

Modular Threads

a fashion system for a better future

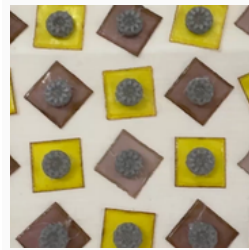
Alison Heryer

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Modular size-adaptable shirt with interchangeable bioplastic appliques

about the project

Today's fashion industry is built on a foundation of planned obsolescence, a model that treats garments as disposable commodities rather than durable goods. By prioritizing rapid trend cycles and cheap labor over longevity, the industry has normalized a linear lifecycle that is currently devastating the planet. This system traps us in a perpetual loop of purchasing and discarding that can be overwhelming for individual consumers trying to make sustainable choices around what they wear.

Modular Threads introduces a vision for a sustainable fashion ecosystem, empowering individuals to modify both the fit and style of their garments through an adaptable framework of adjustable panels, snap-based seams, and interchangeable appliques. By including the wearer as an active participant, this accessible design provides true agency over the creation and long-term evolution of a personal wardrobe, transforming it into a lifelong system of evolution and repair.





**What makes
a garment
worth
keeping?**

Fit & Functionality

Longevity is often tied to how well a garment suits the wearer's physique and daily needs. While traditional ready-to-wear manufacturing expects individuals to fit into rigid, standardized sizes, this research prioritizes adaptive design. Utilizing modular strategies allows for clothing that can be tailored for specific uses and modified to accommodate physical changes throughout a lifetime.

Aesthetic Variation

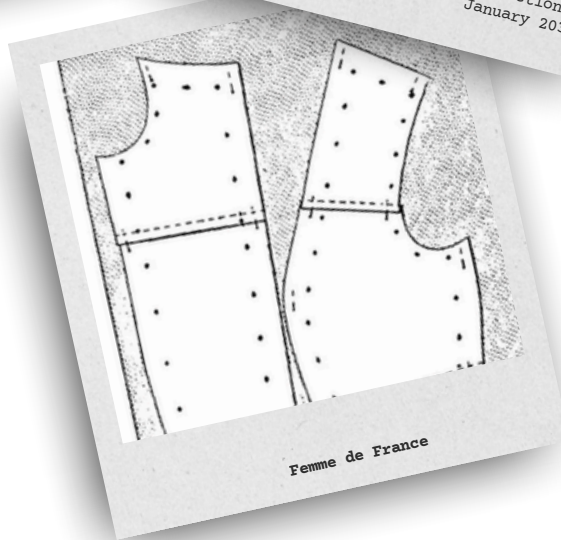
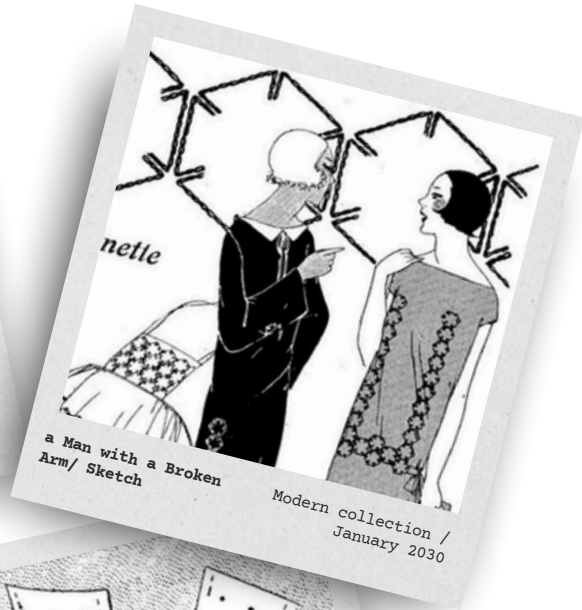
Garments are frequently discarded once they are perceived as outdated, a trend fueled by fast fashion's accelerated style cycles. This project introduces modular appliques, giving consumers the power to refresh the look of their clothing. This approach enables them to respond to shifting trends or express a unique, evolving personal style without replacing the entire item.

Maintenance & Repair

Wear and tear are major contributors to textile waste, especially as garment durability declines. By investigating innovative seaming techniques, this initiative makes it simpler to mend or swap out specific components. The goal is to maximize the functional life of every piece in a wardrobe.

Personal Connection

We tend to preserve items that carry emotional weight, whether linked to a specific memory or a significant event. By involving users in the creation, customization, and upkeep of their clothing, this project fosters a deeper social and personal bond with their wardrobe, rendering these garments truly irreplaceable.



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historic references

This project explores the intersection of historical garment construction, preindustrial efficiency, and 20th-century avant-garde design to inform contemporary, sustainable fashion practices.

Historic Examples of Zerowaste Garments

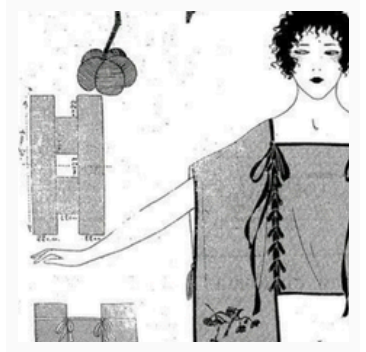
Before the rise of fast fashion, textiles were incredibly precious commodities, and this project draws heavily on preindustrial approaches where fabric scarcity mandated extreme efficiency. Because material was so expensive, historical garments were patterned to utilize every inch of the textile, minimizing or entirely eliminating cutting scraps to create an early form of zero-waste design. This valuing of fabric led to innovative construction methods, that allow for easy alteration, repair, and style updates, which significantly extended the lifespan of each piece.

Hyper-Local Production Models

Preindustrial models of production and acquisition offer an alternative blueprint to modern mass-manufacturing. This was an era when clothes were custom-tailored to fit the unique geometry of the individual body, and garment production happened locally or entirely within the home. To replicate this ethos, this project methodology references early commercial patterns as well as domestic sewing and patterning guides, reviving the art of home garment creation and self-sufficiency for a modern context.

Avant-Garde Structural Aesthetics

The project's visual identity and functional ethos are also inspired by the structural aesthetics of Russian Constructivist fashion, which rejected bourgeois luxury in favor of highly functional, geometric, and mass-producible "production clothing" (*prozodezhda*), utilizing the bold graphic textiles and linear patterns designed by Varvara Stepanova and Lyubov Popova.



contemporary influences



Julia Kroener

Julia Kroener explores sustainable fashion through computational design and multi-color 3D printing directly onto textiles, creating organic, zero-waste garments featuring innovative 3D-printed snap joints that allow a single piece to be seamlessly disassembled and reconfigured.



Andrea Zittel

Andrea Zittel's A-Z Personal Uniforms is an ongoing, decades-long project in which the artist designs and constructs a single garment to wear exclusively each season, subverting consumer culture and the capitalist demand for endless variety by demonstrating how personal liberation can be achieved through self-imposed restrictions.



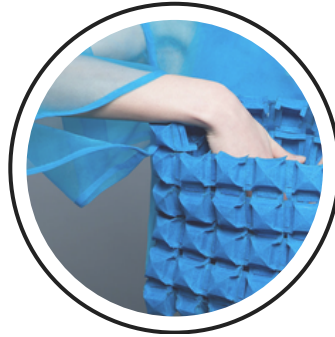
Brigitte Kock

Through her studio Variable Seams, designer Brigitte Kock advances circular fashion by combining home-accessible 3D printing with modular "design for disassembly" principles, creating customizable, ready-to-wear garments made of interlocking modules and fully compostable, bio-based materials.



Carolyn Raff

Carolyn Raff work includes compostable algae-based biopolymers derived from agar-agar and natural waste-stream dyes to create flexible, eco-friendly bioplastics that can be engineered into sustainable materials like biodegradable sequins for the circular fashion industry.



Bolor Amgalan

Bolor Amgalan explores sustainable design through collections that utilize laser-cut geometric units and tab-interlocking seam systems that allow for garments to be completely disassembled, reconfigured, and customized by the wearer without a single stitch.



Holly McQuillan

Holly McQuillan advances circular design through zero-waste pattern cutting and 3D weaving, utilizing digital jacquard looms to simultaneously construct both the 2D textile and the 3D garment form to eliminate manufacturing scraps entirely.

a garment that adapts to your body



This project challenges the culture of disposable clothing by introducing a single, highly adaptable shirt pattern engineered to dynamically expand and contract across multiple lifespans and body types. Designed around the concept of radical growth, a garment created during childhood can be adjusted and continuously worn throughout a user's entire lifetime rather than being discarded after a single growth spurt. To prove this extreme versatility, the current prototype successfully utilizes its modular adjusting system to seamlessly fit both a mother and her 10 year old daughter, demonstrating a scalable blueprint for true lifelong longevity and size inclusivity in a single piece of apparel.



pattern development

Zero-Waste Layout

Patterns were developed using CLO3D software on custom digital avatars mapped to the exact measurements of the models, ensuring a perfect fit and drastically reducing the need for physical, wasteful prototyping cycles. Furthermore, the geometric pattern pieces are engineered to be nested tightly together on the fabric layout, eliminating cutting scraps while allowing the digital markers to adapt effortlessly to varying laser-cutter bed dimensions.

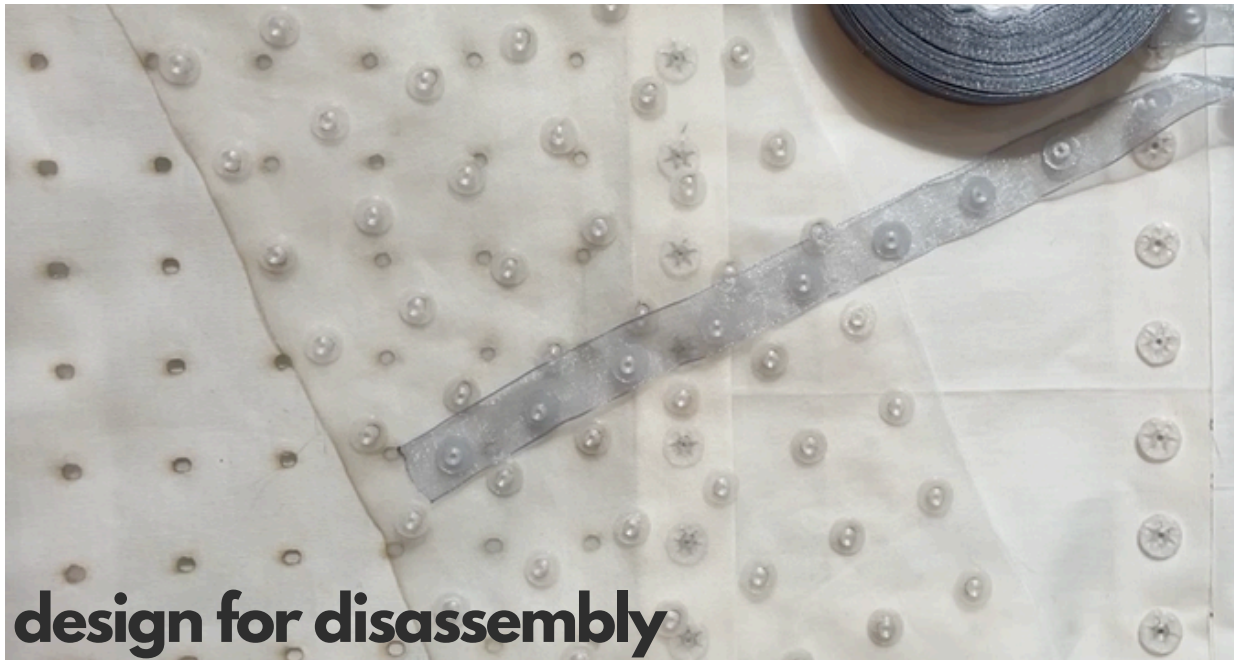
Adjustable Panels

The design utilizes a system of efficient rectangular panels that entirely eliminate curved edge waste, featuring laser-cut holes engineered at precise 1-inch increments to serve as a modular matrix for assembly. To ensure longevity, weight fluctuations, and size inclusivity, the garment features built-in width adjustability along both the central panels and side seams, while length adjustability is seamlessly achieved by folding up the hem.

Sustainable Materials

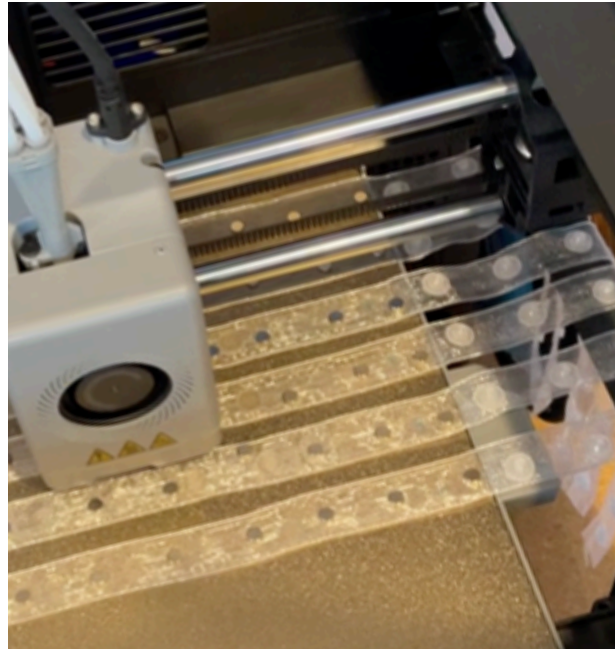
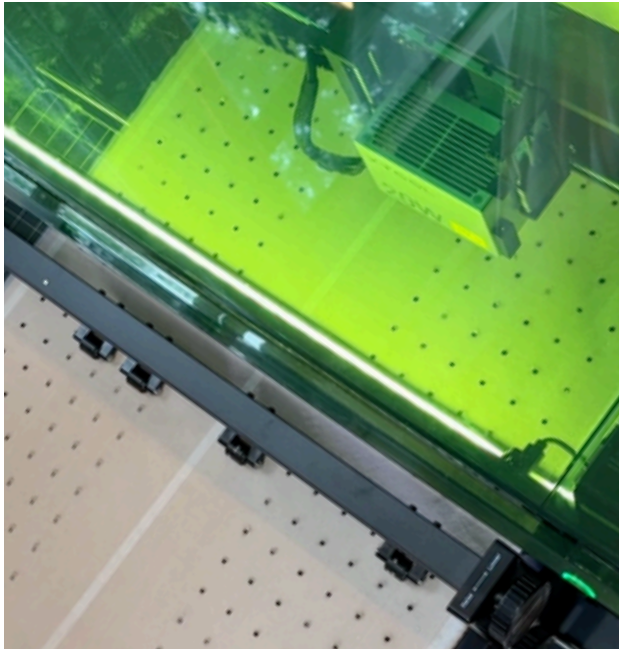
The physical prototype was built from repurposed natural textiles, the material choice actively supports a circular economy and reduces the demand for extracted resources. The cotton sateen bedding was selected for its ability to be laser-cut with minimal edge-fraying, ensuring clean finishes and durable structural integrity, while still offering the flexible option to be custom-dyed for aesthetic variation and personalization.





The approach to the prototype centers the entire manufacturing and lifecycle process on the principles of design for disassembly. A major barrier to modern circular fashion is that traditional garments fuse incompatible materials—such as synthetic threads, metal zippers, and blended textiles—making them impossible to separate and recycle into like parts at the end of their lives. By eliminating traditional stitched seams entirely, this project ensures that every component can be effortlessly unlinked, sorting materials cleanly back into their respective waste or recycling streams.

The structural foundation of the prototype relies on 3D-printed snap tapes and panels that snap directly into the textile's modular matrix, enabling rapid alteration and adaptation. Wearers customize the fit of the garment by sizing the snap tapes and panels to match their exact personal measurements, shifting the agency of tailoring directly to the user. To enhance personalization, the snap sockets can be 3D printed to either seamlessly blend in or boldly contrast with the garment fabric, and they can even be swapped out with decorative caps to completely alter the garment's visual identity on a whim.



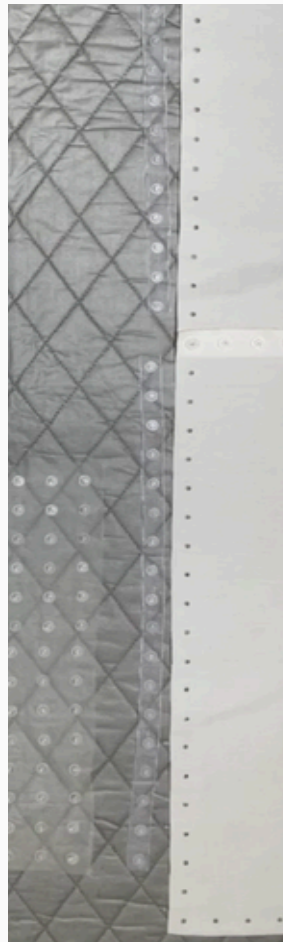
Beyond aesthetic customization, this modular snap architecture significantly extends the garment's functional lifespan. Individual fabric panels can be easily detached and swapped out for localized laundering, targeted repair, or dramatic aesthetic variation without needing to wash or replace the entire piece. Crucially, this method democratizes the creation of clothing; because the entire system snaps together like a puzzle, it allows for seamless garment assembly by everyday consumers who may not have access to traditional sewing equipment or an extensive knowledge of complex garment construction.

By replacing permanent stitched seams with an intuitive, 3D-printed snap framework, this project bypasses the technical barriers of home sewing while solving the ultimate end-of-life recycling crisis in circular fashion.

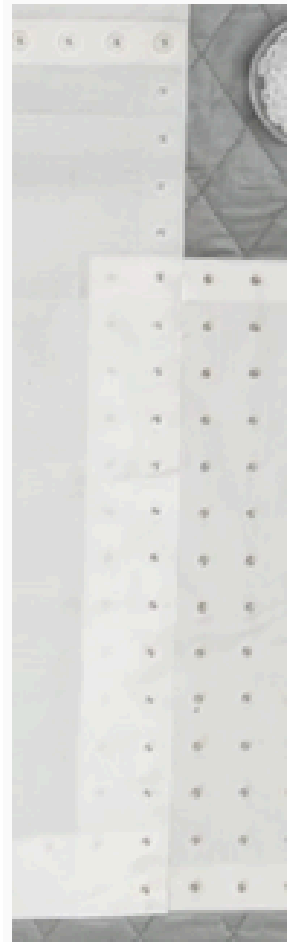
no-sew assembly



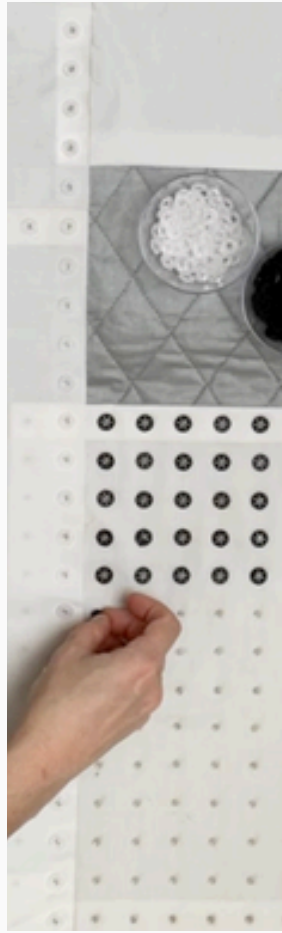
Step 1:
Cut the snap tapes and panels to size.



Step 2:
Connect the front and back at the shoulder.



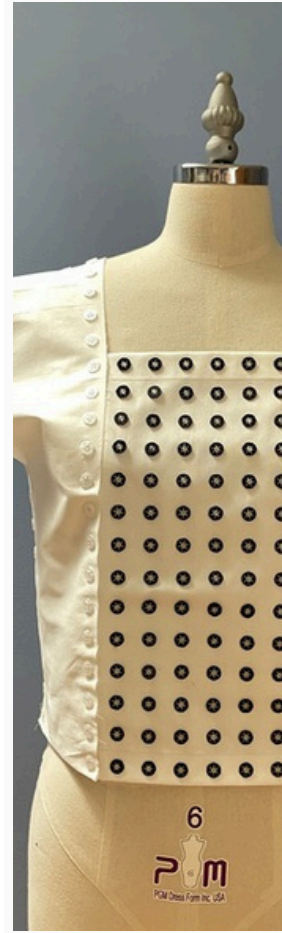
Step 3:
Fold and lap panels to fit snaps.



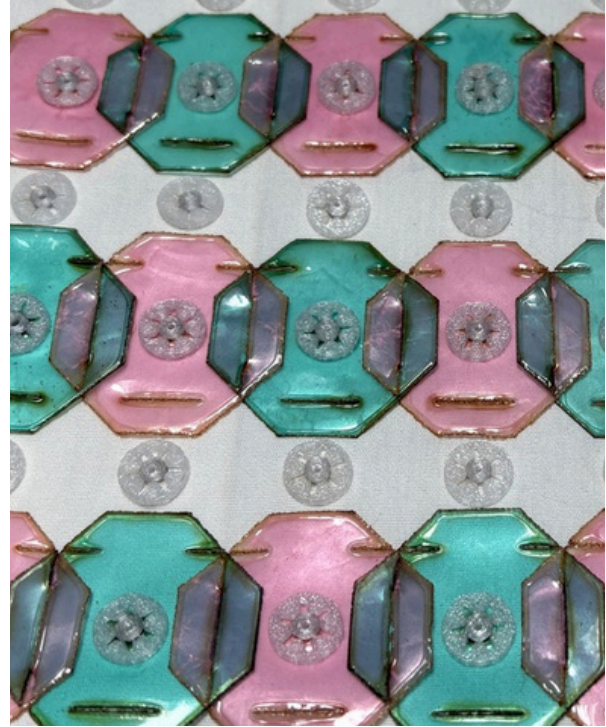
Step 4:
Use sockets to lock
seams and decor.



Step 5:
Connect at side seams.



Step 6:
Wear and adapt as
needed.



biofabricated applique

Decorative variation is made possible through the integration of biofabricated appliqués. Using a simple, accessible blend of gelatin, glycerine, and natural food colorants, these embellishments can be easily made in a consumer's kitchen, completely bypassing toxic chemical manufacturing. The liquid bioplastic mixture is poured into thin 1mm sheets that cure into a flexible, resilient, and fully compostable biomaterial that replicates vinyl. Once dried, these sheets are cut into precise, modular decorative components using a digital laser cutter.



Once fabricated, these individual components offer a dynamic system of personal expression that evolves alongside the wearer's needs. The modular pieces can be attached to the garment entirely on their own for subtle detailing, or interlocked into larger, intricate structural strips and panels using a seamless, hardware-free tab-and-slot connection method. By allowing the wearer to easily snap, slide, and interlock different shapes and colors onto the base fabric, this bio-based system opens up expansive design variations to effortlessly pair with different outfits and occasions.



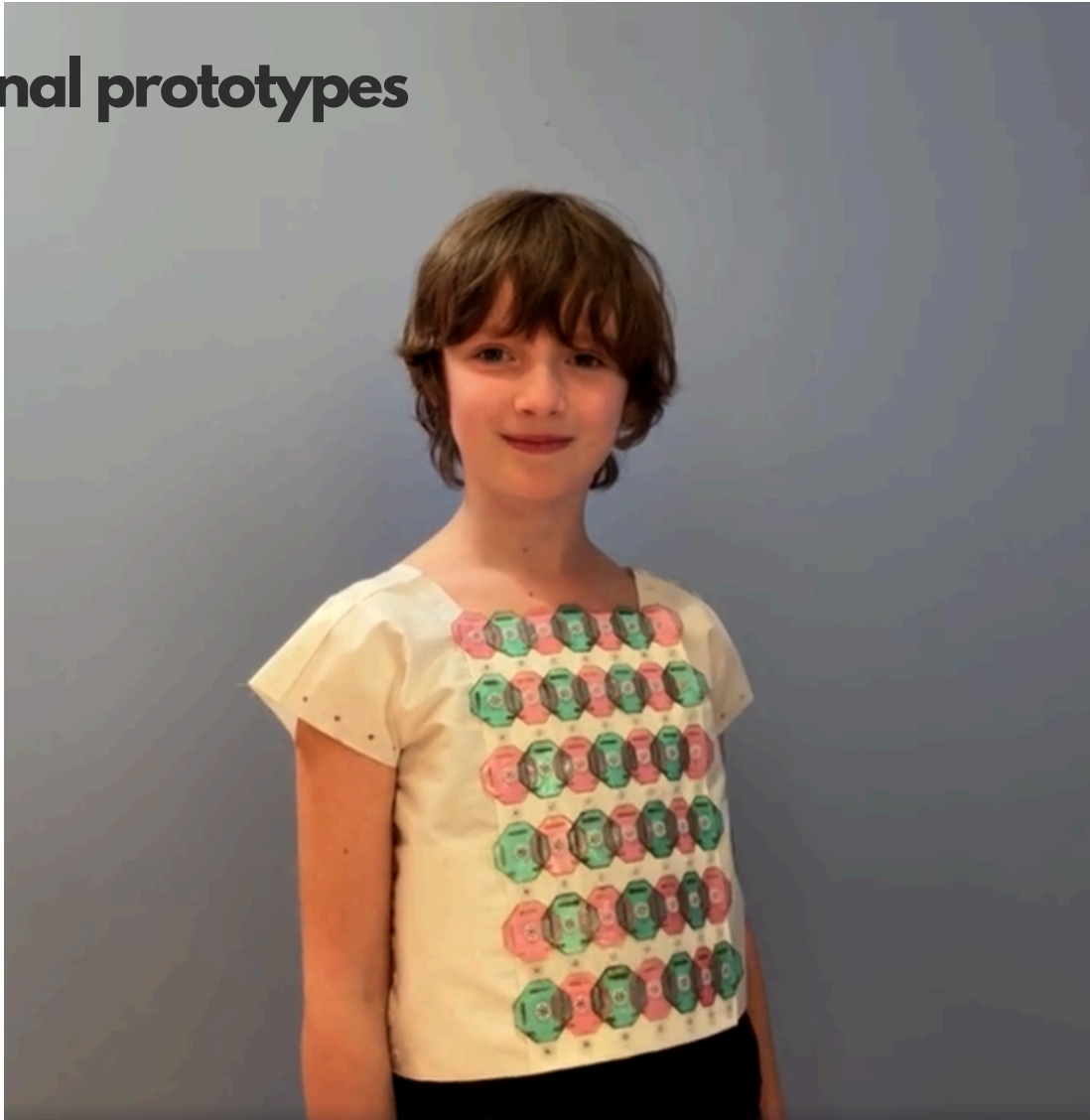
agency through craft

At the heart of this project is a return to collective making, transforming garment creation from an isolated industrial process into a shared human experience. By utilizing an accessible, stitchless assembly system, the project invites families and friends to reengage in the historic tradition of domestic craft. The process of building, customizing, and altering clothing becomes a collaborative ritual, creating meaningful opportunities to make clothes alongside loved ones and passing down tangible skills through generation-spanning activities.

The modular architecture of the garments introduces a new paradigm for circular fashion economies rooted in social exchange. Because the clothing is built from standardized, interchangeable panels and snap components, garments can be dynamically shared and customized across social networks. Friends and family members can trade individual elements—such as biofabricated appliqués, structural sleeves, or colored panels—to instantly refresh their style without purchasing new products. This open-source exchange system fosters a community-driven wardrobe that thrives on collaboration rather than consumption.

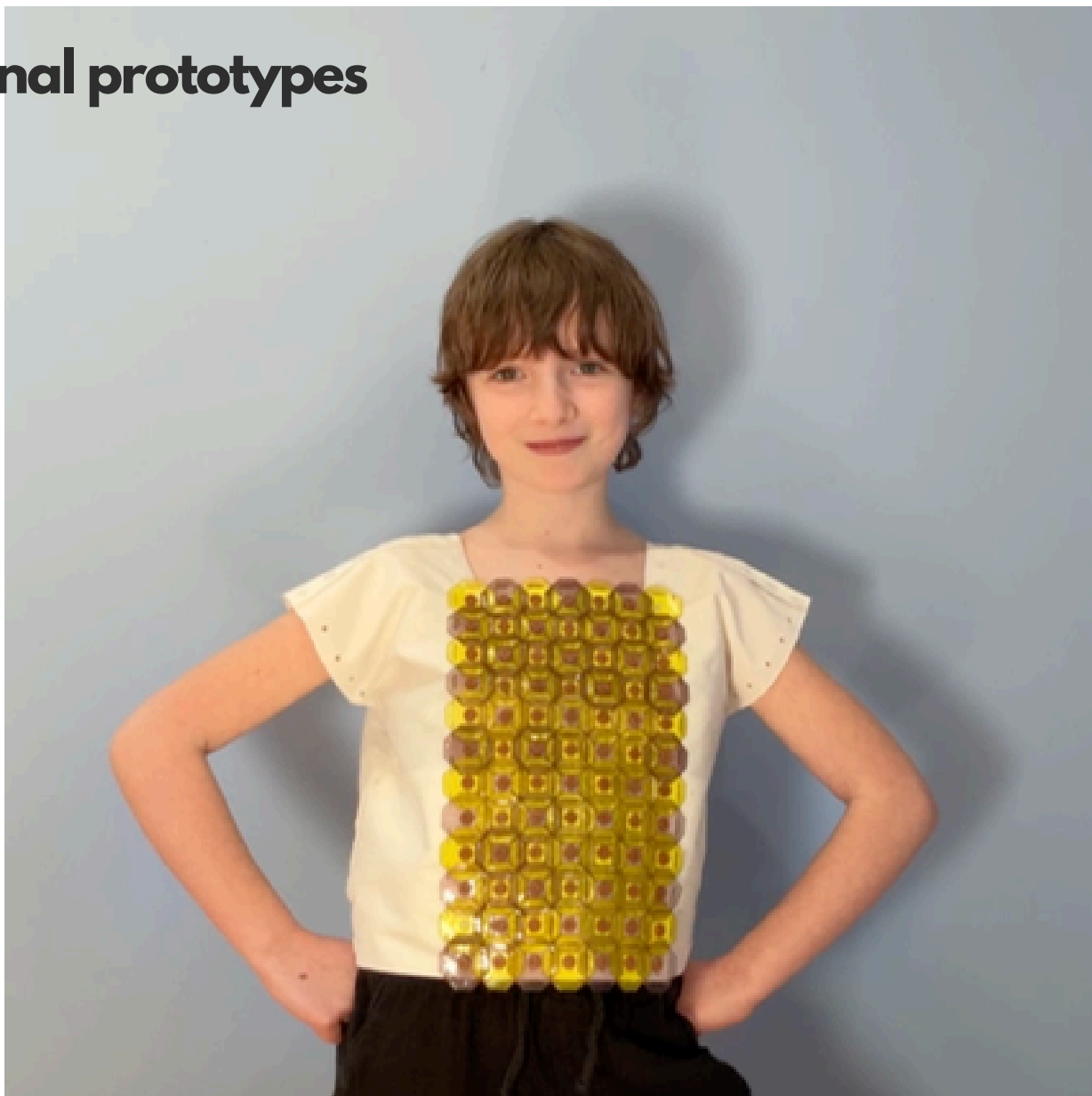
Ultimately, this project strips away the dependency on mass-manufacturing by situating consumers as the primary instigators and designers of their own wardrobes. Providing individuals with the tools to pattern, adjust, and repair their own clothing creates a profound sense of creative agency and self-sufficiency. This decentralized, localized production model empowers people to build and maintain a highly personalized wardrobe that adapts to their changing bodies and lives, shifting the role of the consumer from a passive buyer to an active, autonomous creator.

final prototypes





final prototypes







artist/ contributors

Alison Heryer is an interdisciplinary artist whose work combines textiles, performance, and social practice. She has exhibited work in theaters, galleries, screens, storefronts, and public spaces across the world. She loves thinking where clothing comes from, how it is made, and how it is used to construct identity.

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Nuria Robles

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Avalon Kovac

Fabrication Assistance:
Genevieve Hildebrand-Chupp

