

Microfabrication with Inkjet printing

Master thesis project theme

Introduction

As you know, our group specializes in microfabrication. So far, moulding is the most used method for making our (soft) microstructures, because of the ease of geometry control and reproducibility. However, it is inefficient as a research tool, we cannot put different materials in one structure, and many complex structures simply cannot be realized by moulding.

Lake3D is a company who develop a ground-breaking 3D printing technology with a multi-material nature, called voxel-based multi-material jetting (VB-MMJ). Where most conventional 3D printing techniques are mono-material, VB-MMJ can mix different materials on droplet level, resulting in the freedom to combine different mechanical properties in the final object. On top of this, by jetting tiny droplets with a diameter of only 10-30 μm , a high level of accuracy can be achieved, making it possible to print product with details in the range of tens of micrometers.

With our joint effort, we are investigating the potential in using 3D inkjet printing for making multi-material microstructures. And who knows, maybe one day you can print out a microrobot at home!

Project Theme

Many questions need to be answered before 3D inkjet printing can be used for microfabrication: what is the minimum feature size? How to get the required 3D accuracy? How to control the droplets? How to predict the behavior of droplet contact and subsequent curing? How to compensate the unavoidable errors? Can we build a model, or even a digital twin of the actual process?

Those are interesting questions both for the application and for the fundamental research. And we are certain there is a specific problem that tickles your interest!

We'll do it together

You will not only work on an exciting research topic, but also get the opportunity to experience working at a young and dynamic start-up company. Your work will directly contribute to Lake3D's major applications and you will be part of our multi-disciplinary and international team with expertise ranging from physics to material science and software development. Do you want to join Lake3D in evolving the manufacturing market by enabling multi-material 3D printing? Don't hesitate and apply now!

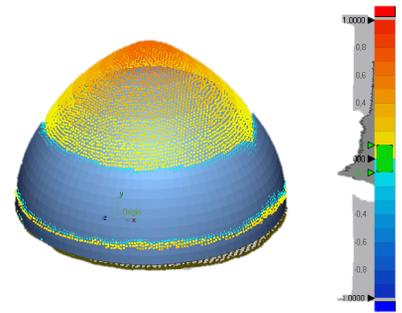
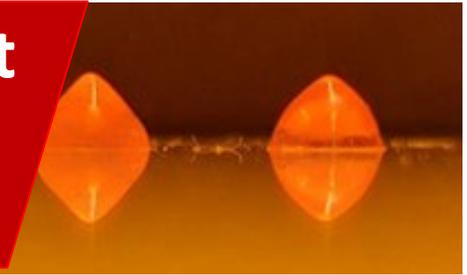
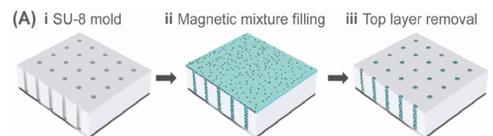


Figure 1: deviation of the printed object from the desired shape.



Figure 2: custom 3D printer at Lake3D.



Moulding



Printing?



Figure 3: microfabrication: from moulding to printing?