3D SYSTEMS®

Imprint Medical Enhances Lattice-Based Implant Design with 3DXpert for SOLIDWORKS

Medical device design bureau uses 3D Systems' all-in-one design for additive manufacturing software to enhance and accelerate innovative medical device design.

Imprint Medical (www.imprint-medical.com) is a project development and design bureau based in Oullins, France, that specializes in the orthopedics market. With vast experience in the orthopedics market, the team at Imprint Medical helps surgeons, manufacturers and medical technology companies achieve the goals they set for their patient care, businesses, and timelines. Imprint Medical offers its clients a complete product development solution through design and project management up to the transfer in manufacturing of implants and medical instruments.

Getting the most out of metal 3D printing
Additive manufacturing (AM) has been part of Imprint Medical's offering since the company's founding to help the company achieve a wider range of possible outcomes. Whereas standard design for manufacturing assumes a subtractive approach that limits possible part outcomes based on tooling capabilities, additive manufacturing enables previously impossible geometries to be built. "It was clear to us that we needed to change our design mindset in order to get the most out of the AM benefits available," says Didier Guillon-Cottard, CEO of Imprint Medical. In order to unlock these new design freedoms, Imprint Medical needed the right software.

Market research led the company to 3DXpert™ for SOLIDWORKS®, a 3D Systems add-in for SOLIDWORKS® that equips designers and engineers with everything they need to prepare and optimize their designs for 3D printing. A click of a button in SOLIDWORKS transports native SOLIDWORKS CAD data into 3DXpert for SOLIDWORKS and provides an extensive toolset for analyzing, preparing and optimizing the design for additive manufacturing.

"3DXpert for SOLIDWORKS turned out to be the missing link between our SOLIDWORKS design software and the additive manufacturing world," Guillon-Cottard says. "Not only that, but it gave us a competitive edge by accelerating our time-to-market with innovative designs."

Imprint Medical uses 3DXpert for SOLIDWORKS to enhance the biomechanical properties of the implants it designs by applying volume and surface lattice structures. "The unique structures we can create with this software maintain the exact customized outer shape of the implant while allowing us to reduce its weight and increase biocompatible features to improve bone growth and facilitate assimilation of the surrounding organic tissues with the implant," Guillon-Cottard says.
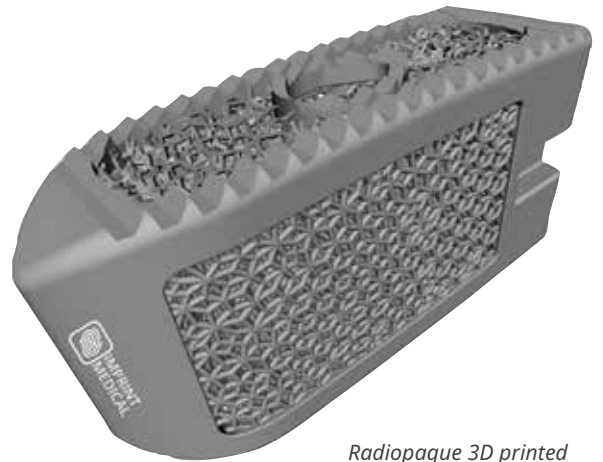
Radiopaque 3D printed titanium cage with osteoconductive surfaces, which mimic cortical bone.

CHALLENGE:
Design complex medical parts with volume and surface lattice structures.

SOLUTION:
3DXpert™ for SOLIDWORKS®, 3D Systems' all-in-one design for additive manufacturing software for preparing and optimizing SOLIDWORKS CAD models for 3D printing.

RESULTS:
- Accelerated design-to-manufacturing cycle
- Enhanced competitive positioning through design innovation and speed-to-market
- Optimized geometries leverage the value of additive manufacturing

"The lattice performance of 3DXpert for SOLIDWORKS is 10 times faster compared to any other solution we tested, enabling us to shorten the design for additive cycle of complex geometries by 50-percent," says Guillon-Cottard. "Moreover, being able to alter lattice cell parameters allows us to bring our competitive expertise into play."

The typical design cycle with 3DXpert for SOLIDWORKS follows a simple and streamlined workflow:

1. Complete the design in SOLIDWORKS.

2. Open the design in 3DXpert for SOLIDWORKS to check for printability and see how lattice structures, support type and part positioning will affect print time and material usage.

3. Optimize the design using volume and surface lattice structures.

4. Export the optimized file as generic CAD format, STL, 3MF or CLI slicing data.

"The lattice performance of 3DXpert for SOLIDWORKS is 10 times faster compared to any other solution we tested, enabling us to shorten the design for additive cycle of complex geometries by 50-percent," says Guillon-Cottard. "Moreover, being able to alter lattice cell parameters allows us to bring our competitive expertise into play."

New opportunities with metal 3D printing
The medical industry is one of the leading sectors to adopt metal additive manufacturing and has experienced particular success with implants. Key drivers for using metal additive manufacturing for medical devices include capability enhancements such as:

• **Complex geometries** — the ability to create geometries that are practically impossible to produce by any other manufacturing techniques;

• **Rapid development** — an accelerated design feedback loop to enable faster product development;

• **Better control** — increased design control over implant porosity and hardness, resulting in lighter weight and radiopaque geometries;

• **Patient-specific** — ability to produce geometries with better fit for specific patient anatomies.

For more information about 3DXpert for SOLIDWORKS, please visit:
https://www.3dsystems.com/software/3dxpert-solidworks
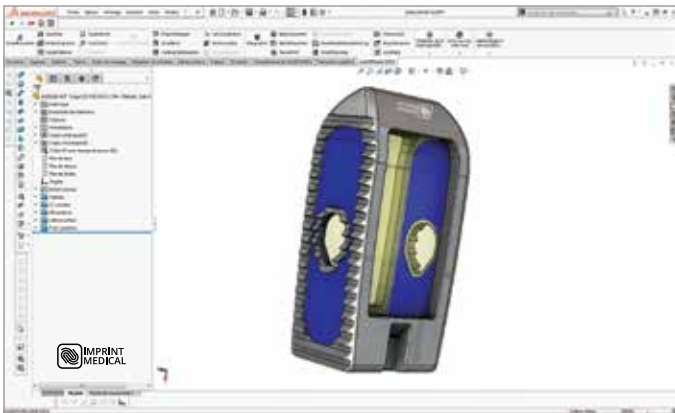
Design of interbody spacer in SOLIDWORKS®.
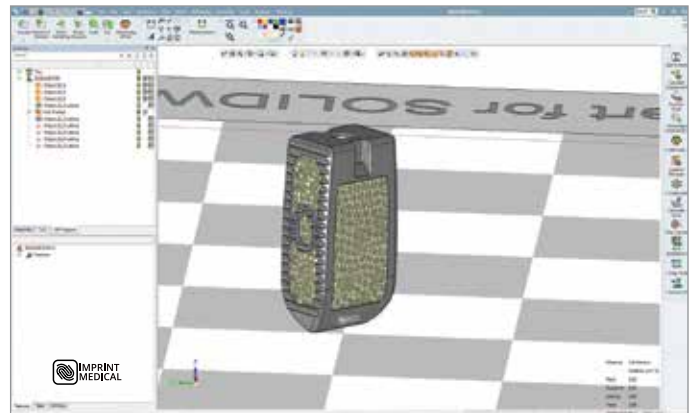
Applying volume and surface lattices using 3DXpert™ for SOLIDWORKS®. Osteoconductive lattice structures are embedded on upper and lower surfaces, which contact bone. Radiopaque lattices are positioned on the lateral surfaces.

3D Systems Corporation
333 Three D Systems Circle
Rock Hill, SC 29730
www.3dsystems.com