

## Plenary Address: Our World in the Next 50 Years—The Importance of Science and Science Communication

Speaker:

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As the Goldsmith's Professor of Materials Science, Colin Humphreys studies intimidating fields: electron microscopy, ion-beam lithography, and superconductivity. But when he opened Monday's address with a quotation by Donald Rumsfeld, the ensuing laughter put everyone at ease:

I would not say that the future is necessarily less predictable than the past. I think the past was not predictable when it started.

Humphreys listed predictions made in 1950 by Waldemar Kaempffert, *New York Times* science editor, about the year 2000:

- Steel would be replaced by light metals.
- The average price of a house would be \$5000.
- Everything in the house would be made of plastic.
- Cooking would be defunct.
- Each family would have its own private helicopter.

Having planted images of *The Jetsons* in our minds, Humphreys concluded that one cannot make detailed predictions about the future. However, he highlighted key issues that will make our next 50 years the most challenging in history.

Since 1976, China has incorporated engineers into its leadership, including Presidents Hu Jintao and Jiang Zemin. Not surprisingly, 80% of its schoolchildren want to be engineers, too, and why not?

China's scientists earn salaries comparable with those of its lawyers and financial experts. China invests in science because it views science as its path to economic success. In the last 5 years, China has increased research and development investment by 24% per year, compared with only 4.5% per year in the United States. Manufacturing in China increased by 28% last year, causing a record trade surplus. China also plans to export steel and is building massive steel plants. Humphreys believes that in the next 10 years, China will dominate world manufacturing and trade, whereas other countries will experience trade deficits and job losses. In the next 50 years, China may surpass the United States as the world's leading economic and military power.

Although global warming was discussed later, Humphreys stated that more people probably will die in this century from a lack of drinkable water than from the results of global warming. The main problem is how to destroy the bacteria, viruses, and mosquito larvae in water, preferably without chemicals. One potential solution, the use of ultraviolet radiation from mercury lamps, has practical challenges related to the high operating voltage required. A new technology that emits ultraviolet radiation, the use of aluminum gallium nitride light-emitting diodes, requires low voltage but currently



**Humphreys**

has low efficiency. Humphreys estimates that it will take about 10 years to increase its efficiency enough to win the water war.

In 2005, for the first time, we used more oil and gas than we discovered. According to Humphreys, the gap between supply and demand will continue to widen with a continual slow rise in the cost of energy, causing difficulties for poorer nations. A newer energy source, solar energy, has great potential but also huge problems regarding worldwide use. Nuclear power, a clean energy source, will need to be used instead. The basic message is that we are not about to run out of energy, but we should not expect gas prices to come down any time soon.

Al Gore's 2006 film, *An Inconvenient Truth*, made global warming a hot-button issue (no pun intended), but scientists have been studying the subject for years. Part of the problem is natural: we are between two ice ages. Another part is due to our four-legged friends: methane, produced by cows and sheep, causes 30% of global warming. The rest of the responsibility lies with us. The concentration of carbon dioxide in the atmosphere is the highest in 650,000 years. Despite the 1997 Kyoto Protocol, world carbon dioxide emissions are 30% higher than they were in 1990. Without a change in human behavior, droughts and flooding will cause millions of people to be displaced from their homes.

The good news? Science and science communication are the answer to solving these challenges. The next 50 years will be exciting times for science editors! 🔥