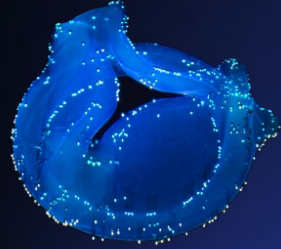
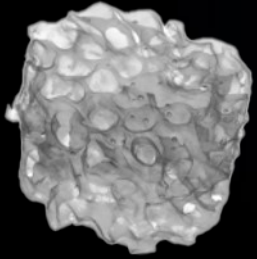


Readily3D



Volumetric 3D printing for Life Science applications



Paul Delrot, PhD
CEO, Readily3D SA

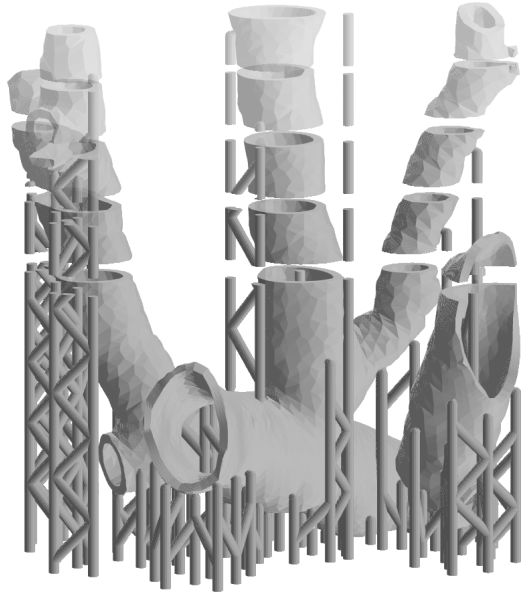
paul@readily3d.com
+41 22 570 14 82

Company information

- Spin-off from EPFL
- Located in Lausanne, Switzerland
- Founded in May 2020
- Commercializes tomographic 3D printers
- Focus on biofabrication

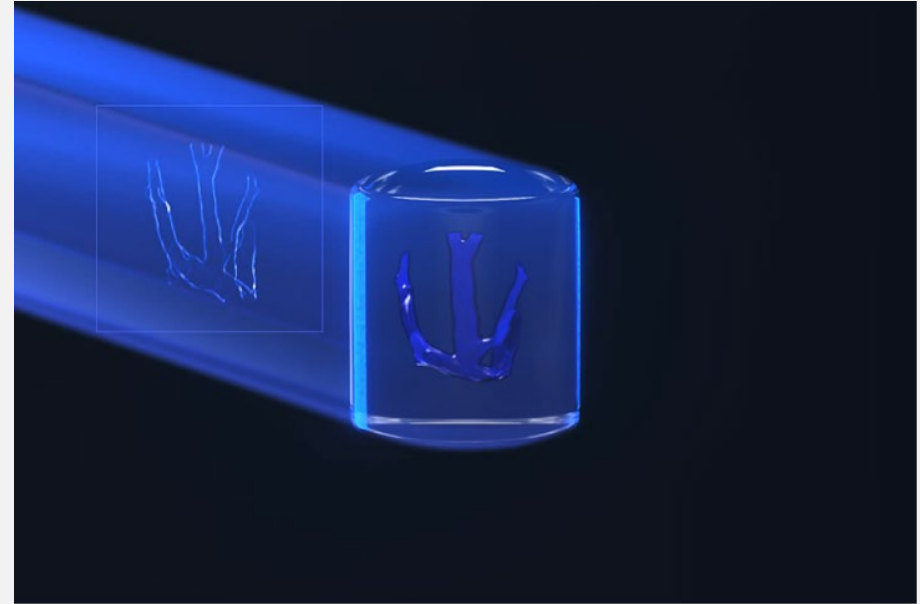


Layer-by-layer fabrication



- Low throughput
- Struts
- Design constraints
- Exposed resin

Volumetric 3D printing

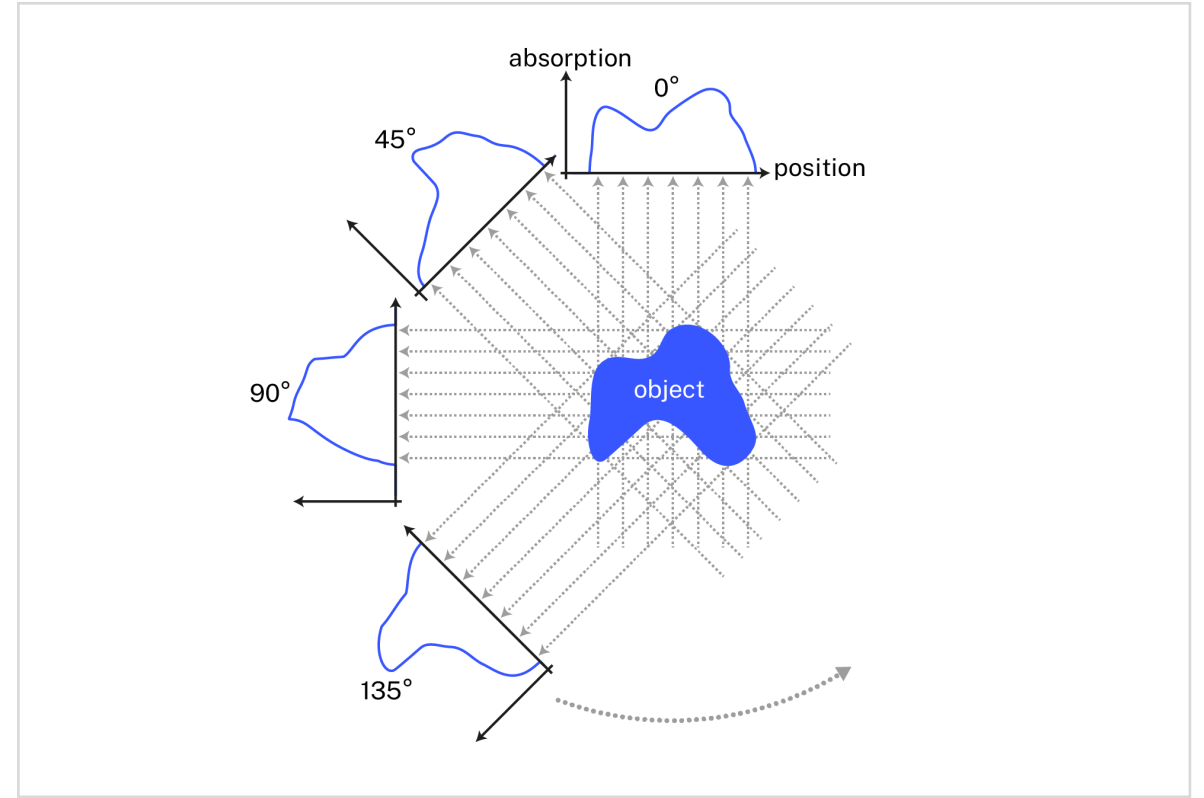


- ✓ Ultra rapid (30s) [Watch video](#)
- ✓ No supports (=low manual labor)
- ✓ Multi-centimeter scale
- ✓ Freeform structures (cavities, conduits,...)
- ✓ Contactless – no contamination, no damage and no cleaning

Inspired by medical tomography

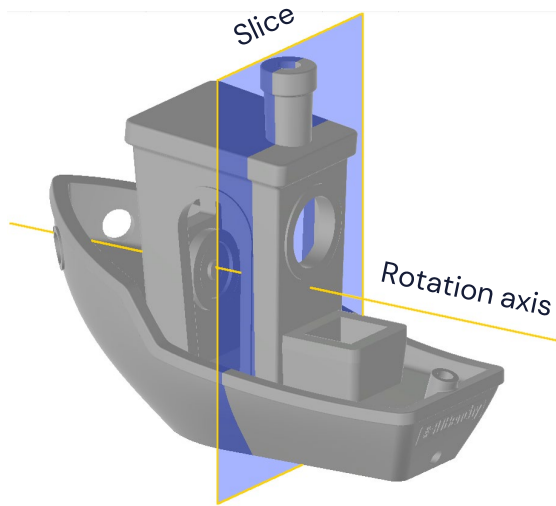


CT scanner



Radon transform
(relates an object and its projections)

Illustration of the Radon transform in medical imaging



Object
3DBenchy by Creative Tools,
license CC BY ND 4.0

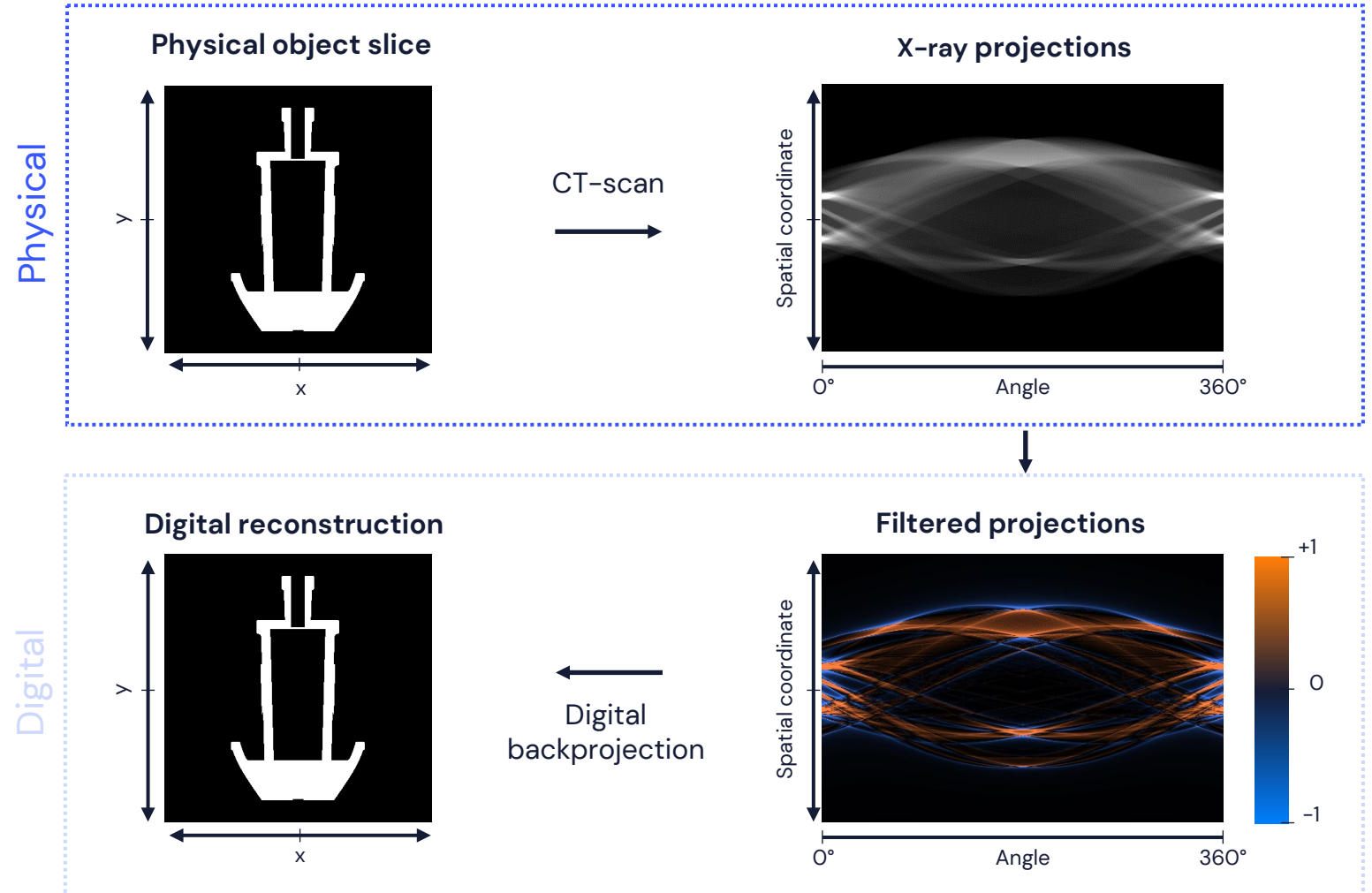
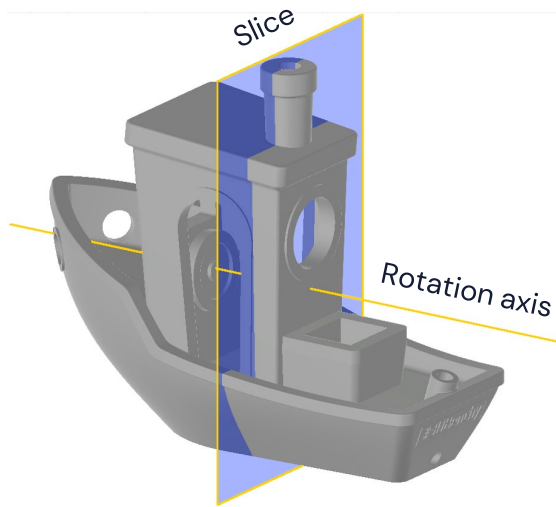
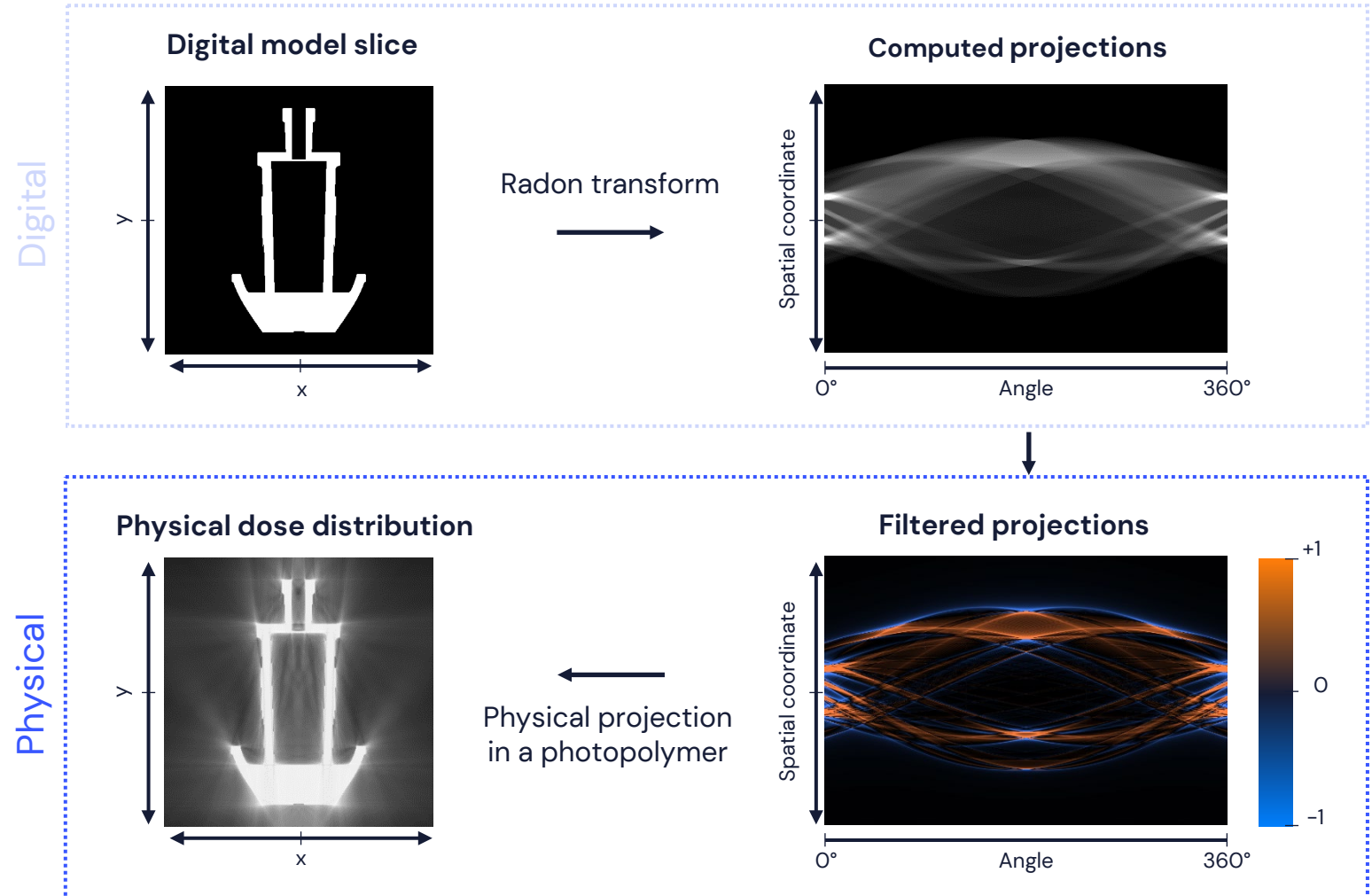


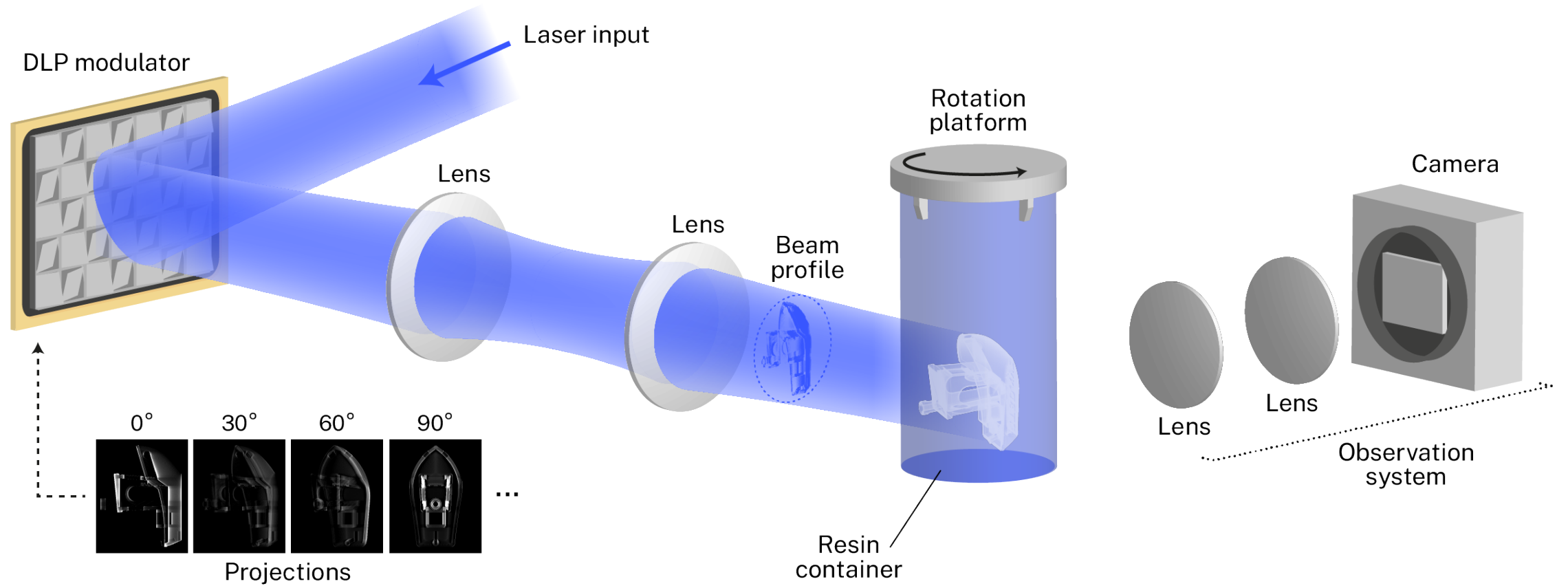
Illustration of the Radon transform in volumetric 3D printing



3D Model
3DBenchy by Creative Tools,
license CC BY ND 4.0



Tomographic 3D printing process



Readily3D



Print example:
Vasculature

[Watch video online](#)

Open platform compatible with many materials

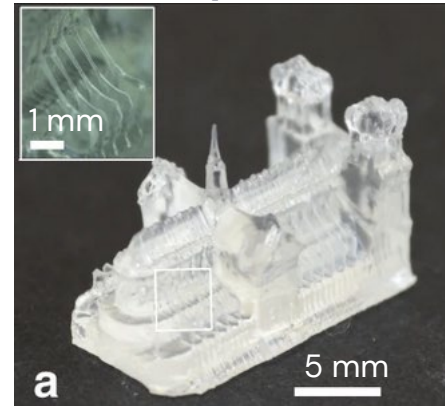
Any transparent to translucent photopolymers:

- Hydrogels (acellular/cell-laden)
- Acrylics
- Silicones
- Ceramics
- Glass

Works with any light-triggered chemistry:

- Free-radical chain polymerization
- Thiol-ene
- Cationic

Acrylics



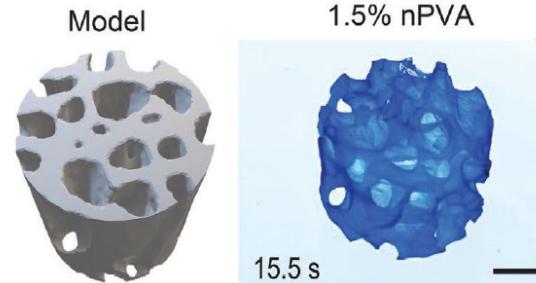
Credit: Loterie et al., Nat. Com., 2020

Thiol-ene hydrogels



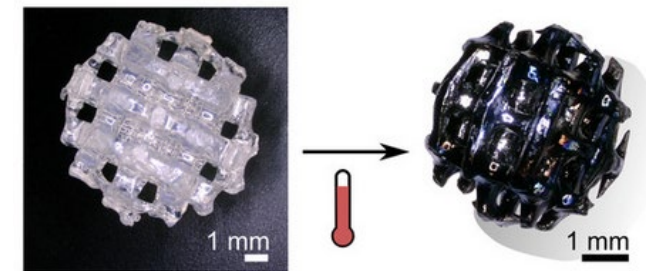
Credit: Rizzo et al., Adv. Mat., 2021

PVA



Credit: Qiu et al., Adv. Func. Mat., 2023

Ceramics



3D printed green body

Polymer Derived Ceramics

Credit: Kollep et al., Adv. Eng. Mat., 2022

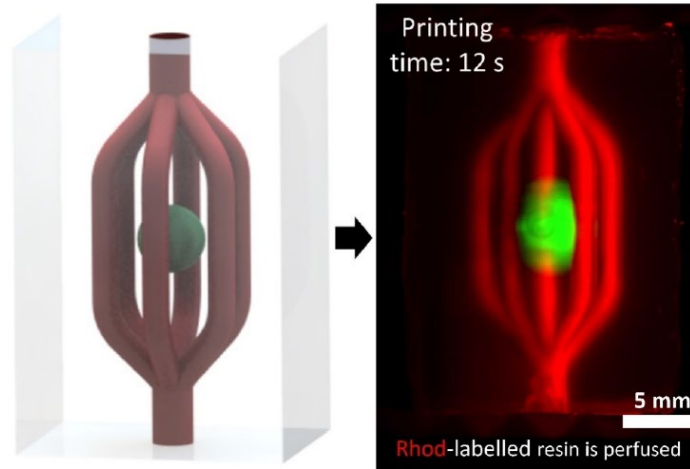
Dental and audiology parts

- Machine built with relevant print scale (5cm) for audiology and dental applications

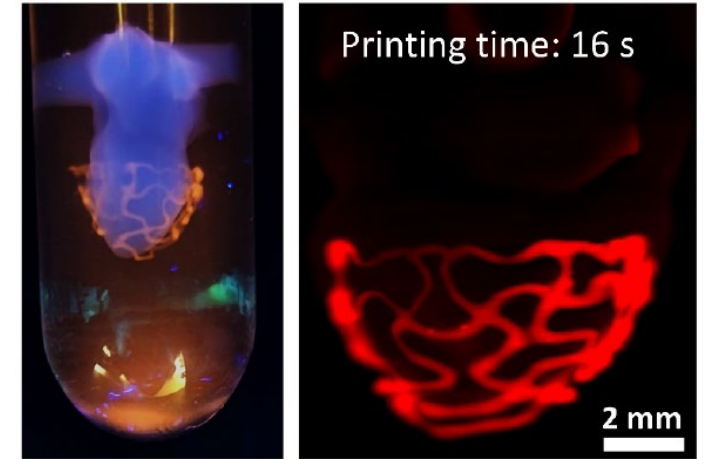


Multi-material printing for advanced and functional studies

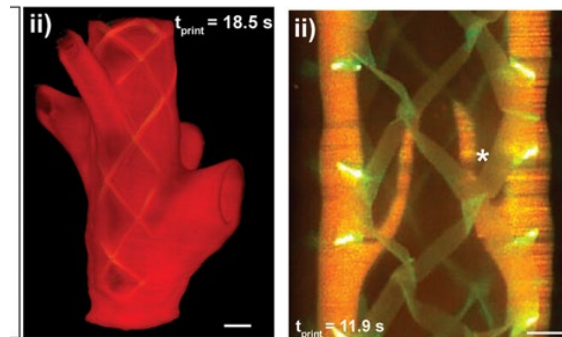
Perfusable constructs



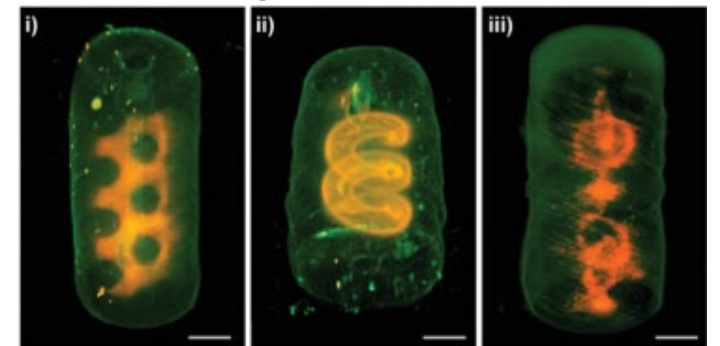
Organ specific auxetic meshes



Composite mesh and VP structure



Over-printed material



Credit:

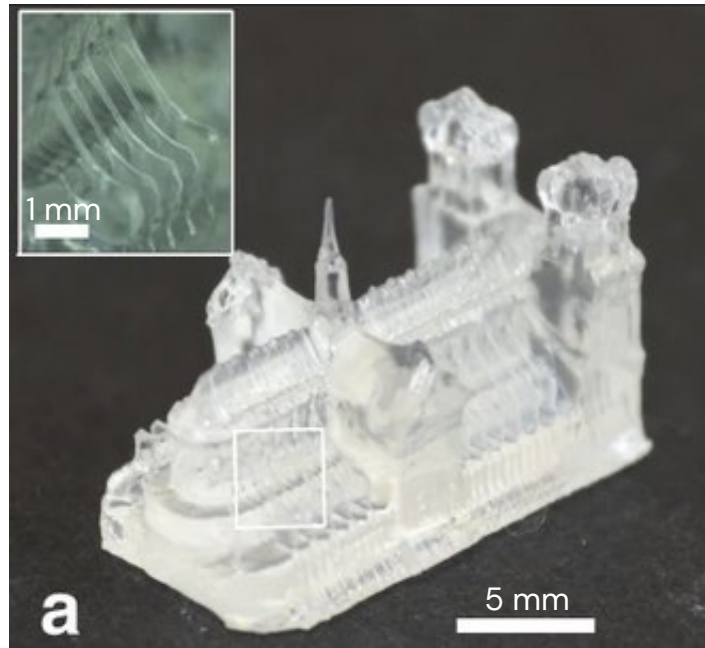
Top row: Chansoria et al., Adv. Sci. 2023

Bottom-left: Grossbacher et al., Adv. Mat., 2023

Bottom-right: Falandt et al., Adv. Mat. Tech

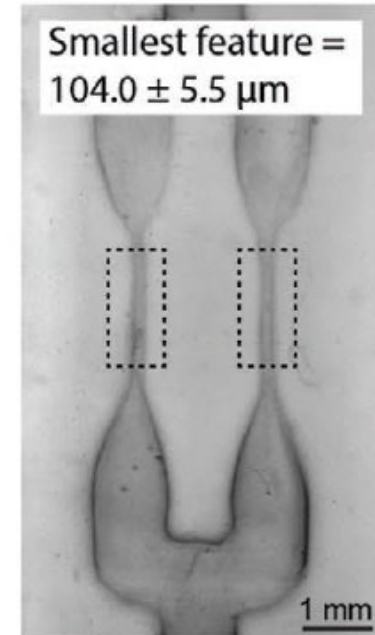
High resolution macro-scale constructs

80 μm positive resolution



Credit: Loterie et al., Nat. Com., 2020

Negative resolution



Credit: Bernal et al, Adv. Mat., 2022

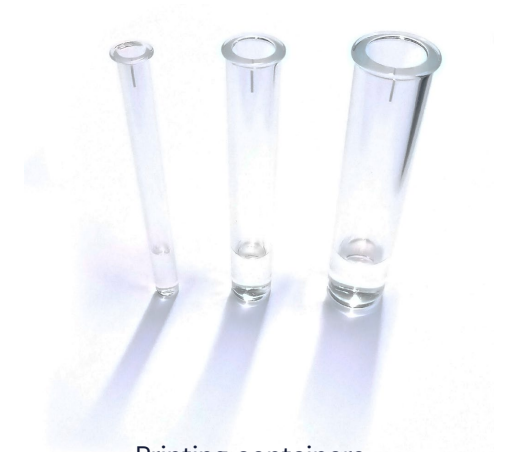
Current products

Specifications

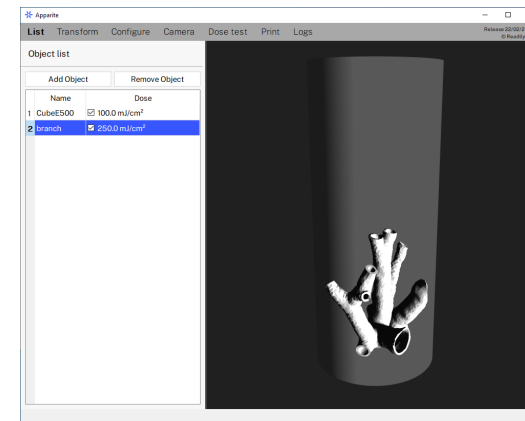
Build volume	Performance version: up to \varnothing 12.5 mm x 25 mm height Standard version: Up to \varnothing 6.6 mm x 25 mm height
Optical resolution	28 μ m (customizable)
Print time	15s to 60s
Light source	Performance version: 400 \pm 1 nm, 45mW/cm ² peak Standard version: 405 \pm 5 nm, 35mW/cm ² peak
Containers	Autoclavable glass + plastic lid
Materials	hydrogels, acrylics, silicones
Footprint	30 cm x 67 cm x 26 cm (W x L x H)
Software features	<ul style="list-style-type: none"> • Integrated hardware control & slicer • Cloud-based high-speed computing • Advanced physicochemical modeling • Direct STL import



Tomolite™ v2 3D printer



Printing containers



Apparite software



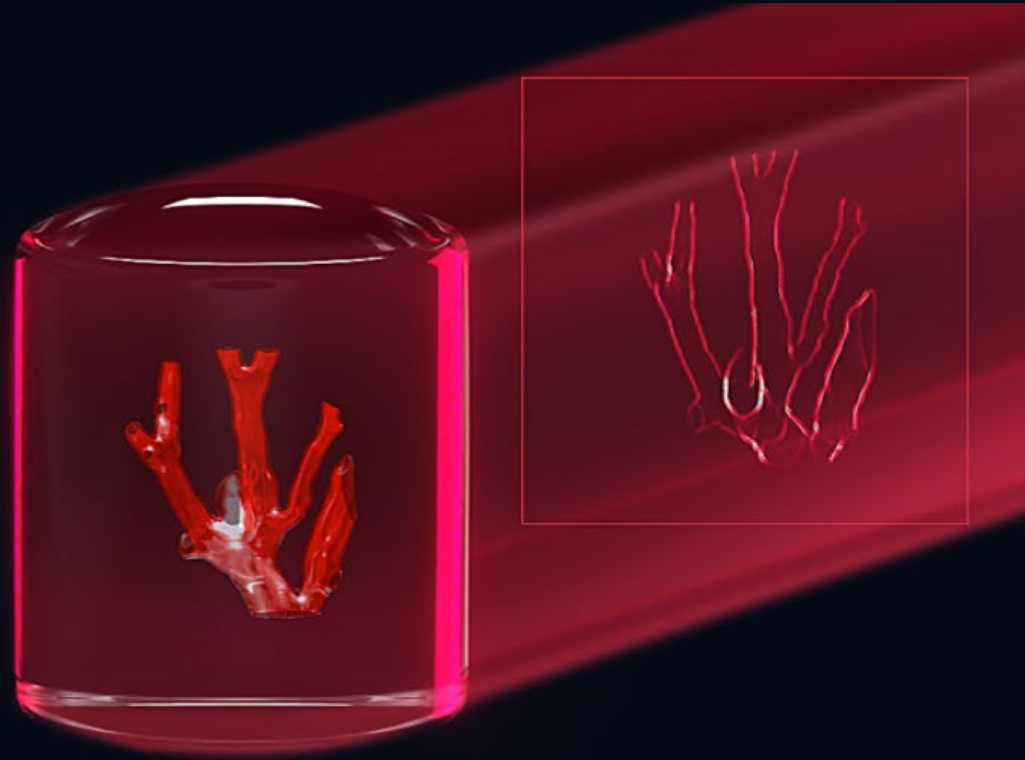
Materials
(under development)

- Technology is covered by **7 patents**
- Proprietary software



Automated multi-wavelength tomographic printing and light deposition as an add-on to the Tomolite v2

Printing
Up to four different
automated
wavelengths from
400 to 750nm



[Watch video online](#)

Summary

- Tomographic printers enable high-speed 3D printing by fabricating the whole object at once.
- As a tool for biofabrication, tomographic bioprinting enables:
 - Printing centimeter-scale constructs
 - Optical printing resolution (<100 microns)
 - High cell/organoid viability
 - High throughput
 - High repeatability
 - Multi-material printing



Contact us for further
information



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Appendix

Additional material

Videos

- [1min. product presentation](#)
- [5min. product presentation:](#)
- [Pancreas bioprinting](#)
- [Real-time Yoda demo](#)
- [Real-time vasculature demo](#)
- [Bioprinting workflow](#)
- [High-precision printing](#)
- [Complex biological structures](#)

Papers

- [Volumetric Bioprinting of Organoids and Optically Tuned Hydrogels to Build Liver-Like Metabolic Biofactories](#)
- [Volumetric Bioprinting of Complex Living-Tissue Constructs within Seconds](#)
- [Tomographic volumetric bioprinting of heterocellular bone-like tissues in seconds](#)
- [Optimized Photoclick \(Bio\)Resins for Fast Volumetric Bioprinting](#)
- [High-resolution tomographic volumetric additive manufacturing](#)
- [Tomographic Volumetric Additive Manufacturing of Silicon Oxycarbide Ceramics](#)