

The Atari ST is a home/personal computer that was commercially popular from 1985 to the early 1990s. It was released by Atari in 1985. The "ST" officially stands for "Sixteen/Thirty-two" (1), which referred to the Motorola 68000's 16-bit external bus and 32-bit internals. The Atari ST was a notable home computer, based on the Motorola 68000 CPU, with 512 KB of RAM or more, and 3 1/2" floppy disks as storage. It was similar to other contemporary machines which used the Motorola 68000, the Apple Macintosh and the Commodore Amiga.



TECHFOCUS

The unfamiliar world of Bionanotechnology

AHSAN HABIB

"Everyone was so quiet watching this movie. It was amazing," said Clayton Teague, director of the National Nanotechnology Coordinating Office, during the presentation of a video clips created by Samuel Stupp, a materials scientist and director of the Institute for Bionanotechnology in Medicine at Northwestern University. The video's protagonist was a mouse with a damaged spinal cord and it could only barely move using its front legs. Stupp's research involves engineering nanomolecules called peptide amphiphiles consisting of a hydrocarbon tail attached to a peptide into which is inserted amino acid sequences that stimulate neurons to seek new connections with neighboring neurons. As the video clip revealed, two months after the injured mouse received an injection of Stupp's peptide amphiphiles, it was able to move using all four limbs. Analyzing anatomical, molecular, and behavioral results from mice with spinal cord injury, Stupp and his collaborator, Northwestern neurology professor John A. Kessler, suspect that the amphiphiles, which form a gel when they self-assemble, prevent scar tissue from forming, thereby allowing initiation of the regenerative process in the injured spinal cord, a process that normally is blocked.

The idea of Nanotechnology was first given by Richard Feynman in 1959 during his talk at the California Institute of Technology. "The principles of physics, as far as I can see, do not speak against the possibility of maneuvering things atom by atom. It is not an attempt to violate any laws; it is something, in principle, that can be done; but in practice, it has not been done because we are too big," said Feynman.

But Richard Smalley is considered as the "Pioneer of Nanotechnology" who won Nobel prize in Chemistry in 1996 for discovering buckyballs—the all-carbon, soccerball shaped molecules—that helped to push nanotechnology into high gear. Smalley, who died of leukemia in October at the age of 62, was one of the most vocal champions of the beneficial potential of Nanotechnology, which he argued was destined to solve major societal and medical problems. In many of his speaking engagements since his cancer diagnosis

in 1999, he asked rhetorically, "Am I part of the last generation to die of cancer, or the first to be saved by nanotechnology?" Now there is a growing roster of biological nanotechnologists who are taking audacious questions like Smalley's to heart and to their laboratories.

The word "Nanotechnology" conjures up the notion of human innovation and control over objects and processes on the nanometer scale. Mankind did

of atoms to form a desired molecule. But it is nanotechnology on a bulk scale, controlled by statistical mechanics rather than controlled atom-by-atom at the nanometer scale.

From Biotechnology to Bionanotechnology
Biotechnology harnesses biological processes and uses them for our own applications. For instance, researchers routinely use purified enzymes to cut and

Bionanomachines in nature

As you read these words, about 10,000 different nanomachines are at work inside your body. These are true nanomachines. Each one is a machine built to nanoscale specifications, with each atom precisely placed and connected to its neighbors. Remarkably, many of these nanomachines will still perform their atom-sized functions after they are isolated and purified, provided that the environment is not too harsh. Already, these nanomachines have been pressed into service. Natural digestive enzymes like pepsin and lysozyme are so tough that they can be added to laundry detergent to help digest away stains. Amylases are used on an industrial scale to convert powdery starch into sweet corn syrup.

Another example is the flagella that push bacteria around in pond water, driven by a motor that looks like it came from a mechanical parts catalog.

Nanomachines: doctors of tomorrow!

Scientists have built a tiny biological computer that might be able to diagnose and treat certain types of cancer. The device, which only works in a test-tube, is years from clinical application. But researchers hope it will be the precursor of future 'smart drugs' that roam the body, fixing disease on the spot.

Instead of silicon chips and electrical circuits, the minuscule machine is made of DNA. And rather than being controlled by electrical signals, it senses changes in its environment and responds by releasing biological molecules.

The biocomputer senses messenger RNA, the DNA-like molecule that helps create proteins from the information in genes. In particular, it can detect the abnormal messenger RNAs produced by genes involved in certain types of lung and prostate cancer.

When the computer senses one of these RNAs it releases an anticancer drug, also made of DNA, which damps expression of the tumor-related gene, researchers report in Nature.

Billions of the computers can be packed into a single drop of water, so they could easily fit inside a human cell. "It is decades off, but future generations of DNA computers could function as doctors inside cells," says Ehud Shapiro from the Weizmann Institute of Science,

Israel, who led the research. The idea is they could diagnose disease from within cells and dispense drugs as necessary.

Prospects of Bionanotechnology in Bangladesh

Food shortages and starvation will be a thing of the past if Bionanotechnology is perfected. Nanomachines will be able to turn any material into food, and this food could be used to feed millions of people world wide. Again, since the technology is self replicating, food produced by nanomachines will be low cost and available to all.

As well as food, nanomachines will be able to build other items to satisfy the demands of our growing population of consumers. Clothing, houses, cars, televisions, and computers will be readily available at virtually no cost. Furthermore, there will be no concern about the garbage produced by the new consumerist society because nanomachines will convert it all back into new consumable goods.

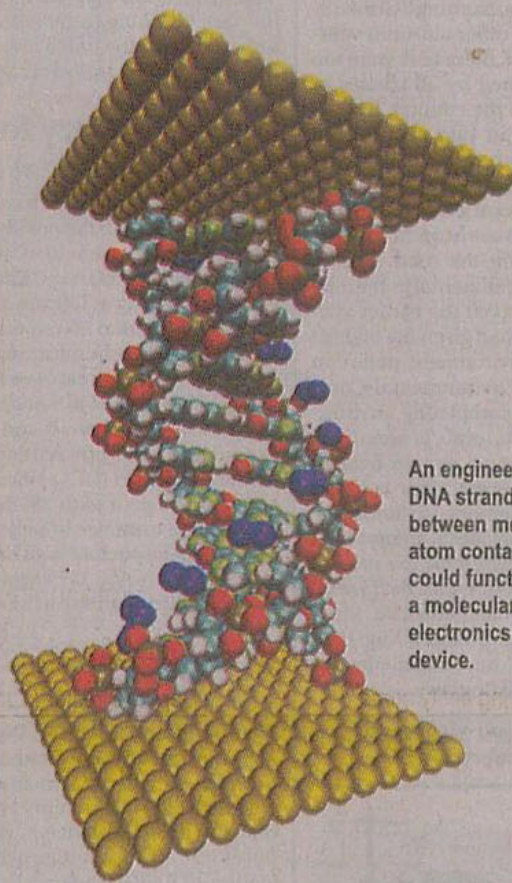
Environmental problems such as ozone depletion and global warming could be solved with nanotechnology. The perfection of nanotechnology and the production of nanomachines could herald a new age for humanity. Starvation, illness, and environmental problems could quickly come to an end.

In Bangladesh, the department of Biotechnology and Genetic Engineering, Khulna University, Khulna included the course of Bionanotechnology in their Masters level. Though it is a modern technology and seems to be impossible at present in respect of our country, but I do believe we have merit and knack to handle the science of Bionanotechnology if we get proper opportunity and cooperation.

The above article is extrapolated from several scientific papers.

- References**
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An engineered DNA strand between metal atom contacts could function as a molecular electronics device.

not make any concerted effort to shape the atoms in manufactured products until medieval times, when alchemists sowed the seeds of the modern science of chemistry. During their search for the secrets of immortality and the transmutation of lead to gold, they developed methods for the willful combination of atoms. Chemical reaction, purification and characterization are all tools of the alchemists. Today, chemists build molecules of defined shape and specified properties. Chemical reactions are understood, and tailored, at the atomic level. Large quantities of pure materials are mixed and reacted, and the desired product is purified from the mixture of molecules that are formed. Nonetheless, chemistry is nanotechnology—the willful combination

paste genetic instructions and add this back into cells. Knowledge of the atomic details are not important, just as knowledge of the type of ink used to print this page is not important for understanding the words printed here. On the other hand, bionanotechnology is a subset of nanotechnology: atom-level engineering and manufacturing using biological precedents for guidance. It is also closely married to biotechnology but adds the ability to design and modify the atomic-level details of the objects created. Bionanomachines are designed to atomic specifications, they perform a well-defined three-dimensional molecular task, and, in the best applications, they contain mechanisms for individual control embedded in their structure.

TECHNEWS

Sun, Jobs-Iris announce IT education initiative in Bangladesh

RIDWAN A KABIR

SUN Microsystems and the Job Opportunities and Business Support Centre for Institutional Reform and Informal Sector Bangladesh (Jobs-Iris) hosted a dinner on September 4, on the occasion of signing of a memorandum of understanding (MoU) focusing on Sun Academic Initiative (SAI). The programme aims to enhance Bangladesh students' skills and core competency in Sun Technology and their marketability.

The dinner in Hotel Sarina in the capital was also co-hosted by Amir Khasru Mahmud Chaudhury, a member of the parliament of Bangladesh. The MoU was signed between Thulasiross Mohandoss, Sun Microsystems' regional director for government education and health care in South Asia, and A Imran Shauket, country representative of Jobs-Iris. Under the agreement, Jobs-Iris Bangladesh will help increase awareness about the latest Sun technologies among the members of the academia and student-apprentices of Bangladesh and will create opportunities for them to be trained in those.

The event was presided over by State Minister for Education ANM Ehsanul Haque Milan, who in his speech emphasised the importance of having a solid information technology (IT) structure in Bangladesh, along with highlighting how Sun can play a key role in developing an efficient IT human resources base in Bangladesh through its ongoing local training programmes.

"The world currently has a shortage of adroit ICT profes-

sionals, and Bangladesh is definitely expected to guarantee a good supply of qualified IT professionals and a related labour force given the proper working environment and nurturing," said Shauket, while emphasising how both local private and public IT industries should take all necessary initiatives for acquiring the elements required for such nurturing to occur in the country. Shauket also mentioned how the focus intends to minimise the gap that exists currently between the local ICT industry and the academia. "We may realize that one given graduate from the most reputed institution may also be taken as if he is not well equipped to face the existing practical ICT picture," he said, referring to how the academia may also need to put a little time in re-designing their course curricula so that the graduates may fulfil the ICT demands of the local industry.

According to a recently conducted survey jointly funded by UNDP and Jobs-Iris, it is anticipated that there will be a worldwide shortage of up to 2 million experts by 2008 in the field of IT profession, including 500,000 in India alone. "If Bangladesh has more educational institutions offering internationally certifiable, industry standard ICT education, it can produce highly skilled ICT professionals, for both domestic and international employment," Shauket continued. "It is estimated that non-resident Bangladeshis (NRB) skilled in ICT can generate over US\$1.5 billion in remittance within a decade."

"The target remains simple, we take internationally acclaimed ICT education to all the doors and corners of this

nation," Shauket said, stating further how offering internationally recognised certification courses at all polytechnic institutions could easily fill up some of the anticipated ICT workforce shortage.

According to Mohandoss, students today are looking for more than only book-bound education; they are looking for an edge, a usable and user friendly tool. "With Sun technology training, prospective ICT professionals may propel themselves into fulfilling their career goals, which in turn will create a talent pool of well trained ICT professionals benefiting the local economy," he said.

Certificates were also awarded during the MoU signing to SAI instructors who recently participated in a Sun led instructors' training on Java and Solaris technologies. The instructors come from American International University Bangladesh (AIUB), Chittagong University of Engineering and Technology (CUET), the Directorate of Technical Education under the ministry of education, Feni Computer Institute, Mohila Polytechnic Institute, Shahjalal University of Science and Technology (Sust), and University of Liberal Arts Bangladesh (ULAB).

The MoU dinner was preceded by a University Day held from 10:00am till 1:00pm at AIUB auditorium. The event started with speeches by Shauket (Jobs-Iris), Dr Carmen Z Lamagna, vice-chancellor of AIUB, and Mohandoss. Dr Moyeen Khan, minister of science and ICT, presided over the opening ceremony as chief guest.

TECHSEMINAR

Seminar on infrastructure optimisation initiative held

STARTECH DESK

MICROSOFT Bangladesh held a seminar on Infrastructure Optimisation Initiative on September 6 in Dhaka. Dwayne Nortmann and John Phillips of Microsoft Asia Pacific delivered the key presentations.

According to the presenters, more than 70 percent of a typical IT budget is spent on infrastructure, such as servers, operating systems, storage and networking. Add to this the need to refresh and manage desktop and mobile devices and you have a unique set of challenges for IT infrastructure to face. The Infrastructure Optimisation Model helps customers understand and subsequently improve the state of their IT infrastructure and describes what that means in terms of cost, security risk, and operational agility.

IT infrastructure is a strategic asset and the critical foundation upon which software can deliver services and user applications that a business needs in order to operate effectively and succeed. For many organizations growth and rapid developments in new technologies have resulted in data center and desktop infrastructures that are overly complex, inflexible, and difficult to manage with built-in costs that are not only high, but somewhat fixed regardless of changing business requirements.

Most organizations recognize the importance of an optimised and cost efficient IT infrastructure and have tried to rationalise their infrastructure and increase their operational efficiency through initiatives such as data center consolidation, desktop standardisation, implementing IT operational

best practices, etc. Such initiatives undertaken by IT departments in isolation are not sufficient on their own to deliver the desired and long lasting improvements demanded by the business. In order to achieve a sustained improvement in their IT infrastructure,

fragmented or nonexistent to optimised and repeatable. A customer's ability to use technology to improve their business agility and deliver business value increases as they move from the Basic state up the continuum toward a Dynamic state, empowering



One of the keynote speaker at the seminar

organisations must take a longer term strategic view of IT infrastructure maturity and link these capability and maturity improvements to their business needs and overall business strategy.

The Infrastructure Optimisation Model helps customers realize dramatic cost savings for their IT infrastructure by moving from an unmanaged environment towards a dynamic environment. Security improves from highly vulnerable in a Basic infrastructure to dynamically proactive in a more mature infrastructure. IT infrastructure management changes from highly manual and reactive to highly automated and proactive.

Microsoft and partners can provide the technologies, processes, and procedures to help customers move through the infrastructure optimisation journey. Processes move from

information workers, managers, and supporting new business opportunities.

By working with Microsoft and using this model as a framework, an enterprise can quickly understand the strategic value and business benefits to the organisation in moving from a "basic" level of maturity (where the IT infrastructure is generally considered a cost center) towards a more "dynamic" use, where the business value of the IT infrastructure is clearly understood and the IT infrastructure is viewed as a strategic business asset and business enabler.

IT Decision makers from banks, telecom companies, manufacturing, UN, multinationals, local corporate were present at the seminar along with the local Microsoft partners and Microsoft Bangladesh executives.

PHOTO TECH



BIONIC HIGH-FIVE

Claudia Mitchell (R) and Jesse Sullivan (L) "high-five" each other as they demonstrate the functionality of their prosthetic arms during a news conference on September 14 in Washington, DC. Mitchell is the first female recipient of a "thought controlled bionic arm", an advanced prosthesis, developed by the Rehabilitation Institute of Chicago.

PHOTO: AFP