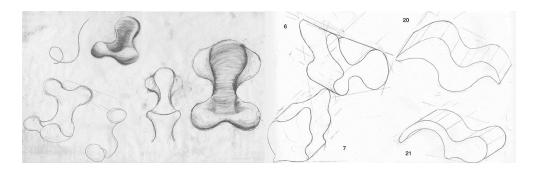


Figure 12. Sketch Ideas for the Knotty Chair Form

Once I established the hand sketched image of the chair, I progressed by producing a scaled model of the work. I used foam, hand and machine saws, spray adhesive, and sandpaper to construct the sketch model. I created the model form in the same manner I drew it. I dimensioned a scaled profile, traced it on the foam, cut out the extruded shape, and then contoured the additional sides. The model acted as a visual reference and guide for other design considerations (see Figure 13). It allowed me to identify issues of ergonomics. Also, it prompted me to consider the design of the chair legs/base and analyze how the form meets the floor.



Figure 13. Scaled Foam Model of Knotty

I moved from hand and model sketches to creating digital drawings of *Knotty*. By this time, I finalized the material construction and processes. Since the chair's fabrication consisted of twelve incremental steel rod profiles, the digital model allowed me to extract and print these full-scale shapes. I used the mapped profiles as a guide to cold bend quarter round steel rods. Additionally, the digital drawing supplied me with information about the amount of steel required for the design. This method of working greatly expedited the construction phase of the design process.

<u>Mockups</u>

I investigated several methods of building the structural metal frame and the upholstery system. The final decisions developed from the hands-on research. Also, I evaluated the construction techniques of the mockups based on the conceptual, visual, and integrated design strength of each. Through the mockup phase, I strived to define the visual language and its relationship between the soft and structural networks of the chair.

For the design of the *Knotty* chair, I sought to establish a unique method of making for seating. Originally, I discussed the chair possessing an exterior upholstered skin and an interior metal structure. My first thought for the metal construction was to weld the frame. However, my design approach shifted as I began to consider the visual dialog between the upholstery and framework.

I brainstormed about the manner in which the two systems could visually and conceptually connect. I reflected on how knots existed as a common theme amongst the researched sewing modification methods. Thus, I pondered other applications related to knot assembly methods and considered their use in sailing and camping. I searched

online for instructional videos of various tying techniques and applications. I discovered a camping tutorial that illustrated how to secure two pieces of wood together with twine (ITS Tactical, 2010). As a result of my analysis, I determined that a method of knotting could potentially tie ideas of the networks together. I explored several ways of tying the metal together. In the end, the lash knotting method proved to be the most successful (see Figure 14).



Figure 14. Lash Knot Detail

Simultaneously, I investigated fabrication processes for the chair's upholstery and frame. As the process for the structural system advanced, the rigid form's aesthetic also took shape. I moved from testing preliminary ideas of fabrication manipulation techniques to configuring a more compatible sewing method which related to the structure and was justified by the principles of art and design. I concluded that creating an upholstery pattern similar to the geometry of Sandra Buckland's *Ink Blot* dress would

provide a related finish for the soft surface. Also, I recalled the *Twist* method illustrated in the book *Shadowfolds* (Rutzky & Palmer, 2011). During the mockup phase, I examined the variation of scale, orientation, and volume of the *Twist* method (see Figure 15). My study revealed an undeniable relevancy to the composition of the *Knotty* project.



Figure 15. Scale of Twist Method

Fabrication

The physical development of *Knotty* included troubleshooting potential construction complications, formulating a plan for production that would streamline the process, and moving back and forth from the digital and analog ways of making. Though I previously worked out the majority the chair's design elements, I identified, revised, and resolved numerous design considerations during the making phase of the project. Evaluating processes during the building stage allowed me to organize and preplan my

approach for each fabrication technique. Though I built *Knotty* by hand, the digital processes acted as aids for the analog construction.

I derived fabrication templates for the metal frame from a 3D modeled drawing and plotted them on a large format printer. From the chair's full scale digital model, I printed twelve sectional profiles at two inch intervals (see Figure 16). The templates provided a line path of which I used as a guide to cold bend ½" steel rods. For each print out, I taped it to a tabletop, aligned the start of the steel rod at the print's underside of the seat's profile, and secured the rod into place by drilling large stainless steel screws on both sides of the rod's start position. Then, I repeated the process of setting a screw on the profile's line path, and pulling the rod just enough to match the contour without bending it beyond the next point that needed to be set (see Figures 17). After I bent each rod to match the profiles, I welded them shut.

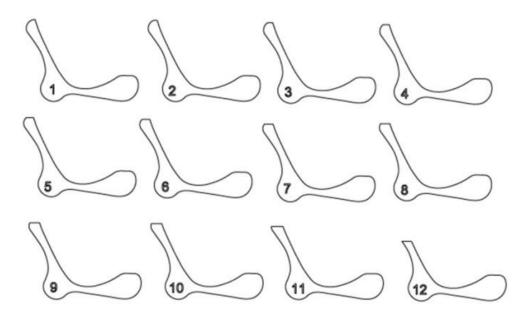


Figure 16. Printed Profiles



Figure 17. Bending Steel Rods

During the time I cold-bent the steel rods, I sketched out ideas to determine how I would accomplish tying the frame profiles and cross bars together. From these notations, I developed a slot system that would hold each profile in place, upright, and two inch increments from one another (see Figure 18). I wedged the profiles' bottom and back into groves on an L-shaped platform I outfitted for the process. The method accomplished what I intended it to do, which was to stabilize the rods while I tied down the steel cross bars (see Figure 19).



Figure 18. Slotted Platform System



Figure 19. Tying Down Steel Cross Bars

I marked the profile paths of the steel rods every two inches. The points identified the placement and lash knot location for rods that ran perpendicular to the profiles (see Figure 20). As I worked, I attached the cross bars at various positions on the profiles. Rather than consecutively fixing each perpendicular rod into place, this method of working allowed me to balance the frame much more efficiently.



Figure 20. Marking Knot Location for Perpendicular Rods

Next, I configured the connection of where the cross bars met the outside profiles of the chair and how to terminate the horizontal rods at the top of the seat's back. I

welded the ends of each cross bar to the first and last profiles. Then, I hand bent and clamped the top rods to their outer profiles. The technique facilitated the locating of a reference point for trimming and welding each bar to their proper point of contact. As a finishing design, I lash knotted all of the welded points in order to achieve a visual consistency.

During the chair's fabrication, the legs/base design evolved from a platform style to the final ½" thick flat stock metal legs (see Figure 21). The initial platform was created from laminated sheets of MDF that were CNC routed. The three dimensional digital model I created during the sketch stage provided me with the dimensions of the seat's underside. Thus, I worked from the 3D model of the chair's seat to configure the digital file for the base. The digital approach to making enabled the base to efficiently contour to the underside of the seat.



Figure 21. Evolution of Leg Design

After collectively observing the chair's seat and platform, I immediately recognized a disconnection amongst the components. The idea of placing the seat on a platform in order to conceptualize the dichotomy between art and design was visually

unsuccessful. However, I immediately refused to settle for the unsuitable and moved forward in configuring, understanding, and rationalizing the appropriate solution to the problem. I analyzed what did not work and why. In addition, I physically interacted with the chair on the base. I viewed it near, from afar, and from various perspectives. On site, I mocked up alternative leg options and critiqued their relevancy to the form (see Figure 22). I sat in it, varied my seating position and evaluated the form from what I experienced. Within an hour, I resolved the issue with a valid solution that developed a smooth transition from the chair's seat, to the base, and to the floor (see Figure 23).



Figure 22. Mockups of Leg Options



Figure 23. Mockup of Final Chair Legs

After various tests of layered fabric sewing and patterning techniques, I chose an origami style for the *Knotty* upholstery. Initially, I decided on using a *Flounce* sewing method (Wolff, 1996). However, once I finished the grid of the chair's metal frame, I realized the fluid style of the pattern was not appropriate for the rigid geometry of the chair's frame. Therefore, I moved forward with reinterpreting the *Twist* pattern technique in the *Shadowfolds* book (Rutzky & Palmer, 2011). The information I retrieved digitally contributed to the fabrication of multiple trail templates for the upholstery pattern (see Figure 24). During my revision of the sewing method, I evaluated its scale, volume, and performance for seating applications. In order to create more volume within the fabric layers, I stuffed Dacron between the folds. Additionally, I top stitched the corners of the pattern's raised surface because of its inherent nature to unfold and become disheveled when constantly sat on.



Figure 24. Laser Cut Pattern Templates

I created two upholstery styles for *Knotty*. The first I based on the amount of the gridded frame's visual reveal (see Figure 25). The idea related back to my initial concept of the upholstery as more of a skin from which the frame would peek through. As a

result, I developed the first chair cover with a pixelate style edge. I sewed the cover from a crème colored vinyl. Though the upholstery was tied down to the frame to cover the seat deck and inside back, it exposed the chair's back and bottom. This initial full-scale upholstery design visually disconnected the soft and structural networks of the chair. I was extremely disappointed due to the amount of time and energy I contributed to the cover's construction. However, to raise the caliber of the design I understood the upholstery needed to be reevaluated and revamped.



Figure 25. First Upholstered Cushion for Knotty

I approached the design of the second upholstery cover by analyzing what characteristics were necessary and complimented the steel grid frame. I sat in the chair and annotated its points of contact to the body. Therefore, I determined the necessity of the design in relation to the user. The resulting information guided and strengthened my decision of constructing three pads for the chair (see Figure 26). The pads, or bikinis, were fabricated to fit several regions of pressure point locations on the seat and inside

back. I revisited the manner in which the cover attached to the frame. Instead of wrapping around the profiles, the pads ultimately contained straps that laced together (see Figure 27). The linear dominance of the bands reinforced the chair's horizontal grid lines.



Figure 26. Three Upholstery Pads for Knotty's Cushions



Figure 27. Laced Pads

Analysis

My awareness and reflection on the project's mistakes and concept provided answers to questions I had during the design process, such as: What will the chair form be? What should the chair legs look like? What fabric manipulation technique should be used on the upholstery and which will work best with the structural design? The back and forth of making and reflecting guided me in my design decisions.

By stepping back from the process and evaluating it, I saw clearly the answers to my many design questions. Early on I studied where form comes. I struggled with defining the form. However, I found the answers in my designer and fabric manipulation precedents. I encountered dilemmas with the design of my first chair base and upholstery cover. I resolved the issues by redirecting my focus from the specific to the whole design.

During the mockup phase, I realized direct links between the making processes for both the upholstery and structural systems. For example, the knotting and tying used in the textile fabrication techniques was extended to the lash knot formation of the steel frame. Instead of welds, the frame was constructed almost entirely of lash knots that fortified the surrounding ties and the final framework. The creation of a lash knot assembly technique for the steel frame, helped to develop a rich relationship between the structural and the upholstery systems. The assembly created a truss-like support system for the chair to successfully maintain its integrity and distribute the weight of the user. I related the scale of the upholstery pattern to the incremental sizes of the chair's grid. I developed the upholstery based on associations I formed between the user and the chair's

networks. As a result of my investigation, I redefined the construction approach of each system based on their applications and validated their significance based on the relationship they had to one another and the user.

Shorty-Fat

Approach

The *Shorty-Fat* vase project investigated the interaction between expandable polyurethane foam and poly mesh fabric with an applied fabric manipulation technique (see Figure 28). The research delved into revealing the potential to produce vessel forms derivative of the foam and fabric material properties. The vase's design compositions were not predetermined. Instead, the medium explorations steered the design.



Figure 28. Shorty-Fat Vases

The style of my investigation for the *Cocoon* and *Knotty* chairs continued into my design development of the *Shorty-Fat* vase covers. For the project, I continued my

experimental approach of materials and processes. By referring to my previous fascination with the method of foam injection and considering the available means of material processing, I determined the range of products that were possible.

A large portion of my investigation dealt with the origin of form, how it's generated, and how it's created for functional products. My manner of working and identity as an artist and designer innately produced functional sculptures. Therefore, I steered my research toward the embodiment of sculptural form into functional objects. The *Shorty-Fat* project addressed the idea of how form emerges when the designer limits the number of controlled variables.

Precedent Studies – Furniture

The precedents I researched for the *Shorty-Fat* project reflected my study of fabric manipulation techniques. In addition, I selected references grounded in the exploration and experimentation of injectable foam processes. The design references allowed me to gauge the potential of my investigation.

I found the works of Crafted Systems included the development of vessel fabric forms. Early on, I considered this product genre due to my interest in developing smaller scale projects. Crafted Systems weaves and interlocks patterns cut from wool felt (Crafted Systems, 2010). From my visual analysis of the works, I understood how the geometry of the cut sections, assembly of the patterns, and material properties of the felt generated the objects' three dimensional forms and surfaces.

Another designer, Elena Salmistraro created vessel forms from fabric (Salmistraro, n.d.). On her website's *Cover Vase_Origami* description, the objects are

identified as vase covers for various vessel types (Salmistraro, n.d.). The summary described the Jacroki textile used in her *Cover Vase_Origami* series as a natural and recycled paper fiber material. Additionally, the article explained how Jacroki embodied characteristics similar to paper, which enable her to develop the forms in the style of origami construction methods.

The vessel precedents strengthened my understanding of several interpretations of the object and its functions. The forms produced by Crafted Systems appeared to serve more as a container for dry items. In contrast, Salmistraro's covers were adaptable for holding a water filled vase with fresh flowers (Salmistraro, n.d.). The research guided me in determining my design approach for the *Shorty-Fat* series. I realized the diversity of vessel functions and solutions for their varying degrees of applications.

During my material explorations, I discovered the Studio Hausen furniture precedent that turned out to be extremely valuable for troubleshooting the issues I encountered while developing my foam injection process. My attempt was similar, but distinctly different. The Studio Hausen (2012) website article, *Textile Moulded Chair: Making Furniture with a Textile Mould*, illustrated Brose's undertaking as a predetermined chair form based on a pattern he cut and injected with polyurethane foam. In contrast, my investigation was steered by the concept of revealing form based on the interaction between material compositions and the characteristics of mesh fabrics and polyurethane foam. Brose based his *Textile Moulded Chair* design exploration on reenvisioning mold methods of fabrication (Studio Hausen, 2012). The common threads of our designs were fabric polyurethane foam injection and questioning how form is

constructed. As a result, Brose's process for *Textile Moulded Chair* project steered me in the right direction for developing a technique for the fabrication of the *Shorty-Fat* collection.

Sketches

I compiled the majority of my ideas in a journal. I brainstormed in written and sketched formats. My drawings unfolded from the thoughts I documented and analyzed on paper. My focus concentrated less on realizing the entirety of the final form and more on the parameters for constructing functional products with a manual foam injection process (see Figure 29).

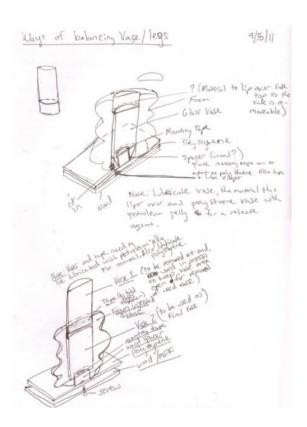


Figure 29. Drawing of Manual Foam Injection System

I proposed the development of a vase for the project investigation. In order for the objects to fulfill their functional objectives, I placed certain attribute requirements on them. For example, I noted a vase must retain water for the flowers and a table needed a flat top to place items on. The plans I sketched, allowed me to identify possible methods for attaining these characteristics.

Mockups

The project included an investigation of multiple spray foams and fabric types. I opened the exploration by sewing shut fabric pouches and spraying canned polyurethane foam into the sacs (see Figure 30). I experimented with foams that manufacturers intended consumers would use for home insulation and surface gap repair. I did not possess an industrial foam injection machine. My solution was to develop a manual foam filling technique that could potentially crossover to an industrial application.



Figure 30. Foam Filling Fabric Pouches

As I moved forward with testing, I conducted mockups of the foam injection process with two textiles that had a sewn manipulation technique (see Figure 31). The fabrics were a mesh material. One contained a breathable open web construction. The other textile mesh was more closed, opaque, and dense. Also, I dyed the fabrics to figure out other color options for the final forms. The breathable mesh retained a more accurate representation of the hues.



Figure 31. Foam Injection of Two Types of Fabrics

During the material exploration, the open mesh performed favorably. I realized its open web material property allowed the foam to dry faster. However, with both fabrics I experienced shrinkage in the foam. The occurrence appeared days after injecting the foam into the fabric forms. I suspected the material had not fully cured.

Additionally, the mockups contained areas where the foam leaked through the fabric. I questioned whether or not I over filled the textile with foam. I used a needle to puncture a hole in a foam injected fabric mockup. Once I removed it, I heard air expelling from the hole and noticed the needle was wet. The foam dried from the outside to the inside. Since the outside cured first, air did not reach the interior to solidify the material.

After finalizing the fabric choice and troubleshooting some of the fabric filling technique, I designed a system for the foam injection process. It allowed for the fabric to be concurrently foam injected and formed around a glass vase (see Figure 32). The first full-scale vase cover mockup demonstrated an extremely successful outcome. It displayed great promise for the approach and consisted of minor flaws. Thus, I incorporated the mockup fabrication steps into the process for the final forms.



Figure 32. Foam Injection Around a Glass Vase

Fabrication

I followed a step-by-step strategy for the fabrication of the *Shorty-Fat* vase covers. I devised a plan from all I learned during the mockup phase of the project. The strategy included a two part procedure. I completed all of the sewing. Then, I proceeded to the foam injection process.

Previously in the *Cocoon* project, I measured out each point. This was overly time-consuming. For all projects I later produced, I designed a laser cut cardboard template to aid me in drawing fabric manipulation patterns onto fabrics (see Figure 33). The guide helped to expedite the hand sewing portion of the projects.



Figure 33. Laser Cut Cardboard Pattern Template

The sewing portion of the *Shorty-Fat* vase covers utilized both manual and machine sewing applications. On the fabric, I used my template to draw a diagram of the

pattern. Then, I hand stitched it to create a specific sewn modification technique (see Figure 34). I machine sewed the altered material to form a pouch that had a connecting zipper on two sides (see Figure 35).



Figure 34. Hand Stitching Fabric



Figure 35. Machine Sewing Pouch

The zippered sac required preparation before the foam injection occurred. Plastic tubing was inserted into holes on the pouch's bottom. I cinched the tubes to the fabric with metal clamps (see Figure 36). These tubes supplied an entrance for the foam to be injected into the fabric.



Figure 36. Clamping Tubes to Pouch

I moved forward with the foam filling process after completing the sewing and adapting the fabric for the injection approach. I lubricated a glass vase, which the textile sac slipped over (see Figure 37). The plastic tubes connected to the pouch were inserted into the holes of the fabrication table. I capped the glass vessel with a customized lid and

clamped it down to the injection assembly. After turning the apparatus upside down, I filled the fabric slip with canned polyurethane spray foam. I waited a week before I removed the form from the device. The time allowed for the foam to fully cure. As a result, this insured the fit of the glass vase into the fabric vase cover.



Figure 37. Textile Sac Slipped Over Glass Vessel

Analysis

Fortunately, I entered into the project with the plan to construct several smaller furnishings. The scale of the objects I sought to produce for the *Shorty-Fat* series were appropriate for the manual foam injection process of fabrication.

The design embraces the spontaneity of the combined elements and construction process. Giving up control and letting the material properties drive a large portion of the work contributed to each vase being one-of-a-kind. Even if the fabrication steps are

identical, the physical components and environmental variables directed the formation of each vessel.

Functional sculptures developed from the research of the *Shorty-Fat* project. The vase covers innately evolved from my manner of working. I gained insight for the design development from my extensive investigation into the material properties, their limitations, and their capabilities. Thus the materials drove the concept, approach, and form.

Beekeeper

Approach

I entered into the *Beekeeper* project with the intent to design a bench. However, the idea and final product of a modular stool/bench surfaced from the research (see Figure 38). The designing of the object presented many of the same challenges and sentiments I expressed about my previous projects. For instance, I started by questioning where the form emerged from. For the upholstery, my previous fabric manipulation mockups guided me in determining which technique to further examine. I consistently reevaluated the fabrication process for the structure of the bench. The questioning of the construction method arose from my choice to contract the work out. This decision changed the course of the project's development but strengthened the design visually and conceptually.



Figure 38. Beekeeper Stool

I merged digital production practices with handmade construction. This qualified the categorization of the design to shift from one-of-a-kind to replicable small batch production. I aimed to achieve balance between the two ways of making and accelerate the fabrication. I desired to retain a hand crafted visual appearance instead of sterile machined characteristics. Therefore, I constructed the stool base digitally and the upholstery manually.

<u>Precedent Studies - Furniture</u>

Inga Sempé's *Ruché* sofa stood out as an applicable precedent for the *Beekeeper* stool. At this point in my development as a designer, I looked to fuse technology more with the handmade aspect of my work. The *Ruché* sofa was comprised of a quilted

upholstery throw attached to a linear wood frame (Gross, 2012). From the study I recognized the potential of balancing the handmade with other easily reproducible methods of construction. In the case of the *Beekeeper* stool I incorporated CNC milling, fiber glassing, hand-stitching, and machine sewing techniques.

The question of how my products could be produced in a manufacturing setting was constantly posed to me. In 2012, *Dwell* magazine conducted an interview with Inga Sempé (Gross, 2012). From the article I drew insight into the future possibilities of my work and its feasibility of manufacturing. During my previous projects, hand sewn fabric manipulation techniques required an enormous amount of time for construction. *Dwell* author Gross (2012) discussed how the team at Ligne Roset helped to automate Sempé's sewing process by developing a flatbed machine that creates 2,008 stitches for the upholstery of the *Ruché* sofa. The study allowed me to reference Ligne Roset's manufacturing process for the *Ruché* sofa as evidence for the potential of larger scale production of my designs.

Sketches

At the start of the project, I hand and digitally sketched bench structures embodying the appearance of being light and airy. I considered that a frame with clean lines would be less distracting from the fabric manipulation technique. Additionally, in my drawings I addressed how the upholstery visually connected to the structure and the overall composition of the design (see Figure 39).



Figure 39. Upholstery's Connection to the Structure

My digital drawing investigation took place early on and continued into the mockup and fabrication phases. As I progressed in establishing the form, the sketches changed drastically (see Figure 40). Once I recognized my chosen fabric manipulation technique as inspiration for the form, I stopped drawing general digital representations of form. My mental image of the bench transformed from a broad shape to a relevant form captured by the upholstery and infused into the structural composition.

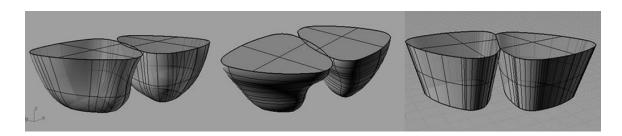


Figure 40. Digital Sketches

After I finished hand and digital sketches of the final proposed modular stool, I sculpted a scaled model of the product. I created the model from polystyrene and felt (see Figure 41). The physical sketch informed my understanding of the full scale version of the *Beekeeper* stool. From the model's construction, I obtained insight on possible fabrication methods and the stability of the stool's base.



Figure 41. Polystyrene Model

Mockups

The fabric manipulation technique required multiple tests to determine the scale and volume for the upholstery. I strived to achieve an upholstered surface characterized by volume and depth, yet comfortable. I chose to further my study of the *Honeycomb* sewing pattern as demonstrated in the text *The Art of Manipulating Fabric* (Wolff, 1996). The surface's highlights and shadows achieved from the fabric sewing method attracted me to implementing the pattern into the *Beekeeper* design.

Eventually, the upholstery pattern scale was determined after constructing the stool's frame. The pattern's configuration varied depending on the appropriateness of the

honeycomb size to the base and the amount of volume desired for the fabric. I opted for a microfiber textile. The fabric appealed to me for the project because of its malleability of soft shapes. However, I found it necessary to line the textile with felt in order to achieve resiliency and fullness in the upholstered surface (see Figure 42).



Figure 42. Textile Lined with Felt

Fabrication

I sought to create a sense of wonder and new applications through my material selection and fabrication. I devised a magnetic connection between the cushion and the top of the base. The attachment consisted of pocketing magnets to the underside of the cushion that attached to a steel structure. I considered painting the steel base, so the connection was less apparent. However, my journey of fabricating the steel structure redirected the path of the construction process.

I designed and fabricated my previous projects. For the *Beekeeper* stool I undertook a divergent construction path. I elected to experience how a project evolves

when a designer contracts some of the labor out to skilled crafts people. Still, I hesitated because this meant I possessed less control over the project's construction. Later, I understood the ramifications of it influencing other fabrication aspects, such as the production timeline.

The 3D drawing created in Rhino supplied me with images and construction documents for the *Beekeeper* stool. I brought some of the digital renderings and detailed sketches to a local fabricator. The company mainly dealt with metal work for HVAC systems and sold steel to retail customers. The fabricator provided a cost estimate, and it fit within my budget. They received all the templates I CNC routed for them to use during the fabrication (see Figure 43). I was led to believe the company had the means and skills to perform the work. Unfortunately, the business dragged their feet on my project, only to let me know three and a half weeks later that they did not have anyone skilled to do the type of craftsmanship needed for the project. It seemed as though the employee who quoted me felt comfortable proceeding with the fabrication for the stool. However, the manager relayed the news to me that it could not be done. I understood the entire ordeal to mean the business had no time for this type of project, and did not want to be held responsible for any manufacturing issues. This interaction only reinforced my fear of relying on other fabricators to complete tasks.



Figure 43. CNC Routed Templates

Although my experience with one maker proved to be frustrating, I searched for another fabricator. By this time my project had been set back by almost a month. I scrambled to find someone else. During my second attempt, the craftsman I located explained precisely how he would construct the form. He communicated his confidence in completing the project. In spite of the promising outlook, the job completion date was not realistic for me to finish the project. After the fabrication of the stool, I still needed to configure and produce its upholstery.

I returned to evaluating my options for building the stool myself. The little welding experience I possessed of working with 22 and 24 gauge steel, meant I'd spend more time troubleshooting fabrication issues. Ultimately, I questioned the relevance of steel and its fabrication to my design. I reflected on the material's relevance to my concept and to its appropriate pairing with the chosen upholstery fabric. In turn, I

concluded the visual texture characteristics and possibilities of using fiberglass more relevant than fabricating with steel.

The construction of the base entailed CNC milling foam and fiber glassing over it. I routed multiple two inch thick foam layers for the stool (see Figure 44). The material thickness determined the height of these sections. This resulted in the stool containing seven specific foam layers. One by one, I glued and stacked the parts (see Figure 45). Once dry, I applied dry-wall compound to the form and sanded it smooth (see Figure 46). I repeated the step three times to insure a sealed surface. Next, I fiber glassed over the compound by laying down the glass and working a resin into the material with a brush and plastic roller (see Figure 47). Though I previously constructed my Cocoon chair from fiberglass, I adapted an alternate approach for the stool. I experimented with colored pigment for resin to achieve a grey finish. I employed a traditional fiber glassing method for the Beekeeper construction. However, I deviated from the standard approach by sandwiching a sheet of steel between the seat's fiberglass layers. The inclusion of the steel of 22 gauge steel fulfilled the function of connecting the magnetized cushion to the seat. The hidden network of the magnets and steel created a sense of wonder about the attained physical stability of the cushion to the fiberglass form.

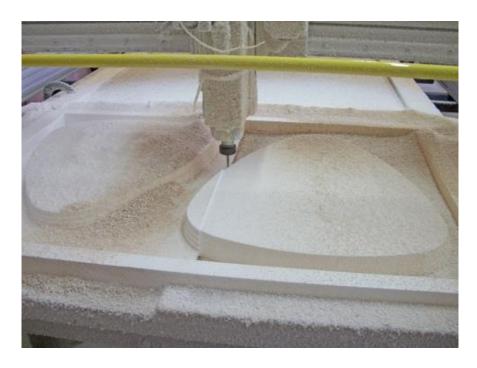


Figure 44. CNC Routing Foam Layers



Figure 45. Gluing Foam Layers



Figure 46. Applying Drywall Compound



Figure 47. Rolling Fiberglass onto Surface

The upholstery portion of the design consumed most of my fabrication time. I fine-tuned details relating to the connection of the cushion to the seat deck, the rolled tapered edge of the cushion, and the height of it in relation to the overall stool. The hand

stitching of the *Honeycomb* textile manipulation technique was extensive due to the size of the cushion and pattern (see Figure 48). After completing the manual sewing process, I made a mockup of the cushion with scrap fabric (see Figure 49). This guided me in determining the exact sewing dimensions for the top and underside of the cushion, in addition to the construction measurements of its waterfall edge. From the templates, I drew and cut the components of the cushion's fabric. I sewed the parts together, leaving enough room to insert a one inch thick bed of foam. Then, the opening of the cover was hand sewn shut. I finished the cushion by pocketing rare earth magnets into the underside of the cushion.



Figure 48. Sewing Honeycomb Technique



Figure 49. Mockup of Cushion

Analysis

The early digital modeling exploration distracted me from focusing on how to define the form of the object. Sketching with a pen and paper required me to contemplate a method of drawing the object three dimensionally on a flat surface. On the other hand, I found the computer digital modeling program enabled me to easily realize three dimensional objects and draw in 3D space. I felt the manual drawing process depended more on my critical thinking and justifying the form through my research, while the digital sketching mentally distracted me from developing a research justified design. I believe I attempted the digital process too early in the conceptual phase. Thus, in the beginning my approach turned into a very mechanical manner of designing instead of a conceptually thoughtful path of creating the product. Nevertheless, I figured out the appropriate moment to use the tool later in fabrication of the of the *Beekeeper* stool.

I learned a great deal from my experience with contracting out some of the stool's fabrication. First, even if an employee of a company says they are capable of completing the task, ask a higher level of management to confirm the job. Also, less control over the fabrication means possible longer lead times. In the future I will need to allow for at least double the amount of time for someone else to produce the product. The length of time may be extended, but the cost of materials would be less. There is less room for error on the fabricator's part in the project. In the end, the stool benefited from the inquiry because the failure of contracting the steel work out brought about a much more successful material solution.

Thesis Exhibit: Fabricating Form

Approach

My exhibit objectives transitioned from a grand production to a challenging yet attainable showcase of my work. The amount of time, labor, and resources were not available for an extravagant exhibition. I directed my search to a modest exhibition space.

The organizers of the Elliot University Center (EUC) Gallery at University of North Carolina at Greensboro approved my *Fabricating Form* exhibit proposal for their space. The location was already conducive to presenting my amount of work and the scale of the projects. Additionally, the organizers equipped the space with lighting, security, and setup for opening night. I felt extremely fortunate to have worked with the university and its curators on my exhibition.

I utilized every aspect of the exhibit area in order to communicate my journey as an artist and designer. I went through several iterations of space planning for the showcase. During the design of the interior, I searched for an emotionally-engaging visual language that I longed for in the beginning stages of the exhibit planning. To achieve the effect, I painted the title wall of the exhibit a bold yellow (see Figure 50). It coordinated with other brightly colored elements I arranged in the space. I demonstrated the importance of process to my research in both printed and digital formats. The scale of each work, the aspects of each I wanted to highlight, the size of the space, and ease of access influenced the placement and size of the custom built pedestals. Overall, I strived to create an interior that professionally unveiled the work and its story, my story, to the community (see Figure 51-52).



Figure 50. Yellow Title Wall



Figure 51. Fabricating Form Exhibit Artist Talk



Figure 52. Fabricating Form Showcase

<u>Precedent Studies – Fashion & Furniture</u>

I referenced both fashion and furniture precedents for the development of my exhibition. I searched to find a visual overlap of the two genres which I hope to infuse into my presentation. I found the environments of Alexander McQueen and Chanel to be profound in transforming the space of their runway shows. However, the monetary scale and size of such a space seemed unrealistic for my first exhibit, which I coordinated and produced alone.

I continued to dissect the precedents by focusing on elements important to the visual impact of fashion and furniture design exhibitions. I discovered the introduction of dramatic lighting, bold color, and graphic text as key aspects in the transformation of the presentation areas. McQueenworld (2012) posted online at YouTube, the McQueen Autumn/Winter 2012 runway show. The exhibit breathtakingly transformed an environment into a forest, where the audience disappeared into the setting, and the models emerged from the shadows onto a brilliantly illuminated path. At the Salone Internazionale del Mobile di Milano 2011, Area Declic (2011) staged the company's furniture design exhibit around color saturated walls with high contrast fonts. During Milan Design Week 2008, the Superstudio project title was presented on a long exaggerated wall with oversized text (Core77, 2008). They achieved a stunning display through the exaggeration of color, font size, and the length of the wall.

Sketches

I digitally plotted the floor plan from measurements I took of the EUC Gallery. I created several layout options (see Figure 53). During planning, I considered the flow of

the space, the lighting, scale of the exhibit objects, location of power outlets, and interior obstacles. There was only one doorway for entering and exiting. The doors opened into the space. I marked the area they occupied as unusable. The size of the gallery limited the number and position of the power sources. The placement of the products depended on the scale of the works along with the walking clearance necessary within the space.

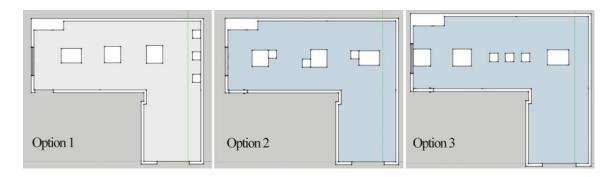


Figure 53. Exhibit Layout Options

Mockups

I strategized the presentation of my process work by creating multiple digital versions of the possible display. The development of the options afforded me the opportunity to preview and critique the potential layouts and graphics of the process imagery. Some of the most significant pictorial documentation varied in resolution. The colored photos emphasized the difference in the clarity of the photographs. Therefore, I tested converting all of the images to black and white instead of color. First, I configured the stills in a black and white color mode. Then, I placed a color wash on the images. I conceived coordinating the color washing of each project's picture series with the specific hue of each work's information label. I wanted the technique to act as an

indicator for the audience to quickly match specific process imagery to the related work. However, some color wash hues distorted the photographs. I determined the presentation of black and white process pictures to be more successful than their color counterparts, avoiding distractions from the displayed products. The process photos acted as secondary informational components of the exhibit.

Fabrication

I chose to move forward with constructing the *Fabricating Form* exhibit elements necessary to successfully complete the layout of my option 1 sketch (see Figure 53). Many tasks needed to be completed before the installation date. The undertaking required transforming the interior with custom-built displays, visual imagery, lighting, color, and sound. I resolved any issues and made many decisions during the fabrication process.

Early on, I addressed several items for the exhibit and its opening. The opening reception for the exhibition was advertised several weeks before the event (see Figure 54). I designed postcard and posters, which I displayed on various UNCG communication boards and in local artist social hotspots in Greensboro, NC. Additionally, I created a digital invitation that I sent via an email blast to all of my contacts. Other important steps in the setup operations consisted of painting the title wall several days ahead and preordering vinyl lettering for the wall and food for the reception.

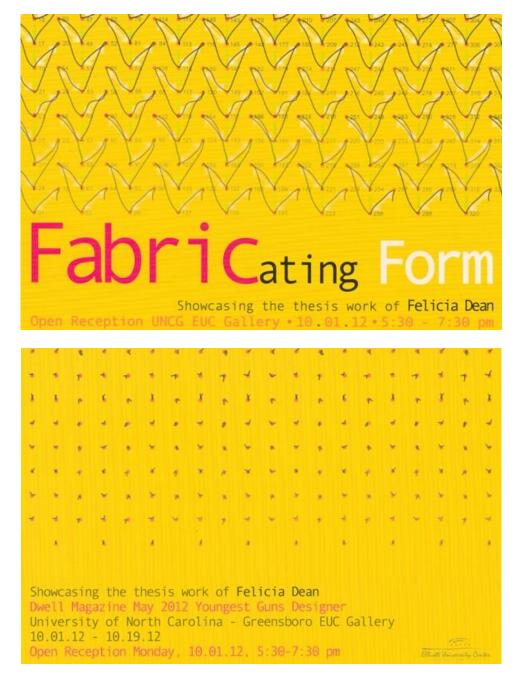


Figure 54. Exhibit Postcard Advertisement

My sketched floor plan included appropriately-sized pedestals for each of the works. Working digitally to create the layout allowed me to determine the maximum

dimensions of the stands for each product. I obtained the pedestal measurements from the plans and sketched cut dimension sizes. The preplanning insured fewer complications during construction. I cut and assembled MDF panels for each platform one at time. I contoured the edges of the pedestals with a router. Then, I patched and sanded open seams and nail holes. Once the filler compound dried, I sanded, primed and painted all seven stands (see Figure 55). Building all of the pedestals for each work involved an extreme mount of physical labor.



Figure 55. Custom Built Pedestals

I incorporated multiple types of visual imagery for the showcase. I printed an artist statement, photographs depicting the fabrication of each work, shots of each piece within an environment, and title/information labels for each object. The sizes and layout

of the process photographs were determined during the sketch phase. I printed and mounted the larger environment photos on foam-core board, while the process images were attached to the walls with t-pins. Instead of applying the pictures to the wall with thumb tacks, I appropriated the use of t-pins because of their significance in sewing and upholstery applications. Instead of using paper, I printed etched acrylic labels using the laser cutter within the department of Interior Architecture at UNCG. Later, I painted the plastic tags to link the process imagery and physical works with corresponding colored labels for each product (see Figure 56).



Figure 56. Color Coordinated Labels

The final preparation activities entailed applying the vinyl lettering to the title wall, setup of the furniture design displays, and positioning the lighting in the gallery. I moved the pedestals to their allocated positions within the space. Next, I situated the video monitor and works of art on their appropriately sized platforms. The showcase of the furniture designs required the lighting of the space to be reconfigured in order to

highlight the works and imagery. Fortunately, the gallery's flood light track system was easily adaptable.

Analysis

The experience I gathered during the production helped me to make design decisions along the way. My previous space planning of the space through my digital sketches directed my organization of the process images on the gallery's walls. I hung all of the process work before introducing the physical designs within the space. This enabled me to move freely within the interior for the exhibition setup. During my experimentation with color washing the process imagery, I realized the technique added too much visual noise for displaying the photographs.

The planning and preparation of my exhibit took many turns during the process of organizing the showcase of my projects. I refined the exhibit based on what I deemed appropriate for highlighting every aspect of the design process, the amount of work, scale of the objects, and the feasibility of executing the presentation in a timely and economic manner. The attributes of the gallery contributed to the placement of all the designs, process work, video monitor, artist statement, and location of the tile wall.

Conclusion to the Collection

All of my works developed from in-depth exploration and analysis that occurred during the design and fabrication stages. I learned the significance of the design process, material research, and concept as it relates to driving the form's generation. I moved past difficult phases within each product's development by creating a self-dialog filled with

the evaluation and reflection of what I had done and my intent. I constantly navigated my design approach between one of art, to one of design. The application afforded me the opportunity to investigate the sculptural form potential of the furniture designs. Thus, the works visually evoked not only a sense of function, but also a touch of emotion. From all the analysis I gained a deeper understanding of what my role as a designer entailed, which was to develop sculptural furnishings from a process tensioned between the innate nature of the materials and my intended design direction.

The journey I experienced while cultivating my collection guided me in discovering who I am as an artist and designer and how I fit into the creative worlds. I recognized the value of expanding my collection beyond chairs and to other forms, whether alternate seating functions or accessories. The variation in scale and subject uncovered the range of applications my design approach possessed. The distinct style and aesthetic that flourished from my research, defined me as an artist and designer.

CHAPTER IV

ANALYSIS

My exploration centered on transferring fashion fabric manipulation techniques into upholstery sewing and patterning methods for generating three dimensional textile forms and surfaces for furniture. The research expanded into a more in-depth examination of sculptural furniture design and fabrication. Processes of material experimentation and research drove the development of the projects. This allowed me to identify links among art, design, analog methods of making, and digital fabrication. These connections were further strengthened by analysis of precedent studies and Craft Theory. All of the realized forms progressed by consistently questioning, analyzing, and evaluating the direction of the designs.

Ultimately, the use of apparel fabric manipulation techniques in upholstery sewing and patterning methods successfully generated distinct three dimensional upholstered forms and surfaces for furniture design. The textile reliefs ranged in volume. My approach integrated the physical, mechanical, visual relationships between the furniture's upholstery system and its structural network. I achieved my intent of moving upholstery beyond a flat plane finishing procedure to a three dimensional design process. Only time will tell if my research will spark new interest in the field of upholstery, lead to a greater realization of the role that skilled people can play in design development, and

the potential for upholstery fabrication as a site for design and innovation for the 21st century and beyond.

I introduced artistic and design methods of making during my design development. My process was rooted in an artist's approach of material experimentation and interactive insight. Thus, my reflection, critical thinking, and physical interaction with the material advanced my understanding of each design's potential. This back and forth dialog I engaged in while analyzing and evaluating my projects and processes afforded me the opportunity to work through problems successfully. Also, I resolved difficulties by fusing my hands-on discourse with digital strategies of production. My incorporation of digital design methods of making into my fabrication enabled me to expedite tooling, patterning, and analog construction techniques. Concurrently, the theoretical tools I borrowed from Craft Theory allowed me to further my design process through the introduction of related artistic presentation and craft production methods.

I questioned the origins of form for all of my designs. My methodology enlightened me on approaches of creating forms that were relative to my design investigation. I felt my own distinct style materialized from one work to the next as I addressed the question of form and its validity to the conducted research. As a result, my knowledge of creating research-based form distinguished my projects and creative identity.

CHAPTER V

CONCLUSIONS

Marketing

After finishing my thesis exhibit, I moved a large portion my research to developing and investigating public relations, marketing and branding business approaches for my product line. I aimed to broaden and diversify my conference, competition, exhibit and press accolades with the business direction for continuing my MFA research. By extending my research to the business and professional context of design, I set a goal to position my qualifications more closely with the tenure track research expectations of academic institutions.

I compiled bookmark listings of exhibits, awards, academic conferences, competitions, and funding opportunities. I made note of the due dates for all opportunities that were relevant to my research. From there I prepared a log of final images of my designs and statements regarding the works. The submission process for all of the opportunities proved to be easier because I previously assembled a design package of each work directly after its fabrication. This enabled me to submit my work immediately, with very little refinement to the application materials.

My ambitious nature, dedication, and strong design work afforded me many exhibitions, awards, and competition placements. I received some of my most prestigious accolades from high profile furniture industry professionals. The first

occurred in 2011. The Furniture Revolution Gallery coordinators, at NeoCon in Chicago, invited me to showcase my *Cocoon* chair in their Herman Miller sponsored showroom. While in May 2012, the same chair was published in *Dwell* magazine. The article highlighted me as a *Youngest Gun*, an emerging designer with great promise. Recently in 2014, I placed first at the Appalachian State University Competition in Boone, NC. The event included judges from Bernhardt Design, Dwell magazine, and Tolleson Saul Design. Additional press, exhibits, accolades and creative scholarship are listed below.

Press

- Home Furnishings Business Media: The Best of High Point The people, products and parties that rocked High Point - University of North Carolina at Greensboro Presents Their Premiere Student Designers, Spring 2012
- IDEC Exchange: Winter 2011
- dsgnWrld: Our Highlights from Chicago's NeoCon 2011, online, June 18, 2011
- Design Applause: Furniture Revolution Gallery. NeoCon 2011, online, June 13,2011

Exhibits

- New, Turchin Center for the Visual Arts, Boone, NC, 2014
- High Point, NC Furniture Market, red egg showroom, 2013
- Phillips Collection Design Competition, Center for the Visual Artists Gallery Greensboro, NC, 2013
- Buyers Market of American Craft, NICHE Awards Finalists Exhibit, 2013
- 100 for \$100, Center for the Visual Artists Gallery Greensboro, NC, 2013
- FABRICating FORM, solo thesis exhibit, Elliott Center Gallery, University of North Carolina at Greensboro, 2012
- Art & Design Student Exhibit, Center for the Visual Artists Gallery Greensboro, NC, 2012
- Process & Assemble, Center for the Visual Artists Gallery Greensboro, NC, 2012

- High Point, NC Furniture Market, University of North Carolina at Greensboro exhibit, 2012
- Sitting on the Edge, Turchin Center for the Visual Arts, Boone, NC, 2011

Accolades

- Penland School of Crafts: Lucy Morgan Scholarship, fully funded, 2013
- NICHE Awards Student Finalist, 2013
- UNCG: Graduate Expo, Creative Arts, First Place, 2013
- WithIt: Student Scholar, conference scholarship, 2013
- UNCG: Richard & Pamela Allen Scholarship, 2013
- UNCG: Lula McIver Graduate Scholars Inclusiveness Scholarship, 2013
- International Furnishings Design Association (IFDA): Ruth Clark Furniture Design Scholarship, 2012
- WithIt: Student Scholar, conference scholarship, 2012
- WithIt: Catherine Frinier and Richard Frinier Scholarship, 2011
- WithIt: Brown Jordan funding, 2011
- UNCG Graduate Summer Research Assistantship Scholarship, 2011
- Bernice Bienenstock Furniture Library Scholarship, UNCG, 2011
- Furniture Revolution Gallery, Invited Exhibitor, NeoCon, Chicago, IL, 2011
- Sitting on The Edge, Appalachian State University Design Competition, Finalist, 2011
- UNCG: Center for Design Innovation Funding, 2011
- Extreme ReDesign Challenge, Top Ten Finalist, 2011

Creative Scholarship

- International Journal of Interior Architecture and Spatial design (ii), student highlight & article, 2012
- AIA: Fashioned Outputs, "Forward 112: Process" by The American Institute of Architects (AIA), July 2012, Authors: Jonathon Anderson, Felicia Dean
- IDEC: Regional Creative Scholarship Finalist, 2011

Conferences

I attended many conferences during my time researching marketing, branding, and public relation techniques. They included the WithIt Annual Conference, Art

Business Institute seminar at the Buyer's Market of American Craft, Southern

Entrepreneurship in the Arts Conference, and the Southeastern College Arts Conference.

At the events, I gained insight into professional practices of entrepreneurship in business, teaching in higher education, marketing strategies, branding approaches, and networking.

The first conference I attended was the WithIt Annual Conference in 2011. Since then I have returned each year with help from the organization's student scholarship for their conference. I have acquired a wealth knowledge, positive experiences, and valuable relationships from my participation. The conferences taught me everything from how to develop an elevator pitch, memorable business card, to a successful resume. The annual event also made me aware of some of the obstacles I would potentially encounter as a female in a male dominated industry and successful methods of handling the circumstances. Above all, I have built and maintained professional relationships which I highly value. These relationships have been extremely influential in my growth as a designer.

My attendance of the 2013 Art Business Institute conference enlightened me on approaches to reach my consumer market. Before the workshops, I struggled with how to market my one-of-a-kind works that fell on the higher end price point of home furnishings. I discovered the potential fit for my works to reach consumers would be through working with galleries to sell my creations, by consigning my works, and through wholesale. I learned that through tradeshow attendance I could gain exposure to agents and representatives who could help to sell my work.

Another focal point of the Art Business Institute was the value of branding. The discussion led by Megan Auman (2013) defined branding in terms of telling your company's story and purpose through visual and written contexts. This included everything from a person's online presence, company name, tradeshow appearances, and marketing materials. The conference panel pointed out the importance of artists and designers emotionally engaging with consumers through their branding.

The topic of emotionally connecting to your audience was reiterated in presentations at the Southern Entrepreneurship in the Arts Conference (2013). Panelist Annette Dunlap (2013) discussed how as an artist you are not only selling your product, but you are selling an identifiable and relatable you. In other words, you are your brand, the face of it, and its representative. Dunlap explained the means by which you promote yourself range from paid to free methods, such as through having a social media presence. Additionally, she noted that in order to market your work, you must know the message of your work and deliver it effectively.

All of the conferences stressed the importance of social media to build a brand. Some of the social media they referred to included Facebook, Twitter, Instagram, blogs, and personal websites. At the WithIt Conference, Danielle Hatfield (2013) spoke about tools to increase your social media presence. One tool she identified was an online service which links all of your social media for the purpose of posting to each simultaneously. I felt relieved once I discovered how to streamline my use of social media. I know one of the most exhausting aspects of using the online sites for branding was the enormous amount of time it entailed for posting to the numerous pages.

The Southeastern College Arts Conference (2013) included lectures on methods of successfully producing your artistic works for profit. Brenda Smith and Dr. Collins (2013) were two of the speakers at the conference's presentation, *Evolution of Art and Craft as a Viable Profession*. Smith elaborated on how she has attained success as a jewelry designer by paring with a collaborative and networking through competitions. On the other hand Dr. Collins touched on design licensing and showcasing work through retailers. The conference allowed me to learn from the experiences of others to aid me in developing a rewarding path for myself and my design work.

Business Card Design

I created and refined my professional business card, logo, portfolio, elevator pitch, brand, image and website as part of my investigation into marketing, branding, and public relations for my collection. Branding for my business card, logo, elevator pitch and website changed numerous times. I based the revisions on how clearly and unified each method identified my brand and design work to the public. Also, I improved my branding based on input I observed from the public's perception of the marketing materials. For example, I noticed a large portion of people could not decipher my logo on the second rendition of my business card. Thus, I removed the abstraction from the logo design and refined its legibility (see Figure 57).

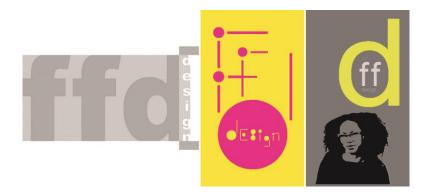


Figure 57. Design Evolution of Personal Business Card

Internship

In the summer of 2013, I completed an internship with *red egg*, a furniture and home accents company in High Point, NC. The opportunity provided me hands-on experience within the home furnishings industry from an entrepreneurial perspective. My job entailed creating digital and print marketing material, updating the company website, assisting during photo-shoots, and arranging the showroom for the High Point, NC furniture market. I learned about the rigors of working with manufacturers locally and abroad. In addition, I acquired knowledge on the inner workings of what it takes to run and own your own small business. The experience allowed me to evaluate my future entrepreneurial practice plans and in what capacity I will explore them.

The opportunity to focus on the commercialization of my products expanded my academic and professional explorations. The exploration included many challenges along the way. Some of the difficulties pertained to the cost of conferences and exhibiting, the amount of application materials needed for competition submissions, and the time it took to build and constantly revise my brand. I attended many local

conferences because the cost to visit locations requiring overnight stays was not conceivable for me without proper funding. Once you add the cost of the number of nights at a hotel, transportation, and meals, the expense easily reaches over the thousand dollar mark. I endured the same challenge for exhibits. Even though I understood the monetary implications of exhibiting beyond the local level, I submitted my work to as many exhibit proposals that I could complete.

Penland School of Crafts

As my collection developed I questioned how I could move my process from labor intensive one-of-a-kind methods of making to an approach that streamlined fabrication but still embodied a sense of the handmade. I brainstormed the idea in order to discover other disciplinary and trade processes that existed outside of furniture design. Previously, I considered exploring millinery hat-making process and materials. I reevaluated the millinery reference based on the ability to reproduce the hand-made hats. My primary goal was to conduct research into the millinery processes and materials to determine their potential to transfer over to methods of producing furnishings and sculptures. My investigation revealed significant and relevant possibilities of assigning millinery methods of working with felt, straw, and wood in my own making and design processes for furnishings, lighting, installations, and accessories.

Penland School of Crafts conducted a millinery summer workshop, which I received a scholarship to attend. The timing of the studio with my interest was perfect! In the course, I completed seventeen hats in two weeks (see Figure 58). I learned how to shape felt and straw over wooden hat forms called blocks. Instructor Wichern (2013)

guided me in learning how felt was steamed and stretched over a wood hat block, then tied down so it conformed to the wood form (see Figure 59). Instead of steaming straw, the material was sized with gelatin, shaped over a wood hat block, and cinched over the form (Wichern, 2013). Once dry, the fabric molds were removed, trimmed and finished with embellishments (see Figure 60). I shaped multiple hats on the same block over a day's time.



Figure 58. Millinery Work Created at Penland



Figure 59. Hat Shaping Process



Figure 60. Hat Finishing Process

The turning point for me happened when I experimented with using parts from various wood blocks to create my own designs (see Figure 61). From this exploration emerged the understanding of creating my own wooden blocks for forming felt and straw for various home accent, furniture designs, and installations. I realized the potential of

the process to produce volume, form, and some rigidity in the final products.

Additionally, I identified the sculptural quality of the hats I produced from the merged hat block sections (see Figure 62).



Figure 61. Stacking of Wood Block Forms



Figure 62. Hat Form Produced from Stacking Process

Drift

The knowledge I acquired from the millinery workshop directed my research for the *Drift* series. I created wooden forms that could later be used to shape felt (see Figure 63). The forms were made to be modular (see Figure 64). The modularity of the blocks allows for variation amongst the final forms. My intent was to develop a series of lighting products from the process. However, during the process of making I realized the potential of the blocks to be stacked sculptures (see Figure 65-68). In order to create them, their organization needed to be different from those used with forming felt. When the blocks were used as wood sculptures, their composition could be much more exaggerated because it was not restricted by its interaction with another material.



Figure 63. Custom Wood Form for Shaping Felt



Figure 64. Modular Wood Blocks



Figure 65. Drift 1



Figure 66. Drift 2



Figure 67. Drift 3



Figure 68. Drift 4

The *Drift* series is only the beginning of my research of transferring millinery processes and materials into fabrication methods for interior products, installations, and sculptures. I have already begun research into digital fabricating wooden replicas of the individual parts that I sculpted on a lathe. The amount of research I have obtained from the *Drift* investigation seems to be limitless.

Future Research

My future approach will be to merge handcrafted techniques with digital methods of fabrication. From my research I have found that by developing an interplay between manual and digital processes for product design, a warm aesthetic emerges from the forms. This is where the digital processes have the potential to engage the user with an

emotional connection, which adds value to the design. Through experimentation with design processes I aim to investigate other digital methods that bring a similar essence to my works.

Digital fabrication for me goes beyond the machinery being a tool for design.

Creativity is not solely operational, rather it stems from imagination. I believe challenging the capabilities of digital machines and fabrication will allow us to uncover design methods not yet realized. Instances of "operator error" during digital tooling processes could be exploited to manufacture digital designs with a "human touch". Our manual mishaps that create so called "failures" could be used to our advantage in a way that we are able to integrate a humanistic quality into the design.

The root of my research will investigate the potential of a back and forth examination of analog and digital processes to develop furniture, installations, and sculptures. My hands-on and experimental approaches to research have provided me valuable feedback about the advantages and limitations of numerous materials. On the other hand, my future integration of digital fabrication methods will provide the opportunity for my manual explorations to be replicated and streamlined for small batch production. By combining the techniques, I strive for my future works to fully embody a spirit of craft, art, and design.

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APPENDIX A

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APPENDIX B

PROCESS OF ALL PROJECTS

Cocoon Process

Design Development

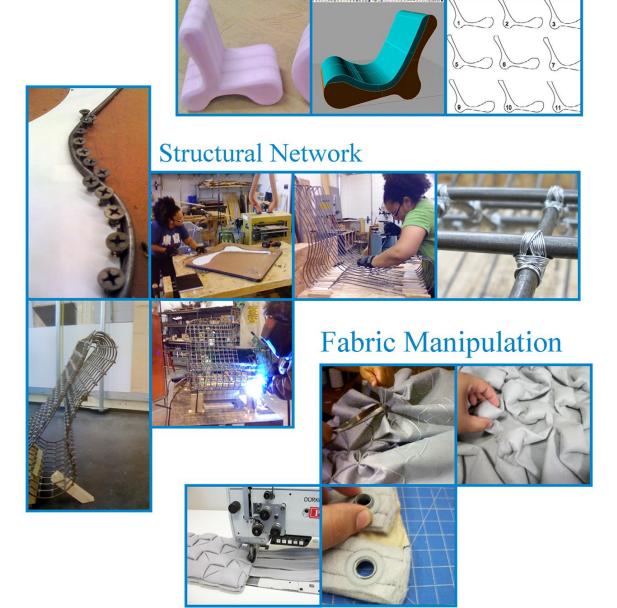


Structural Network



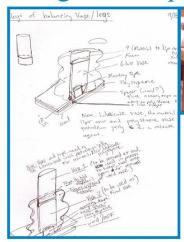
Knotty Process

Design Development



Shorty-Fat Process

Design Development





Fabric Manipulation







Structural Network



Beekeeper Process

Design Development

