Nano convergence topic of SEMI webcast

Small Times, Aug. 16, 2004

The convergence of **nanotechnology** and the **semiconductor** industry will be discussed during SEMI's quarterly webcast Wednesday at noon EDT.

New Technique That Improves The Power Of Atomic Force Microscopy

Space Daily, Aug 17, 2004

Researchers have developed a **method** that could vastly improve the ability of atomic force microscopes (AFM) to "see" the chemical composition of a sample on a nanometer scale, follow variations of the sample, and map its topographic **structure**.

To use the AFM in its new mode, the **research**ers attached antibodies keyed to **individual protein**s to the tip of an AFM's probe. When an **antibody** reacts with the **protein** it is specifically targeted for, it creates a variance in the microscope's reading compared to a reading with a bare tip, thus showing the presence of a **protein** or other specific material in the region being scanned.

The advance could have significant implications for drug development by allowing scientists to monitor the effects of potential drugs on an ever-smaller scale.

Pen Writes Micro Wires

Technology Review, August 17, 2004

Researchers from the Swiss Federal Institute of **Technology** and the University of California have devised a way to write one-micron-wide features using gold deposited onto glass.

The **method** could eventually be used to manufacture conductors for tiny **electronic**s devices. The **research**ers are working on improving the **system** to write stripes as narrow as 100 nanometers.

A Laser Gets at the Layers

New York Times, August 17, 2004

A new "selective plane illumination microscope" uses a slice of **laser light** to illuminate an intact specimen one thin layer at a **time**, building a high-resolution picture of the entire specimen without cutting it.

Samples can be kept alive and studied for hours or days while tissues develop and differentiate. The scientists say the microscope has better resolution than other living-sample imaging techniques, like multiphoton microscopy.

Howard Rheingold's Latest Connection

BusinessWeek online, Aug. 11, 2004

The tech **guru** sees a "new economic **system**" in the unconscious cooperation embodied by **Google** links, **open source**, open spectrum, reputation systems such as **Amazon.com**, online communities, and mobile devices.

These could dramatically transform not only the way people do business, but economic production altogether.

Nanotubes may have no 'temperature'

Nature.com, Aug. 17, 2004

Physicists have made a bizarre discovery: the **concept** of temperature is meaningless in some tiny objects because of the statistical fluctuations inherent in the quantum world.

Although the **concept** of temperature is known to break down on the scale of **individual** atoms, **research** now suggests that it may also fail to apply in rather larger entities, such as **carbon nanotubes**.

"If you're down to a scale where temperature is not relevant, the fluctuations in physical properties of that **system** could be unpredictable, and that is potentially bad for any **device**," says Peter Atkins, a physical chemist at University of Oxford.

NASA Ames and Biophan to develop

nanothermoelectric materials for implants

Kurzweilai.net, Aug. 17, 2004

Biophan Technologies announced today that its TE-Bio subsidiary has signed an agreement with **NASA** to jointly develop high-density, nanoengineered thermoelectric materials for use with implantable medical devices.

They plan to develop breakthrough power generation systems for use in implanted medical devices, such as pacemakers, as well as long-**life**, lightweight power for use in **future space** exploration applications, such as on-board power for astronaut health monitors.

"On deep **space** missions such as a trip to Mars, having efficient ways to monitor and treat astronauts can be very useful. The benefits for humans with implanted devices are very clear," said David Lackner, **technology** partnership manager at NASA Ames Research Center.

Streaming video of NASA-Biophan announcement

Unraveling the Big Debate over Small Machines

Betterhumans, Aug. 16, 2004

Nanobot naysayers argue that molecular manufacturing is impossible, but the evidence goes against them.

Report: World spending $8.6 billion on nano in '04

Small Times, Aug. 16, 2004

Public and private **individual**s and institutions will spend more than $8.6 billion worldwide on nano **research** and development this year, according to "The **Nanotech** Report 2004," published by New York-based Lux **Research** Inc.

The report also found that **nanotech** startups are beginning to make money, with revenue ranges between $10 million and $20 million.

Prions speed evolution

Nature.com, Aug. 16, 2004

Prions could help **organism**s adapt to tough situations by subtly altering the **protein**s manufactured by a cel1. The discovery backs the idea that **protein**s as well as **DNA** are vital in driving **evolution**.

A yeast prion can change the way that cells behave. In their infectious form, the prions sometimes helped the yeast to adapt, changing their rates of survival when they were grown in various nutrients or temperatures.

Researching the weapons of the future: 'micro-fusion' weapons

Jane's Chem-Bio Web, Aug. 13, 2004

Advances in **nanotechnology**, **genetics** and nuclear isomers are permitting the production of a new generation of weapons intended to maintain **future** US **military** superiority and deter "rogue states" and terrorists.

Too Much Information?

ABC News, Aug. 12, 2004

Officials are concerned about a Web site that has published publicly available but sensitive **information** about the Democratic National Convention and other **information** that could be useful to terrorists.

Trying to Take Technology to the Masses

New York Times, August 16, 2004

Pioneering **AI research**er **Raj Reddy** plans to unveil at yearend the PCtvt, a $250 **wireless**ly **network**ed **personal computer** intended for the four billion people around the world who live on less than $2,000 a year.

Breakthrough Nanotechnology Will Bring 100 Terabyte 3.5-inch Digital Data Storage Disks

PhysOrg.com, August 11, 2004

100 terabytes of **data** on a 3.5-inch disk may be possible with a new technique for creating an "Atomic Holographic

DVR" disc drive within five years, priced at $570 to $750 with the replacement discs for $45.

Holograms Help Identify Sham Script

ScientificAmerican.com, August 11, 2004

Scientists have developed a new tool for fighting forgers: a **hologram**-based technique produces a three-dimensional image of a handwriting sample.

By scanning a document with **laser** beams, the team can generate a **hologram** of the pen strokes within a signature. Using **image processing** and **virtual reality** makes it easy to detect the presence of bumps at crossover points and determine the sequence of strokes in a piece of handwriting and the telltale signs of a forgery or original.

Is Science Fiction About to Go Blind?

Popular Science, August 2004

Modern **science fiction** is facing a crisis of confidence at it attempts to visualize **life** after the **Singularity**.

Faster Wi-Fi spec suggested

CNET News.com, August 13, 2004

A consortium of **network**ing companies calling itself WWiSE (World Wide Spectrum Efficiency) is proposing a new 802.11n standard that will allow for throughput rates of up to 100 megabits per second.

802.11g, the current fastest Wi-Fi standard, has optimal rates of 54mbps but average rates of about half that.

Computers with multiple personalities

Boston Globe, August 16, 2004

"Virtualization **software**" allows **computer**s to run multiple **operating system**s and save money by using one **computer** to do the work of several.

FDA Approves Dirty Bomb Antidotes

AP, Aug. 11, 2004

The Food and Drug Administration approved two new products -- Penetate calcium trisodium injection and Penetate Zinc trisodium injection -- designed to help deal with the consequences of terrorists using dirty bombs.

By removing three of the radioactive **element**s that may be found in dirty bombs -- plutonium, americium or curium -- quickly from the body, the victim may avoid possible **future** effects including the development of certain cancers, which may occur years after exposure.

Protein-Based Nanoactuators

Physics News Update, August 12, 2004

Protein-based nanoactuators can now be controlled rapidly and reversibly by thermoelectric signals, emulating how muscle tissue contracts or relaxes.

The **protein** motors could power **linear motion** of **nanowire**s for uses such as bioanalysis chips and gene delivery.

When machines breed

Salon.com, Aug. 12, 2004

Evolvable **hardware** -- **machine**s that design themselves -- can get the job done, even if humans have no idea how they do it.

Using **evolution**ary processes to optimize **machine** performance is nothing new. What is new, however, is the application of **evolution**ary processes in the **hardware** realm. Thanks to reconfigurable devices such as the field **program**mable gate array (FPGA) and increasing **computation**al power, **research**ers are suddenly free to let their designs evolve for a while just to see what happens.

Biology Enters Fourth Dimension

Wired News, Aug. 12, 2004

A new microscope that lets scientists peer deeper into

living **organism**s than ever before and in real **time** has been developed by **research**ers at the European Molecular **Biology** Laboratory.

The **technology**, called Selective Plane Illumination Microscopy, or SPIM, allows scientists to study relatively large (2 to 3 millimeter) live **organism**s from many different angles, under real conditions and with minimal disruption to the specimen.

SPIM shines a very thin slice of **light** through the sample and records the image picked up by a separate detector array. Micromotors, which can move the sample a half-micron at a **time**, systematically move the specimen through the **light** sheet to capture images from each layer.

The **information** extracted from multiple, illuminated layers of the sample can be run through image-processing **algorithm**s that **merge** the different views to create a 3-D image. Successive images captured over **time** can be used to produce movies of growing embryos.

RNA could form building blocks for nanomachines

Kurzweilai.net, August 11, 2004

Researchers have coaxed **RNA** to self-assemble into 3-D arrays, a potential backbone for **nanotech** scaffolds. These **RNA structure**s can form a wider variety of shapes than double-stranded **DNA** can and are easier to manipulate than many **protein** alternatives.

Peixuan Guo of Purdue University and his colleagues report the findings in the August 11, 2004, issue of the journal Nano Letters.

By mixing the custom-made **RNA** strands with other substances, such as magnesium chloride, the **research**ers were able to get the strands to join into 3-D shapes.

In 1987, Guo discovered that a **bacteria**-infecting **virus** possesses a biomolecular nanomotor that requires **RNA molecule**s to function. While determining how **RNA** works in that motor, he learned to manipulate and control **RNA** assembly.

Now, Guo and his colleagues have applied that **knowledge** to building artificial **RNA** nanostructures, including "large" 3-D arrays formed from identical **RNA** building blocks. Because these arrays extend to several micrometers, far larger than **individual RNA** strands,

they may potentially link nanofabrication with current microfabrication processes.

The **research**ers hope that the arrays, while still in the earliest stages of development, will one day serve as the scaffolding on which diagnostic chips, tiny sensors, gene delivery vehicles and other nanoscale devices will be mounted or constructed.

NSF press release

Britain Grants License to Make Human Embryos for Stem Cells

New York Times, August 12, 2004

British regulators have issued the country's first license to use cloning techniques to generate a **human embryo** to produce **stem cell**s that might be used for the treatment of **disease**.

Design Eases Nano Locomotion

Techology Review, August 10, 2004

Researchers from the Institute for Advanced Studies in **Basic Science**s in Iran and the Max Plank Institute for **Physics** have designed a swimming **machine** that allows nanoscale **machine**s to move through water.

The design overcomes the loss of turbulence at small scales, making liquids more difficult to travel through.

These **machine**s could be constructed in one or two decades from **molecule**s that change length in the presence of **light** or from motor **protein**s used by microbes.

Emerging field shifts perceptions of human, machine limits

EE Times, August 9, 2004

Canesta, a pioneering company in the **perception technology** field, has introduced a **commercial** development kit for its 3-D-sensor **machine vision chip**.

Applications using Canesta's **electronic perception**

technology include size and depth detection, image **segmentation**, **object classification**, **object** tracking and location analysis, and **human** interaction.

For example, the **technology** could be used to **sense** the location, size and shape of a person. That would allow for making an airbag that could choose to deploy or not, depending on whether the occupant was an adult or child.

Earth to E.T.: We're waiting

Washington Post, Aug. 9, 2004

SETI scientists gathered last week for a workshop on "The Significance of Negative **SETI** Results."

Project Phoenix, the most sensitive survey so far, targeted only 1,000 nearby stars. "Earthlings are just getting into the game," said Dan Werthimer, a University of California-Berkeley professor who is chief scientist for SETI@home. He urged against making too many assumptions about the way **extraterrestrial**s would want to communicate.

About half of all great discoveries are purely serendipitous, he said. The breakthrough might not even come from a **SETI search**. "It'll be somebody doing a **dark matter experiment**, or a **gravity wave experiment**," he said.

Probe Set to Test Einstein Theory

Wired News, Aug. 7, 2004

NASA's **Gravity** Probe B spacecraft will test Einstein's general theory of **relativity**.

Gravity Probe B will test two **concept**s of the theory: that **Earth** -- and almost any body in **space** -- creates a dimple in the **universe**'s **space-time** fabric; and that the rotation of the **Earth** twists that fabric.

It will attempt to measure those effects by aligning itself with a distant **star** and then measuring tiny changes in the direction of its four spinning gyroscopes with respect to the line of the **star**.

Volcano could trigger tsunami disaster for New York

The Telegraph, Aug. 10, 2004

A collapsing volcano could trigger a vast tidal **wave** capable of wiping New York, Washington and Miami off the map, warn geologists.

Geologists are concerned that an unstable flank of the Cumbre Vieja volcano on the island of La Palma in the Canaries is in danger of sliding into the sea.

If shaken loose by a volcanic eruption, the huge slab of rock would send a tsunami more than 150 meters high racing across the Atlantic at the speed of a jumbo jet.

The **wave** would strike the west African coast with a wall of water more than 300ft high in two to three hours. Within three to four hours, a 33ft high **wave** would smash into the south coast of England, causing immense damage. New York, Washington, Boston and Miami would be hit by successive waves abound 20 meters high. Tens of millions of people could die.

Portable Internet to Be 10 Times Faster

Korea Times, Aug. 11, 2004

Starting next year, South Koreans will be able to **access** the **Internet** via **cell** phone at 1 Mbps, ten times faster than they can currently.

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