

# Fashion + Technology

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## Sociology of Consumption & Fashion

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10 November 2020



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Aalto-universitetet  
Aalto University



# Who?

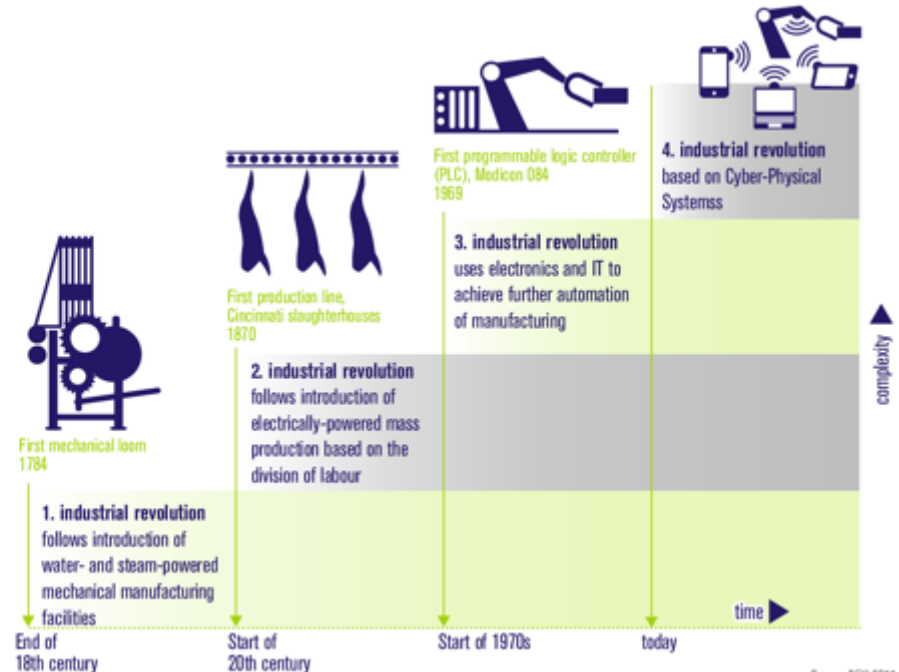
- BA (**Lahti Institute of Design, 2006**) & MA (**Aalto ARTS, 2013**) in fashion design,  
Research-based thesis on open-source fashion  
Worked in the industry and as a freelancer
- Doctoral Candidate at **Aalto ARTS Department of Design (2017-)**  
*“Fashion Designers’ Authorship and Professionalism in Contemporary Technological Environments”*  
*How the professional jurisdiction transforms in fashion 4.0 practices?*
- Visiting Fulbright Scholar at **Parsons School of Design (2020)**
- Project **Intimacy, Creative Work and Design** in consortium **IDA – Intimacy in Data-Driven Culture**,  
Strategic Research Council at Academy of Finland

# Context: Fashion 4.0

New technological and organizational paradigm linked to the loose concept of Industry 4.0 that operates in cyber-physical space and develops towards smart products, production and networks, automation, optimization, flexibility, as well as sustainability-oriented, datafied and customer-driven processes (*Schwab 2016; Bertola and Teunissen 2018*).

Six design principles:  
interoperability  
virtualization  
decentralization  
modularity  
service orientation  
real-time capability  
(*Hermann, Pentek & Otto 2015*)

Figure 1:  
The four stages of  
the Industrial Revolution



# Fashion + tech

“[...] fashion itself can be considered as a history of technology” (*Quinn 2002, 3*)

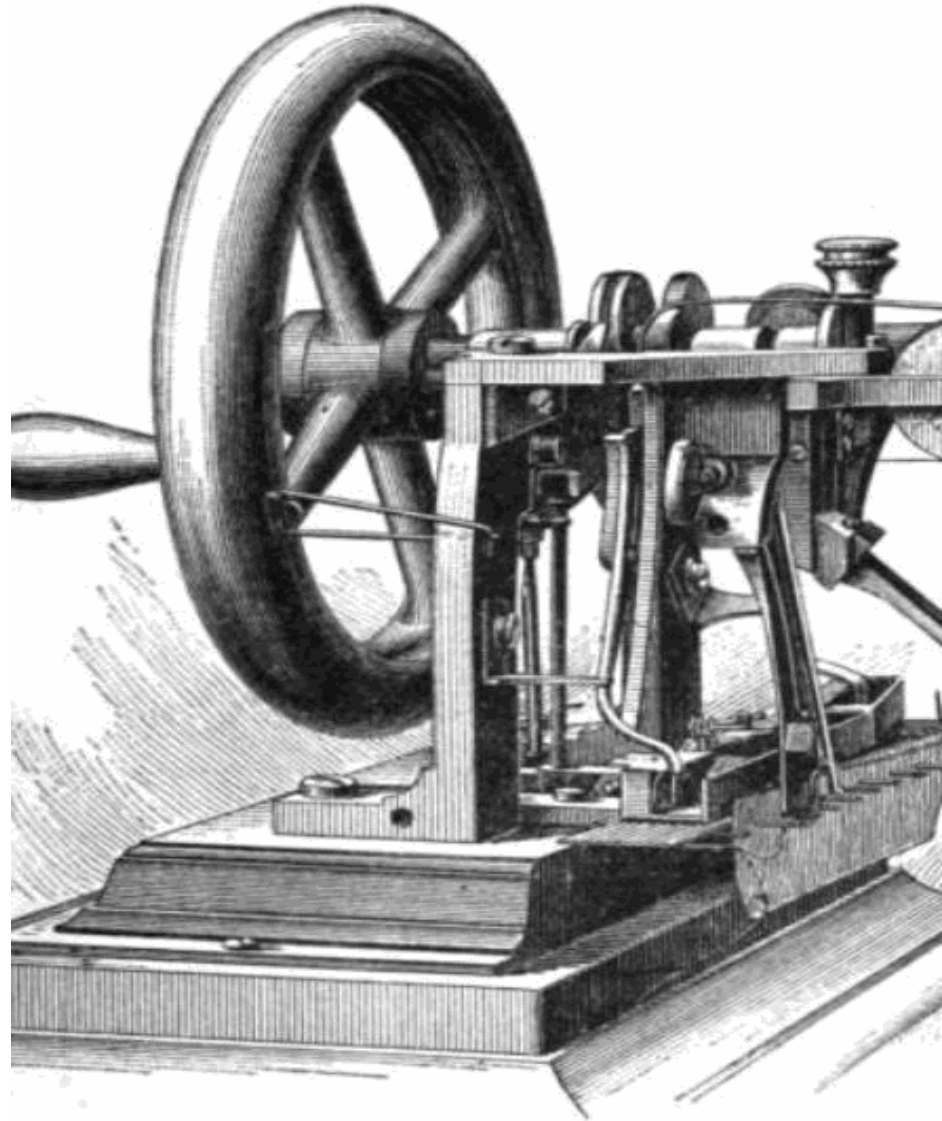
**First:** water & steam, mechanical production

**Second:** electricity, mass production

**Third:** informational, off-shoring, digital tools

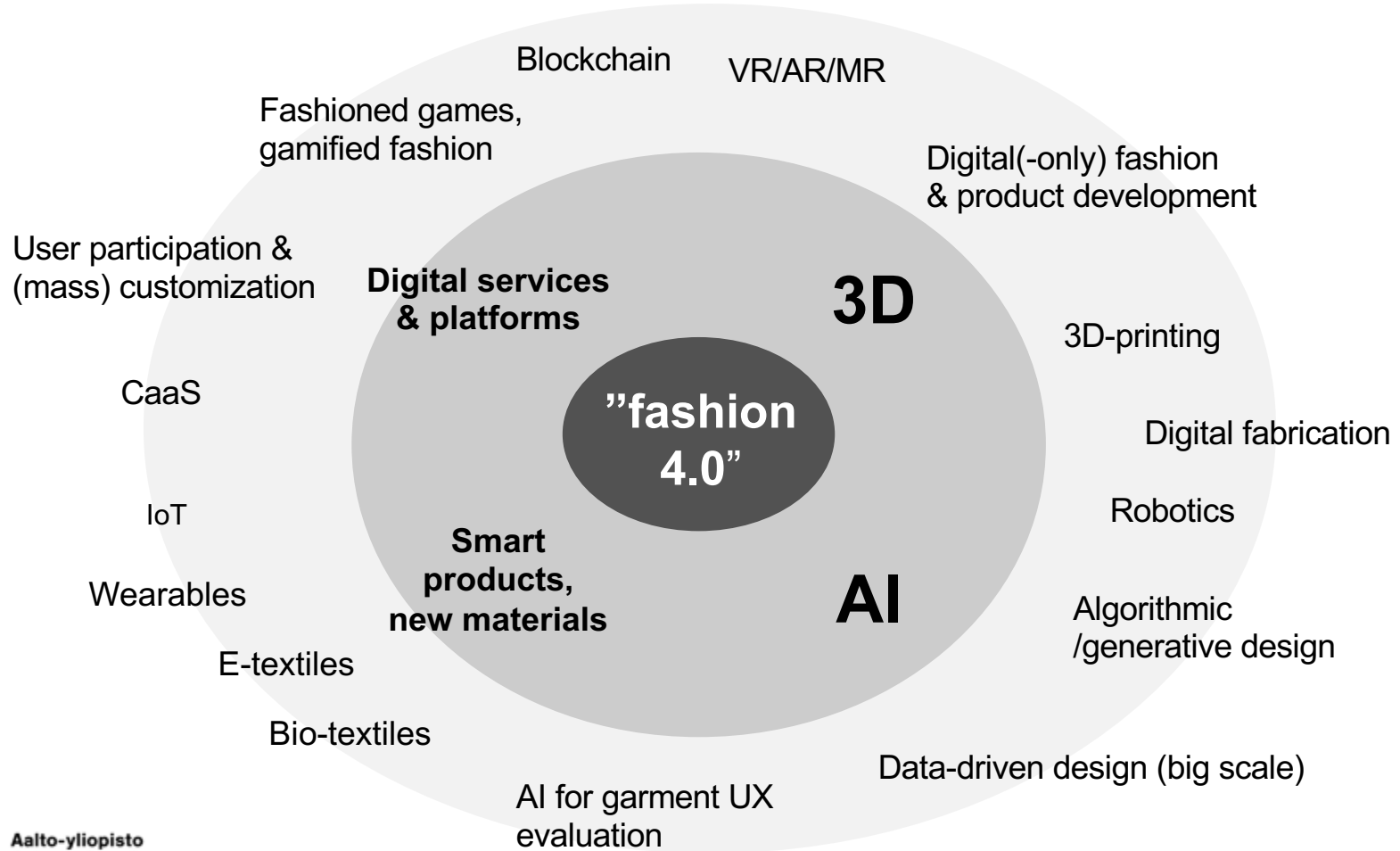
**Fourth (now):** smart digital technology, products and processes

(*Bertola & Teunissen 2018*)

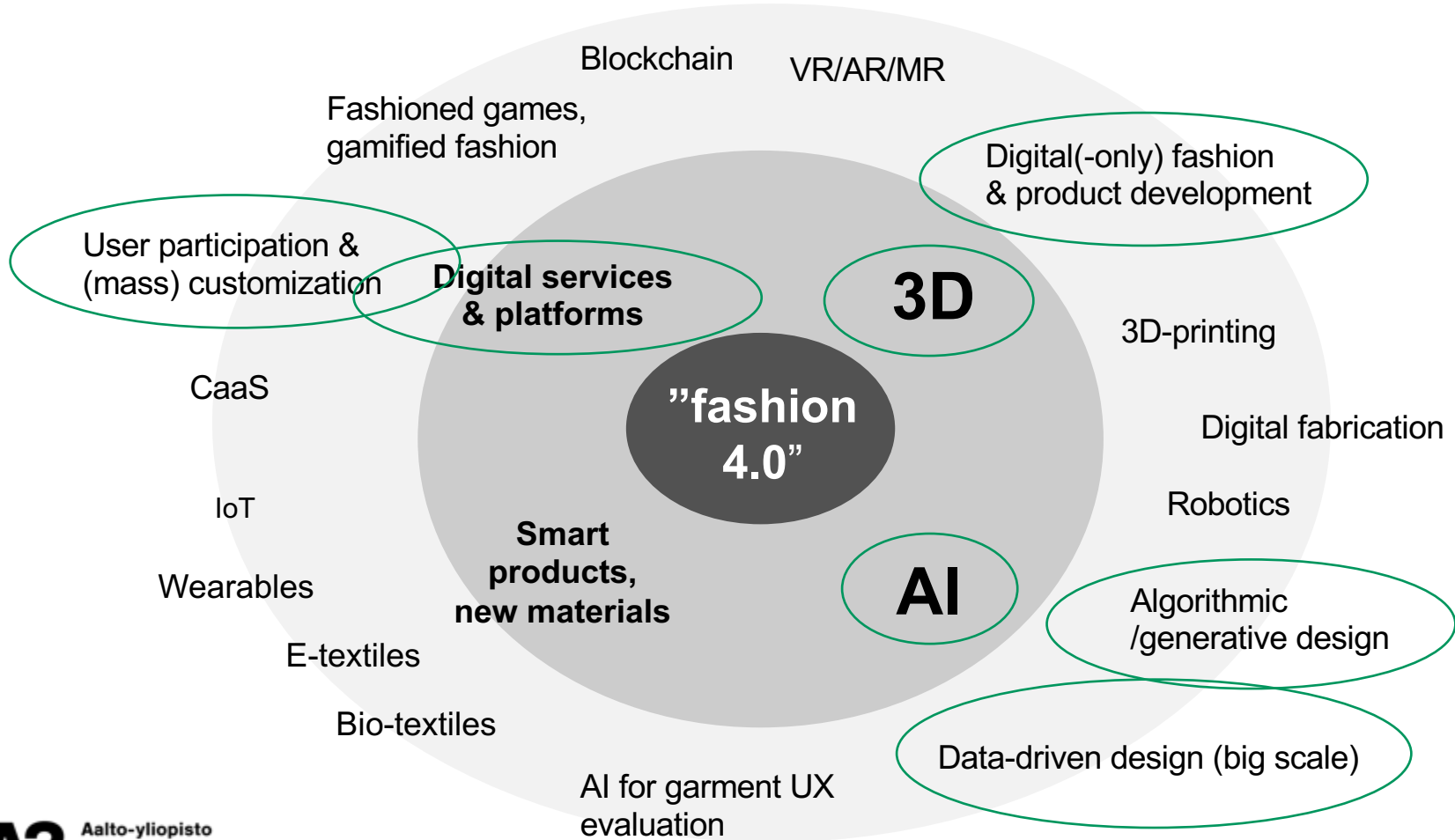




# Fashion 4.0 overlapping streams



# Fashion 4.0 overlapping streams



**Digital services  
& platforms**

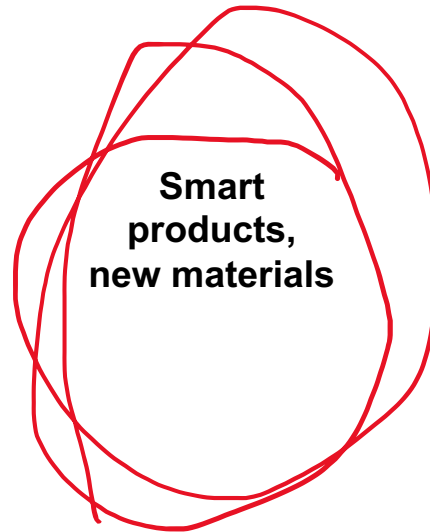
**3D**

**Smart  
products,  
new materials**

**AI**

**Digital services  
& platforms**

**3D**



**Smart  
products,  
new materials**

**AI**

A close-up photograph of a woven textile, likely a smart fabric. The fabric features a complex pattern of blue, black, red, and gold threads. The blue threads are prominent on the left side, while the black threads form the base of the weave. Red and gold threads are visible on the right side, creating a diagonal pattern. The overall texture is highly detailed and intricate.

# Smart products, new materials

- Wearables (IoT)
- E-textiles and integrated tech

# Hard wearables

OURA

WHY SLEEP MATTERS WHY OURA HOW OURA WORKS LATEST [SHOP](#)

RINGS ACCESSORIES





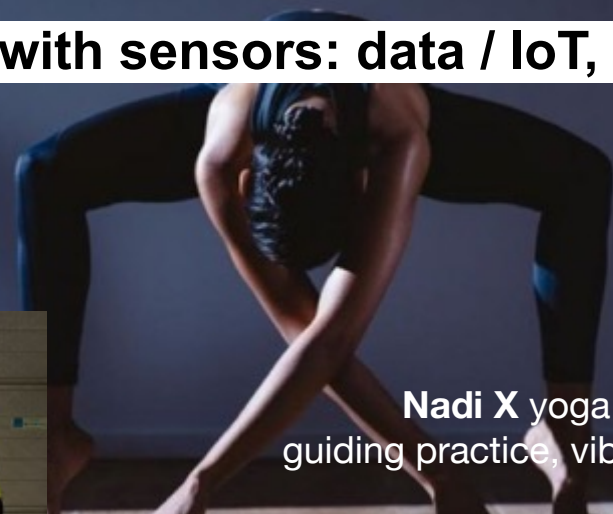
## Hard wearables



**Xenoma** smart pajamas for dementia patients



## Soft wearables with sensors: data / IoT, HCI



**Nadi X** yoga pants  
guiding practice, vibrating



**Imagewear** -workwear



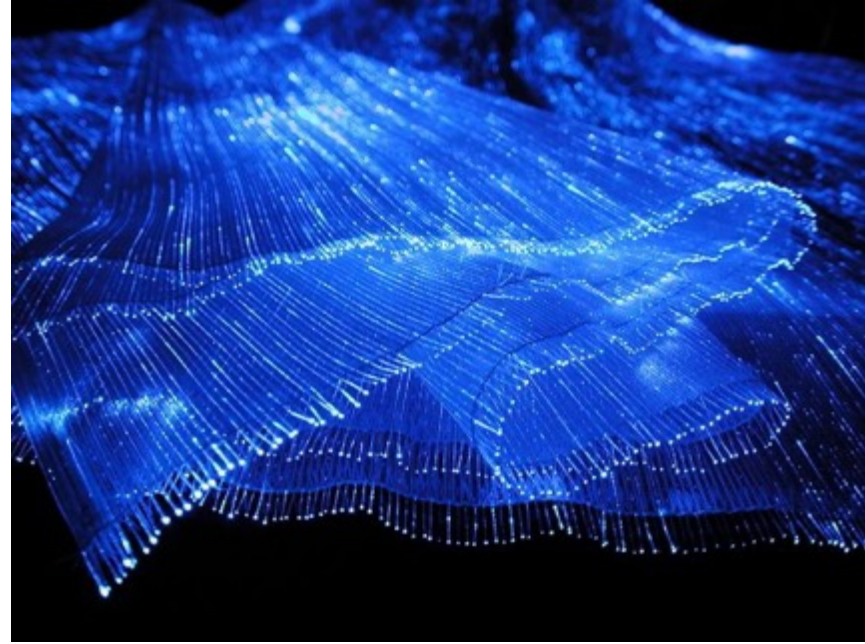
**Komodo AIO** sleeve monitors e.g. heart rate and sleep



**Owlet** baby monitor sock



## Soft wearables with physical function (charging, heating, light etc.)



Pauline van Dongen's solar garments



<https://www.youtube.com/watch?v=9uuhxGhD9bo>



**Digital services  
& platforms**

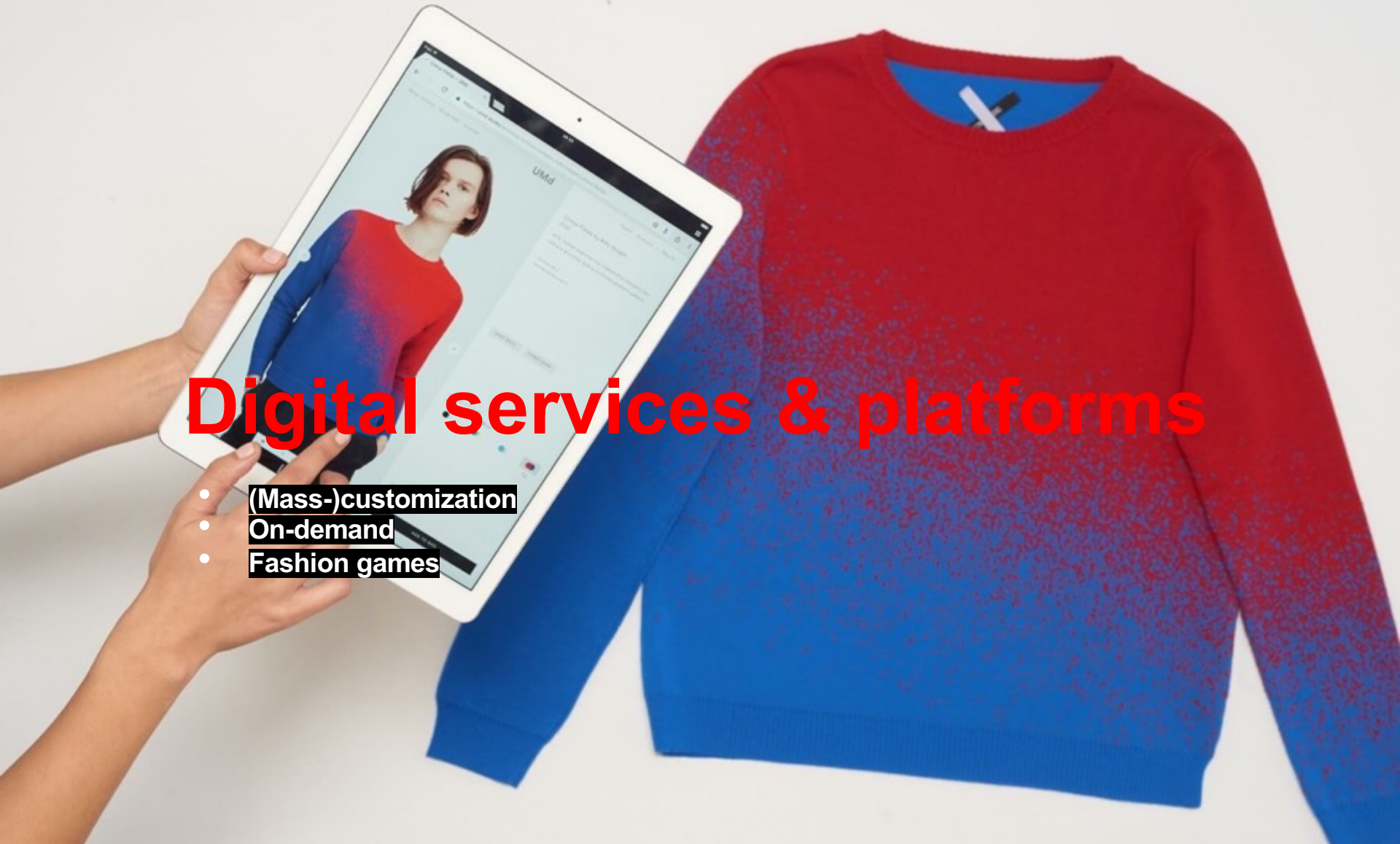
**3D**

**Smart  
products,  
new materials**

**AI**

# Digital services & platforms

- (Mass-)customization
- On-demand
- Fashion games



# NIKE ID



DONE

- Modular design
- On-demand production

TOE



Black



Cool Grey



Wolf Grey



Obsidian



Game Royal



University Red



Team Red



University Gold





# COLLEGE-PAITA

57,00

VAIHDA PUOLTA



## SUUNNITTELE OMASI

RUNKO ☒ Smokey Blue

YKSIVÄRISEKSI

LYHYET HIHAT ☒ PITKÄT HIHAT

Oikea resori ☒ Terracotta

Vasen resori ☒ Terracotta

PYÖREÄ PÄÄNTIE ☒ HUPPU

VAIN HUPPU ☒ KISSA LEPAKKO DINO

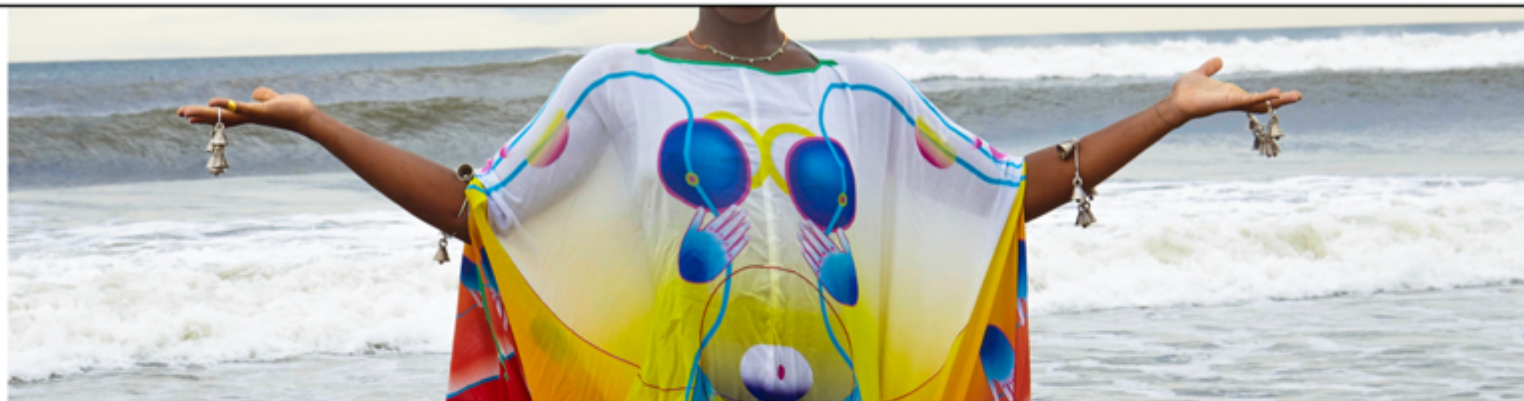
ILMAN TASKUJA ☒ VETOKETJUTASKU

LISTATASKUT

Tasku ☒ Terracotta

Palaute

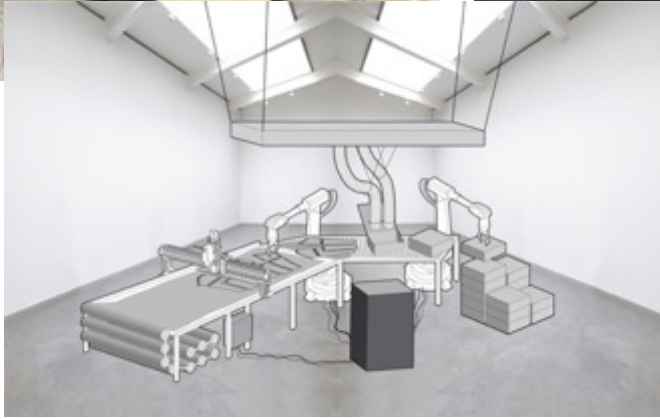
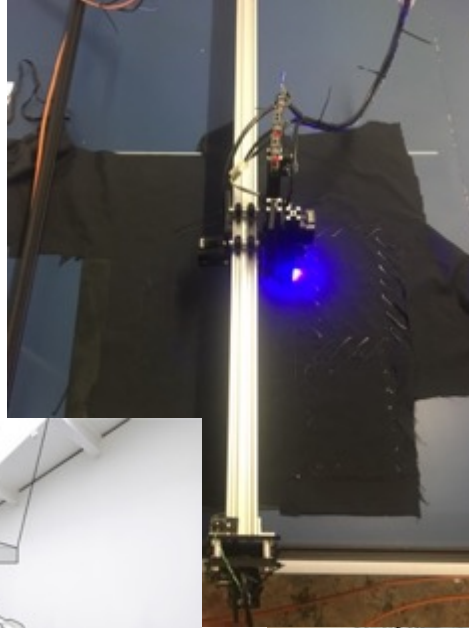
- Modular design
- On-demand production



## DIY - DESIGN IT YOURSELF



# Self-Assembly

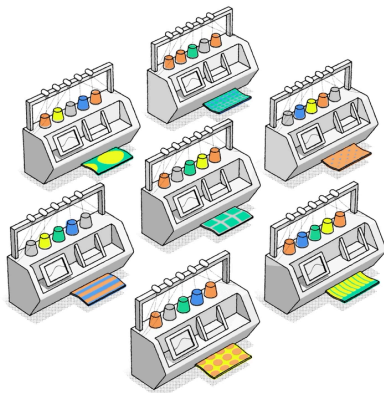
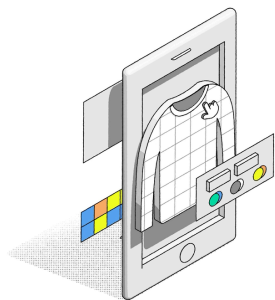


# Unmade

"We work together with you to create parameters that consumers can design their individual orders within. We call it *curated customisation*: brands have control but the consumer feels more involved and engaged in the experience and product."

<https://www.unmade.com/what-we-do/>

- Software + hardware
- On-demand digital production





“consumer-driven, on-demand  
production; the end of mass production and mass consumption”

B2B, fashion and sportswear industry



# Gamified fashion



<https://www.drest.com/>

# Fashioned games



Animal Collective / Nintendo Switch



<https://www.gq.com/story/nba-2k-fashion-designer>

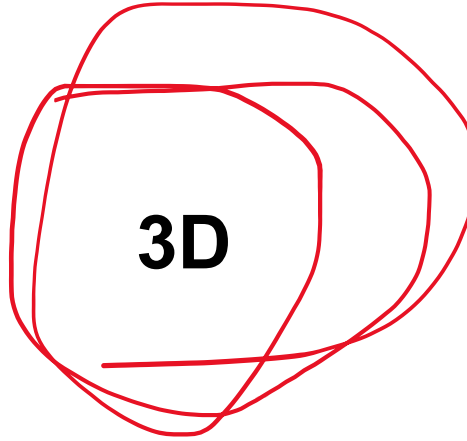


"Making an NBA game without fashion designers is like building an aquarium without water".

Louis Vuitton  
X League of Legends



**Digital services  
& platforms**



**Smart  
products,  
new materials**

**AI**



A 3D digital fashion model is shown in a desert landscape. The model is wearing a long, white, open coat over a patterned skirt and leggings. It has a metallic, helmet-like head and colorful, reflective sunglasses. The background features rugged, brown mountains under a clear blue sky. A large, colorful, abstract fabric structure is visible on the right side of the frame.

# 3D

- Digital(-only) fashion
- 3D printing

# The rise of “digital fashion”

Digital 3D-design/modeling is argued to enable...

- unlimited creative experimentation
- minimization of resource use and investment
- an inclusive approach to bodies and identities (no sample sizes)
- accessibility of luxury and digitized archival fashion
- late hype and mainstreamization - especially during COVID-19 restrictions



Fig.1  
Issey Miyake  
Pleats Please Dress  
1996



Fig.2  
Thierry Mugler  
Jacket  
1988



Fig.3  
Issey Miyake  
Suit: Jacket, Skirt  
c. 1989



Fig.4  
Diane McCardell  
Dress  
1945

Superficial

@lilmiquela

Tommy Hilfiger



2019 "The world's first digital blockchain clothing sells for \$9,500"



<https://www.thefabricant.com/digital-science>



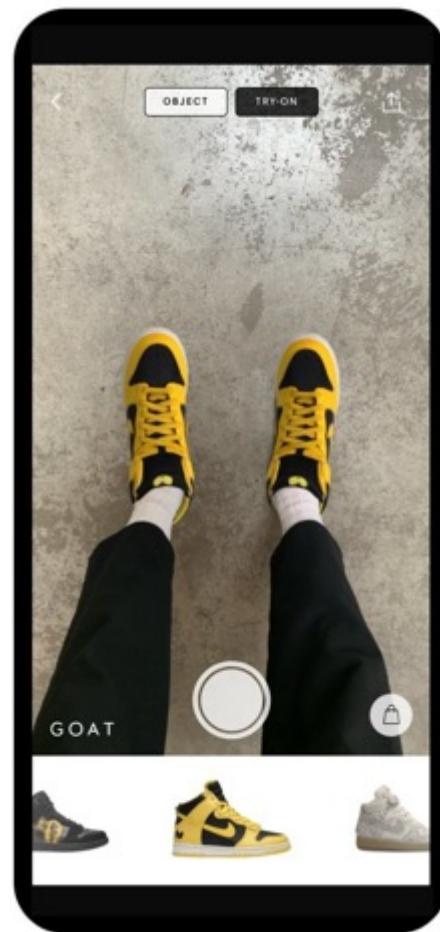
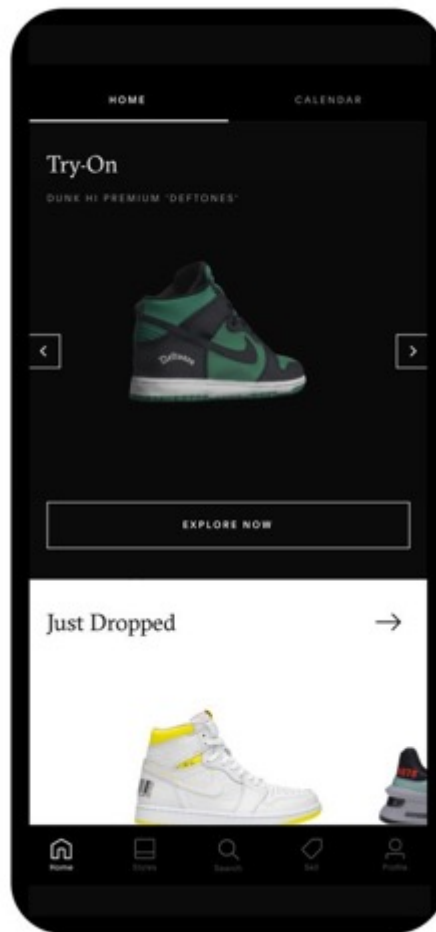
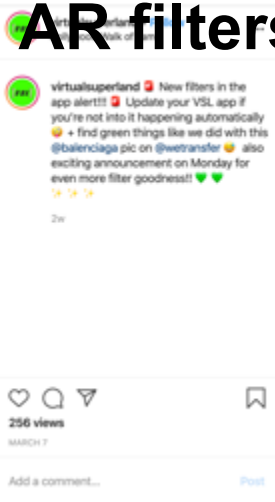
# VR and virtual fitting



Silk Caftan Light Yellow  
atacac's store

**S 300**

# AR filters /experiences, tailored or real-time







# ***R-O-H-B-A-U Digital Hoodie***

**€40,00**

Tax included.

Colour

Iridescent Rosé

Quantity

-

1

+

**ADD TO CART**

Buy with  Pay

[More payment options](#)

The ROHBAU digital hoodie is our signature unisex digital garment.

This **SUPER LIMITED** digital-only hoodie is the core of our brand and what we believe to be the future of fashion. Behind it lies the conviction that digital fashion fully embraces the potential of being fully sustainable.

**KEY FEATURES**

# Designer-friendly 3D-software

- Garment as 3D-file made in 3D-software
- Design and prototyping > sample and/or end-product
- Real-time visualization
- Hyper-realistic outlook

TRUST  
VIRTUAL  
SAMPLING



(Dita Vārna, 2019 @\_\_dita\_\_)



# Atacac



2019-2019 SHORT 4x



JUMPSUIT 4x



ATACAC SQUIRREL COAT 4x



KAFTAN 4x



ATACAC BODYSTOCKING 4x



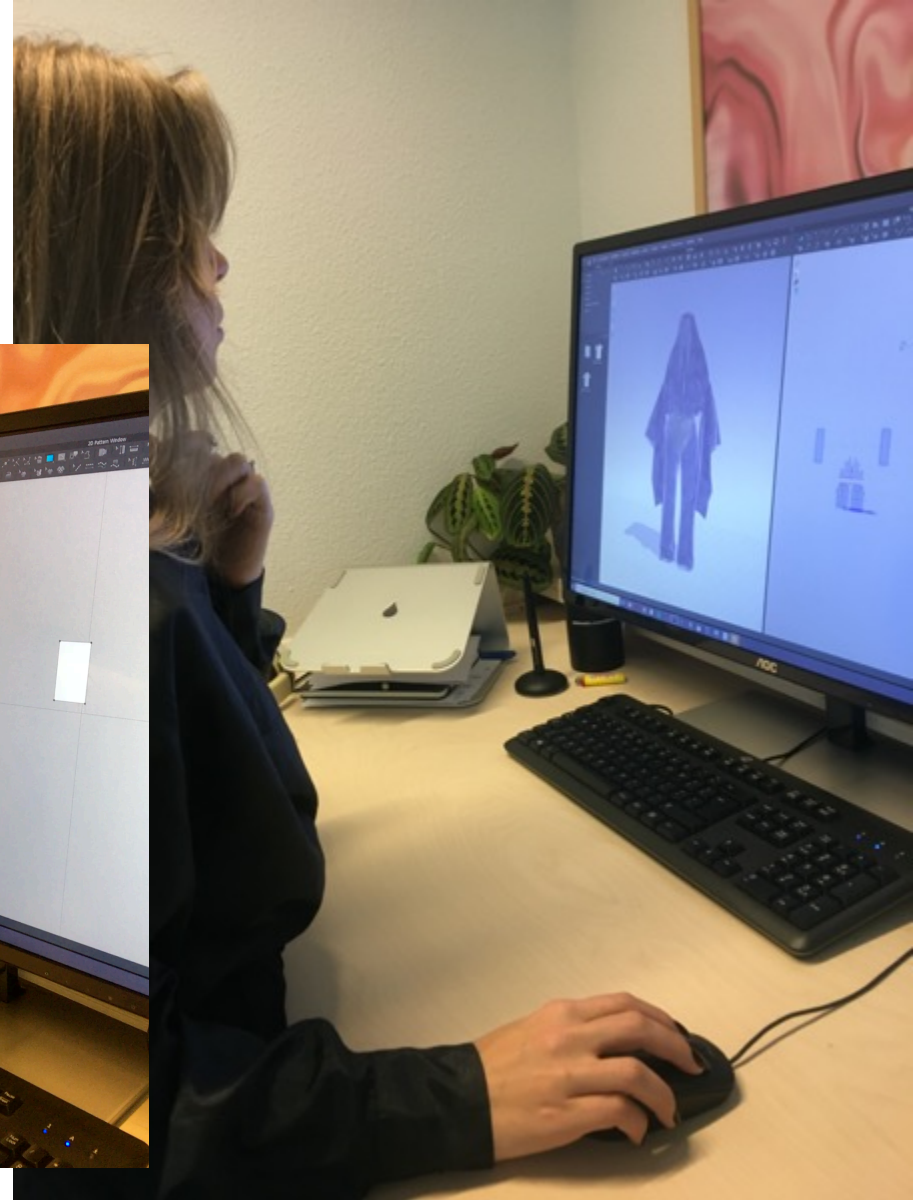
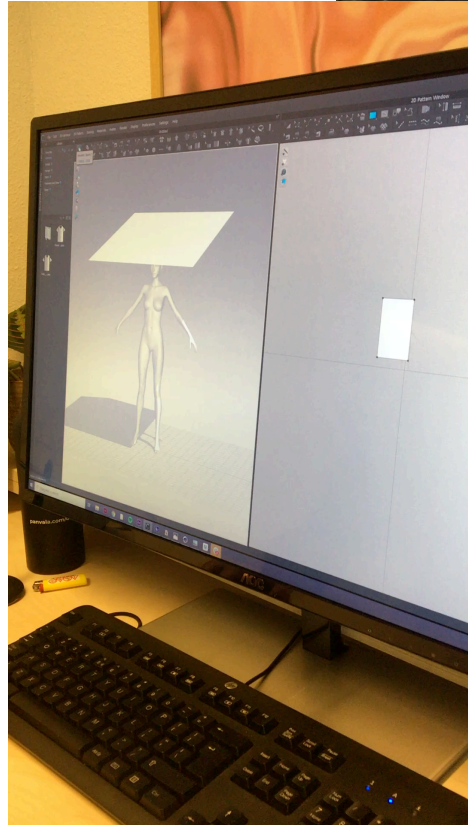
- fluid datafied object + user-driven customized on-demand production





# The Fabricant

- Small fashion company, located in Amsterdam and founded by a visual effect specialist (with Finnish roots!) and a fashion designer
- *Digital-only* “thought couture”, “the first digital fashion house,” digital craftsmanship
- End-products: digital garments, styles, concepts, stories, animations and films
- Draping on avatar, experimentation with surreal - does fashion need to *exist*, *physically*? (functional + expressive layer)

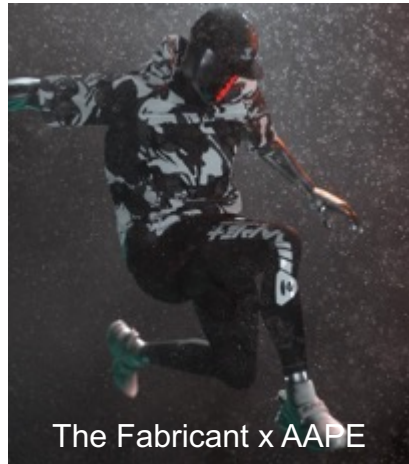




The Fabricant X I.T Hong Kong



THE FABRICANT



The Fabricant x AAPE

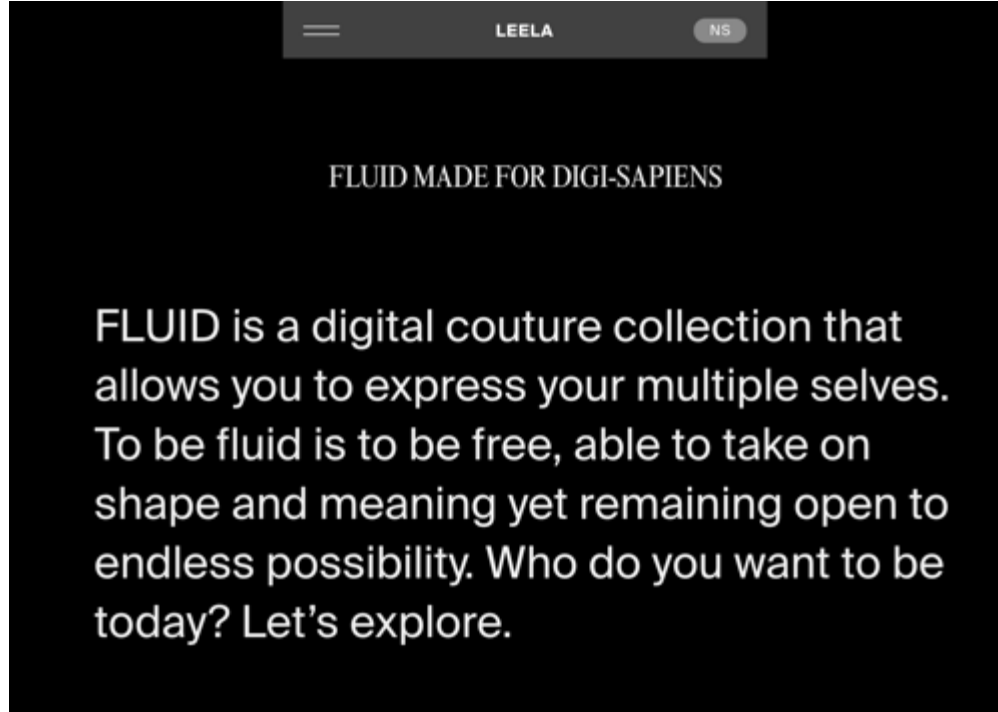


**FREE FILE DROPS**



# Leela-platform

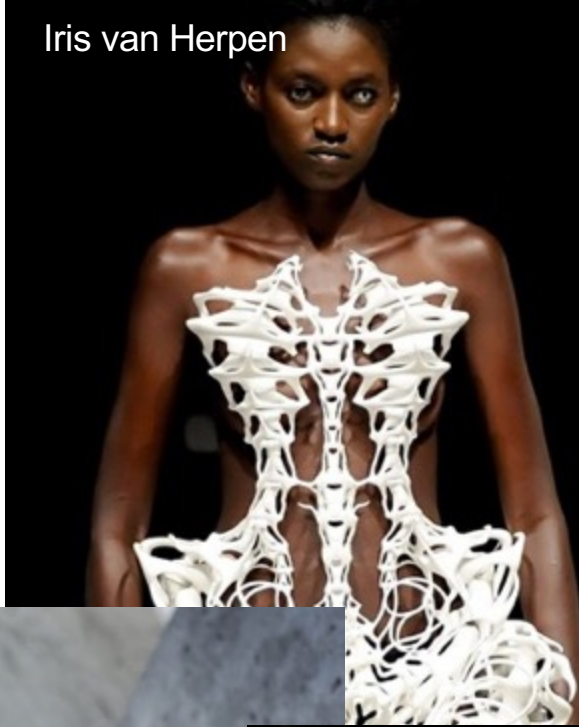
digital.fashion (beta-version)



# 3D-printing



Iris van Herpen



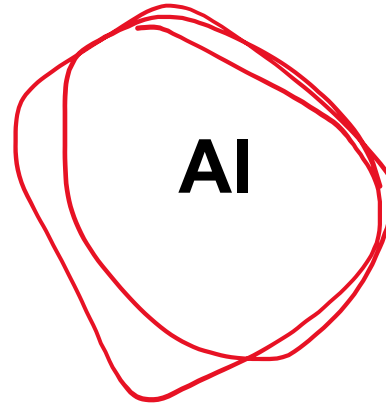
- 3D-models materialized
- Hard surfaces



**Digital services  
& platforms**

**3D**

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A!

AI

- Design
- Production
- Retail



Daniel Browns, 2018-9,  
GANs,  
machine learning  
- generating images





Little Black Dress re-imagined by AI  
<https://lbd-ai.com/>

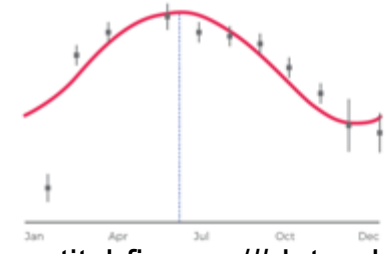
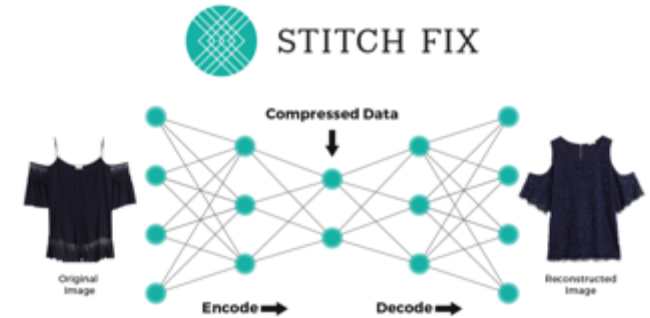
“Project Muze” by Zalando x Google, 2016



# Design

- Data analysis based on structured or unstructured input (big) data, acquired from e.g. social media, companies' online stores and virtual retail spaces – user, market and trend research > *optimization of design* – e.g. improved bestsellers (e.g. Stitch Fix)
- generation of *images* using machine learning, e.g. GANs (Generative Adversarial Nets) – conceptual approach or for inspiration – at some point 3D?
- Algorithmic and generative *pattern design* based on parameters
- Functional design – user experience research: performance, comfort, fitting
- **Augmenting human designer's creativity and practical decision making – useful where *numbers* are involved, not useful where we want human judgement, embodied knowledge and cultural nuances (fashion = social phenomenon)**

Luce, Leanne (2019) Artificial Intelligence for Fashion: How AI is Revolutionizing the Fashion Industry. Apress. DOI: 10.1007/978-1-4842-3931-5



<https://algorithms-tour.stitchfix.com/#data-platform>



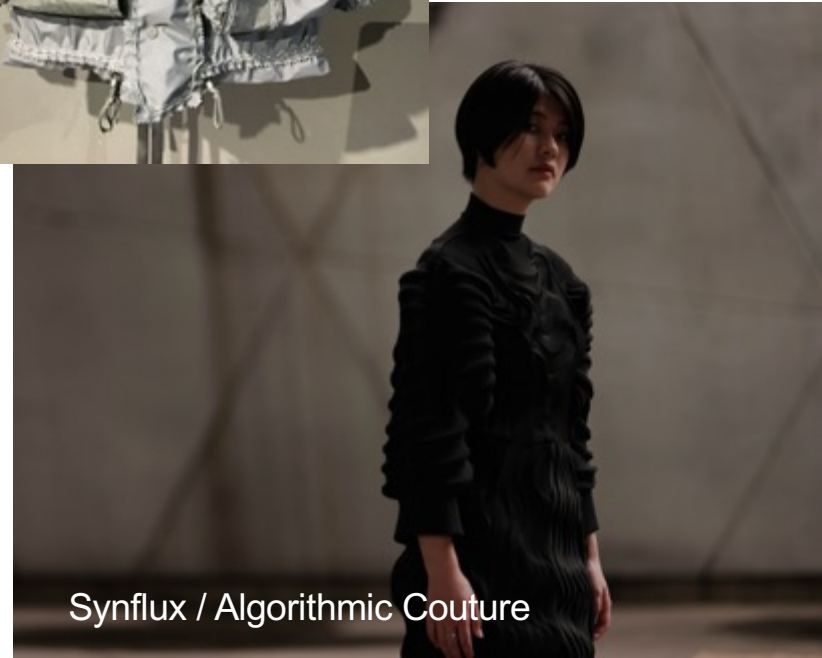
# Production

- Optimization of pattern placing or pattern shapes to maximize the material usage towards zero-waste (e.g. Algorithmic Couture)
- Optimization of resources and minimization of inventory and loss
- Automation and robotization of cutting processes and manufacturing
- Garment quality evaluation processes
- **Production efficiency, quality control and localization**

Thomassey, Sébastien and Zeng, Xianyi (eds.) (2018). Artificial Intelligence for Fashion Industry in the Big Data Era. Springer Series in Fashion Business. Singapore: Springer. DOI: 10.1007/978-981-13-0080-6



Matti  
Liimatainen /  
Self-  
Assembly



Synflux / Algorithmic Couture

# Retail

- Optimizing distribution, merchandizing, pricing and other operations that garments lifecycle includes
- Customized visualization\* of products on customers' avatars / body types
- Recommendation systems (styles, fitting)
- Shopping assistants and virtual stylists
- Virtual fitting rooms, smart mirrors

- **Personalizing shopping experience**

\* Yildirim et al. (2019) Generating High-Resolution Fashion Model Images Wearing Custom Outfits



# Why fashion tech?

- Technology for sustainability, e.g. digital-only fashion  
<https://bit.ly/36okGK7>
- Optimization of resources and products
- New business models beyond conventional fashion field & industry
- New materials, realms, spaces, roles
- Technologies for well-being, safety, prevention of crime – also surveillance?
- Critical examination is important – tech is developing faster than ethics



# Transformations in “fashion 4.0”

- **Virtualization, real-time capability**: physical → virtual body/material/context
- **Decentralization, individualization, service orientation, modularity**: mass → individual; producer-driven/designer-centered → consumer-driven (actively or passively)
- **Redistribution of creative agency, interoperability, redefinition of fashion professionalism** (especially in AI-fashion and mass-cust.)
- **Datafication**: questions of privacy and intimacy

# Thank you!

## Break-out rooms:

- a.** Which presented fashion tech developments do you find the most impactful/interesting? Think of 3 ways in which the culture of fashion might be transforming from a sociological perspective (or is it transforming?)
- b.** What/which of these fashion tech developments are relevant for your group work topic? Why/how?



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