

# 'Termite guts can save the planet', says Nobel laureate

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The way termite guts process food could teach scientists how to produce pollution-free energy and help solve the world's imminent energy crisis. Speaking at the Institute of Physics conference Physics 2005 in Warwick today, Nobel laureate Steven Chu urged scientists to turn their attention to finding an environmentally friendly form of fuel. In an impassioned plea to some of the world's brightest minds, he explained how he's leading by example, and encouraged others to join the effort which "may already be too late."

Chu, who shared the Nobel Prize for Physics in 1997, has begun studying termite guts – one place in nature where a key hurdle for carbon-neutral energy supply has already been solved. Termite guts take indigestible cellulose, which makes up the bulk of all plant material grown on earth, and convert it to ethanol, which even today is a versatile and popular fuel.

Chu described how he decided to leave the richly-funded precincts of Stanford University to become Director of the Lawrence Berkeley Labs to kick-start the effort. He has been cajoling his new colleagues, including 56 members of the prestigious National Academy of Sciences, to realise the gravity of the problem and shift the focus of their research. And, he says, it's beginning to work.

The US already subsidises farmers to grow corn to turn into ethanol, but \$7bn in the past decade has been wasted because the process isn't carbon-neutral. "From the point of view of the environment," explains Chu, "it

would be better if we just burnt oil."

"But carbon-neutral energy sources are achievable. A world population of 9 billion, the predicted peak in population, could be fed with less than one third of the planet's cultivable land area. Some of the rest could be dedicated to growing crops for energy. But the majority of all plant matter is cellulose – a solid, low-grade fuel about as futuristic as burning wood. If scientists can convert cellulose into liquid fuels like ethanol, the world's energy supply and storage problems could both be solved at a stroke."

This is where the termite guts come in. A billion years of evolution have produced a highly efficient factory for turning cellulose into ethanol, unlike anything which humans can yet design. By exploiting these tricks, says Chu, we can use biology as a solution to a pressing world problem.

Nuclear fission may be the holy grail, but in the 50 years since it was first proposed, the predicted time-to-market has grown ever more distant. Solar and wind power look appealing, but mankind has not yet discovered how to store electricity on a large scale. Ethanol – a chemical fuel which would release no more carbon than it took to produce, would be the solution.

Immense funding is made available to cure the "diseases of rich people" such as cancer and heart disease, says Chu. "If we can't cure cancer in 50 years," he says, "it will be tragic but life will go on. But if we can't develop carbon-neutral fuel sources, life will change for everyone."

Source: Institute of Physics

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