3D Food Printing
Why, Who, How, When?

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Internship period of ±5 months at TNO
Only public information & internet research is presented

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Why food printing?

- More food produced efficiently converting alternative ingredients such as proteins from algae, beet tops, or even insects in tasty products that are not only good for health but also for the environment
- Fully customizable nutrition (Personalized Food): products that exactly fit the needs and preferences of individuals
- Create a fresh and healthy dish waiting for you when you get home
- Freedom in design, make products that can not be made: 3D shape, composition (ingredients and mutual relationship), structure, texture and taste

Who wants printed food?

Printing materials

Which materials can we print more?

Printing techniques

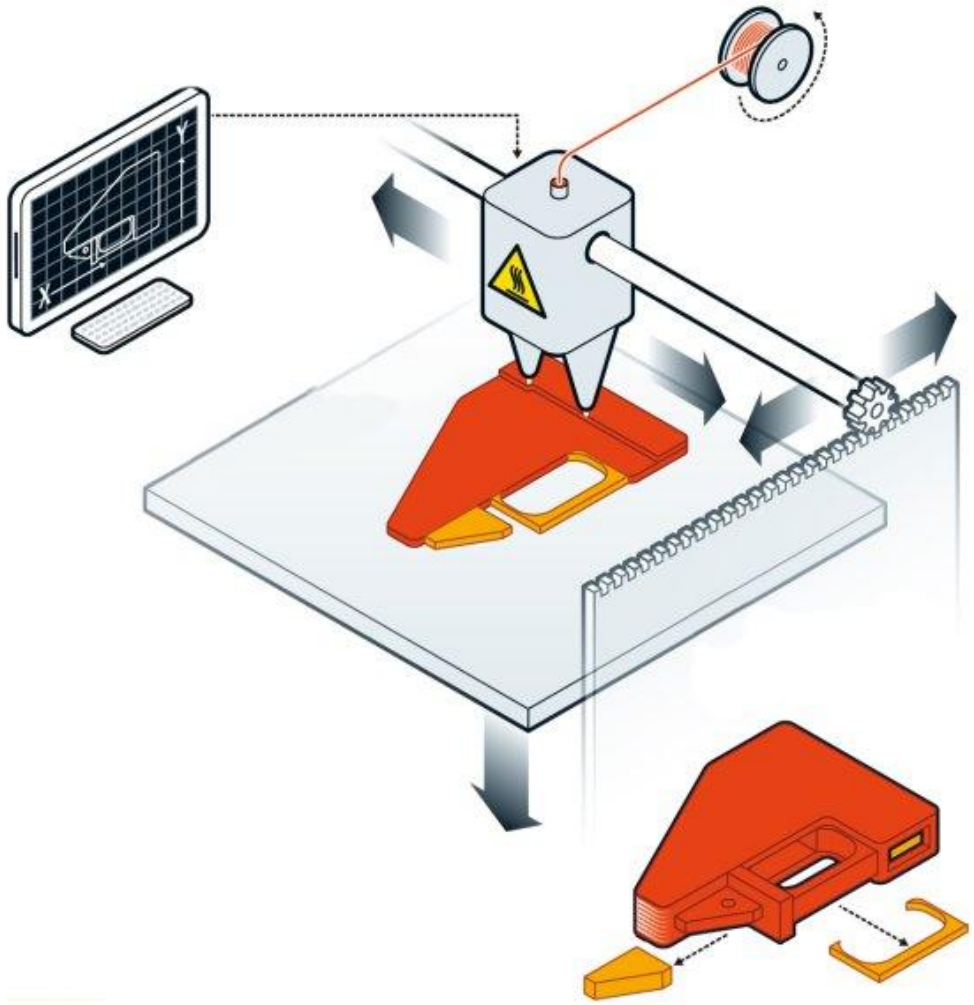
What are currently the printing techniques for food printing?

- Fused Deposition Modeling (FDM)
- Selective Laser Sintering (SLS)
- Powder Bed Printing

FDM

Advantages
- Easy to control
- Possibility to change extruder
- Accurate

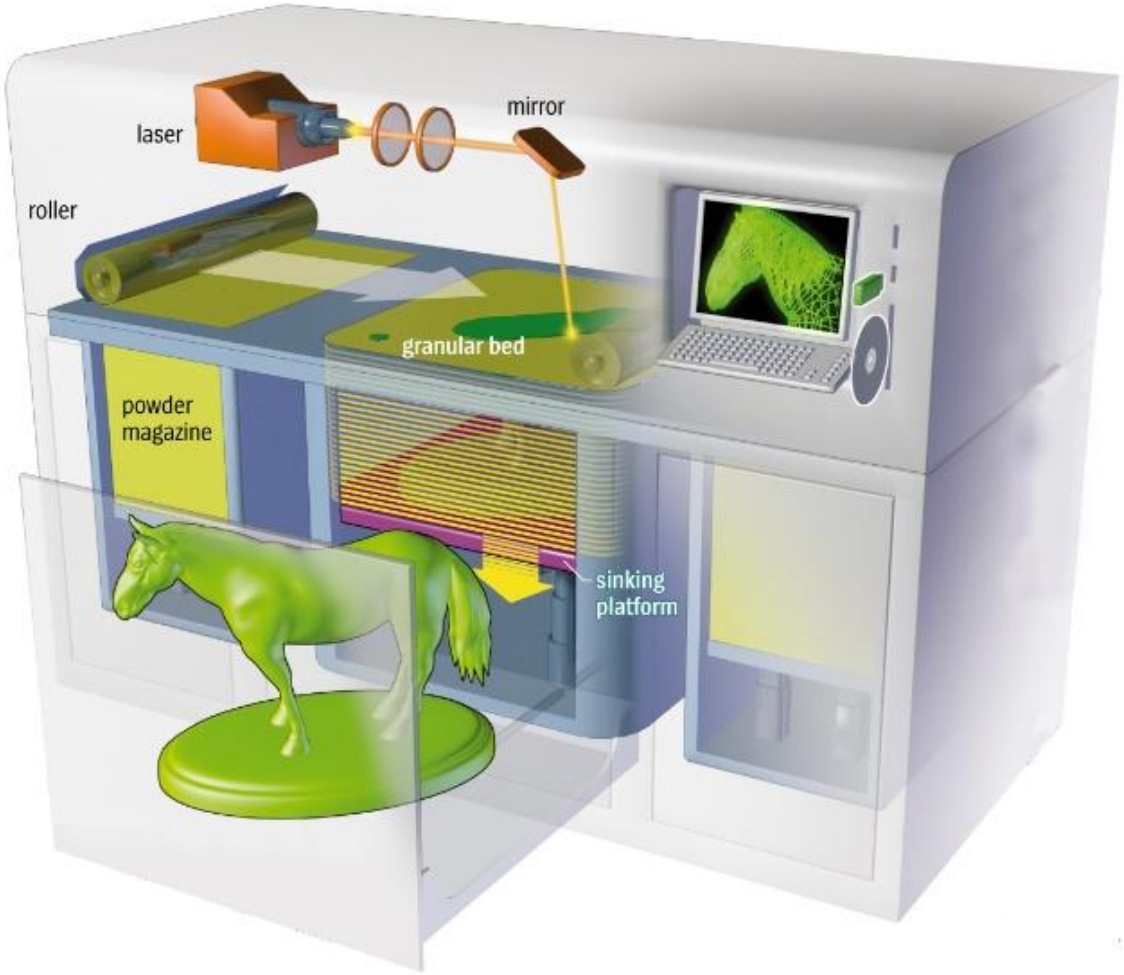
Disadvantages
- Support is needed for some prints
- Not so fast



SLS

Advantages
- Multiple objects at the same time
- No support needed
- Accurate
- Use of different powders

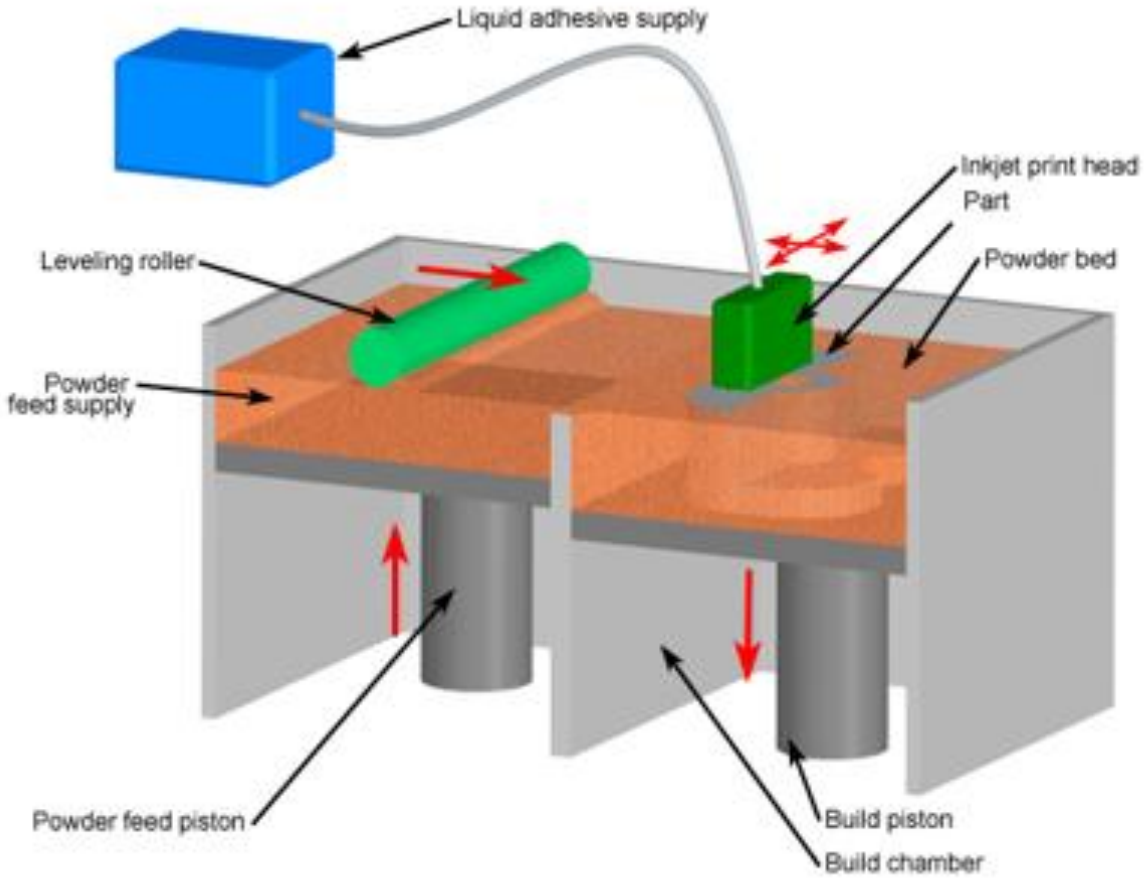
Disadvantages
- Expensive machine
- Large machine



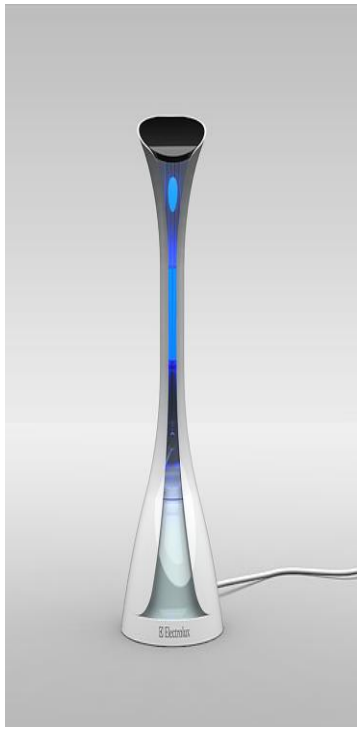
Powder Bed Printing

Advantages
- Multiple objects at the same time
- No support needed
- Accurate
- Use of different powders

Disadvantages
- Objects very fragile
- Large machine



Concepts by other people

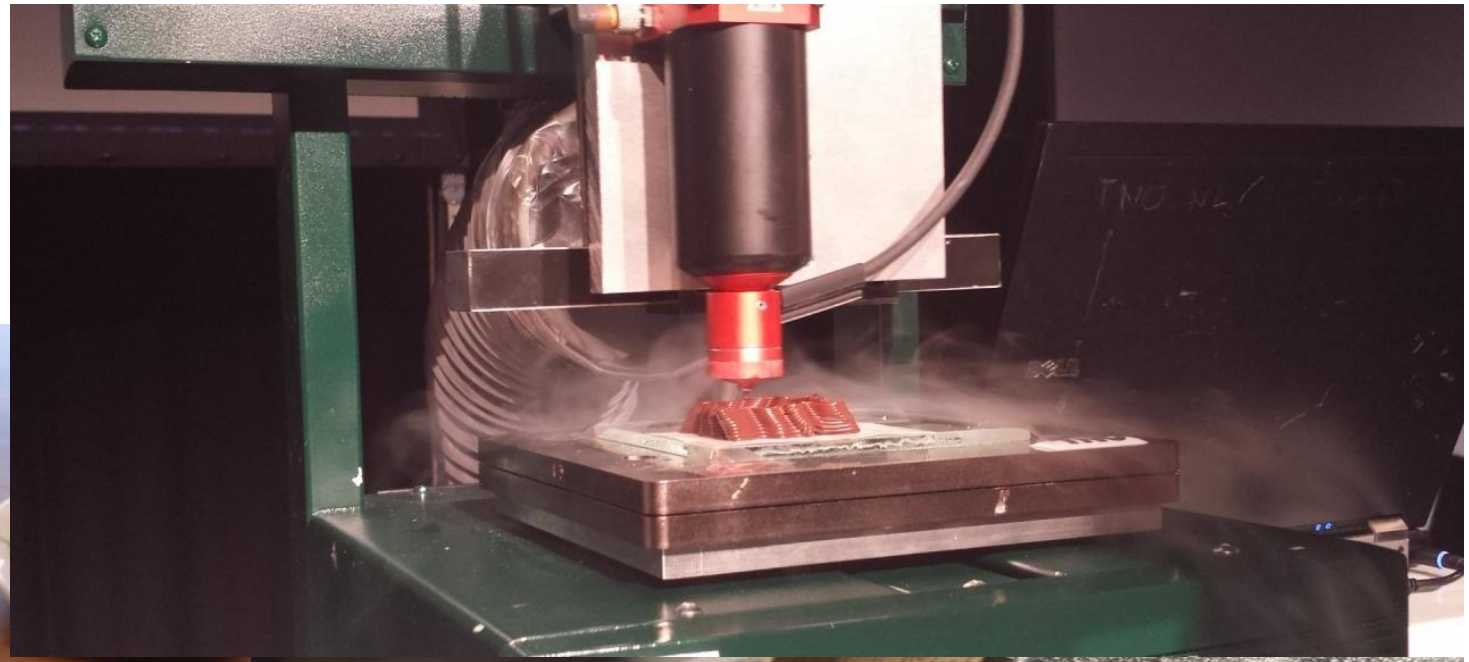


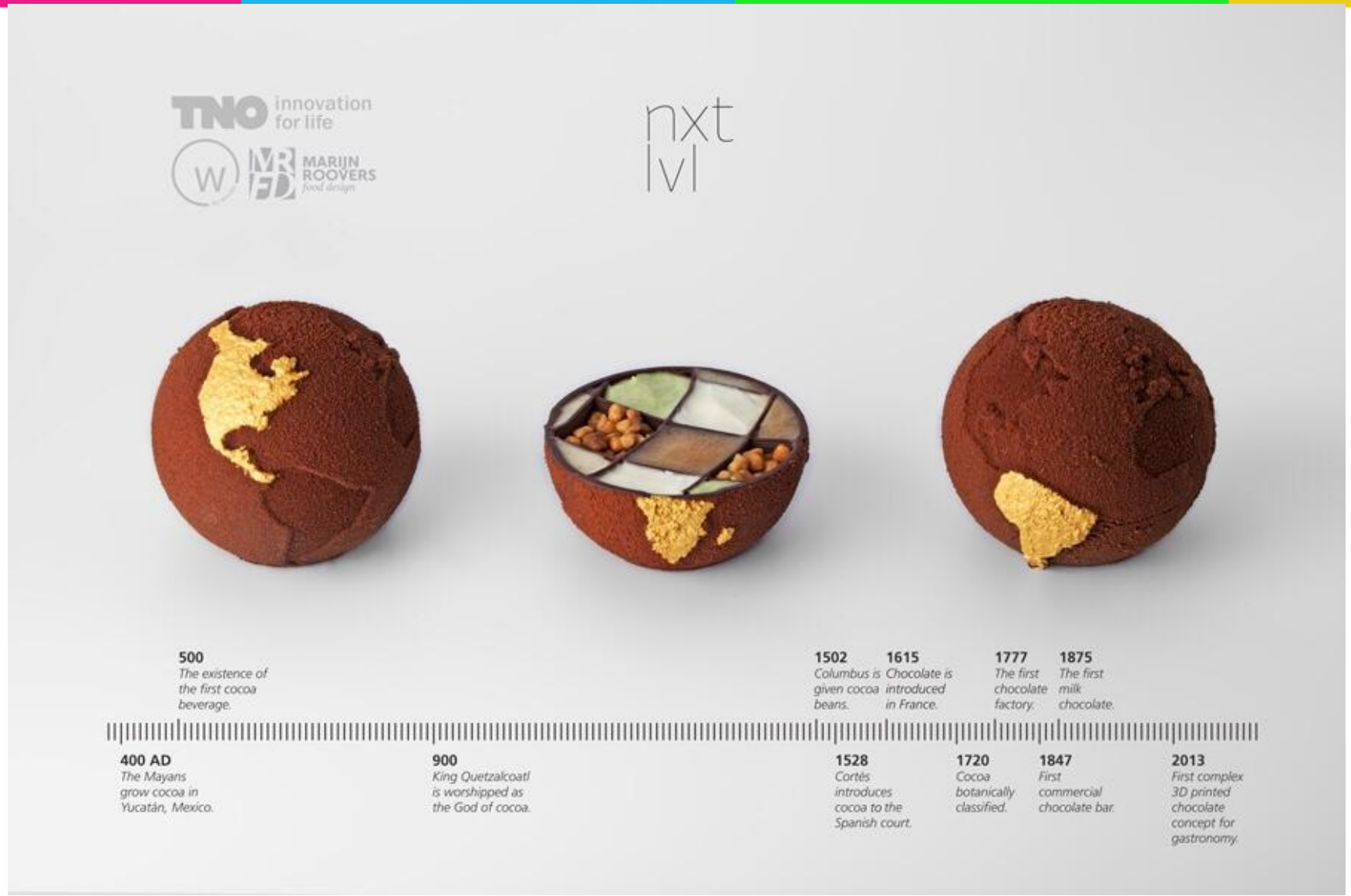
Electrolux

MIT

Philips

Research at TNO Eindhoven





One week experiment at Michelin star Restaurant De Molen


rtl XL

Conclusions

Printing food is good for several target groups and the environment
It is possible to print with lots of ingredients
Making new products, healthy, tasty and nice to see
It is to slow now for large amounts
More research is needed

Credits: TNO (Kjeld van Bommel, Peter Brier), fooddesigner Marijn Roovers chefkok Wouter van Laarhoven