

# Process & Material Optimization in Fused Deposition Modelling

Making Additive-Manufacturing Great Again (MAGA)

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## 3D PRINTING MARKET IS MATURING

**+72%**

expect their spendings on additive manufacturing to increase for 2018

**+47%**

saw a greater Return on Investment than last year

**+49%**

of respondents increased their expenses in 3D Printing this year

**+90%**

consider 3D Printing as a **competitive advantage** in their strategy



**\$9,504**

is the average budget for 2017 compared to \$6,132 in 2016

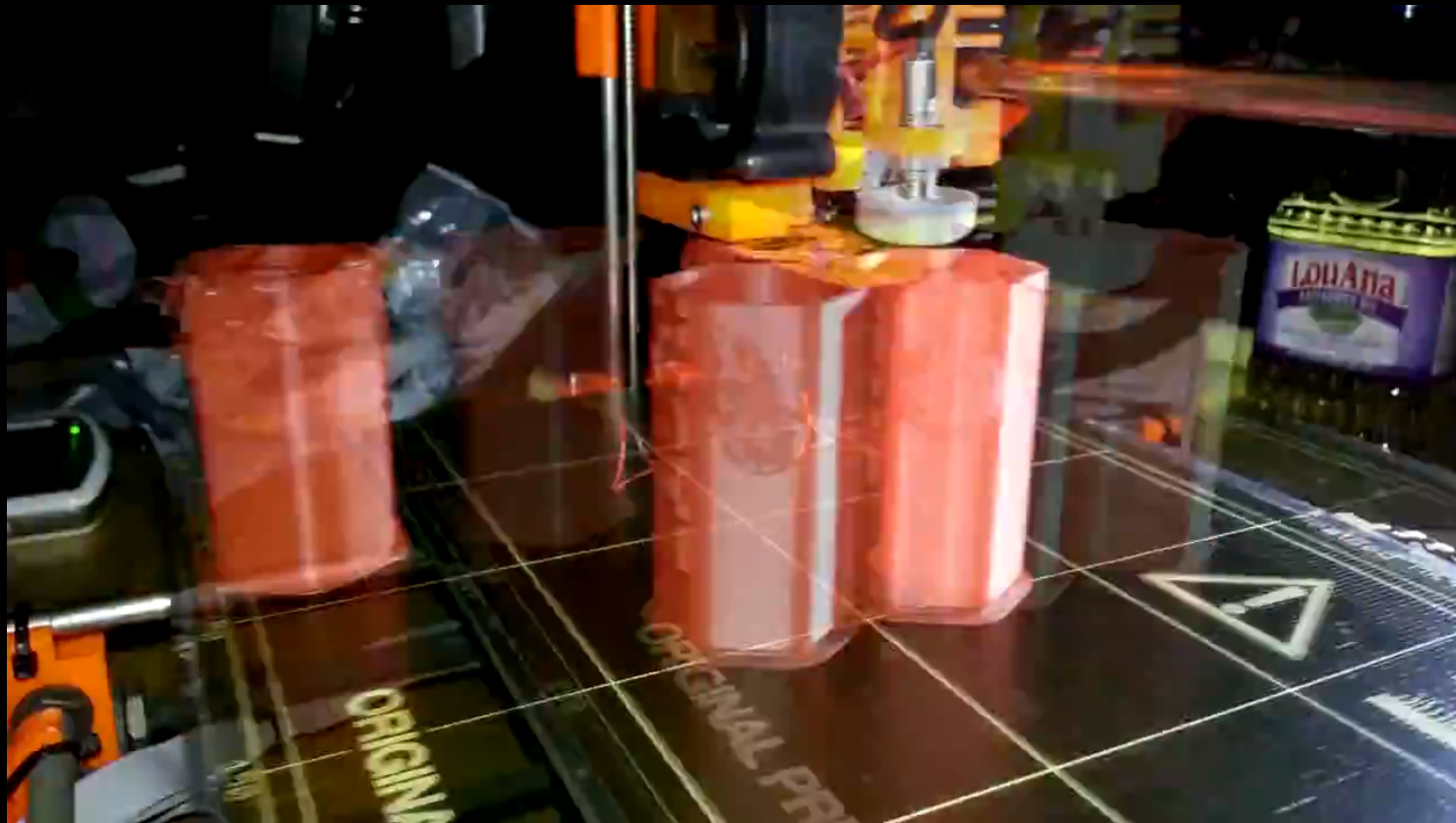
Additive manufacturing is still ramping up. 49% of our respondents increased their expenses in 3D Printing this year. And this trend is here to stay: 72% of them expect their spendings to increase again next year. Last year, almost the same amount of respondents had the same expectation (77%).

Additive manufacturing is showing positive results. Indeed, 47% of the respondents saw

a greater return on investment than last year. Moreover, 90% of them consider 3D Printing as a competitive advantage in their strategy.

These elements show that the respondents are loyal to additive manufacturing and that they consider this technology as a real partner for their activity. As a result, we can say that the market is becoming more stable and mature.

17.4% growth in worldwide revenues in 2016 - less than in 2015 (25.9%)  
Let's Make Additive-Manufacturing Great Again (MAGA)!



Processes like FDM have lots of potential... to create 'crap'.

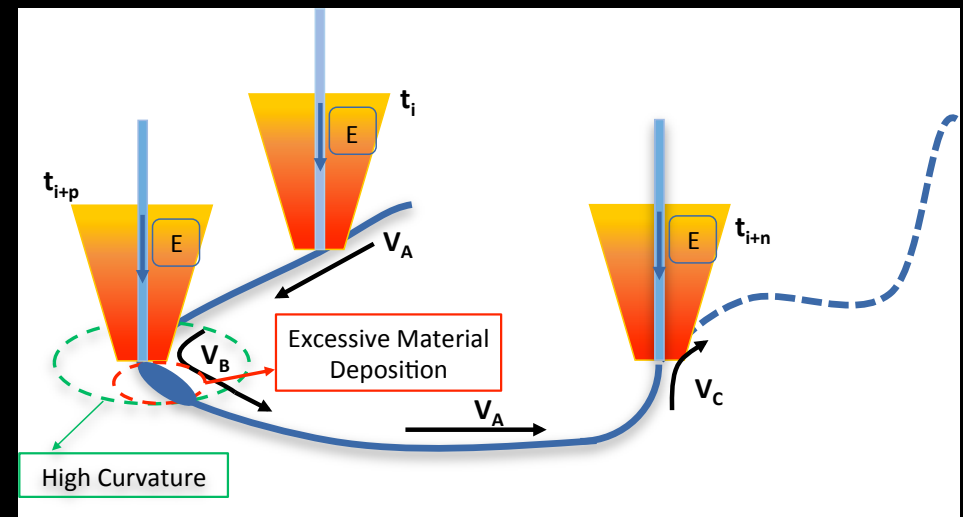
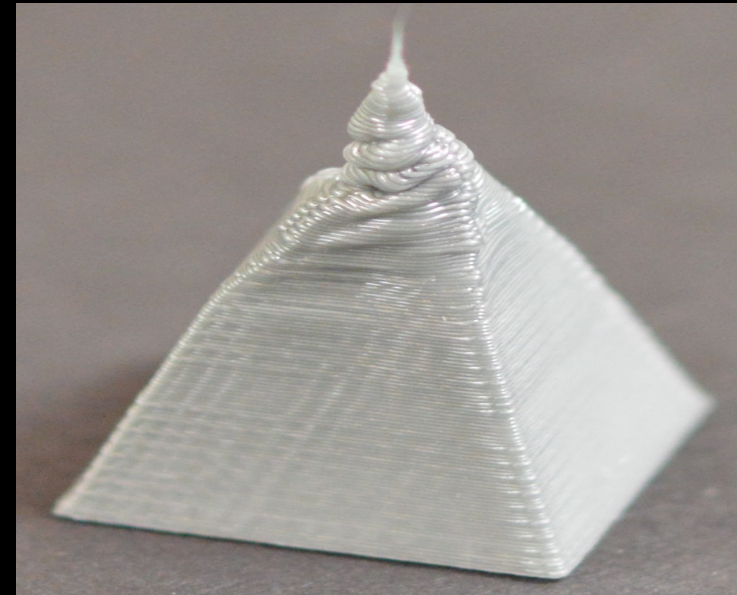
Problems:

1. Material Fusion/  
Sintering



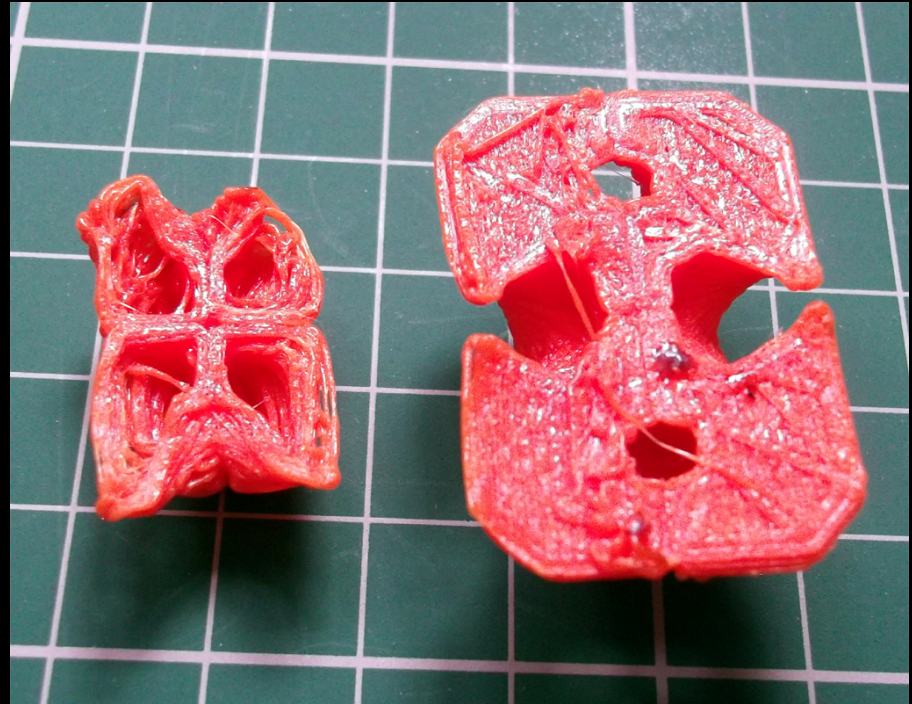
# Problems:

1. Material Fusion/  
Sintering
2. Material  
Feeding Rate  
(temperature)



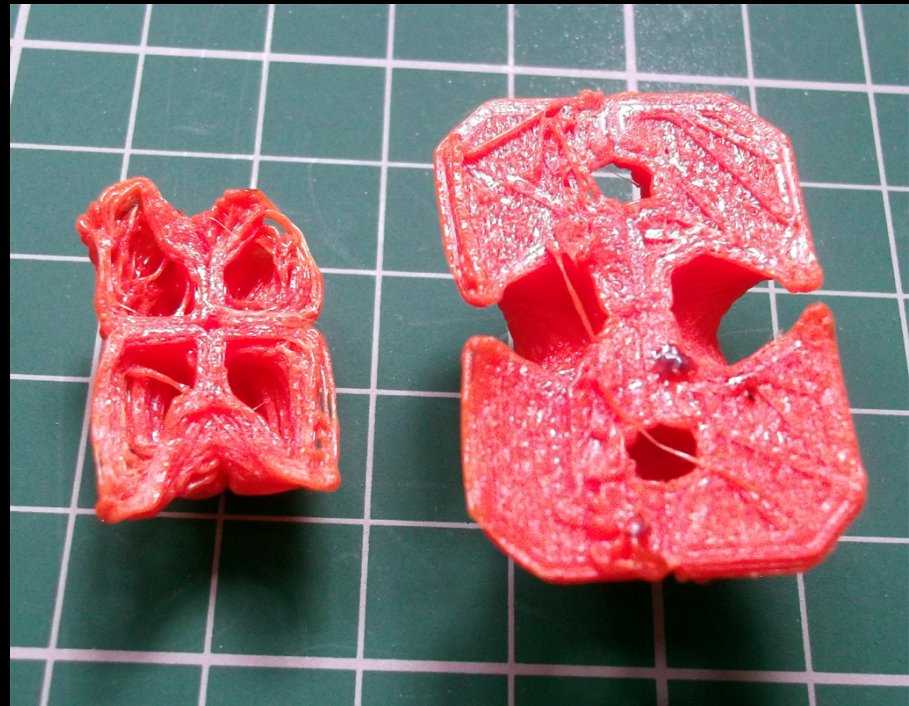
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All of these problems are related to the control of material response with temperature

# Project Goals

1. Develop “process models” for predicting material temperature and properties in i) heater ii) on bed and use this to predict optimal process windows
2. Experimentally measure the temperature of material and the fusion/sintering of deposition to verify optimal operating conditions. Suggest improved heating strategies
3. Select a reference part and compare FDM to “competitive” processes in terms of i) economics ii) environment
4. MAGA!

