MATERIAL WITNESS

A PLACE FOR MAKING

If you could make anything, what would it be? A materials scientist will probably come up with a long list rather easily, but most other people are likely to find themselves trapped between their imagination (which might exceed the creativity of many scientists) and their ignorance of what is possible and how it might be done. The Institute of Making (www.instituteofmaking.org.uk), which opened at University College London in March, hopes to offer a way to bridge that gap between ideas and means.

The principle is elegantly simple. Anyone at UCL (and hopefully soon a wider public) can pay a modest membership fee, which entitles them to come along to the institute — an old loading bay wedged between the Petrie Archaeological Museum and the Department of Engineering, now converted into a space both stylish and functional — and use the battery of fabrication equipment to make whatever they want. The institute houses, among other things, a state-of-the-art laser cutter, a 3D printer, and various milling, moulding, casting, calcining and cutting devices, along with some wet-chemical facilities and a cooker — for experimenting with food, not for making lunch (although a bar remains under discussion).

But as director Mark Miodownik realizes, it is not enough — indeed, positively unwise — simply to make all this gear accessible to all comers. To turn an idea into a product, you need to understand the materials issues: to appreciate the virtues and limitations of different kinds of material, so as to select those that are best suited to the task in hand. This is the kind of issue on which Miodownik and the institute's creative director Zoe Laughlin regularly offered advice when they ran its previous incarnation, the Materials Library at King's College London. Much of that library — a collection of materials new and old, from pewter to aerogels and ferrofluids — is now housed in a mouth-watering display in the institute's entrance. There are no glass windows to protect the samples: visitors can pick them up and examine them, and, if they desire, use them.

The Institute of Making will offer regular workshops and ongoing instruction on the considerations that surround materials choices and use, from physical properties to aesthetic, ethical and environmental issues. This isn't merely a facility that allows people to make, but one that will teach people how to make.

That is really the institute's motivation: to disseminate the art and science of creating things.

PHILIP BALL

Miodownik imagines that some members will be researchers needing bespoke experimental equipment, but hopes that others will come from farther afield both geographically and intellectually: artists, musicians, textiles specialists — and, if all goes to plan, school children, for whom the Institute may offer a Saturday club at which, under careful supervision, they can spend the day inventing and making. "It's OK if people just come in here and mend their bikes", Miodownik says.

It's not hard, on visiting the institute, to imagine every university principal saying "I want one too". But what the institute's team has understood is that this is about more than creating a gallery of tools. It is about crafting an environment that is approachable, informative, safe (of course), unintimidating to non-scientists and most of all, inspirational. ❐

THERMAL TRANSPORT

Breaking through barriers

Understanding heat flow across interfaces remains an open question for thermal science. Nanocrystal arrays may play a key role in unlocking this mystery.

Mark D. Losego and David G. Cahill

Collective excitations such as phonons, the atomic or molecular vibrations that transport heat in a material, have always lagged behind electrons and photons, both in terms of their velocity and our scientific understanding of them. The relative difficulties of measuring heat and temperature has hindered thermal science from achieving the same level of sophistication as electronics and photonics. Whereas electronic and optical transport have long been studied with high levels of precision (for example, reaching the manipulation of single electrons and photons), experiments on thermal energy transport have typically lacked the control and sensitivity needed to explore behaviour at the nano- and atomic scales. Writing in *Nature Materials*, Ong *et al.* have significantly advanced this topic by examining in detail the flow of heat at organic/inorganic interfaces[1].

To illustrate the significance of this work, it is useful to contrast our understandings of electronic and thermal transport at an interface. For electronic interfacial transport, a simple model based on the aligning of work