

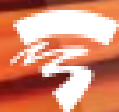
3D PRINTING *with* BIOMATERIALS

TOWARDS A SUSTAINABLE AND CIRCULAR ECONOMY

AD VAN WIJK & IRIS VAN WIJK



THE GREEN
VILLAGE



Hogeschool
van Amsterdam

TU Delft
Delft University of
Technology

BioBased
Economy



3D PRINTING APPLICATIONS

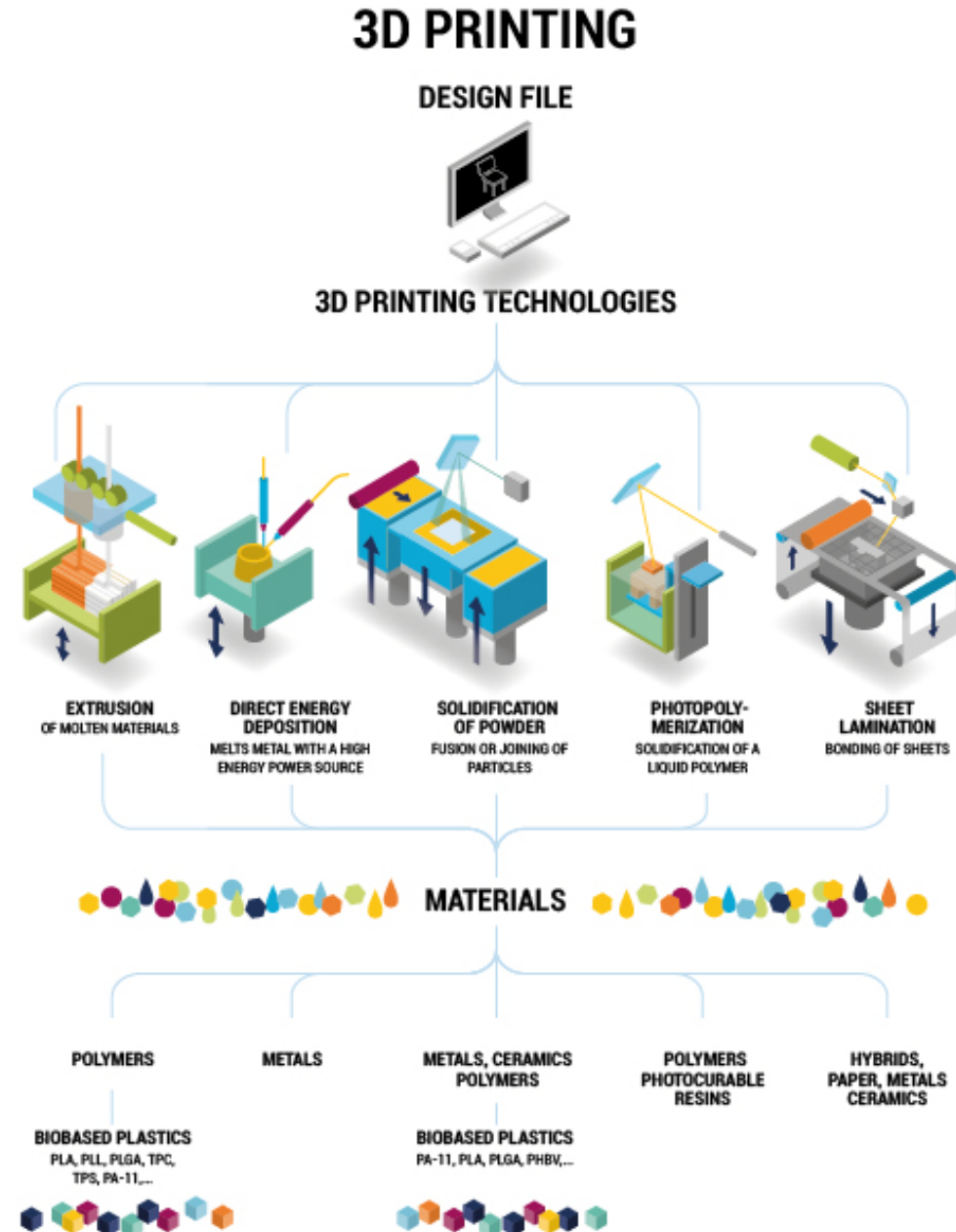


Joris Laarman



SECTOR	PRESENT APPLICATIONS	FUTURE APPLICATIONS
INDUSTRY	Product components, spare parts, reproduction of parts	Complete and complex products, washing machines, mobile phones, guns, drones
HEALTH	Dental bridges and crowns, prostheses	Living tissues and organs, bionic ears, eyes
FASHION	Jewelry, special designed clothes	Clothes, shoes, accessories - personalized for your posture and taste
FOOD	Nice looking deserts, appetizers	Producing food (hamburgers, potatoes) personalized to your diet, calories and taste.
BUILDING	No applications yet	Building parts and complete buildings with a high degree of freedom of design and future changes
AT HOME	Special designed gadgets, simple products	Order products and print at home, repair products, design and produce personalized products
OTHERS	Building in space	Chemistry: building molecules Pharmacy: building personalized medicine

3D PRINTING TECHNOLOGIES AND MATERIALS



HOW DOES IT CHANGE THE WORLD?

CHEAPER MANUFACTURING

Relocate manufacturing to the point of need (market)
Large number of small investments instead of small number of large investments in manufacturing capacity
Lower working capital, less stock, semi-manufactured products and labor
Supply chain and logistics will be simple and more efficient
Less raw material required, produce what is needed, no waste

HOW DOES IT CHANGE THE WORLD?

MASS CUSTOMIZATION

Every product can be adjusted to personal preferences; colors, size, design
Clothes can be adjusted to personal size, shapes and preferences
Furniture can be adjusted to size, number, personal style
Teeth, prosthesis, medicines, etc. can be adjusted to personal conditions

HOW DOES IT CHANGE THE WORLD?

LOCAL PRODUCTION

Production can take place near demand, at home or in local 3D print shops
Unit production cost can be higher, will be offset by less shipping cost
Spare parts and replacements parts can be produced locally
Materials can be recycled and used for production locally

HOW DOES IT CHANGE THE WORLD?

NEW PRODUCTS, SYSTEMS, APPLICATIONS

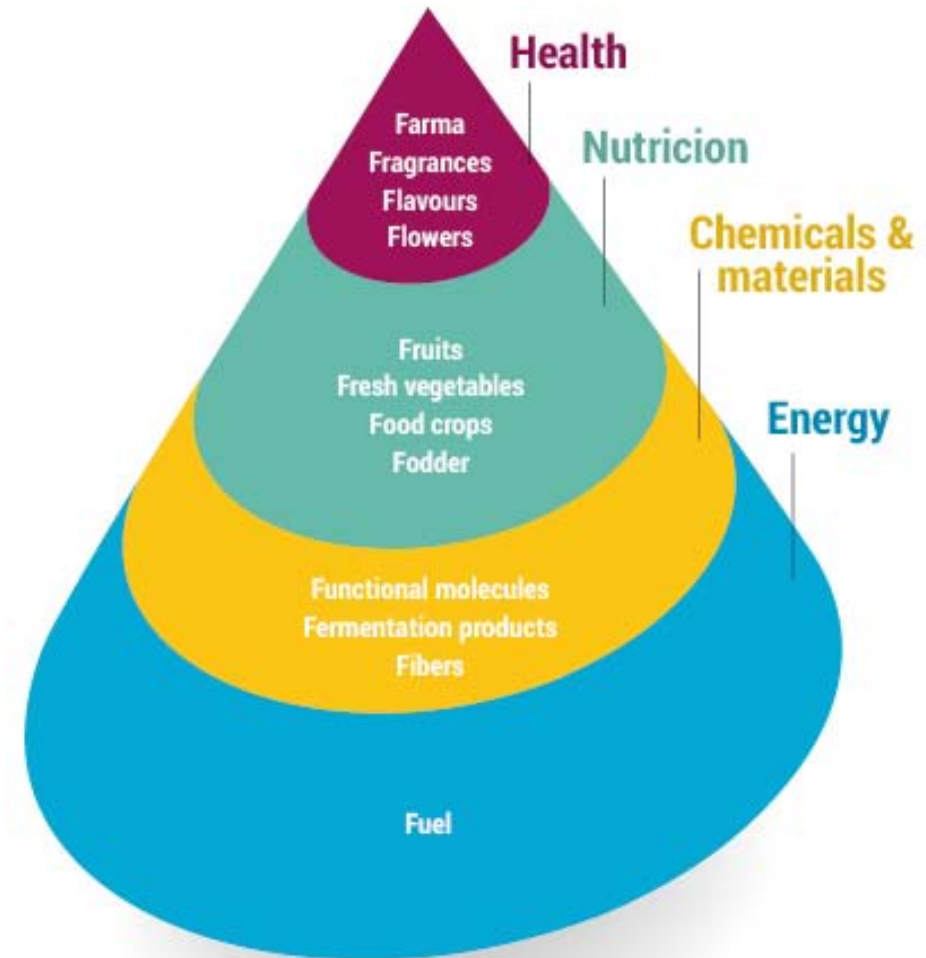
3D Printing technology development towards faster, more detailed and complex manufacturing
Develop products in open-source co-creating communities
3D scanning of objects and adjustment of design
More freedom in creating complex structures and shapes
Possibility to adjust material properties on a very small scale
Living tissues and organism can be 3D printed

BIO- BASED ECONOMY

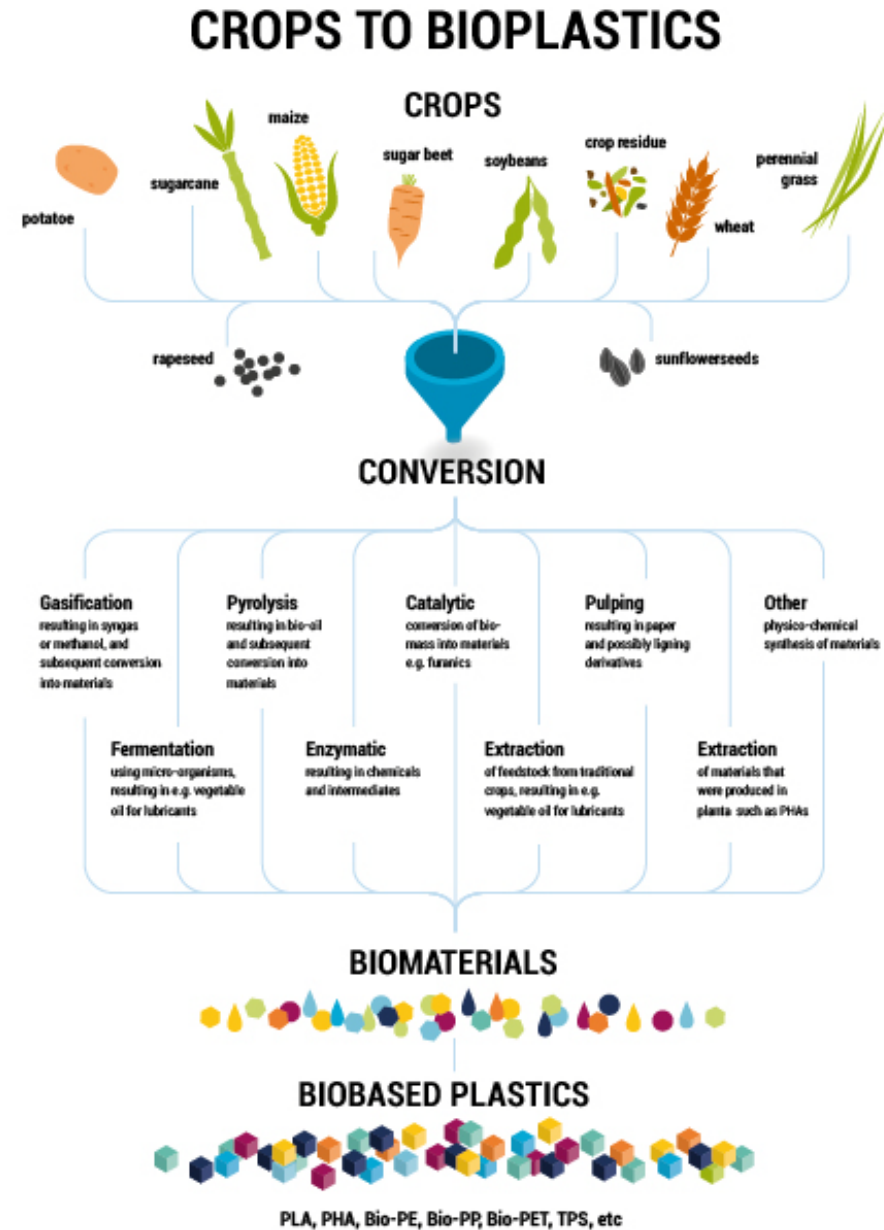


BIO- BASED ECONOMY

BIOMASS VALUE PYRAMID

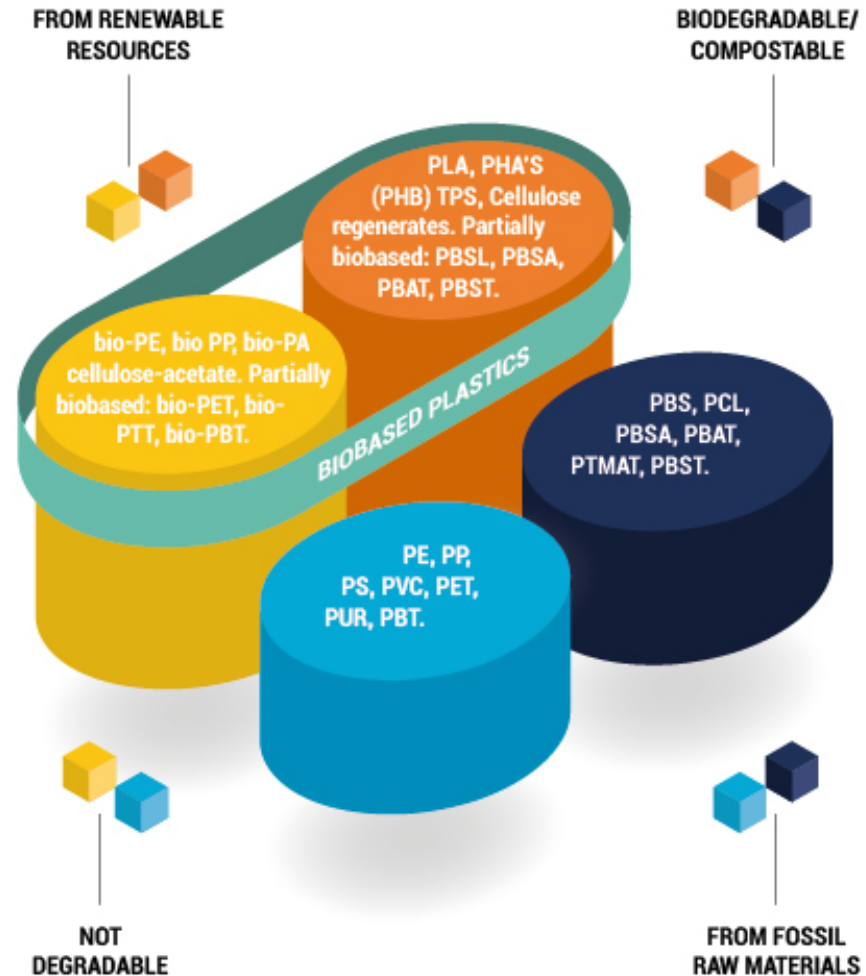


BIO- BASED ECONOMY



BIO-BASED ECONOMY

BIOBASED AND BIODEGRADABLE PLASTICS

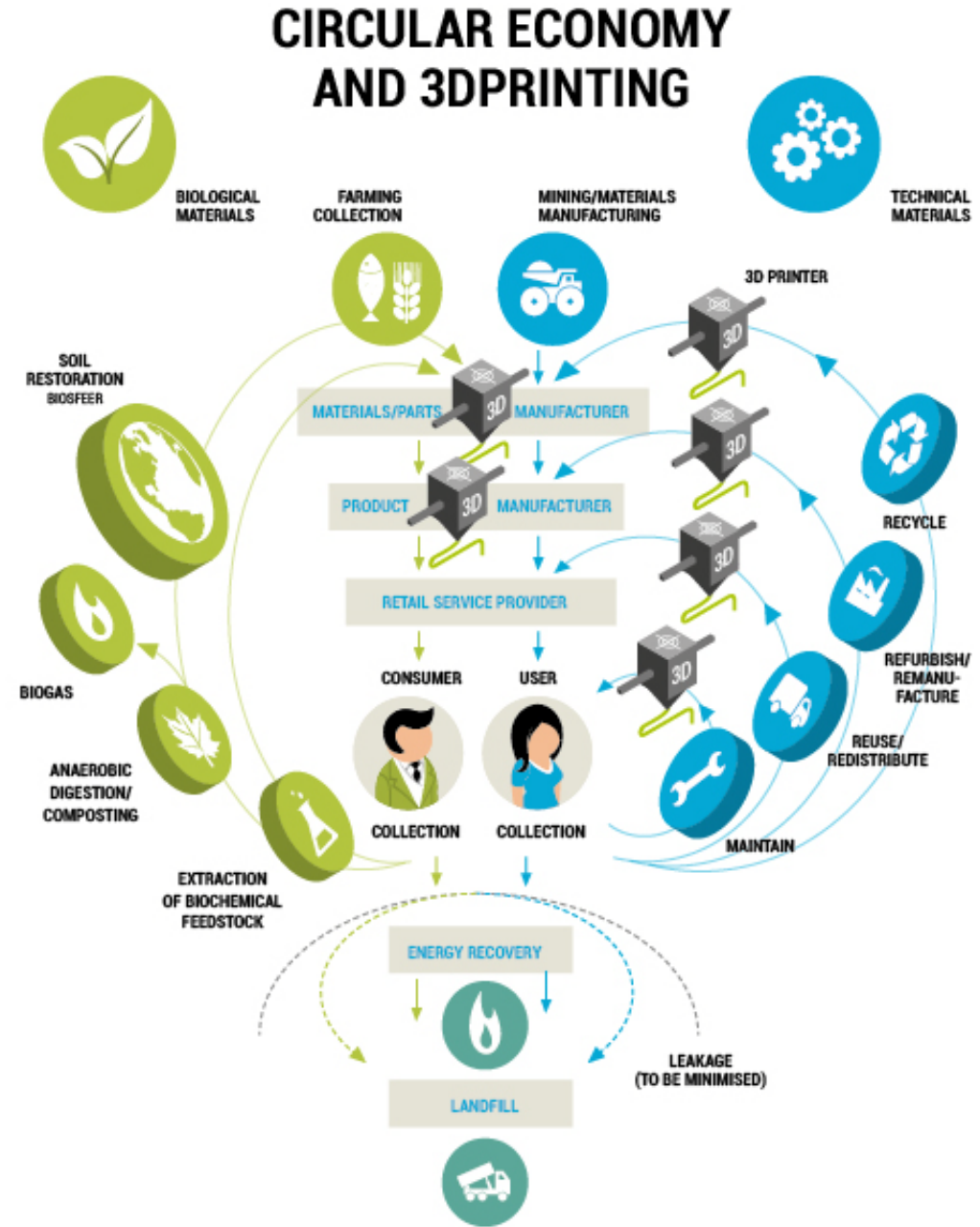


HOW DOES IT CHANGE THE WORLD?

BIOMATERIALS

Material from biological origin instead of fossil fuels
No CO₂ (short cycle) emissions
Feedstock can grow everywhere
Every plastic can be produced
Specific and unique material characteristics for 3D printing

PROMISES SUSTAINABLE AND CIRCULAR



THE FUTURE



JIP, my robotic assistant, wakes me up. While we discuss the day ahead, the 3D-printer is printing my breakfast, adding an integrated supplement of potassium and calcium - apparently my values are too low. Nowadays, we are living a fully sustainable and circular life - thanks to excellent resource management, a sustainable energy supply for everyone and the use of Additive Manufacturing Facilities (AMF).

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<http://www.hva.nl/urban-technology/publicaties/item/3d-printing-with-biomaterials.html>

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