Create or conform?

In an interview with Senior Editor Adam Gristwood, ICSU Executive Director Deliang Chen explains why universal interdisciplinarity is the key to taking science forward...

Mobilising the resources and knowledge of the international scientific community is increasingly important. Huge challenges such as climate change, biodiversity loss, food and water supply, energy and pandemics must increasingly be confronted in ways that transcend borders.

Yet progress is currently at a crossroads, where the right path could bring greater collaboration, research output and societal benefit, while the wrong path could see scientific progress stagnate and fail to connect with problems in the real world.

Deliang Chen, Executive Director of the International Council for Science (ICSU), points to an immense task in achieving a vision of a future guided by science and embedded in the needs of societies.

"Many of the problems we face are global in nature, covering a broad range of disciplines," he says. "Resources are quite limited at national level. We have to have more international cooperation efforts to achieve the goals necessary for society.

"Furthermore, resources are unevenly distributed. It is necessary to have more interdisciplinarity. By integrating different disciplines and facilitating more international collaborations, we hope to achieve universality in science."

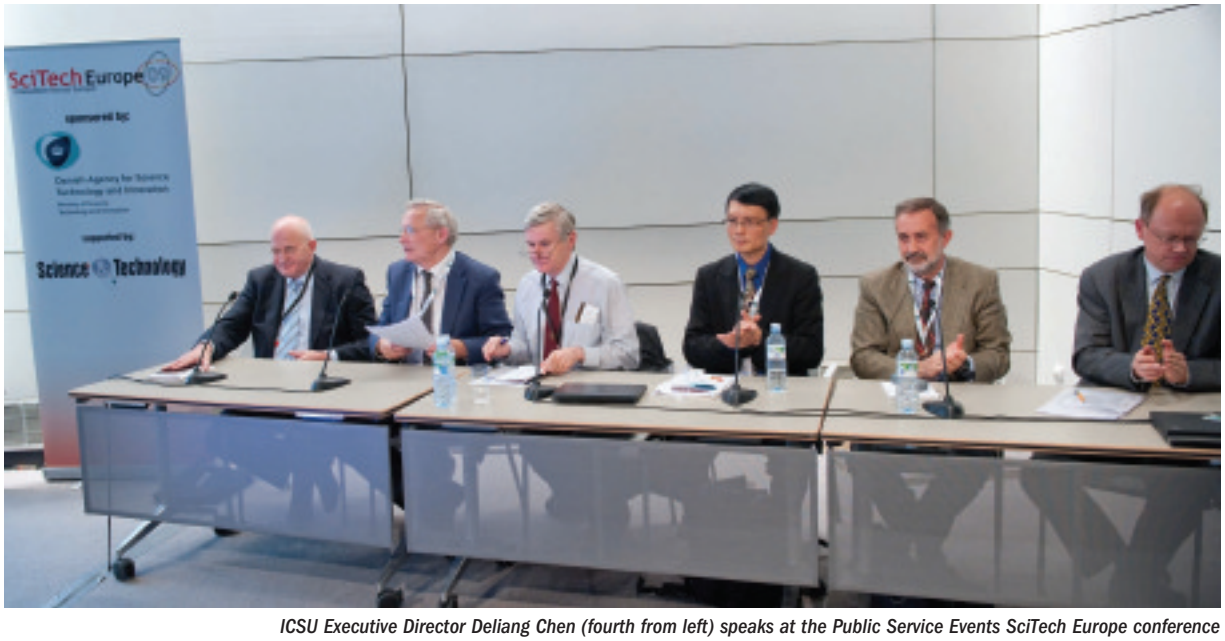
Chen is critical of the rigid structures in place for career paths of scientists, and also those in place for many funding, evaluation and overall coordination activities worldwide.

"You need to have this interdisciplinarity," he says. "Career paths for young scientists are still fairly traditional. It means that if you want to have a scientific career, you have to conform to the traditional way of doing science. Otherwise you do not have a future.

"The same is true with the funding mechanisms, not in all countries but in general this is the case." The result, he believes, is stifled creativity and stalled progress.

"If you are creative, then quite often you do not get a very high rank," he points out. "On an international level there are not enough innovative platforms bridging disciplines. Global platforms are really important in creating a research environment that is both productive and creative. "To achieve these, there must be coordination at the international level."

He points to the progress made by the World Climate Research Programme (WCRP) in developing global



ICSU Executive Director Deliang Chen (fourth from left) speaks at the Public Service Events SciTech Europe conference

climate models as a basis of climate change science and, in turn, the provision of information to decision-makers.

And such programmes have achieved much in building knowledge on the grand challenges societies face and making clear policy options at national, EU and international levels.

"Providing a platform for integration between social science and natural science is crucial in addressing grand challenges," says Chen.

"When we carry out assessments, looking at the scientific knowledge in relation to societal needs, often we try to address societal needs with our scientific knowledge.

"The IPCC assessment is a good example demonstrating a great need of an integrated approach involving both social and natural sciences. But we simply do not have enough people trained in both fields."

Another priority for ICSU is the strengthening of support for developing countries.

"There is a need for trained and knowledgeable people in all regions," he says. "We have to develop a network that can deliver, for example, lectures in developing countries by established scientists from the developed world.

"We should have extensive opportunities for scientists from developing countries to come to the best institutions in the developed world to gain experience and foster community integration.

"We need support for infrastructure – especially in terms of data delivery, accounting and visualisation and computing for information sharing."

In the developing world, international coordination of research programmes is critical, he says.

"We have to simplify interfaces and minimise duplication of efforts. Repeated working is often a problem in developing countries. You lose the critical mass needed to address the issue."

Important too is the development of mechanisms to ensure the career development of scientists from the developing world, he says. And governments, NGOs, foundations and multinational organisations must take collective responsibility.

"We need to develop suitable mechanisms at multiple career levels – for university students, early career scientists, post-doctorates, etc., to really provide people with a career path – an opportunity to work and stay in the developed world – to really develop themselves."

The magnitude of the challenge is immense, but one that can be met with the right resources, he says.

"Many organisations work in Africa, for example. Many are trying to achieve similar things, so there is a need for greater coordination."

Another major dilemma for policy-makers in the developed world is the alarming decline in interest in studying natural sciences and mathematics, he explains. This holds particular resonance given their pivotal role in economic and social advance.

"If you do not have young people interested in mathematics and science, we are going to have problems," says Chen. "We live in a knowledge society. Innovation and scientific development are very important for sustainable development."

ICSU has been conducting a review of its role in science education. And it has a significant focus on global environmental change programmes. It sponsors four programmes, including the WCRP, the International Geosphere-Biosphere Programme, the International Human Dimensions Programme and DIVERSITAS – an international biodiversity programme.

Catherine Brechignac
ICSU President

Together with ICSU President Catherine Brechignac, Chen has called for a 'spirit of cooperation' between the northern and southern hemispheres.

One such move will be the development of an IPCC-like Intergovernmental Platform for Ecosystem Services that will base recommendations on the research findings of programmes such as DIVERSITAS and embed them in social and environmental potentialities.

Here, Chen points to the challenge of getting policy-makers on board. "The most challenging thing for us is to convince governments that such a platform is needed to provide a scientific basis for decision-making at regional and local levels," he says. "Convincing them that existing infrastructures are not good enough to handle or tackle all the challenges and also to provide them with a very concrete design of the process."

Ultimately, achieving such goals requires greater links between natural and social science.

"Environmental policy decisions must be based on sound science," he says. "This requires integration of natural and social science. The challenge is to ensure people work together to support an integrated approach for science in achieving sustainable development."

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