



# Photonic Fabrics

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## Introduction

While reusing and recycling materials used by clothing brands and manufacturers is necessary to deal with the mass of clothes accumulating in aged inventories, it does not significantly improve environmental footprint. This is because the rate of clothing production and consumption is expected to accelerate. Ultimately, sustainable fashion means less fashion, which contradicts the mainstream business model of producing and consuming more.

## Background

With the rise of e-commerce, consumer demand can come from anywhere at any time. Fashion brands must now have a more agile production cycle to adapt their supply to the consumer's changing demands. The standard industry practice has been for fashion brands to purposefully overproduce for fear of missing out on the sales of their future #1 best seller. They operate under the assumption that the profits of their top sellers will offset their financial cost of overproduction while marginalizing their environmental impact. However, this business model of ensuring overproduction and encouraging overconsumption resulted in \$50 billion loss every year for U.S. retailers due to aged inventory.

## Concept

Create versatile eco-friendly fabric that would

- Reduce textile waste
- Improve clothing reusability

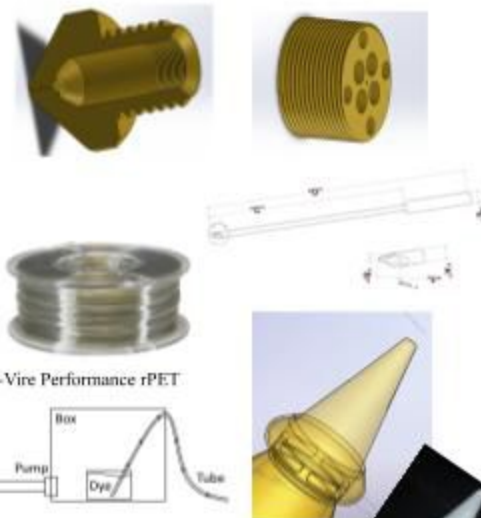
## Materials

- rPET 3D Printing filament
- 3D Printer
- Customized nozzle
- Pressurized pumping system
  - Acrylic box
  - Air/pressure pump
- Acid Red 1, Acid Yellow 42, Acid Blue 277

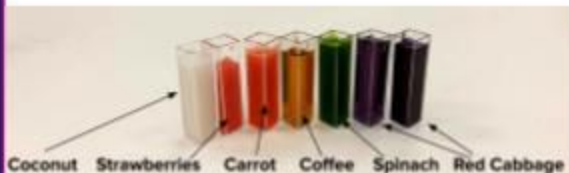
## Methods

- Assembled a 3D printer and customized extruder nozzles for fiber production
- Determined that rPET would be the best fiber material for our purposes
- Researched options for water soluble dyes and food coloring
- Constructed a syringe pump to inject the dyes

## DESIGNS



N-Vire Performance rPET



## Timeline



## Conclusion

**"sustainability" will be both the single biggest challenge and the single biggest opportunity for the industry in 2020"**

—The State of Fashion, McKinsey

By reducing the amount of textile and dye waste generated, Photonic Fabrics aims to transform conventional, linear fashion into circular fashion.



## Acknowledgements

