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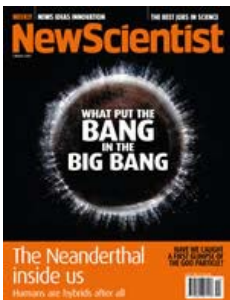
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A cheap self-assembly device capable of fabricating 3D objects has been developed by US researchers. They hope the machine could kick start a revolution in home fabrication – or "rapid prototyping" – just as early computer kits sparked an explosion in home computing.

Rapid prototyping machines are already used by designers, engineers and scientists to create one-off mechanical parts and models. These create objects by depositing layer upon layer of liquid or powdered material.

These machines typically cost from \$20,000 to \$1.5 million, says Hod Lipson from Cornell University, US, who launched the Fab@Home project with PhD student Evan Malone in October 2006.

The standard version of their Freeform fabricator – or "fabber" – is about the size of a microwave oven and can be assembled for around \$2400 (£1200). It can generate 3D objects from plastic and various other materials. Full documentation on how to build and operate the machine, along with all the software required, are available on the Fab@Home website, and all designs, documents and software have been released for free.

Many hands

"We are trying to get this technology into as many hands as possible," Malone told **New Scientist**. "The kit is designed to be as simple as possible." Once the parts have been bought, a normal soldering iron and a few screwdrivers are enough to put it together. "It's probably the cheapest machine of this kind out there," he adds.

The machine connects to a desktop computer running software that controls its operation. It then creates objects layer-by-layer by squeezing material from a mechanically-controlled syringe. A video shows a completed machine [constructing a silicone bulb](#) (16MB, wmv format).

Unlike commercial equipment, the Fab@Home machine is also designed to be used with more than one material. So far it has been tested with silicone, plaster, play-doh and even chocolate and icing. Different materials can also be used to make a single object – the control software prompts the user when to load new material into the machine.

Malone and Lipson hope Fab@Home will grow into a community of enthusiasts who share designs for 3D objects and even modify the machines for themselves. This will prompt the emergence of widespread personal fabrication, Lipson hopes.

"We think it's a similar story to computers," he explains. "Mainframes had existed for years, but personal computing only took off in the late seventies." A cheap self-assembly computer called the Altair 8800, launched in 1975, sparked the rapid development of personal computing, he notes: "We hope Fab@Home can do the same for rapid prototyping."

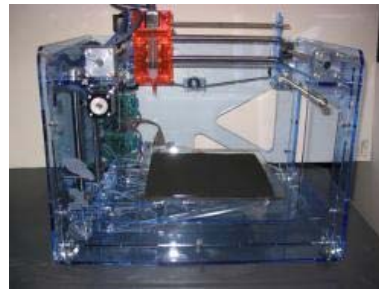
Copy cat

Adrian Bowyer, who is also working on rapid prototyping machines at Bath University, in the UK, agrees that the technology could have mass appeal once the equipment is cheap enough. One of his own machines can even make some of its own parts (see [3D printer to churn out copies of itself](#)).

"Fab@Home is an interesting idea; it should be easy for anyone in the world to build," Bowyer says. "Once you've used one you never want to go back, it's liberating and enormously fun." Bowyer believes the technology could one day even replace traditional models of manufacturing.

Bowyer adds that the Fab@Home machine could probably already be used to make many cheap injection-moulded products already on the market: "I can imagine people swapping plans of things to make online, or paying to download them instead of going to the shop."

Tools



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The Fab@Home device can be used to create 3D objects from various materials (Image: Hod Lipson / Evan Malone)

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