THE WONDERS OF NANOSCIENCE: INSECTS HELP DEVISE NEW INSTRUMENTS AND WHITE LIGHT SAVES MONEY

While physicists and biologists at Bristol University are using nanoscience to devise new instruments by understanding the way that insects hear, scientists at Bath University are looking at how nanoscience can save your electricity bill.

The Atomic Force Microscope is the main tool used to obtain images at the atomic scale. Likened to an old fashioned record player, it has an 'arm' with a highly sensitive probe on the end. Much like a stylus bumping around in the groove of a record, the probe moves across the specimen, mapping its shape by 'feeling' the bumps. The result is a three-dimensional map of the specimen's surface. However, when examining delicate biological material, such as DNA, there is a risk that the probe might damage it.

By collaborating with colleagues in the Biology Department, Professor Mervyn Miles and his researchers in the Physics Department at Bristol University have used the Atomic Force Microscope to 'see' the ways in which insects such as locusts and moths use their hearing systems to detect very faint vibrations. Understanding how this happens has helped them devise more sensitive instruments, with which to 'see' delicate biological materials.

Professor Daniel Robert from Biological Sciences said: "We actually borrow their tools to study our insects. In return, by understanding how biological systems have evolved to detect these tiny vibrations, technologists understand how to devise better instruments to detect vibrations."

This kind of interdisciplinary research is key to nanoscience and is central to the philosophy of the Interdisciplinary Research Centre in Nanotechnology, a new initiative recently awarded to the universities of Bristol, Cambridge and University College London. It is funded with £10 million for six years and has already attracted substantial further funding. Several groundbreaking discoveries have already spawned the creation of the University's spin-out company, **Infinitesima.** Professor Miles said: "The excitement that we've had by working with biologists can be reproduced

by bringing together chemists, engineers and mathematicians, into the new centre. There we will create new ideas and new directions and the whole process will occur at a much more rapid pace."

A few miles down the M4 in Bath's Nanotechnology Research Centre, a new revolution in lighting technology is being developed. Based on Light Emitting Diodes (LEDs) and known as Solid State Lighting, researchers estimate that in the next 20 years 90 per cent of the world's lighting will be provided by this technology.

Until recently Light Emitting Diodes (LEDs), only produced red light. Recent research has allowed LEDs to emit high-quality green and blue light as well, so that the full spectrum can now be produced artificially. Conventional lighting emits a yellowish light, but light produced by combined LEDs can be tuned so that the result is more like natural sunlight.

Professor Wang-Nang Wang said: "Our research here is looking at some novel LED designs and trying to increase their efficiency. In addition, we are combining different LEDs and optical designs to create something very close to natural light in lighting."

LEDs last 20 times as long as ordinary light bulbs and can be readily adapted into any shape or form for lighting. At the moment, 20 per cent of the world's energy consumption is in the form of lighting, so any reductions in consumption will not only save costs, but will also contribute to saving the planet. END

Notes for editors

A newsclip featuring this research will be broadcast by Research-TV on Thursday 3 February. **The feed time is 12.15-12.25.**

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