



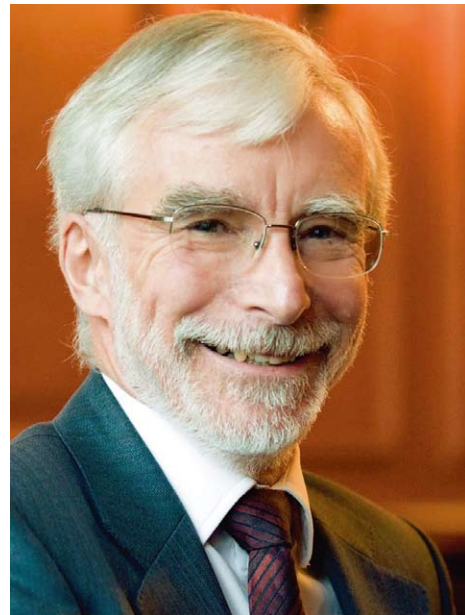
# “Mechanics Is to Look at Interesting Phenomena and Inspire Imagination”

— An Interview with Prof. Timothy J. Pedley

August 2012 is an unforgettable month for Prof. Timothy J. Pedley from Cambridge University: a few days after his nation had successfully hosted the Olympic Games in London, he and more than 1,500 mechanical scientists from all over the world gathered in Beijing, China to celebrate their own “Olympics” – the International Congress of Theoretical and Applied Mechanics (ICTAM). As President of the International Union of Theoretical and Applied Mechanics (IUTAM), Prof. Pedley talked to *BCAS* reporter XIN Ling immediately after the conference’s closing ceremony on August 24 to convey his impressions of the meeting, his insights into mechanical research in the world and in China, and his suggestions for young scientists.

*BCAS: What impressed you most during this conference?*

**Prof. Pedley:** The scientific quality of the conference is very high. The quality of the presentations was high, as always in ICTAM conferences thanks to a rigorous selection process for the papers. The invited lectures, sectional lectures and the opening and closing lectures were exceptional. As for participants, although the number of foreigners was a bit lower than we hoped, the number of Chinese participants was very good. There are a large number of mechanical scientists in China, and I’m glad many of them have joined in. Besides, I think the organization of the conference is very efficient. The China National Convention Center is very large, and the whole area is amazing. I have greatly enjoyed the conference.



Prof. Timothy J. Pedley.

*BCAS: It’s the first time IUTAM chose China to host an ICTAM meeting. How do you define China’s role in world mechanics? What do you think of the recent development of mechanics in China?*

**Prof. Pedley:** I know there is a long history of scientific investigation in China from ancient days, more ancient than other parts of the world. The number of scientists in China, in all subjects and especially mechanics, is very large and growing rapidly. At the moment, China’s mechanics tends to be more applied to addressing engineering and social problems, whereas in the West there is also a strong tradition of fundamental science which may not have an application for another twenty years, or even fifty years.



Prof. Pedley at Session 217 of the ICTAM Beijing meeting.

*BCAS: Do you have any collaboration with Chinese scientists?*

**Prof. Pedley:** Personally I had a Chinese postdoc who graduated from Xi'an Jiao Tong University and came to Britain to work with me about twenty years ago. She is now a professor and resident in the UK. In general, my collaborations with Chinese researchers are not very intense because I work on the fluid mechanics of swimming microorganisms, which is a growing subject not yet popular in China. However, I know some Chinese scientists who investigate the swimming of fish and flying of birds, and I like to talk to them. Three years ago I went to a conference on this subject in Shanghai with some Westerners and many Chinese. I think it was great.

*BCAS: As a leading mechanical scientist in the world, how do you see the development trend of mechanics?*

**Prof. Pedley:** Given that so many natural phenomena and industries are fundamentally based on mechanics, I think mechanics, especially the mechanics of new materials, will continue to develop very fast. The biological application of mechanics, where my research interest lies, is also developing rapidly. New mechanisms for drug delivery will be based on very small scale nano-mechanics, and people are researching the internal and external mechanics of cells of all sorts.

*BCAS: In many people's eye, mechanics is very abstract and asks for superb calculating abilities. What would you like to say to the students and young scholars who are interested in mechanical research?*

**Prof. Pedley:** I suggest they look at interesting phenomena. If you treat mechanics as an abstract branch of mathematics, then it's not so interesting. It's the phenomena, the things that happen for you to explore and understand via basic mechanical knowledge, that makes it exciting. If you are a theoretical scientist, make sure that somebody shows you the experiments. Go to the lab or the environment to see what's happening; don't just do the mathematics. This is my attitude to applied mathematics.

In Britain, if I talk about applied mathematics, I mean *applying* mathematics. But in some other countries, applied mathematics means the mathematics that *may be applied*. To me, it's "doing the applying" that is important: it may not be new mathematics, but getting new understanding of physics or other phenomena. I think education in mechanics should be concentrated on solving interesting problems from science, engineering, industry and the natural world, and not doing it as if it was a branch of mathematics. Mechanics should not be abstract. It should be concrete.

*BCAS: What are your suggestions for the future development of mechanics in China?*

**Prof. Pedley:** Imagination is a very important part of all sciences, including mechanical science. The best science is often performed by the best scientists following their own ideas to do what interests them, what is fundamental and can be very imaginative. In China, there is often a belief that the No.1 authority, an old professor, must be right. But in the West, the opposite is true. We encourage young people to criticize and question what their teachers tell them. The questioning of authority is a means to get imaginative ideas and new developments more quickly, both for technology and for fundamental science. Not only the Nobel Prizes but companies like Microsoft and Google grew out of people being imaginative when they were very young. That's a major difference between Western traditions and those of Asian countries, including China. However, I think the situation is changing here. More and more good universities encourage their students to think with imagination, and there are so many good students that you get some *really* good ones. Maybe in ten years' time, I couldn't say these things.