



Global Conference on Sustainability in Higher Education
presents

**Unlikely Relationships:
Multidisciplinary Cooperation to
Divert Textile Waste**

Presented by: Dr. Rachel Eike and Megan Romans (Doctoral Candidate)

Iowa State University, Ames, IA

Introductions

IOWA STATE UNIVERSITY
OF SCIENCE AND TECHNOLOGY

Rachel J. Eike, PhD

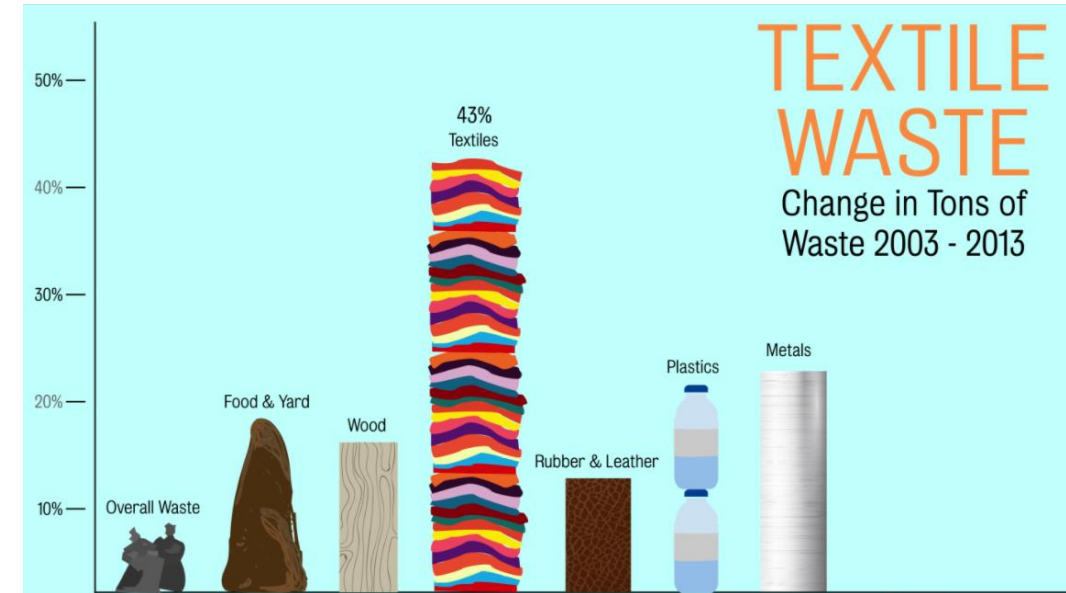


Megan Romans, PhD Student



Overview of Presentation

- Issue of Textile waste
 - Apparel Industries
 - Education/Classrooms
- On-going collection of textile waste from studios
 - Weight Data x Semester
- Closing the Loop
 - Discussion of collaborations across campus
 - Visuals of Process
 - Challenges & Solutions
 - Opportunities to cooperate with unlikely partners in you community



Textile Waste – it's a serious issue

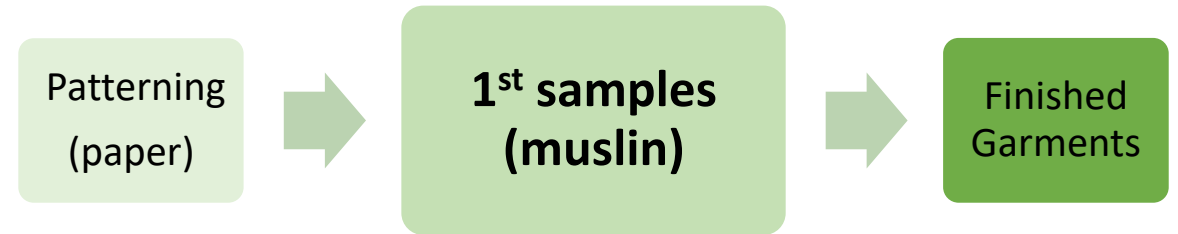
Industry

- The internationally dependent clothing and textile industry is valued at over \$1 trillion (Allwood et al., 2006)
- It is estimated that between 80-100 BILLION pieces of clothing are produced each year (Batelier, 2018)
 - *That is a lot of hidden waste*
- Over the past 20 years, the U.S. has generated 15-17 million tons of textile waste each year (EPA, 2020)
 - about 47 pieces of clothing per inhabitants per year
- Only 1.5 million tons is recycled or composted (EPA, 2020)

**Textile waste can be in pre-consumer or post-consumer forms: scraps or remaining yardage from the production process or unwanted garments after purchased/used

Education

- Apparel curriculum emphasizes a *hands-on* approach to learn about the design process



- Core design courses (patternmaking, draping, collection (capstone, etc.) involve students making multiple patterns, samples, and finished garments
 - These processes generate an immense amount of paper and fabric waste per student, per semester
- Over 50 fashion programs in the U.S. that offer an apparel design concentration
 - *That is a lot of waste created within the classroom*
- When not recycled or composted, waste ends up in landfills

Studio fabric processing project

Study – Collect & Weigh

- Stemmed from grad-level sustainability class
- Six apparel design classes (basic, pattern-making, draping, advanced) --> sample-making
 - Approximately 75 students
- Students discarded natural fiber fabrics (textile scraps) in designated collection bins
 - Cotton, silk, wool, flax/linen, etc.

Our goal was to gather, collect waste data (for future studies), and prepare scraps for composting

→ To discontinue sending natural fabrics to the landfill

→ Trial a process that may be adaptable for other Apparel/Fashion programs

Fall 2019

- Collection bins were processed 12 times
- Approximately **100 pounds** of natural-fiber fabrics were gathered for processing
 - Potential data issues – convenience of bins & removing of fabric
- Resulted in an average of 8 pounds per week
- Equaled ~ 1.5 lbs. per student over the semester



Visualization:

1 student = 5-gal. bucket of fabric (x 75/sem.)

Studio fabric processing project

Study – Sort & Shred

- Fabrics sorted into similar sizes and stacked in layers:
 - Large pieces (12"+) with medium/smaller pieces sandwiched between
 - 3"-5" in height to accommodate machine cutter (length x width varied)
 - Sorting & layering = 3-4 hrs.
 - Shredding & bagging = 2-3 hrs.
- Stacks secured with clamps and pattern weights
- Shredded lengthwise then widthwise into (*roughly*) 2x2 squares
- Shredded pieces bagged for transport



Collection bin



Pre-sorted piles



Prepared layers

Challenges & Solutions

Hand-held electric rotary cutter limited height; time consuming



New Tech cutting machine allowed for 3"-5" stacks

Layers shifted/ fabric stuck in cutter



Paper placed under and on top to reduce shifting and jamming

Inconsistencies in sorting (zipper, synthetics, closures)

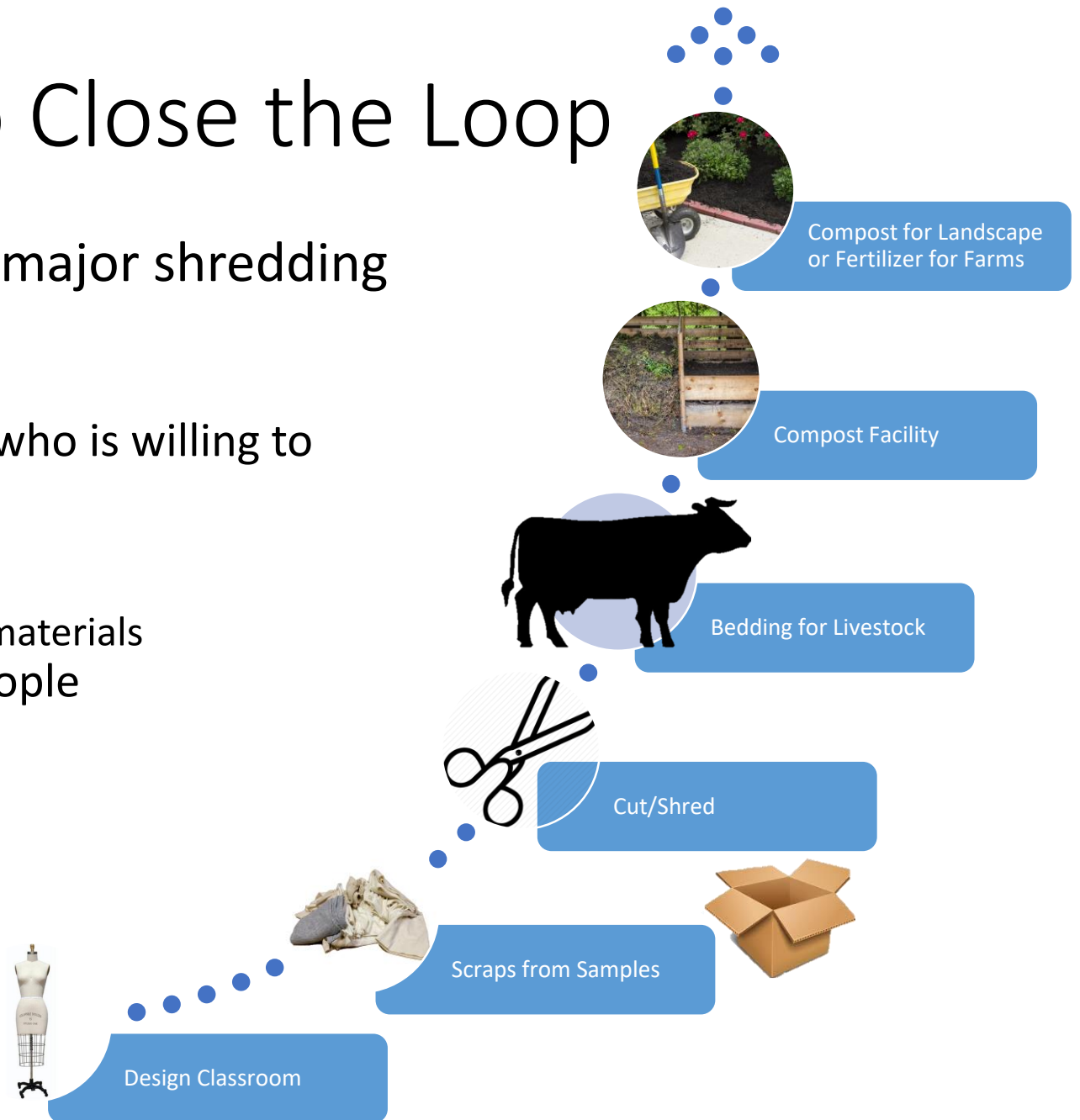


Additional sorting was required

- New Tech Cutting Machine (CZD-3)
- Pattern weights
- Pattern (butcher) paper
- Bar clamps
- Large table

Unlikely Partnerships to Close the Loop

- Eco-fest program attendance led to major shredding & composting team...*a short story*
- Key points for project progress:
 - Sharing your ideas/work with anyone who is willing to listen
 - Say 'Yes' to opportunities
 - Brainstorming solutions
 - Project potential & diversifying 'input' materials
 - Attend team meetings – meet new people
 - Communicate and be accountable
- Challenges:
 - Scale – Funding – #Covid



Process Images



Process Images – Composting Facility



Future directions to further mitigate textile waste



In our classrooms

- Learning module
 - Sustainability through design:
 - Marker-making (layout of patterns)
 - Adjusting patterns for textile efficiency
 - Non-traditional sources of textiles
 - Estate sales, unwanted textile products, designing with waste, single-fiber content
- Textile 'Recycler' bin in each lab space
 - Easily accessible and clearly labeled
 - Detour away from trashcans
 - Emptied and sorted weekly

In our communities

- Ideas for collaborative programs:
 - Donations
 - Clean out fabric bins – Give to students
 - Community Shred days
 - Free compost

Challenges:

- Synthetic or blended fibers can not be composted
- Shipping for processing (if needed)
- Learning (and willing to implement) non-traditional design approaches

Questions & Comments

Join us live for Q & A through the Hubb portal

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Contact information:

Rachel J. Eike: rjeike@iastate.edu

Megan Romans: mromans@iastate.edu