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MFG 4.0

3D-tulostuksen
ajankohtaisseminaari 2.12.2020
(verkossa)

LUT University

Simulation of Additive Manufacturing (3D printing)

Junior research scientist Saied Parchegani

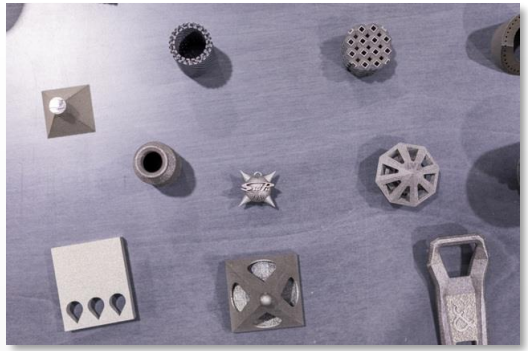
LUT University
Department of Mechanical Engineering
WMS Consortium
Research Group of Laser Material Processing and Additive Manufacturing, LUT Laser & AM

Background of LUT Laser & AM

- *Research in laser processing since 1985 and research in 3D printing since 2009*
- *The focus of the research in 1980s and 1990s was in laser welding, laser cladding, laser surface treatments, etc., in 2000s on laser welding and cutting and in 2010s on laser welding, laser engraving and 3D printing.*
- *Head of the research group: Professor Heidi Piili*
- *Staff (11/2020): 12 persons, 1 Professor, 1 Post-doc Researchers, 2 Project Researchers, 1 Postgraduate Students, 1 Laboratory Engineer, 1 Operator, 2 Master's Thesis worker, 3 Research Assistants.*

Background

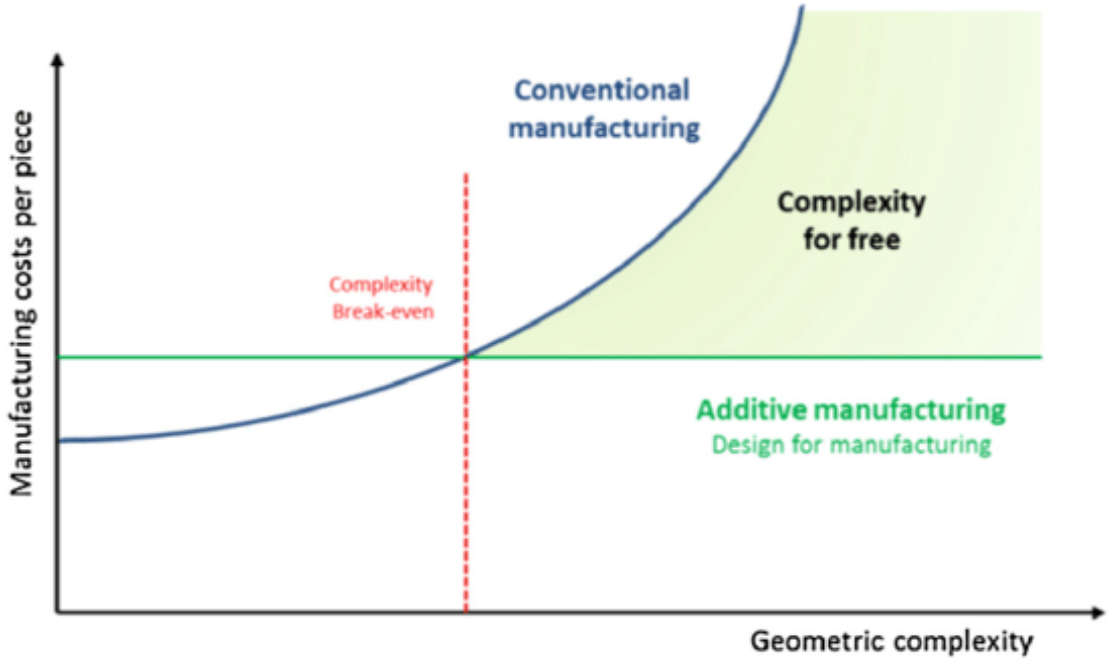
- *Turnover ~ 1.1 M €/year*
- *Master's Theses ~ 10 /year*
- *Dissertations 1-2 /year*
- *Publications ~ 20 /year*
- *Citations > 450 /year*



Source of images: LUT Laser&AM

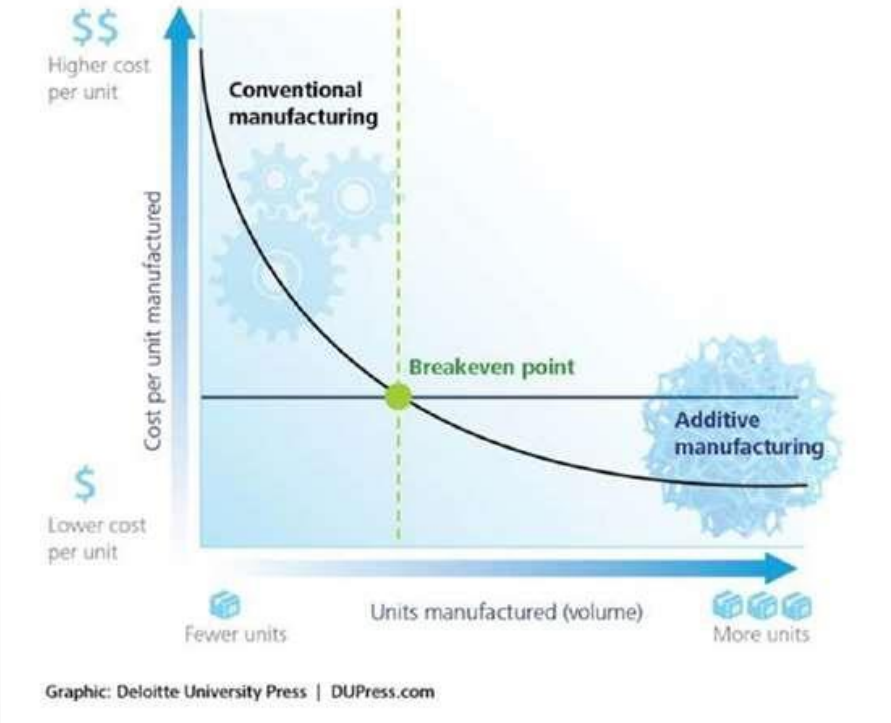
See more of us: Näytteilleasettajat

Additive manufacturing

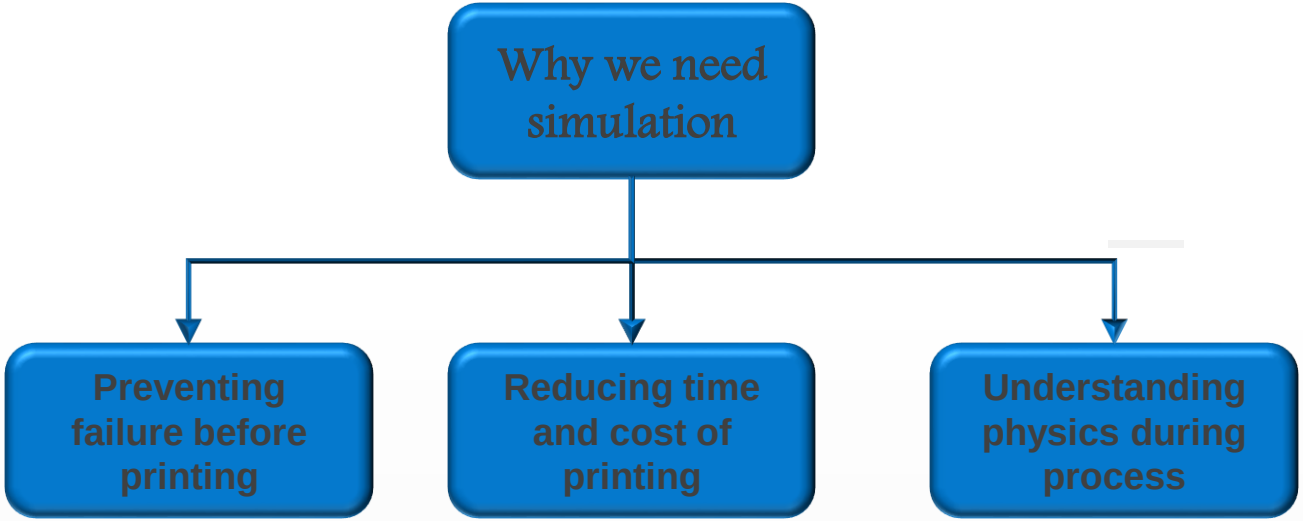


Hans-Jörg Dennig. **Why Education and Training in the Field of Additive Manufacturing is a Necessity.** International Conference on Additive Manufacturing in Products and Applications Jan2018.

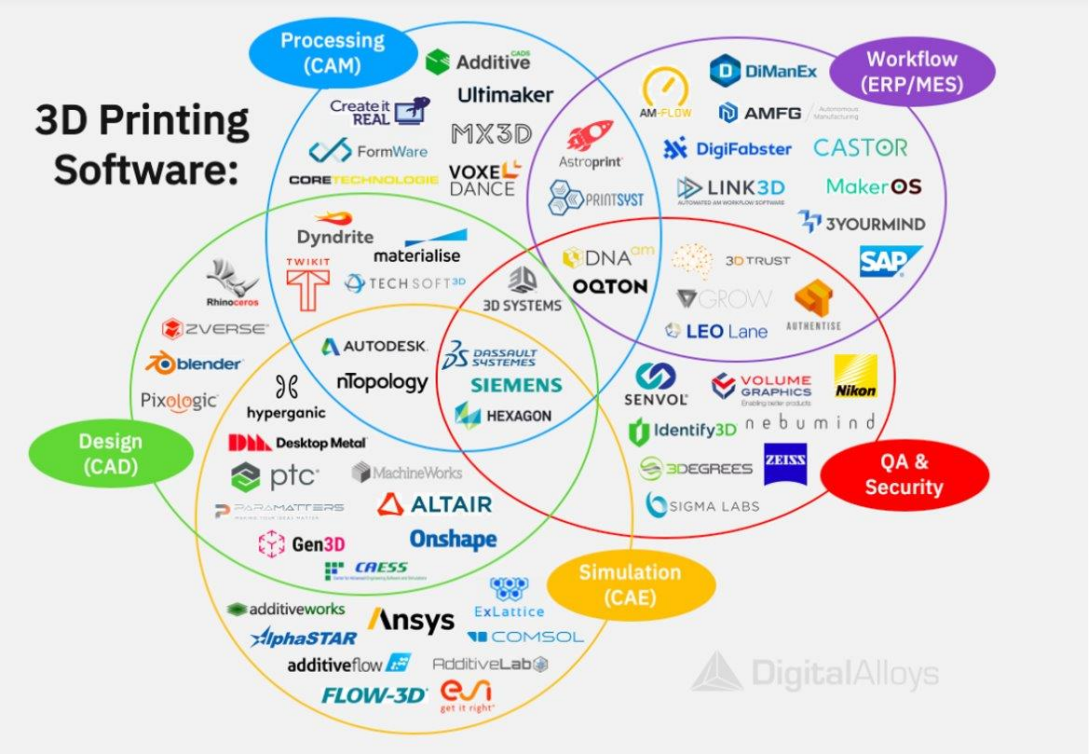
Additive manufacturing



Simulation of AM

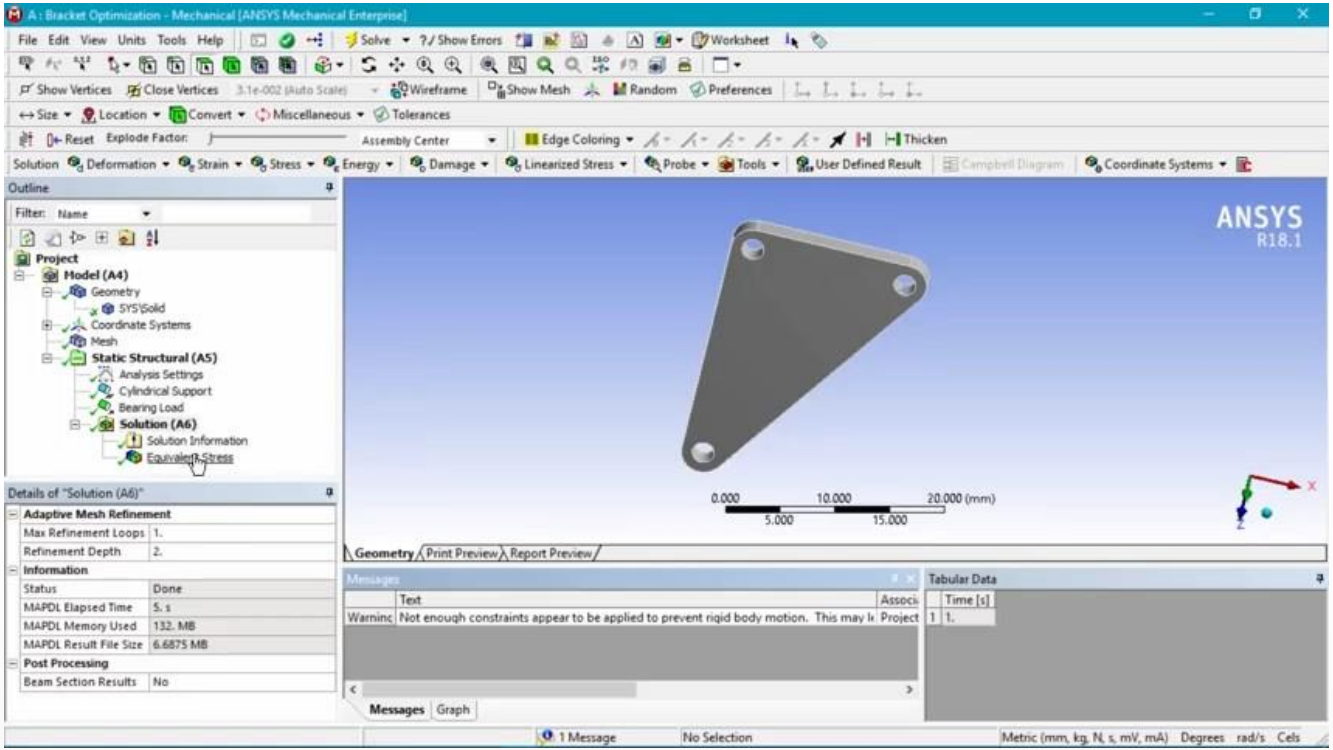


AM simulation softwares

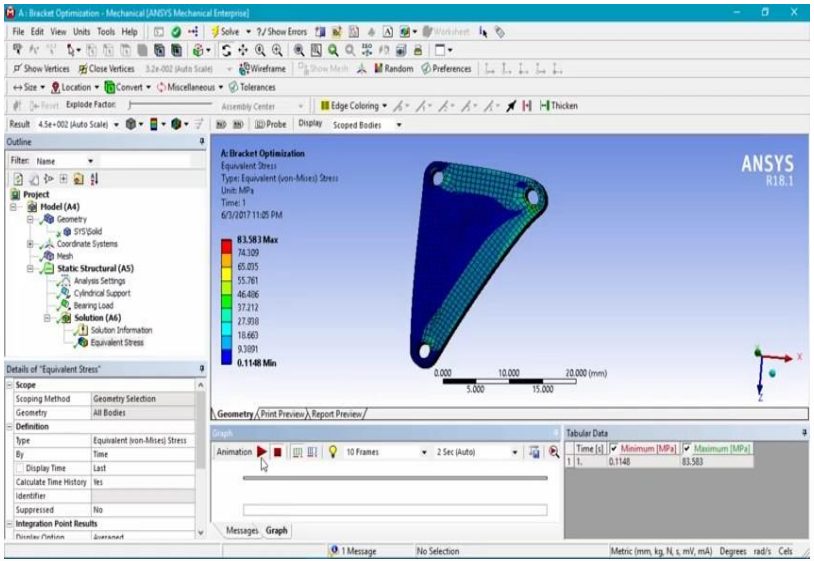


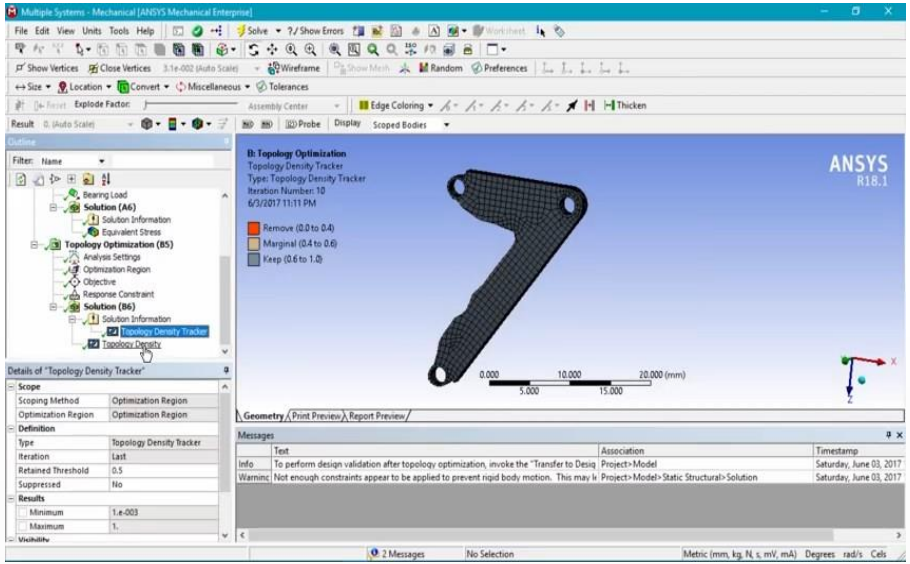
AM simulation workflow

Topology optimization



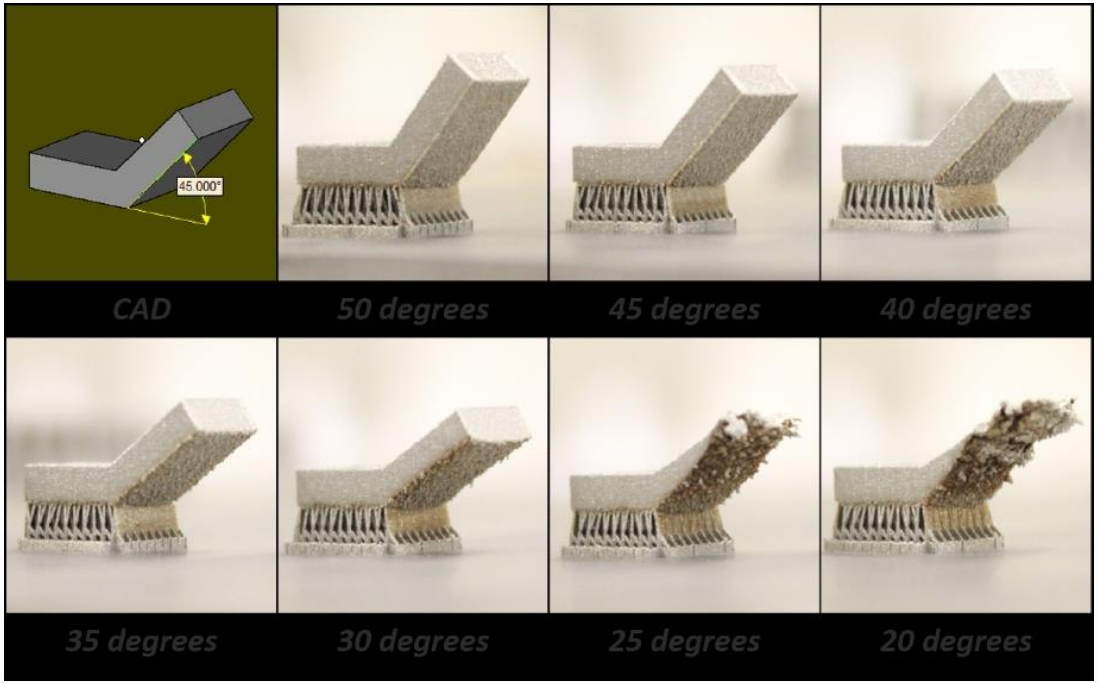
Topology optimization





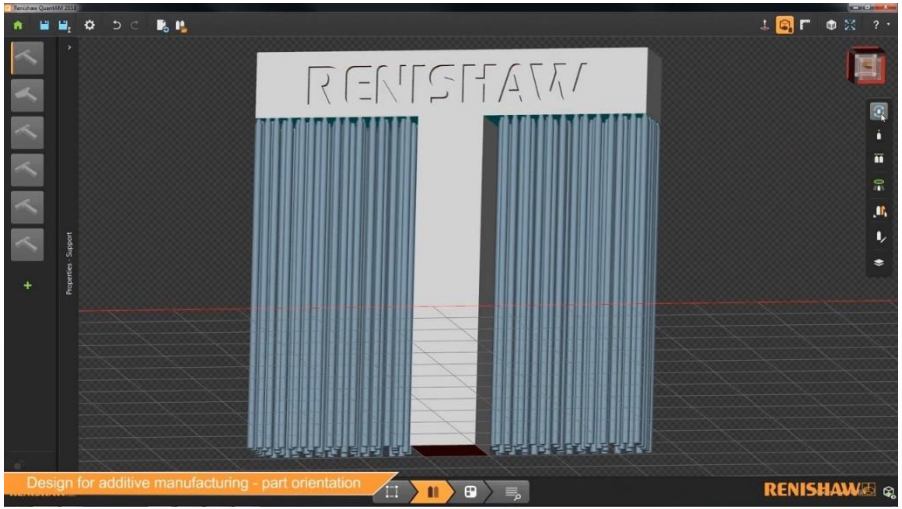
Topology optimization

Orientation optimization



https://www.thefabricator.com/additivereport/article/additive/less-support-is-a-good-thingwhen-3d-printing

Orientation optimization



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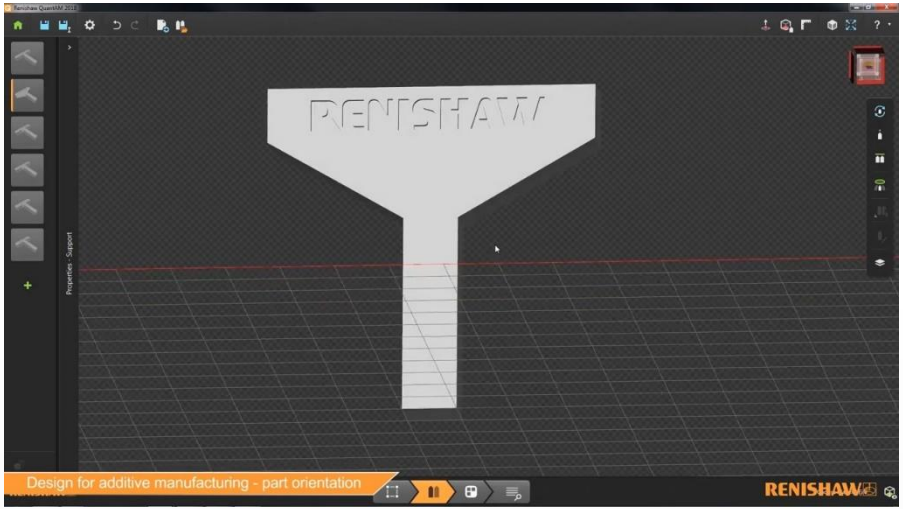
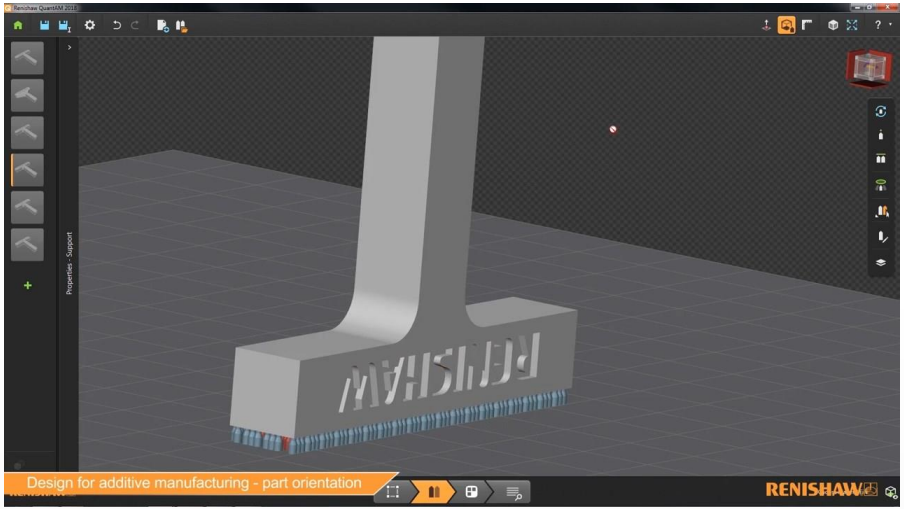
Orientation optimization





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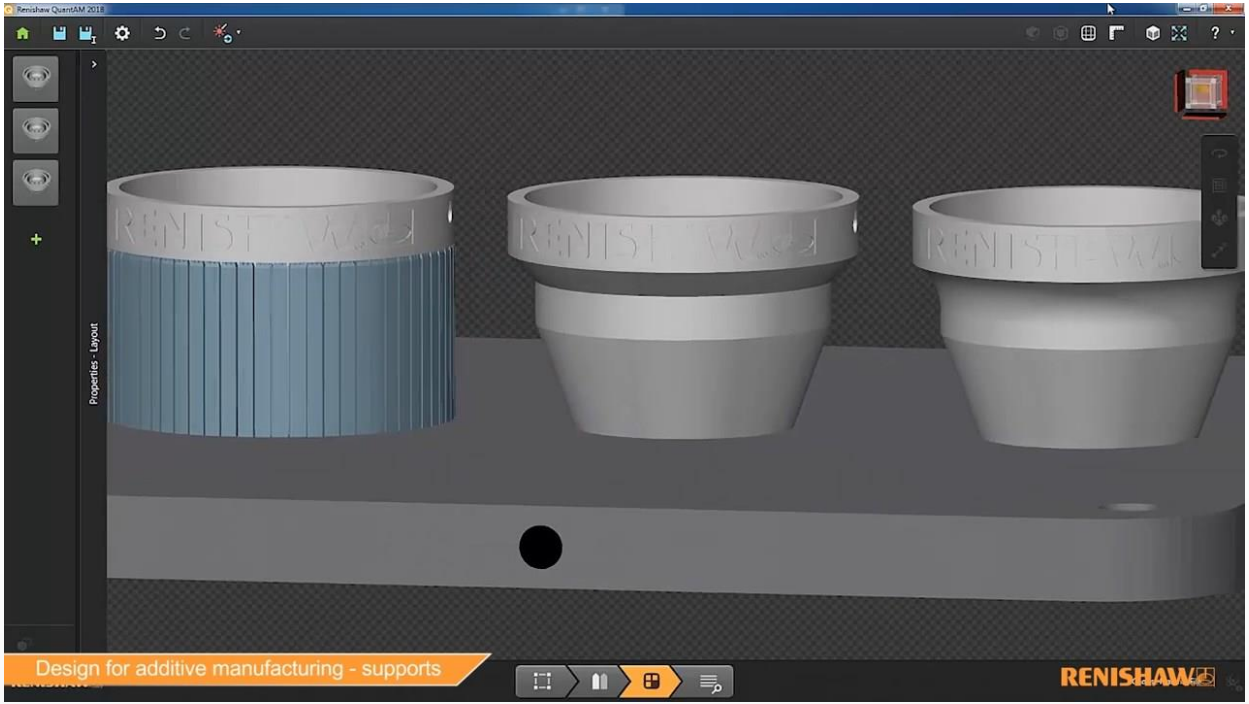
Orientation optimization

Supports limitations



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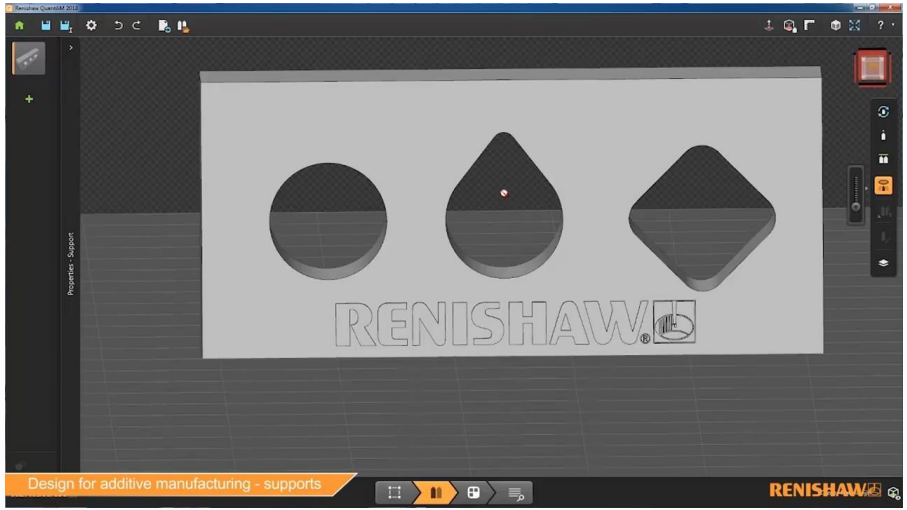
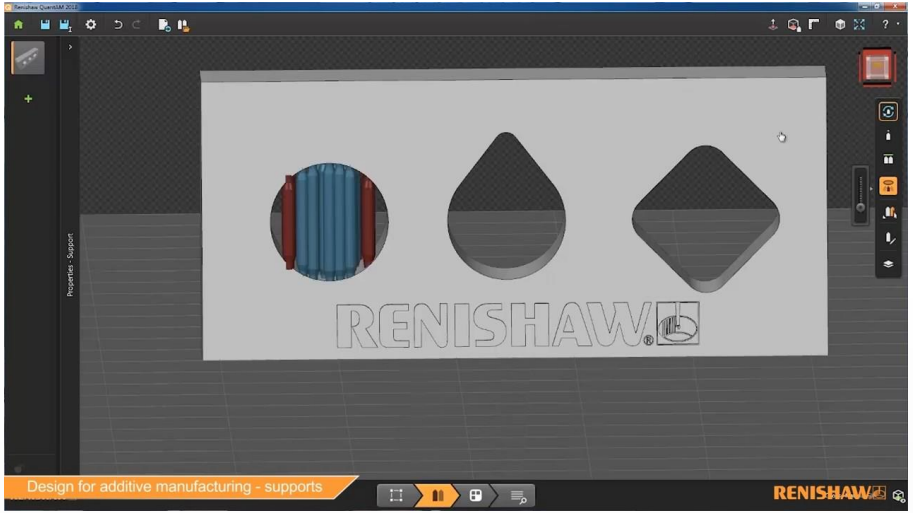
Orientation optimization

Supports limitations





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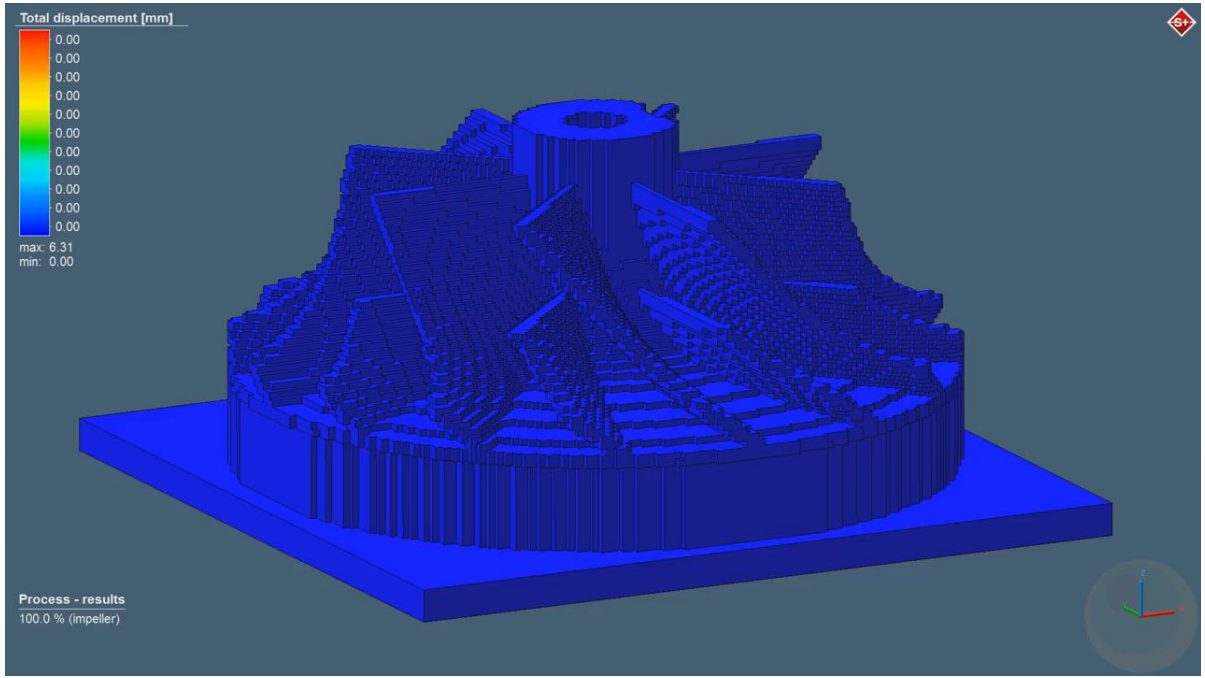
Print process simulation



simufact
Simulating Manufacturing

Print process simulation

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Summary

- *Simulation is a powerful tool to reduce the time, cost, and weight of AM parts.*
- *The simulation could reduce the cost of large-scale production even lower than the traditional manufacturing cost.*
- *Combining three simulation methods of topology optimization, orientation optimization, and print process simulation will make additive manufacturing to be the next manufacturing technique in almost every industry.*

Thank you for your interest!

Do you have any questions?

LUT University

Research Group of Laser Material Processing and Additive Manufacturing, LUT Laser&AM

Junior Research Scientist, Saeid Parchegani

saeid.parchegani@student.lut.fi