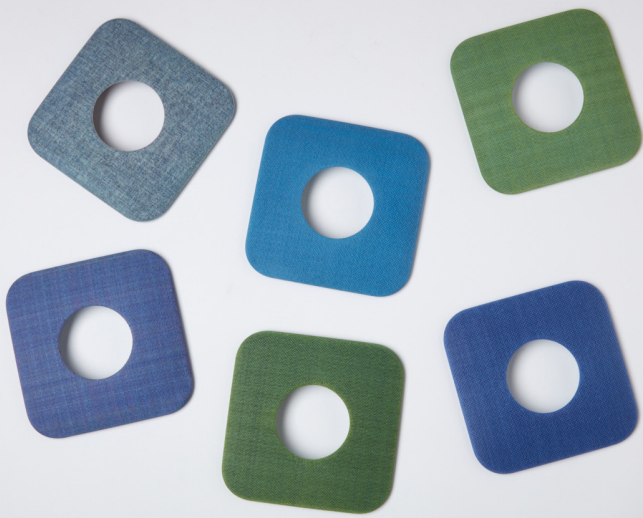# How to Streamline Your Design Process **with Multimaterial 3D Printing**

Introduction

You've gone through the design process over and over – design inspiration, initial sketches, rough prototypes, renders of detailed designs, high-fidelity models – all to get to that golden model and design freeze. You've had successful designs and maybe some that didn't quite make it. You've probably also dealt with design flaws that put the process back a month, outsourcing headaches, miscommunication between team members or clients, and the ever-challenging process of stakeholder approval.

The design process is inherently a venture into the unknown, and will always include some frustrating questions, scrapped ideas, and approval issues. But what if those minor hiccups didn't mean halting your process for days or weeks? What if you could have full color models in just a few hours?

What if you had reliable, easy-to-use tools right at your fingertips?

Read on to find out how to upgrade your design process and make everything from initial prototypes to design reviews more efficient – and to see a real-world example.

Get
inspired.

All designs start with an idea. But if the thought following that initial idea is "I can't do that" or "that will take too long," designers have a problem.

You shouldn't be limited before you even begin the prototyping process – designers need tools that excite and inspire. Imagine what you could design if you had ready access to virtually unlimited colors and textures, or the ability to create dozens of prototypes in just days. Imagine what you could do if you knew you didn't have to rely on outsourcing, but could create every model in-house. Those built-in weeks of waiting for outsourced parts to come back would be more time to perfect your ideas.
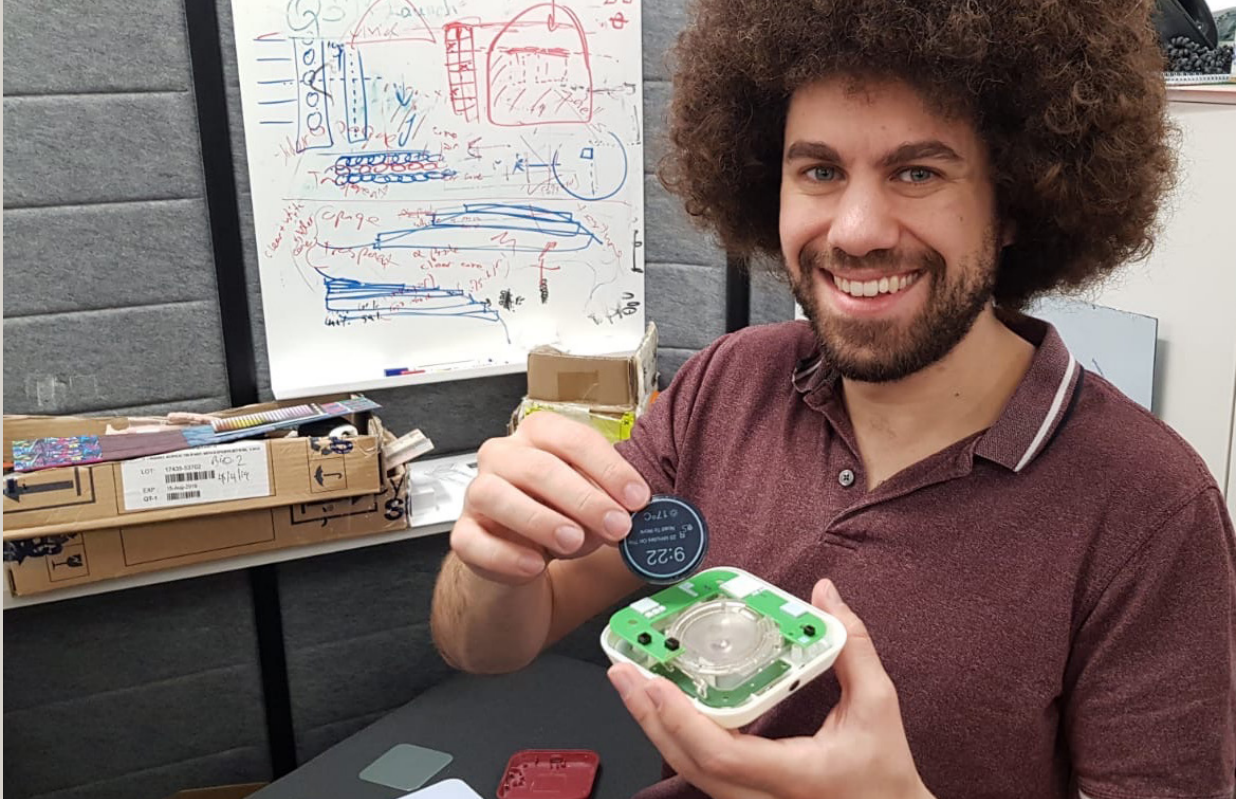
Inspiration

Meet Lior, an application engineer and senior industrial designer at Stratasys.

Lior was tasked with designing a smart speaker meant to fit into a home environment. Right off the bat, he had a few general guidelines for his design. The smart speaker had to be small and needed to look good in any room, whether it was set up in the kitchen or a bedroom. The design also needed to allow for a weighted base to offset bass beats.

"I started with dozens of hand-drawn sketches," Lior said. "I liked the look of minimalist, geometric shapes, so I tried cubes, spheres, even triangles."

Lior wanted a design that used a fabric covering, a popular trend in smart speakers. Because he was using multimaterial 3D printing for this project, he knew he could incorporate fabric into the design immediately.
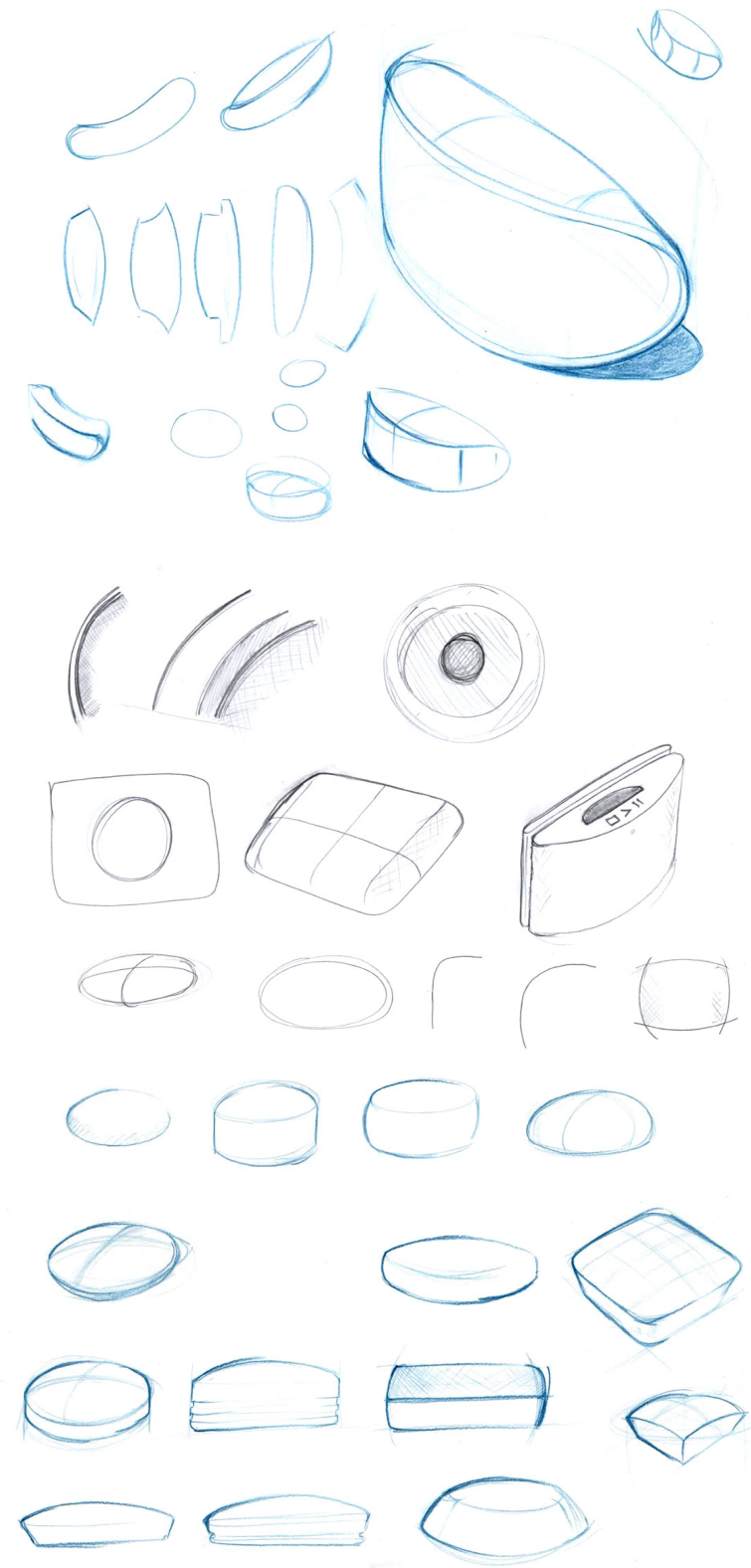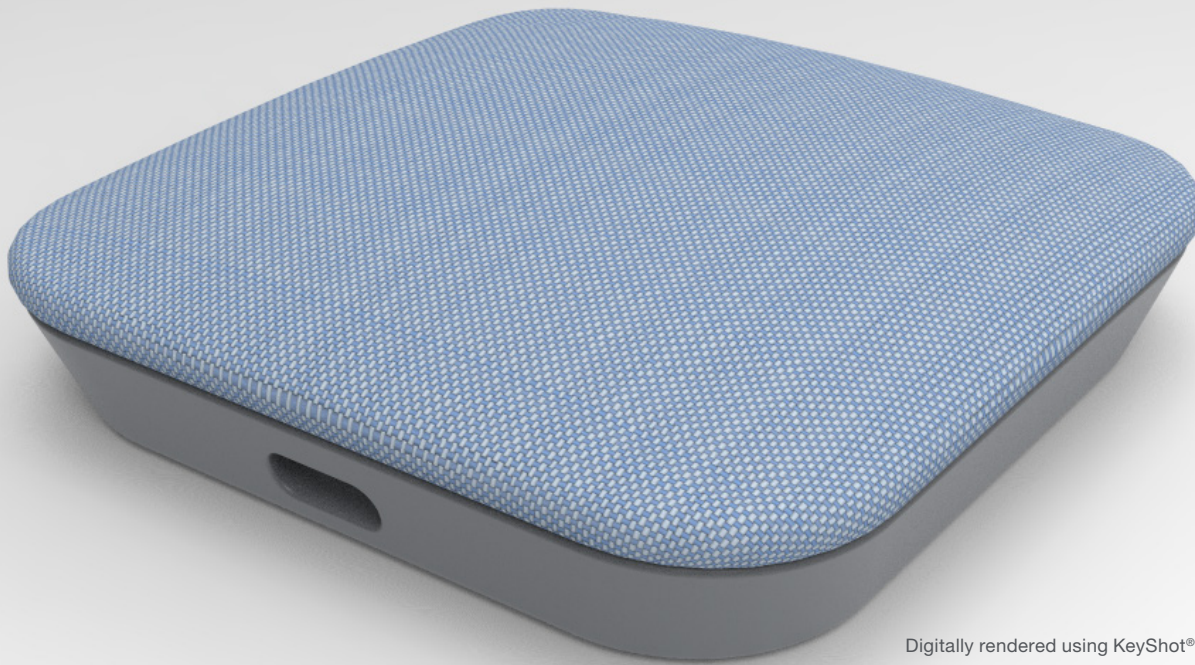
Digitally rendered using KeyShot®.

Fail faster – and smarter.

Seasoned designers know that without a solid foundation, the design process can quickly get frustrating.

Many designers rely mostly on flat renderings to perfect the initial shape of a product, with one or two physical prototypes. But 2D images or 3D renders don't fully let you see how a product will look in its environment, or how it feels in the user's hand.

You can't afford to spend half of your time on such an early step in the design process, but correcting major design flaws later in the process is time-consuming and expensive. 3D printing makes design iterations fast and simple to create, letting you explore possibilities and perfect a product's overall shape earlier in the design process.

Digitally rendered using KeyShot®.

3D Printed with Stratasys J55.

Form

After working on paper, Lior moved on to digital 3D renders and physical models. He created dozens of digital renders and six to seven 3D printed iterations of the initial form.

For the smart speaker project, Lior used PolyJet Technology™. His first models were 3D printed with DraftGrey™ – a low-cost, single material, fast printing option ideal for rapid prototyping. 3D printing made it possible to product two or three prototypes per day – and the printer could be left running overnight. Best of all, Lior could learn from each iteration and move onto the next idea, fixing design flaws and making decisions faster.

"I had so many iterations that it was hard to keep track of them all – I had to stay very organized," Lior said. "After a couple of weeks, I chose a square shape over the circle because I wanted it to stand out from other smart speakers on the market."

Digitally rendered using KeyShot®.

Go from render
to reality.

Because of the limitations of outsourcing or traditional modeling, many designers can't afford the time or money to create detailed design and full-color models until the very end. This means that if a major issue with CMF arises – for example, if the color model reveals a previously unseen problem with the form – the project is at risk. It also means that the team relies on digital renderings to communicate CMF choices, but colors on a screen don't always look the way you expect them to in real life.

3D Printed with Stratasys J55.

CMF

After just a week, Lior was able to incorporate color into his 3D printed designs. Because the form was so simple – a rounded cubic shape – it didn't immediately "read" as a speaker. He wanted to experiment with several different finishes, including wood. Normally, outsourcing wood for this type of project would take several weeks, which the timeframe didn't allow. Multimaterial 3D printing let him apply a wood texture to the design and print it in a few hours.

Lior eventually went with a fabric texture after several iterations.

The models that had been printed with a simple fabric texture immediately looked more "speaker-like" to reviewers. Lior could print several models in different colors and get immediate feedback, instead of waiting for models to be painted or for fabric to be outsourced.

Get stakeholder approval.

Reviews aren't anyone's favorite part of the design process, but miscommunication issues can make getting approval even more of a headache.

While many companies rely on digital renders for approvals throughout the design process, reviewers may not know how to provide feedback on just 2D images. Limitations on creating physical prototypes can also make it difficult to keep up with stakeholder feedback.

3D printing lets you create high-fidelity prototypes in a day or overnight, and place them in the hands of stakeholders often and consistently. This lets reviewers know that you haven't just heard their feedback – you've taken it into account and updated designs accordingly. When everyone involved feels heard and valued, projects can move more quickly – and approvals happen faster.

3D Printed with Stratasys J55.

3D Printed on Stratasys J55

Make it
real.

Designs don't stop at CMF. High-fidelity or final models can incorporate several functional aspects to guarantee a better final product. But if you spend all your time making models by hand or waiting for outsourced prototypes, that final design phase might be rushed, complicating production later on or increasing product-market fit risk.

3D Printed with Stratasys J55.

Design
Freeze

To ensure that the design of the speaker wouldn't be changed once it went into production, Lior wanted to incorporate elements like a USBC port, digital screen, and a transparent cover to show the innerworkings.

The designs looked good digitally, but had some flaws that only showed up once printed. The digital screen was sized correctly in the digital render, but was clearly too big once it was printed. Because he was 3D printing his physical models, Lior could correct any sizing and placement issues and print a new model in the same day, meaning that the design was as well thought-out as possible.

"Going by chance alone isn't enough for a design project," Lior said. "Every decision I make and present has to have purpose and lots of iterations behind it."
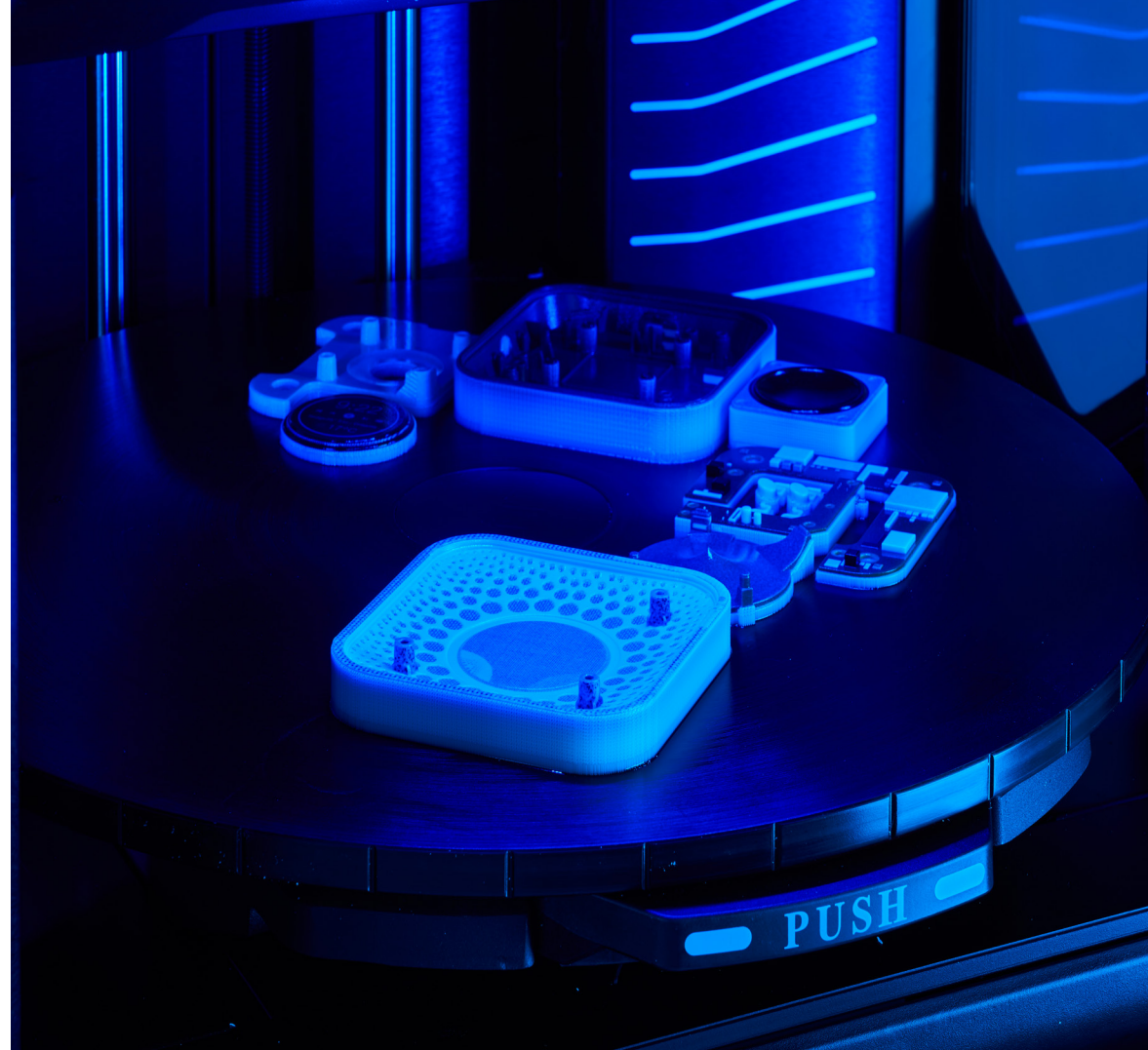
For the smart speaker project, Lior worked with the J55 3D printer, which features multicolor and multimaterial capabilities for smoother design processes and faster turnaround. "It was really convenient to have the printer literally right next to me," Lior said. "I didn't have to go into a different building or walk across the office to get my models – I could get the prints immediately and they were high quality right off the print tray."

The J55 combines the unbeatable quality of PolyJet technology with a compact and office-friendly design, which means it fits seamlessly into your design space. Parts printed with the J55 require little to no post-processing, saving you hours of time normally spent sanding and hand-painting models. Work with over 500,000 unique color combinations, including PANTONE-verified colors, and dozens of texture and surface finish options, from wood to fabric. Fix problems the moment they arise and give stakeholders a physical prototype (or five) to review. Make your ideas real.

Learn more at
www.stratasys.com/3d-printers/j55

E-Book