

Production digitale par impression jet d'encre des aliments de demain: *défis et opportunités*

InnoFood & co – Cluster Food & Nutrition – 14 juin 2022

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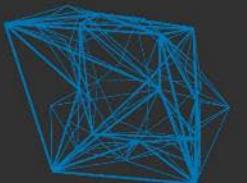
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inspire. challenge. create.

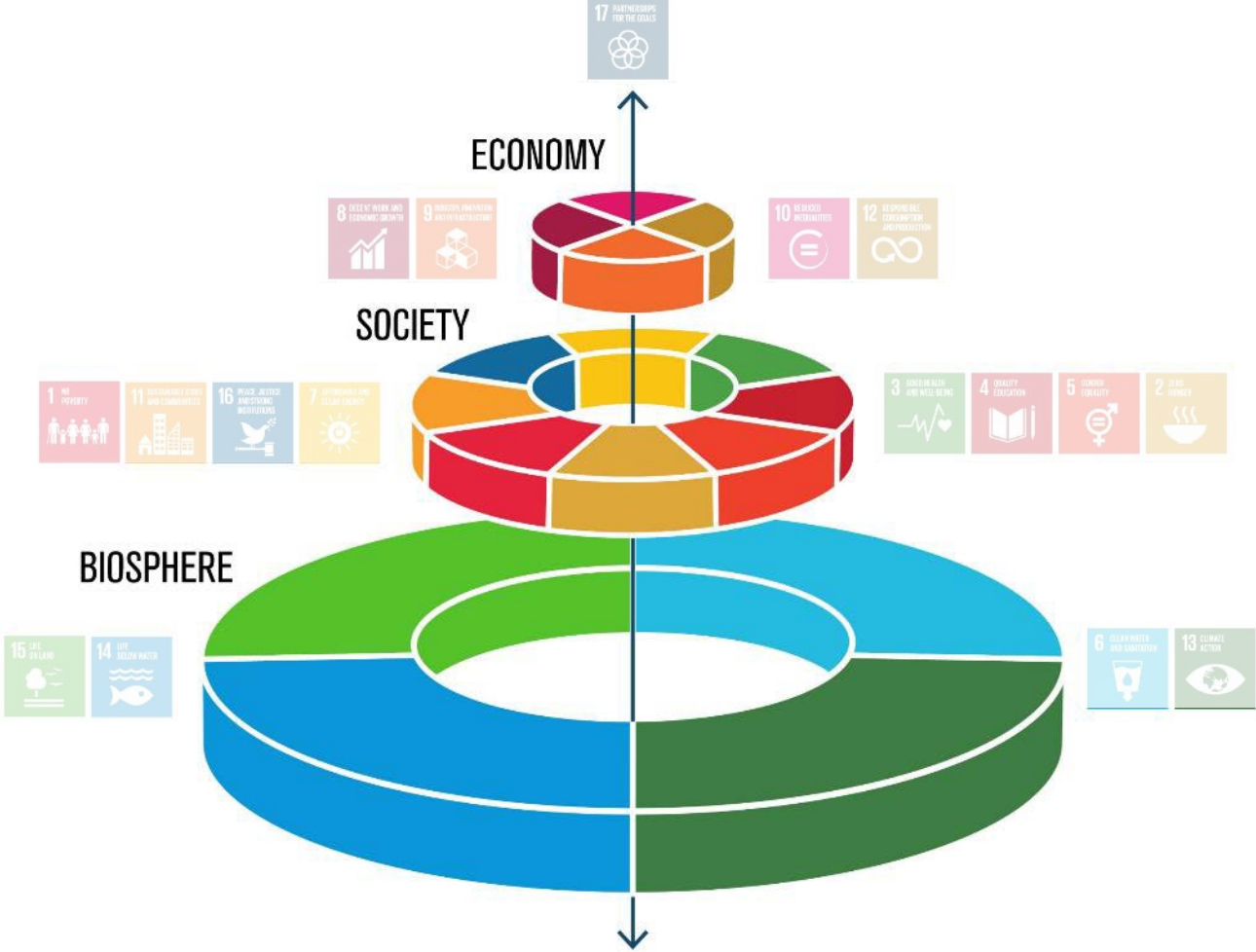


Haute école d'ingénierie et d'architecture Fribourg
Hochschule für Technik und Architektur Freiburg

Hes·SO
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de Suisse occidentale
Fachhochschule Westschweiz



Can we inkjet print a more sustainable cake?



Who would be ready to eat digitally printed food?



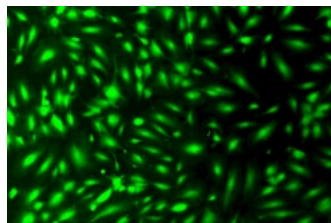
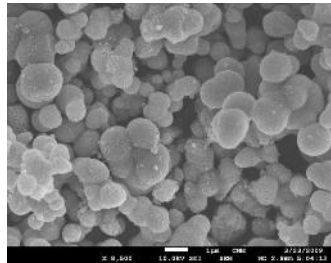
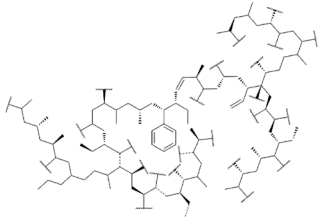


Digital production

The content of this presentation is confidential.

Digital production

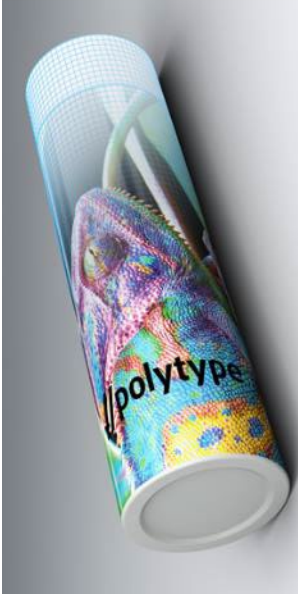
Material



Digital process



Product



Digital printing techniques for food industry

Powder based

Liquid based

Selective laser sintering/melting (SLS/SLM)

Binder/solvent jetting (BJT/SG-3DP)

Inkjet

Material jetting (DOD, MJM)

Extrusion (DIW, FDM)

Tool production

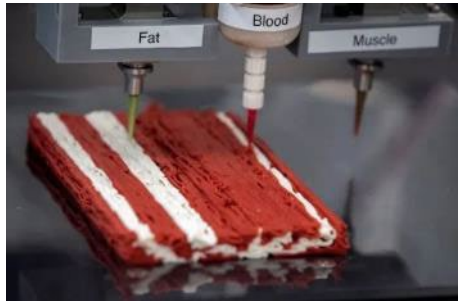
Food production



dti.dk



xlogic.it



thebeet.com

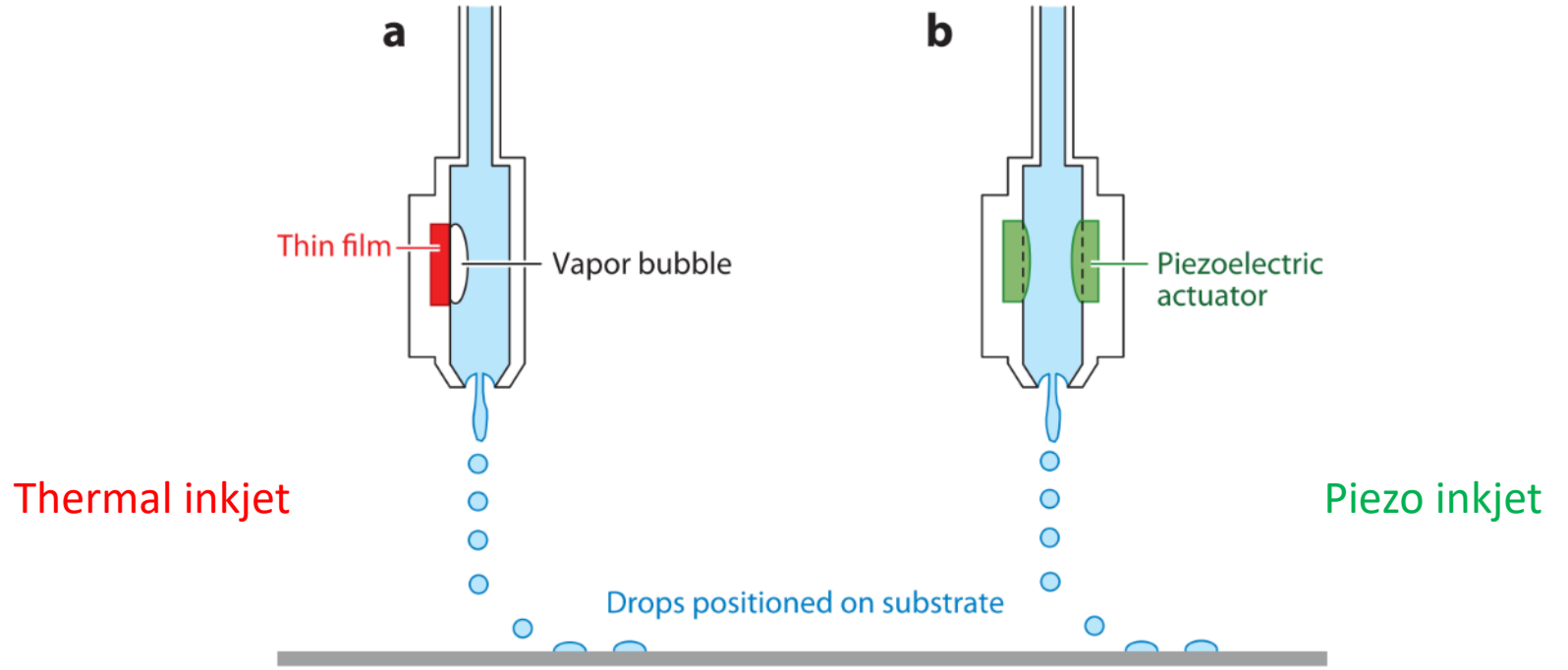
Inkjet printing



www.union-c.com



epson.com

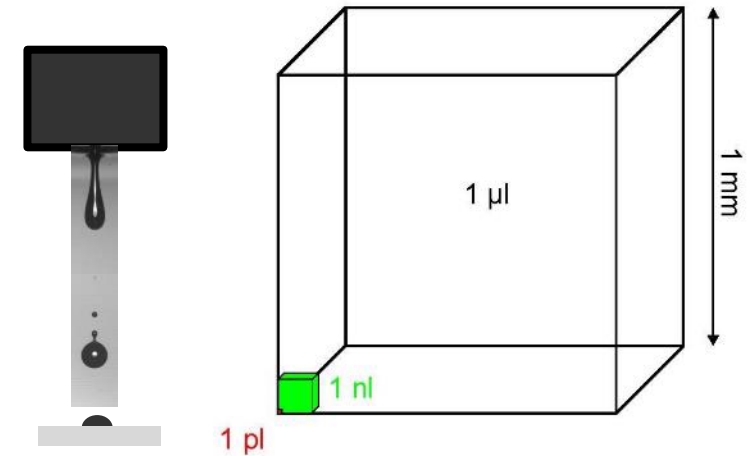


Derby (2010)

Why inkjet printing?

- **Non-contact process**

- ✓ Print on 2D – 3D objects
- ✓ Print out 2.5D – 3D objects
- *Shift from print to produce*



- **On demand & multi-material**

- ✓ Change design whenever you want
- ✓ Combine different materials
- *Mass customization*



- **High definition and productive**

- ✓ Photographic quality
- ✓ High speed (e.g. 100 m/min)
- *High-value production of the future*



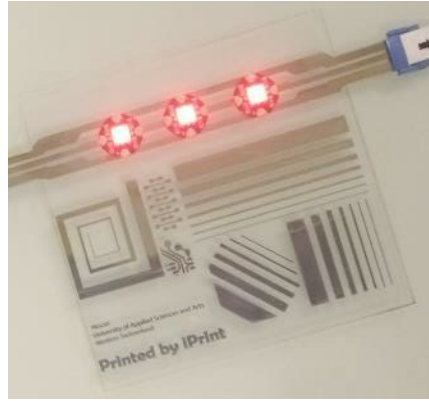
https://japan.mimaki.com/special/3d_print/gallery.html

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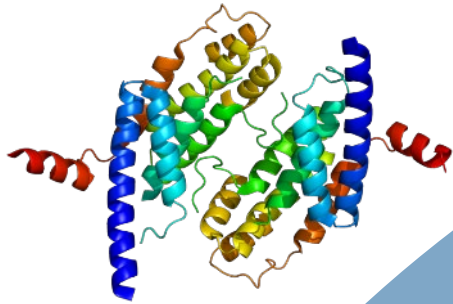
Inkjet possibilities



j-oled.com



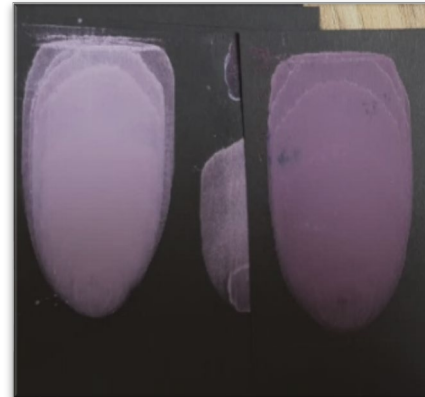
meatech3d.com



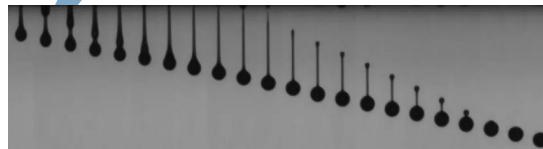
Surface functionalization

3D printing

Controlled liquid volume deposition



stratasys.com



Opportunities

Material

- Minimal quantities
- Food substitutes
- Specific
- Circular economy
- Local

Digital process

- On demand
- On site
- Less waste
- Multi-process
- Multi-material
- Mass customization
- More efficient
- Industry 4.0

Product

- Personalized
- New possibilities
- Healthier
- Better performance
- Added value
- Direct-to-shape
- Identification
- New business opportunities (digital)

Challenges



- Complex fluids
- Specific requirements
- Storage
- Supply chain

- Need new technologies
- Need driving market
- Technology cost

- Who pays additional cost?
- Brand owners should drive the revolution!
- Regulations
- Customer perception



Examples

Chocolate printing

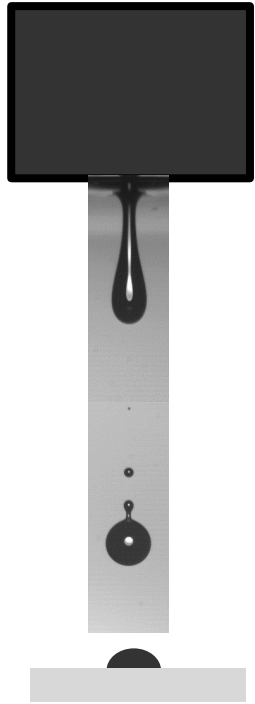
Natalia Carrie



Material



Digital process



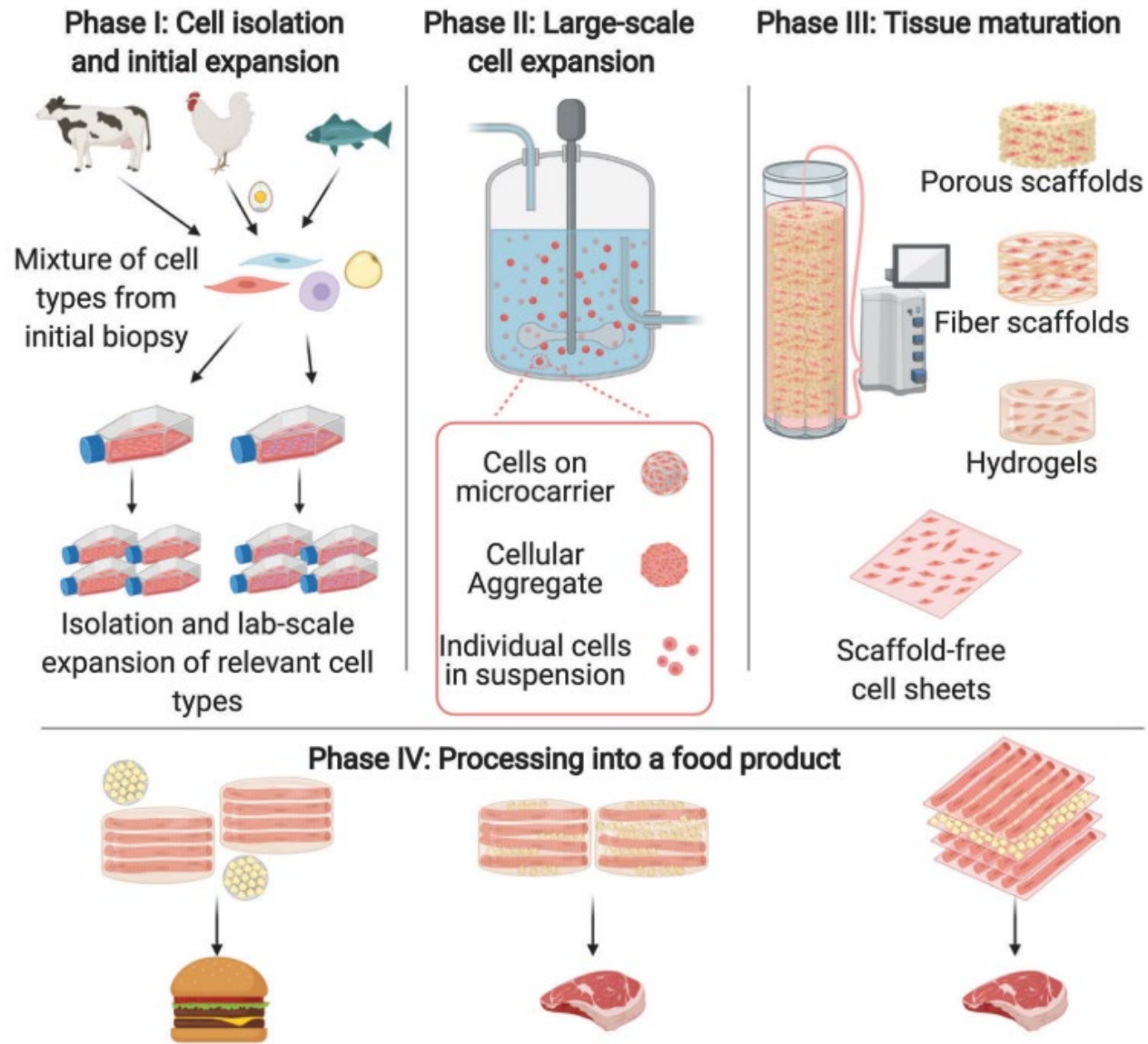
Product



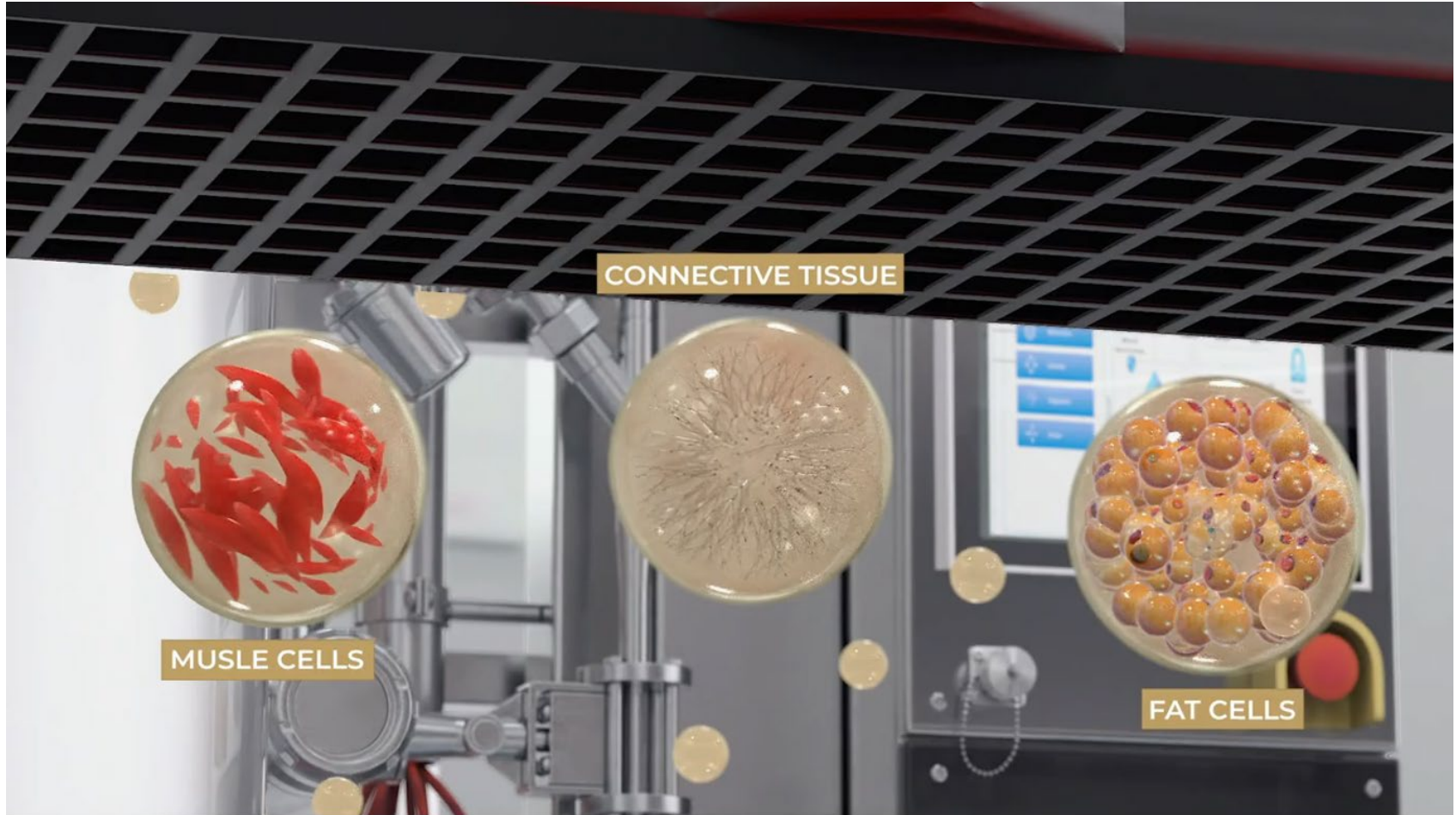
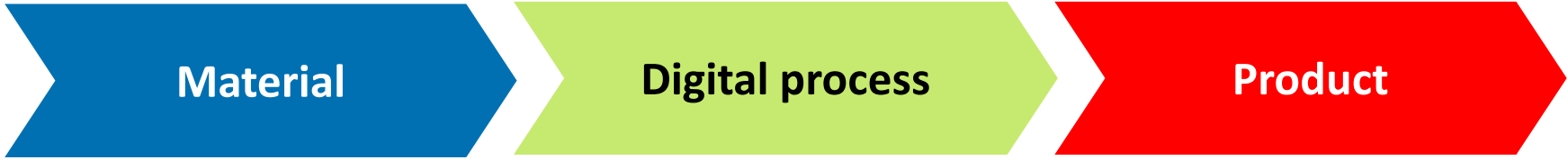
maisonamarella.ch



Cultured meat



Cultured meat (MeaTech)



*And now,
who would be ready to eat digitally printed food?*



Packaging

Decoration



kurz-graphics.com

Texturization



cmaimaging.com

Functionalization



fujiko.jp

Direct printed packaging



3dnatives.com



iPrint – HEIA-FR – HES-SO

What is iPrint?

INSTITUTE & COMPETENCE CENTER FOR INKJET TECHNOLOGY

**Founded in
2013**

**Part of
HES-SO
HEIA-FR**

**@ Marly
Innovation
Center
1'500 m²
24 labs**

**7 professors
32 engineers
2 admin**



Hes·so
Haute Ecole Spécialisée
de Suisse occidentale
Fachhochschule Westschweiz
University of Applied Sciences and Arts
Western Switzerland

 **MARLY
INNOVATION
CENTER**
**Fribourg
Switzerland**

 **Haute école d'ingénierie et d'architecture Fribourg**
Hochschule für Technik und Architektur Freiburg

Mechatronics
Electronics
Mechanics
Material science
Fluid mechanics
Physics
Chemistry
Biology

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Where is iPrint?



MARLY
INNOVATION
CENTER



Marly

What do we
do?

INKJET-BASED DIGITAL PRODUCTION: FROM MATERIALS TO PRODUCTS

Innovative technologies

Develop new technologies enabling the revolution in tomorrow's digital production

Applied research

Develop and optimize inkjet-based digital printing processes in the domains:

- *Printing for electronics*
- *Graphical printing*
- *Biomedical printing*
- *Advanced manufacturing*

Technology transfer

Foster the technology transfer for digital printing processes

Education

Educate specialists in inkjet-related core competences with a highly interdisciplinary understanding



Inkjet ecosystem

What can the **inkjet ecosystem** offer you ?

- **Accessibility to high level inkjet-oriented resources**
- **Accessibility to necessary equipment and measurement devices**
- **Laboratory and office spaces**
- **Support in your developments of new technologies, products or processes**
- **Strong network of equipment and material suppliers, as well as application partners**

Why not joining iPrint in the Marly Innovation Center, Switzerland, and co-create the future of digital production by inkjet?

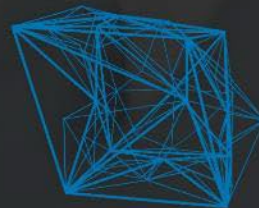


Thank you

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[linkedin.com/company/iprint-ch](https://www.linkedin.com/company/iprint-ch)



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