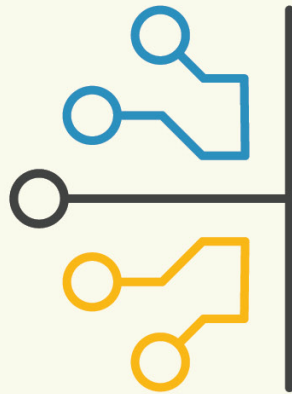


Welcome to



**EMERGING
TECHNOLOGIES**
CONFERENCE at Advanced Textiles® **EXPO**



Valorizing Waste and the BioMaterial Revolution

**Driving the Next Generation of Fibers,
Materials & Coatings**



Thomasine Dolan Dow

- Recovering fashion designer.
- WIP expert in sustainable textile innovation.
- What does sustainability even mean?
- Change and progress over perfection.



Valorizing Waste and the BioMaterial Revolution

**Driving the Next Generation of Fibers,
Materials & Coatings**





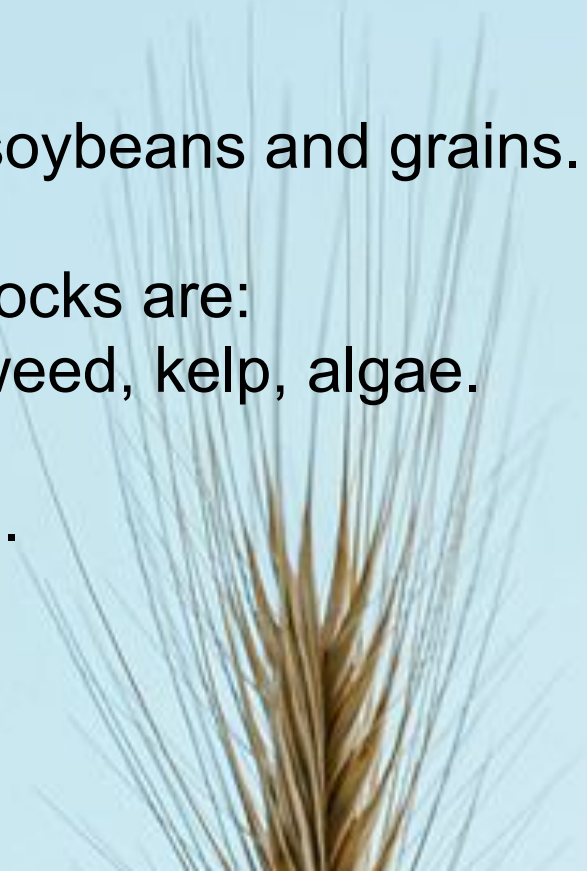
What does valorizing waste mean?

Valorization is the process of transforming overlooked, discarded byproducts into something valuable.

- Ag waste
- Plant waste
- Food waste
- Textile waste

What is Bio-based

- Materials made entirely or partially from renewable inputs or resources that can be grown again and again.
- Common inputs are:
corn, potato, sugarcane, soybeans and grains.
- Emerging next-gen feedstocks are:
mycelium, ag waste, seaweed, kelp, algae.
- Bio-based is nature based.



In this presentation, we will look at:

- BioSynthetics and Biofibers
 - BioMaterials
 - Textile-2-Textile Recycling
 - Performance BioCoatings and Dyes
-

Why should we care?

- Environmental impact -
 - increased global population = more stuff and single use items
 - most damaging impact happens at the material production or Tier 3
 - 60% of apparel is made from fossil fuels
 - Government regulation -
 - EU, and soon California, focuses on traceability and accountability (EPR) with circularity and labeling as a goal.
 - Fluctuating tariffs
-

In 2023, Next-Gen Material market forecast valued: \$73.38B

2030: \$139.02 billion

Source: <https://nextmsc.com>

A close-up photograph of a castor bean plant (Ricinus communis). The image shows several clusters of small, yellow, star-shaped flowers with prominent stamens. The flowers are arranged in dense, rounded inflorescences. The leaves are large, green, and deeply lobed, with some showing signs of being eaten (holes). The background is dark and out of focus.

Biosynthetics

Castor bean plant

Biosynthetics

Sourcing Journal reported in August 2025:

“a new wave of biobased offerings is trading fossil fuels for castor beans, tapping nature’s chemistry to re-engineer synthetics.”

According to a recent report in *Natural Chemical Biology*:

“...scientists successfully genetically engineered microbes to produce a strong, flexible plastic akin to nylon.

Biosynthetics

They can replace petroleum products like: polyester, nylon and acrylic.

Biosynthetics come from renewable sources like corn and sugar.

They are either recyclable, biodegradable and/or compostable.

- * Biosynthetics behave like petrol-synthetics but are made from **renewable biomass** such as corn or sugar beets.
- * They contain no petroleum.
- * It usually involves a process of converting biomass into pellets, extruding them into fiber, and spinning them into yarns.



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Biosynthetic companies:

AMSilk (GER) - Reprograms bacteria to produce spider silk proteins. These proteins are then used to create a filament fiber for a range of biomaterials with applications in textiles, cosmetics, and potentially medical devices.

BIOFUR (US/NDL/CHN) - Uses corn oil to make a PLA to make a faux fur sherpa look alike

Kintra (US) - Biosynthetic derived from sugar sourced from corn and wheat. They create a type of polyester (polybutylene succinate - PBS) that is biodegradable and compostable.

Sci-Lume's (US) - Bylon, biobased, cheap, plentiful feedstocks like ag waste—no food crops. Bylon is 100% recyclable under mild conditions as a monomaterial and blended garments, and naturally degrades in marine and soil environments.

Spiber (JAP) - Replicated protein gene sequences that make up spider silk and made a filament fiber for blending, knitting, weaving.

Tandem Repeat (US/TUR) - Created proteins that mimic protein in squid ring teeth, applications for woven and non-woven materials and knits.

Biofiber companies:

Everbloom (US) - Uses pre-consumer textile waste from wool, silk and cashmere - all of which contain keratin - to make a new protein fiber. There is a 20B ton waste stream generated annually globally from the textiles.

Keel Labs (US) - Using seaweed biopolymers, they make a protein fiber that can be blended with other fibers for knitting, weaving.

Nanollose (tree-free) Nullarbor (NZ/IND) - Creates microbial cellulose from industrial organic and agricultural waste

Renaissance Hemp (US)- Most sustainable natural fiber because it needs so little to survive and yield fiber; new clean technologies have figured out to soften it like a cotton.

St3ms (US) - banana crop waste and...

Bananatex (SWI/TAI) - From Abacá banana plants- Strong fibers can be knitted or woven.



Abacá stalk fibers,
Bananatex



Biomaterials

Non-woven materials made from renewable bio-waste streams.

Product categories:

- Alternatives to animal leather and replacements for polyurethane and PVC

Also:

- Injection molded bioplastics
- Films made from algae and seaweed for packaging.
- Cosmetic and hygiene products.
- Fills and foams made from cattail fibers, kapok tree fruit and mycelium.

A *few* Biomaterial companies

Next-Gen Leather

Arda Bio (UK)
Atma Leather (US/IND)
Evocative (US)
Gozen Bio (US/TUR/FRA)
Lignify (TUR)
Modern Meadow (US)
Nature's Fynd (US)
Polybion (MEX)
Really Clever (UK)
Uncaged (US)
von Holzhausen (US)
Qorium (US/NDL)
Sqim (ITA)

Injection Molded:

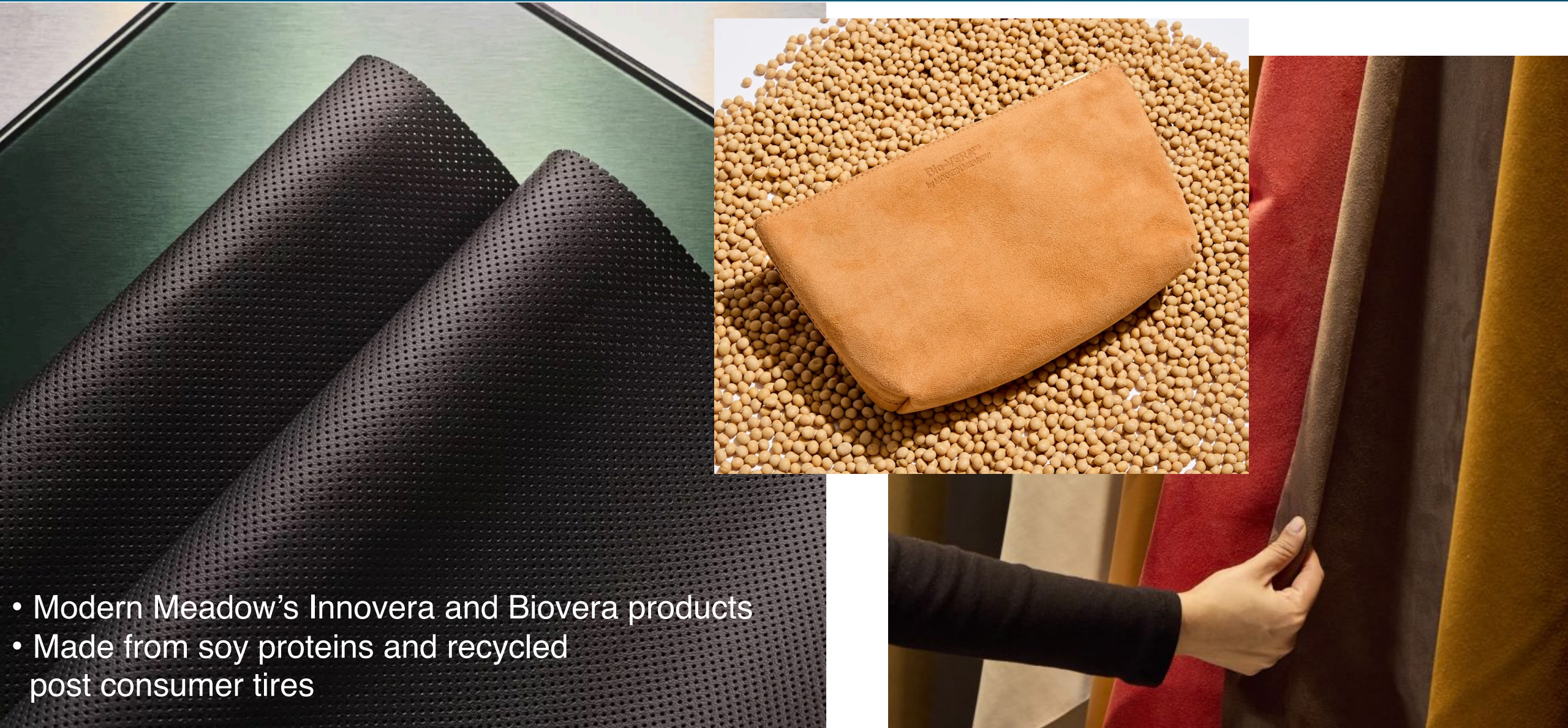
Balena (ISR)
Valupa (GER)
Rheom Materials (US)
Newlight Technologies (US)

Packaging:

TerraSafe (US)
Sway (US)

Fill + Foams

Evocative (US)
Flocus (NDL/Indo)
Ponda Bio (UK)



- Modern Meadow's Innovera and Biovera products
- Made from soy proteins and recycled post consumer tires

Textile 2 Textile Recycling



Global textile waste is estimated to be
134M tons by 2030.

- The US generates 15.4 m metric tons of used material/year.
 - * <1% is recycled into new useable textiles
- T2T involves -
 - * Collecting, sorting, de-trimming, fiber identification and requires voluntary public participation.
 - * Mechanical or Chemical processes



T2T Recycling companies

- Circ (US/FRA)
 - Circulose (SWE)
 - Ambercycle (US)
 - Evrnu (US)
-

An underwater scene featuring a dense growth of yellowish-brown seaweed or kelp. The leaves are elongated and have a textured, wavy appearance. The background is a bright blue sky with white clouds, visible through the water. The overall lighting is bright and natural.

Performance BioCoatings + Dyes

Performance BioCoatings + Dyes

- **BrightPlus** (FIN) - recyclable coatings for textiles, glass, wood, paper
 - **Colorfix** (UK) - match DNA of organisms in nature that produce color. They brew the micro-organisms and feed it waste, like sugars.
 - **Living Ink** - black ink from algae biomass
-

Performance BioCoatings + Dyes

- **S.Café®** from the Singtex Group (TAI) - They recycle used coffee grounds into nano-sized particles that are embedded into yarn making a performance fabric with natural benefits: enhanced moisture management, odor control, ultraviolet (UV) protection and faster drying times.
 - **SOARCE** (US) - seaweed technology for coatings, performance properties and dyes
 - **Sparxell** (UK) - biodegradable pigments made from cellulose
 - **von Holzhausen** “Liquid Plant” (US)
-

MADE WITH SIMPLE, ACCESSIBLE INGREDIENTS

Liquidplant is the only durable alternative plastic made entirely from plants.



CORN SUGAR

Corn sugar is a readily abundant and available resource.



CASTOR OIL

A non-food crop with high seed oil content and yield, it thrives even in drought and saline conditions.

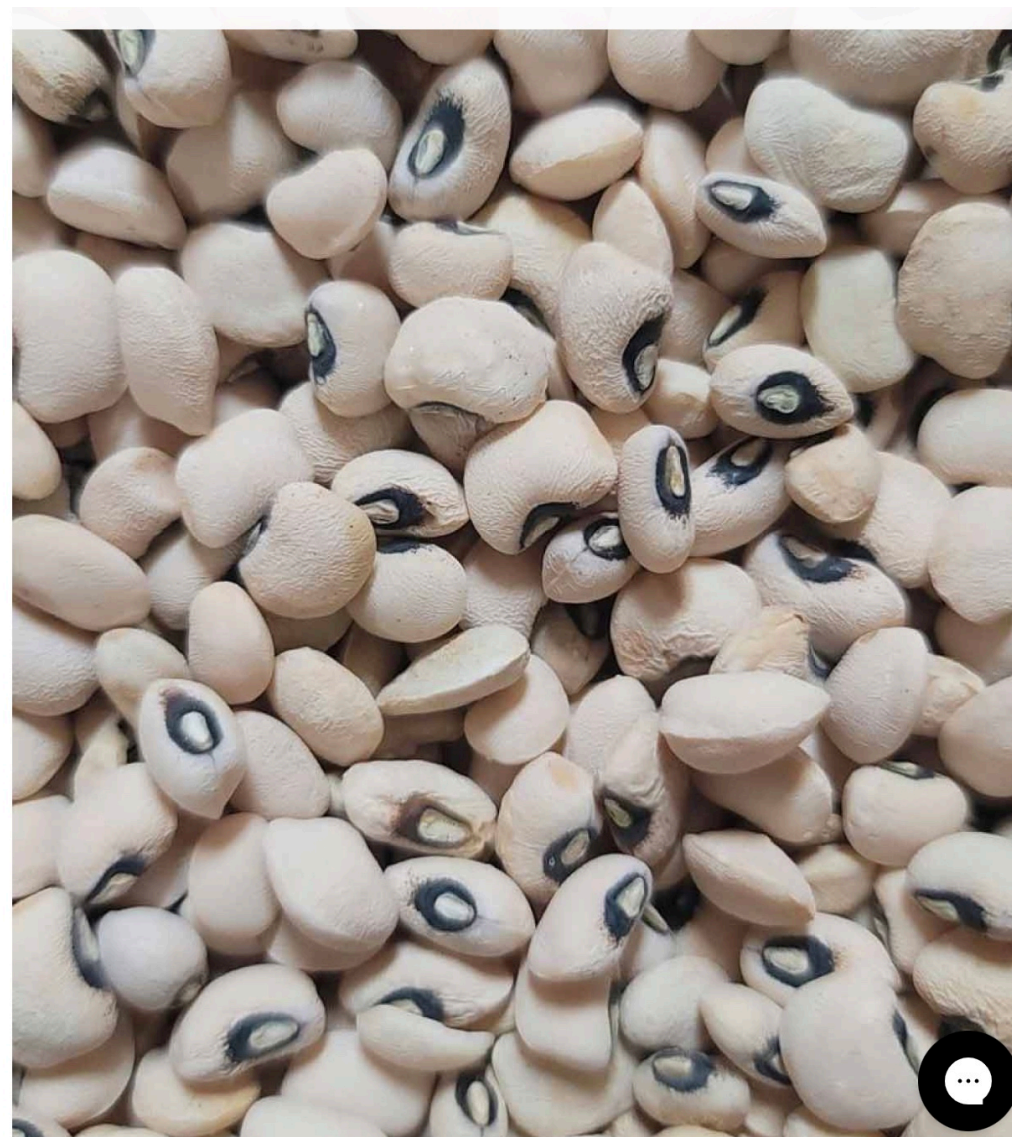


FLAXSEED OIL

This resilient crop grows where many others cannot thrive and is fully utilized, leaving no waste.



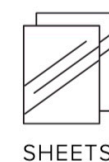
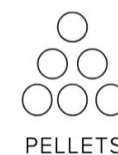
Beta Analytic
TESTING LABORATORY
100% BIO-CERTIFIED





WANT TO BE A PART OF THE NEW STORY OF PLASTIC?

Liquidplant starts life as a pellet and is easy to integrate into existing manufacturing infrastructure as a drop-in plastic replacement.



Policy: Government mandates could accelerate sustainable biotextile alternatives

- Incentivize next-gen fiber and material solutions
 - Create new business - build on US 'start-up' culture
 - Jobs
 - Local economies
-

Companies using traditional textiles, materials and coatings are untangling their supply chains for a variety of reasons.

Next-Gen innovators have built sustainable, traceable, verifiable supply chains for their inputs and chemicals.

The Innovator's Goal: Decarbonize without compromise.

A vibrant autumn landscape. In the foreground, a large, leafy tree with golden-yellow foliage stands on a grassy slope. The sun is positioned behind the tree's trunk, creating a bright starburst effect. A stone wall runs across the middle ground, with a wooden gate partially open. Beyond the wall is a lush green field, and in the distance, rolling hills are visible under a clear blue sky. The text "From Nature Back to Nature" is overlaid in the center-right of the image.

From Nature Back to Nature



See you next year!

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Nov. 3–5, 2026 | Orlando, FL USA