

# Science & Technology

## HealthLine

### Male contraception methods proposed

Specialists reviewed new methods for male contraception at the Future of Male Contraception conference, sponsored by the U.S. National Institutes of Health and held in Seattle last September.

Ronald Swerdloff, an endocrinologist and chief of the division of endocrinology at Harbor-UCLA and professor of medicine at the Harbor-UCLA Medical Center in Los Angeles, proposed two methods at the conference. One method involved hormonal therapy and testicular warming to control the release of sperm.

The other involved transdermal gels; men either applied a progestin gel called Nestorone or a testosterone gel, or they applied both. The researchers concluded that the combination of transdermal gels worked the best to suppress sperm.

Also, researchers at Columbia University tested a drug that interfered with vitamin A receptors in the testes, which are known to reduce fertility.

Source: Health Day

### Researchers find benefits in worrying

Gregory Samanez-Larkin, a psychology graduate student at Stanford, found that people who worried more scored better in a financial game. A person's likelihood of worrying was judged by scans of activity in a part of the brain known as the anterior insula.

An active anterior insula indicated higher chances of uncertainty in terms of financial decisions.

Samanez-Larkin said the research could be used to detect people who are most likely to use too many credit cards or get into financial trouble like incurring debts.

Source: Health Day

### New drug protects against radiation

Researchers have developed a new drug that can protect healthy cells and bone marrow against radiation therapy used to cure cancer.

The new drug, known as CBLB502, has been shown to protect the gastrointestinal cells and bone marrow in mice and monkeys from radiation, but does not reduce the treatment's effectiveness.

Lyudmila Burdelya, a scientist in New York state's Roswell Park Cancer Institute, showed that CBLB502 works by activating a molecular pathway that some cancer cells use to prevent cell death.

Clinical trials on humans may begin this summer.

Source: Agence France-Presse (AFP)

### Diet supplements could be harmful

Recent studies suggest that dietary supplements such as over-the-counter vitamins and minerals may potentially harm individuals, especially when taken in large doses, and in combination with each other or other prescription drugs.

Six natural sources, namely green tea, grapeseed, ginkgo biloba, turmeric, salmon oil, and vitamin E have been found to increase bleeding after an abrasion or surgery. The chemical properties of these substances inhibit platelet aggregation, which is necessary to form blood clots.

According to a 2002 Harris poll, 70 percent of adults in the United States take vitamins, minerals, herbs, and/or other supplements.

Source: *The New York Times*

Compiled by  
CHRISTINE DE BRIFFAULT

## Professors receive Katayanagi Prizes



Christos Papadimitriou (left) and Erik Demaine (right) present their respective areas of research.

MARIUM CHANDNA  
*SciTech Editor*

In association with the Tokyo University of Technology (TUT), Carnegie Mellon awarded professors Christos Papadimitriou and Erik Demaine the second annual Katayanagi Prizes in Computer Science. Papadimitriou

and Demaine teach computer science at the University of California at Berkeley and Massachusetts Institute of Technology (MIT), respectively.

Initiated by Koh Katayanagi, director of the Katayanagi Institute, the prizes serve to honor high achievers in the field of computer science. As this year's senior researcher,

Papadimitriou received a prize worth \$20,000, and Demaine, this year's junior researcher, received \$10,000.

Notable winners in the past include David Patterson, chair of the computer science department at the University of California at Berkeley,

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Kristen Severson/Photo Staff

## SCS' Robot Hall of Fame inducts four new robots

CHRISTINE DE BRIFFAULT  
*Staffwriter*

Though most people are used to living with appliances, cars, and computers, they do not always appreciate this technology's daily impact on their lives. James H. Morris, dean of Carnegie Mellon West, the Silicon Valley Campus felt that robots were similarly under-appreciated and thus created the Robot Hall of Fame, which is now in its sixth year.

"When the robots take over, we want them to remember that we were the first ones to appreciate them," Morris said jokingly. The School of Computer Science established the Robot Hall of Fame to honor real and fictional robots in our society.

There are two categories in which robots receive honors: Robots from Science and Robots from Science Fiction. Robots in the science category must have served an actual or potentially useful function and demonstrated real skills in accomplishing their purpose. Robots in the fictional category must have received worldwide fame, inspired others to build real robots, and helped form opinions about the functions and value of robots.

The first robots to be inducted into the Hall of Fame were NASA's Mars Pathfinder Microrover Flight

Experiment (MFEX), better known as "Sojourner"; Unimate, the first industrial robot; R2-D2, a droid from the *Star Wars* movies; and the evil HAL-9000 computer, featured in the movie *2001: A Space Odyssey*, created by science fiction writer and futurist Sir Arthur C. Clarke and director Stanley Kubrick.

Any robot may be nominated for the Robot Hall of Fame, Morris said. Inductees are then chosen by an international jury of leading thinkers and technology developers. The four robots being inducted this year — Lt. Cmdr. Data, the Raibert Hopper, LEGO Mindstorms, NavLab5 — were announced last May at the RoboBusiness Conference and Exposition in Boston. The Raibert Hopper, LEGO Mindstorms, and NavLab5 were nominated for the Robots from Science category, while Lt. Cmdr. Data was nominated for Robots from Science Fiction.

Lt. Cmdr. Data is an android with super strength and a super memory that was portrayed by actor Brent Spiner during the 1987-1994 run of *Star Trek: The Next Generation*. His award was accepted by Zachary Quinto, a *Heroes* star and Carnegie Mellon alumnus, will

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Courtesy of Christine de Briffault

Maria, the robot from the silent science-fiction film *Metropolis* (1927).

## Scientists facilitate self-assembly of nanoparticles

AKANKSHA VAIDYA  
*Asst. SciTech Editor*

With the scaling down of many devices, nano and microparticles have gained prestige in the world of technology. However, when dealing with devices that use such particles, the arrangement of the particles is an important factor.

Realizing this importance, Carnegie Mellon's Nadine Aubry, head of the mechanical engineering department and Pushpendra Singh, an engineering professor at the New Jersey Institute of Technology (NJIT), have developed a new technique for the self-assembly of nano- and microparticles.

Microparticles have sizes that are measured in micrometers, where one micrometer is 10<sup>-6</sup> meters.

Nanoparticles are even smaller. They are generally less than 100 nanometers in at least one dimension (one nanometer is 10<sup>-9</sup> meters).

The team's research paper,

titled "Micro- and nanoparticles self-assembly for virtually defect-free, adjustable monolayers," was published last month in the *Proceedings of the National Academy of Sciences USA* journal. As mentioned in the paper, the team's research deals with the self-assembly of particles in two-dimensions, or "monolayers," placed at a liquid interface.

A monolayer is a single layer of particles, and a liquid interface is a surface where two liquids come in contact with one another. The free surface of a liquid, which is in contact with air, is also considered to be a liquid interface.

Self-assembly of particles at liquid interfaces was previously based on capillary forces. Capillary forces cause particles at the surface of a liquid to attract one another.

Aubry explained these forces by giving the analogy of a breakfast cereal. "When you have your bowl of milk with cereal, you put the cereal on top of the milk. If you wait long enough, you are going

to see that the [flakes] gather. That is because of the capillary force which makes the particles attract one another," she said.

Although this technique has been in use for quite some time, it has a number of drawbacks. One of the major drawbacks is that it does not work well for small particles that have a radius less than 10 microns.

"If you have very small particles, they don't cluster together because their weight is not large enough," Singh said.

Aubry mentioned two other drawbacks of this technique. Firstly, using this technique makes it difficult to arrange particles into regular patterns. "When we want to make a material, we want it to be as regular as possible," Aubry said. Therefore, the final materials may be defective.

Secondly, after self-assembly the particles touch each other. Many devices require the particles to have gaps between them. Such an arrangement cannot be achieved by relying solely on cap-

illary forces.

Aubry and Singh's new method provides a solution to all of these problems.

In their model, electrodes are placed above and below the surface of the liquid so that an electric field can be generated perpendicular to the free surface of the liquid that the particles are on.

Aubry explained that the electric field generates electrostatic forces acting on the particles, which can be split up into vertical and lateral components.

The vertical component of the force moves the particles in its direction, causing capillary forces to arise in the lateral direction. Unlike capillary forces generated without the use of an electric field, these capillary forces are capable of moving even small, light-weight particles.

Along with these capillary forces, lateral repulsive forces are also generated, which prevent the particles from coming close enough

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## SciTechBriefs

### Ancient rocks found at North Pole

Jonathan Snow, an assistant professor of geosciences at the University of Houston, revealed unmixed rocks composed of osmium (a metal rarer than platinum) at the floor of the Arctic Ocean. Findings show that the rocks are probably 2 billion years old. The expedition, led by Snow, was carried out at the North Pole.

This contradicts the age-old theory that the rocks beneath the earth's surface were homogeneous.

Scientists are now interested in studying why these rocks remain unmixed. This will give more insight into the history of the mantle layer.

Source: [www.sciencedaily.com](http://www.sciencedaily.com)

### War could lead to ozone depletion

Researchers fear that nuclear wars between South Asian countries like India and Pakistan would result in a large hole in the ozone layer. The studies are based on computer models that suggest the amount of fire produced by a nuclear war in the region.

Scientists believe that smoke will be the prime cause of this destruction of the ozone layer. Fires in the cities could send an estimated 5 million tons of soot into the troposphere, the lowest parts of the atmosphere. Heat from the sun will carry the particles to the stratosphere, where chemical reactions will lead to ozone depletion.

Holes in the ozone layer allow ultraviolet radiation from the sun to reach Earth, causing cancer in humans, in addition to further permanent damage to animals and plants.

Source: Reuters

### Fake diamonds protect engines

Scientists discovered that zirconia, a substance found in fake diamonds, can make jet engines run faster, with more fuel efficiency, and for longer amounts of time. Zirconia can be used to coat the engines' turbine blades, preventing the damage caused by sand.

The coated blades suck the air and increase the pressure inside, leading to better fuel ignition. The high-pressure air expelled from the hind of the plane allows it to move farther.

The special zirconium coating inside the engine also protects it from extreme temperatures, which could otherwise cause the engine to expand or contract.

Source: Discovery Channel

### IBM works on 'race-track memory'

IBM is working on a technology called "racetrack memory," which will result in devices capable of storing 100 times more data than present MP3 players.

The technology uses magnetic boundaries made of nanowires to store data. Nanowires are essentially shrunken-down versions of modern day wires and are less than 100 nanometers in size. The data travels (or races) through wires simultaneously as it is being read.

This storage medium is expected to be fast, durable, and cheap. It has the potential to replace the presently used storage devices such as flash memory and hard drives. However, scientists still suspect that it may take seven to eight years to commercialize the product.

Source: BBC News

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