

# Lisäävä

Uusien tuotantomenetelmien (3D-tulostus ja ALD) sovellettavuuden kartoitus ja kokeilut keskisuomalaisten pk-yritysten kasvun tukijana

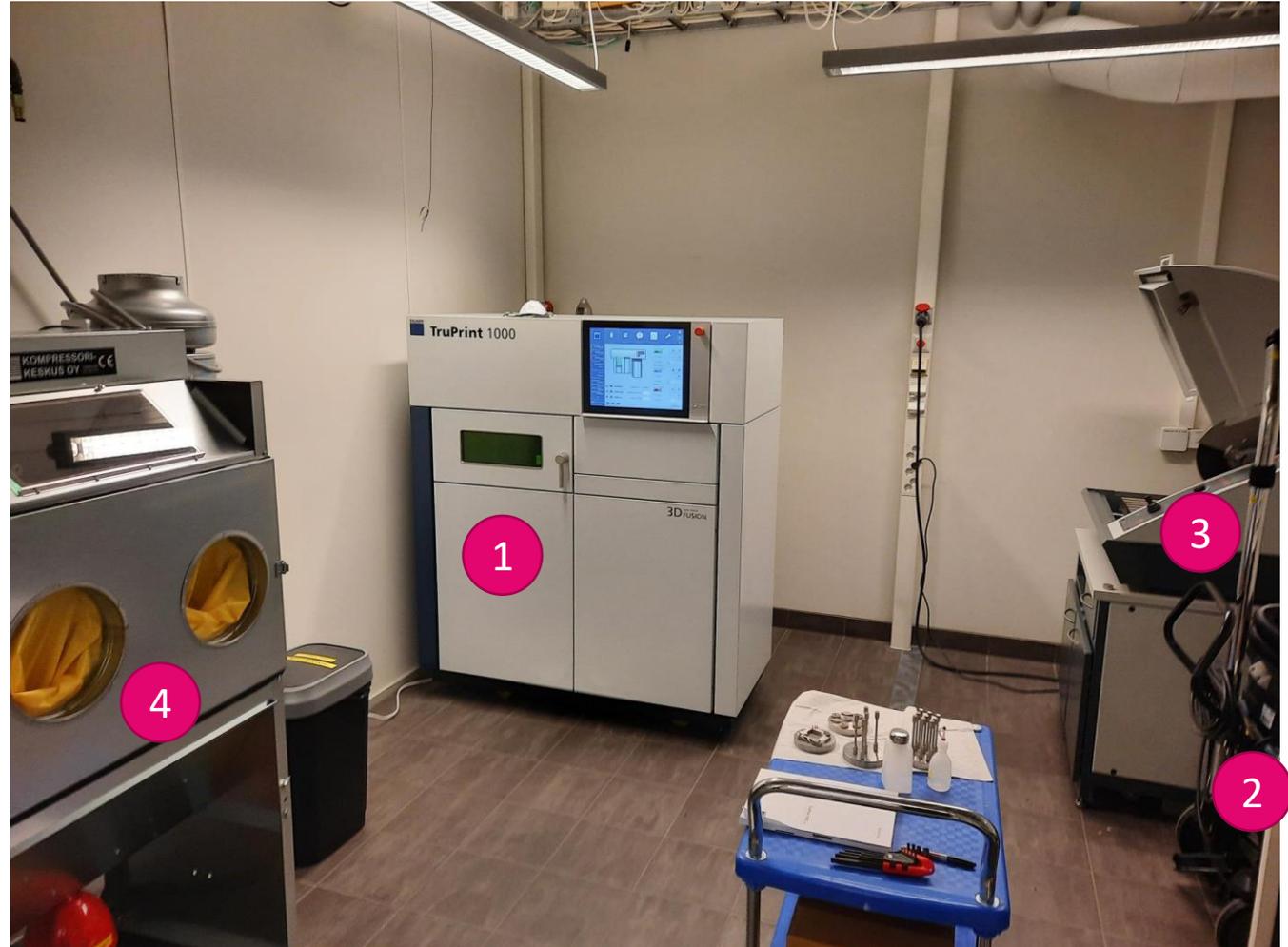
3D-tulostus: JAMK:n metallitulostusympäristö  
Janne Lappi, Vesa Jääskeläinen ja Olli Jokinen

Loppuseminaari 9.2.2022



# JAMK Metal AM environment

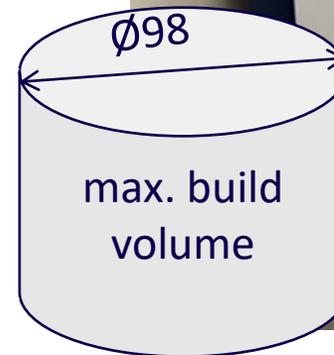
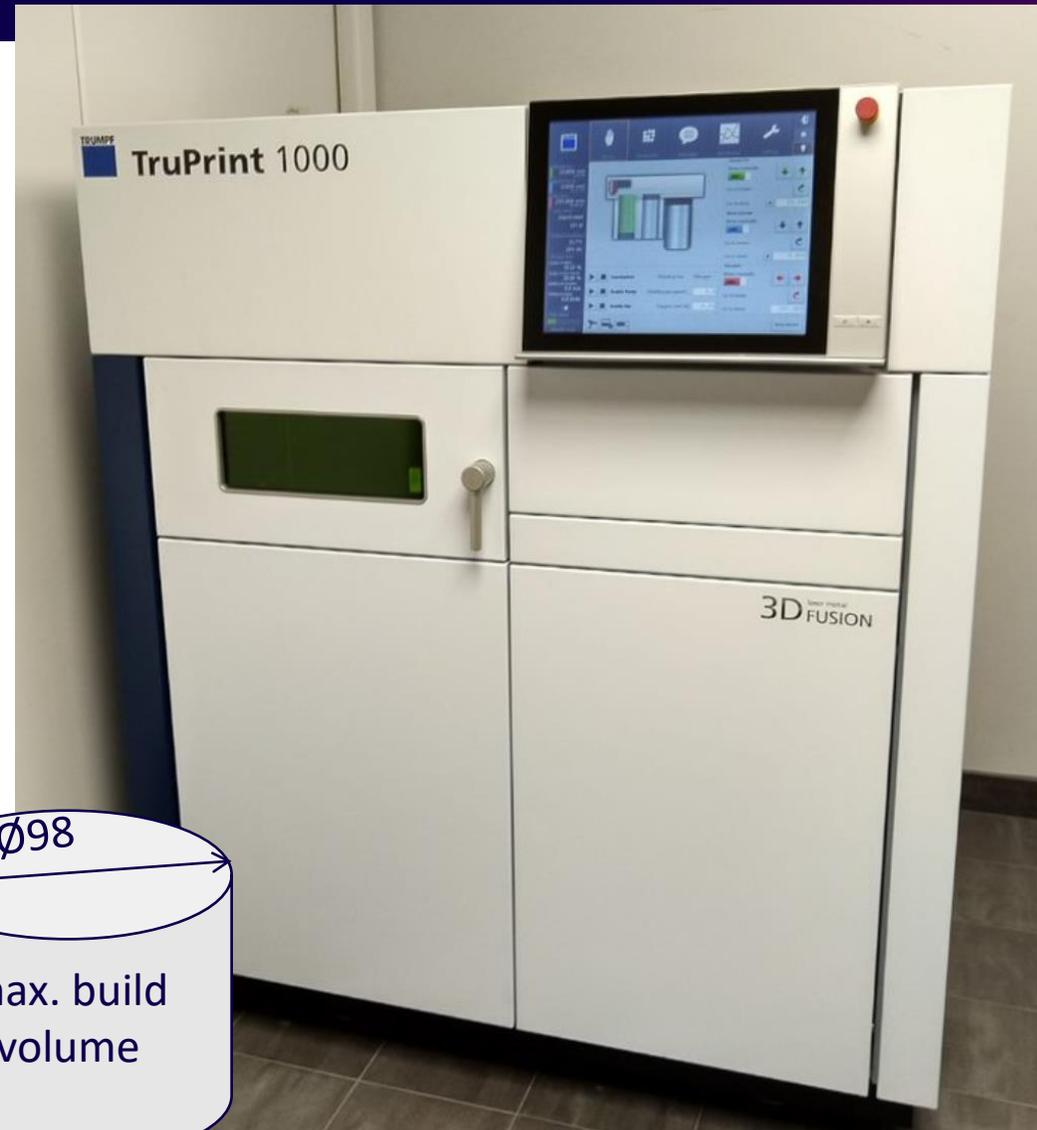
- Located at JAMK main campus laboratory facilities (Rajakatu 35)
  - Start up at JAMK August 2021
1. TruPrint 1000 - printer
  2. Screening of printing material
  3. Cutting of printed parts
  4. Cleaning of printed parts

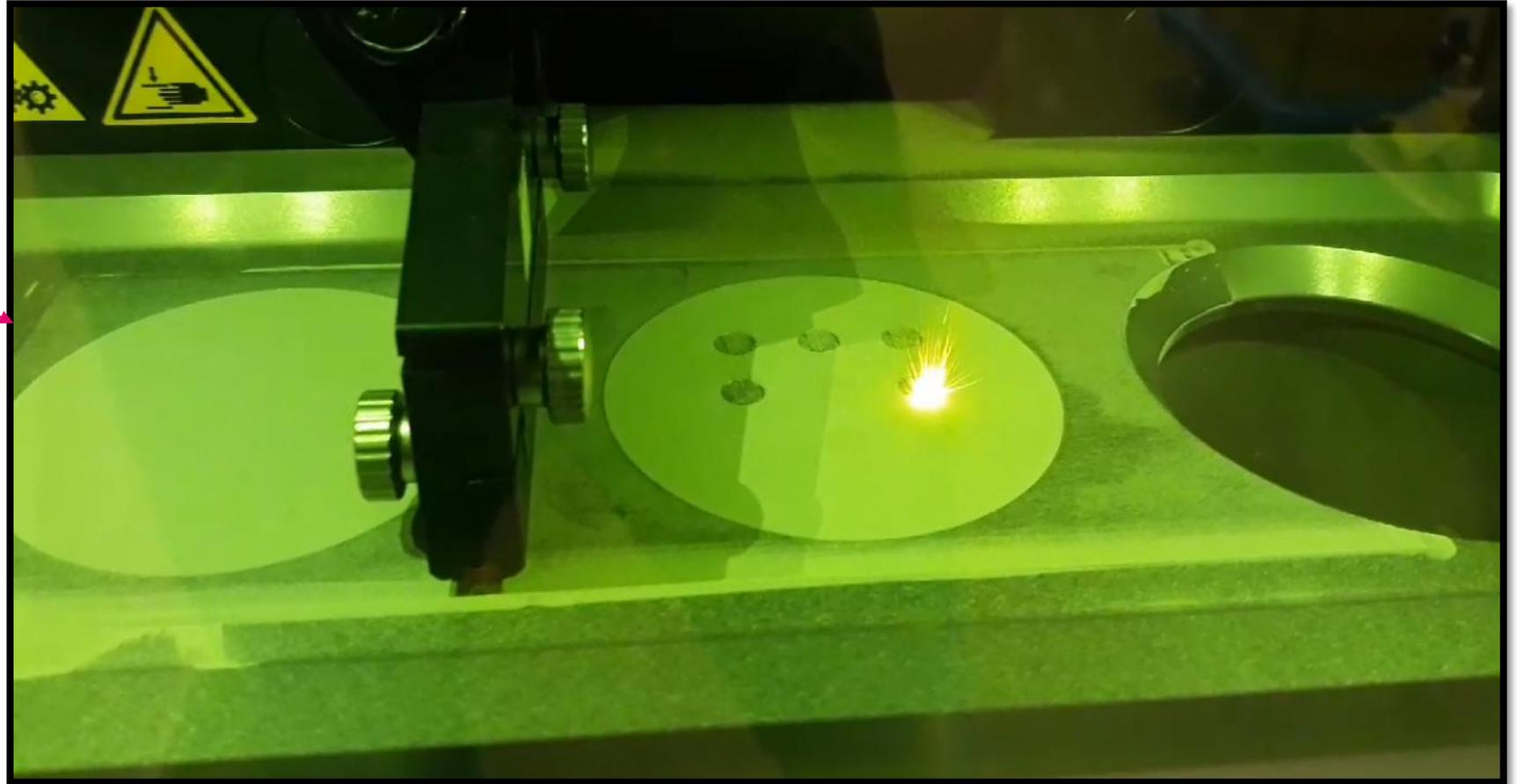
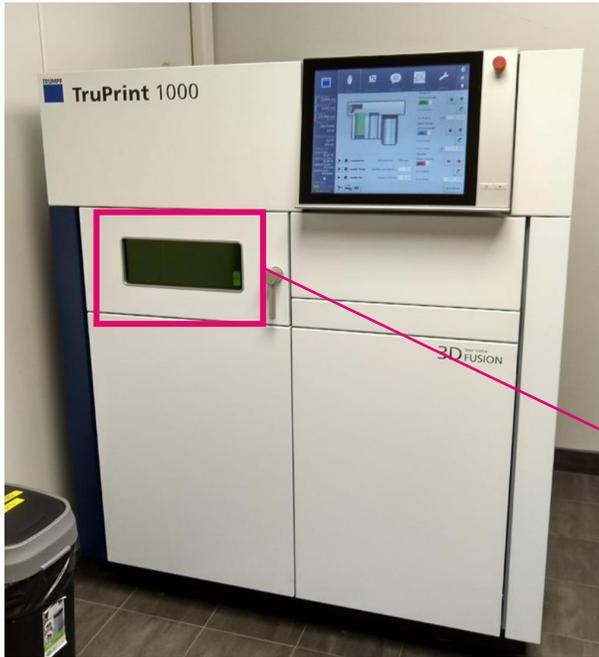


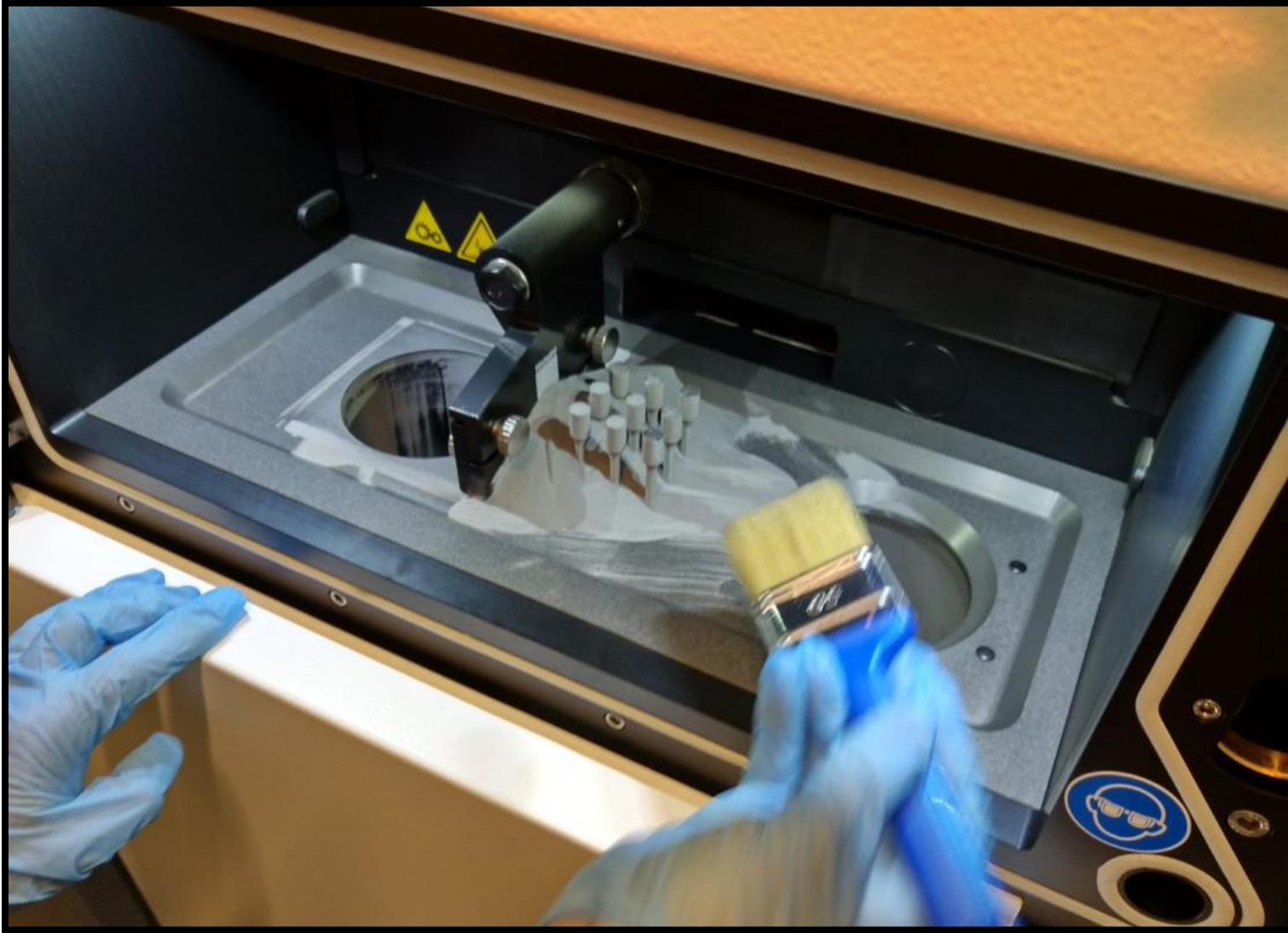
# JAMK AM equipment

## Trumpf TruPrint 1000

- Laser metal fusion process
- Max laser power 200 W, beam diameter 55  $\mu\text{m}$
- Build volume: diameter 98 mm, height 100 mm
- Layer thickness 10 – 50  $\mu\text{m}$  (adjustable)
- Built rate 2 – 18  $\text{cm}^3/\text{h}$
- Shielding gas: Nitrogen (argon)
- Printing powders:
  - Stainless Steel 316 L for LMF
  - Stainless Steel 630 for LMF
  - Tool Steel 1.207 for LMF
  - Tool Steel H11 for LMF
  - Nickel Alloy 718 for LMF







KESKI-SUOMEN LIITTO

Vipuvoimaa  
EU:lta  
2014-2020



Euroopan unioni  
Euroopan aluekehitysrahasto

jamk



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# JAMK AM equipment

## Screening

- used metal pulver is screened after printing process
  - Reject:
    - unclean and oversize particles will be removed
  - Accept:
    - will be reused in printing process



# JAMK AM equipment

## Disconnecting of printed parts

- printed parts will be disconnected from base plate
- NC-controlled
- Cutting thickness 2,5 mm



# JAMK AM equipment

Cleaning and removing of printing material

- glass ball blasting process is for cleaning of the surfaces of printed parts



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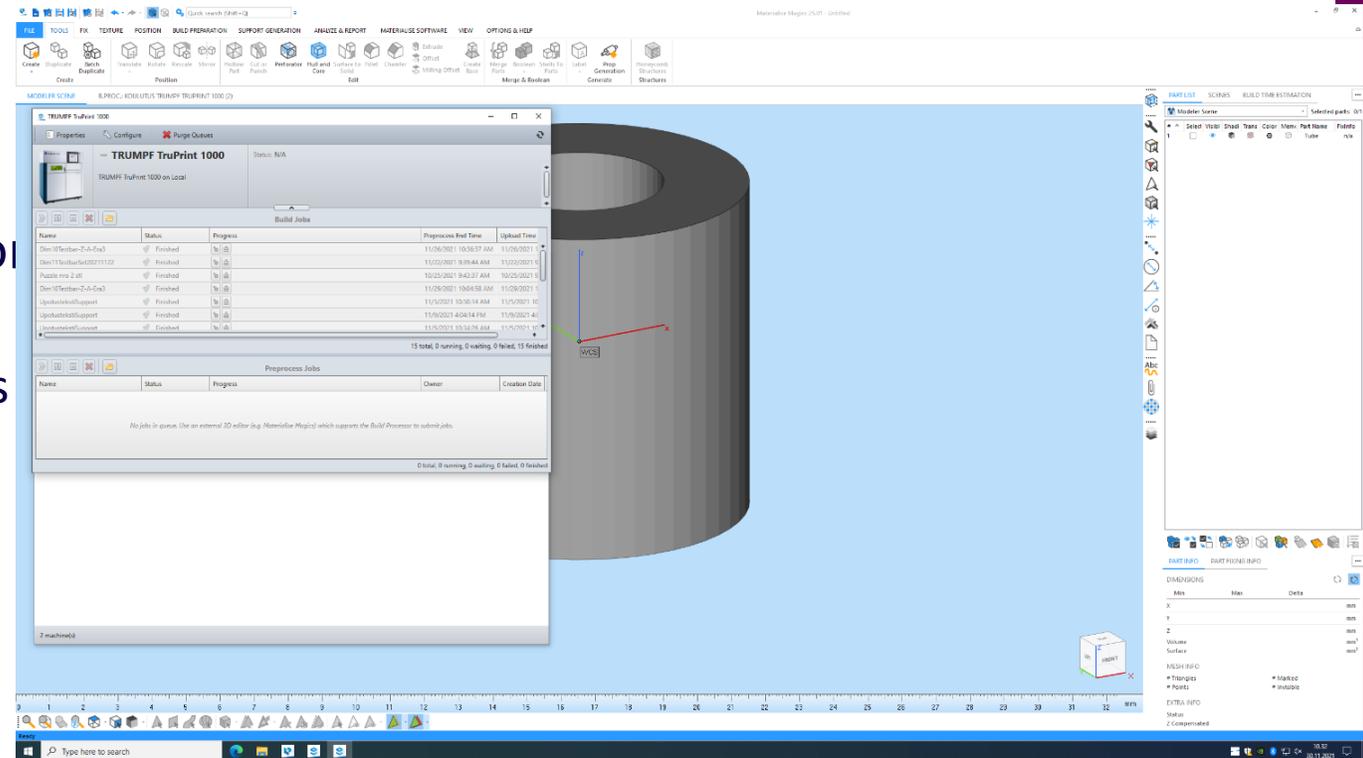


**jamk**

# Software

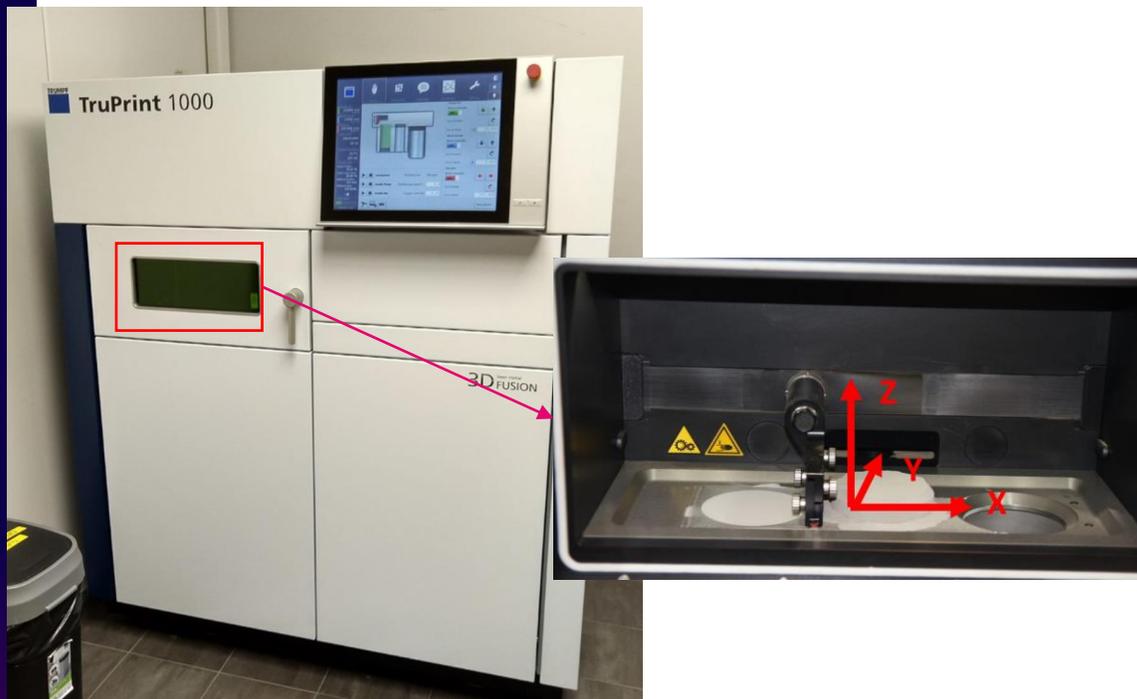
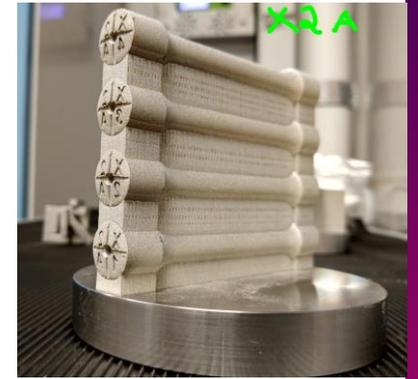
## Materialize Magics

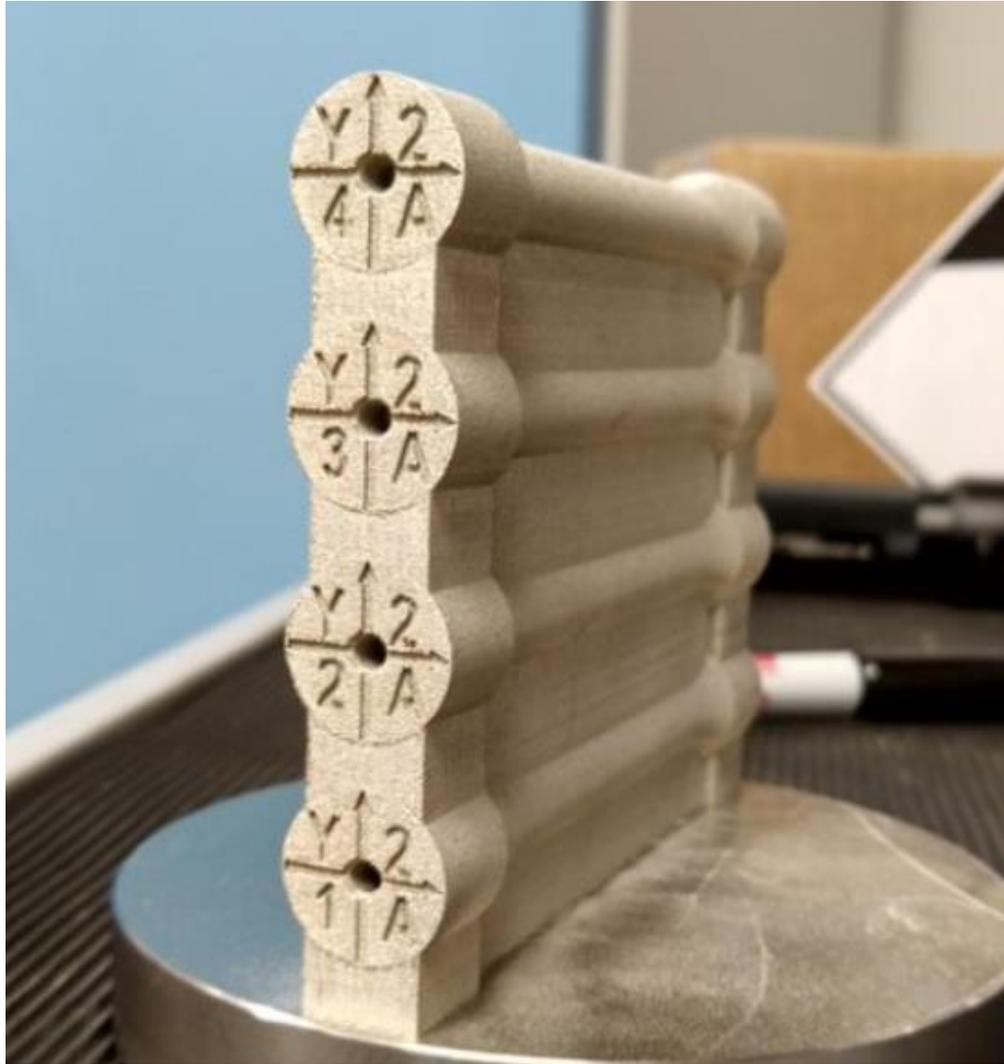
- JAMK has Materialize Magics Education production of metal parts
  - making the setup for printing process
    - material selection
    - building of support materials
    - defining of printing parameters



# Material parameters evaluation ongoing

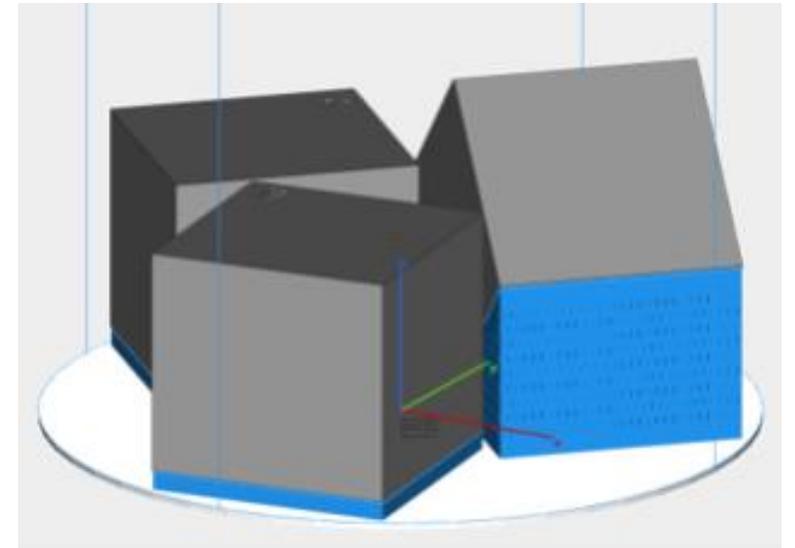
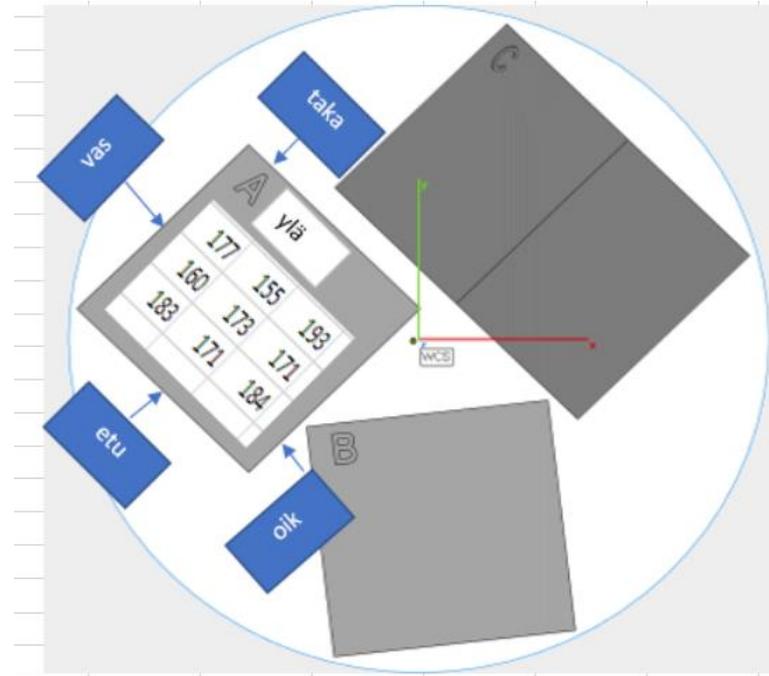
- printed tension bars
  - static strength - ongoing
  - dynamic strength - later





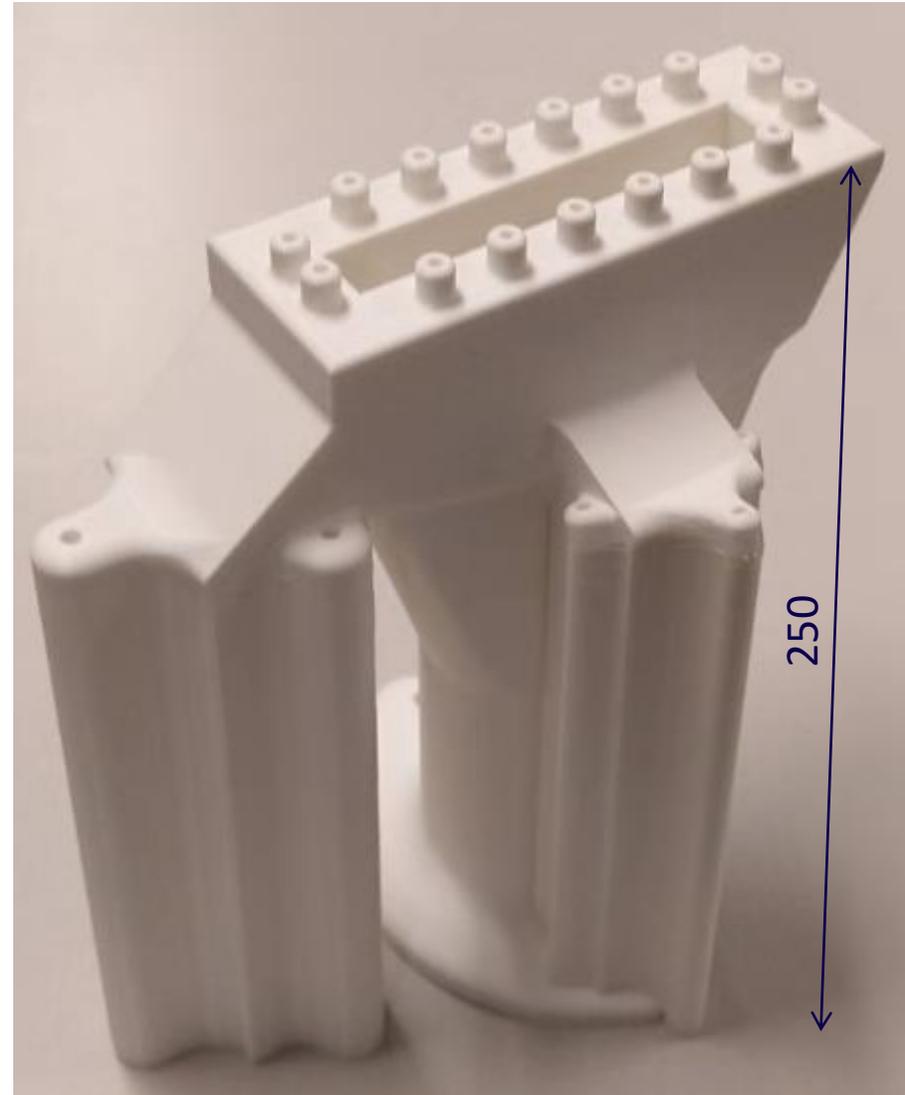
# Material parameters evaluation ongoing

- hardness tests - ongoing



# Muut testaukset

- Prototyypin tulostus, JAMK
  - Prosolve – suutinkappale tulostettu JAMK:n toimesta 12-2021





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2014–2020



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University of Applied Sciences**