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# Eco-Cosplay: Upcycling as a Sustainable Method of Costume Construction

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Eco-Cosplay: Upcycling as a Sustainable Method of Costume Construction

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**Abstract**

This research addresses sustainability in the apparel industry from the specific perspective of repurposing materials for use in costume development. Repurposing discarded materials, also referred to as upcycling, is examined as a viable approach to waste management and evaluated for its impact on sustainability in apparel and textile production, especially in relation to costume development. Current issues in sustainability in the apparel industry that are a focus for this research include waste from production as well as post-consumer waste. The project includes the design and construction of two costume pieces based on a style of costume known as cosplay. Cosplay is a subculture of costume enthusiasts that dress up to resemble one or more characters from a fan universe. The rise of popularity in cosplay contiguous to upcycling is one reason the project combines the two concepts. Secondly, cosplay costume development can repurpose materials beyond textiles, such as plastics, glass, metal, and wood. Finally, many cosplay hobbyists may have budget constraints that can be resolved by purchasing materials to upcycle from resale stores. Resale stores are a source of materials because the maintenance of the discarded materials removes a portion of cleaning from the project. Results of the research are the conclusion of the efficacy of upcycling in costume development as an approach to waste management, the assessment of the aesthetic quality of upcycled costumes, and useable guide for cosplay participants to follow with the intention to utilize as much repurposed or upcycled materials as individual skills allow.

*Keywords:* cosplay, sustainability, upcycling, fashion, subculture

## **Introduction**

Between 2011 and 2016, the terms “upcycling” and “cosplay” have separately had an increase of more than 60% in Google searches (Google trends, 2016). While both rise in popularity, it is possible that the individuals interested in upcycling will also have interest in cosplay. The words are distinct in their definitions and range. Upcycling refers to reusing or repurposing discarded material to create a valuable product, and cosplay refers to dressing in costume as a character (Bond, 2012). Participants in cosplay have shown an affinity for repurposed material. If cosplay culture were to embrace an environmental mindset, like the one behind fashion upcycling, the current strategy for management of textile waste would extend into other recyclable materials, such as plastics, glass, and wood, with a growing population of participants. Cosplay is often built with materials beyond textiles, such as plastics, glass, metal, and wood. Compared to the practice of upcycling, which mostly repurposes textile waste, cosplay participants would be repurposing a wider breadth of post-consumer waste categories. As the population of cosplay participants grows, upcycled cosplay costumes could potentially present a viable approach to waste management. One goal of this project is to develop a useable guide for cosplay participants to follow with the intention to utilize as much repurposed or upcycled materials as individual skills allow.

To represent the plausibility and efficacy of upcycling in cosplay costume building, this project will consist of two full costume designs that will encompass popular, but challenging, components found in cosplay pieces. The cosplay costumes will be created from source material that is mostly repurposed or recycled. The costumes will be demonstrative of the possible results upcycling and cosplay could yield. The process of building the costumes will provide guidance and suggestion for early adopters. Cosplay participants are likely to embrace upcycling as a

primary material source due to the lower price of used materials and the creativity needed for the challenge. The practice of upcycling in cosplay likely stems from budget constraints, as cosplay is most often practiced as a hobby and therefore funded by an individual's discretionary budget (Donellen, 2014). When given the choice to buy a completed cosplay piece for \$50, or replicate the piece for \$5, a cosplayer with limited funds would likely opt for the cheaper option that requires more effort. Another reason cosplayers may choose to build their own costumes is that this aspect of the hobby is the most enjoyable for them. Many cosplay culture participants will take commissions for cosplay props, pieces, and full costumes. In this situation, the costume builder would not wear the costume, and therefore the motivation to participate in cosplay is not isolated to the act of dressing up, but from the enjoyment of building cosplay costumes. Therefore, the scope of the effects of this project has the potential to influence waste management internationally, wherever there are cosplayers.

### **Literature Review**

Due to the present lack of scholarly references to cosplay, information and conclusions about cosplay are based on personal attendance to comic book conventions and participation in the cosplay community. As cosplay continues to gain western popularity, more academic sources are likely to become available. All descriptions listed are based on anecdotal experience; however, the inferences are necessary to understand the purpose of the project.

### **Cosplay**

The creative work of this project is the building of two cosplay style costumes. Cosplay is a combination of the two words costume and play. Most often, cosplay describes either a costume piece or the act of portraying a character while in costume. Costume pieces titled cosplay are usually representations of a character from popular culture, most popularly comic

books and movies based on comic books. For this reason, cosplay participants, called cosplayers, will most often cosplay at comic book conventions. As the number of participants expands, the conventions have become broader to accommodate the varying interests of attendees. Common events at conventions include gaming, video games and tabletop gaming, live-action role-playing (LARP), and historical costume and battling. Gaming hobbyists who cosplay will often dress as video game characters from online games or platform games, such as World of Warcraft or Legend of Zelda. LARP participants are more likely to dress in costume outside of conventions than other groups. LARP is a type of game based on popular tabletop games like Dungeons and Dragons. Depending on the LARP group, participants cannot participate in a game unless they are dressed in costume. Costuming in LARP expands from medieval style clothing and game plots into post-apocalyptic styled costume. Historical costume enthusiasts, such as civil war reenactors or Renaissance festivalgoers, will also participate in costume play outside of conventions. However, their presence is growing within the convention community. Medieval costume hobbyists with full knight's armor and sword fighting matches are common at larger conventions. These styles of costume influence cosplay through building techniques, but cosplay still is more likely to be used to describe a costume that is based on one or more pre-existing characters from movies, television shows, web comics and comic books.

Within the subculture of cosplay, several unofficial terms describe different styles of cosplay. Gender bender or Rule 63 cosplay is a women's costume based on a men's character, or vice versa. Mash-up or crossover cosplay is a single costume that consists of two or more characters that may or may not be from the same source. An example of this would be a cartoon princess crossed over with space-fiction style clothing, resulting in the colors and hair of the princess but with a garment silhouette and accessories attributed to space adventure. Original

cosplay is a term used to describe either a character that does not exist in a specific source universe, but created as a character that would be part of that universe, or a completely original character with no source. The costumes created for this project will be completely original cosplay to avoid copyright and trademark issues. A faction of cosplay culture is based on accuracy. These participants are called “purists” by fellow cosplayers, and most often, they will reject that the different styles of cosplay listed qualify as cosplay. Although these cosplayers would be dissatisfied with the originality of the costumes in this project, their needs are still important to the construction process. A wider acceptance of original cosplay designs in the US is possible as the television series “Cosplay Melee” is viewed by cosplay enthusiasts. The show features cosplayers building original costumes in the style of and inspired by cosplay in a design process similar to that of this project.

One significant obstacle to the exclusive use of repurposed material is distinct cosplay personalities. The purists previously mentioned maintain that straying from even the correct type of fabric will degrade the costume. These cosplayers strive for accuracy over aesthetics. The challenge of accuracy will be implemented into the design of the costumes so that the experience of material searching sufficiently emulates that of a purist cosplayer. If a cosplayer has a costume that calls for crepe silk in crimson, it is unlikely they could easily find such a precise fabric in a thrift store. Thrift stores are retail locations that exclusively sell products that have been used then donated, often as an alternative to trashing the items. Since thrift stores are a common place to find usable, recycled textiles, they are an ideal main source of material for this project. Post-consumer waste that is discarded as trash would most often need to be cleaned more thoroughly than the waste discarded through donation, and would require specialty cleaning equipment, so reclaimed waste will be a limited source, if not avoided.

### **Sustainability and Upcycling**

The cosplay community is only one group of creative hobbyists that may purchase materials from thrift stores. Though it cannot be determined what purchasers do with products from thrift or resale stores, revenue in the US of \$16 billion (NARTS, 2016) from such stores suggests that it is a mainstream market. Evidence of fashion upcycling for casual wear can be found on internet blogs and websites like Pinterest. Bloggers that redesign clothes purchased from thrift stores or repurpose items from their home are becoming popular, with one such blog maintaining over 300,000 followers on social media (Recycled Crafts, 2016). Pinterest, a site with links and images to various other websites, is a common place for crafters to find inspiration and instruction. A search for upcycling will bring up a seemingly endless list of blog links, projects, and guides for the activity. While internet blogs and Pinterest projects concerning upcycled clothes purchased from thrift stores become more abundant, a trickling up of the style may be influencing the runways.

The polysemantic trope “fashion repeats itself” can now describe a revolutionary wave of repurposed fashion. In the fashion industry, the terms “trashion” and “upcycling” have existed for over a decade now (Hart, 2006), but the number of runways showcasing the unique material sourcing is limited. The word trashion, similarly to cosplay, is a combination of two words: trash and fashion. The difference between trashion and upcycling is that upcycling often refers specifically to redesigned textiles and can also include jewelry, furniture, and decorations. Trashion is more likely a label applied to a garment that may or may not be wearable that is created with unusual, visibly discarded material, such as cardboard or plastic bottles. Both terms can be used to describe garments or accessories made of repurposed or recycled materials. While

the United States produces close to 500 pounds more municipal waste per capita than the United Kingdom (Lacey, 2013), the concept of upcycling is much more popular in the UK.

A possible reason that upcycling and trashion are not as common in the US is that there is less mainstream media representing the concepts. However, the US show *Project Runway* provided an example of trashion in an episode in which challenged competitors to design and create garments from waste materials, rather than the usual high fashion fabrics used on the show (Hart, 2006). In the episode, the participants faced the challenges of limited useable materials and dissonance in their design and their products. Waste Management purchased the final dresses and donated them to promote environmental conservation. While Waste Management accomplished the important goal of raising awareness, a more significant impact would be to influence the general population to repurpose material and dispose of used items with more discretion.

The current representations of upcycling and trashion are not as applicable to hobbyists as they could be. Aside from being featured on television shows, upcycling and trashion can be popularized as a conduit for political statements. Fashion shows highlighting upcycled clothing are funded and presented by resource management councils (Hart, 2006). These items are closer to art pieces than functioning garments, which may disconnect the practice from the feasibility of massive populations participating. The blogs mentioned earlier present clothing repurposing that a larger demographic can utilize, and a product that can be used by an individual more than once for practical purposes. The limit of exclusive textile upcycling is visible when comparing casual wear to the diverse materials in runway fashions. Cosplay allows for the diversity of medium found in high fashion, and the use repeatability found in the upcycling blogs. Still, the issue of textile waste in the fashion industry needs to be resolved. The brand H & M has started a



program titled “closing the loop,” in which they collect used garments and repurpose the fabric or the yarns to create new clothes. Currently, they use 20% of the collected garments. However, their intent is to reuse 100% of the garments turned into the program (H&M, 2016). The final goal is for all fashion producers to reuse fiber rather than allow textiles to occupy municipal landfills.

In the US, about 5% of municipal waste is post-consumer textile waste (PCTW), with a projected 35.4 billion pounds to be sent to landfills in the year 2019 (Council for Textile Recycling [CTR], 2009). Cosplay costume building could remove waste from textiles, but also plastics, metal, glass, and cardboard paper waste. This means that up to half of the materials in the US considered waste could be reconsidered as supplies for costumes. The average American consumes 70 pounds of textiles a year, and discards all but 10 pounds (CTR, 2009). Costume building could repurpose the excess weight, plus other municipal waste. Although individual waste is inevitable in the building of costumes, there would be a more significant reduction of strains on sustainability and the environment, such as textile production, transportation, and clothing manufacturing. To create cotton, a natural fiber, there is an immense amount of water needed; more than 200,000 liters for enough cotton to make a t-shirt and a pair of jeans (Claudio, 2007). Agricultural chemicals are sources of pollution for any fiber generated from a crop, which can ruin a water supply. The loss of topsoil associated with modern farming practices is another form of environmental degradation caused by fabric crops. All organic fibers are exposed to pesticides while being processed as raw material. These pesticides can be toxic to both the immediate ecosystem and workers harvesting and processing the fiber (Gardetti, Torres, 2013). Agriculture production in the United States is regulated by the United States Department of Agriculture and complies with environmental standards. However, the United Nations

Environment Programme, UNEP, states that persisting consequences of textile production are freshwater consumption, water pollution, and air pollution (UNEP). Repurposing of existing textiles diffuses the processing detriment of textile production and reduces environmental impact. As the cosplay community grows, so can the practice of upcycling and repurposing materials. As more materials are recycled rather than discarded, the landfills will be smaller and the need for manufacturing new textile products considerably reduced.

### **Development Plan**

To address the challenges that building cosplay with repurposed material presents, I created two costume designs to avoid copyright issues. I designed one men's and one women's costume based on a review of popular cosplay, including emergent themes that would be perceived as difficult to replicate with repurposed materials. These designs were broken down into flat technical drawings and drafted as flat patterns. Following completion, I evaluated the designs for potential materials and important key features, such as color.

I planned to collect materials through thrift store purchases, yard sale purchases, and reclaiming of disposed material. Consignment stores were not included in material collection because the materials sold by the shop can profit both the store and the donor. In consignment stores, the price is higher than the listed collection sources, and items sold are less representative of waste material. Each item purchased or collected was recorded in a log including product description, price, location, intended use, fiber or material content, weight in ounces, waste category, and secondary waste. Secondary waste is the amount of discarded material that is not used in the construction of the costume. Using the initial weight and the weight of the secondary waste, I was able to more accurately measure repurposed weight.

The method of construction was expected to include the use of safety equipment, a rotary tool and kit, a multiple-temperature setting glue gun and heat gun, an orbital sander, a wood burner tool, a hobby knife set, contact cement, multiple-use scissors, fabric scissors, pliers, an eyelet tool with eyelets, a riveter and rivets, and a significant amount of machine and hand sewing for altering and garment production.

### **Design Process**

The design of the costumes started with an industry method of creating a trend board. A trend board is created by collaging photographic inspiration including colors, silhouettes, and other images that will be the basis of a design or set of designs. One board was created for both costumes and consisted of cosplay and live-action roleplay costume images (see figure 1). Based on the trend board, I followed up with the industry method of trend analysis, which is to draw conclusions and predict trends. Themes that appeared most popular and visibly distinct in cosplay are apocalyptic, horror, medieval or Renaissance, realistic, science fiction, superhuman, such as superheroes, and Victorian inspired design. Since some popular women's cosplay calls for large skirting, corset style bodices, and decorative accessories while other women's cosplay calls for body contouring items and armor, the design was created to accommodate significant aspects of as many styles as possible while remaining cohesive (see figure 2). The men's cosplay design includes a large proportion of armor with a base layer to represent cosplay without emphasis on armor (see figure 3). The men's cosplay is intended to be a combination of multiple styles as well. Cosplay is a fan culture generated by each hobbyist's interest in a character from a particular universe. These universes are most often stories or collections of stories that have a large depth of lore and symbolism that usually appear on the characters' costumes. The original cosplay designs include a few subtle fabricated symbols to imitate this particular challenge that

cosplay accuracy brings. Sketches were done in pencil then uploaded onto Adobe Illustrator and live traced. A random color palette generated through Adobe color was used because the colors of cosplay costumes are often predetermined and not chosen by the cosplayer. Coloring was done in Adobe Photoshop. The final color sketches were used to create flat sketches in Illustrator, which were organized and paired with verbal and visual ideas for possible materials to purchase and repurpose. The color images and materials guides were printed and stapled in booklets to use while in thrift shops gathering materials.

Patterns were created before material purchases to determine the amount of fabric that would be needed. However, some pieces were determined best suited to be created from alteration, such as pants or simplistic shirts. When no item was found that could be altered, a pattern was drafted. Pattern pieces were cut out of the garments. If the structure was difficult to manipulate, I disassembled the original garments to lay flat (see figure 4). As shown, leather jackets were the stiffest and most difficult to cut patterns out of due to style seams and sturdy assembly. Pattern pieces that would not be dramatically changed visually were cut into smaller pieces to ease placement and use more of the available material (see figure 5). Throughout construction, plans were adjusted and most steps were a process of trial and error. Each step was taken carefully to reduce waste, and failures were addressed from a standpoint of conservation and adjustment rather than new attempts or starting over.

## **Creative Works**

### **Men's Costume**

The first items constructed for the men's costume were the shoulder pieces. The plastic was cut from a flattened bin and laced together with polyester string. The pattern I cut from the plastic was identical to the sewing pattern piece without seam allowances. This means the

shoulder plastic had a dart that needed to be molded with a heat gun for proper form. To contain the plastic, the shoulder guard piece has a leather side, with applique trim, and a lining side that is less visible. The trim was sewn to the leather around the edge at the seamline and around the edges of the applique. It is still possible to see the underside, so the lining color matches the rest of the costume. Using a pyrography pen, holes were melted into the plastic pieces for snaps. The lining holes were created with an awl. The snaps were female ends and installed with a setting tool. The thickness of the plastic made sewing the lining and leather together before insertion virtually impossible, therefore the casing was sewn right sides together along the front and back edges, then edgestitched closed, as in stitched on the outside of the casing around the edge. The neck guard is sewn with one side to the lining and one side to the leather, with plastic inserted and riveted to the outer piece, and the casing edgestitched closed. Four arm scales with a leather side and a lining side were sewn right sides together with the top open. Then, the scales were turned inside out and riveted together in sets of two. Each top armscale set was whip-stitched to a shoulder guard lining. Next, the back and front armor pieces were cut from the flattened plastic bin. The casings with trim attached were sewn along the top. A decorative piece was cut from plastic and rivets to the chest plastic with the fabric in between. A leather cover piece was hot glued on. Male snaps were installed in line with the female snaps on the shoulder guards. The lining of the chest is poorly matched, but is invisible on the outside of the costume. The chest and back were edgestitched closed around the plastic. Arm braces were created from leather, plastic from the flattened bin, and eyelets. The lace for the eyelets is made from strips of leather. The arm braces have a subtle decoration traced onto the plastic in hot glue with lining fabric covering it. The plastic and lining are sewn to the wrong side of the brace. Hand flaps were turned, stitched, and sewn to the arm braces. On the waist, two layers of skirting were basted on.

The orange skirting had leather trim applique attached and the lower skirting was left raw as a design choice based on the appearance of the color sketch. The waist armor and trim were sewn to the lining and leather flaps were sewn to the edges of the front where the belt buckle and loop were attached with rivets. The boot covers were sewn with each scale turned and sewn then basted to the larger pieces. The zippers were installed between the trim leather and the main leather. Underneath the armor, the undershirt was made from alteration. The center front was sewn closed, the cuffs removed, and the neck cut wide. The raw edges were turned and stitched. The vest was altered to be slightly more fitted and shorter, with a wide neck and sleeves removed. Center front was altered to be an eyelet and leather lace closure. Another alteration was the pants, which were sewn to fit more like tights. Excess fabric from the pants was used to make a slip on neck scarf. A draped pattern for the helmet was cut, sewn, and simply glued to the plastic helmet pieces, with a face cover riveted to the leather.

The largest challenge in using the leather jackets was finding sections that could be cut for a full pattern piece. This is the reason the chest and back covers were cut from a polyester jacket that had the right color, but fewer style seams. The trim and arm braces had patterns that would be easier to cut if the pieces were cut into smaller sections, and would have a less altered appearance because of the small size. All trim pieces were cut from the same red brown jacket so that the color difference was uniform and at least appeared intentional. A dark brown leather jacket was the source for the waist and helmet fabric. The waist was cut to appear symmetrical, so that the style seams of the original piece matched on either side. Scraps from the dark brown jacket were sewn into a rectangular shape, and the helmet pattern pieces were cut from this. The helmet plastic was altered from a youth baseball helmet. Scraps were used for the scales on the boots, and the large sections of the boots were cut from the sleeves of the dark brown jacket. The

zippers on the boots were salvaged from the jackets. The altered shirts worn under the armor were both button up, collared shirts, and the pants were pajama bottoms. Woven fabric of medium-weight was ideal for the underclothing. Since the fabric of the pants was knitted and silky, it would have compromised the construction appearance to add an eyelet and leather lace closure as in the original design.

Alongside the choice to leave out the eyelet closure on the pants, a failure in the snaps created a need to attach hooks and eyes for the shoulder guards to connect and hold to the chest and back pieces. The plastic for the back piece was not holding a mold from the heat gun, so snaps salvaged from the red brown jacket were placed on the chest and back pieces on each side to pull the plastic down. Upon construction and fitting, it became clear that the waist armor would look better without a plastic insert, although this kept the appearance more true to the original design than other changes. The boot design included lacing up the sides and a buckle closure. However, the lace that could be made was better allocated to the arm braces and vest closure, and using the zippers salvaged from the jackets removed weight from the secondary waste. In the original design, the chest armor may have looked better with plastic scales in the lower half; however, the fitting was better without the stiffness of the plastic.

### **Women's Costume**

The women's costume was much simpler to construct because most of the steps were exclusively alteration or basic sewing. The corset style shirt was created from a dress that was shortened, sleeves removed, and seams released at the bust. A pin tuck on the wrong side of the garment down center front was added as the fit of the garment was already tight, but the center front seam was a highly visible construction element in the costume design. For the same reason, faux corseting was added to the side seams in the form of flaps and eyelets with lace

closure that do not affect the fit. The original design called for one strap, however, this construction was not compatible with the weight and structure of the garment used for alteration, so the costume has two straps. The hip belt was created using material from a purse for interfacing and a purple shirt. The buckle in the front is permanently connected through a cut plastic buckle to one side with a sewn fabric loop, and removable to the opposite side with a loop closed by hook and eye. The skirting is attached to the stiff hip belt with a simple sewn channel through which drawstrings made from the purple shirt run. The skirting was part of a formal dress and the hem was left intact from the original garment. The same dress provided beading for the sleeves, leg covers, and headband. Underneath the skirting, the pants were created in two separate pieces to create the appearance on two separate garments. There was not enough fabric to create full pants for the green colored portion of the garment, so leg extensions were added to turquoise shorts with a seam finish that has the appearance of hemmed shorts over tights. To cover the bottom of the tights so that it was not obvious there was a cut off, the leg covers overlap the finish of the green fabric. The corset style shirt and leg covers were created from the same fabric. The leg covers have leather patches attached with an embroidery finish. The original design included three patches along the center front; however, to keep the shape true to the design but on a model with a different body shape, the patches were reduced to two. At the bottom of the covers, there is beading that was hand-sewn with beads transferred from the bodice of the formal dress. The forearm portion of the sleeve was cut from the same material as the lower portion of the pants. At the hand, there is beading and a finger loop to hold the sleeve. Above the elbow, the elastic waist of a turquoise dress was used to create a puff sleeve cap. A shortened belt and belt cover is attached at the top of the sleeve to hold the sleeve up. The same



strategy of sewing a cover and inserting a belt is used for the chest and shoulder accessory and the leg accessory.

The chest and shoulder piece was created first by sewing covers, then attaching them to a sewn leather shoulder cap at points determined by fitting. Then, belts were run through the covers. Two attachments are along the underarm strap, which is a belt buckle left in place, and a medallion created from cut plastic in three layers. The first layer holds one side of the waist belt with rivets and hooks. The second layer holds the other side and arm strap and attaches to the opposing hooks through horizontal eyes. The top layer hides the rivets and holds the design, and all were painted over. On the leg, a purple leg wrap and bag are held closed by a belt through a sewn cover. The original design has two straps, however, the model leg was not long enough to accommodate both straps with the width of available belts, so it was reduced to one strap. The headband was sewn with scraps from the purple shirt. The main piece of the band is sewn fabric around a piece of the purse that was also used for the waist belt. Along the top, finished and wrapped triangular pieces were rolled and sewn in place. At the sides, beading was included that emulated the original design as closely as possible with available beading from jewelry found in thrift stores.

### **Discussion**

The final costumes compared to the original designs can be evaluated as successful or unsuccessful based on fit and silhouette, which had to be reconciled between the body type of the design and body type of the model, color matching, and total material repurposed. Cosplay participants do not always have the same body proportions as the source material, and if the design is not original there will need to be compromises to maintain an overall aesthetically appealing appearance. This is why the original designs were not based on a specific model, but

rather sketched onto croquis, or basic fashion body drawings. Color is usually not something that would call for compromise; however, since this project had limited material resources, there was a challenging but infrequent need to compromise some color choices. I was encouraged to adjust within already constructed pieces rather than remake pieces due to the material repurposing weight being recorded, and so these choices resulted in imperfect appearances in some instances.

The men's final costume compared to the original design seems overall successful (see figures 3 and 6). The model has a wider and more muscular body than the design, and shorter legs and arms. The helmet also has a much rounder appearance than the design due to the helmet base being a youth baseball helmet. The mask has a different appearance as well to accommodate the shape of the helmet and the face and eyes of the model. Slight variations in the armor color, which is mostly uniform in the original design, is due to multiple leather jackets of different colors and color differences within single jackets. The colors match well, so the difference could pass as a design choice or at the least be considered acceptable variance. The color of the vest, skirting, pants, and neck scarf are visually very close in color and successful recreations. The undershirt is much whiter than the original design, but the color change is not a large enough compromise to negatively effect the complete costume. Repurposing for the men's costume had an average of fifty-four percent by weight, which is a considerable reduction in waste if the source material is defined as post-consumer waste.

The comparison of the women's final costume to the original design shows an arguably more successful recreation (see figures 2 and 7). The model is again wider and has shorter proportions than the original design; however, the silhouette of the design is less effected by the difference than the men's costume. As mentioned, the proportions and aesthetic were reconciled by slight adjustments to less significant parts of the costume. The most obvious variations are the leg

cover, due to proportions, the headband, due to available material, and the choice to keep two straps because of the model's body type. The colors are very well matched to the original design, although the medallions were matched with paint rather than selections from thrift shops. The one color that could be better is the fabric of the corset style shirt. The women's costume repurposing percentage had an average of fifty-two percent, with some items being totally repurposed with no secondary waste. Completely upcycling is ideal and would contribute to a goal of zero waste, but further research and practice would be required to achieve this goal. The women's costume provides evidence that it is possible.

Both designs were realized in the costume to a recognizable level. Whether the final costume is satisfactory is dependent on the cosplay participant's personal preferences and intended use. For example, if the cosplay participant hopes to place in a cosplay costume contest, it may be less likely that they would be willing to utilize upcycling. To this extent, opening a category within cosplay competitions for upcycled costumes could lead to an increased practice of upcycling in cosplay costumes. Since some of the material collection depends on skill and partly on probability and availability, individuals in metropolitan areas would likely be more successful with more options in resale shops and a higher volume of donated items. If donated items are considered to be post-consumer waste, forty-seven percent reuse by weight in this particular project is significant enough to consider repurposing and upcycling as a material source for cosplay costumes, but would require further investigation and a stronger development of repurposing skills (see table 3).

### **Conclusions**

The industry skills necessary to complete this project included trend analysis, pattern drafting, pattern draping, apparel production, garment alteration, and adept use of computer

design. The designs were created using Adobe and inspired by trend analysis. Using technical sketches and model measurements, the patterns were created and cut from material. The pieces were then assembled or altered into garments and accessories. The skills unique to this project were discovered throughout the process and should be utilized by cosplay enthusiasts that would use repurposed materials to construct their costumes. When cutting pattern pieces from the fabric, I found that disassembling the source garment was the easiest solution. This meant that items with few style seams, such as men's clothing, and large amounts of fabric, such as larger sizes, would be ideal purchases. Alternative or congruent strategies include opening darts that will not be used and hiding seams with overlying garments or applique. Another approach is to maintain symmetry in style lines, such as left and right pieces being cut in way that style lines are mirrored, so that the design seems intentional. To increase popularity of upcycling in cosplay, conventions and cosplay events could begin emphasizing the construction method by introducing a prize category or entire contests focused on upcycled material in costumes. Beyond cosplay participants utilizing these strategies, projects could include everyday clothing, formalwear, occupational clothing, and home goods. By expanding the range of participants in upcycling, and providing possible strategies, the viability of upcycling having a lasting effect increases exponentially by becoming applicable to most people and often in more than one way.

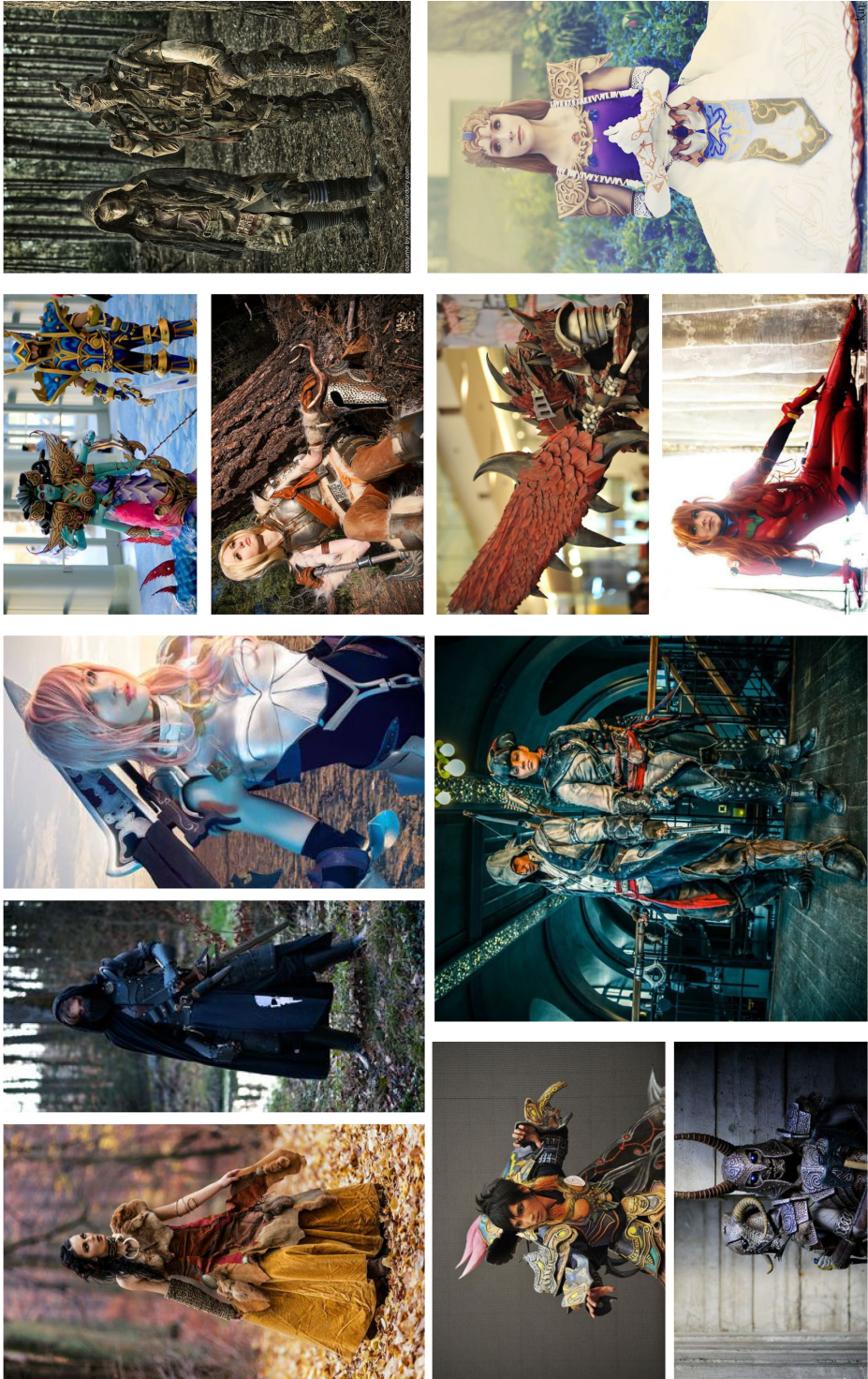
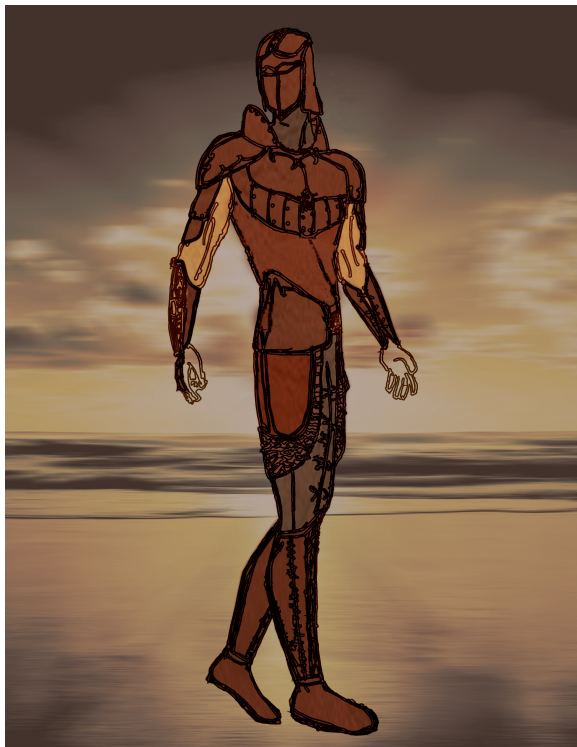


Figure 1. Trend board. This image is meant to summarize prevalent trends in the cosplay subculture.



*Figure 2.* Women's costume design. The original illustration used to create the women's costume.



*Figure 3.* Men's costume design. The original illustration used to create the men's costume.





*Figure 4.* Flat jacket. An example of the deconstruction of thicker garments.



*Figure 5.* Arm brace pieces. The pieces of the arm brace are shown as divided into smaller sections for easier cutting and more efficient spacing.



*Figure 6.* Men's costume. The completed costume on the model.





Figure 7. Women's costume. The completed costume on the model.

Men's Costume	Material Weight (oz)	Secondary Waste (oz)	Total Waste Repurposed (oz)	% Repurposed
Product Description				
brown leather jacket	40.35	26.45	13.90	34%
brown pants	17.30	2.15	15.15	88%
plastic bin	37.40	19.99	17.41	47%
red-brown leather jacket	35.05	23.75	11.30	32%
white shirt	13.12	2.90	10.22	78%
orange shirt	15.50	9.00	6.50	42%
brown jacket	19.70	14.75	4.95	25%
dark brown leather jacket	34.50	14.85	19.65	57%
youth baseball helmet	21.55	3.90	17.65	82%
2 inch belt	5.55	1.50	4.05	73%
plastic bin w/ lid	18.15	11.15	7.00	39%

Table 1. Men’s repurposed totals. The numbers in this table show how much material was used in the construction of the men’s costume.

Women's Costume	Material Weight (oz)	Secondary Waste (oz)	Total Waste Repurposed (oz)	% Repurposed
Product Description				
plastic bin w/ lid	18.15	11.15	7.00	39%
dark purple shirt	10.50	6.15	4.35	41%
turquoise dress	8.70	5.90	2.80	32%
1 inch belt, white	1.40	0.55	0.85	61%
1.5 inch belt, dark brown	1.80	0.40	1.40	78%
green dress, stretch	13.10	8.90	4.20	32%
green dress	8.25	6.85	1.40	17%
2 inch belt	6.90	1.10	5.80	84%
dark purple dress	14.95	4.70	10.25	69%
earrings	0.45	0.15	0.30	67%
feather necklace	0.25	0.20	0.05	20%
blue multi-strand necklace	2.55	1.45	1.10	43%
wood necklace	0.75	0.50	0.25	33%
green circle gem necklace	0.65	0.00	0.65	100%
turquoise beaded dress	17.35	6.25	11.10	64%
purse	13.65	10.30	3.35	25%
brown leather jacket	21.65	19.50	2.15	10%
1 inch belt, brown	1.35	0.15	1.20	89%
1 inch belt, graphic	2.00	0.20	1.80	90%

Table 2. Women’s repurposed totals. The numbers in this table show how much material was used in the construction of the men’s costume.

Totals	Material Weight (oz)	Secondary Waste (oz)	Total Waste Repurposed (oz)
Total Weight (oz)	384.42	203.64	180.78
Total Weight (lb)	24.03	12.73	11.30
		% Repurposed	47%

*Table 3.* Costume totals. This table provides a summary of the waste repurposed from both costumes.

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