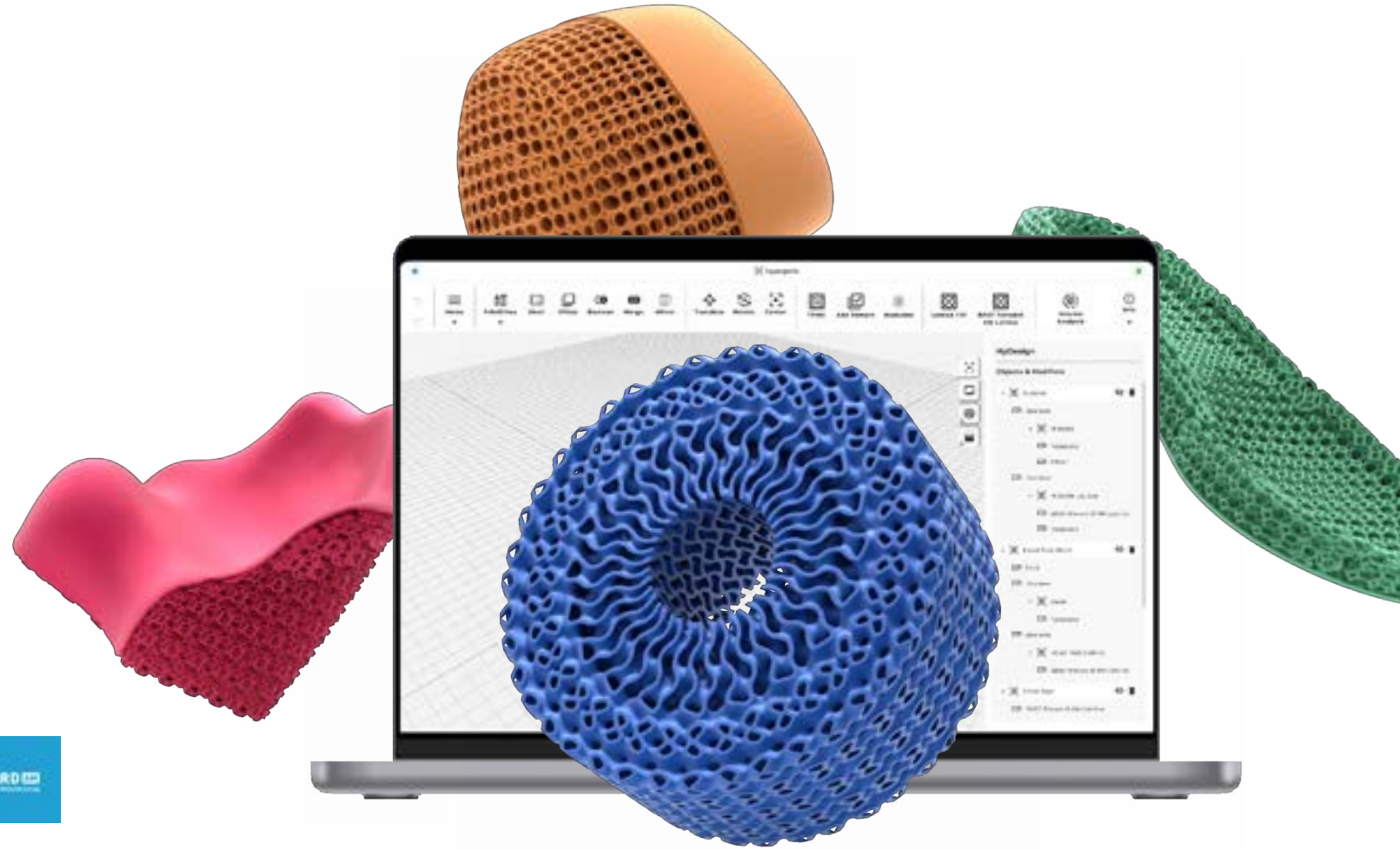
HyDesign

Effortless Lattice Design



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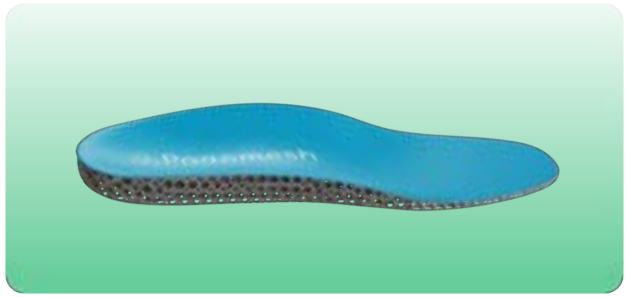
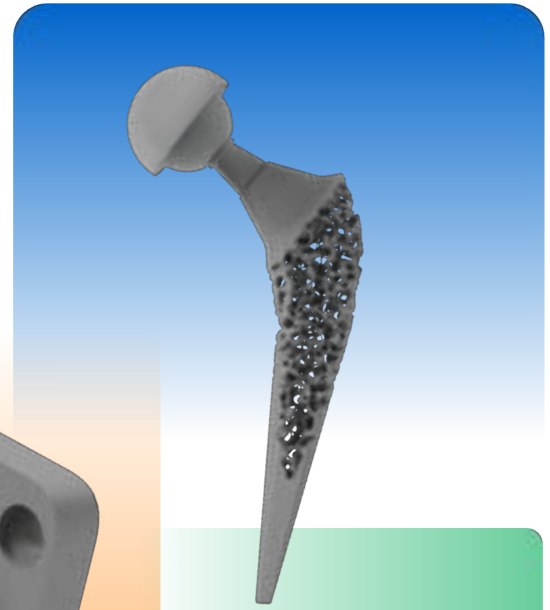
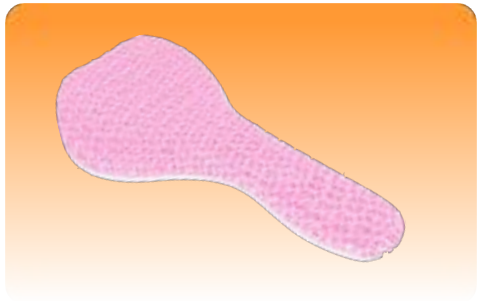
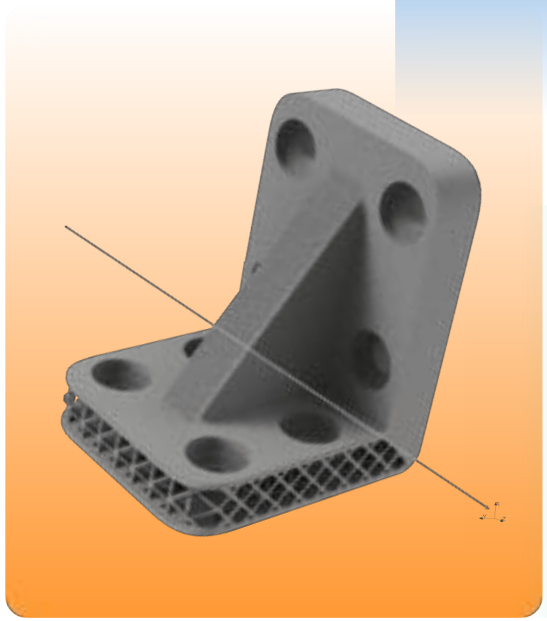
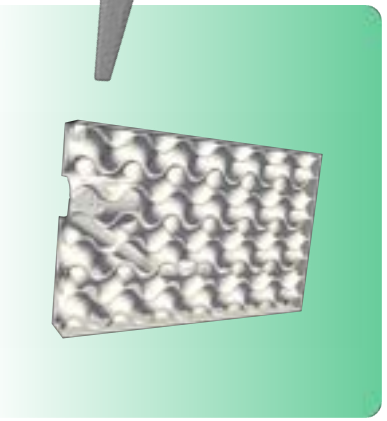
hyperganic x BASF We create chemistry | FORWARD

An increasing number of products with 3D-printed lattices are being developed.



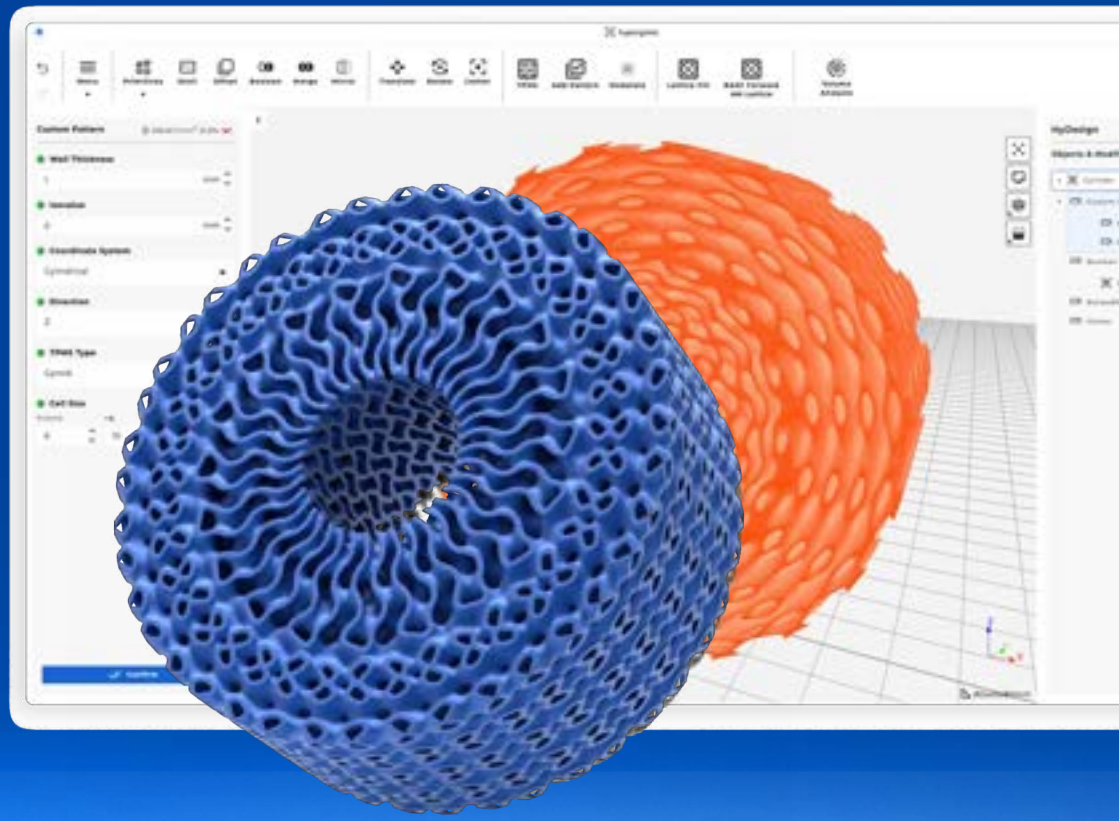



3D-Printed lattices are more than just intricate designs.

HyDesign

Effortlessly create, customize, and optimize 3D-printed latticed parts with an easy-to-learn and cost-effective design application straight from your browser.



The Solution

Design with Speed and Confidence.

Seconds to start, minutes to master. Save time and resources with validated materials from the Ultrasim® 3D Lattice Library.

Unlock Precision and Control.

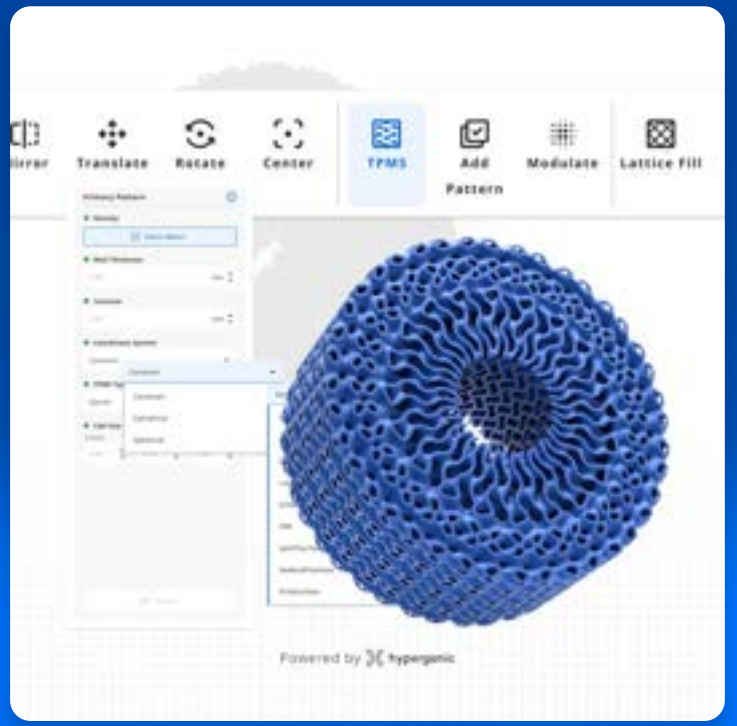
Fully control Triply Periodic Minimal Surface (TPMS) structures to meet your functional and aesthetic requirements.

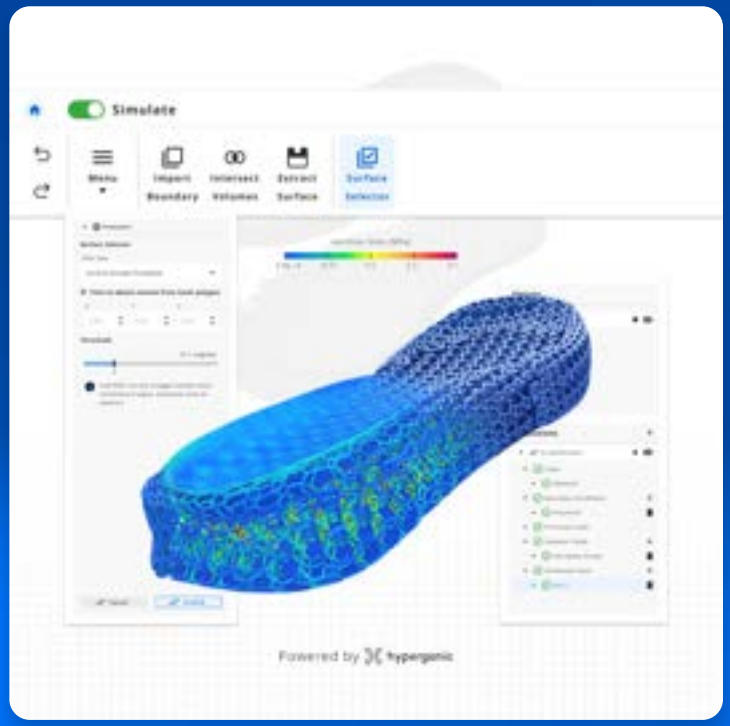
Choose from Cartesian, cylindrical, spherical periodicity, smoothly blend different TPMS types and modulate cell size and wall thickness.

Iterate virtually with Simulations

Currently a beta feature, meshless simulation is seamlessly integrated with the design application, eliminating the need for manual meshing or export to external simulation software.

This helps give you confidence in your designs before you invest in physical prototypes.





Ultrasim® 3D Lattice

Validated TPU Lattices for First-Time-Right Designs

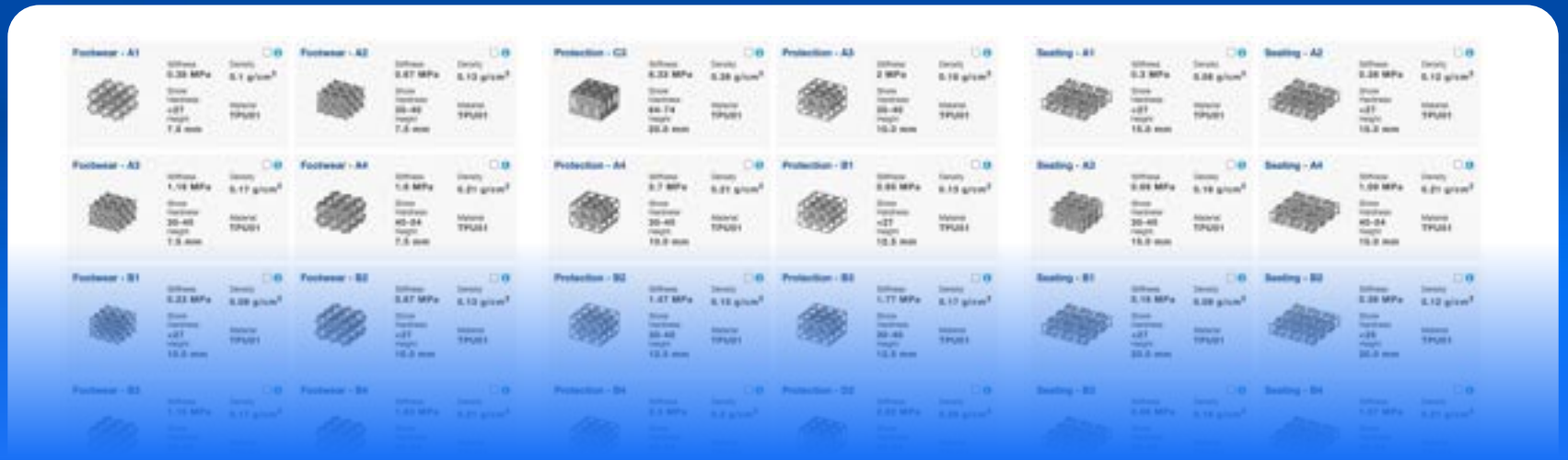
With deep expertise and decades of experience in materials, Forward AM developed a lattice library that captures the mechanical performances of lattices at various cell sizes and thicknesses.

This minimizes trial-and-error and ensures desirable lattice designs from the get-go.

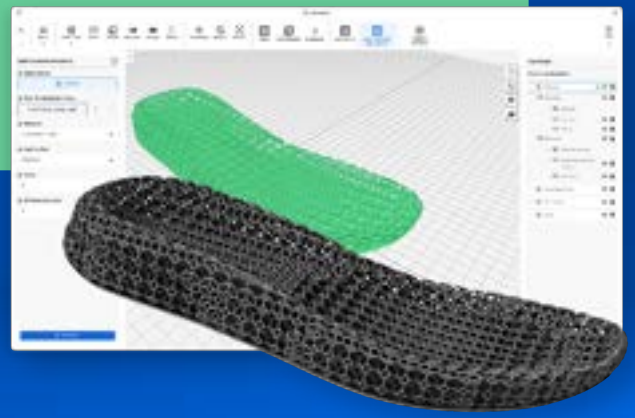
Digital Lattice Library

Physical Test Pads for 3 use cases

Footwear Protection Seating



Go from PU midsole to validated lattice part in 10 minutes



1 *Import base geometry of midsole.*

2 *Upload pressure map.*

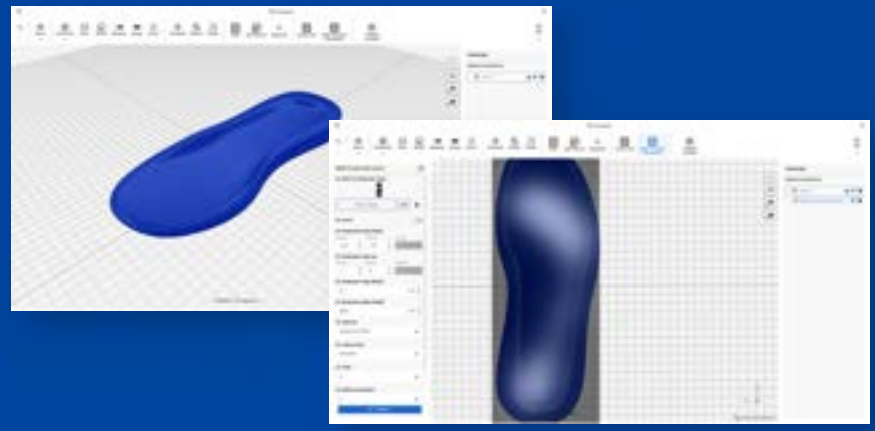
This tells HyDesign which regions of the lattice it needs to modulate in terms of thickness.

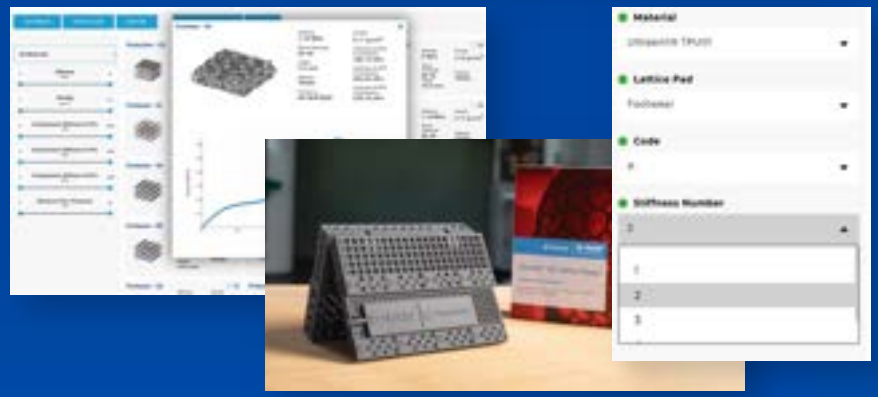
3 *Select the suitable lattice type and settings.*

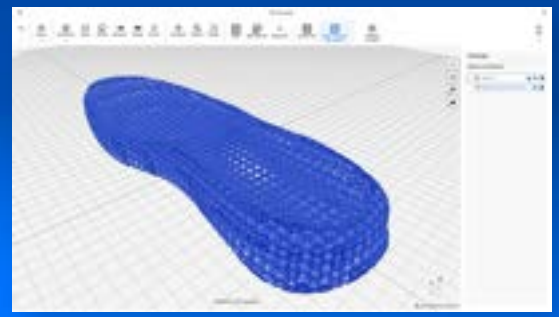
This is based on Ultrasim® 3D Lattices. They can be accessed via the digital lattice library or physical test pads.

4 *Generate latticed midsole and export for print.*

Optional: spend the time saved on other tasks.



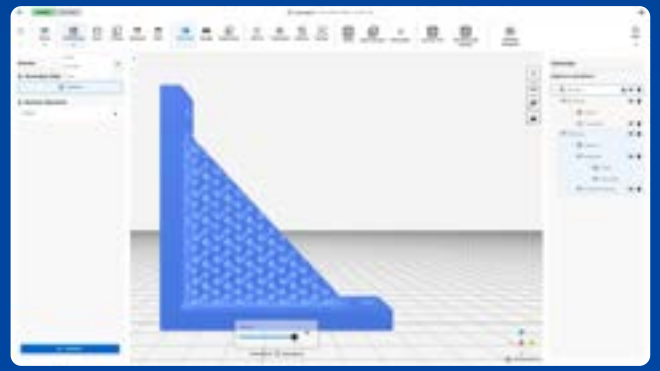




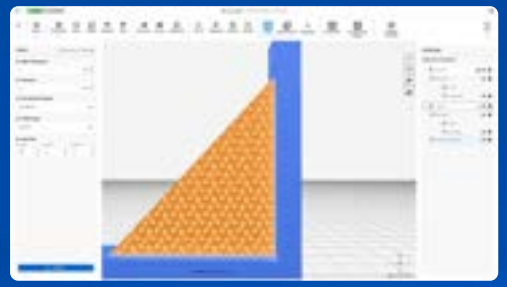
The Solution

Beta Feature: Linear-Elastic Structural Simulation

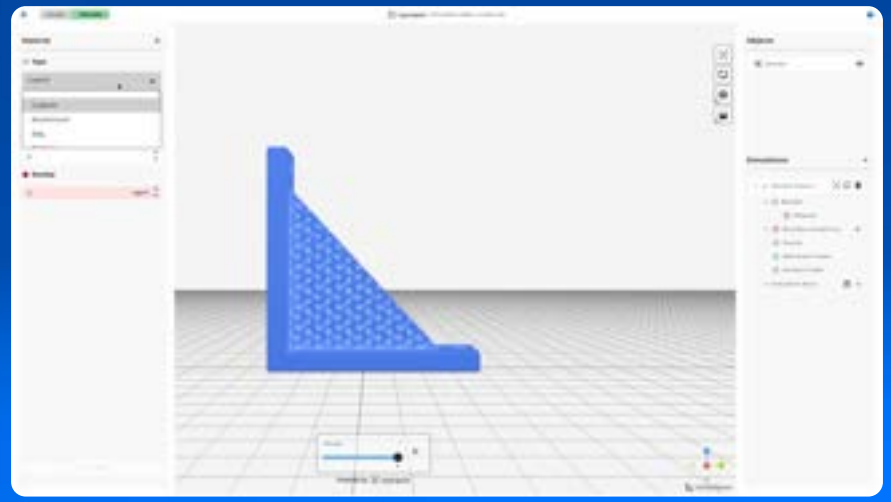
Switch to Simulation Module



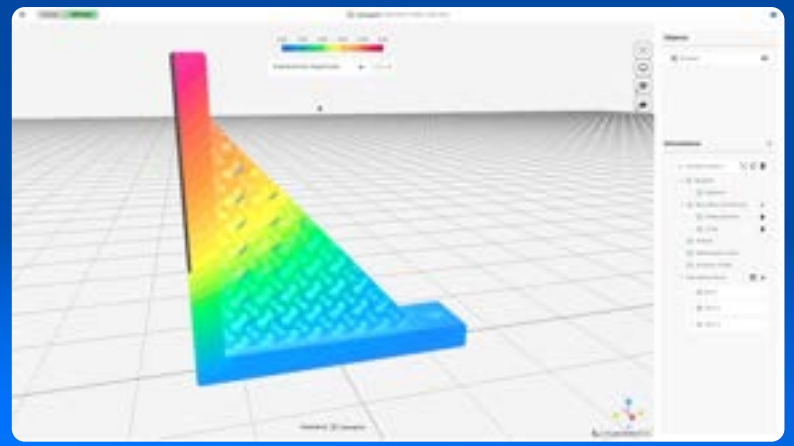
Refine Boundary Geometry



Infill



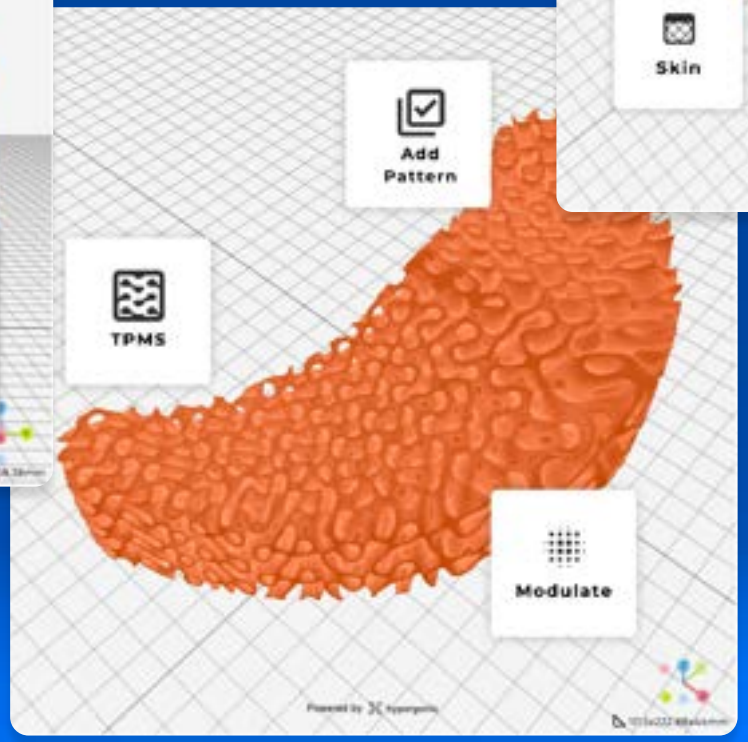
Apply Boundary Conditions

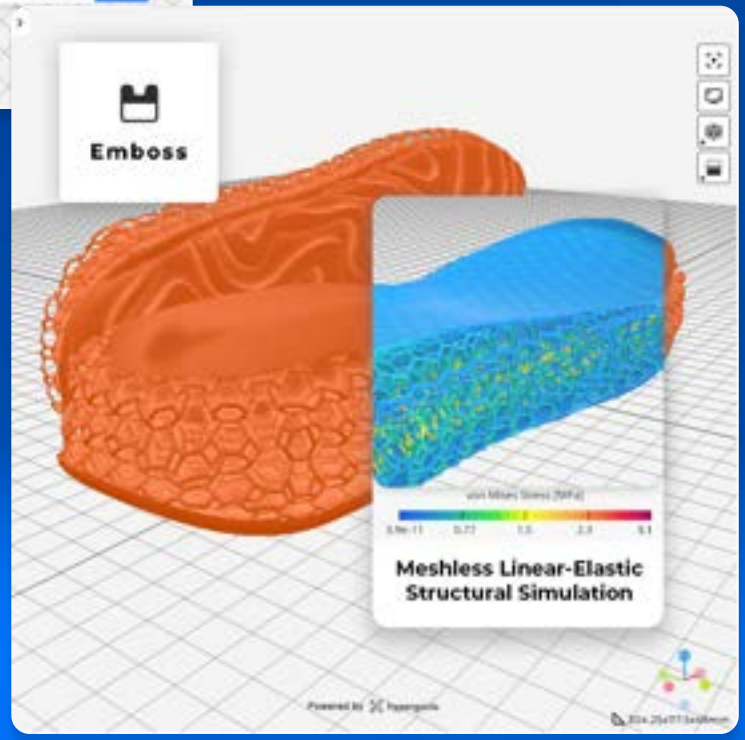


Simulate & View Results

The Solution

Feature Highlight





Success Story

Ergonomic Bicycle Saddle

David Aly Medina
Automotive designer & avid cyclist
Started designing ergonomic saddle 4 years ago

Challenge: Countless trial-and-error

1. Overwhelming variety of lattice, material, and printer combinations made prototyping and testing expensive.
2. Existing lattice design tools were too computationally intensive for his hardware setup, leading to significant frustration and delays.

> “HyDesign was the breakthrough I had been seeking for the past four years. Now, I can leverage HyDesign’s implicit modelling technology and [Forward AM’s] pre-validated Ultrasim® 3D Lattices, **which drastically accelerated my design-prototyping cycles**.”

Mass-Customized Kitesurfing Pad by PADICS

Carlo Neumann
Founder & AM Enthusiast

Challenge: Searching for high-performance materials

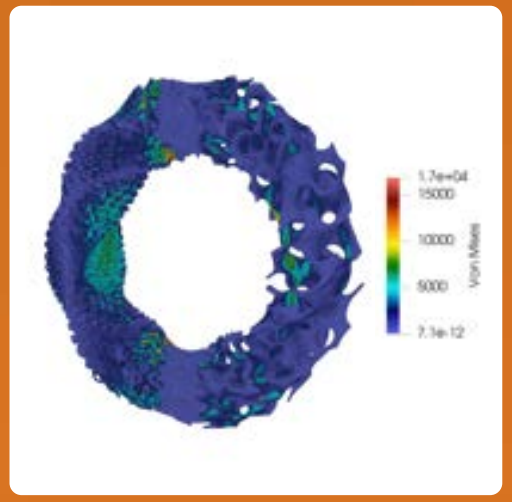
Inability to efficiently customize materials to dampen riders' weight and movement.

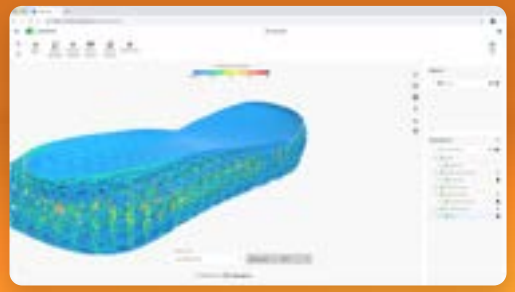
> "From a girl (40kg in weight) to a huge guy, we can now achieve unique dampening properties. This increases the riding comfort and performance on the water. **And HyDesign helped us create a workflow that is super easy to use. You just import your volume files, and then within seconds, you get a lattice structure** with which you can continue developing your product. So I really liked the process, I like the speed of the program, and we will continue to work on it."

Simulation Highlight

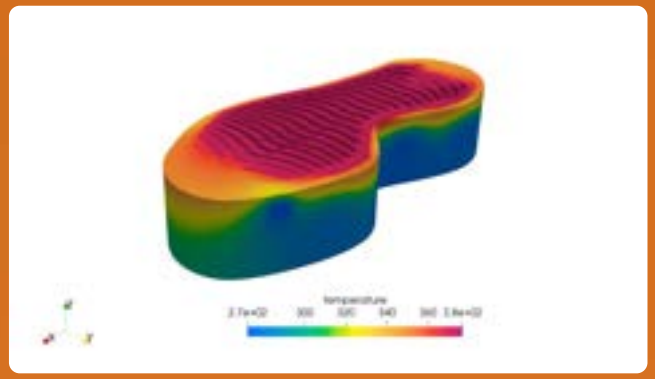
The Road To Integrated Multi-Physics Simulation

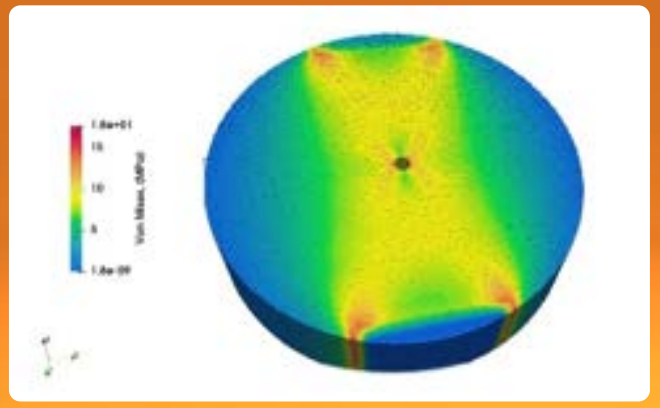
Linear-Elastic Structural Simulation



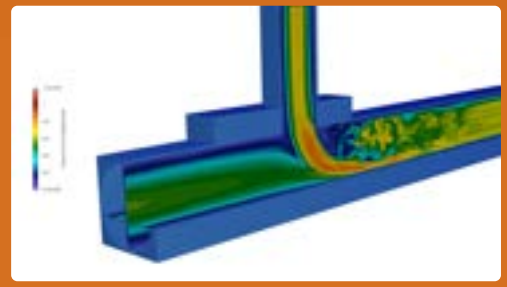


Thermal Simulation

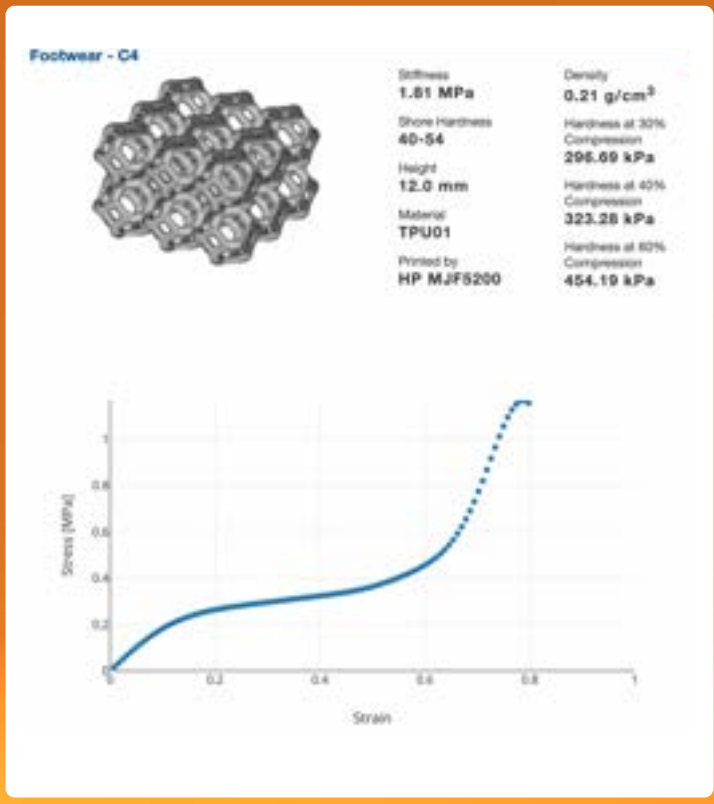




CFD
Multi-phase, phase-change, and convective flows



Non-linear & plastic deformation for polymer material models

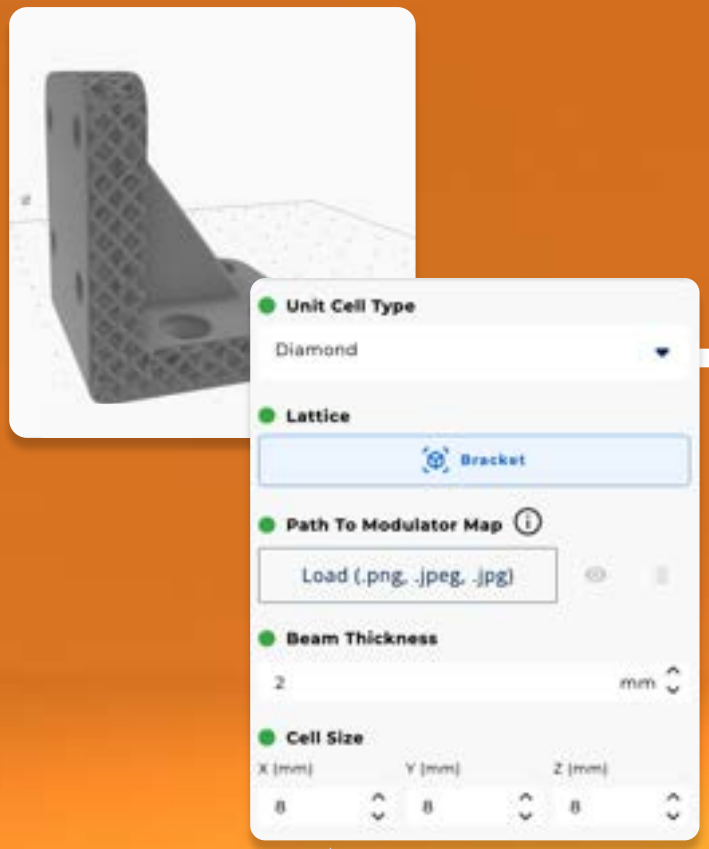


Q2 2024

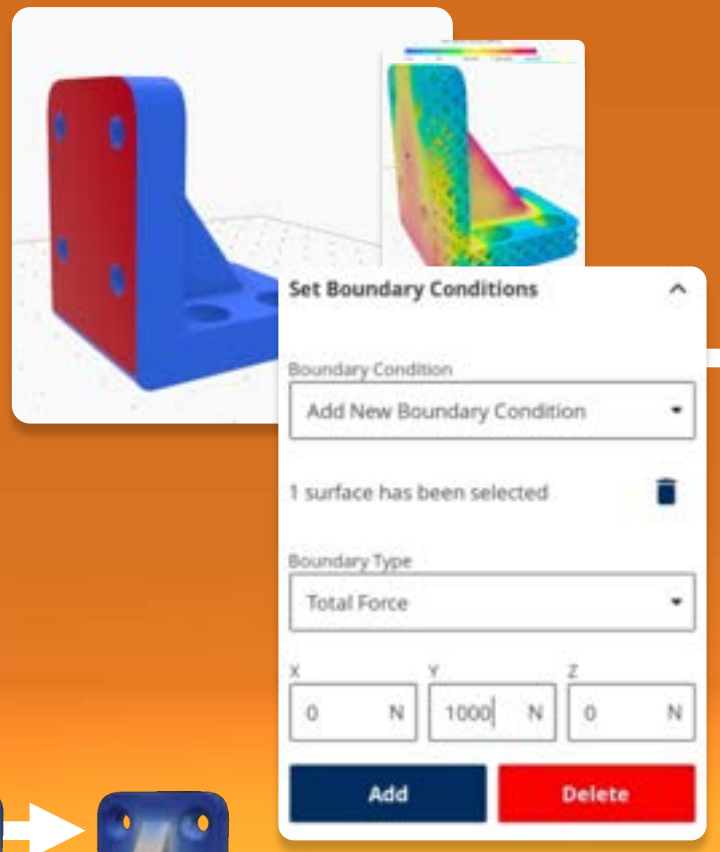
Q2 2025

An Easy-To-Use, Unified Design-Simulate-Optimize Loop for Product Design and Optimization

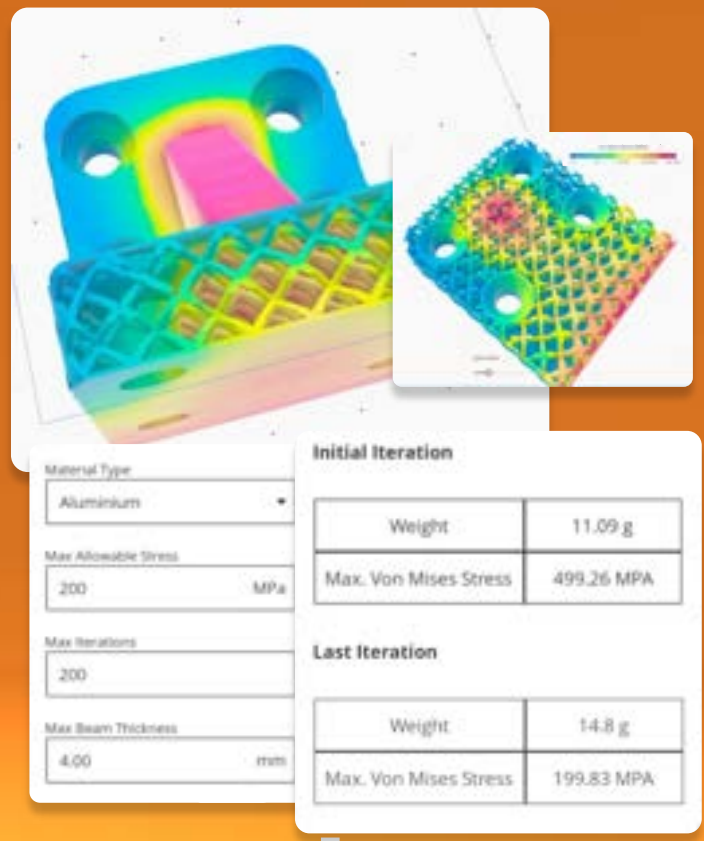
Design



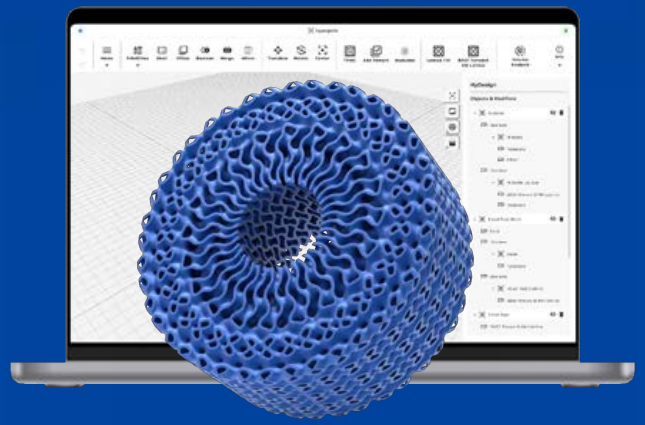
Simulate



Optimize



Effortless Lattice Design Available Today



Standard

EUR 50 /month after trial

Everything you need to start creating 3D-printed lattice products. Become a lattice design master in minutes.

Key Features

- Full access to design features
- No limits on exports
- Access to Simulation Beta*

Pro

Coming soon

Higher limits and priority access to simulation for you to iterate faster and with greater precision.

Key Features

- Everything in Standard
- Higher limits for simulations
- Priority during high-traffic periods

Sign up for HyDesign Now

Free 14-Day Trial

- ✓ Free instant access
- ✓ Unlimited exports
- ✓ Access to Simulation Beta (a limited introductory offer)

Sign Up for HyDesign

hyd.sg/lw

Features

Cloud Integration and File I/O

- **Cloud Projects** Automatically saves changes to the cloud, with access from anywhere and undo/redo capabilities.
- **Import Formats** (3D models): STL & OBJ files
- **Export Formats** 3MF & STL (with decimation options).
  Slice formats like PNG and CLI

Volumetric Modeling and Design Tools

- **Shell & Offset** Easily adjust part thickness without worrying about mesh errors.
- **Boolean & Transforms** Combine and modify objects using Boolean operations and simple transformations.
- **Merge** Smoothly merge two nearby objects into one.
- **Linked Copies** Sync changes made to an original object across all its copies.

Utilities

- **Volume Analysis** Calculate the volume fraction of different infill patterns within a 3D model.
- **Slice View** Examine the internal structure of 3D models with cross-section views.

Advanced Structures, Lattices, and Structural Optimization

- **TPMS** Cartesian, cylindrical and spherical periodicity.
- **TPMS Transitions** transition between one TPMS to another
- **Modulate** Change the cell size and/or wall thickness of TPMS infills in a specified axis.
- **Forward AM Lattice** Utilize beam lattices with pre-validated structural properties.
- **Image Modulation of Lattices** Easily vary lattice beam thicknesses using image projections.

Simulation (Beta)

- **Meshless Linear Elastic Simulation** Simulate complex latticed parts without worrying about meshes or mesh quality.
- **Simulate on the Cloud** Queue up to 2 simulations and continue iterating designs at the same speed while they run.
- **Import Boundary Surfaces** Export boundary surfaces as STLs in your CAD tool of choice and import them to use in HyDesign.
- **Create boundary surfaces** Use our flexible and powerful workflow to create more complex boundary surfaces.
- **Material Library** Choose from a library of common materials or input your own material data.
- **Available Boundary Condition Types** Apply distributed load, force, displacement, and gravity boundary conditions in your simulations.
- **View and Analyze Results** Directly in HyDesign.

FAQs

How can I quickly get started with HyDesign?
You can hit the ground running with HyDesign by simply creating an account. Immediate access allows you to start designing without delay on a web browser of your choice.

How does HyDesign enhance TPMS and Lattice design capabilities?
On top of TPMS and lattice-beam infills, HyDesign offers advanced functions such as dynamic cell size and wall thickness modulations, and mapping on spherical and cylindrical surfaces. In addition, it is now possible to apply skins over specific regions of an infilled object with a grayscale image.

What geometry operations can I perform with HyDesign?
HyDesign comes equipped with a comprehensive suite of geometry operations, including adding primitive shapes, shelling, offsets, booleans, and emboss.

Can I export designs from HyDesign?
Exporting your designs from HyDesign is straightforward and user-friendly. You can directly download your designs to your local drive from the cloud in various formats, including STL, 3MF, CLI, and PNG stack. There’s no limitation on the number of exports.

How can I design with the Ultrasim® 3D Lattices?
The Ultrasim® 3D Lattices allow you to easily and confidently design parts with ideal mechanical performances, reducing trial-and-error. You can access the validated lattices in two ways. First, you can purchase physical Ultrasim® 3D Lattice Test Pads from Forward AM. There are Test Pads for Footwear, Seating and Protection. Second, you can access the digital Ultrasim® 3D Lattice Library via Forward-AM’s website.

What is the trial period for HyDesign?
Explore HyDesign's capabilities with a 14-day full-access trial with beta access simulations (Queue up to 2 simulations and continue iterating designs at the same speed while they run.)

What other features are planned for HyDesign?
We will continue making complex design workflows as accessible as possible. Features on the roadmap may include reusing workflows for new imported objects, structural simulations and topology optimization.