BILL TRUSLOW

An etched glasswork by artist Peter Houk, part of his Big Dig series.

MATERIALS

Vitreous visions

Daniel Cressey celebrates the pending refit of the Glass Lab — an innovative crossroads of science and art at MIT.

The most oversubscribed programme at the Massachusetts Institute of Technology in Cambridge takes just 16 students a term and offers no credit nor classes in physics, chemistry or engineering. Instead, it teaches the art and science of glass-blowing — the creation of objects ranging from ornamental pumpkins to functional musical instruments, such as the flask-shaped 'vitreous membranophone'. Blowing through its neck creates audible oscillations in the thin glass base.

The Glass Lab is now attracting big-name glass artists. Dale Chihuly is one — famous for his exuberant, brilliantly hued sculptures resembling fantastical marine organisms or jungle flowers. The Venetian artist Lino Tagliapietra is also on board: his visually stunning vessels and geometric panels have earned him the title of the world's greatest glass-blower. Staff include the likes of mathematician–artist Martin Demaine, known as the father of Canadian glass.

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For more lab art by Martin and Erik Demaine, see:
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The lab's sales of artworks created in its basement room, such as sculpted bowls and ornaments, are hugely popular.

This year, after almost three decades of operation, a lab refit costing around US$2.5 million will enable even more students to train in this modern alchemy — transforming sand into a frozen spray of colour. The number of workstation benches is to double. "The main reason driving the expansion and renovation is demand," says Peter Houk, Glass Lab director since 1997 and an established artist in the medium, whose work ranges from vases etched with exquisitely detailed cityscapes to huge coloured panels. "The joke is it's harder to get into the Glass Lab than MIT," he says. The odds are actually about the same, he explains, "but one is merit and the other is luck".

Engineering researcher Michael Cima, the lab's faculty director, was in on the idea from its unplanned beginnings. A junior faculty member in 1986, he was offered the lab to pursue his work, which involves engineering technologies in health and medicine. Two students and the artist Page Hazlegrove visited him before he had even glimpsed the lab, reporting that it contained a glass furnace "and would I mind if they used it". Cima had previous experience in lampworking — a process often used to make laboratory glassware — but none in the wilder realm of glass-blowing.

Today, training at the lab both channels artistic creativity and feeds directly into science, while providing valuable lessons on improvisation and other skills to future engineers and researchers. "The reason why the engineering school supports it is this learning how to improvise," says Cima. Glasswork is largely collaborative — the efforts of a team enduring scorching heat and the shards of failed attempts. "Glass-blowing teams have to adapt quickly while they work, changing their plans or methods in response to changes in the material they are manipulating," he adds.

The history of glass-blowing can be traced back to the fourth millennium BC, when it was realized that silicon dioxide, sodium oxide and calcium oxide, subjected to extremely high temperatures, would fuse into glass. Glass in the MIT lab, however, is ordered in as clear chunks called cullet. These are dropped into a furnace that can keep about 50 kilograms of glass molten at temperatures of 1,100–1,200 °C. Purified in one chamber of the furnace — which runs all day, every day — the refined glass flows into a second chamber, where it is retrieved by the glass-blowing team while it is still malleable.

The shape of every piece is determined by both the glass-blower and the person manipulating the glass on the bench. As its name implies, glass-blowing involves puffing into the blowpipe to which the glass blob is affixed, forming a bubble. Shaping is done with moulds or scissor-like tools called jacks, or simply by squeezing the mass by hand while protected by a wad of wet newspaper. Bubbles are also rolled on a steel table called a marver to shape them and to remove heat from certain parts, changing the way the bubbles grow when they are blown. The blobs can be repeatedly reheated to restore malleability.

Colour can be added with coloured glass rods; Cima likens them to a paint palette. These can be ground up and used to coat the bubbles of glass in a colour-saturated layer, or heated and pulled into strings to add lines and patterns.

Cima never ended up using the Glass Lab for his own research. But the adaptiveness and can-do inventiveness fostered by the lab, he says, is "a perfect example of why MIT is different". ■

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