

3D Printing (3DP) provides a wide range of possibilities for the realization of freeform 3D structures. Recent developments allow for a wide range of materials to be processed, from pure polymers to polymer-based highly filled composites for creating functionality enhanced 3D parts. In the FFF process, the material of choice is provided as a filament that is melted in a hot chamber, extruded through a nozzle and selectively deposited on the building platform layer by layer. In inkjet printing, on-demand small and uniform droplets of different UV curable ink are precisely ejected onto a wide range of substrates to produce multi-material functional components with intricate features of micro-scale resolution.

Contact

See KNMF website or contact the KNMF User Office.

Equipment

FFF-Printers

- Leapfrog Xeed
- Leapfrog Bolt
- zMorph 2.0 SX
- Builder Extreme 2000
- Prusa MK3S with MMU2s

Inkjet Printers

- Notion System n.jet 3D functional/high laydown
- Notion Systems n.jet 3D

3D Scanning

- Einscan Pro (Accuracy up to 0.05 mm)

Filament fabrication

- Filafab Extruder & Winding

Key Features

- FFF-Resolution: 50 μm (z-axis), 200 μm (x/y-axis)
- Inkjet-Resolution: 10 μm (z-axis)
- FFF: Printhead temperature up to 250 °C
- FFF: Graded structures possible (see Samples)
- Multi-Material prints for both FFF and Inkjet possible

Materials

- ABS, PLA, PVA, Nylon
- Filled materials (optical effects, magnetic, electrically conductive)
- Custom materials
- Inkjet: Depending on material availability

Data

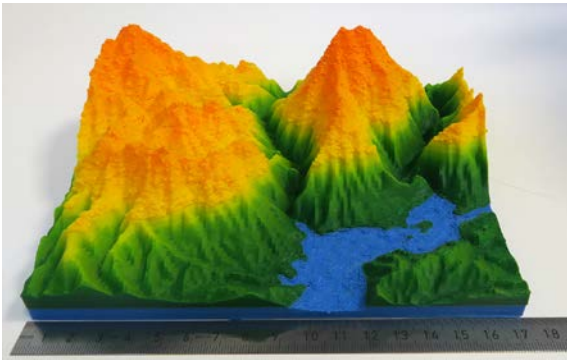
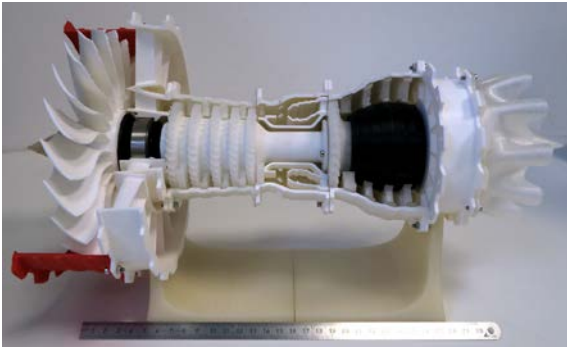
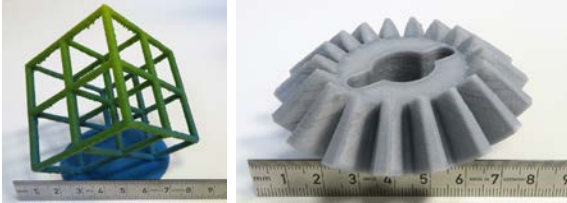
- STL format
- Various CAD files can be exported to STL format
- Wall thicknesses should be multiples of x/y resolution for better accuracy
- Use correct units during designing the structures
- Avoid duplexes (use snaps)
- Overhangs with degrees $>30^\circ$ need support
- Models must be solid bodies, not surfaces. No open faces, models must be watertight
- In case of periodic structures a single unit cell is sufficient

Limitations/constraints

- Depending on object size & geometry: long build time
- Currently no materials with melting temperature $>250^\circ\text{C}$ possible

3D Printing (3DP)

Samples: FFF



Samples: Inkjet

