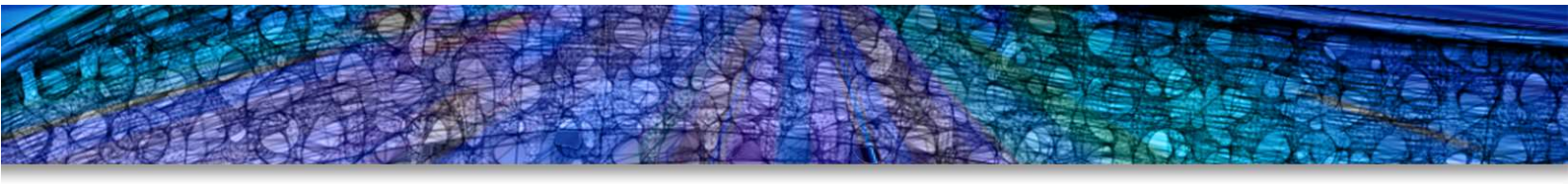
SYNOPSYS®

Footprint 3D
Forward Thinking Footwear

Advanced Lattice Creation for Footwear Production by Additive Manufacturing



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footprint 3D

Matthew Flail
Co-Founder and COO, Footprint 3D

Overview

Footprint 3D was established to create footwear and accessories that address the most common deficiencies found in the footwear industry: fit, the consumer purchasing experience, and the environmental impact of waste created in traditional molding processes for footwear manufacturing.

Footprint 3D is a footwear company dedicated to providing style and comfort for feet of all sizes and widths. The company's core mission is to build fashion forward footwear that provides ergonomic customization and support designed to maximize comfort and functionality for the user. Utilizing Simpleware's lattice generation tools, Footprint 3D is able to quickly and cleanly create lattice structures from original CAD files and "Boolean" a variety of solid surfaces to the lattice structure. End-use parts can be produced in a variety of thermoplastic polyurethane powders for SLS as well as elastomeric resins for DLP/SLA printing systems.

Highlights

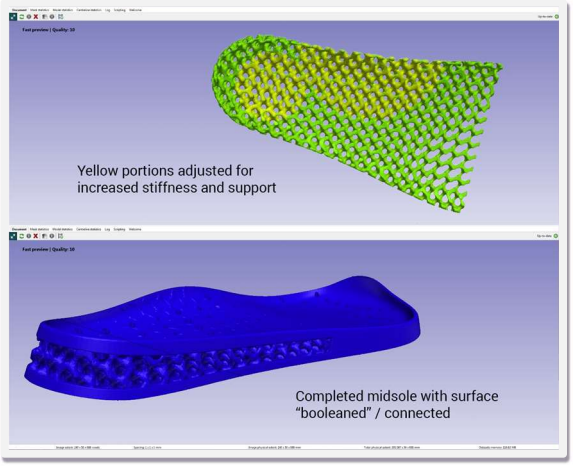
- 3D scan data used to generate unique contoured soles from customer or patient's feet
- Midsole and insole designs incorporate Simpleware lattices tailored for ergonomic needs and support
- Finished footwear is produced using Additive Manufacturing

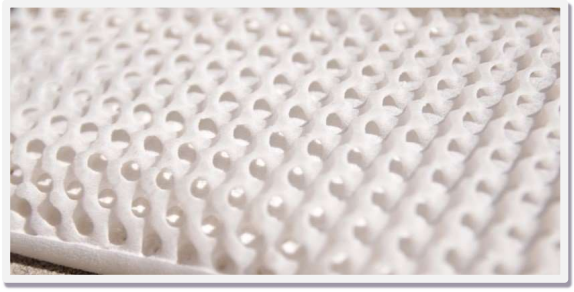
Scanning and customization

Footprint 3D takes 3D scan data of a customer or patient's feet and creates uniquely contoured soles that allow for proper ergonomic support and promote a natural gait. Footprint 3D is custom-made to order and designed to be optimized by the input of podiatrists and foot care professionals.

Lattice creation

Footprint 3D is able to design original soles mapped to a user's feet and optimize them in Simpleware. The creation of lattice structures based on these original solid STL files is straightforward and accurate and allows the company to quickly create and modify certain areas of the lattice based on unique foot and gait characteristics. Areas of the sole that need to be more or less flexible, such as the heel and arch areas, can be thickened or reduced using Simpleware's morphological 3D editing tools.





Additive manufacturing

The company's original midsole and insole designs incorporate lattice structures that are laser sintered (SLS) out of an advanced TPU powder and coated with a polyurethane finish for durability and waterproofing. This manufacturing process allows Footprint 3D to create an infinitely variable range of size options without ever opening up a mold, reducing waste and eliminating excess scrap material created in traditional molding processes. Early tests indicate that the unique particle bonding of the TPU material, coupled with Simpleware's lattice creation module, allows energy from each step to be dispersed evenly and at a slower rate, adding stability and reducing the impact on the wearer over time.

Wear testing

In order to save time and money, Footprint 3D designers often remove the soles from existing shoes, and use the upper to test new outsole and midsole designs. This requires heating the shoes in a toaster oven to soften the heat activated glues commonly found in mass produced footwear. Acetone is then used to dissolve the glue, and the knit upper is pulled off of the sole to facilitate the use of the knit upper for testing purposes.

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