



TEXT SUPPORT

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In conversation with
Ted Sargent

THE DANCE OF MOLECULES,
HOW NANOTECHNOLOGY IS
CHANGING OUR LIVES

RATING: ★ ★ ★ ★ ★

TED SARGENT IS ONE OF THE world's leading researchers in nanotechnology. *The Dance of Molecules, How Nanotechnology is Changing Our Lives* is a book that helps envision a changed world in the not too distant future. It points to the possibility of great advances in fighting disease and to the potential dangers of hazardous nanotechnology waste. My only wish for this very well-written and highly informative book would have been having the Epilogue information up front to lead me in to the science of the technology. That said, I thought the sections on Health, Environment and Information were extremely well done.

Many people think that to understand nanotechnology one needs to study a single set of scientific principles. Why is this incorrect?

Nanotechnology is more culture than content — a re-evaluation of what is important in science and engineering. It's the active search for convergence among traditionally disparate disciplines — a quest to see the unity of ideas. One example is ophthalmologists taking advantages of engineers' exquisite control over silicon to enable blind people to see by connecting a sight-giving chip directly to the optic nerve.

You note that nanotechnology is a re-birth of Renaissance science. Most formal structures of study both in academia and industry are more vertically oriented. Does nanotechnology ask us to reconsider how we formally structure most research?

Nanotechnology is both horizontally and vertically integrated. It cuts laterally across traditional disciplines. My own group consists of people who would traditionally have been labelled synthetic chemists, others called materials scientists, some of them optical physicists, others electrical engineers. People are leveraging each others' talents so much that now we hardly re-

FAST
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Favorite author

Salman Rushdie

Favorite Web site

www.engagingtheword.net/

A good book ...

Engages, and thereby empowers, the reader

Guilty pleasure

Miso- and mirin-marinated black cod

member which teammate came from which traditional silo.

My own group also seeks to be vertically integrated: We go from fascinating fundamental science (e.g. new chemical synthetic routes, new physical properties, quantum phenomena) all the way to very human applications addressing the world's energy needs, enabling people to see in the dark, making materials that could help seek out cancerous tumours when they're a 100 cells instead of the billion cells we see them at today.

Explain how nanotechnology will change both the diagnosis and treatment of diseases such as cancer. When will we see these changes in our hospitals?

In three ways:

1) In enabling us to diagnose cancer at the earliest stages. Today we catch cancer typically seven years after it began. This gives it ample opportunity to spread. Nanotechnologists are using molecular beacons to see which cells are where, spotting the subtlest signs of the emergence of a nascent tumour and determining malignancy without biopsy. This has been shown in animals and might see relevance in humans in five years.

2) In enabling us to treat cancer in a localized way, killing the bad cells but not the good, and thereby also allowing us to administer higher doses of chemotherapeutic agents where they're needed. The lab of Bob Langer at MIT has alone generated 30 products that are either on the market or in FDA trials.

3) In enabling us to grow replacement organs in the lab. Eighty thousand people are on organ transplant waiting lists

right now. Each year 15 per cent of those on waiting lists die. Tissue engineers are working to grow organs in the lab that are intrinsically compatible with the patient — they use the patient's own cells. Already lab-grown tissue has been shown to be effective in animals.

The U.S. military is among the world's leading investors in nanotechnology research. What sorts of changes might nanotechnology bring to both the battlefield and to war strategies?

Researchers are working towards producing muscle-suits that can apply force to aid the wearer in lifting loads or can compress a wound in the battlefield. They're working to make smart materials that can change colour to provide camouflage. They're making flexible materials that nevertheless protect the soldier from bullets and can on command protect the soldier from chemical and biological agents. At MIT, Tim Swager has built cheap, wearable sensors that can detect TNT at parts per quadrillion — dogs are sensitive to parts per trillion.



INSIDER

The most wonderful time of the year

THE HOLIDAY SEASON IS UPON US ONCE AGAIN, a time to reflect on some of the deeper philosophical questions that give meaning to our plebian existence, like: Can I afford that? Or that? Where did the year go? And, of course, what critter will Telus Mobility press into service to sell us more phones this year?

The Telus critter ads are, I am told, meticulously market-researched, focus-grouped and demographically targeted (hello, women aged 18 to 34). While Fido stuck with mutts — to be fair, adorable widdle mutts, yes you are yes you are, who's a pwetty widdle doggie? — ahem, sorry — Telus tags a new poster species every year, thus guaranteeing the attention of a different animal-mad sub-demo each year. The pot-bellied pig fanatics had their day. So did birders. Telus even made lizards heart-tugging in their own creepy, cold-blooded, reptilian way.

(Notice, though, that nobody aside from the toilet paper people — oh, feel the cottony softness — ever ventures near cats. That's because of something

every cat owner knows in the depths of his or her heart, but refuses to admit — YOUR CAT HATES YOU. But I digress.)

This year's spokesperson is the bunny. Not rabbit, mind, but bunny. And judging by the gushing it's provoked, bunnies are a winner.

A media-circulated statement tells us the types of bunnies represented in the ads (lops, dwarfs, rexes and more), their weight (two to four pounds) and their source (a rabbitry in Dundas, Ont.).

There's also mention of how easily the animals adapted to their roles: "Not only did they all get along with each other, they never displayed a hint of grouchiness to the Telus Mobility team members working with them. As long as they were free to eat non-stop, they were happy."

(This applies equally to the staff here at IT Bidness Central, as a matter of interest. Let us eat, we're all smiles. Get between me and my sammich, though, and — as my friend Angie likes to say — Drop Da Puck.)



COLE SLAWSOME

New to the Web, courtesy of an outfit called Strategic Hair Command, is nifty little service called Slawsome (www.slawsome.com). It's early in development yet — "Slawsome is so alpha it makes us cry," notes the Web site — but the service allows the user to embed voice files in e-mail messages. Thus, one can actually communicate verbally with someone far away.

It's cool. But it's been done before. I remember something called a telephone . . .

PSST! Got an inside scoop? Email us at insider@itbusiness.ca