



# CP122990-Fusion 360 for 3D Printing FDM Technology Workflow

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Technical Sales Autodesk

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# BIO – Matteo Crocetti

- 18 year experience on CAD\CAM\PLM
- Autodesk since 2013
- Technical Sales
- Fusion 360 enthusiast
- New technology
- Motorsport and Snowboard



# Learning Objectives

- Understand the Fusion360 environment for additive technology
- Leverage the benefit of 3d printing for changing the way to design
- Better perform your model using design optimization
- Take away tips and tricks for optimizing shape and production of your parts

# Agenda

- 3d printing technology
- Fusion360 intro
- Creative Rollerblade Project
- Take away tips for additive technology

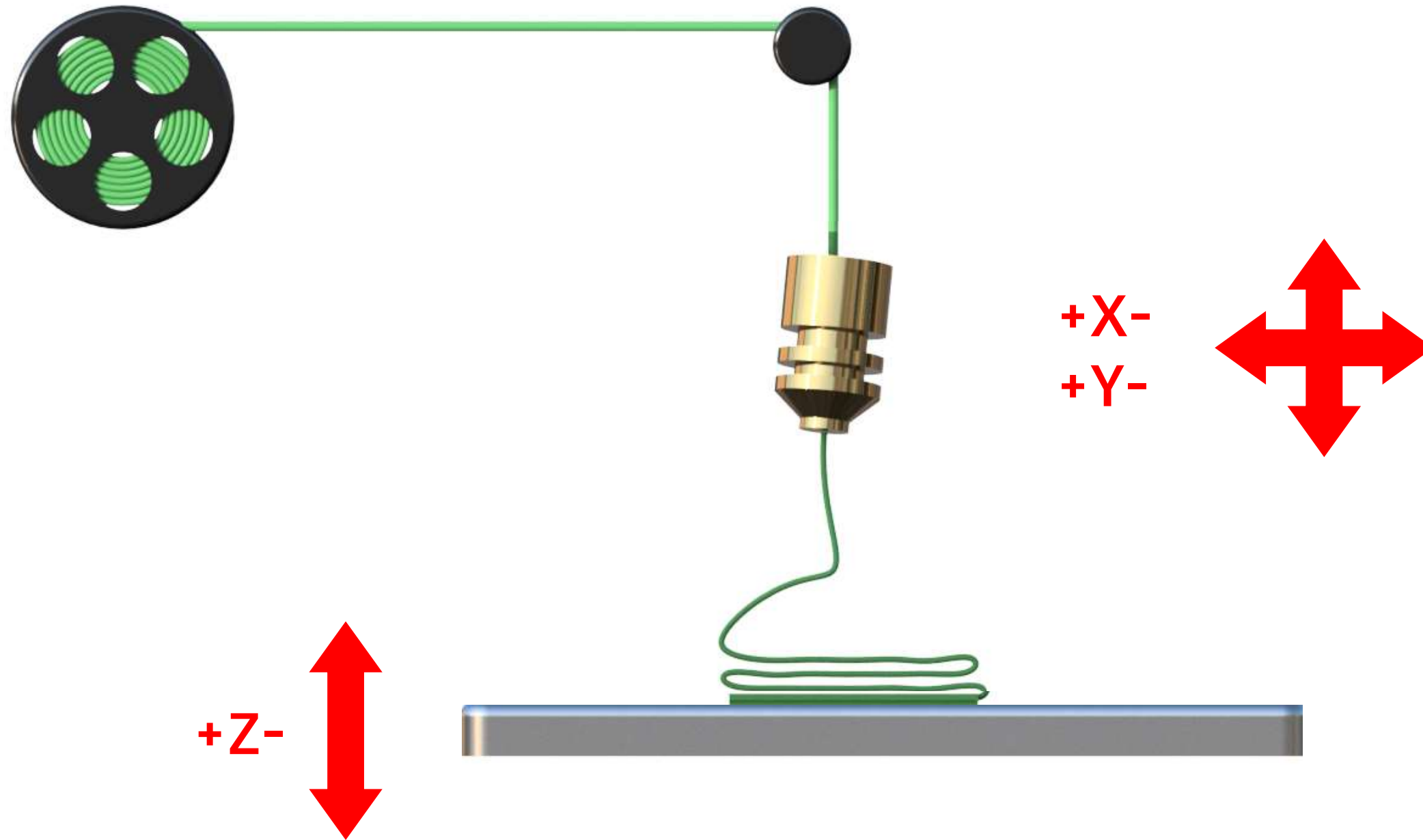
3d printing



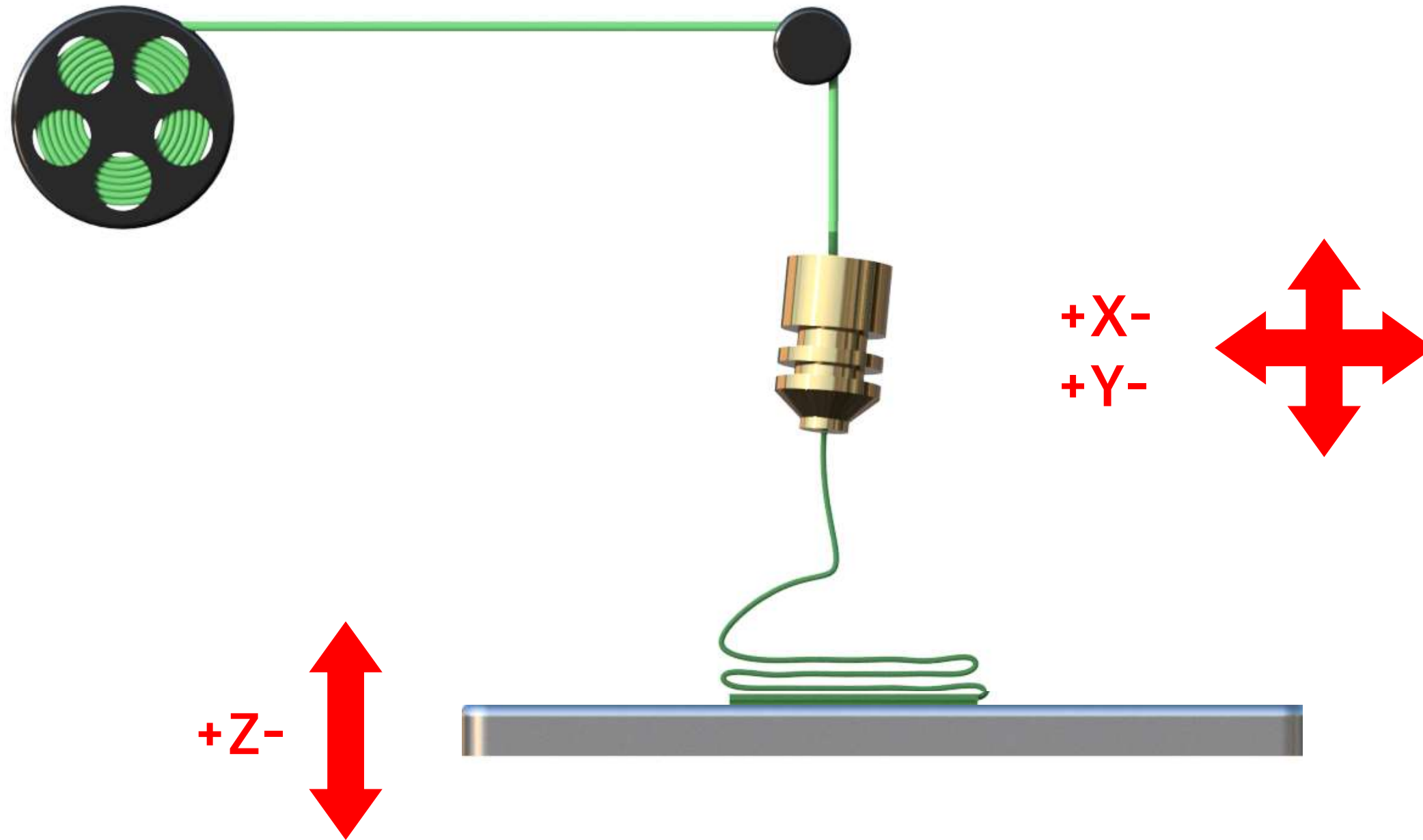




# FDM – Fused Deposition Modeling



# FDM – Fused Deposition Modeling



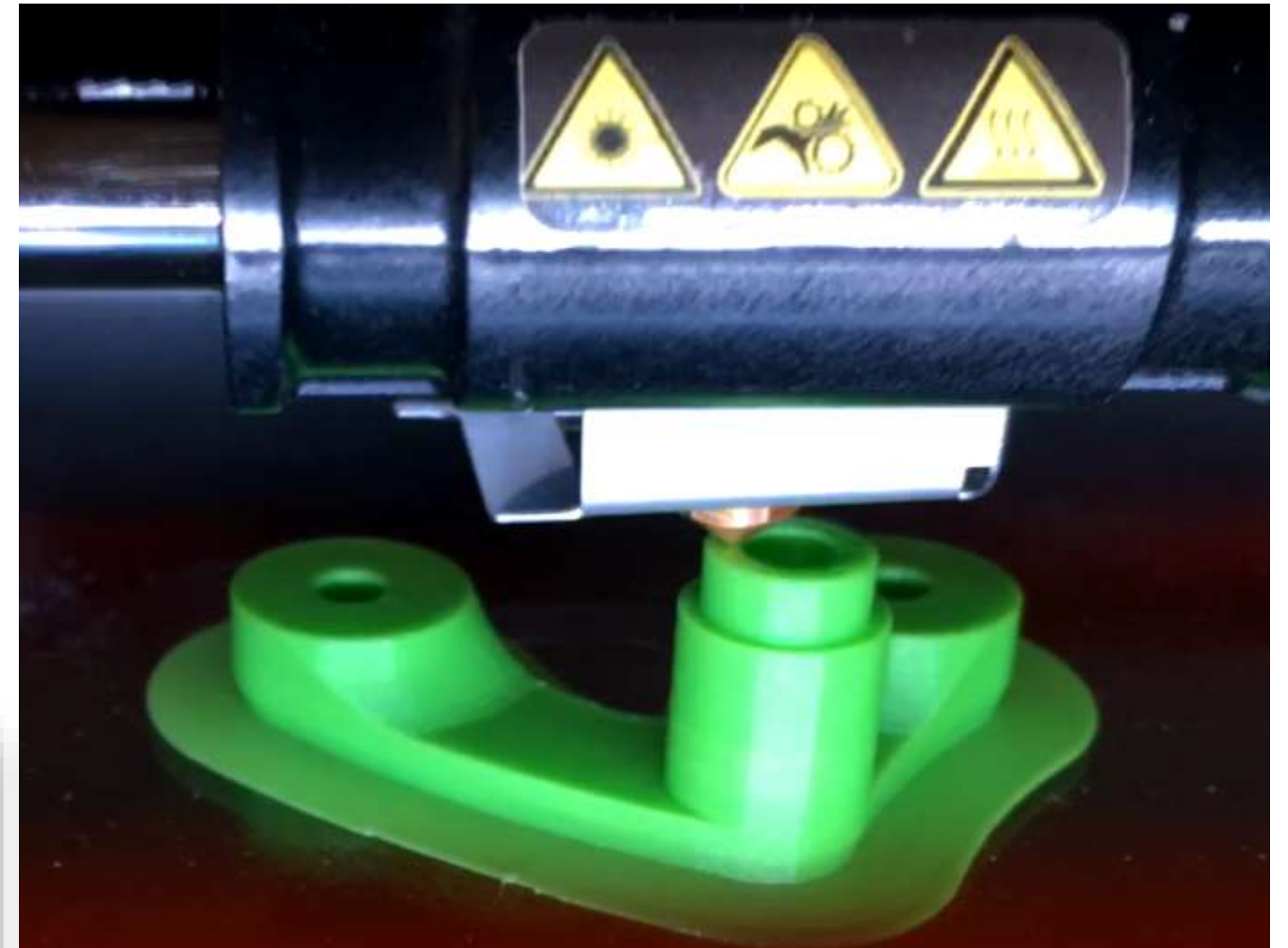
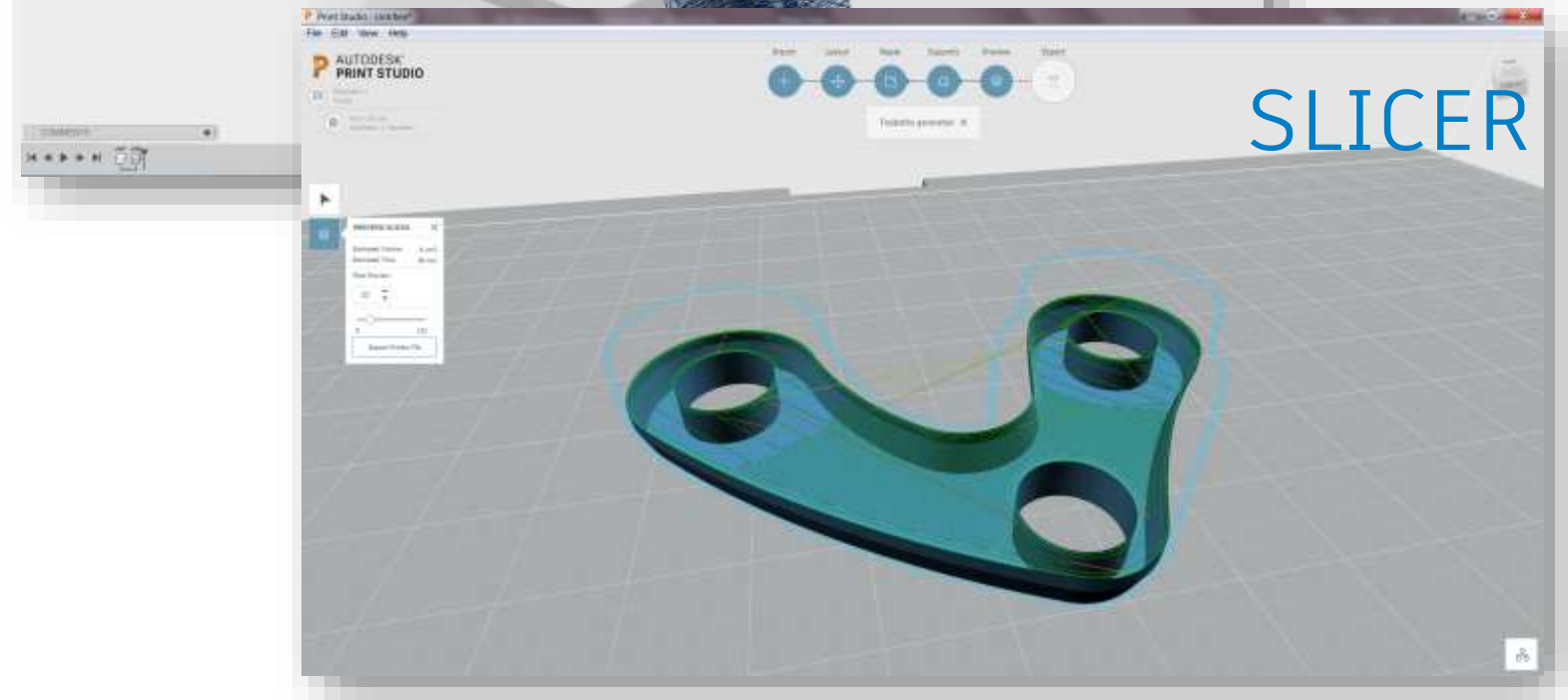
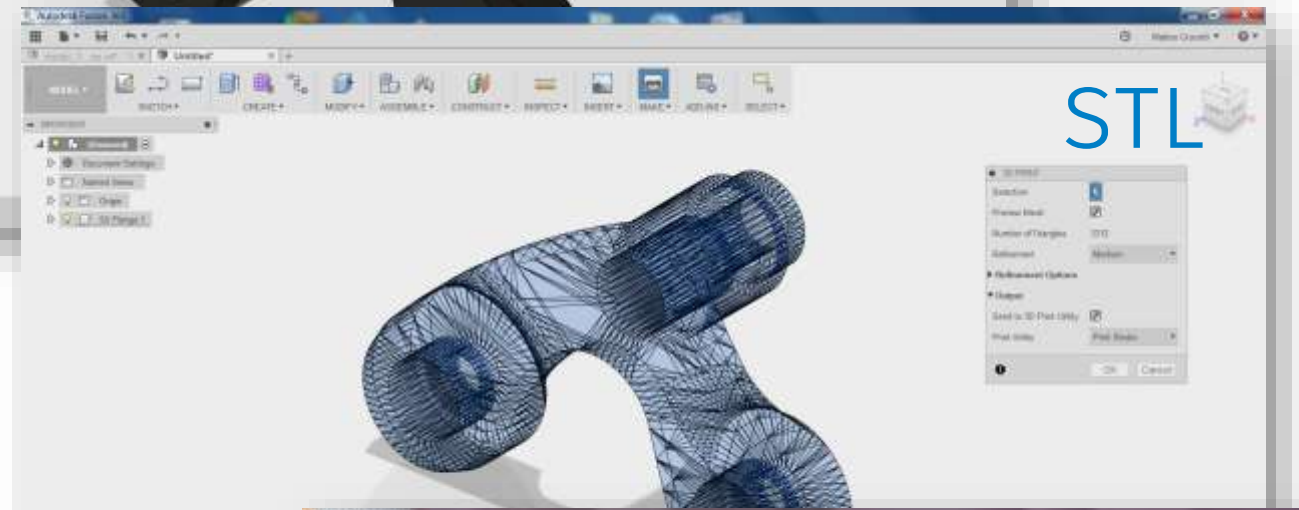
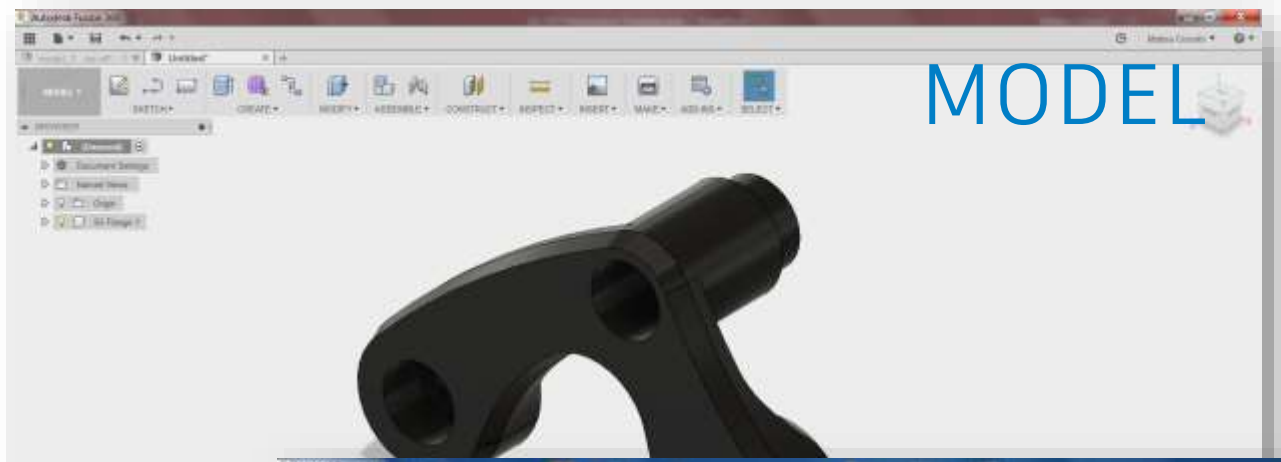


# Materials

- PLA
- ABS



# The Process





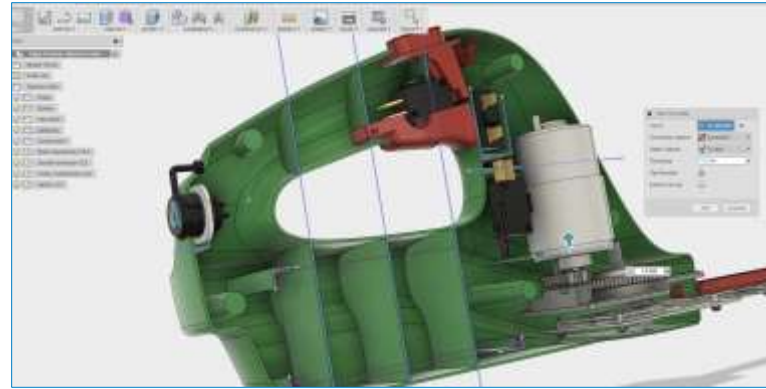






## Rendering

- Cloud and local renderings
- Custom environments
- Advanced materials

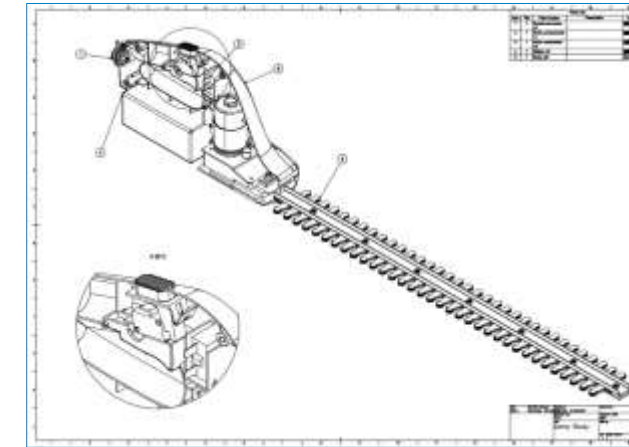
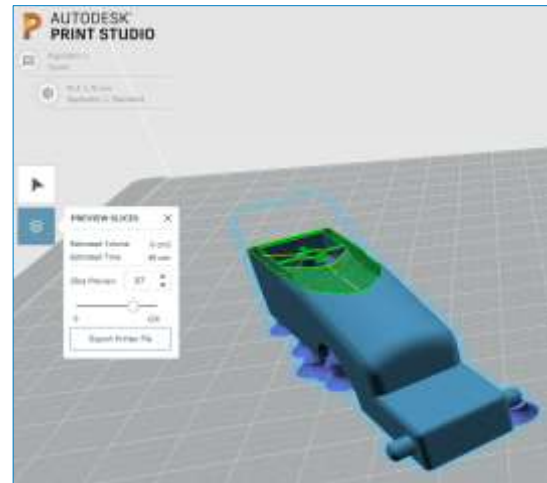


## 3D Modelling

- Solid / Surface / T-Spline Modelling
- Assembly modelling
- Component Referencing
- Animations
- Storyboard

## 3D Print

- Print Studio Support
- Automated layout
- Customized options

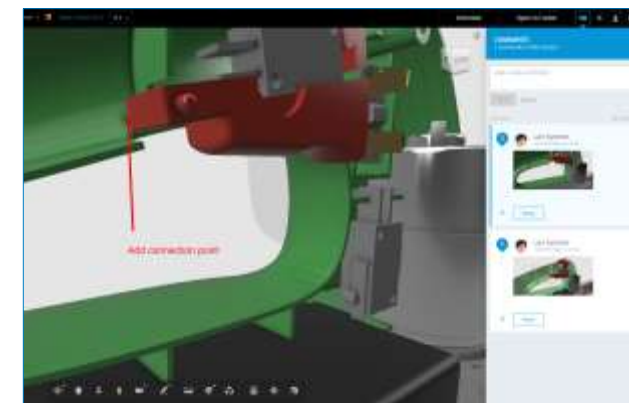
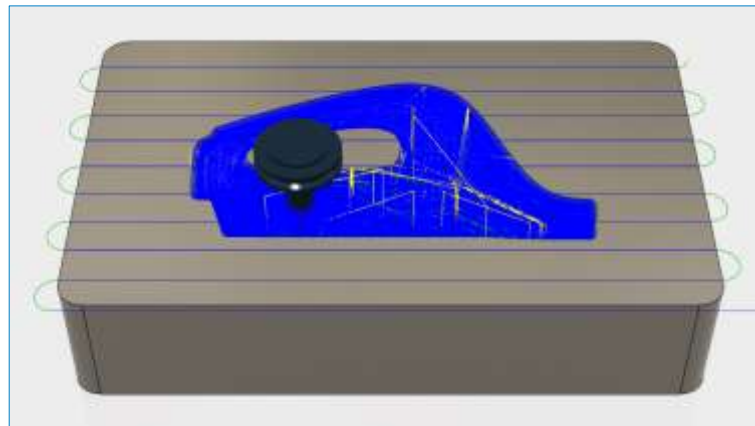


## 2D Drawing

- Simple Views
- Simple Parts List
- Exploded Views

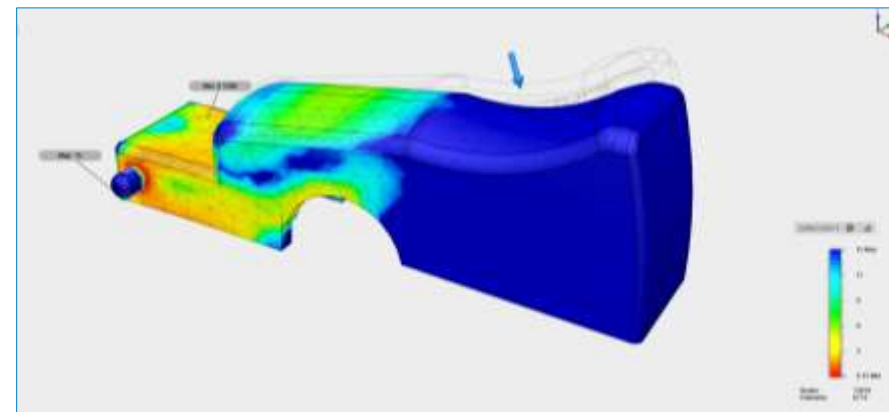
## CAM

- 2.5 Axis
- 3 Axis
- Turning
- Water Jet
- Engraving



## Project Collaboration

- Cloud based data
- Access & view on any platform
- Redline, Measure & Markup
- Live Review

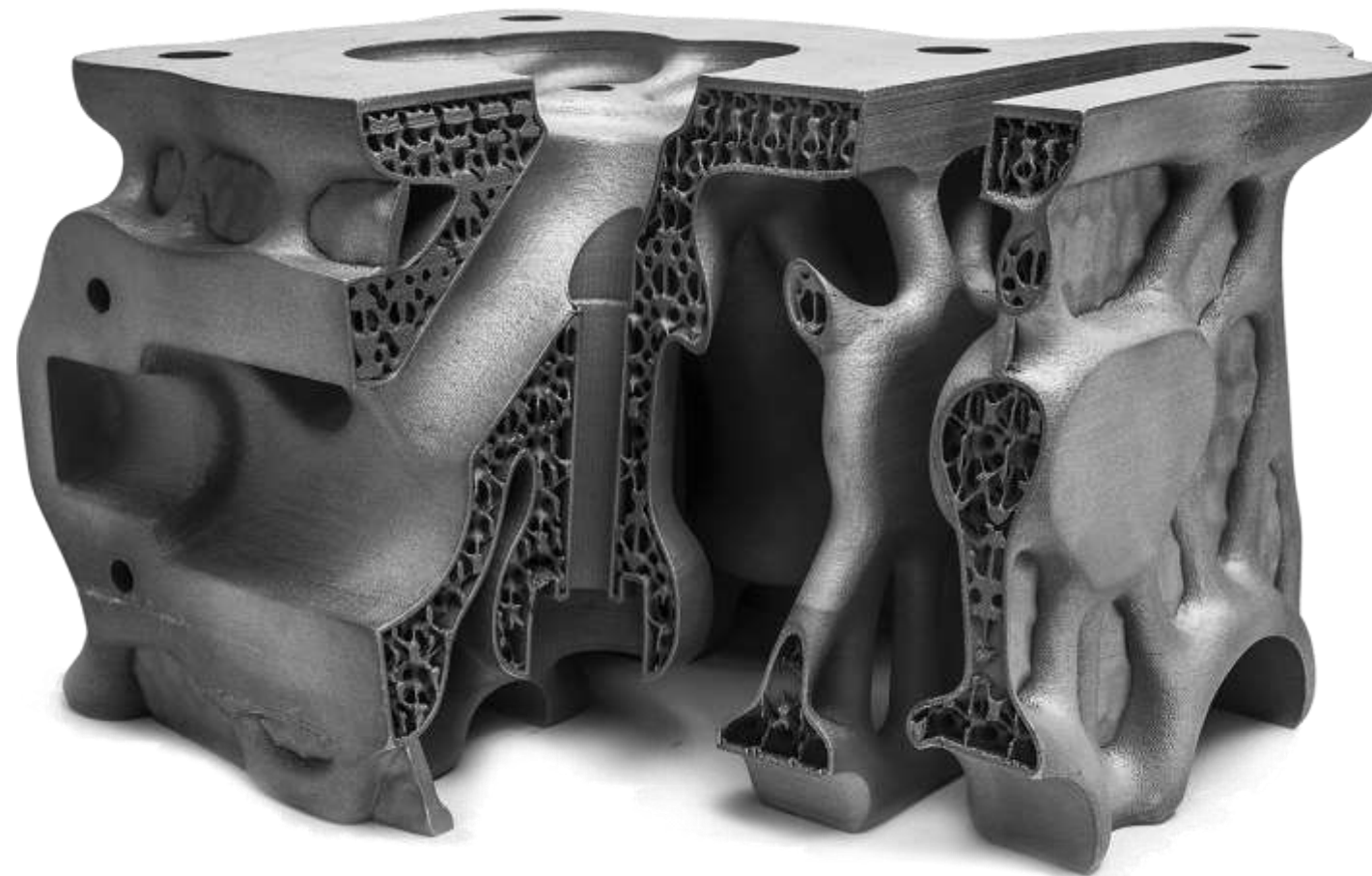
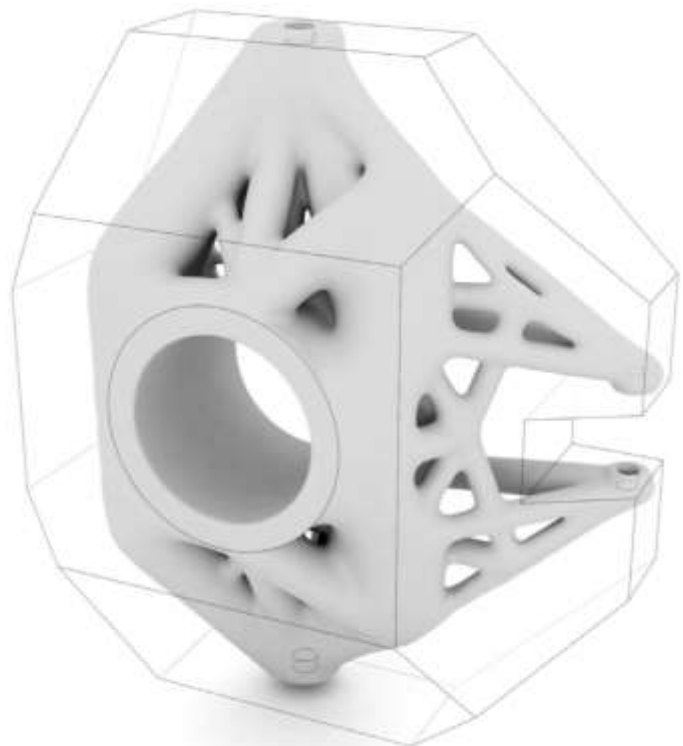
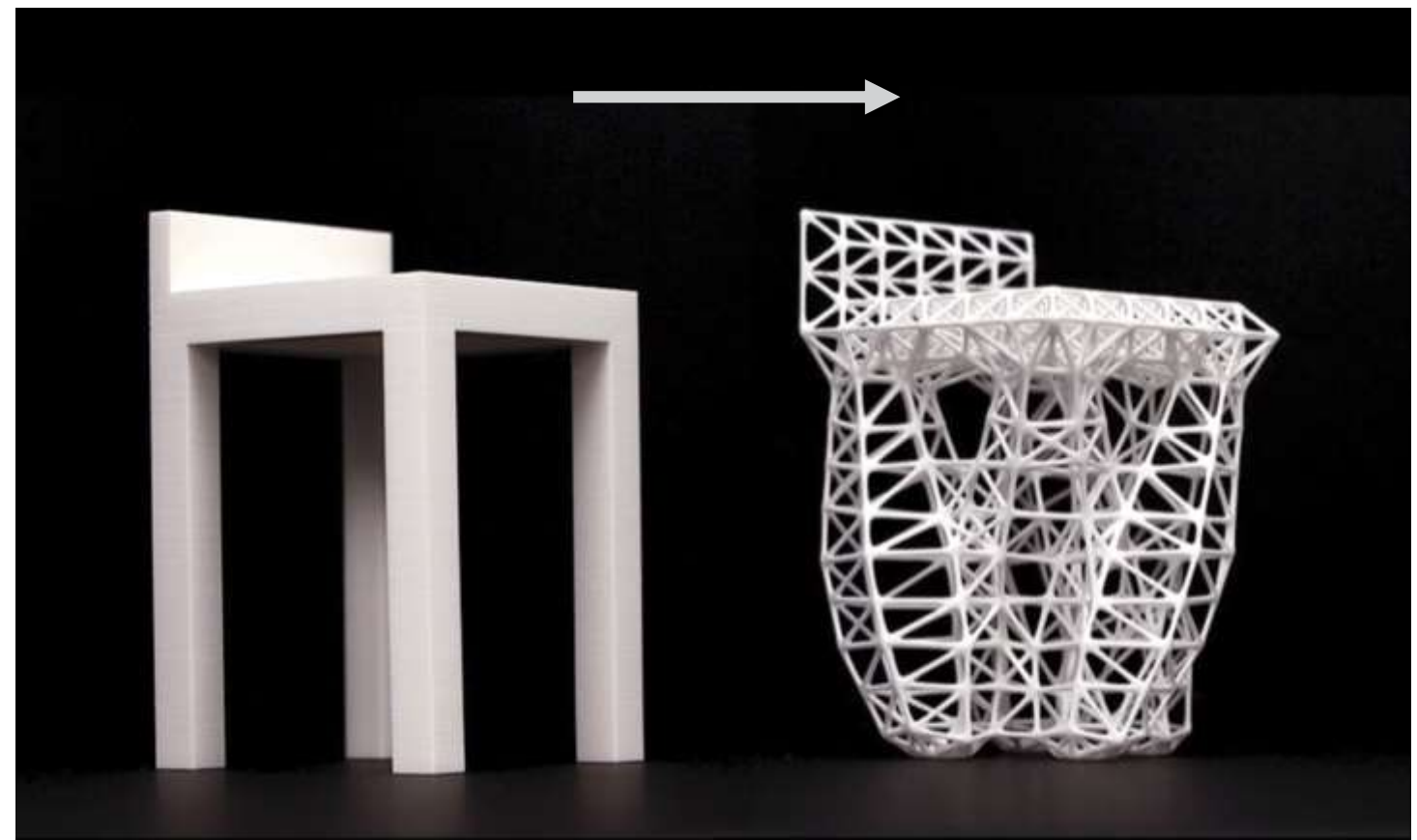


## Simulation

- Linear Static FEA
- Modal Analysis
- Thermal
- Thermal Stress

# Goal Driven Design

- Topology optimization
- Lattice Structure
- Generative Design





# Creative Rollerblade story





# The Idea

Standard Rollerblade:

- Fixed shoe
- Heavy weigh
- Shoe number
- Can not be shared
- Not easy to transport



# The Idea

Re-thinking Rollerblade:

- Sharable
- Light weight
- No fixed Shoe
- Easy to transport





# Re-thinking Rollerblade

 AUTODESK® FUSION 360™

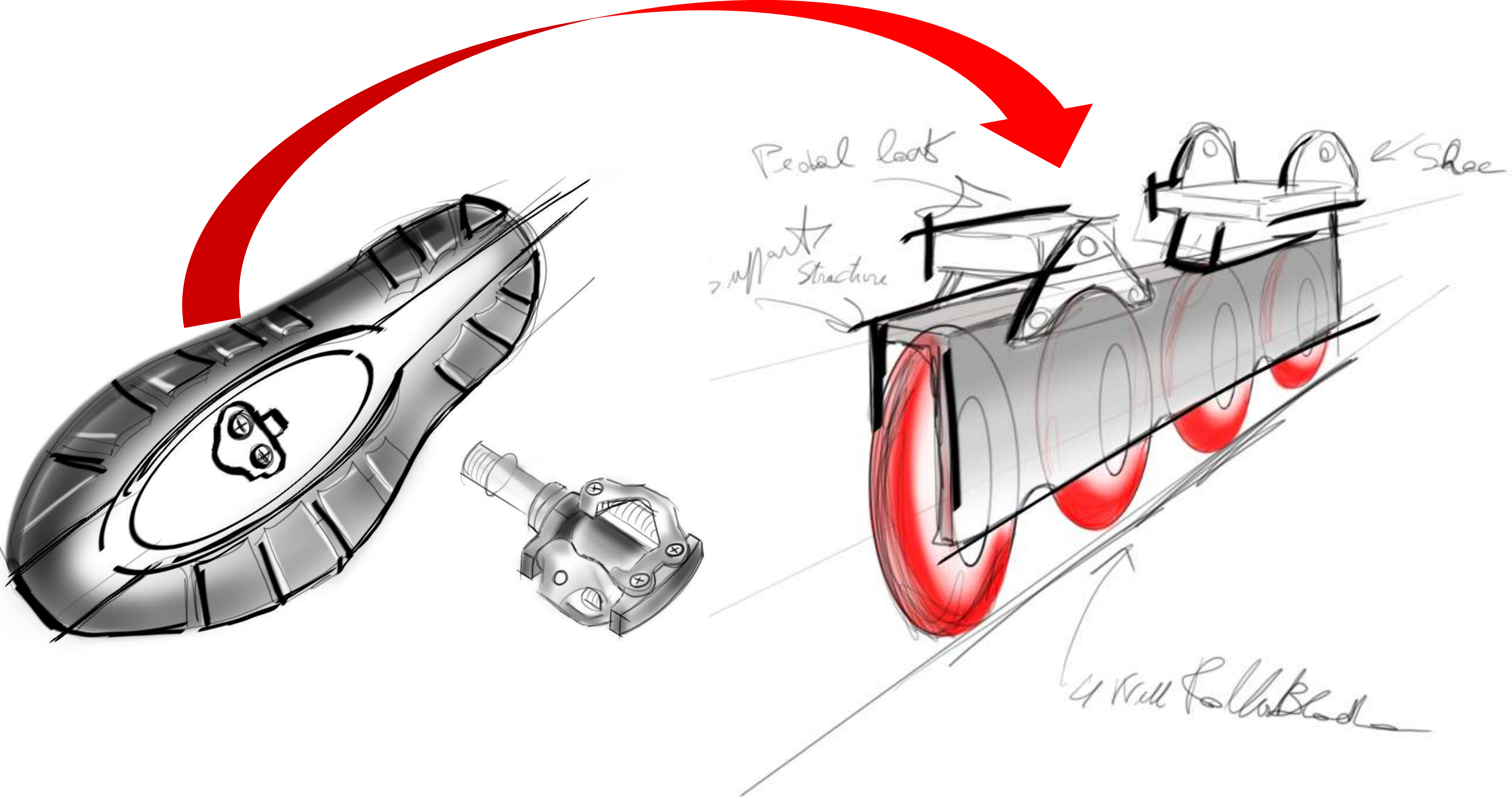


Standard part



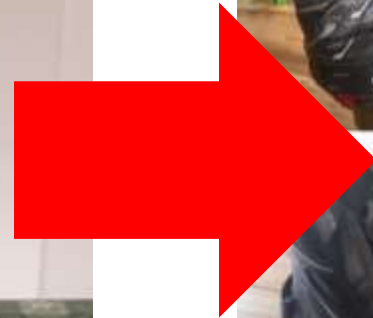
Creative  
Rollerblade

# Re-thinking Rollerblade





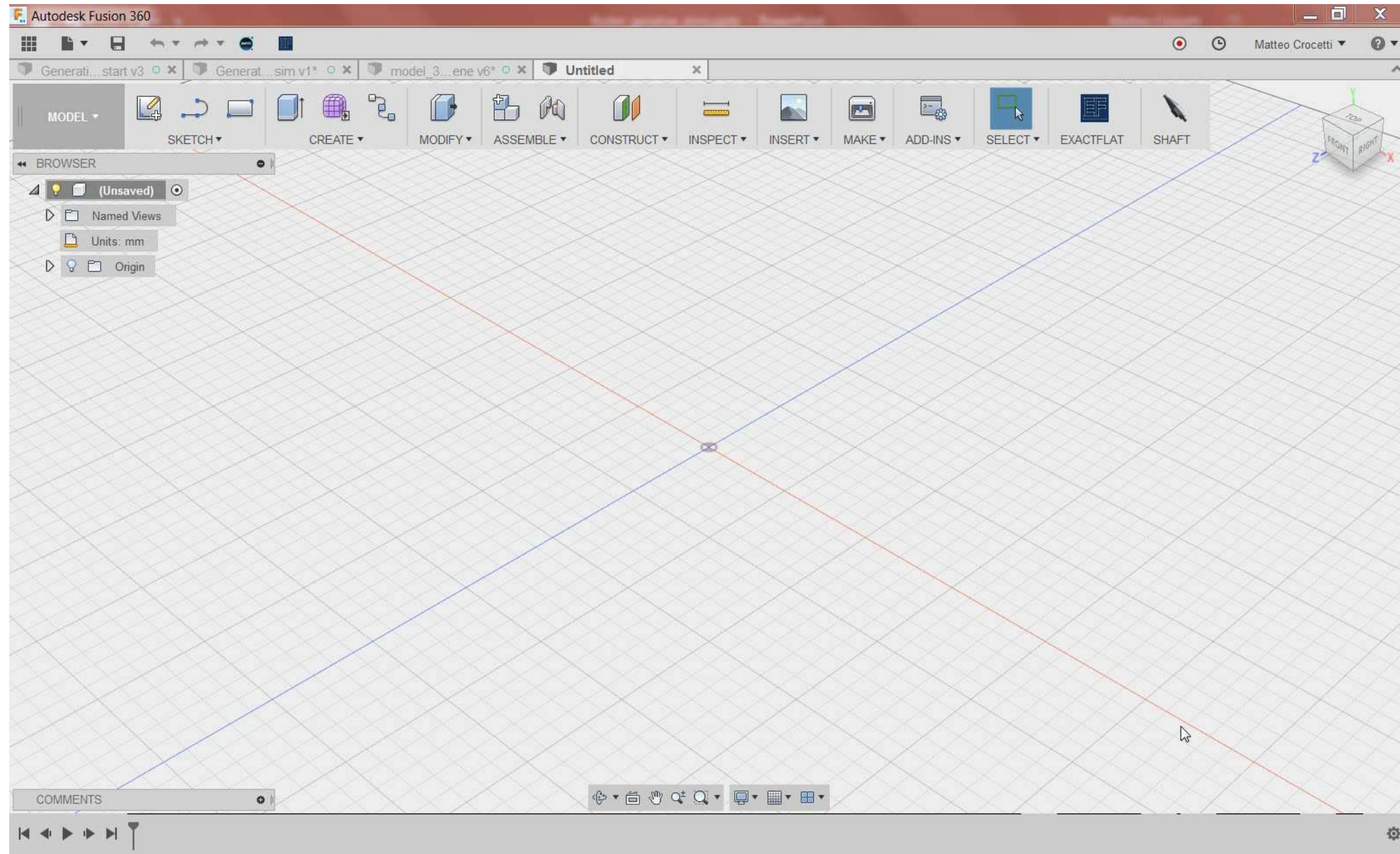
# Acquiring data





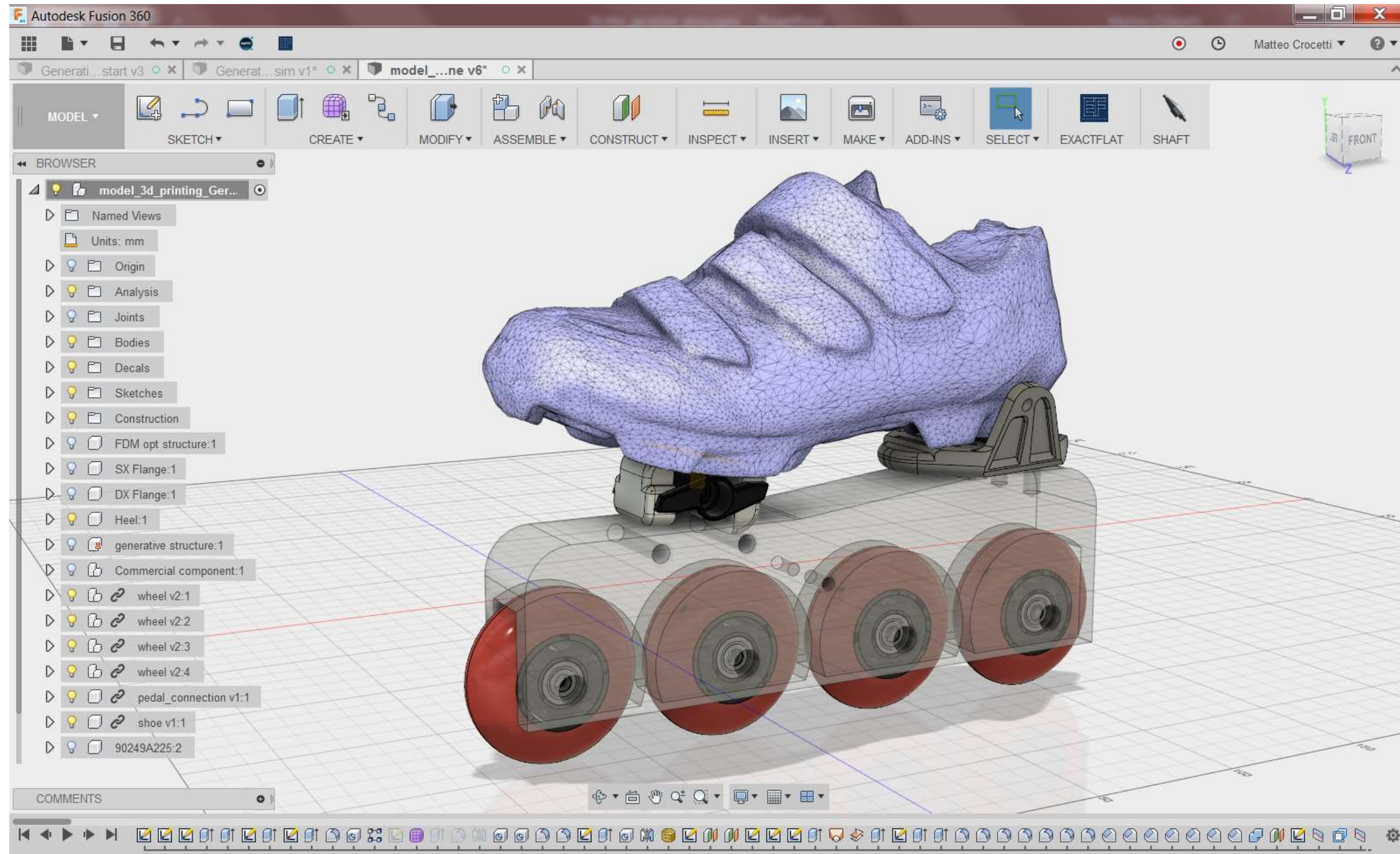


# Mesh management



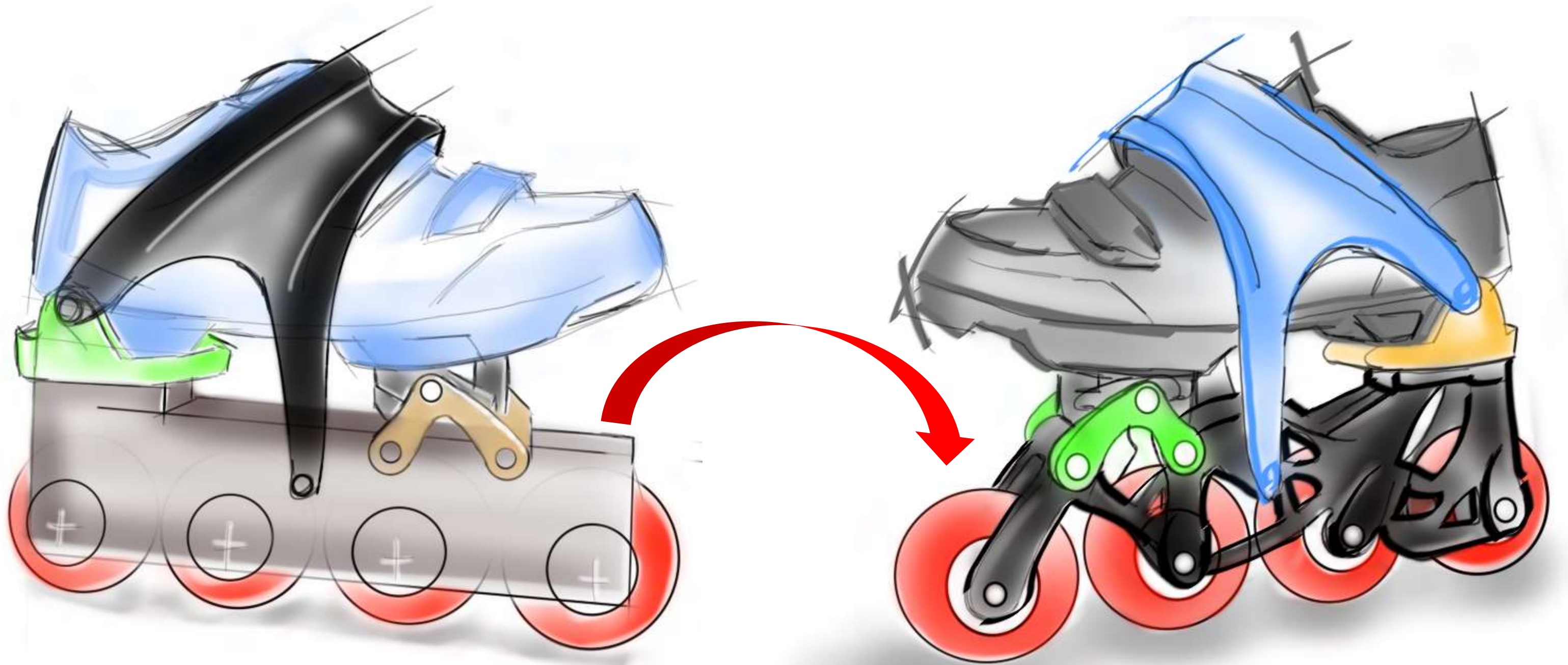


# Setup volumes

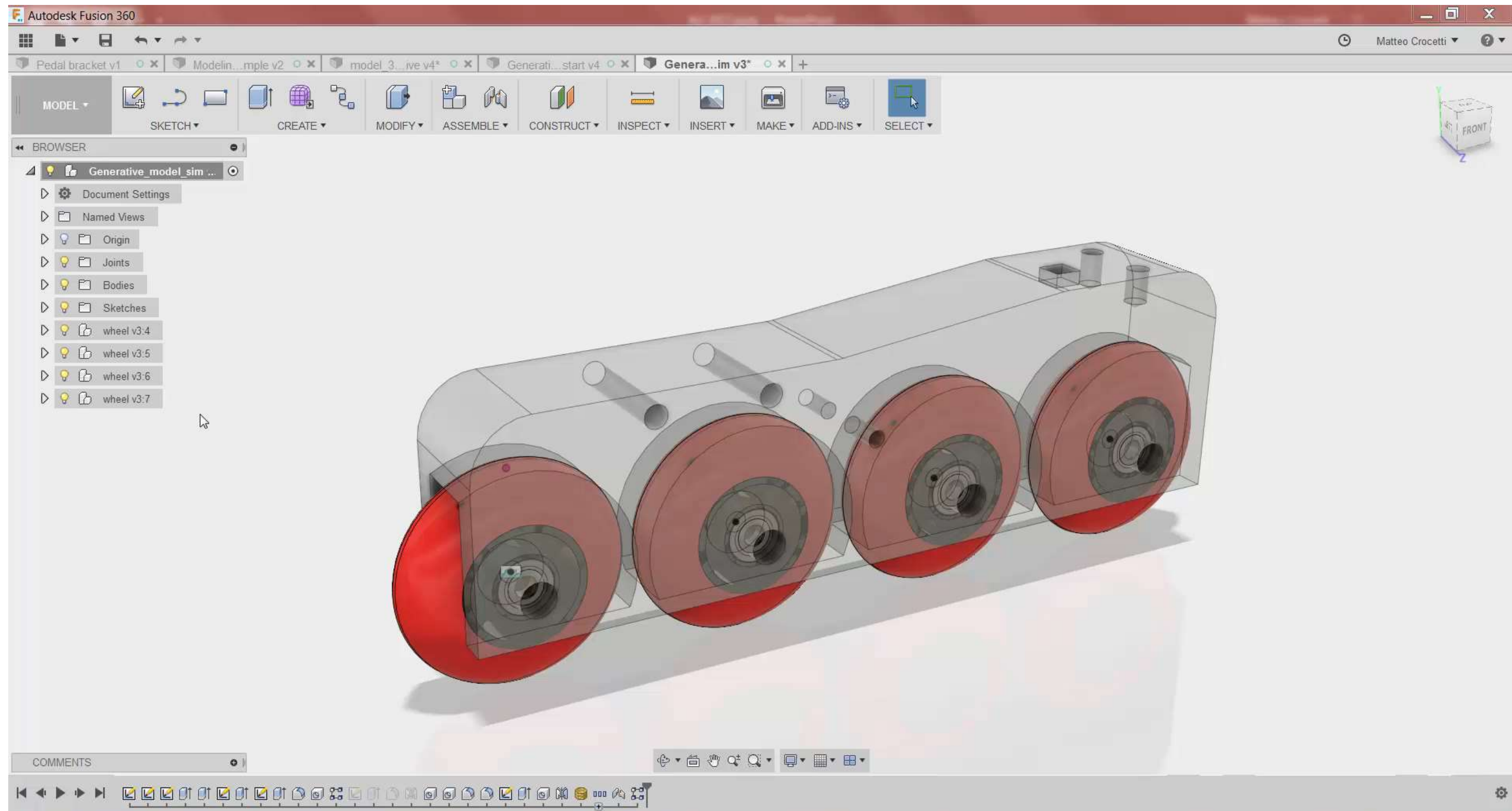




# Re-thinking Rollerblade

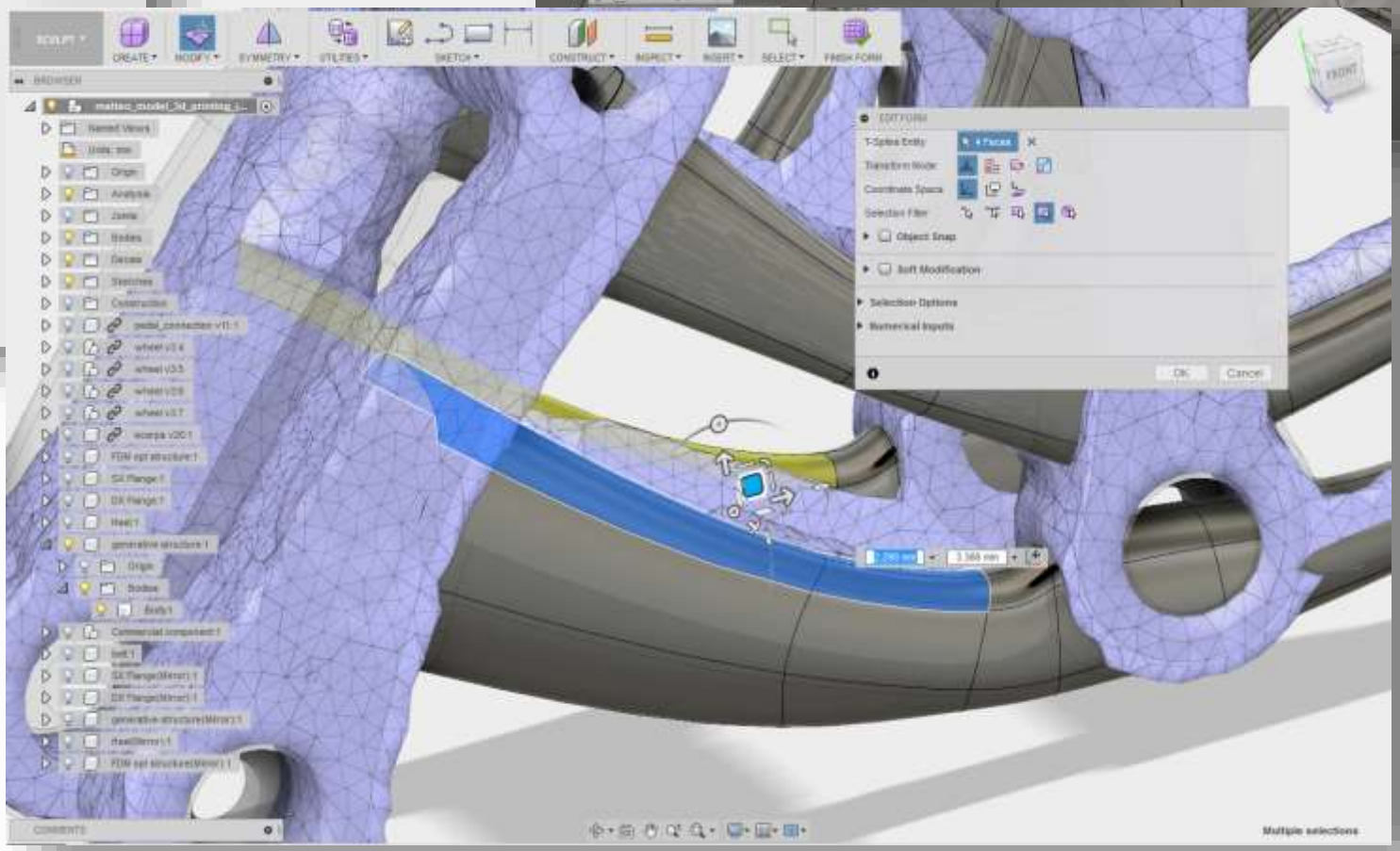
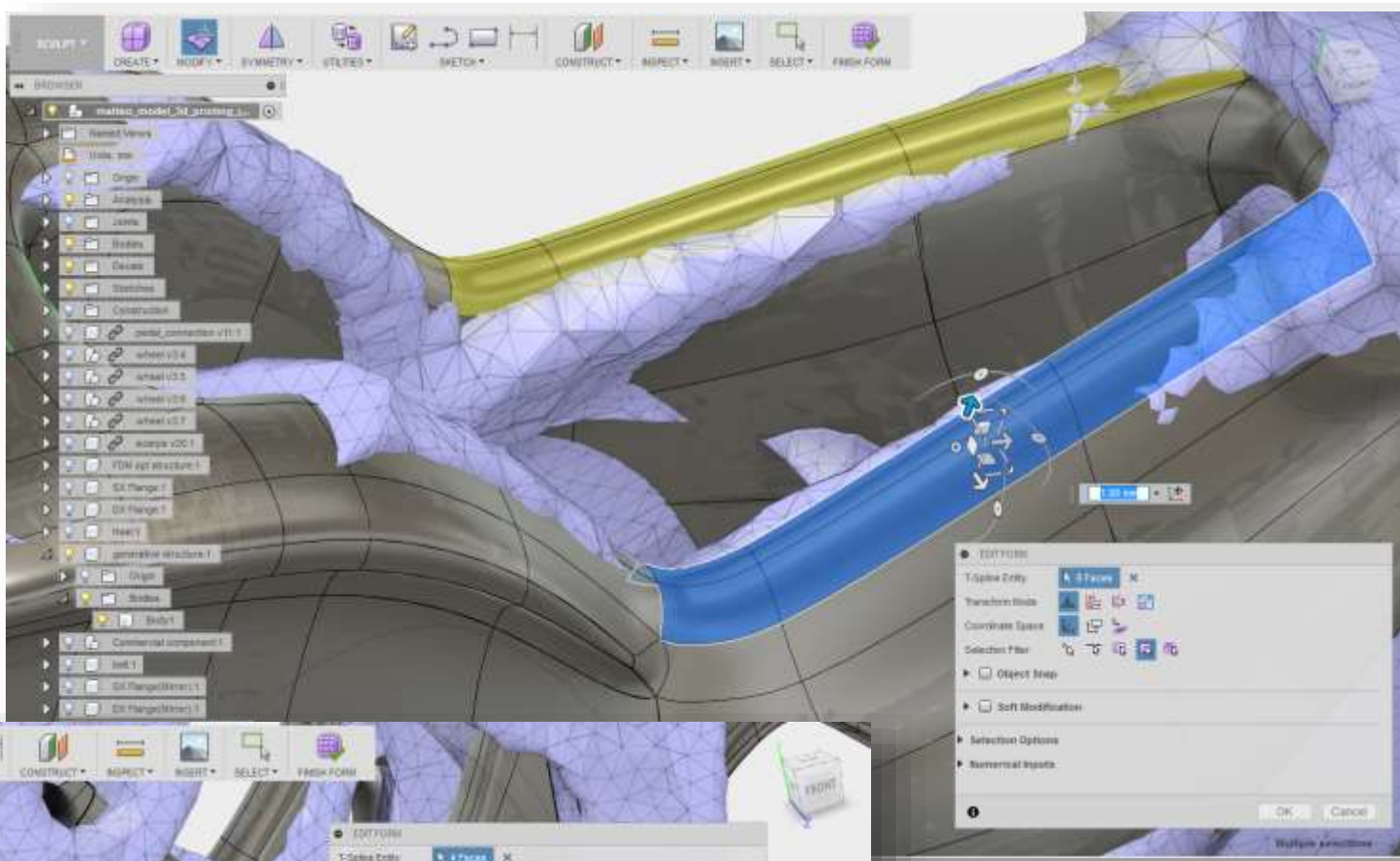
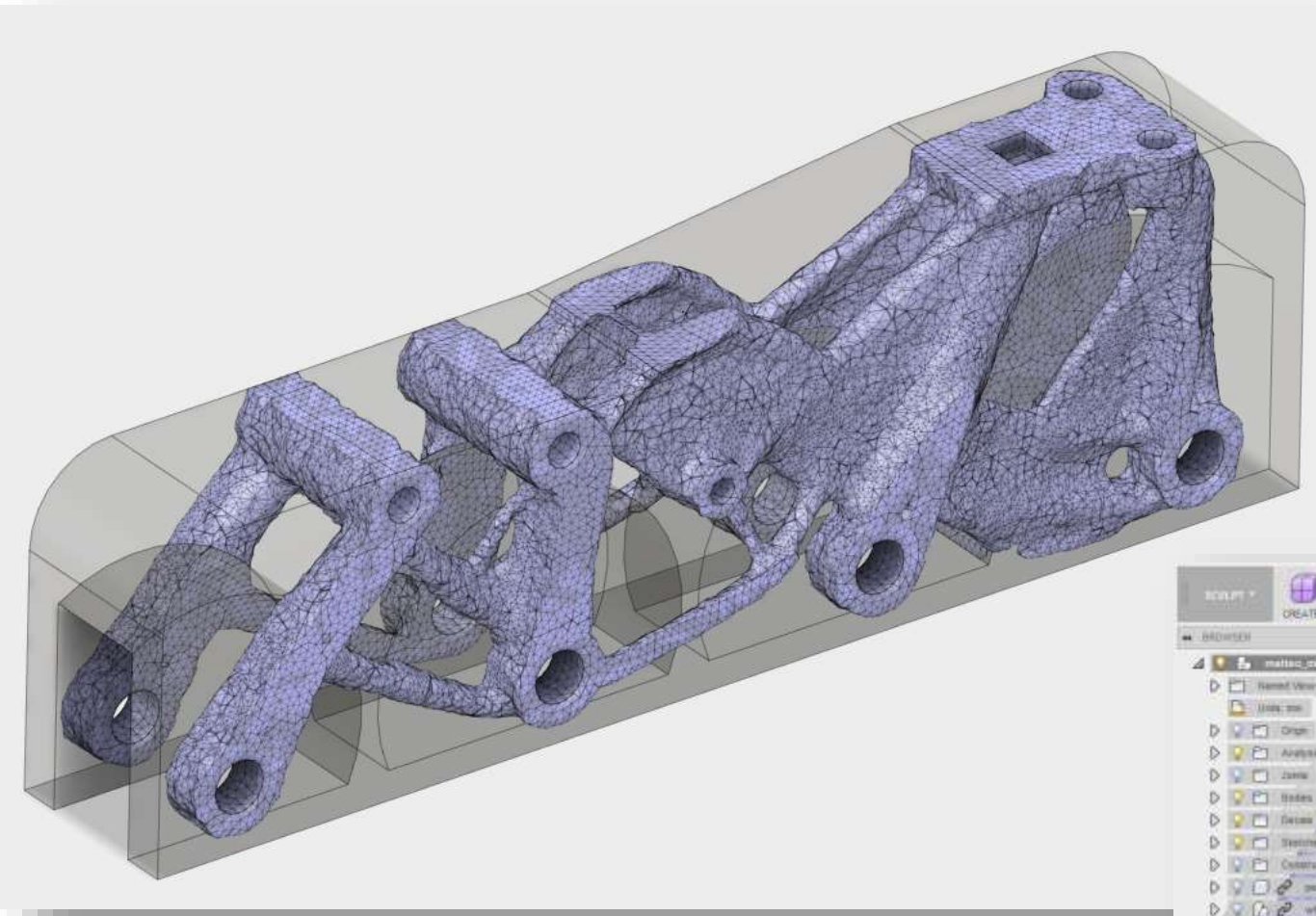


# Shape Optimization



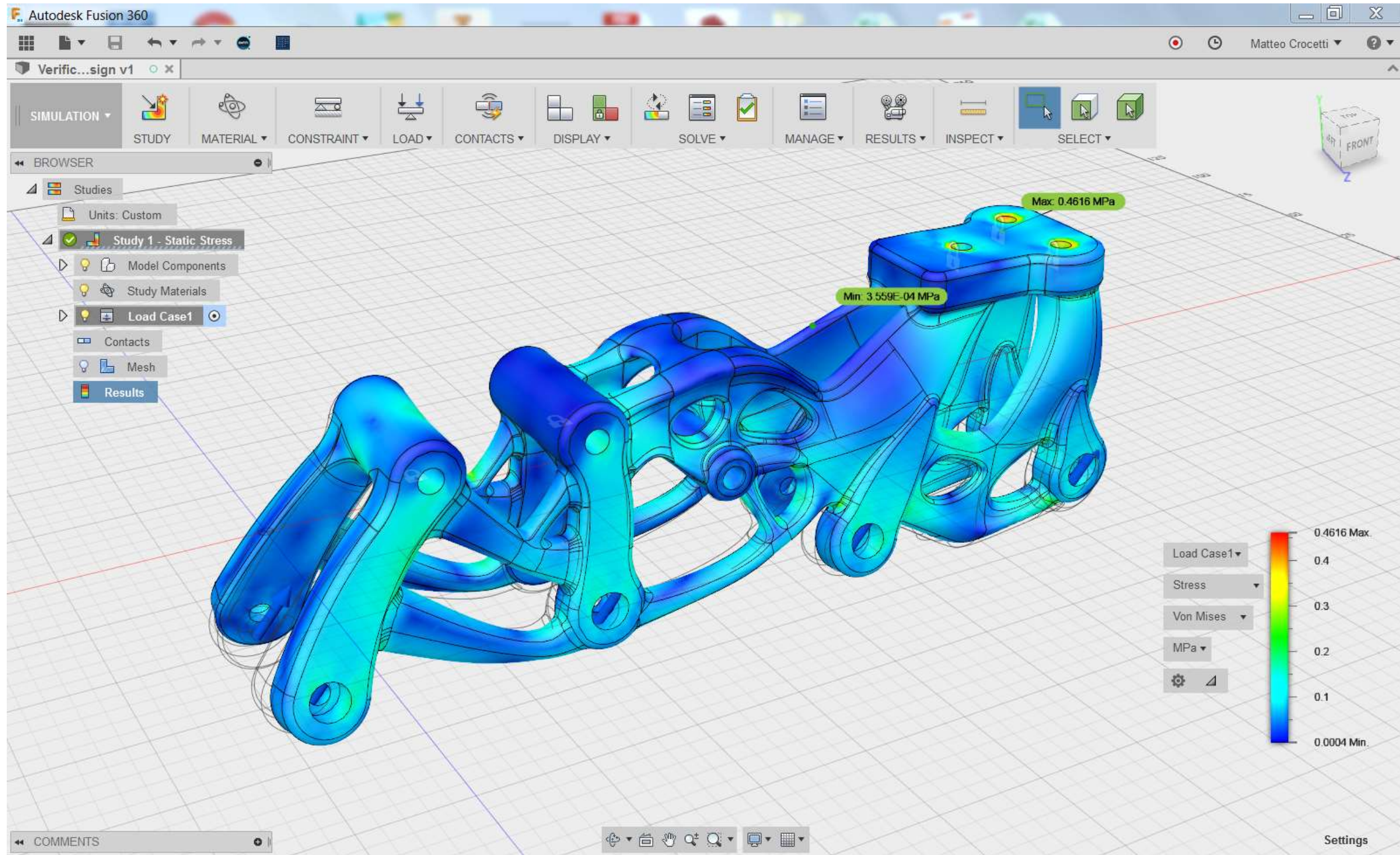


# Modelling



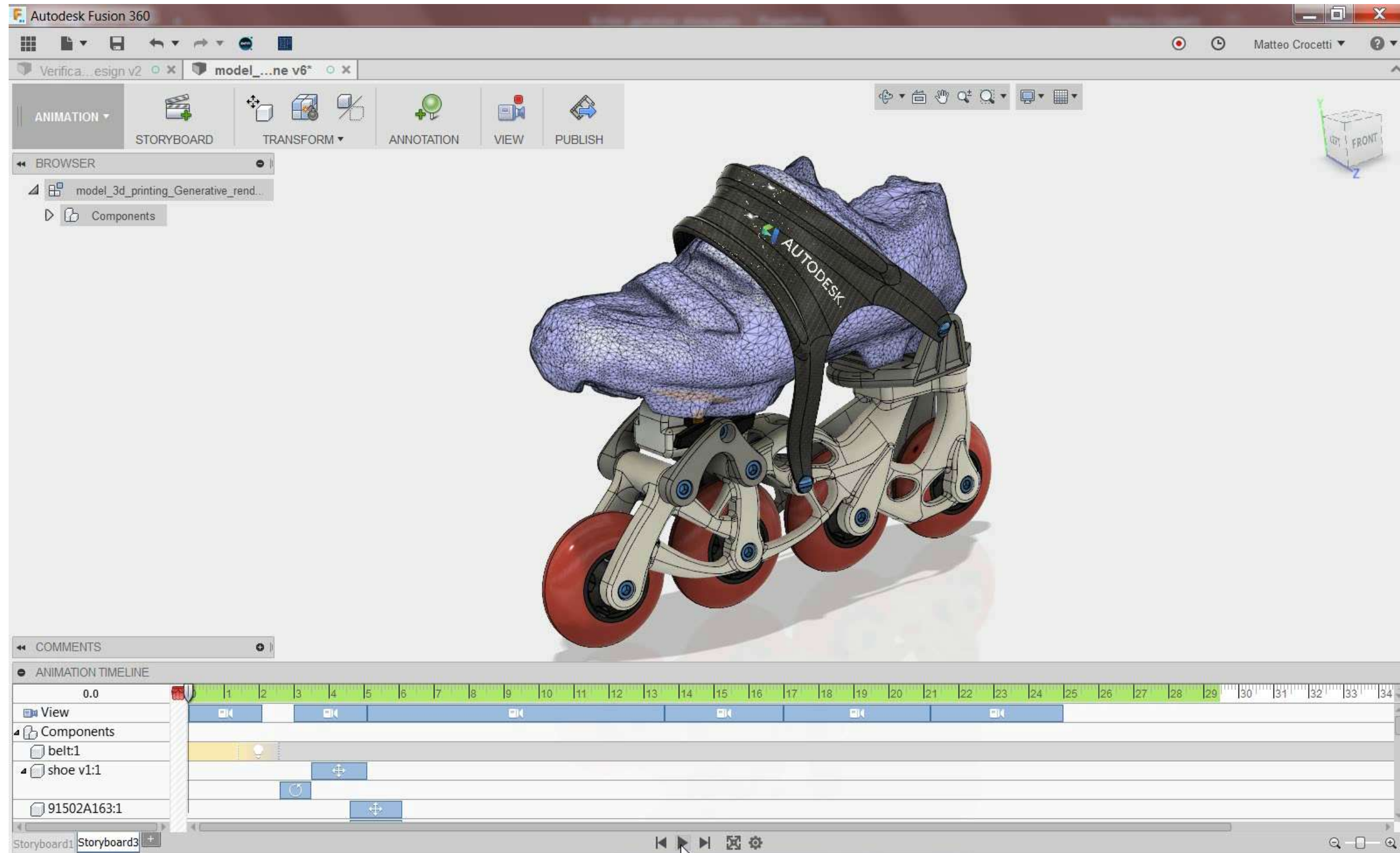


# FEM check





# Final result



# Final result

Autodesk Fusion 360

Verifica... esign v2 | model... ene v7 | model... ing v1

DRAWING VIEWS | MODIFY | CENTERLINES | DIMENSIONS | TEXT | SYMBOLS | BOM | OUTPUT

BROWSER

- Sheet1
- model\_3d\_printing\_Generative\_r...

Parts List

Item	Qty	Part Number	Description	Material
1	1	SX Flange		Steel
2	1	DX Flange		Steel
3	1	Heel		Steel
4	1	Generative structure		Aluminum
5	1	Commercial component		Steel
6	1	90249A225		Steel
7	1	Belt		Steel
8	4	Wheel v2		
9	1	Pedal_connection v1		Steel
10	1	Shoe v1		Steel

Created by: Matteo Crocetti 5/19/2017

Approved by:

Document type:

Title: model\_3d\_printing\_Generative\_rendering\_scene

DWG No.:

Rev. Date of Issue Sheet: 1/1









# Printed parts



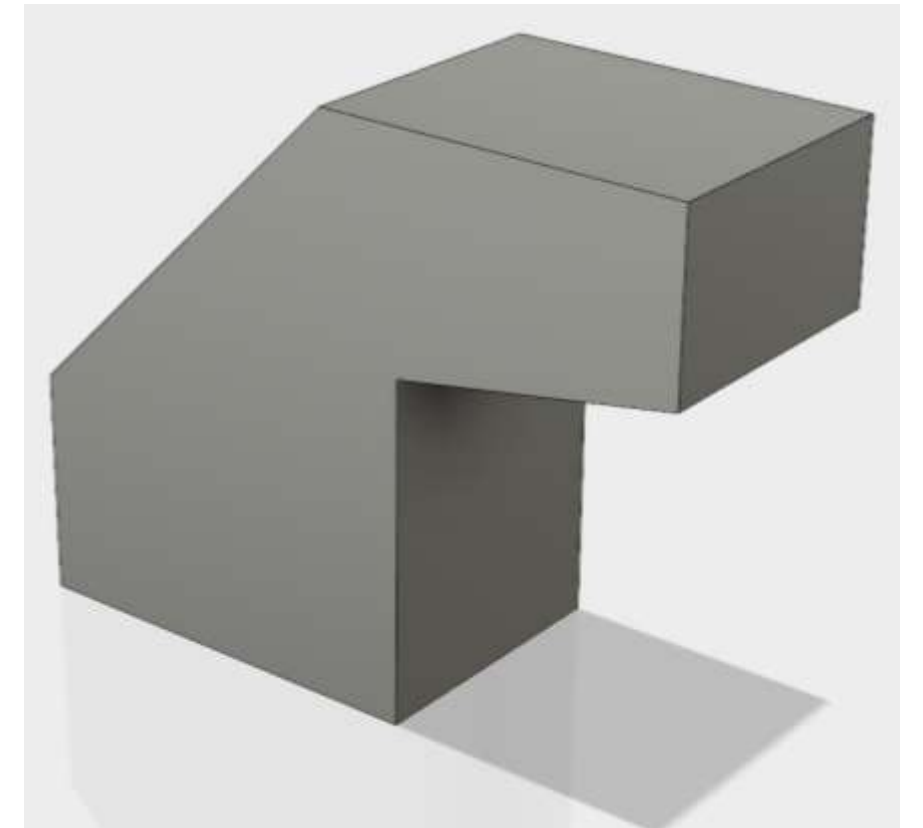
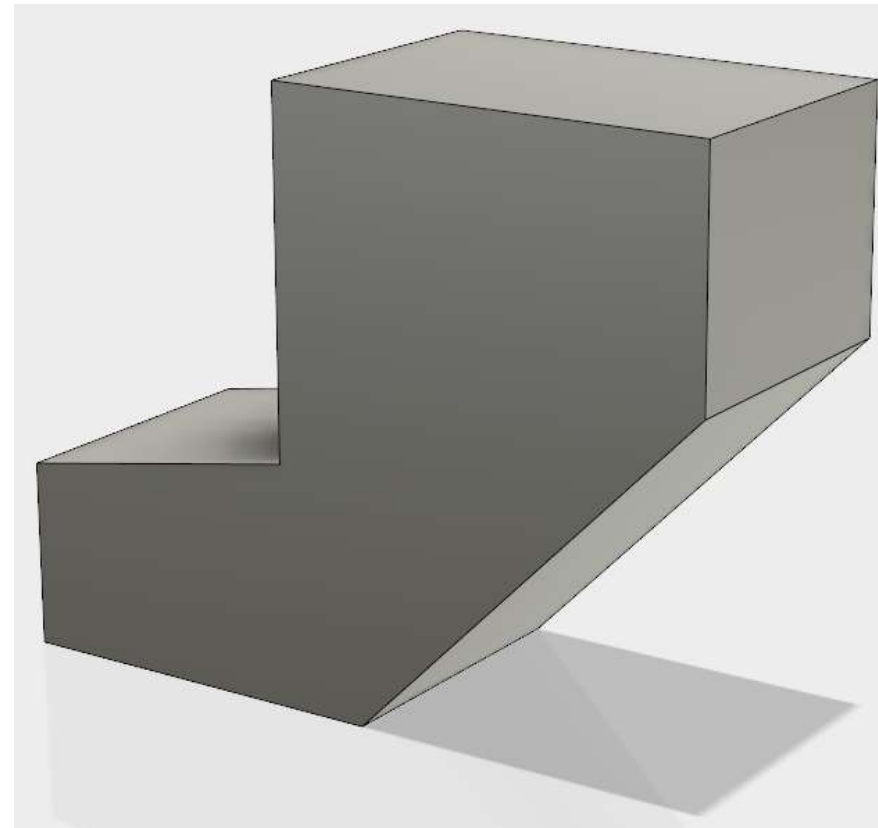
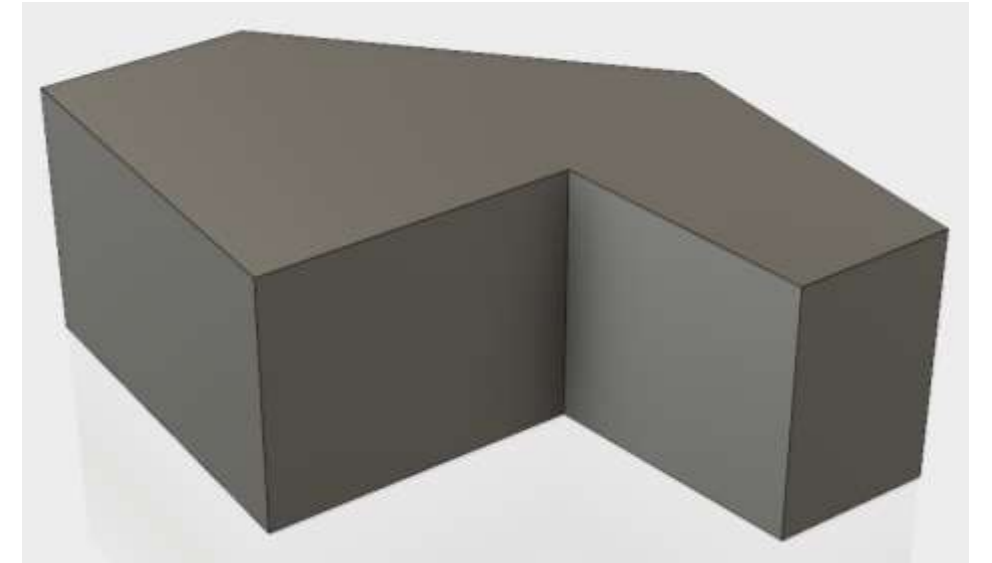
# Best practice to take away

- Model Orientation
- Support material – Overhanging
- Shrinkage and warping
- Holes and tolerance
- Fillets

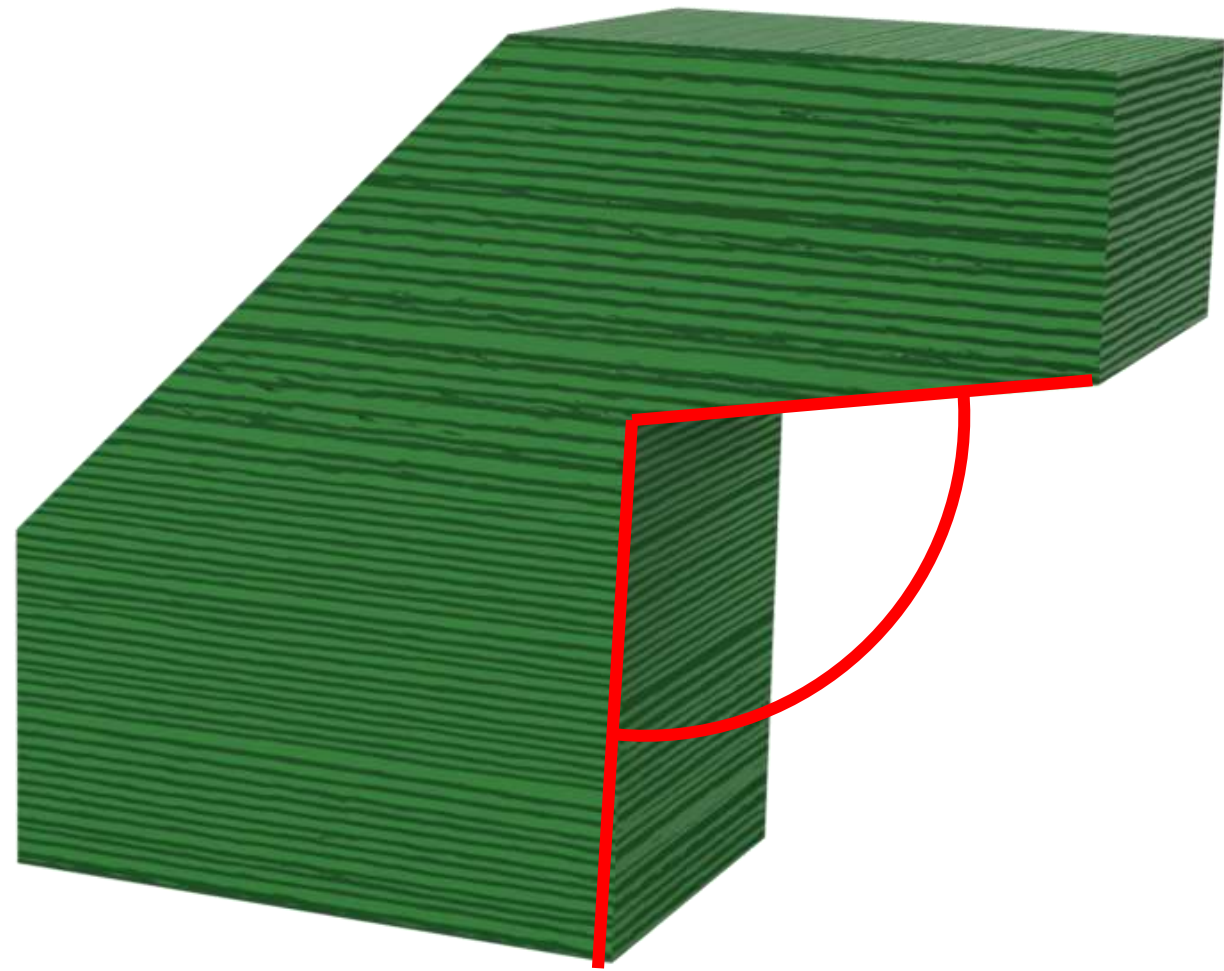


# Model Orientation - Impact

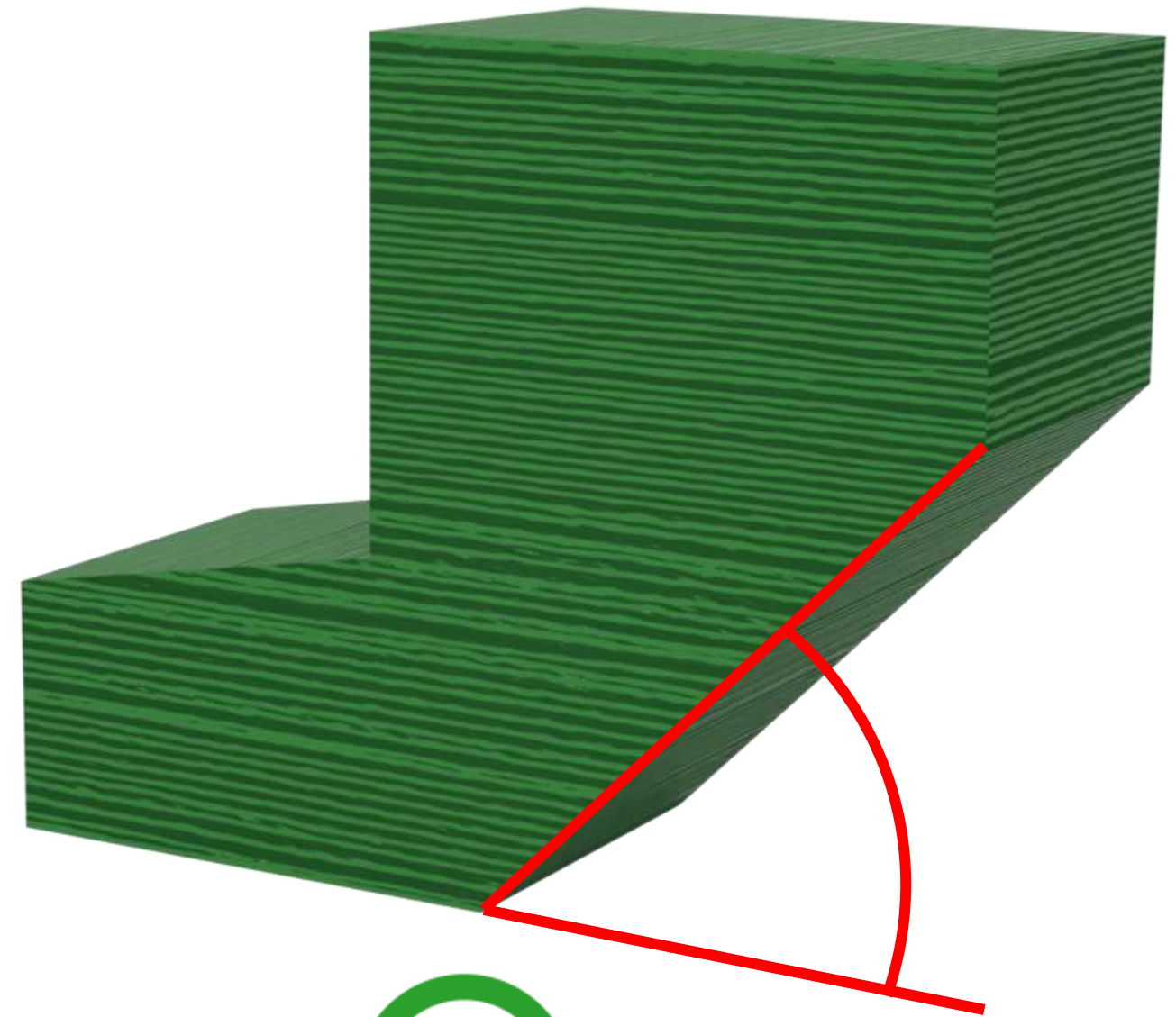
- Product quality and performance
- Shrinkage and warping
- 3D printing time
- Material quantity



# Model Orientation



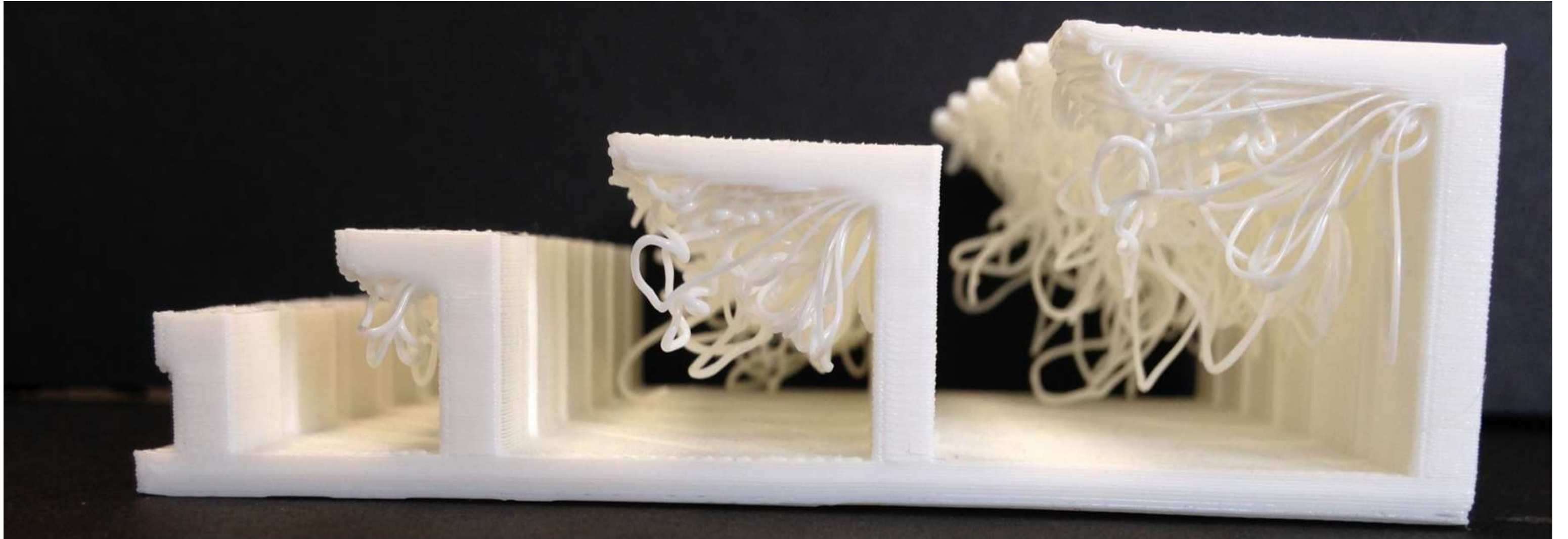
$90^\circ >$    $< 135^\circ$



$45^\circ >$    $< 90^\circ$

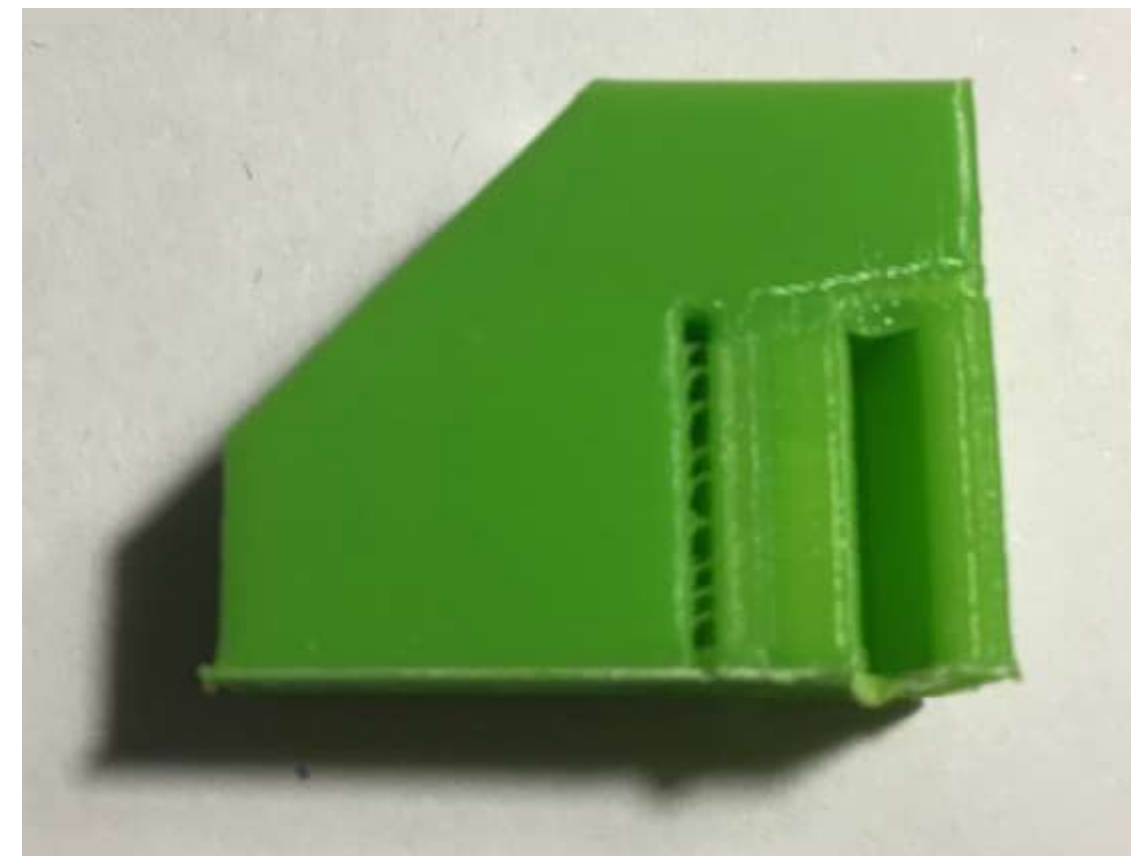
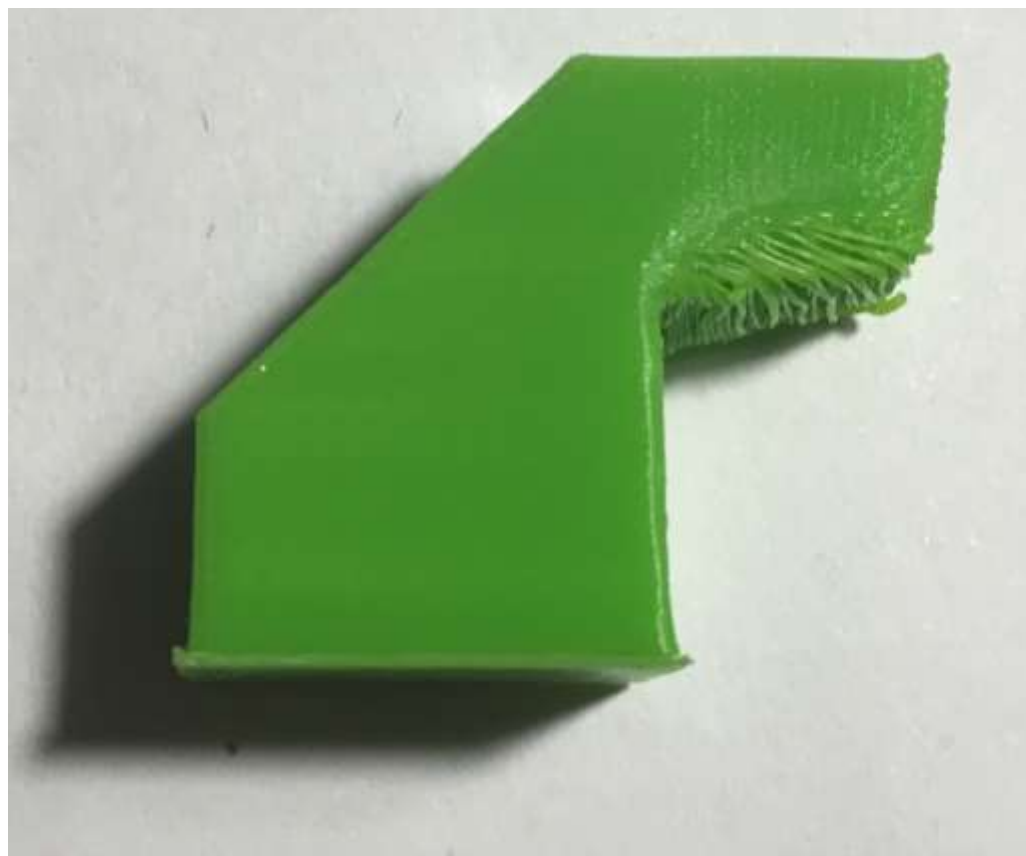
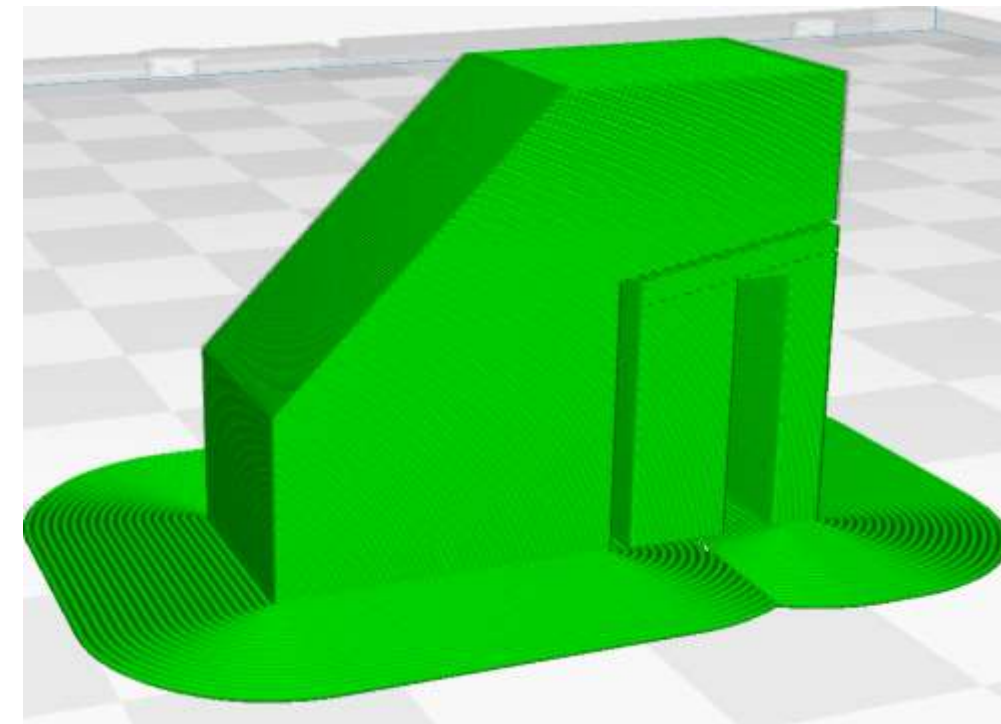
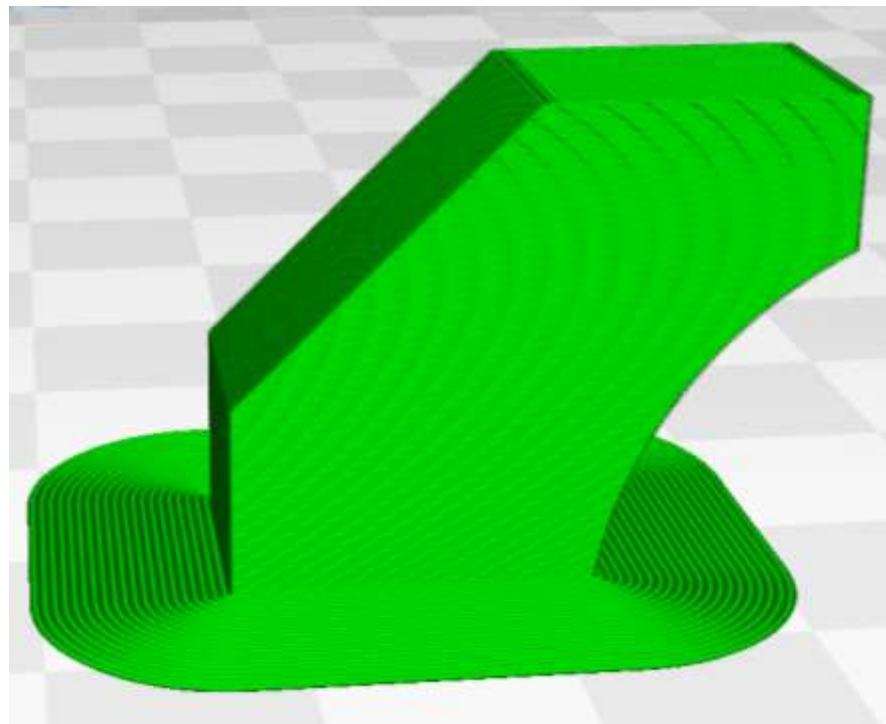
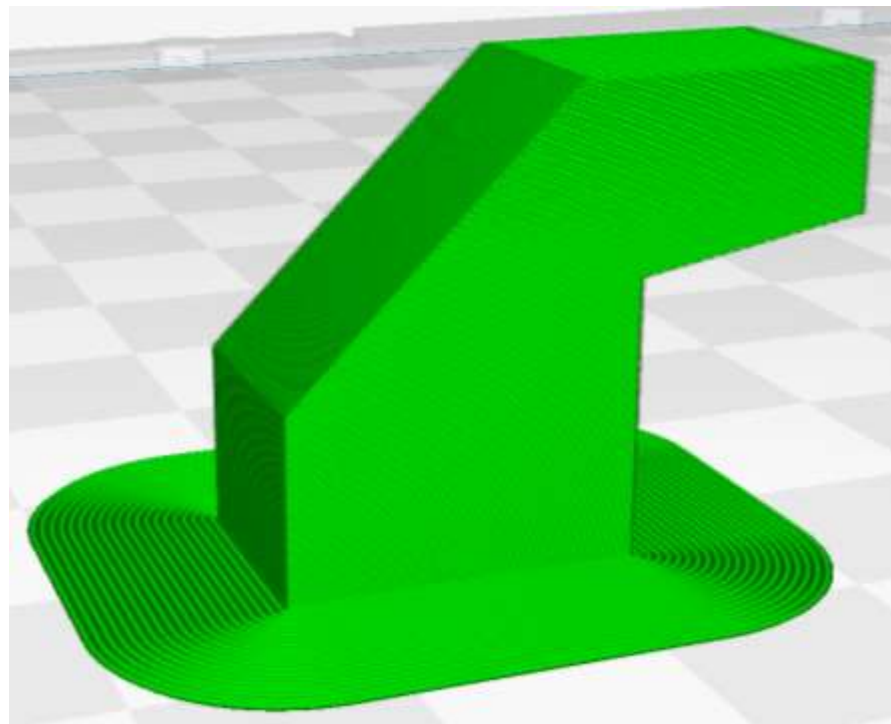


# Model Orientation



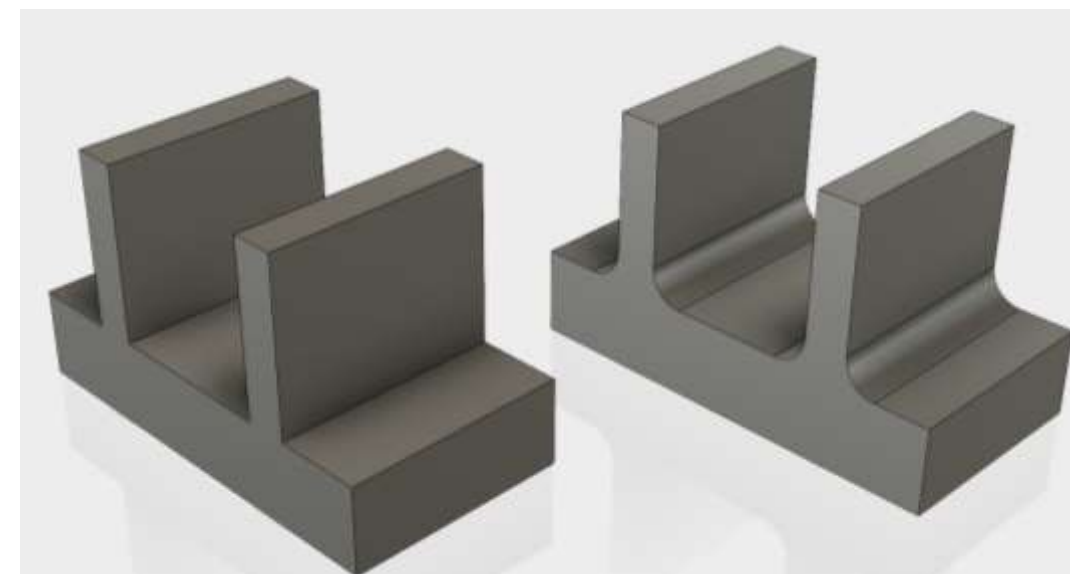
Failed Horizontal Overhangs

# Support material – Overhanging





# Rounds to make it robust

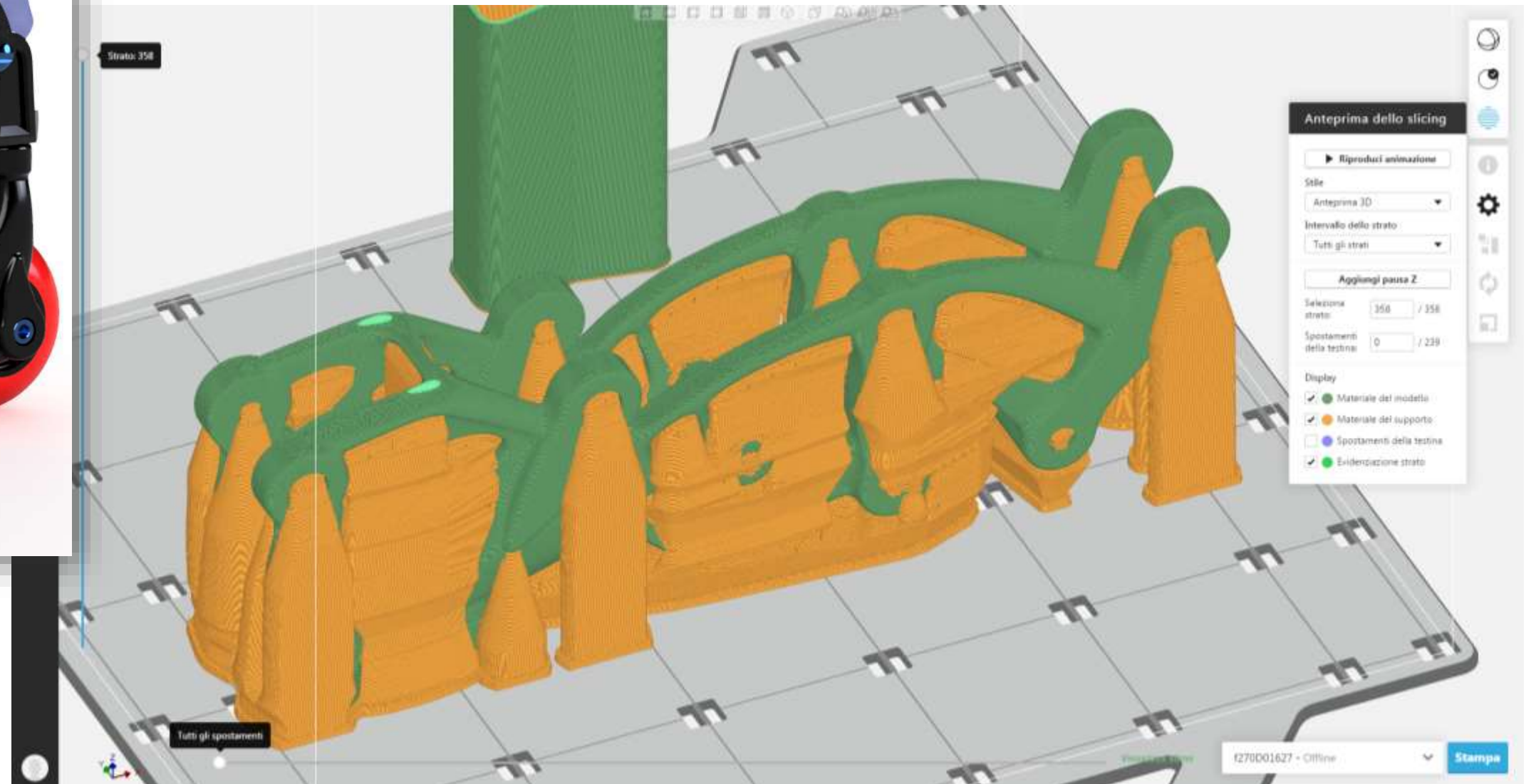




# Printing time VS Shape



13h 45min

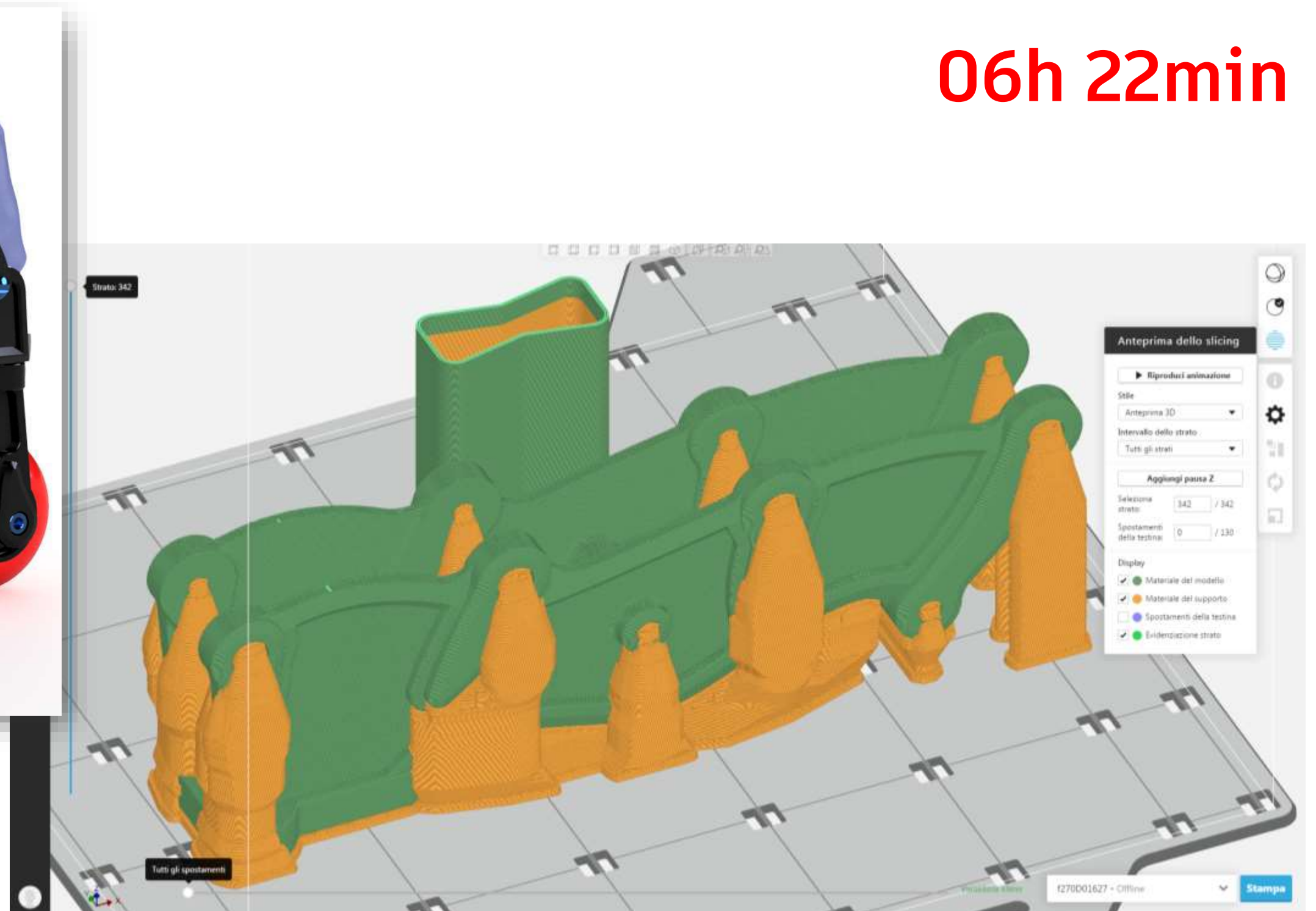




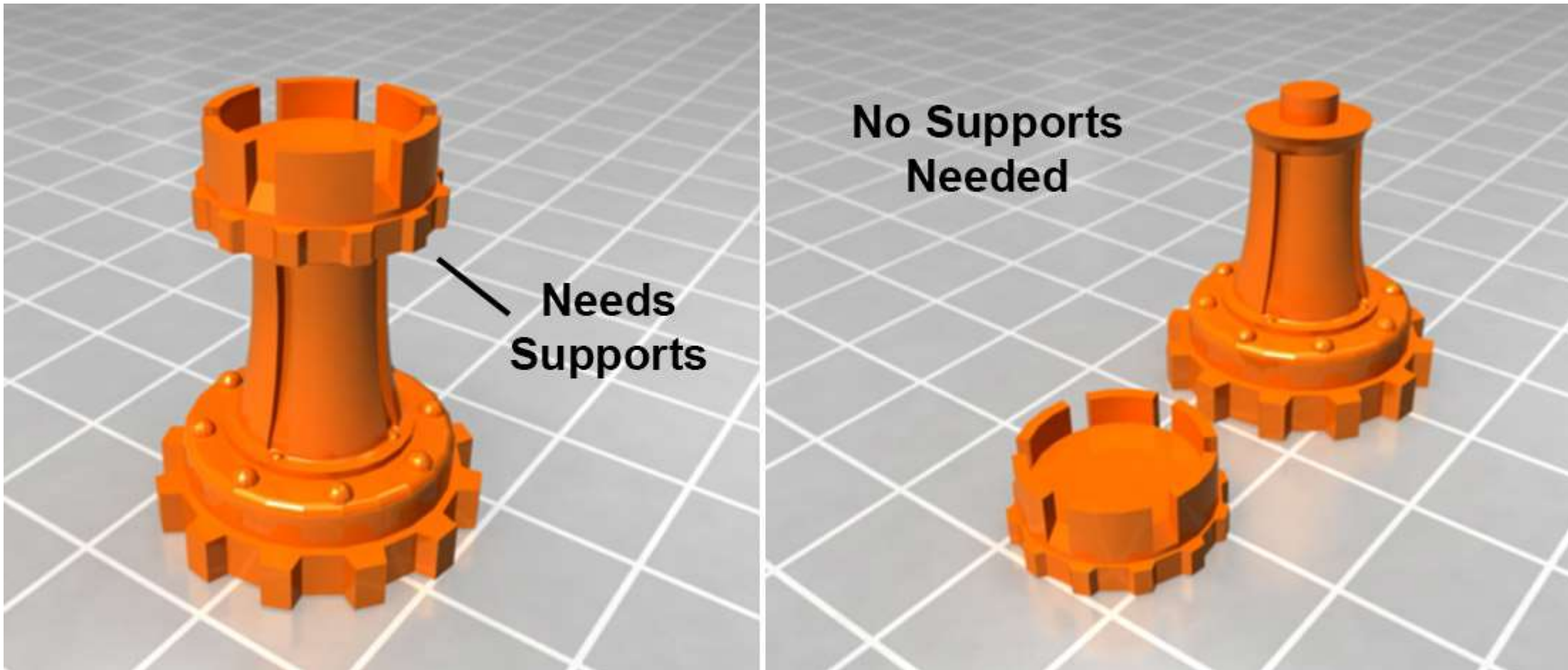
# Printing time VS Shape



06h 22min



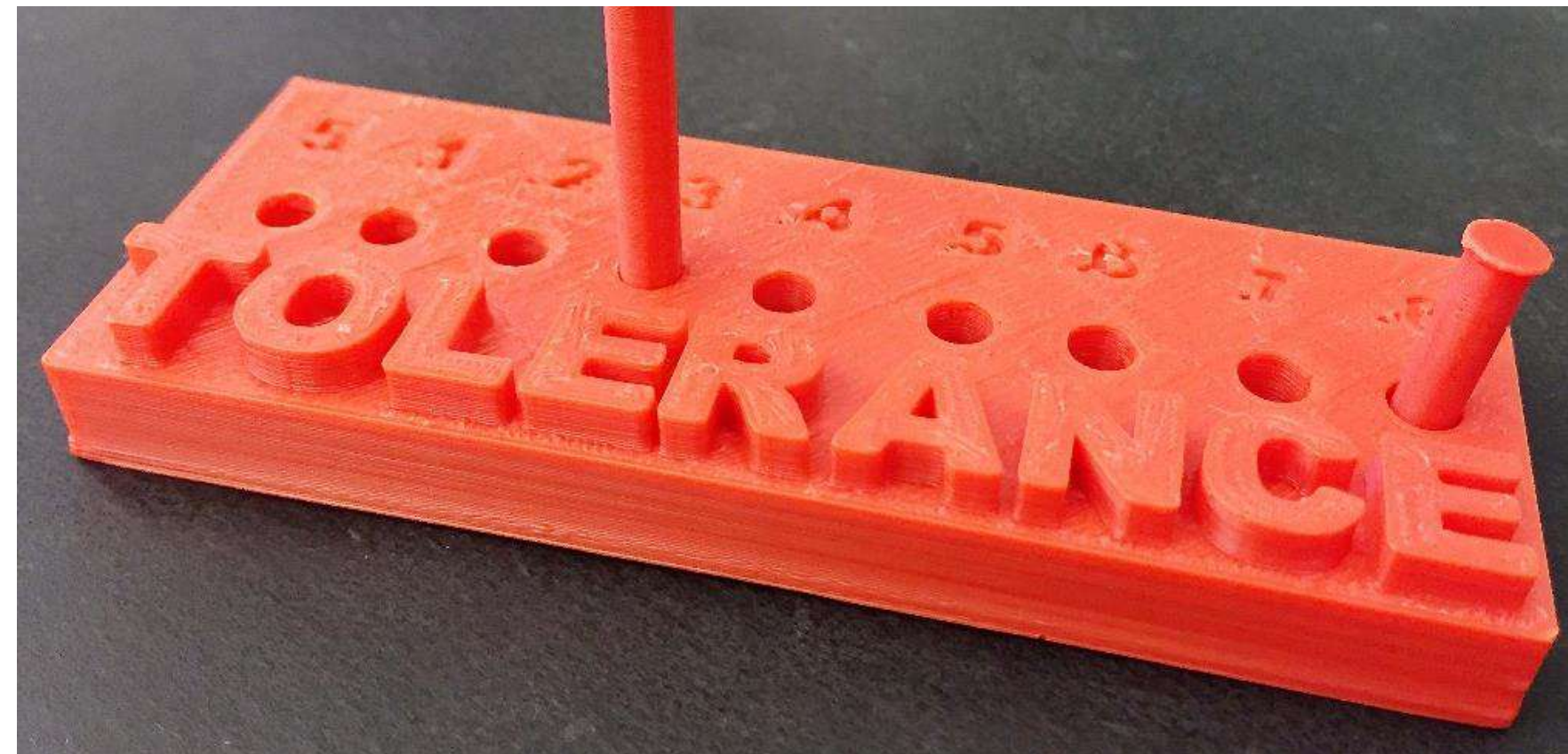
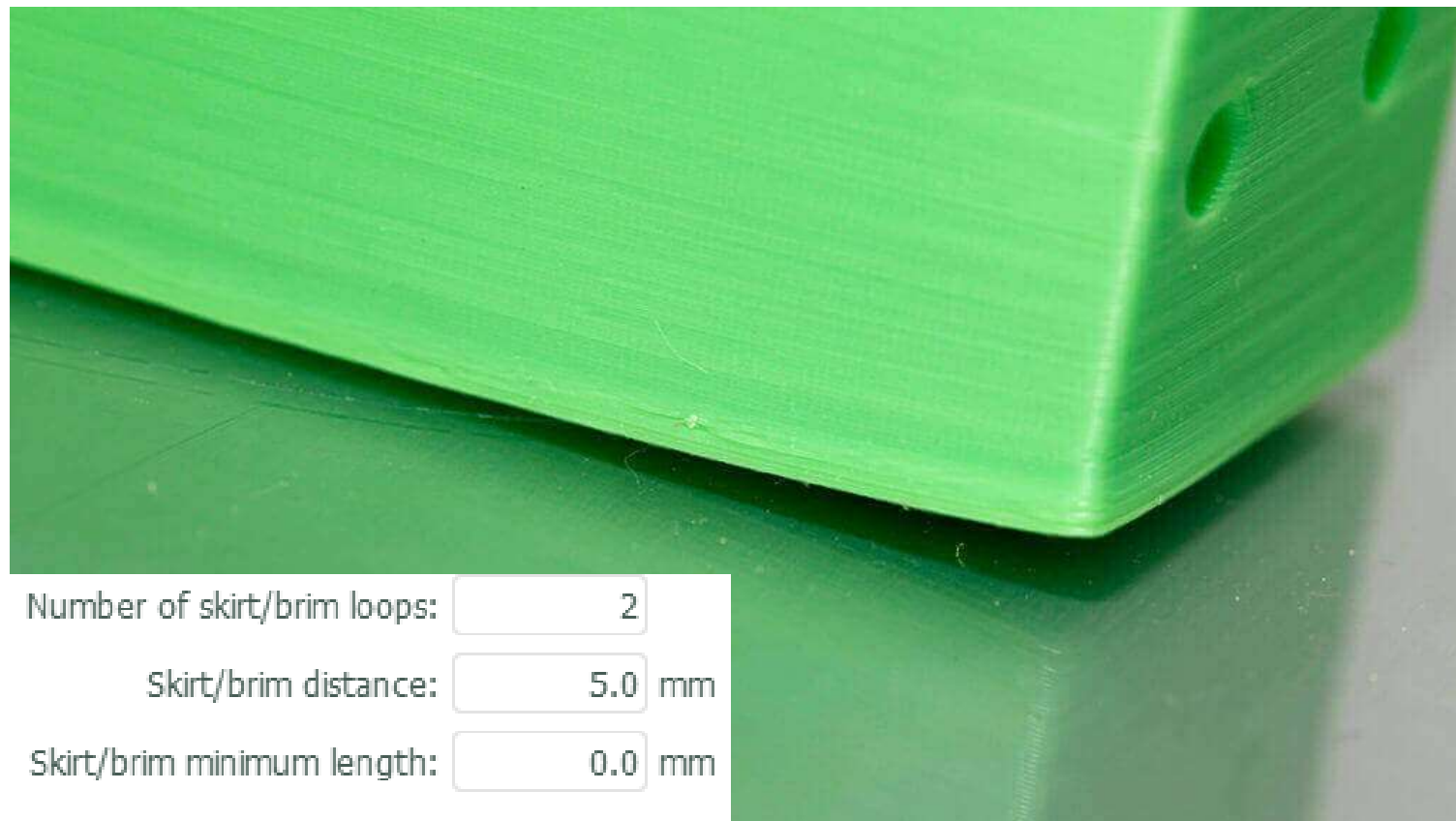
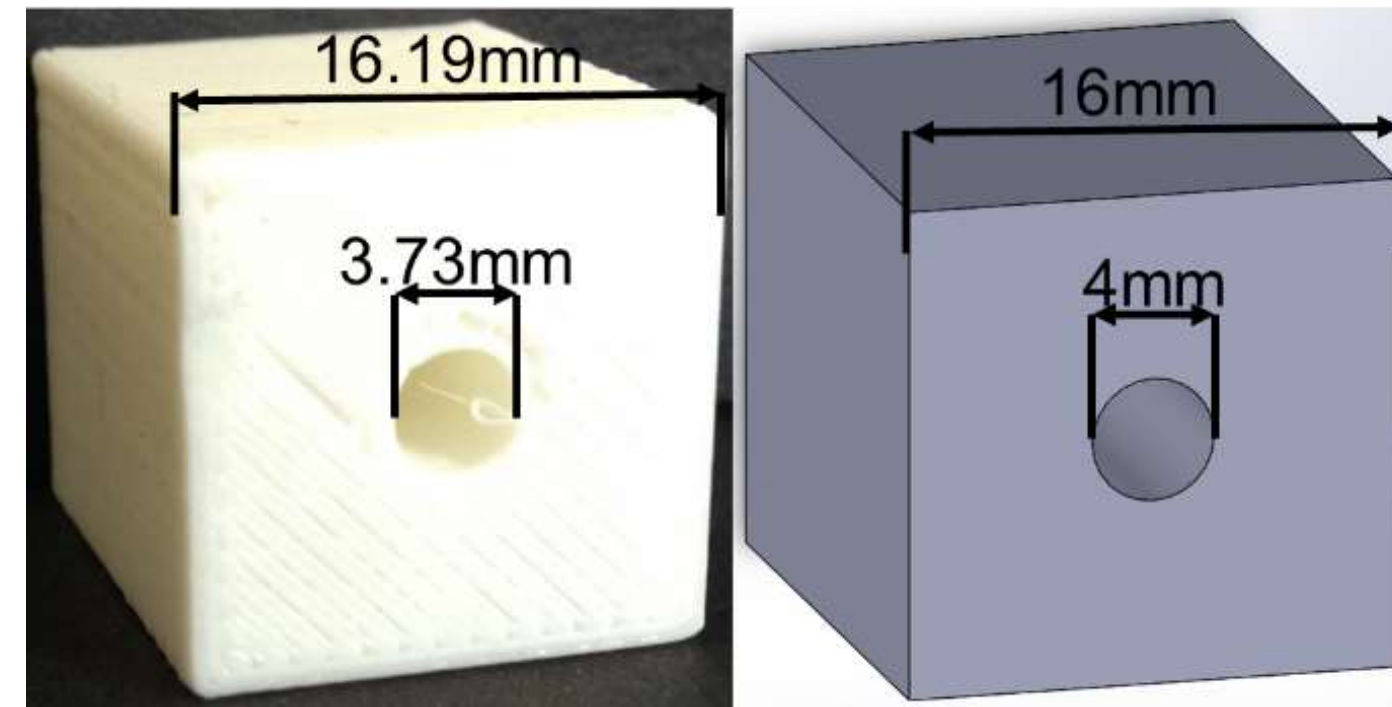
# Avoid supports





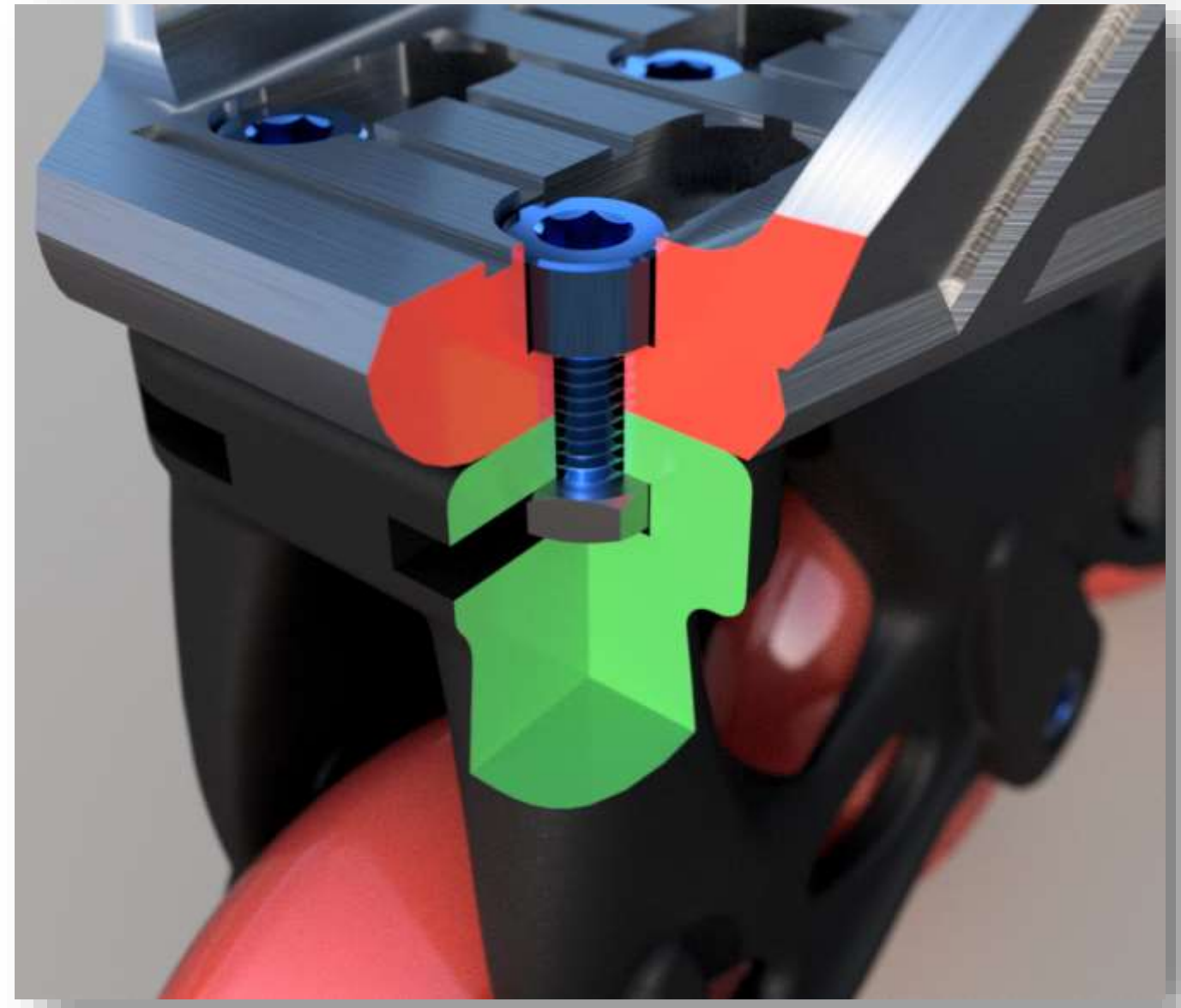
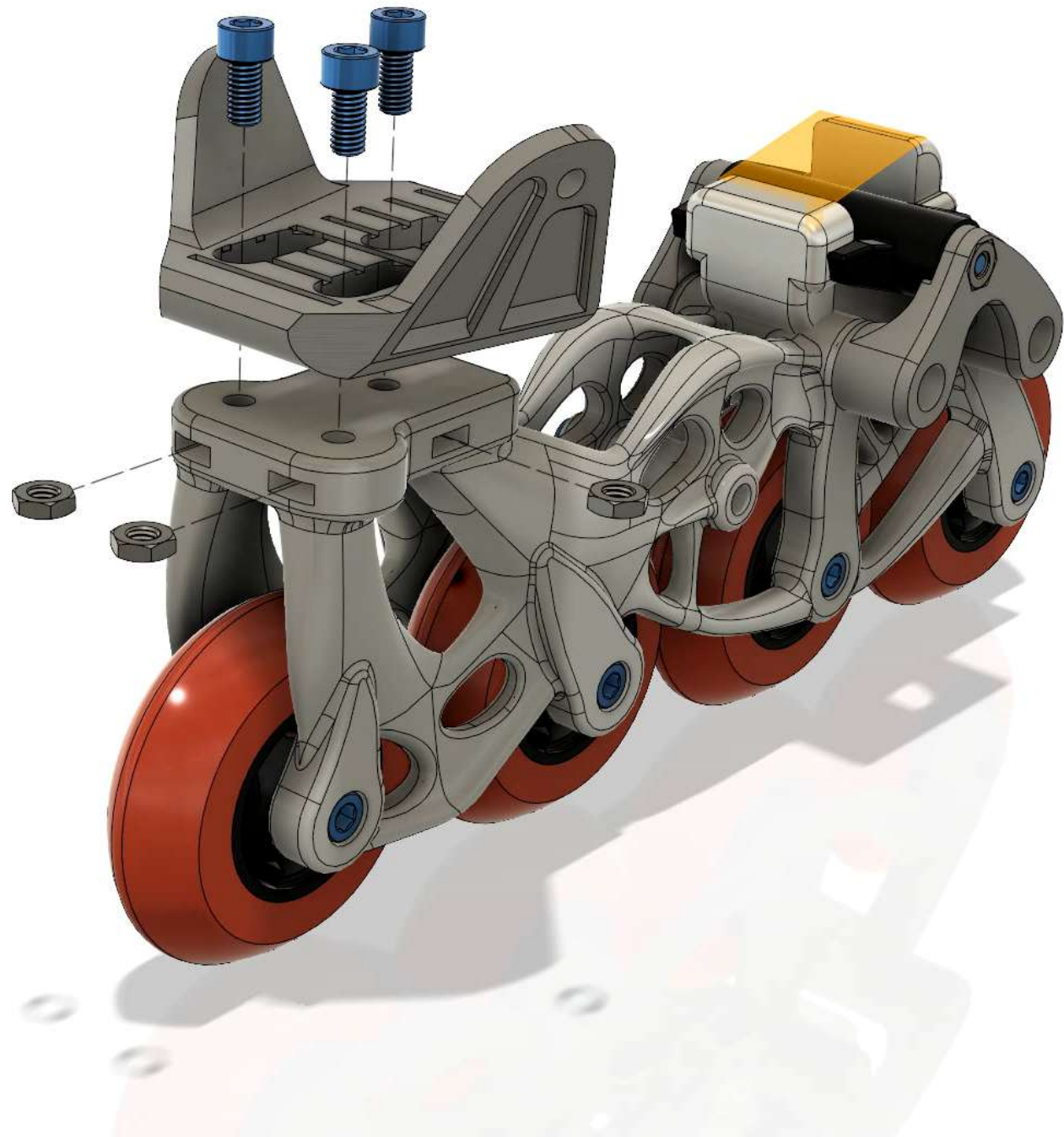
# Shrinkage and warping

- Check your 3d printing performance
- Check your material properties
- Print a test part before starting





# Leverage the 3d printing benefit





# Leverage the 3d printing benefit



# Learning Objectives

- Fusion360 environment for additive technology
- 3D printing for changing the way to design
- Design optimization
- Tips and tricks







Make anything.