felt that their own teaching was highly effective. This suggests that at least some of the respondents are fooling themselves.

Certainly, that apparent complacency would help to account for the notably slow uptake of pedagogical innovations in the teaching of science to undergraduates. But there is strong evidence that talking at students isn't nearly as effective as engaging them with cooperative, hands-on learning activities. A prime example of the latter approach is Process Oriented Guided Inquiry Learning (pogil.org), which originated in US college chemistry departments in 1994, and which is now used in many other subject areas.

But the biggest barrier to improvement is the pervasive perception that academic institutions — and the prevailing rewards structure of science — value research far more than teaching. That perception was apparent in one of the survey's most striking contradictions: despite their beliefs that teaching was at least as important as research, many respondents said that they would choose to appoint a researcher rather than a teacher to an open tenured position.

To correct this misalignment of values, two things are required. The first is to establish a standardized system of teaching evaluation. This would give universities and professors alike the feedback they need to improve. Undergraduate student outcomes can already be measured in a variety of innovative ways, such as the 'concept inventory' system developed in physics. But more research is needed in this area.

The second requirement is to improve the support and rewards for university-level teaching. For example, universities and professional societies could offer staff systematic training in how to teach well — something less than a two-year degree, but more than a two-hour workshop. Universities could encourage donors to endow professorships based on teaching excellence. And funding agencies could make teaching more of a financial priority, as does the private Howard Hughes Medical Institute in Chevy Chase, Maryland, which offers scientists up to US$1 million over four years to innovate in science education.

Correcting the misalignment will be neither quick nor easy. But by showering so many rewards on research instead of on teaching, universities and funding agencies risk undermining the educational quality that is required for research to flourish in the long term. They need to find a more balanced way to allocate their resources — and in the process allow the majority of academic scientists to act on their conviction that teaching and research are equally important. ■

Mouse megascience

Mouse research for human diseases has grown, and researchers must defend and promote it accordingly.

From cancer to cognitive disorders, the mouse has become an important biomedical model, in both academia and industry. During the past decade, the creation of mouse resources has consumed untold millions of research dollars. Large-scale efforts have contributed to the sequencing of the animal's genome; developed smart tools to make genetically modified mice in which specific genes can be switched on and off in different tissues at will; and established repositories to house and supply mouse mutant strains or genetically engineered mouse embryonic stem cells that can be developed into mice 'to order'. Within a few years, embryonic stem cells with modifications in every mouse gene will be available.

But if the mouse is to fulfil its biomedical potential, that, unfortunately, is still not enough. The function of each gene must be identified through phenotyping: comprehensive screening to see what happens to the animals' organs and skeletons, and to their general physiology and behaviour, when individual genes are knocked out.

This has been understood by the cognoscenti for years. The European Commission has already spent several hundred million euros pioneering large-scale systematic phenotyping, and 'mouse clinics' are starting to spring up around the world. The International Mouse Phenotyping Consortium (IMPC) has just been launched (see *Nature* **465,** 410; 2010) to focus these efforts into a single global programme, which the US National Institutes of Health, under the leadership of Francis Collins, has endorsed with an injection of US$110 million.

The IMPC estimates that with 'just' $900 million it can phenotype 4,000 mutants in a five-year pilot project. To put this into perspective, the mouse has about 20,000 genes. Mouse genetics is launching itself into the league of stratospherically expensive science projects, a domain currently occupied by international physics mega-projects such as the Large Hadron Collider (LHC) and the fusion-energy project ITER.

Certainly, phenotyping will become cheaper and more efficient as technologies develop, but the scope of the IMPC pilot project will also have to expand in important ways that scientists are discussing. Secondary phenotyping may be needed to investigate particularly interesting hits from primary screens in more detail. Full phenotyping under different environmental challenges — yet to be decided, but possibly including high-fat diets — will also be incorporated. The inclusion of ageing mice to model our ageing society is also likely — an expensive prospect, given the time periods over which such mice must be kept. Phenotyping is, in fact, an infinite task, as long as a piece of string.

Mouse geneticists will have to prepare themselves for this new league in which they will no longer be competing for funding only within the life-sciences community, but with all scientific disciplines.

First, they will need to advocate the benefits to broader audiences. A full catalogue of mouse genes and functions will be invaluable in helping to crack currently intractable diseases. Individual scientists can certainly make slow progress laboriously creating and phenotyping knockout mice from scratch to model the plethora of candidate genes weakly associated with such diseases — but would save themselves years of possibly dead-end research by simply looking in a database.

Second, and most importantly, political paymasters must be reassured that the IMPC's aims are clearly ring-fenced and limited to the minimum effort that will serve all of biomedicine effectively; they will rightly fear the infinite piece of string. They face shrinking budgets, and the LHC and ITER have shown how easily — and by how much — billion-dollar budgets can overrun. They also have responsibility for competing social priorities such as climate change.

The international mouse-genetics community is now as united and cohesive as the international particle-physics community was when the LHC was conceived. It just needs to be as politically coherent. ■

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WHO/TDR/PASTEUR INST.

UN body will assess ecosystems and biodiversity

The United Nations is setting up a body to monitor global ecology modelled on its influential climate panel. Last week, representatives from 85 countries gathered in Busan, South Korea, to approve the formation of the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES), which will operate much like the Intergovernmental Panel on Climate Change.

According to the document hammered out on 11 June, the IPBES will conduct periodic assessments of Earth's biodiversity and 'ecosystem services' — ecosystems outputs, such as fresh water, fish, game, timber and a stable climate, that benefit humankind. These assessments, based on reviews of the scientific literature, will answer questions about how much biodiversity is declining and what the implications of extinctions and ecosystem change might be for humanity. Assessments will take place from global to sub-regional scales.

The IPBES will help to train environmental scientists in the developing world, both with a budget of its own and by alerting funders to gaps in global expertise. The organization will also identify gaps in research and highlight tools — such as models — for policy-makers looking to apply a scientific approach to decisions on issues such as land management.

"Governments wanted to be reassured that it would be lean and mean and streamlined."

Negotiations in Busan stretched late into the night as delegates debated the scope of the IPBES and how it would be funded. A key concern among developed countries was that the body should "not become a huge bureaucracy", says Nick Nuttall, a spokesman for the United Nations Environment Programme. "Governments wanted to be reassured that it would be lean and mean and streamlined."

Among the governments that assented to the IPBES's creation were the European Union, the United States and Brazil. This autumn the plan will come before the general assembly of the United Nations for official approval, which those involved say is a virtual certainty.

Anne Larigauderie, executive director of Paris-based Diversitas, a facilitator for biodiversity science, says that the IPBES could turn the "fragmented" field of biodiversity research into a more coordinated "common enterprise" that will lead to better models of future biodiversity changes. ■

Emma Marris

For a longer version of this story, see go.nature.com/cyOPX2.

Correction
The Editorial 'Mouse megascience' (*Nature* **465,** 526; 2010) wrongly stated that the estimated cost of phenotyping 4,000 mouse genes is $900 million; that is actually the estimated cost for phenotyping all 20,000 mouse genes.