# Abstract

* This paper is focusing on basic feature shapes

# Introduction

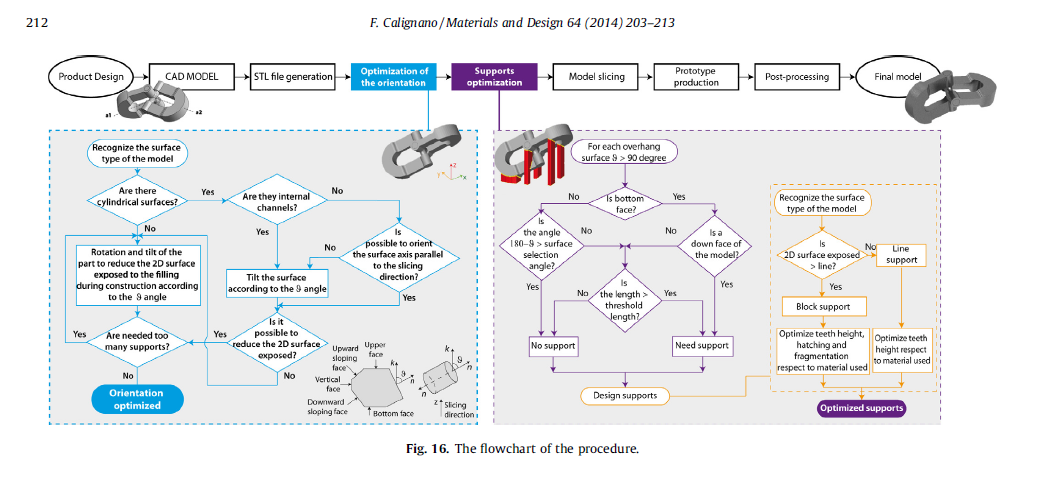
* Intro into process of component design and manufacturing using SLM
* Introduce problematics of support structure design
  + Need for experienced operator
  + Sometimes process is iterative because of fails
  + That leads to ineffectivity of process – if this process should be deployed in broader amount of businesses this ineffectivity needs to be eliminated

Figure 1 Design optimization of supports for overhanging structures in aluminum

# Part orientation

1. Body import
2. Iterational - Orientation optimization based on minimizing support volume
   1. Rotate STL
   2. Voxelize
   3. Calculate support volume
   4. Decide where to move -> grid or gradient descent
3. Export final body orientation to STL

# Dataset library

1. Basic shapes of bodies
2. Simulation of process in F360 with Additive manufacturing Extension
3. Parameters of bodies which will vary:
   1. Support height
   2. Overhang height
   3. Count of supported sides
   4. Feature XY Size
4. Parameters / support of print which will vary
   1. Support pattern list (max 3)
   2. Support density from - to
5. Support prediction
   1. Based on
      1. performance of support - max distortion
      2. risk of recoater collision
      3. Print time

# Feature identification

1. Whole body symetry check
2. Feature shape classification from cut sections
3. Feature size evaluation
4. Feature excentricity - how thin feature is?
5. Feature surrounding analysis - how much material is in surrounding?
6. Check if supports are standing on base or on the top of another feature
7. Based on dataset trained dataset classify feature support parameters ()

# Results and discussion

# Conclusion