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Fri, Jan 12, 01

Scientists go back to nature to go forward

By NIALL MCKAY

Now that the Internet is hanging its head in shame after failing us as the great technological revolution where do we go from here?

Recently, I made a pilgrimage to some of the most prestigious research institutions on the planet in search of the new hope for the technology industry. I spent the first couple of days of 2001 at IBM's Thomas J. Watson Research Center in Yorktown Heights in New York and Lucent's Bell Labs in Murray Hill, New Jersey.

IBM's research centre is responsible for bringing us products such as computer memory and the average home contains at least 25 products that stem from Bell Labs innovations, including phones, TVs, remote controls, VCRs, radios, stereos, CD players, and computers.

Both institutions are famous for long-term research. They pump massive funds into science and technology that seemingly has no bearing or relationship to product development. However, there are several themes emerging.

Firstly, there is a convergence or a blurring of the lines between traditional scientific disciplines of biology, physics and chemistry.

In the past, these research institutions would have predominantly hired physicists. Now they need biologists and chemists. The biologists observe biology and figure out how Mother Nature computes. The chemists are figuring out ways to build computing devices by mixing solutions in a beaker and the physicists figure out how to

make these devices work.

For example, at IBM I met Dr Shouheng, a materials chemist who is developing new magnetic storage technology by combining iron and platinum molecules.

The solution is basically mixed in a beaker and coated onto the hard disk and, if Dr Shouheng and his team can get the technology working, it will give us a tenfold increase in storage capacity.

This means that by the time the technology is ready for prime time - a mobile phone could have as much storage capabilities as today's PCs.

So far, Dr Shouheng has managed to combine the molecules and bind them to the hard disk. However, now IBM's quantum physicists need to figure out the new compound's magnetic properties.

This brings us to the second theme that because microprocessors and storage devices are getting smaller and smaller, the next scientific disciplines that these institutions are working on are quantum computing and nano-technology - the manufacture of materials and devices 10 thousand times smaller than the full stop at the end of this sentence.

For years quantum computing has been the almost exclusive domain of atomic physicists but has meant nothing to the rest of us. Now there is a push in the US to develop quantum computers. The Defence Advanced Research Projects Agency - the research-funding arm of the US military - is pumping \$100 million (€106 million) into the science.

The third area of advanced research is finding new ways for humans to interact with computers so that every time we want to collect our e-mail, find a phone number or buy a product over the Internet we don't have to find a computer, boot it up and connect to the Web.

However, what was almost as interesting as what these places were developing was how they managed to produce so much good science. One would be forgiven for picturing these centres of scientific and technological excellence as places where eccentrics with long beards pace the halls bellowing eureka and scribbling their thoughts on the nearest napkin, however they are massive sterile government-like buildings.

What is interesting is that These people think for a living and if for some reason you manage to wangle your way in and you're not very smart then you'll be bullied by the

intellectuals who don't suffer fools, sloppy thinking or poor arguments.

At least half of all the research scientists are foreigners. Indians, French, Germans, Chinese to name but a few. Most of the Irish have left in the past couple of years and returned home. Basically, these research institutions don't care where you're from as long as you have a PhD and a good idea.

The US still manages to attract some of the best and brightest from around the world. Of course, there's also the money. IBM pumped over \$5.8 billion into research and development last year . . .

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