

## AT A GLANCE

**Organization:** Industrial Design Department, Holon Institute of Technology

**URL:** [www.hit.ac.il/index\\_e.asp](http://www.hit.ac.il/index_e.asp)

**Location:** Holon, Israel

**Industry:** Education

## Challenges

- > Produce prototypes to demonstrate students' design projects, within tight time frames
- > Teach students how to use 3D printing technology, with minimal learning curve
- > Create prototypes that are highly precise and finely detailed

## Solution

- > Eden260V 3D printing system from Objet Geometries

## Results

- > Products designed in Solidworks are perfectly replicated as 3D prototypes, with far greater precision and detail than was possible with manual prototyping
- > Students can test how internal parts, such as hinges, will act
- > Ability to produce prototypes quickly and easily enables students to focus more on design
- > Objet-sponsored "Mini Me" project helps build students' skills and generates multiple varied models for marketing purposes

## HIT Industrial Design Department Gains Speed, Accuracy and Creativity with Objet 3D Printing Technology

Israel's Holon Institute of Technology (HIT) is a fully accredited academic center dedicated to science, engineering and technology. More than 3,600 bachelors and masters degree students study in a wide range of disciplines, including Industrial design, mathematics, computer science, electrical engineering, information science, and others. The Industrial Design Department, part of the School of Design, is the major user of the Objet 3D printer at HIT.

Industrial Design students at HIT use SolidWorks CAD software to design parts and assemblies. For all presentations and projects assigned as part of the academic program, they need to create prototypes.

### "Mini Me" Project Showcases Students' Creativity and Objet's 3D Printing Capabilities

Recently, Objet and HIT cooperated on a unique project with the dual aims of developing students' 3D printing knowledge and generating a variety of innovative models that Objet could later use to showcase the capabilities of its PolyJet™ 3D printing technology.

The "Mini Me" project challenged third-year industrial design students to create a figure or doll in their own image, using SolidWorks to design the piece and Objet's Ede260V 3D printer to create the 3D model. According to the brief, the figure was to be inspired by the student's characteristics and based on the concept of a designer toy, which is typically produced using vinyl. Objet planned to use the figures to showcase its capabilities to a market currently dominated by handmade toys.

Twenty-five students and their professor participated in the project. They were given six weeks for design and a few additional weeks for 3D printing and testing, including a maximum of 10 hours each of 3D printing on the Eden260V printer.



“  
Using Objet let us focus on the design aspects of our projects. We knew Objet can deliver accurate prototypes, quickly and easily

”

**Ayala Bougay**  
4th year industrial design student, Holon Institute of Technology

HIT's onsite printing studio manager supported the students by advising them on the capabilities and limits of 3D printing, checking their SolidWorks files, and showing them how to use Objet Studio Software to ready the file for printing. As part of this, the students were shown how to position their designs so that printing would take the shortest possible time. The "Mini Me" figures were printed on the Eden260V 3D printer, using FullCure720 Transparent, TangoGray, VeroGray and VeroWhite model materials, and then painted with acrylic paints.

### Hinges add movement to figure

Ayala Bougay, one of the students who participated in the Mini Me project, wanted to create a figure with moving parts. After consulting with an Objet representative, she learned that she would be able to print the entire figure, moving parts and all, in a single run on Eden260V printer.

"We were shown how objects could be printed within objects and the support material could be extracted through holes or gaps, enabling you to print your model in one piece," Bougay recalled. "Using this information along with insight provided by an Objet representative on the possibilities and limitation of this system, Bougay came up with the idea of using hinges to allow her model to move into two different positions."

"I determined that gaps of 0.3mm inside the hinges and 0.5mm to the sides of the hinges were required to be able to extract all of the support material. Whilst this was complicated to work out, the support of Objet gave me the determination to use the system to its fullest. I wanted to make sure that the doll would look good in each position and so had to work out the suitable angles for the hinges to sit at within the model. The fact that the material is translucent really helped me understand and visualize the design."

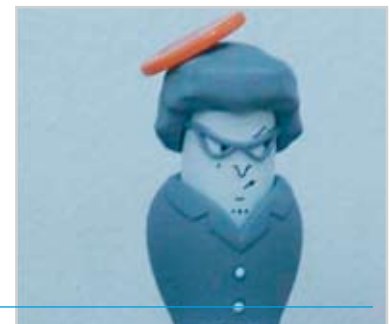
### Success is in the details

According to Bougay, Objet's 3D printing process greatly enhanced her ability to turn her design into a successful miniature figure. "Objet enables us to produce prototypes far closer to final products than we have ever managed before," she said. "Using Objet let us focus more on the design aspects, safe in the knowledge it would produce accurate prototypes, quickly and easily."

Bougay commented that one of the most noticeable advantages of 3D printing with Objet's PolyJet Technology was the much shorter time needed to produce a prototype. "Previously we would spend hours in the workshop, producing prototypes by hand. Our prototypes were never precise and we were unable to produce the finer details that really make the difference in product design."

"Since Objet will produce a carbon copy of the design rendered in SolidWorks, our prototypes can now be an exact visual replica of a final design," she said. "My doll did not even need to be test printed, thanks to the exceptional replication capabilities of the Objet technology."

"Via the use of Objet extensions within SolidWorks we can also test the way the printed model will react, such as the movements of the hinges. This has raised the bar for prototyping, as we know that anything designed, tested and visualized within SolidWorks will be faultlessly produced by Objet."



## About Objet Geometries

Objet Geometries Ltd., the innovation leader in 3D printing, develops, manufactures and globally markets ultra-thin-layer, high-resolution 3-dimensional printing systems and materials that utilize PolyJet™ polymer jetting technology, to print ultra-thin 16-micron layers.

The market-proven Eden™ line of 3D Printing Systems and the Alaris™30 3D desktop printer are based on Objet's patented office-friendly PolyJet™ Technology. The Connex™ family is based on Objet's PolyJet Matrix™ Technology, which jets multiple model materials simultaneously and creates composite Digital Materials™ on the fly. All Objet systems use Objet's FullCure® materials to create accurate, clean, smooth, and highly detailed 3D parts.

Objet's solutions enable manufacturers and industrial designers to reduce cost of product development and dramatically shorten time-to-market of new products. Objet systems are in use by world leaders in many industries, such as Education, Medical / Medical Devices & Dental, Consumer Electronics, Automotive, toys, consumer goods, and footwear industries in North America, Europe, Asia, Australia, and Japan.

Founded in 1998, Objet serves its growing worldwide customer base through offices in USA, Mexico, Europe, Japan, China and Hong Kong, and a global network of distribution partners. Objet owns more than 50 patents and patent pending inventions. Visit [www.objet.com](http://www.objet.com).

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