2025 - 2026

IMAGINE. PRINT. HEAL.

Lattice Services

WHITE PAPER

When your medical projects take shape thanks to 3D printing

SUMMARY


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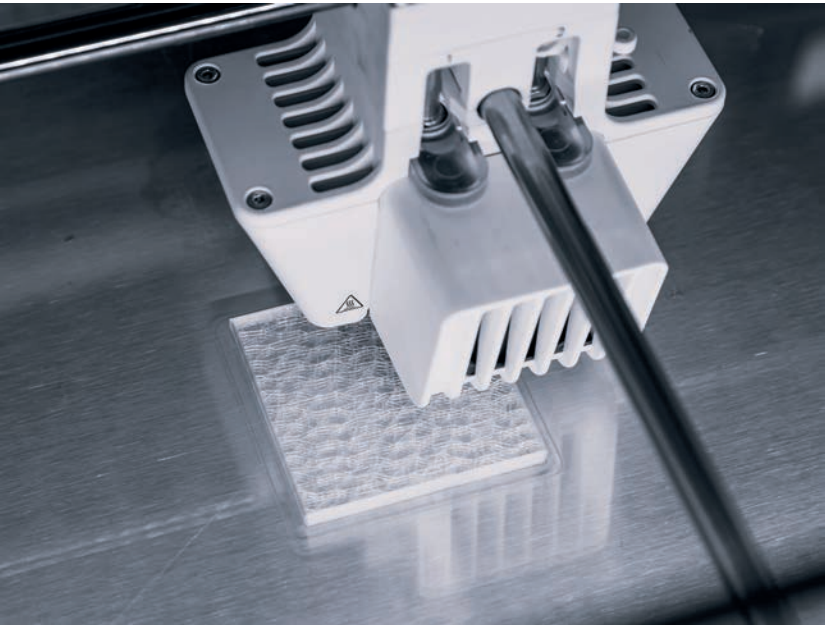


Lattice Services, a brand of Lattice Medical.

Lattice Medical is a french company whose main mission is to design resorbable tissue reconstruction implants using 3D printing. The company's first application is for breast reconstruction after breast cancer.

Building on its expertise in the development of medical devices, Lattice Medical created its Lattice Services brand in 2020 with the aim of making 3D printing more accessible and suitable for the healthcare sector.

Specializing in the marketing of medical-grade biomaterials, the brand also offers customized support to effectively integrate additive manufacturing into R&D projects, from formulation to industrialization.

With its in-depth knowledge of regulatory requirements and technical expertise in medical polymers, Lattice Services is positioned as a preferred partner for healthcare players seeking to innovate in full compliance.

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Our ambition: Accelerate medical innovation through biomaterials and 3D printing.

Biodegradable, radiopaque mesh for monitoring tumor cavities in breast tissue

Researchers at Ohio State University are developing an innovative solution to improve follow-up care after breast-conserving surgery.

After a tumor is removed, it is essential to accurately locate the residual cavity in order to effectively target radiation therapy. Current solutions, such as metal clips, can move, deform, or remain permanently in the body, which can complicate treatment and patient comfort.

To overcome these limitations, researchers are working on the development of a marker made of PLCL (poly(lactide-co-caprolactone)), a biodegradable and biocompatible polymer. Thanks to the flexibility of this material, the marker adapts perfectly to the shape of the cavity, and its mechanical strength allows it to maintain its structure for the time necessary to guide the radiotherapy. The PLCL then degrades naturally, avoiding any additional intervention.
It is in this context that Lattice Services was pleased to support the university in carrying out their project by providing them with its PLCL filament.

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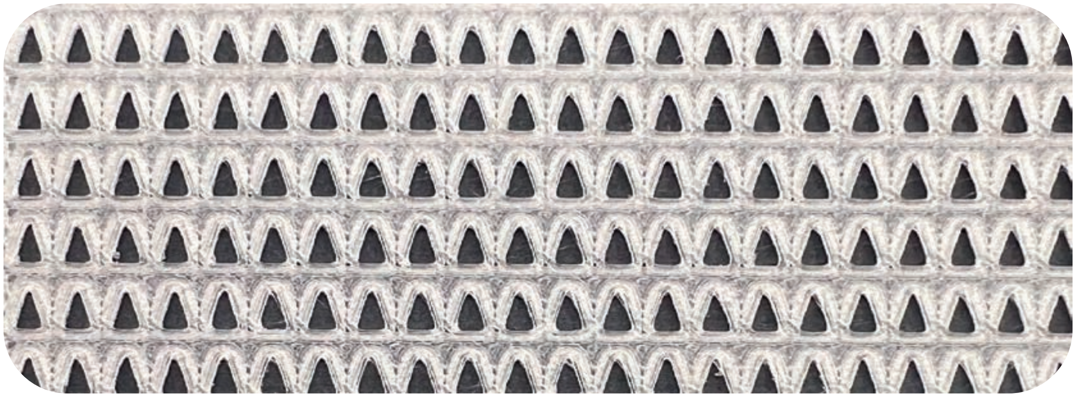
This filament has been incredible to work with. There have been zero issues with regards to printing in part due to how spot on the recommended settings have been.

Adrian Bakhtar, Mechanical Engineering at The Ohio State University

To ensure good visibility during imaging examinations, PLCL is combined with a small radiopaque agent. The device is designed in the form of a mesh or lattice, which optimizes gradual degradation while maintaining sufficient visibility.

This approach allows medical teams to accurately locate the cavity and deliver targeted radiation therapy, while avoiding the constraints associated with a permanent implant. The PLCL marker combines adaptability, safety, and effectiveness, offering a temporary and reliable solution to support post-operative treatment and improve patient comfort.



Our PLCL

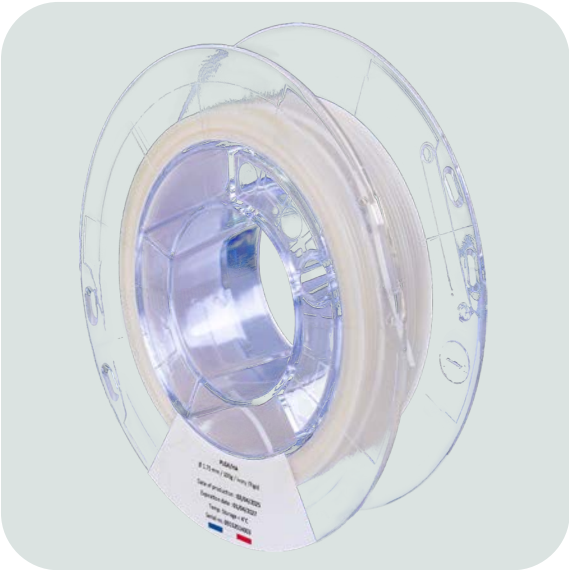
PLA/PCL 70:30 or POLY(L-LACTIDE-CO-E-CAPROLACTONE) 70:30 is a semi-crystalline, semi-transparent thermoplastic with a slightly white appearance. It resorbs within 12 to 24 months after implantation. Although crystalline, the polymer has a glass transition temperature close to room temperature, which ensures high flexibility. This material is therefore generally used to make parietal reinforcements and nerve reconstruction guides..

IN VITRO BONE MODEL USING 3D-PRINTED PLGA AND PLGA-HA SCAFFOLDS

The project led by the research team at The University of Manchester represents a major advance in the modeling of bone tissue in vitro. Using 3D printing, the researchers have succeeded in creating "laboratory bones," biocompatible and biodegradable scaffolds capable of hosting stem cells and reproducing natural bone structure. Among other things, this offers an alternative to animal testing for studying tissue and cell behavior.

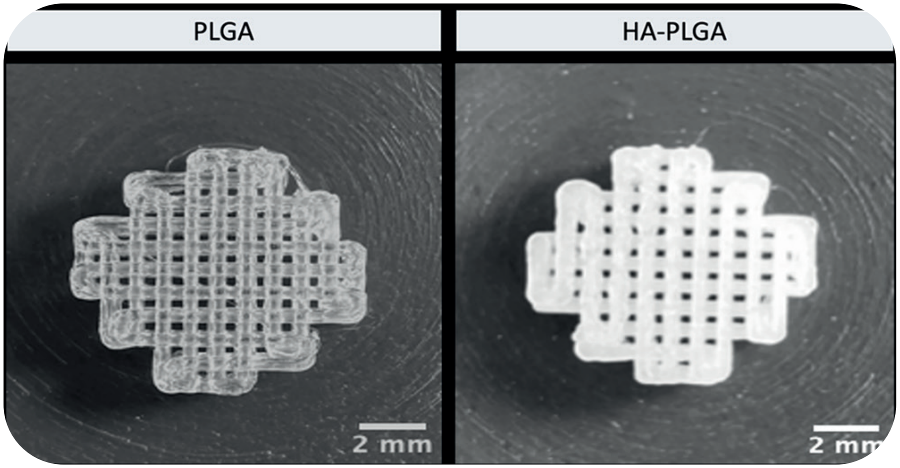
To build these structures, they relied on a polymer well known in tissue engineering: PLGA, used as a base matrix for its rigidity, biodegradability, and biocompatibility.
As part of this partnership, we provided them with our GLYCOLACTISSE 85/15 material, a medical-grade PLGA copolymer that is perfectly suited to FDM printers and widely used for bone regeneration applications.

To go further and improve the biomimetic properties of scaffolds, we have also developed a customized PLGA enriched with hydroxyapatite, which is now part of our product range.
This version combines the resorbable and structural properties of PLGA with hydroxyapatite, a mineral naturally present in bone that improves bone compatibility and allows us to approximate the actual mineral composition of the tissue.



By providing these two materials, PLGA for the initial structure and PLGA-HA for an environment closer to natural bone, our collaboration has made a concrete contribution to cutting-edge research.

This project illustrates the potential of 3D printing to produce realistic bone models, reduce the use of animal testing, and demonstrate the importance of selecting and adapting biomaterials to optimize the biological and mechanical quality of scaffolds.



Our PLGA-HA

PLGA/HA is an amorphous, ivory-colored thermoplastic that resorbs within 12 to 24 months after implantation. Our filament is composed of 90% polylactic-co-glycolic acid (PLGA) and 10% hydroxyapatite (HAP). This innovative composition combines the resorption properties of PLGA with a natural component of bone, hydroxyapatite, thereby improving osteoconductivity, making it an ideal filament for bone reconstruction applications. The polymer is rigid because at room temperature it is above the glass transition temperature.

MANUFACTURE OF A NERVE GUIDE FROM RESORBABLE MATERIALS

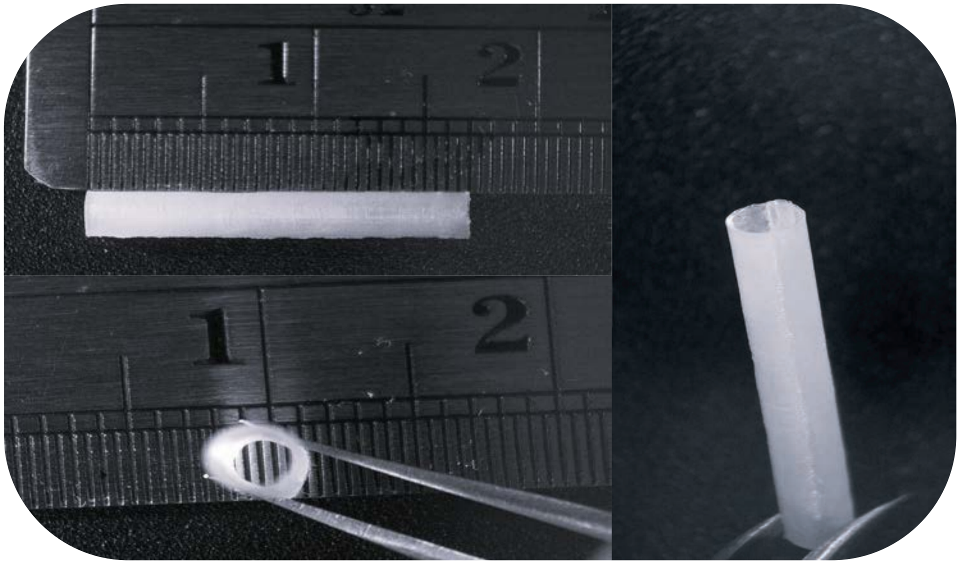
As part of its research into a multi-material nerve guide, Pioneer Neurotech turned to Lattice Services to manufacture the device's outer casing. The materials initially sourced presented significant constraints, both regulatory and technical.

By using our PDO filament, it was possible to implement a reproducible manufacturing process based on a biodegradable and biocompatible material that had already been validated.
In addition, fused filament fabrication (FFF) offers unique flexibility, allowing Pioneer Neurotech to quickly incorporate design adjustments, promoting agile iteration between the development phase and experimental testing.

This collaboration perfectly illustrates how advanced manufacturing technologies can accelerate innovation in the field of implantable medical devices.

PDO filament is allowing us to work with consistent fabrication processes using proven biodegradable and biocompatible materials. Most importantly, fused filament fabrication (FFF) makes incorporating certain design alterations in our application feasible and fast.

Kenneth NGUYEN, Chief engineer



Know more
about the project

Our PDO

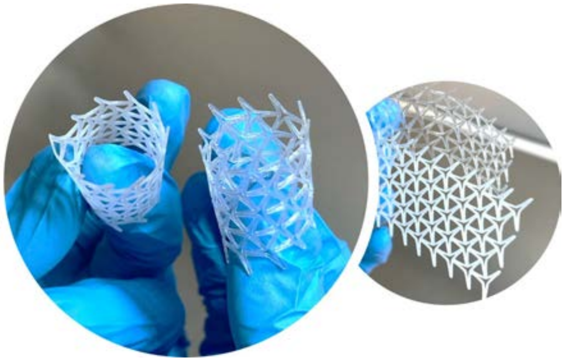
PDO, or polydioxanone, is a white semi-crystalline thermoplastic. It is rapidly absorbed once implanted, within 4 to 6 months. Although highly crystalline, the polymer has a glass transition temperature below room temperature, which guarantees a certain degree of suppleness and flexibility. This material is therefore widely used to make sutures, textile meshes, tissue engineering scaffolds, etc.

DiMεD, THE NETWORK OF EXCELLENCE IN THE FIELD OF NEXT-GENERATION PERSONALIZED INVASIVE MEDICAL DEVICES

Over the past decade, personalized medicine has made major advances, aiming to offer patients the best possible results while optimizing costs.
In this context, the DiMεD project, led by the IDONIAL technology center in collaboration with several European centers of reference, aims to revolutionize personalized medicine by developing customized invasive medical devices using additive manufacturing technologies, particularly bioprinting.

The design of devices adapted to each patient's anatomy and physiology offers undeniable advantages over standard products: it improves surgical precision, functionality, aesthetics, and stress distribution. It also reduces the need for post-operative care and the associated costs, thus directly contributing to patients' quality of life.

To meet this growing demand for customization, DiMεD relies on cutting-edge technologies, combining additive manufacturing, medical image analysis, and digital simulation of processes and products. The initiative aims to strengthen the capabilities of participating centers, generate cutting-edge expertise, and foster collaboration with strategic players in the healthcare sector, both public and private, in order to transform innovative concepts into concrete, customized solutions for patients.



We supplied our PCL and PLCL filaments, specifically designed to meet the strict requirements of medical 3D printing. These materials made it possible to create scaffolds with adjustable mechanical properties, perfectly suited to regenerative medicine applications, while ensuring smooth and reproducible printing without additional technical complications.

> *The tested PCL filaments (PCL100 and PLCL) have enabled us to create scaffolds with varying mechanical properties tailored to the project's needs. These high-quality filaments feature a homogeneous composition and consistent diameter, allowing for easy and reliable printing without added complications.*

Helena HERRADA MANCHÓN, R&D technician

Our PCL

PCL, or polycaprolactone, is a white, flexible, semi-crystalline thermoplastic. It degrades slowly once implanted, over a period of more than 36 months. The polymer has a glass transition temperature below room temperature, which ensures a certain degree of suppleness and flexibility. As a result, this material is widely used to make scaffolds for tissue engineering, osteosynthesis plates and screws, and sutures.

Development of a customized, robust, and sterilizable surgical device

INFINEIS is an innovative French company that combines medical imaging, artificial intelligence, and 3D printing to design customized medical devices.
Each device is designed to adapt precisely to the patient's anatomy and the surgeon's specific needs, ensuring a safe and optimized surgical procedure.

As part of their INFIX project, INFINEIS was looking for a material capable of meeting specific requirements for use in operating rooms, including high mechanical strength, compatibility with hospital sterilization processes (autoclave, plasma, etc.), biocompatibility in accordance with current standards (ISO 10993), and dimensional stability to ensure the precision of the device.

To meet these requirements, Lattice Services recommended the use of its medical-grade polycarbonate (PC), a technical material perfectly suited to surgical devices, offering very high resistance to mechanical stress and, above all, proven compatibility with sterilization methods.

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The use of Lattice material enabled us to provide a robust medical device that could be sterilized according to current standards.

Steeve CHANTREL, CEO and founder

Our PC

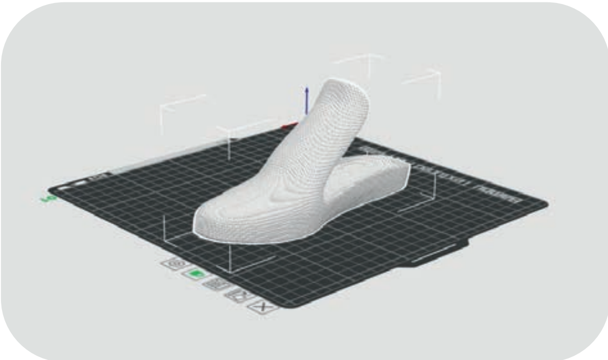
Polycarbonate is an amorphous thermoplastic known for its high strength and resistance to high temperatures. PC filament is made from granules that comply with ISO 10993-5 certification for skin contact. It is also autoclavable and can be used in the operating room for guided surgery.

This filament is generally used for printing 3D parts such as surgical guides and cutting guides, as well as medical instruments.

Podeox, the new-generation insole for amputees, custom-made and 3D printed

Podo-Vision designs innovative solutions for foot orthotics, combining podo-orthotic expertise with advanced technologies such as 3D printing. Its custom-made orthotics improve comfort, mobility, and durability for patients, while providing healthcare professionals with precise devices tailored to the specific needs of each user.

As part of its Podeox® project, a new generation of custom-made, 3D-printed foot prostheses, Podo-Vision was looking for a flexible, adaptable material that was compatible with skin contact. Initial trials with other filaments proved disappointing: the advertised properties were not delivered and technical exchanges with suppliers proved complex and unresponsive.



At Lattice Services, we recommended our medical-grade TPE polymer filament, a flexible, impact-resistant thermoplastic elastomer suitable for skin contact, ideal for flexible parts integrated into orthopedic or prosthetic devices.

Thanks to this personalized support, from material advice to integration into their 3D printing process, Podo-Vision was able to move forward with confidence on a solution perfectly suited to its specific needs, combining medical performance and comfort for the end user.

> *With a team that was available, attentive, and very friendly, I was able to master the filament.*
> *And the final product turned out to be exactly what I wanted.*

Alexie MULLET, CEO

Our TPE

Thermoplastic elastomer (TPE) is a white thermoplastic. With a glass transition temperature below room temperature, this thermoplastic is valued for its flexibility and high impact resistance. TPE filament is made from granules that comply with ISO 10993-5 certification, allowing for skin contact applications such as orthopedic devices and flexible contact parts that interface with rigid parts of orthoses or prostheses.

Thermoforming of baking molds

For over 30 years, PâtisFrais has been supporting professionals in the food industry (bakers, pastry chefs, caterers, and restaurateurs) by providing them with high-quality raw materials, specialized equipment, and training. A family-owned business based in the Hauts-de-France region, it stands out for its expertise and personalized service.

For several years, Patisfrais had been looking for a reliable solution for creating thermoformed molds for making personalized chocolate bars. The goal was twofold: to offer its chocolatier customers high-end customization tools and to host chocolate-themed workshops in stores.

The solution had to combine precision, flexibility, heat resistance, and compliance with food standards, while enabling agile, customized production. No existing solution on the market fully met these requirements, particularly in terms of precision, thermal resistance, and flexibility for customized small-batch production. Lattice Services therefore assisted Patisfrais in designing a customized solution tailored to this specific use.

After a detailed analysis of the technical constraints, we developed 3D-printed matrices for the manufacture of thermoformed molds. This approach allowed for great design freedom and the integration of fine details, which are essential for a professional finish on the chocolate bars.

The choice of material played a key role in the success of the project. After careful consideration, we selected PETG, a polymer offering the right balance between thermal resistance, mechanical strength, and dimensional stability. This material is particularly well suited to the constraints of thermoforming, while meeting hygiene and food environment compatibility requirements, subject to regulatory approvals specific to each end use.

Our PETG

PETG (Polyethylene Terephthalate Glycol-modified) is a rigid thermoplastic valued for its thermal resistance, low deformation in 3D printing, and good mechanical strength. These characteristics make it possible to obtain stable, reproducible, and durable parts, making it a relevant choice, particularly for tools, prototypes, or applications requiring contact with skin or fluids, while complying with certain biocompatibility standards such as ISO 10993-5 certification for skin compatibility.

BONE REVOLUTION

Glad Medical is a French company specializing in R&D support and validation of medical implants, with recognized expertise in the design and optimization of implants, including custom-made ones.

In the field of bone regeneration, where customized surgery and regenerative medicine play a crucial role, optimizing the design and additive manufacturing of specific implants represent major technological challenges. The devices must not only fit the patient's anatomy and physiology perfectly, but also meet strict requirements for biocompatibility, mechanical strength, and sterilization for safe clinical use.

To meet these challenges, Glad Medical has relied on its strategic partnership with Lattice Services, whose resorbable solutions are an ideal complement to the devices designed by the company.

> *This French-French partnership was made possible thanks to the professionalism and responsiveness of our contacts within their team.*

Laurent Badih, CEO and founder

This partnership is a concrete example of how combining Lattice Services' expertise in innovative materials with Glad Medical's expertise in designing and optimizing customized implants can transform design concepts into reliable, functional, tailor-made bone regeneration solutions.

Our expertise in action

Material identification

We worked in collaboration with Glad Medical to identify the most suitable resorbable material for their application, ensuring biocompatibility and controlled degradation rates.

Degradation tests

Comprehensive degradation studies have validated the resorption profile, ensuring that the material functions as intended in the body.

Custom 3D printing

Thanks to our advanced additive manufacturing capabilities, we have provided custom-made implants designed to meet specific anatomical and mechanical requirements.

Mechanical and thermal characterization

Through rigorous mechanical testing and advanced analyses such as DSC (differential scanning calorimetry) and GPC (gel permeation chromatography), we confirmed that the structural and thermal properties of the material met the necessary standards.

INNOVATIVE ABSORBABLE THREAD

In this project, the customer wanted to develop an innovative resorbable device inspired by the design and clinical success of a permanent device already on the market for cosmetic surgery. Since no material available on the market met the specific technical and resorption requirements, Lattice Services was called upon at the outset of the project to contribute its expertise in customized formulation and filament extrusion.

Extrusion

Drawing on its in-depth knowledge of implantable polymers and their degradation profiles, Lattice Services successfully identified and utilized a custom material to produce a bespoke resorbable filament that met the project's rigorous mechanical and bioresorption specifications. This marked the starting point for a robust co-development process aligned with the client's clinical and industrial objectives.

Modeling and analysis

After the materials were validated, the project moved on to the crucial phase of adapting the design for additive manufacturing. Lattice Services helped the customer develop a geometry that was not only printable, but also scalable and compliant with future production requirements.

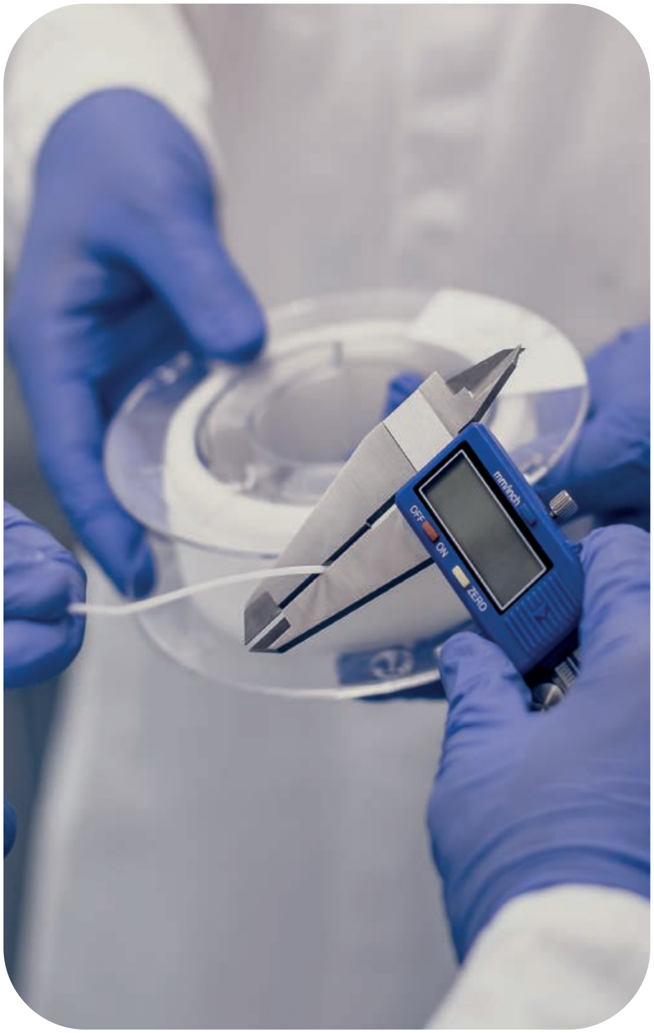
A comprehensive series of mechanical tests, in vitro degradation studies, and physicochemical characterizations were performed to validate the chosen polymer and confirm the reliability of the printed device. This methodical approach ensured both technical feasibility and intellectual property protection, helping to establish a solid foundation for patent filing.

Printing, CDMO

Lattice Services then leveraged its in-house additive manufacturing capabilities to produce the initial parts using the customized resorbable filament. These 3D-printed parts played a key role in design validation, proof-of-concept testing, and pre-production.

This phase enabled the customer to advance its regulatory documentation while demonstrating the functional viability of the solution. Throughout the collaboration, Lattice Services leveraged its full range of co-development expertise, from material development to prototype manufacturing and performance testing.

The next joint goal is the transition to large-scale production.



3D printing as an engineering tool

Behind each case presented, there is a specific need: to test an idea, validate a use, save time, or overcome a technical constraint. Our customers use 3D printing as a tool to serve their projects. With suitable materials and rapid iterations, the goal remains the same: to move forward in a reliable and controlled manner.

What about you?
Where is your project at today?
Is it still at the idea stage, or has it progressed to prototyping, functional testing, or more advanced development?
Whatever your starting point, there is often a simple way to integrate 3D printing in a meaningful way.

To find out more:
Scan the QR code to discuss your project!