Pohjois-Savon liitto SAVONIA

# Formnext 2025

Tilannekatsaus: Lääketiede ja terveysala

3D-tulostus terveysalan sovelluskohteissa (T3D) -hanke

1.1.2025 – 31.3.2026

- This presentation provides an overview of medical and healthcare-related 3D-printing solutions showcased at Formnext 2025.
- The focus is on practical applications and real-world implementations of additive manufacturing in healthcare.
- Covered topics include:
  - Anatomical models for training and surgical planning
  - Patient-specific prosthetics, orthoses, and insoles
  - Medical devices and advanced implant solutions
- Both polymer- and metal-based technologies are presented, ranging from elastomeric silicone printing to serial production of titanium implants.
- In addition, the material introduces some software tools, manufacturing systems, and post-processing technologies supporting medical additive manufacturing workflows.

# Formnext 2025 awards

Half of the Formnext 2025 awards won by Healthcare –related products

- **Design Award**
  - The Hochschule für Gestaltung Schwäbisch Gmünd
  - "Grabbit" hand training devices for patients having limited hand coordination ability because of an injuries or neurological conditions.
- **Rookie Award**
  - IAM3DHub
  - Project "3DMyMask": customized silicone masks that improve the treatment of disorders like respiratory distress.
- **Start-up Award**
  - PERFI Technologies
  - Volumetric Additive Manufacturing (VAM) -technology
- Finalist: Limb kind project
  - In Kenya, the Limb Kind Foundation and HP used 3D printing to create custom prosthetic sockets that were fitted free of charge for children. This project demonstrates how modern technology can restore mobility.
- Other award winners
  - Ambassador Award
    - Irena Heuzeroth
    - Practical study course "Certified Industrial Technician Specializing in Additive Manufacturing", which is offered jointly by the Würzburg-Schweinfurt Chamber of Industry and Commerce and the SKZ.
  - (R)Evolution Award
    - Laempe Mössner Sinto GmbH
    - Laempe developed a 3D Printing system for the large-scale production of sand cores
  - Sustainability Award
    - EOS GmbH Electro Optical Systems
    - EOS developed a filter system that neutralizes condensate, soot, ultra-fine particles, and other reactive by-products of metal-based AM directly in the production process

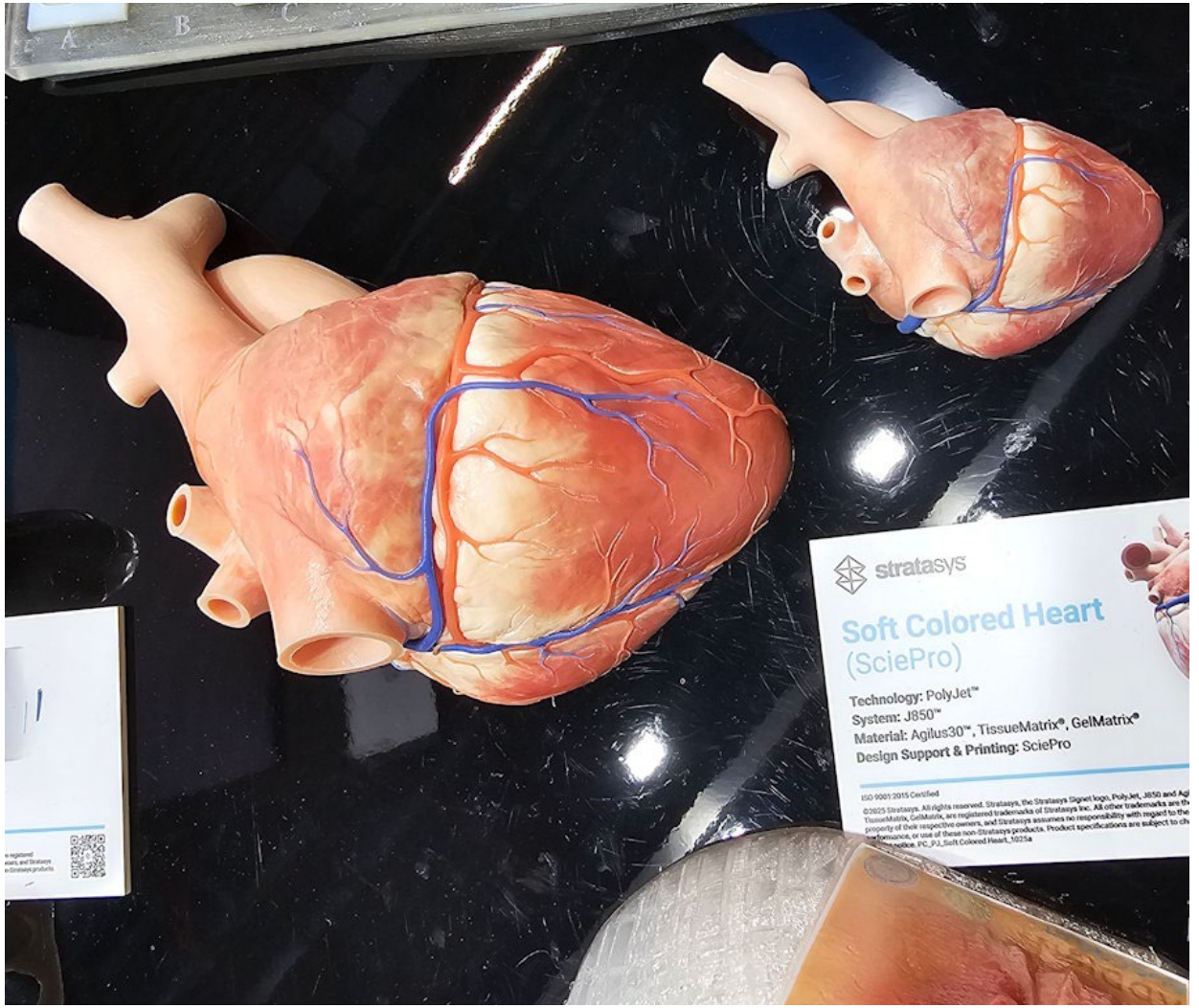
# Anatomical models

# Anatomical models

Manufacturer: Stratasys, SciePro GmbH

Soft Colored Heart

- Printer: Polyjet J850
- Material: Agilus30, TissueMatrix, GelMatrix
- Design Support & Printing: SciePro GmbH
- Lifelike design of the heart provides realistic experience for surgical training and medical education.



# Stratasys


# Stratasys

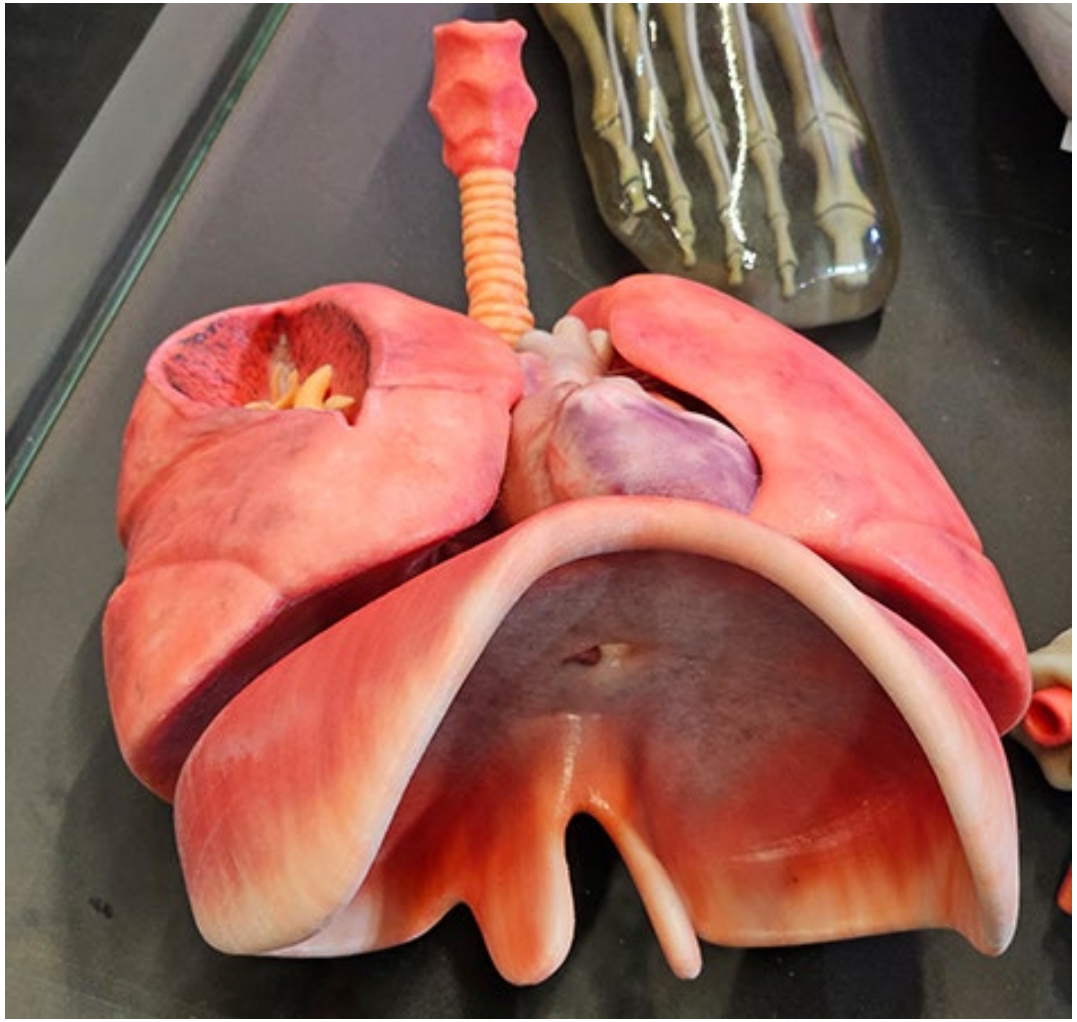
# Anatomical models

Realistic full-color anatomical models

Manufacturer: Mimaki

System: Mimaki 3DUJ-2207

# Mimaki



# Anatomical models

Anatomical models for training, surgical planning

Manufacturer: 3Deus Dynamics

System: Lynxter

Material: LSR Dynasoft silicone

- 10 to 50 Shore A
- ISO 10993 compliant / Biocompatible
- Biomimetic

# 3Deus Dynamics


# Anatomical models

Hand Phantom

Manufacturer: Formlabs

- Printer: Form 4L
- Material: Formlabs Clear Resin V5
- Layer Height: 0.1 mm
- Volume 498.4 ml
- Print Time: 9h 30 min
- Cost: 235 $
- The bones were hollowed out of the hand and backfilled with opaque white material after printing.

# Anatomical models

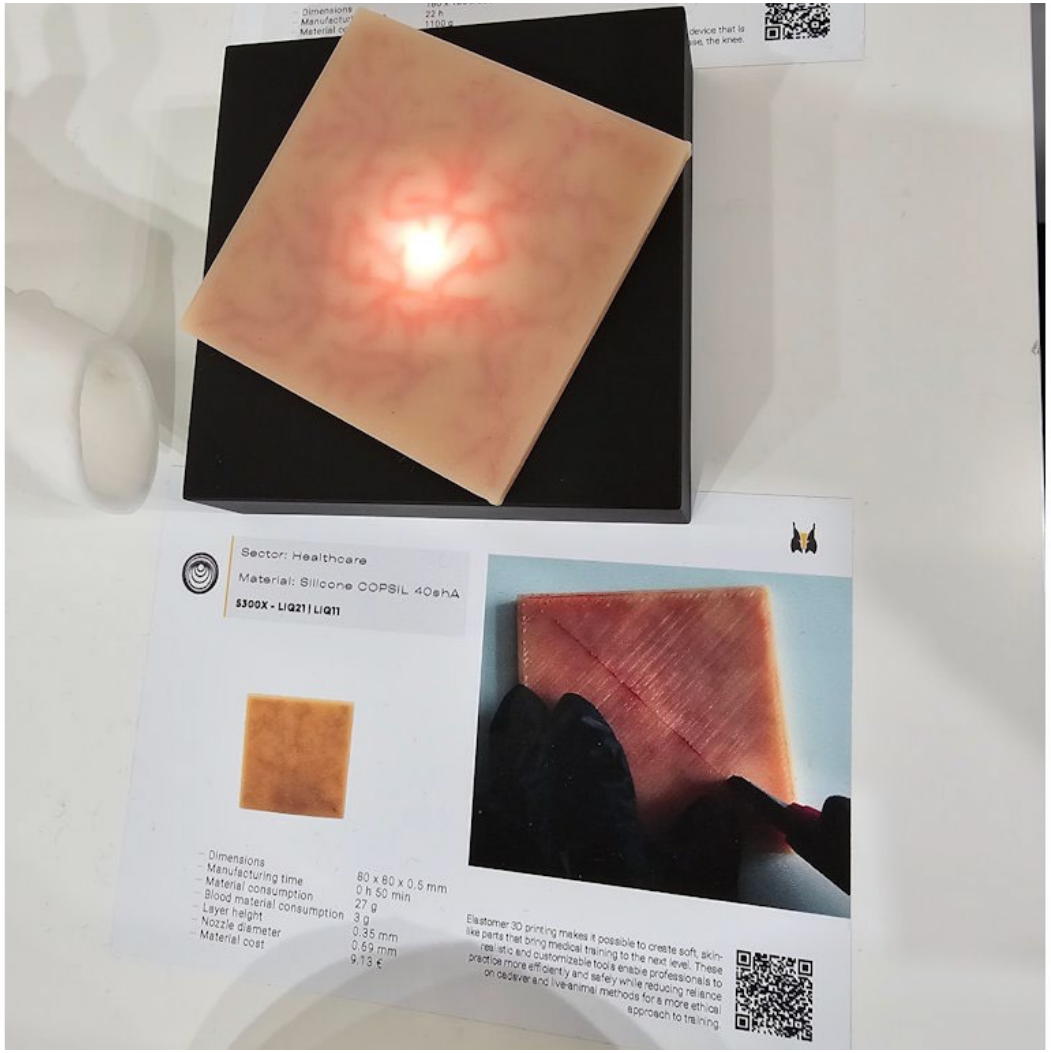
Silicone Skin

Manufacturer: Lynxter

Printer: Lynxter S300X -LIQ21/LIQ11

- Material: Silicone COPSIL 40shA
- Dimensions: 80 x 80 x 0.5 mm
- Print time: 50 min
- Layer height: 0.35 mm
- Material consumption: 27 g + 3 g blood material
  - Separate “blood material” is used to visualize blood vessels.
- Material Cost: 9,13 €

Elastomer 3D printing makes it possible to create soft skin-like parts that bring medical training to the next level.



# Anatomical models

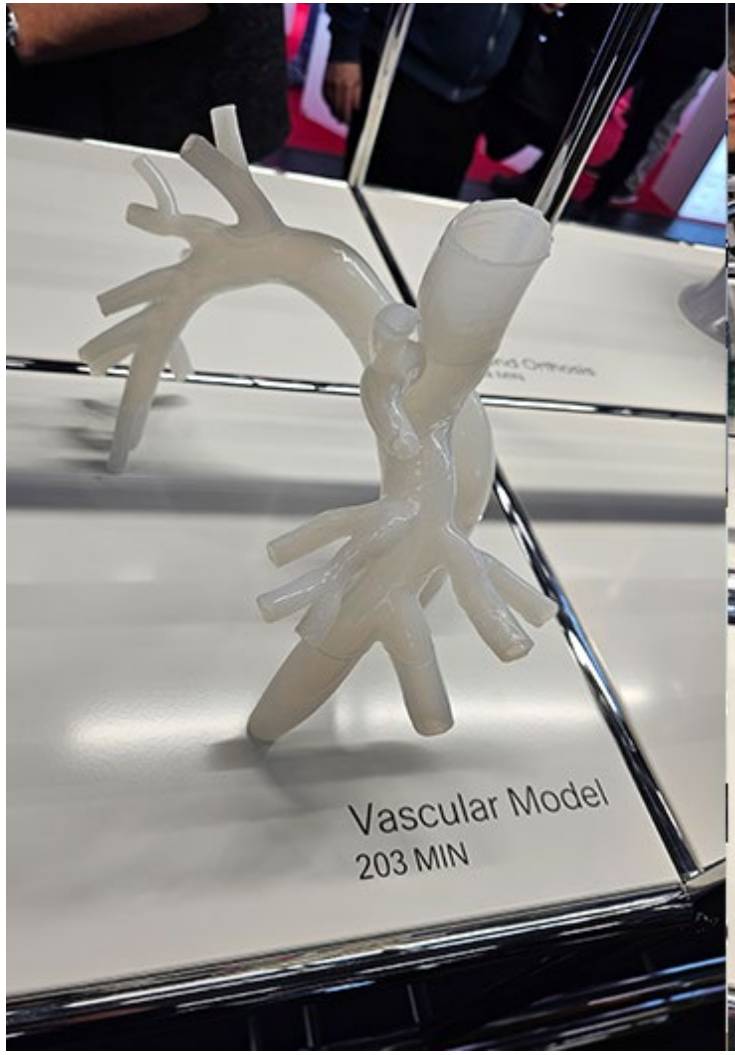
Vascular model

Manufacturer: RLP

- Printer: RLP Levity™
- Print time: 203 min

Rapid Liquid Print presented its Levity™ silicone 3D printer based on Gravity Free Manufacturing™, capable of printing complex elastomer structures without support material.

Example applications included vascular models for surgical planning, training, and device testing, produced from platinum-cured medical-grade silicone.




# Prosthetics & Orthosis

# Prosthetic glove

Prosthetic Glove

- Printer: Fuse 1+ 30W
  - Material: TPU 90A V1 powder
  - Layer Height: 0.11 mm
  - Volume: 70 ml
  - Print Time: 4h 50 min
  - Cost: 74.35 $

TPU 90A powder is a flexible, skin-safe material, ideally suited for patient-specific prosthetics, such as this custom glove.

Its flexibility allows it to conform to the patient’s hand shape, providing a comfortable and natural feel. Additionally, it’s wear- and tear resistance enables it to withstand repeated use, making it a durable, long-lasting solution for patients.

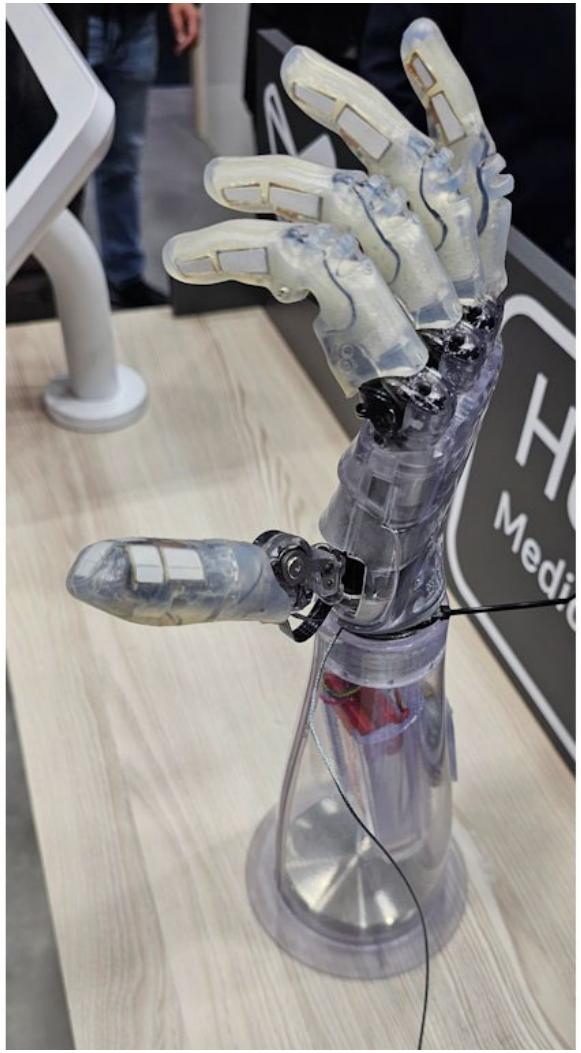
# Prosthesis

PSYONIC Ability Hand

Printer: Formlabs Form 4

Material: Formlabs Durable Resin V1

US-based PSYONIC uses Formlabs SLA technology to produce the Ability Hand – a high-performance bionic prosthesis designed for real-world use.



# Arkema, Snap-fit Wrist braces


# Orthopedic support

Manufacturer: EOS, AMED

Orthox – Orthopedic Support

- Printer: EOS FORMIGA P110 Velocis
- Material: EOS PA 2200
- Software: 3DXpert, EOSPRINT
- Layer height: 100 µm
- Print time: 7 h
- Post Processing Chemical smoothing
- Ergonomic, precise and lightweight design ensures optimal patient comfort and movement control.
- Reinforced structure for comfort and durability
- Adjustable joint (60º-150º in 15º steps)

# Orthosis

Manufacturer: EOS, mign

Mign icon™, Adult Scoliosis orthosis

- Printer: EOS P396
- Material: PA 2200
- Layer height: 120 µm
- Build time: 13 h (~6-8 units/build)
- Post Processing: Blasting, polishing
- Software: mign Genysis + Magics, EOSPRINT

Icon is a 3d-printed phenotype-driven scoliosis brace replacing heavy, generic models. It enables scalable personalization and measurable outcomes, now recognized by CMS (L1007). Patent pending.

# Prosthesis

Limb Kind Foundation, The Limb Kind Project

The project is designed to address the global gap in pediatric prosthetic care by leveraging advanced technology to overcome barriers of access and affordability. The project started in Kenya where the model was created and continued in Sri Lanka.

The prosthesis is manufactured by 3D-scanning the patient foot, 3D-printing a socket with HP Multi Jet Fusion 3D-printer and assembling the prosthesis on site.

# Upper limb orthoses

Upper limb orthoses

Manufacturer: Crispin

Printer: HP MJF

Material: HP PA12

Post-processing:

- Vapor smoothing (PostPro SF100)
- Dyeing

# Arkema, Ankle foot orthosis, PA11

# Prosthesis

Transtibial Prosthesis

Manufacturer: Loctite

Printed in MED9851 with a flexible inner part for patient comfort from MED414.

Both materials are capable of meeting ISO 10993-5, -10 & -23 standards of biocompatibility making them great candidates for prosthetic devices.

# Prosthesis

Personalized 3D-printed Breast Prostheses

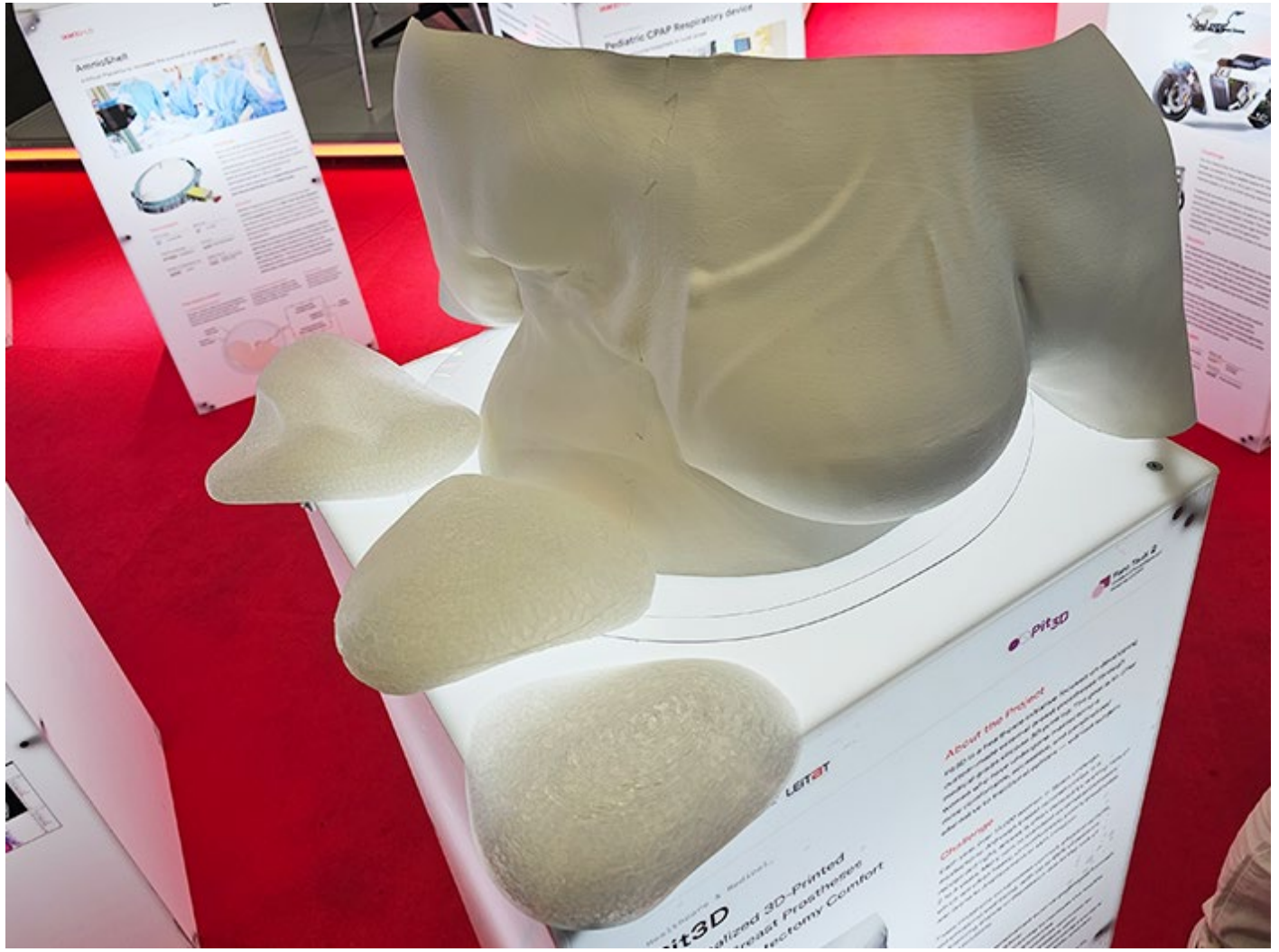
Manufacturer: Pit3D

Printer: Lynxter

Material: SIL-001

Pit3D –project presented personalized external breast prostheses designed for post-mastectomy patients.

The prostheses are produced using 3D-scanning and 3D-printing to match the patient’s anatomy. This improves comfort, symmetry, weight distribution, and breathability compared with conventional off-the-shelf solutions.



# Orthosis

Hip Abduction Orthosis, ORFI

Manufacturer: ORFI, Nowecor AG

Printer: HP MJF

Material: PA12

Post-processing:

- Dye (DyeMansion DM50)
- Polyshot Surfacing

# Cranial helmet

3D-printed cranial orthosis for the treatment of positional plagiocephaly in infants

Manufacturer: Surestep

Printer: HP MJF

Material: PA12

Post-processing:

- Dye (DyeMansion DM50)
- Polyshot Surfacing

# Prosthesis

Body-powered finger prosthesis

Manufacturer: Naked prosthetics

Printer: HP MJF 5200

Material: PA12

# Insoles

KRIWAT Rigid Insole Shell

Manufacturer: Formlabs, Kriwat

Printer: Fuse 1+ 30W

Material: Nylon 11

Layer Height: 0.11mm

Print time: 3h 2 min

Patient-specific insoles. The rigid shell is printed by MotionSupport in Nylon 11. The printed insoles are finished with a top cover. MotionSupport is the 3D printing service behind Kriwat GmbH.

# Insoles

Manufacturer: Arkema, Xfeet

Orthopedic insoles courtesy of Xfeet using HP 3D High Reusability PA11 material and HP Multi Jet Fusion technology.

# Insoles

Podoactiva Smart Insoles

Manufacturer: HP,

- Printed with HP Multi Jet Fusion
- Material: HP 3D High Reusability PP
- Post Processing: Blasted

Measuring 500 pressure data points per second in real-time

Sports performance analysis, used by La Liga and the Spanish National Team

- https://www.podoactiva.co.uk/insoles/

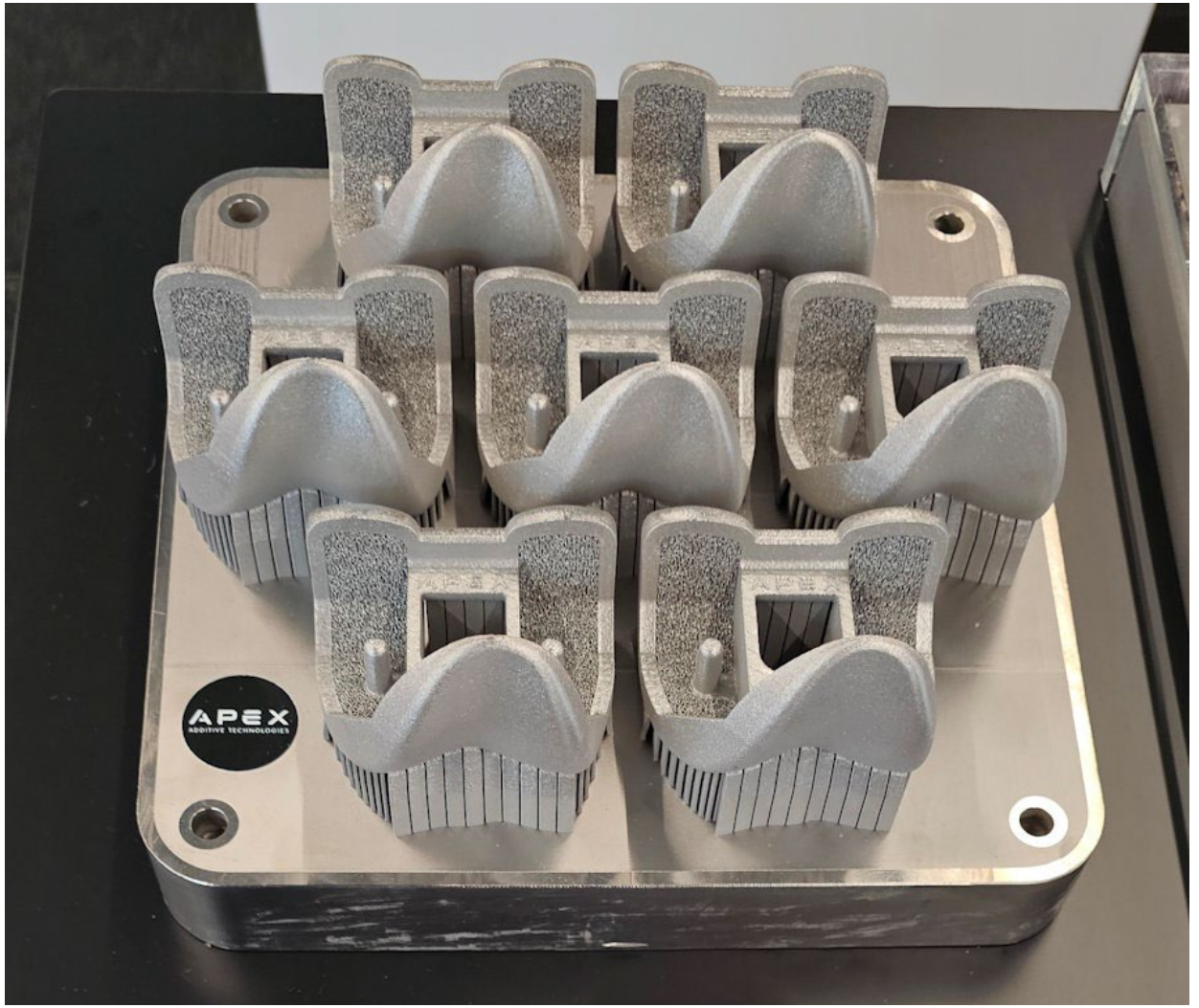
# Implants

# Implant

Femoral parts

Manufacturer: Sandvik / Apex Additive Technologies

Femoral parts printed for Secq by Apex Additive Technologies in Osprey from Sandvik Ti6Al4V-ELI material



# Implant

Femoral Stem, Femoral Knees

Manufacturer: Colibrium Additive

- Machine Spectra L/M
- Material: Ti6Al4V
- Printed with unique trabecular structure, optimized for improved osseointegration
- As-built material compliant with ASTM F3001 Class A-D
- Surface roughness ~Ra 15

# Implant

Femoral knee implant

Manufacturer: EOS, ADDITIVEMINDS

- Printer: EOS M 290-2 400W
- Material: EOS Titanium Ti64 ELI
- Layer height: 60 µm
- Build Time: 18 h 34 min (18 parts)
- Post Processing: Blasting, polishing
- Improved production rate for Ti64 femoral knees approaches casting production costs for implants. Production flexibility of AM offers improvement in a notoriously slow supply chain. Faster development times possible due to a lack of tooling needed for AM product development.

# Implant

Stacks of Acetabular Cups

Manufacturer: Colibrium Additive

- Machine Spectra L/M
- Material Ti6Al4V
- Cups arranged to showcase stacking and free-floating capabilities
- Print speed prioritized over surface finish
- As-built material compliant with ASTM F3001 Class A-D

# Implant

Acetabular cups

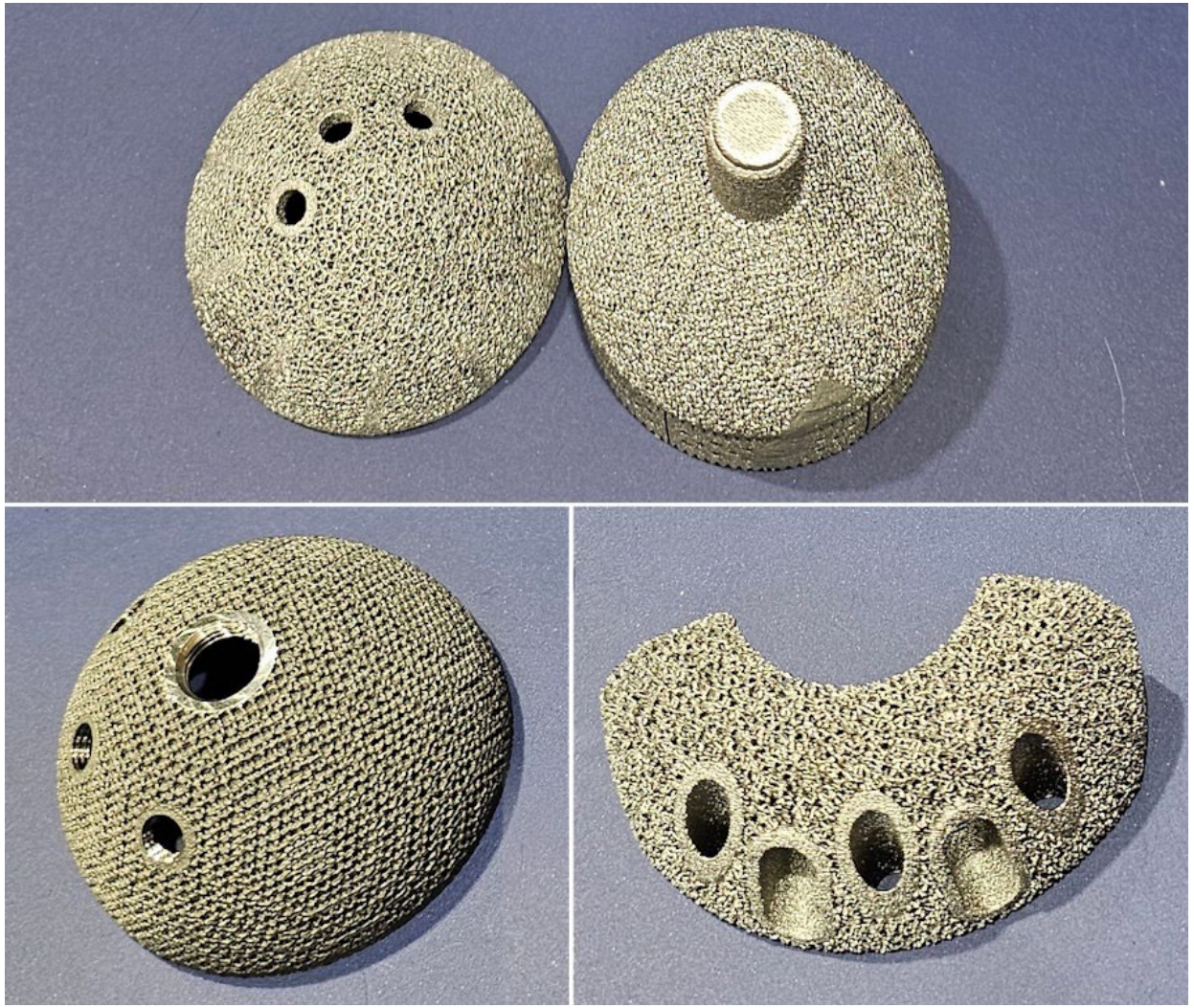
Manufacturer: Colibrium Additive

Machine Spectra L/M

- Material Ti6Al4V
- Printed without support structures
- Printed with unique trabecular structure, optimized for improved osseointegration
- As-built material compliant with ASTM F3001 Class A-D
- Surface roughness ~ Ra 15 µm

Acetabular Augment

- Strut width adjustable from ~250 µm



# Implant

Acetabular Cups

Manufacturer: AVIMETAL Additive

Printer: MT170 (2 laser)

Layer Thickness: 40 μm

Material: Ti6Al4V Grade 23

Printing time: 9 h

Technical Features:

- The acetabular cup is a highly representative application of 3D Printing in the medical field and is currently one of the few orthopedic implant products in China that has completed medical device certification.
- The surface layer of the cup has a porous microstructure, requiring a porosity of over 60%, a rod diameter between holes of less than 0.6 mm and a thinnest thickness of only 1.5 mm

# Implant

Hip Cups

Manufacturer: Vulcanforms

Material: Ti6Al4V Grade 23

Example build plate with acetabular hip cups demonstrating serial production of titanium orthopedic implants using LPBF technology.

VulcanForms is a U.S.-based digital manufacturing company specializing in the serial production of metal components using proprietary laser powder bed fusion (LPBF) technology.

The company develops and operates its own high-throughput additive manufacturing systems as part of an integrated production platform that combines printing, heat treatment, machining, and inspection into a single workflow.

VulcanForms focuses particularly on high-performance applications in medical devices, aerospace, and defense, including the large-scale production of orthopedic implants such as acetabular hip cups.

Manufacturing process certifications include ISO13485, ISO9001.

# Implant

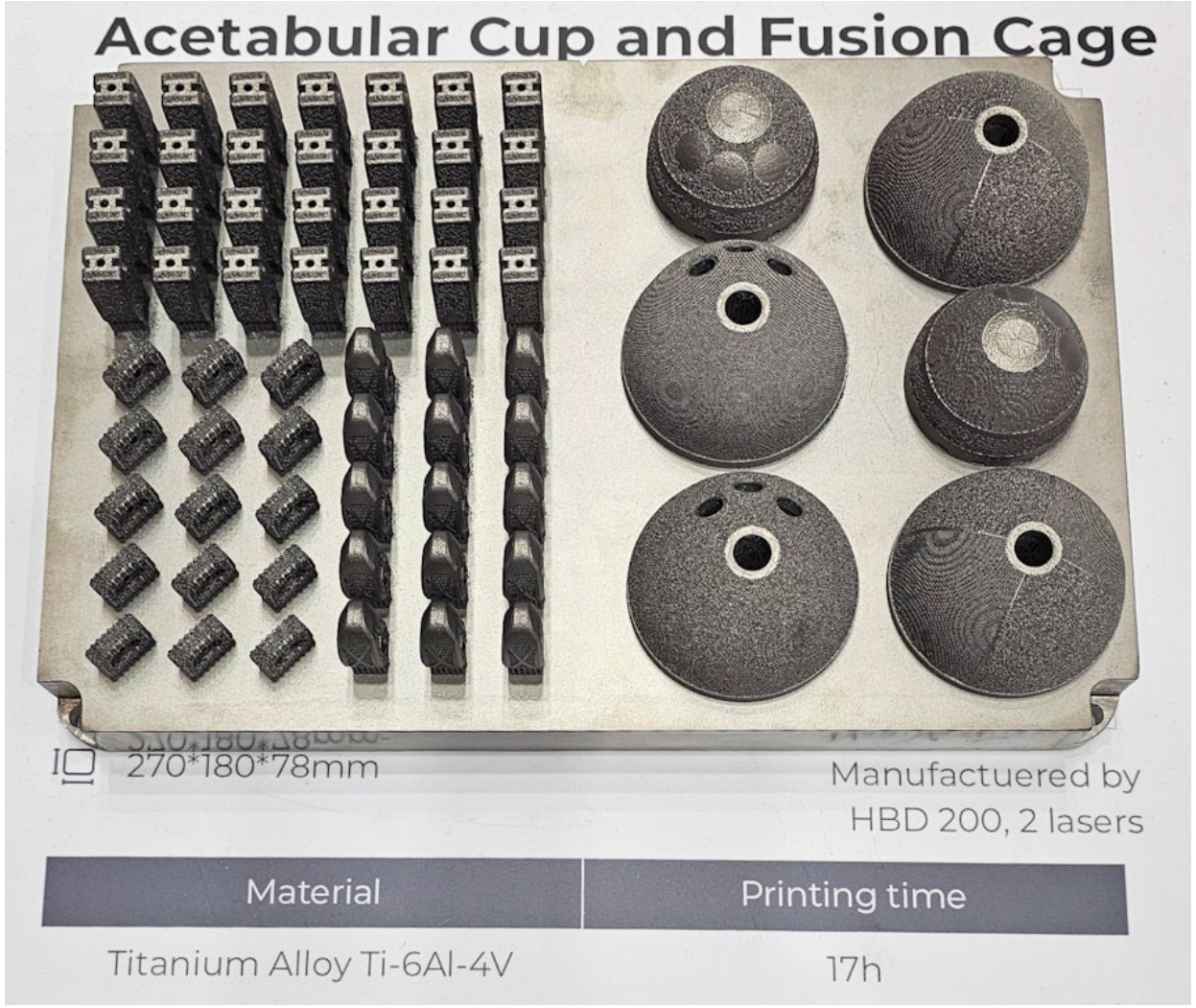
Acetabular Cup and Fusion Cage

Manufacturer: H3D

- Printer: HBD 200, 2 lasers
  - Print volume: 270 * 180 * 78 mm
  - Material: Titanium Alloy Ti-6Al-4V
  - Printing time: 17h (27 parts)

Interbody fusion cages feature precise dimensions and clean trabecular structures that promote osseointegration, with no risk of collapse or residue.

Acetabular cups combine intricate design and biocompatible titanium for optimal fit, stability, and accelerated recovery – advancing orthopedic implant precision and patient outcomes.

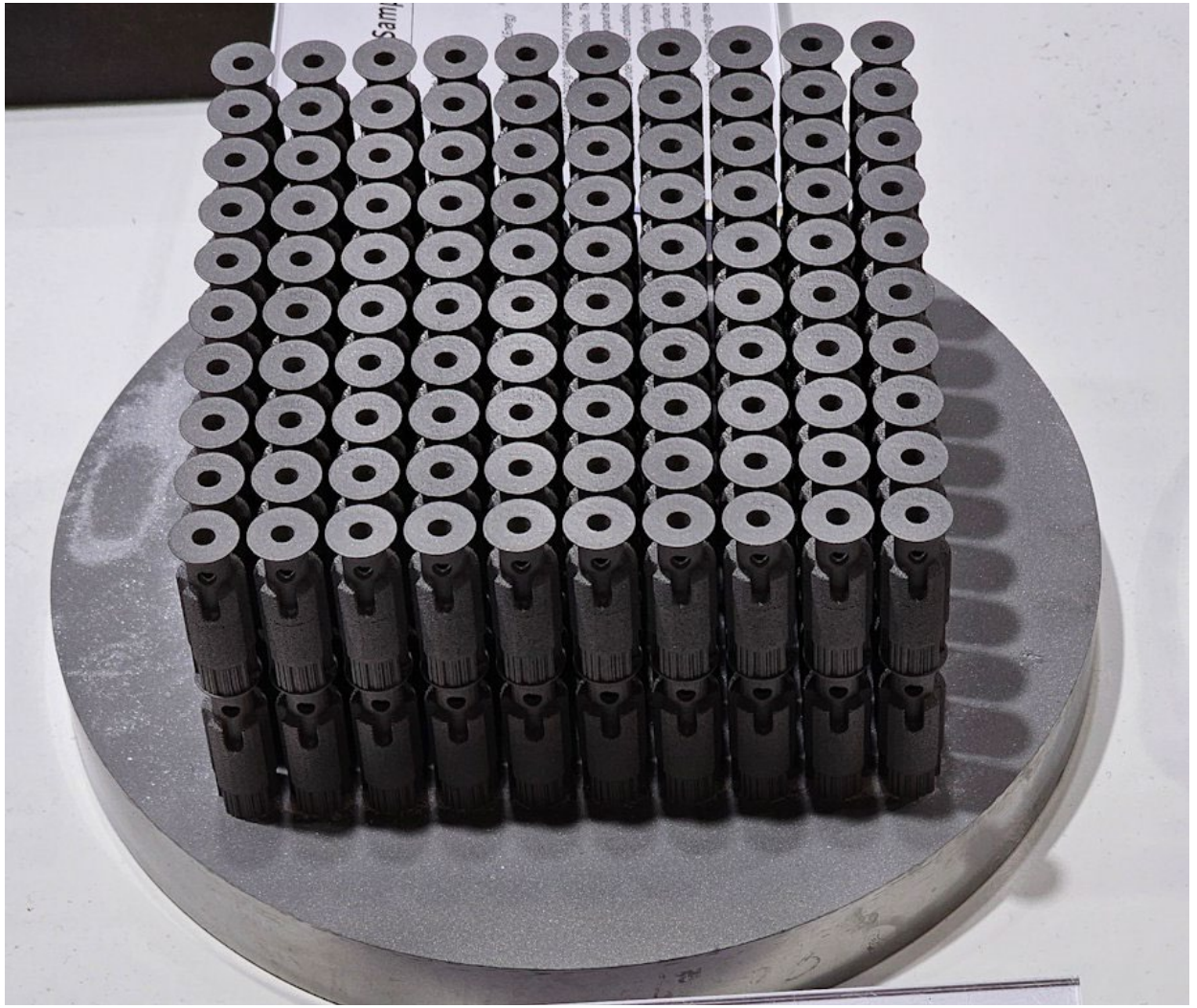


# Implant

Orthopedic Implant / Fixation Plate

Manufacturer: AVIMETAL Additive

- Printer: MT170 (2 laser)
- Layer Thickness: 40 µm
- Material: Ti6Al4V Grade 23
- Printing time: 6h

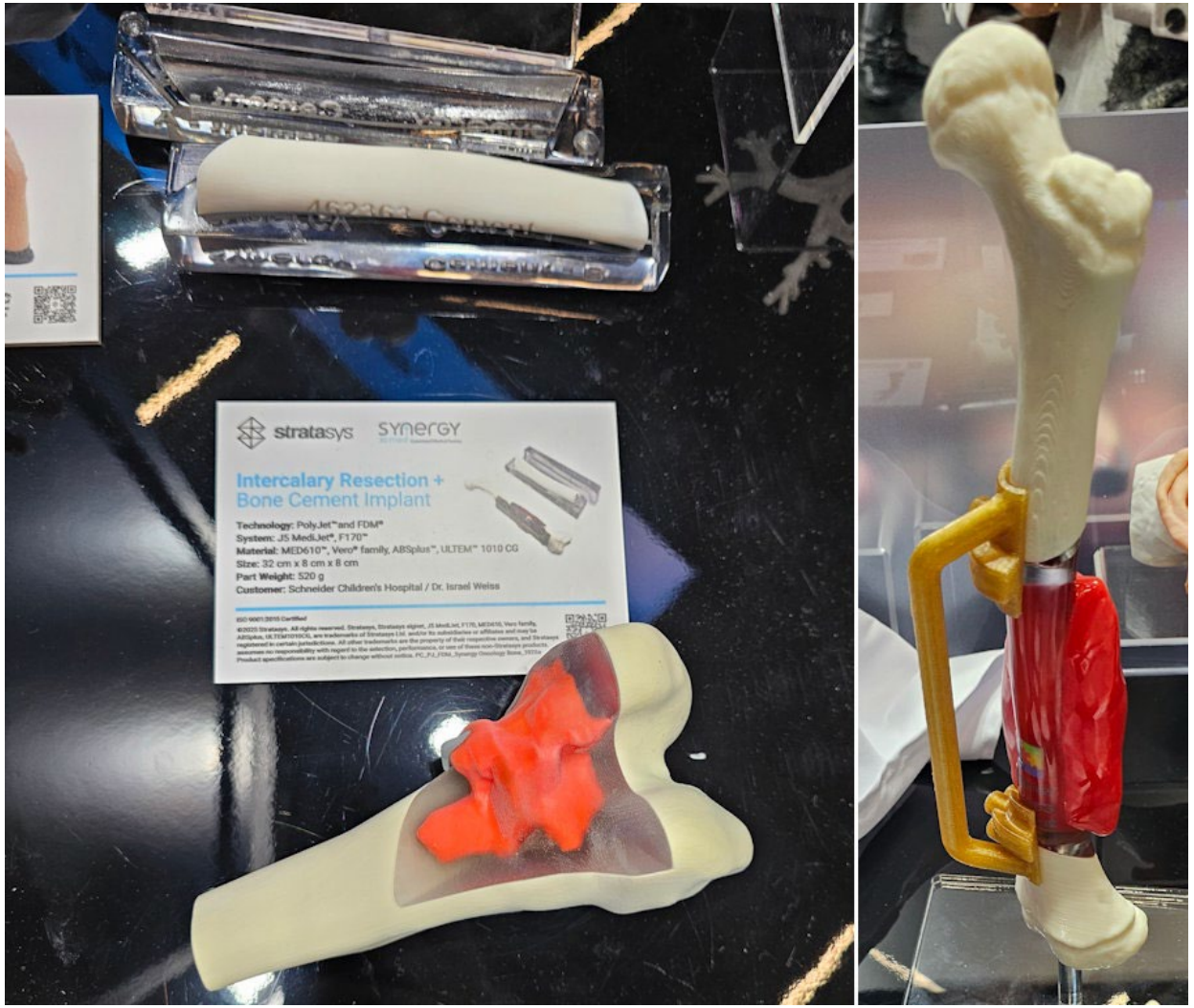


# Implant

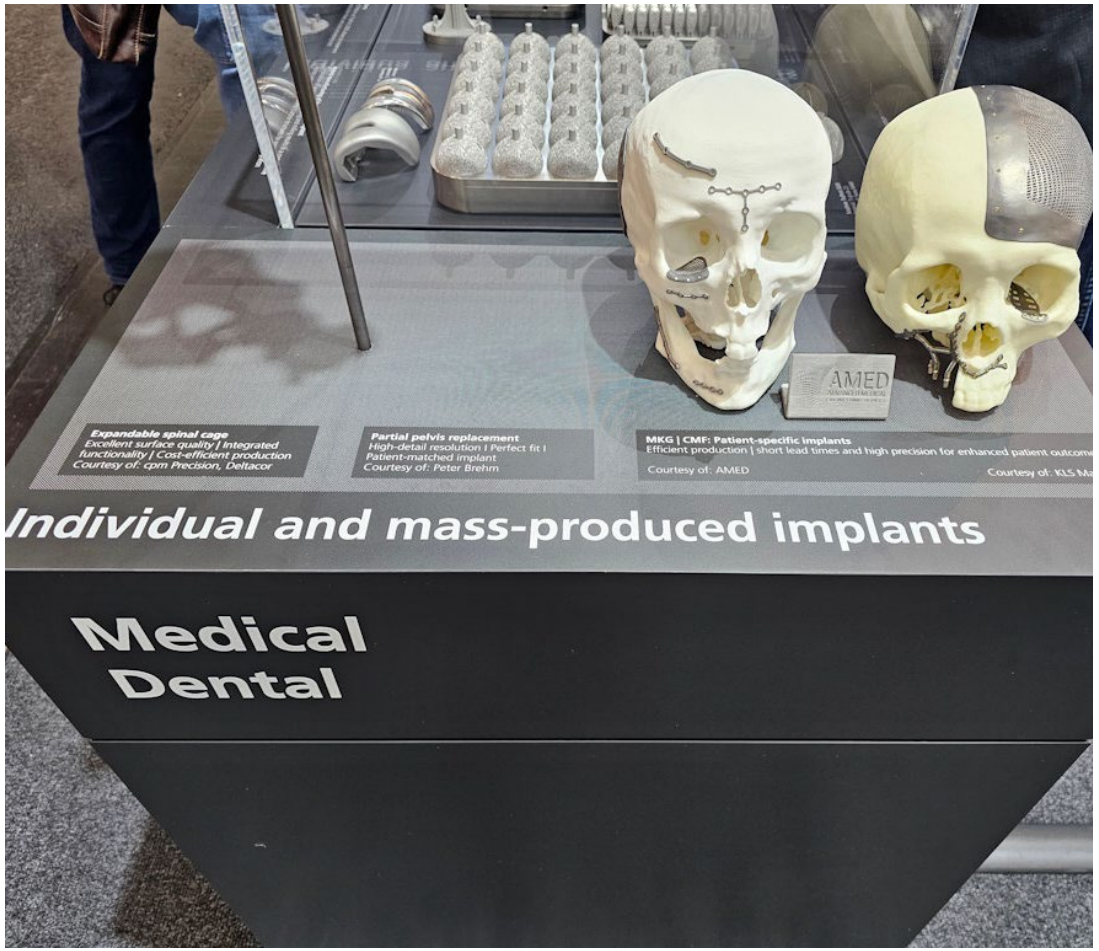
Intercalary Resection + Bone Cement Implant

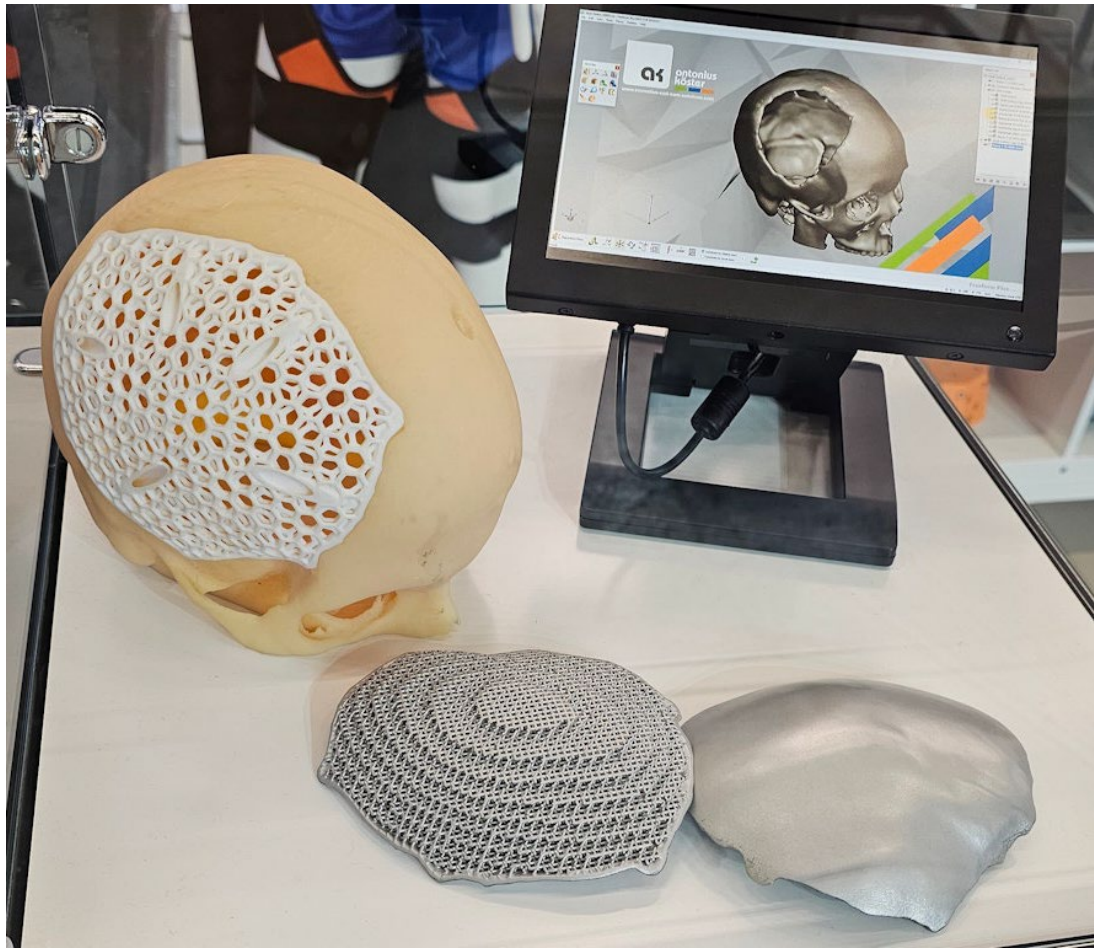
Manufacturer: Stratasys, Synergy 3Dmed

- Printer: Polyjet J5 MediJet and FDM F170
- Materials: MED610, Vero family, ABSplus, ULTEM 1010 CG
- Size: 32 cm x 8 cm x 8 cm
- Part weight: 520 g
- Customer: Schneider Children’s Hospital / Dr. Israel Weiss



# Implants


Expandable spinal cage
Excellent surface quality | Integrated functionality | Cost-efficient production
Courtesy of: cpm Precision, Deltacor
Partial pelvis replacement
High-detail resolution | Perfect fit | Patient-matched implant
Courtesy of: Peter Brehm
MKG | CMF: Patient-specific implants
Efficient production | short lead times and high precision for enhanced patient outcome
Courtesy of: AMED
AMED
Individual and mass-produced implants
Medical
Dental



# Implant

Manufacturer: 3D Systems

3D Systems presented a MedTech Solutions demonstration skeleton illustrating a wide range of additively manufactured healthcare applications, including:

- Cranial implant (CMF reconstruction)
- Spinal interbody cage
- Hip joint replacement components
- Long-bone reconstruction / fixation structure
- Ankle fusion implant
- Transparent anatomical arm model with vasculature
- Transparent lower-limb anatomical model
- Thoracic organ model (heart and vessels)

# Implants

Manufacturer: Wayland additive

Wayland Additive presented medical demonstration components such as cranial implants, hip stems, acetabular cup stacks and knee stacks manufactured using its Calibur3® system based on NeuBeam® electron beam powder bed fusion technology.

The parts were produced in Ti-6Al-4V (Ti64), a biocompatible titanium alloy widely used for orthopedic and cranio-maxillofacial implants, demonstrating the system's suitability for complex load-bearing medical geometries and porous implant structures.

# Implant

Patient-Specific Motion-Preserving Spinal Implant

Manufacturer: Ybi & Nivalon medical

Material: Zirconia-toughened alumina

Geometric features:

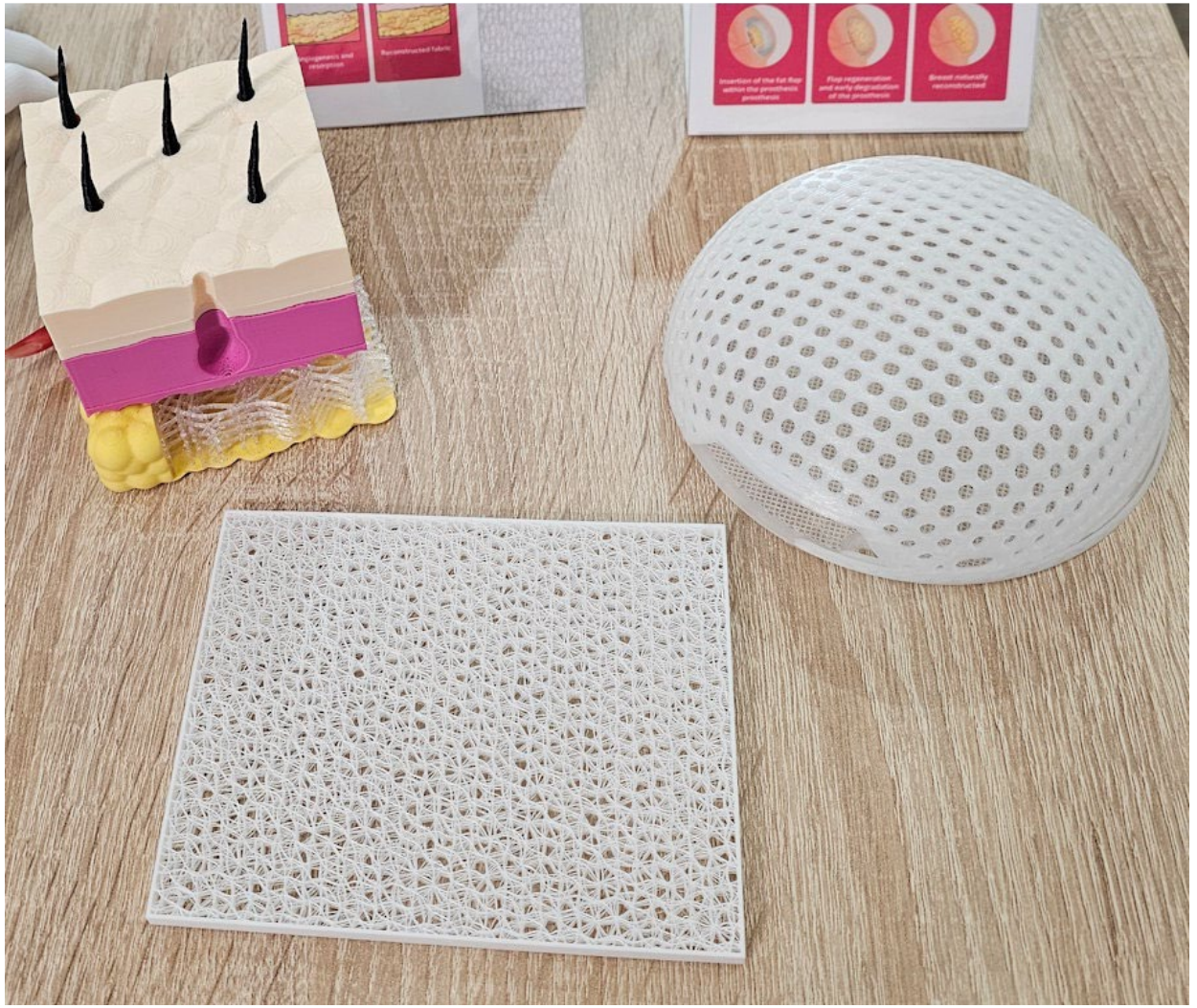
- Multimaterial architecture enabling integration of ceramic endplates with elastomeric core
- Precise geometry customized to the individual patient
- Accurate surface features for patient-specific fit and bone integration

# Implant

Manufacturer: Lattice medical

**Rodin implant** is a 3D-printed, porous and adaptable structure designed to improve fat grafting, more commonly known as lipofilling. It promotes cell adhesion, migration proliferation and angiogenesis. Once it has achieved its objective, the implant gradually resorbs through a hydrolysis reaction.

**Mattisse implant** consist of a porous base to fix the autogous tissue to be regenerated, and a dome to give the desired volume and shape. The implant is designed for women who have suffered from breast cancer. The material is medical-grade resorbable biomaterial, which is shaped by 3D-printing.



# Implant

Manufacturer: Kexcelled

Printer: Intamsys Funmat HT

Kexcelled K11 PEEK is a medical-grade polyetheretherketone filament designed for extrusion-based 3D printing of load-bearing parts such as spinal cages, cranial reconstruction implants, and trauma fixation structures.

The K11 PEEK material is biocompatible but not marketed as a certified implant-grade material (CE/FDA).

The material offers high mechanical strength, chemical resistance, radiolucency, and an elastic modulus closer to cortical bone than titanium, making it suitable for patient-specific implant geometries and surgical applications.

# Medical devices

# Breathing mask

Customized silicone breathing mask for premature babies by utilizing 3d-scanning and -printing.

Manufacturer: Digifab 3DMyMask

- https://lynxter.com/en/learn/blog/when-silicone-3d-printing-transforms-respiratory-care-for-newborns

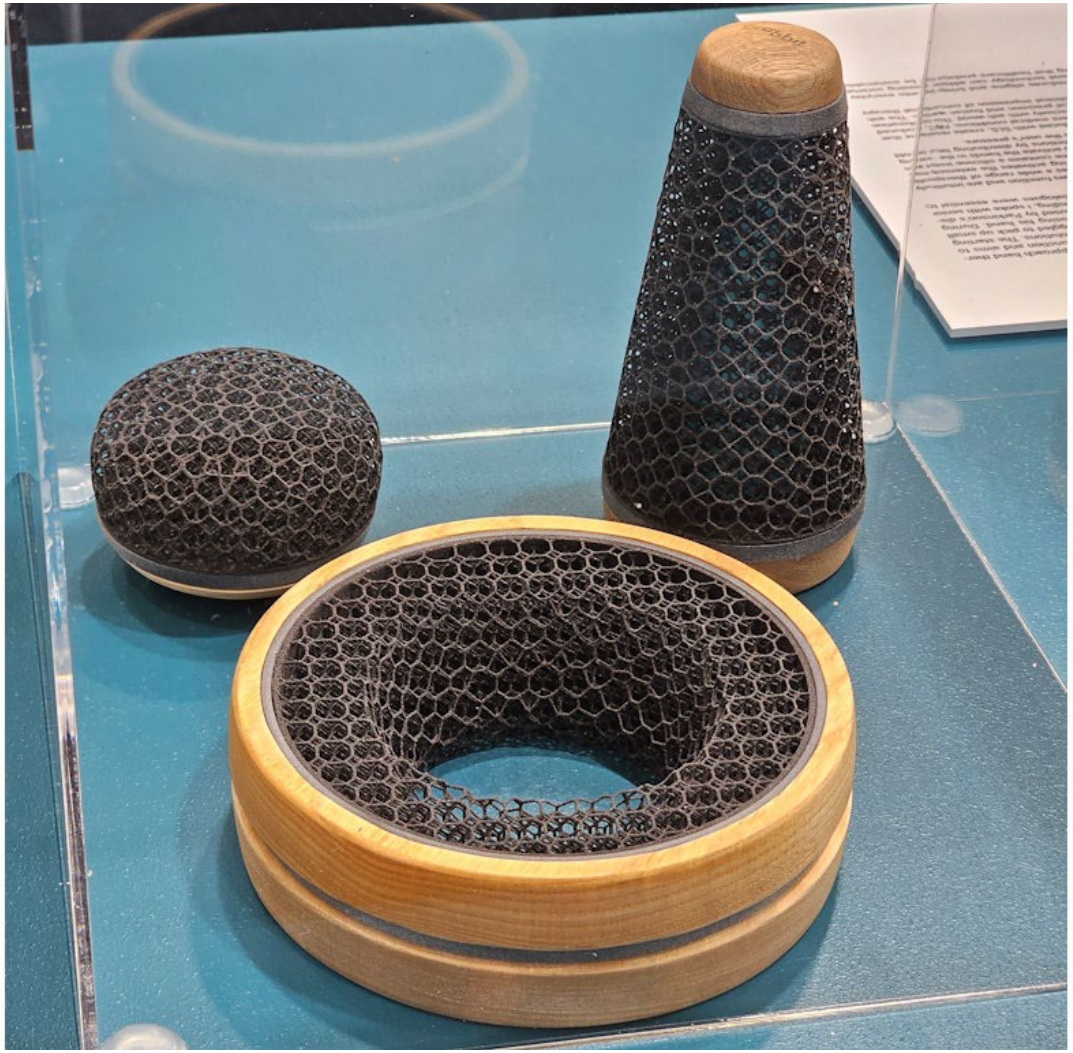
# Hand Training device

Grabbit hand training devices

Manufacturer: The Hochschule für Gestaltung Schwäbisch Gmünd

TPU lattice structures for patients having limited hand coordination ability because of injuries or neurological conditions.

Grabbit consist of three simple geometric forms that follow the principle of form follows function and are intuitively understood. Each form addresses a different aspect of hand training.



# Head lice treatment device

End-use part for head lice treatment

Manufacturer: FloSonix, Loctite

Printer: P3 (Origin One)

- Material: Loctite
- Build Time:
  - Head remesh – 5 h 17 min
  - Tip – 3 h 11 min

FloSonix Ventures, in collaboration with Stratasys and Enventys, used Loctite material to produce ergonomic, sterilizable, end-use parts for lice treatment device. Additive manufacturing helped avoid tooling costs while enabling reusable components and faster production.

https://www.loctiteam.com/case-studies/end-use-part-for-head-lice-treatment/

# Hearing aid, wearables

Manufacturer: Loctite

Med414 Elastomeric resin

- Capable of meeting ISO 10993-5, -10, & -23 standards for biocompatibility
- True elastomeric behaviour
- Good Tear resistance
- Torsional flexibility
- Good balance of strength and elongation

Ideal for, wearables, PPE, Earbuds Medical Devices, Hearing aid, Orthoses

# Handle

Cardiac implant delivery handle

Manufacturer: EOS, 1zu1, Qatna

- Printer: EOS P 500
- Material: PA2200 CarboReduced
- Layer height: 100 µm
- Post Processing: Chemical smoothing
- Enables accurate placement of the implant into the left atrial appendage, which is critical for patient safety.
- Designed with internal threads, channels, and undercuts, all realized in a single build using SLS.
- Optimized for rapid iteration and small-batch manufacturing, enabling fast development cycles.
- Biocompatible, sterilizable, ready for clinical use and produced under medical device standards (ISO 13485).

# Helmet

Custom helmet for impact prophylaxis

Manufacturer: EOS

- Printer: EOS P3 NEXT
- Material: EOS TPU 1301
- Layer height: 120 µm
- Build time: 11 h 40 min
- This lightweight and breathable impact-absorbing helmet is designed to offer reliable protection through intelligent lattice structures and customized fitting.
- Custom design via head scan and ACD
- Lattice core absorbs and deflects impact
- Breathable, waterproof, and easy to clean
- Adjustable chin strap for secure comfort

# Guides

Guide for mandible reconstruction

Manufacturer: EOS, KLS martin Group

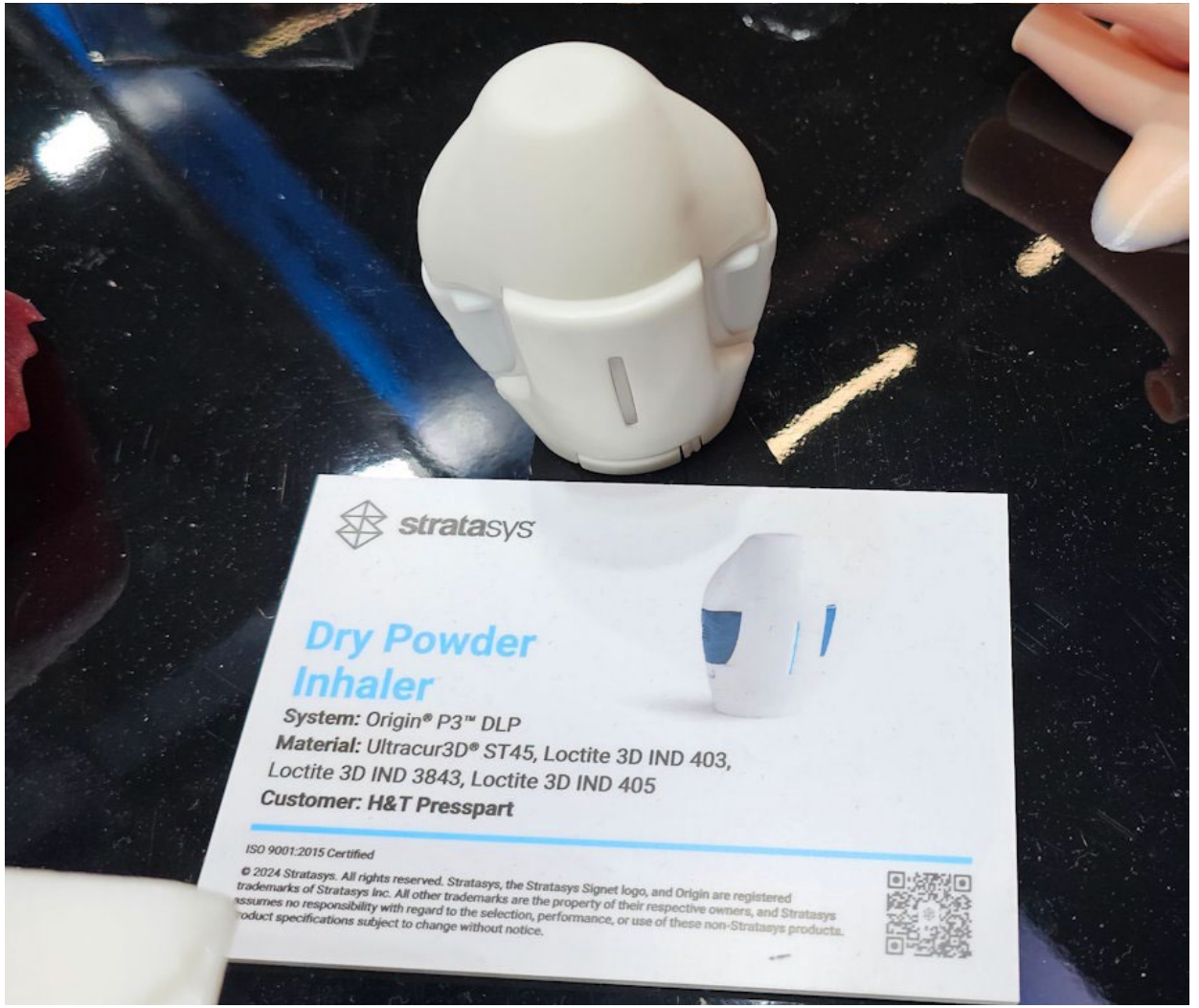
- Printer: Formiga P 110 Velocis
- Material: PA 2200
- Layer height: 100 µm
- Build time: 14h 27min (36 parts)
- Post Processing: Dry ice blasting
- Jaw defects caused by trauma, tumors, infections or atrophy impair physiological and psychological quality of life. Computer-based planning ensures precise custom-made solutions using autologous bone grafts.
- High planning reliability, Perfect fit, Quick treatment

# Inhaler

Dry Powder Inhaler

Manufacturer: Stratasys, H&T Presspart

- Printer: Origin P3 DLP
- Materials: Ultracur3D ST45, Loctite 3D IND 403, Loctite 3D IND 3843, Loctite 3D IND 405
- Model of an innovative connected dry powder inhaler device delivering next generation formulations with high fine particle fractions.



# Cold Sleeve

Silicone Cold Sleeve

Manufacturer: Lynxter

- Thermal medical device that is positioned on a limb, in this case the knee.
- Printer: S300X / S600D
- Material: Silicone COPSIL 40shA
- Dimensions: 180 x 180 x 300 mm
- Weight: 1100 g
- Layer height: 0.5 mm
- Nozzle Diameter: 1.04 mm
- Material Cost: 372 €

# Surgical tools

Customized 3D-printed surgical tools for forearm malunion correction.

Manufacturer: Tailor Surgery

Printer: HP MJF 5200

Material: HP Polypropylene

The package includes 3D-printed tools and instruments for the surgery such as surgical cutting guides, implants, plates and other instruments.

# Multi-Pinhole Collimator

Manufacturer: 3D Systems

Multi-Pinhole Collimator For SPECT

- Direct Metal Printing( DMP)
- Material: Tungsten
- Software: 3DXpert
- High resolution imaging for small field-of-view applications such as small animal studies

# Artificial Placenta

BCNatal Amnioshell

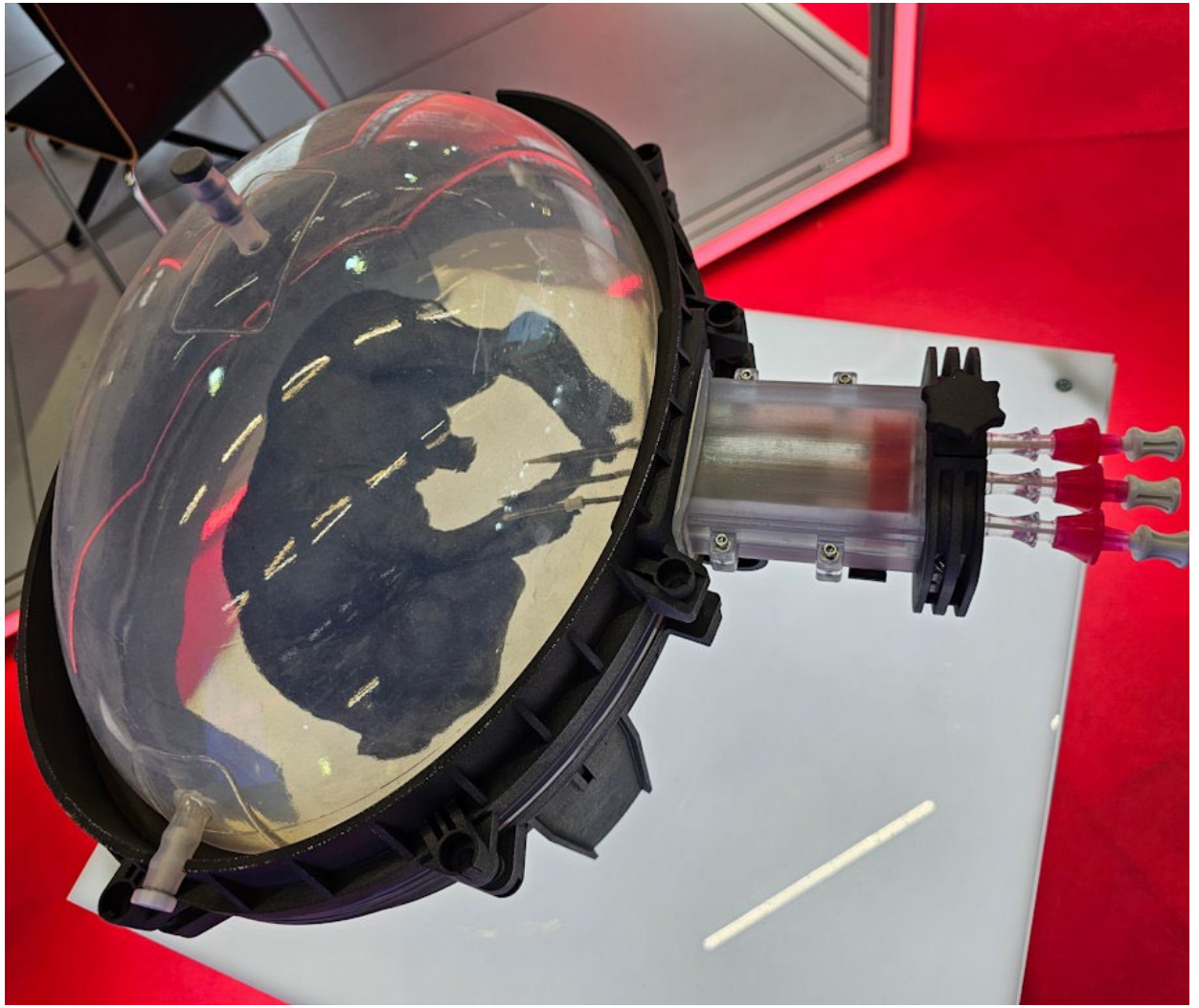
Manufacturer: IAM3DHUB, BCNatal

BCNatal Amnioshell is an innovative artificial placenta prototype designed to improve survival for extremely premature infants (23–28 weeks) by simulating the uterine environment

The device is sealed with silicone lid, creating an isolated environment from noise and light, maintaining stable temperature conditions, and preventing infection. The fetus can be observed from the outside and perform ultrasounds while it remains isolated.

The system uses an animal model (sheep) to test its safety and viability, achieving up to 12 days of successful fetal survival in a biocompatible, fluid-filled chamber.

More information here.



# Dental

# Aligner

Shape Memory Aligner

Manufacturer: Graphy

- Shape driven biomechanics
- The real shape memory effect in oral temperature
- No need for attachments
- Optimal force: Light and continuous
- Adaptability, larger movements, shorter treatment time
- Improved efficacy of OTM
- Adjustable thickness
- Ability to print various appliances
- Biocompatibility certified and no cytotoxicity
- https://www.itgraphy.com/en/dental

# Implants

Dental restoration and implants

Manufacturer: H3D

- Printer: HBD 150, 2 lasers
  - Print volume: Ø150 x 40 mm
  - Material: Cobalt chromium
  - Printing time: 2 h 30 min

Empowering dental labs with batch production. HBD’s metal 3D printing unlocks efficiency through intelligent nesting, perfectly meeting the demands for custom small-batch parts.

# Implants

Dental restoration and implants

Manufacturer: H3D

- Printer: HBD 150, 2 lasers
  - Print volume: Ø150 * 8 mm
  - Material: Cobalt chromium
  - Printing time: 2 h 30 min (189 parts)

Metal 3D-printed crowns have near 100% density, its mechanical properties are comparable to cast counterparts. By directly forming crowns using scanning data instead of molding, 3D-printed crowns can achieve better sealing performance at edges and reduce the risk of leakage. Moreover, it enables custom-designed light-weight structure, reduces the burden of teeth and significantly improves comfort.

# Bracket

Dental Brackets

Manufacturer: H3D

- Printer: HBD 150, 2 lasers
  - Print volume: Ø150 * 85 mm
  - Material: Cobalt chromium
  - Printing time: 2 h 31 min (10 parts)

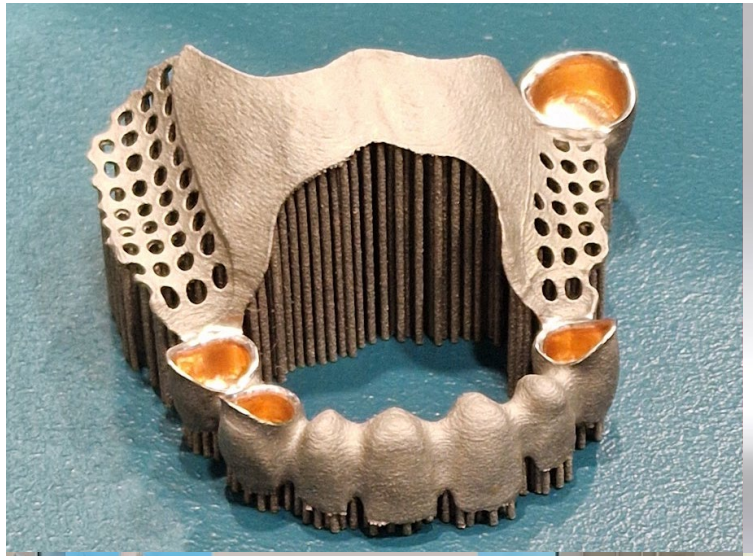
Metal 3D printing technology can utilize hollow honeycomb structures to allow the integration of compatible materials, such as resin, in specified areas to support the subsequent installation of dental parts. This customization aligns precisely with each patient's oral structure, ensuring full functionality and simplified process.

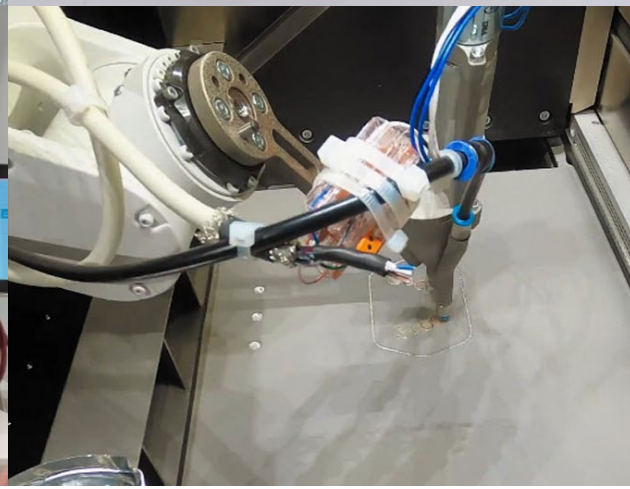
# Multi-material dental prosthetics

Manufacturer: Fidentis

Fidentis is a spin-off from Fraunhofer IGCV, pioneering the world's first commercial multi-material additive manufacturing process for dental prosthetics.

The technology enables the combination of precious and non-precious metal alloys within a single build – a breakthrough that directly addresses one of the most demanding challenges in prosthodontics: telescopic crowns.



# Denture tray

Stratasys presented a TrueDent denture tray demonstrating the production of monolithic full dentures using the TrueDent™ resin, a CE-marked (Class IIa) and FDA-cleared (Class II) dental material.

The material is designed for use on Stratasys PolyJet dental printers, particularly the J5 DentaJet platform, enabling automated multi-material fabrication of patient-specific removable dentures in a single print process.

Typical applications include:

- full removable dentures
- partial removable dentures
- denture bases
- denture teeth

# Stratasys

# Protrusion splint

Orthos Lunasol

Manufacturer: Orthos, EOS

Printer: EOS Formiga P110

Material: PA12

- Biocompatible per EN ISO 10993-1

Post-process:

- Cleaning and surface finishing 12 min (AM Solutions S1)
- Grinding 2 h (Rösler FKS)

Info:

- Fully digital process
- Single-material design that removes weak points

More information here

# Animal healthcare

# Animal prosthetics

Kexcelled, premium filament, Mobility for pets

# Animal prosthetics

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# Pet orthoses


# Software

# Spherene

Spherene is a plugin for Rhino, Grasshopper and Autodesk Fusion softwares for creating sphere-based lattice structures (metamaterials) which can help reduce weight, time and manufacturing cost.

Metamaterials are architected cellular materials that can be inspired by nature or human engineering intuition, that undergo modification to possess properties they don't naturally possess.

The sphere-based lattice structure consist of varying size sphere-like units, which are always at the right angles to any outer surfaces, and support the outer surfaces equally from all directions.

Some of the key advantages of metamaterials in medical fields are:

- Advanced material design
- Superior force distribution
- Enhanced drug delivery
- Enabling perfectly fitting patient-specific implants, prosthetics, orthotics, and other devices.
- Porous biocompatible scaffolds that mimic natural bone structures, promoting better bone-implant integration(osseointegration)

# Paramate

Dental implants

Manufacturer: Trinckle

Designed with Paramate software all-in-one dental implant tool

# Orthomate

Orthosis & prosthetics design app

Manufacturer: trinckle

Software is in beta testing –phase and not yet publicly available.

# Manufacturers & Systems

# Xolo

## Technology: Volumetric Xolography

### Xell

- Build Volume: 10x17x10 mm
- Accuracy: ~10 µm
- Speed: up to 3 mm / min
- Applications: Bioprinting
- Price: ~ 20 k€

### Xube²

- Build Volume:
  - 10x17 mm – 30 x 50 mm depending on resolution
- Accuracy
  - ~5 µm – 15 µm, depending on build volume
- Speed: up to 6 mm / min
- Applications: Research, MedTech


# Xolo

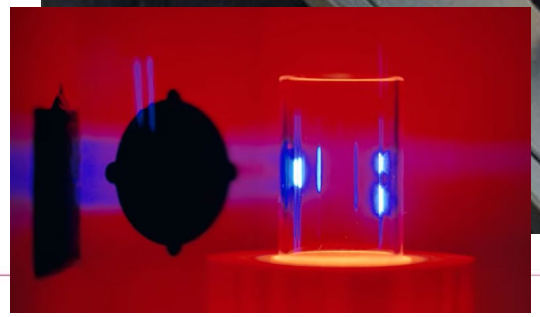
# Perfi

PERFI Lumin

- Technology: Volumetric Additive Manufacturing (VAM)
  - Rotating light source / projection around printing volume
- Print volume: small size capsules*
- Material: fotopolymer
- Support material not needed
- Layer height: no layers, material is hardened in seconds/minutes

* Print volume or accuracy is not public information (yet)

Video: https://www.youtube.com/watch?v=F7OflkR0ai4

# BMF - Boston Micro Fabrication

BMF produces micro scale SLA 3D-printers, and provides printing services

- Open material system
- Thousands of different resin materials, including medical grade plastics

Glaucoma Stent

- Dimensions: 1.8 x 0.8 x 2.17 mm
- Resolution: 2 µm
- Tolerance: ± 0.010 mm
- Features: 110 µm wall thickness, 200 µm internal channels

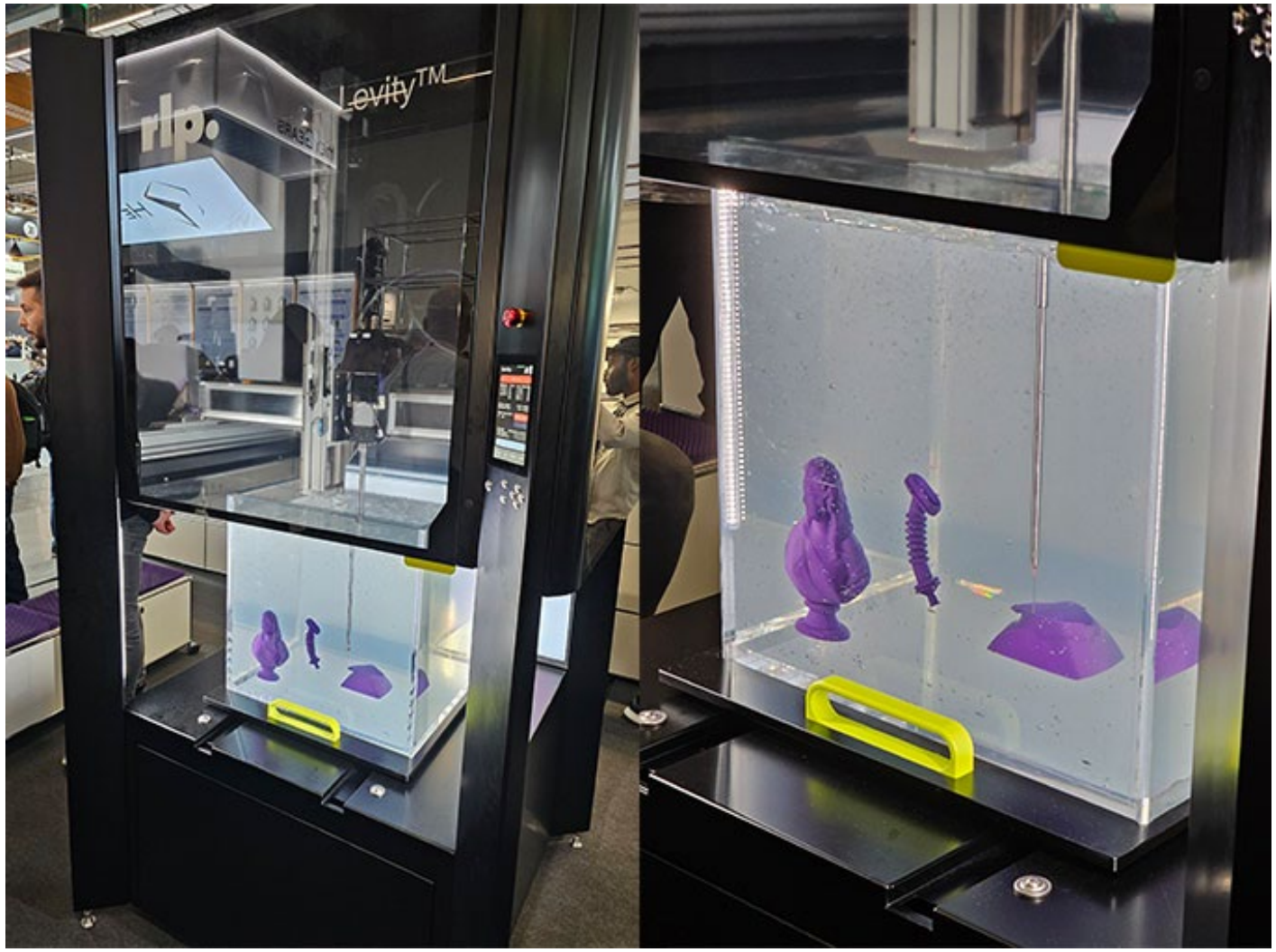
# RLP
## Rapid Liquid Printing

Technology: Gravity Free Manufacturing™

RLP Levity

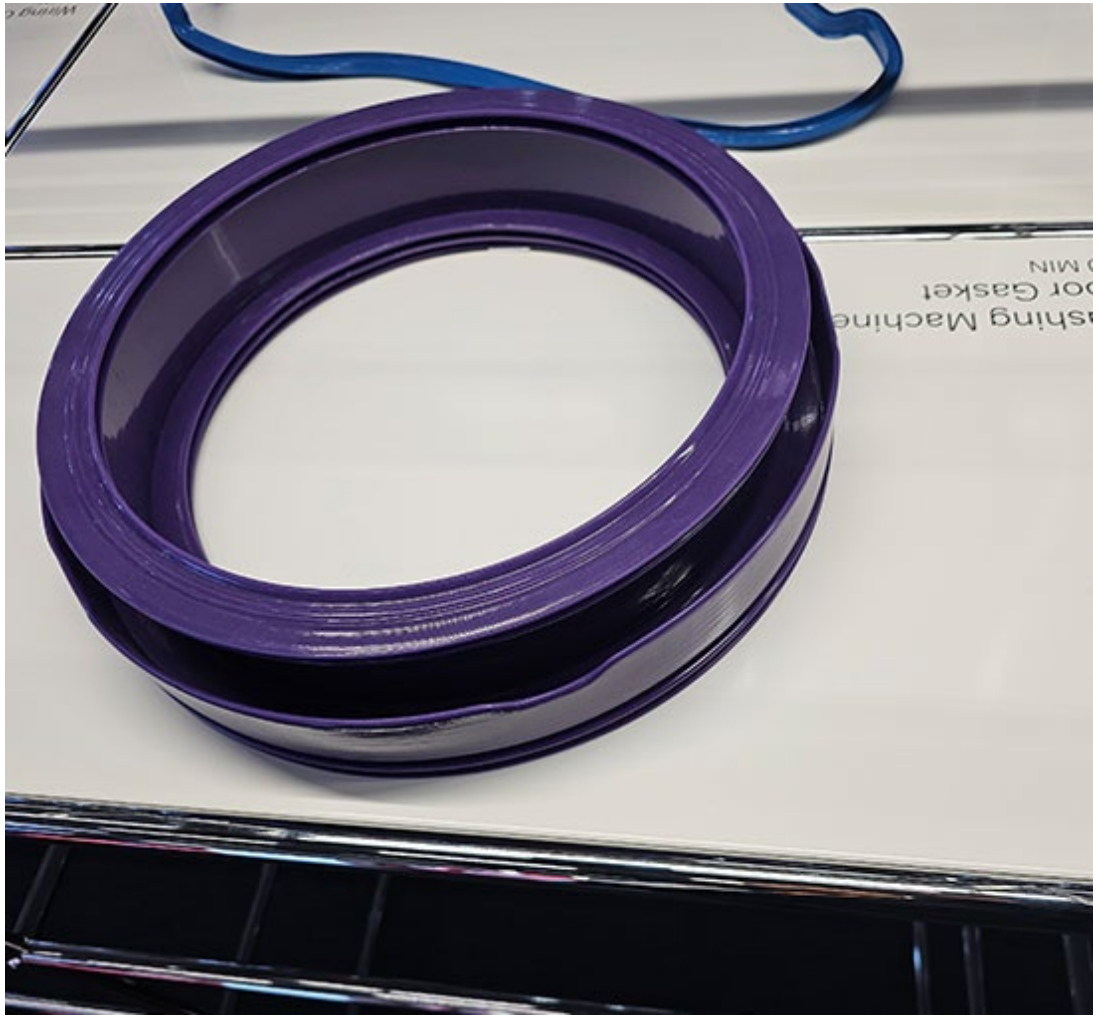
- Build volume: 50 x 50 x 50 $cm^3$
- Material: custom silicone
  - Shore 00 – 50 A
  - medical grade available
  - Non-toxic & skinsafe certification 2026
- Support material:
  - reusable (~ 3 months)
- Price: ~ 200 k€

Resolution or material pricing information not public (yet)



# RLP

# RLP



# RLP

# Mimaki

Device: Mimaki 3DUJ-2207

- Full color: > 10M colors (CMYK+White+Clear)
- Resolution: 1200 × 1200 dpi
- Layer thickness: ~28–30 µm
- Materials:
  - Photopolymer modelling ink (MH-100)
  - Clear ink (transparency)
  - Water soluble support (SW-110)
- Price: ~40 k€

# Lynxter & 3Deus Dynamics

Lynxter specializes in silicone 3D-printing.

3Deus Dynamics collaboration & ”Dynamic Molding” –technology provides new options for the S300X system.

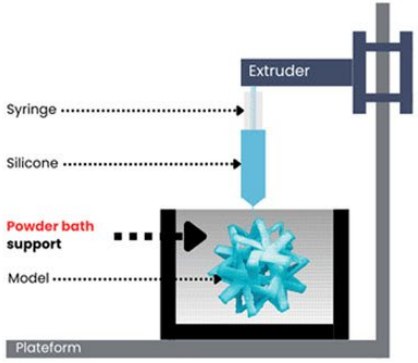
System: S300X

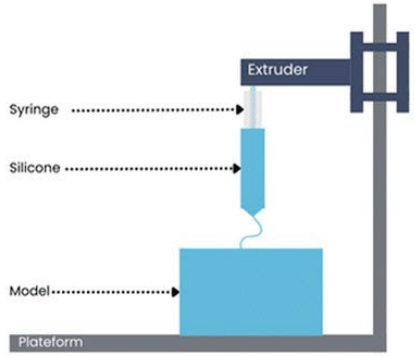
- Three different modules:
  - Gel nest
  - Powder Nest
  - Regular
- Price: ~20 – 40 k + nest modules

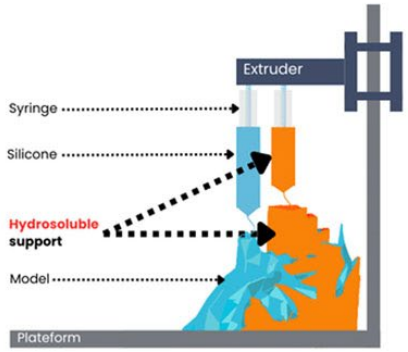
[3Deus Dynamics]

- Service provider
- ISO13485 certified





# Cubicure

Technology: Hot Lithography

Cubicure Caligma 200

- Build Volume: 200 x 100 x 285 mm
- Light source: 405 nm laser
- Resolution: laser spot: ~ 18 µm

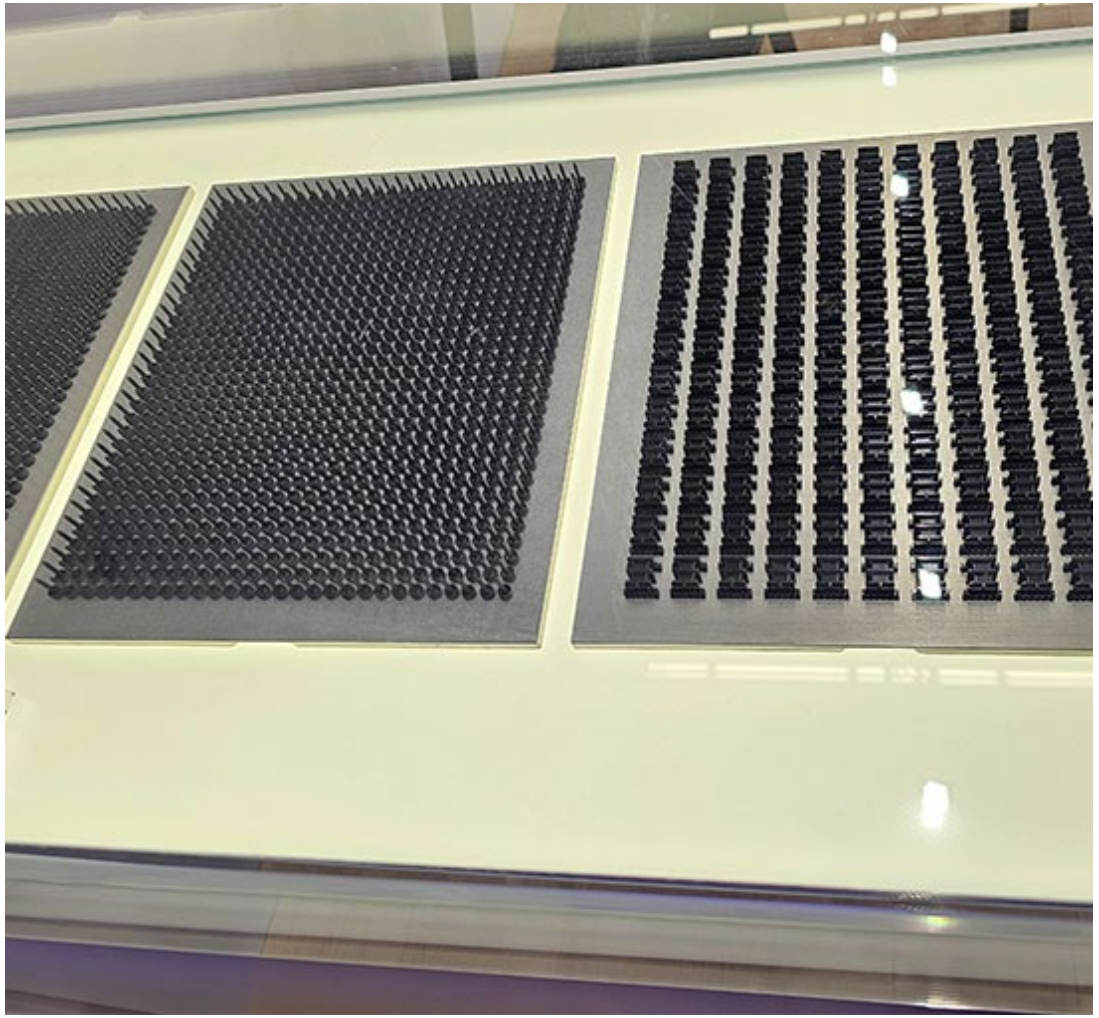
Cubicure Cerion

- Build Volume: ~1000 x 280 x 300 mm
- Light source: Dynamic DLP 405 nm
- Resolution: 50 x 50 µm
- Suitable for serial production

Medical grade materials available

- Biocompatible materials
- ISO 10993-1 and USP V

# Cubicure



# Prusa & filament2

Silicone printing toolhead for Prusa XL

A precision mixing nozzle designed for 2-component liquid materials.

Using silicone toolhead with Prusa XL allows combining filament printing with silicone printing or using multiple silicone toolheads to print different 2-component silicones (with different shore hardness).

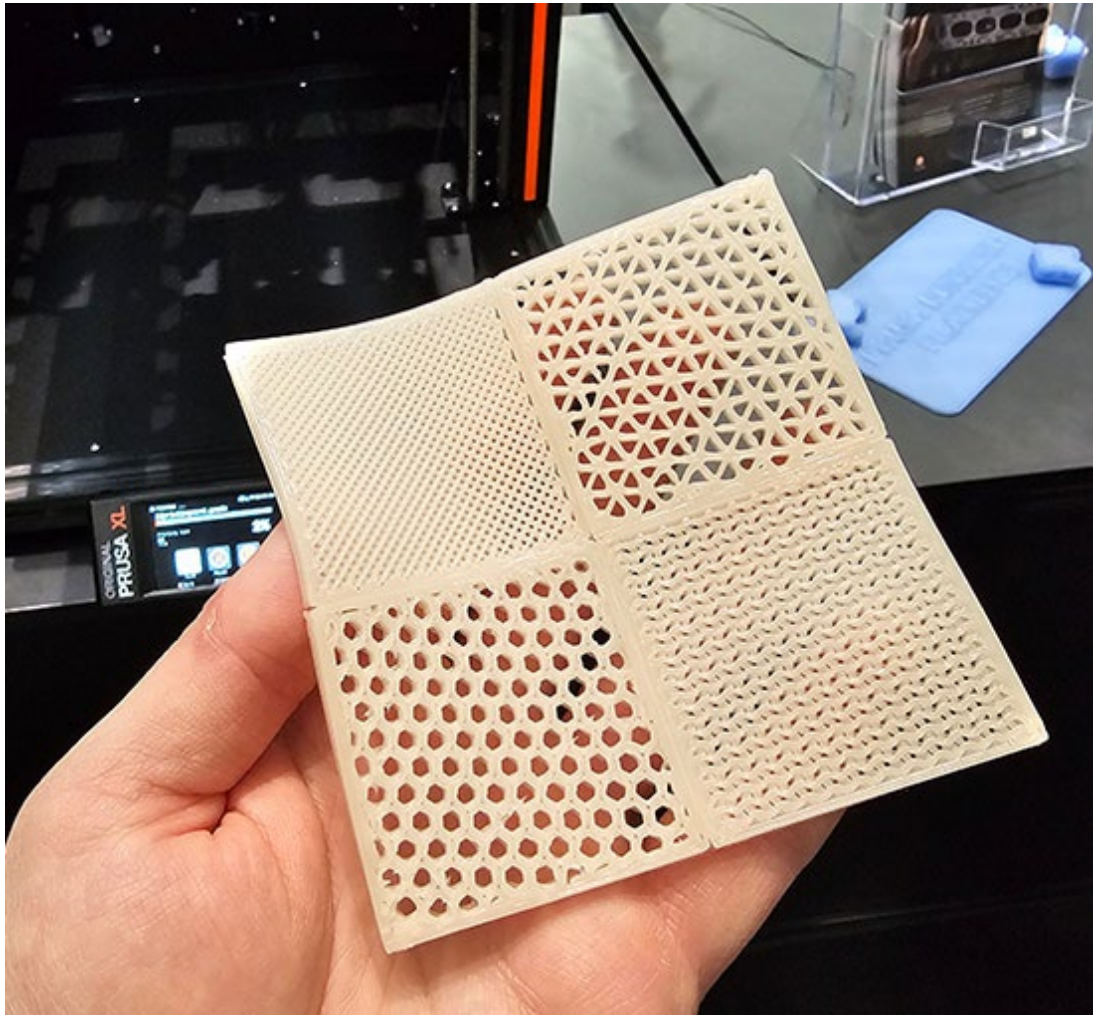
Materials:

- First material available will be 2-component silicone.
- Future materials include polyurethane, industrial epoxy and other paste materials.

Pricing and availability:

- Toolhead: 969 €
  - Note: Material pricing not yet available!
- Available Q2/2026

# Prusa & Filament2




# DLyte

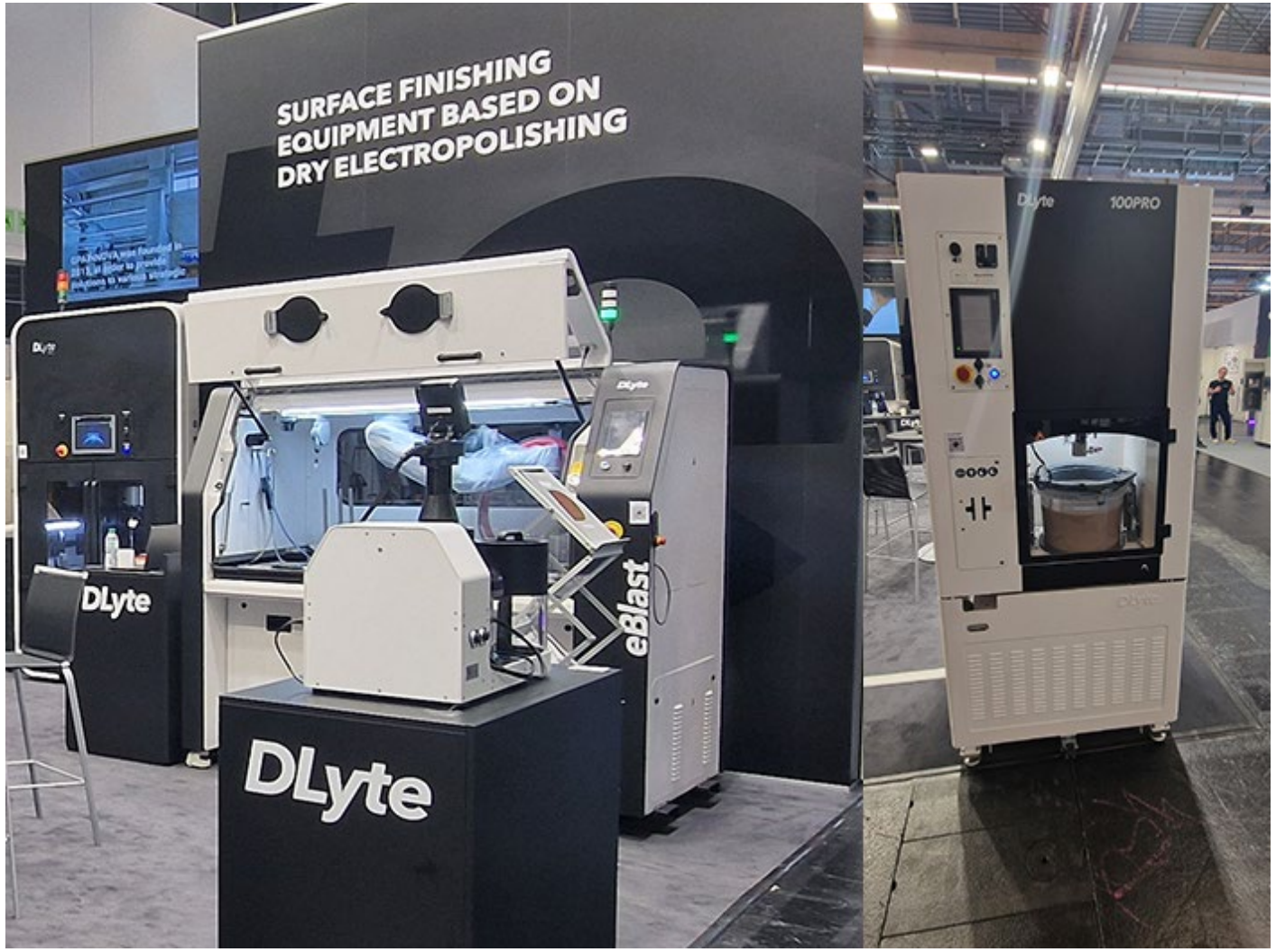
Technology: Dry electropolishing

DLyte showcased a range of dry electropolishing systems covering laboratory-scale, pilot-scale, and industrial post-processing applications for additively manufactured metal parts.

Systems presented at Formnext 2025:

- DLyte PRO500: Large-scale industrial system for medium to high production volumes.
- DLyte 100Pro: Mid-range production unit for small-to-medium batch size.
- DLyte Desktop Pro: Laboratory-scale system for small components.
- DLyte Mini: Entry-level device for single-part processing
- Dlyte eBlast: Internal-surface finishing solution designed for tubes, channels, and complex internal geometries.

In Finland, DLyte systems are used by Oy Polishine AB and by the FMT research group at the University of Oulu.



# DLyte


ULTRASONIC BONE CUTTING SAW
Material: Stainless steel
Manufacturing: Milling
Pre-processing: None
Application: Deburring
Processing time: 4 minutes (16 parts)
DLyte equipment: DLyte 100PRO
SUCCESS CASE.
DEBURRING ULTRASONIC BONE CUTTING SAW
For Medical Device Industry
Powered by DryLyte TECHNOLOGY
QR - Download the success case available in


SURGICAL INSTRUMENTS
Material: Stainless steel
Manufacturing: Milling
Pre-processing: Grinding + manual deburring
Application: Deburring
Achieved Ra: < 0.2 µm
Processing time: 60 minutes (96 parts)
DLyte equipment: DLyte PRO500
SUCCESS CASE.
SURGICAL INSTRUMENTS
For Medical Device Industry
Powered by DryLyte TECHNOLOGY
QR - Download the success case available in

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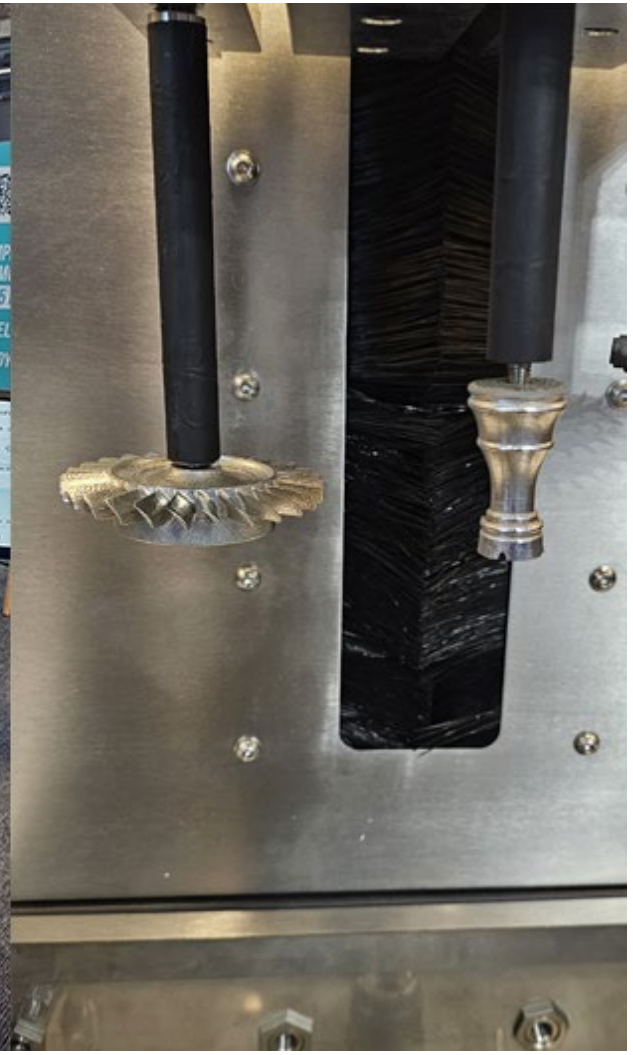
# DLyte


# Holdson

Technology: Electropolishing

Holdson presented its Electroform series of electropolishing systems (EF-150, EF-300, EF-500 and EF-700) for automated surface finishing of additively manufactured metal parts.

The systems are intended for applications ranging from medical components to complex geometries such as lattice structures and internal channels, spanning laboratory-scale processing to industrial production.

# DyeMansion

DyeMansion presented its automated post-processing solutions for polymer AM production, including systems for depowdering, surface finishing, and dyeing of SLS and MJF parts.

The booth featured the Powershot X (depowdering), Powerfuse S and ASM VX1 (vapor smoothing), and DM60 (industrial dyeing) platforms.

- The ASM VX1 platform was added to the portfolio following DyeMansion's 2025 acquisition of ASM's vapor smoothing technology, extending the company's offering toward a more accessible entry-level solution.

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# DyeMansion