

IOP Institute of Physics

Hardaker sees climate challenge

IOP chief executive says scientific literacy is key.

Heather Pinnell reports.

Scientists could play a greater part in explaining uncertainty to the public, not least in the debate over climate change, IOP chief executive Prof. Paul Hardaker told an audience at the Association for Science Education (ASE) conference in January.

Giving the annual John Lewis Lecture, Prof. Hardaker said: "There's a language barrier between science and the public. In science we thrive on uncertainty, whereas to the public it can mean that we don't know anything. Scientists have got a bigger role to play in being clear about the robustness of their evidence."

Prof. Hardaker, a former head of remote sensing at the Met Office and later chief executive of the Royal Meteorological Society, described the challenges involved in building models of the climate that could both be high resolution and take account of the complexities of the Earth's systems. There was an inherent trade-off between these two aims, he said, though the science was making great strides. Ensemble predictions, in which a model is run many times with slightly changed initial conditions, could help scientists to find a range of possible outcomes and estimate the uncertainty inherent in a prediction or forecast, he said.

Scientists had been aware of the Greenhouse Effect since the late 19th century and there was plenty of evidence to suggest that greenhouse gas emissions have an impact on climate, he said. "We cannot reproduce the climate that we have observed over the 20th century if we just use natural variability alone, but we can much more accurately explain the observations if we include the effect of greenhouse gas emissions. That's not factual proof that greenhouse gases are warming the atmosphere, but it's just part of a range



The IOP's chief executive, Prof. Paul Hardaker, speaking at the ASE conference in January.

of compelling evidence to suggest that human emissions of greenhouse gases are playing an important role in the changes that we have already observed," he said.

Everyone was coming at the issue of climate change and how to respond to it from different perspectives, he said, and there was probably no single, simple solution. But to meet the targets set by the government, which are based on the advice of the Intergovernmental Committee on Climate Change, the UK had to start significantly reducing emissions over the next 20 years or so. While there had been discussions about new nuclear power, renewables, and carbon capture and storage, none of these were likely to be adequate for the task within the next decade or so. This meant that we had to consider how we use and consume energy, which presented a really difficult social challenge, he said.

Stressing the need for scientific literacy among the whole population, he said that it was important that all

schoolchildren should gain an understanding of the scientific method and approach, so science education should not focus solely on those who were good at science.

Describing the IOP's many initiatives in education and its effort to increase participation in physics, particularly by girls, he asked whether anything could be learned from the field of meteorology, where almost half of undergraduates and PhD students are female. "Sadly not," he said. Increasingly, such students had learnt about meteorology in the geography curriculum and had found that they had to supplement their studies with further courses that had a high physics and maths content.

The late John Lewis, after whom the lecture is named, had made substantial contributions to scientific research, education and public policy, Prof. Hardaker said, and his talk was shaped by these themes. Catherine Wilson, the IOP's former head of education (schools and colleges), also spoke to pay tribute to Lewis, who died in October.

During the four-day conference at the University of Reading, the IOP ran workshops for teachers on seven topics: teaching physics through football, electricity, graphs and data analysis, forces, embedding careers in teaching, using video, and hands-on particle physics.

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Physics in a flash

Scientists say dissolving minerals may not rock



The pros and cons of adding finely ground olivine

to the oceans to try to mitigate global warming are assessed in a paper in IOP Publishing's journal *Environmental Research Letters*. Overall, the method would be "rather inefficient" the authors say.

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Schools compete in exoplanet project



Students at Lancaster Girl's School have won the autumn round of the Exoplanet Physics Project competition run by the Stimulating Physics Network. The project lasts for eight weeks each term and introduces Year 9 students to the principles that astronomers use to hunt for Earth-like planets. Teams submit their work in progress and a final presentation to judges from the UK's National Space Centre and the Planethunters group.

www.stimulatingphysics.org

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