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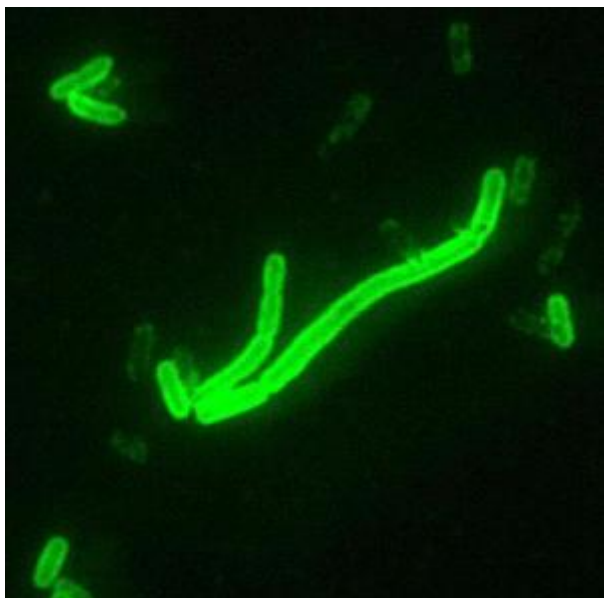
CONTENTS

Scientists Discover Why Plague Is So Lethal	3
Plants Text Message Farmers When Thirsty	4
Asteroid Impact 65 Million Years Ago Triggered A Global Hail Of Carbon Beads	5
Melting Defects Could Lead To Smaller, More Powerful Microchips	7
Secondhand Smoke Exposure Can Cause Cell Damage In 30 Minutes	10
New Polymer Product From Soy Oil, Not Petroleum	12
Diatoms Discovered To Remove Phosphorus From Oceans	14
Solar Images Show Green And Blue Flashes	15
A Challenge for the U.S.: Sun Rising on the East	17
Lots of Animals Learn, but Smarter Isn't Better	20
Appeasing the Gods, With Insurance	23
Researchers Seek to Demystify the Metabolic Magic of Sled Dogs	25
Serra's Monumental Vision, Vertical Edition	27
The Private Sector Role in Global Higher Education	31
Want to Download? Take the Quiz	33
Families Shed Light On Likely Causative Gene For Alzheimer's	35
Gaining Independence For People With Disabilities Through Video Games	37
Office Initiative Reduces Headaches And Neck r Pain By More Than 40 Percent	39
Architecture For Fundamental Processes Of Life Discovered	41
Teen Helps Design Classroom DNA Experiments Using Common Food Dyes	43
Genetic Variation Linked To Preference Sugary Food	45
First-Ever Comprehensive Global Map Of Freshwater Systems Released	47
Discovery Of Most Recent Supernova In Our Galaxy	49
Henry Moore Sculpture Could Be Re-erected Thanks To 21st Century Science	51
Light Emitting Diodes Save Energy And Concentrate Light Precisely Where Needed	53
Study May Explain Variations In Superconducting Temperatures	55
Using Music To Explore The Neural Bases Of Emotional 'Processing' In Autistic Brain	57
Biochips Can Detect Cancers Before Symptoms Develop	58
New Clues To How Proteins Dissolve And Crystallize	60
Traffic Woes? New Method Allows Traffic Optimization Over Large Geographic Areas	63
Meningitis B trials 'encouraging'	64
Single anti-flu drug 'not enough'	67
Rauschenberg and Dance, Partners for Life	69
The Bachelor's Degree Is Obsolete?	72
Artist mixed paint, sculpture, cast-offs	74
O.K., Avatar, Work With Me	82
Bacon Triptych Auctioned for Record \$86 Million	86
Earthquake in China Highlights the Vulnerability of Schools in Many Countries	88
Students Fail — and Professor Loses Job	90
Facebook, Meet Blackboard	94
Calling All Kids: Take Tough Courses	96
'On Course': New Guide to First Semester of Teaching	98
Archaeologist Uses Satellite Imagery To Explore Ancient Mexico	101
Satellite Communications By Laser Looks Promising	103
Air Pollution, Smoking Affect Latent Tuberculosis	104
Designing Bug Perception Into Robots	106



Digging Deeper Into The Genetics Of Schizophrenia By Evaluating MicroRNAs	109
Alternative To Silicon Chip Invented By Student	111
Beijing Game For Clean Air Challenge	113
Treatment For Severe Blood Loss: Less Is More	114
Hot Climate Could Shut Down Plate Tectonics	116
A Molecular Thermometer For The Distant Universe	118
Nearly One-third Of All Inexpensive Earrings Examined Tested Positive For Nickel	120
Seeing Alzheimer's Amyloids With Electron Microscopy For First Time	122
New Technique Measures Ultrashort Laser Pulses At Focus	124
Extinction fear for butterflies	126
Benefits of bedtime reading	127
Molecule With 'Self-control' Synthesized	128
Identifying Abnormal Protein Levels In Diabetic Retinopathy	130
How Embryonic Stem Cells Develop Into Tissue-specific Cells Demonstrated	131
Beyond Fashion: Why You Gotta Wear Shades	133
New Process May Convert Toxic Computer Waste Into Safe Products	135
Are Anxiety Disorders All In The Mind?	136
Children Better Prepared For School If Their Parents Read Aloud To Them	138
How the brain detects the emotions of others	139
Religion a figment of human imagination	140
Live and let DIY	142
Penguin Books Proves The Entire Internet Can't Write A Novel	144
Measure for Measure	145
Pictionary	149
Microwaves 'cook ballast aliens'	151
Frigid robot eyes top tech prize	153
Antidote to lethal germ 'closer'	155
Pollution 'ups blood clot risk'	157
Breastfeeding 'may cut arthritis'	159
Adults 'dropping out of learning'	161
DNA tests open a Pandora's Box of flies	163
Warming Up For Magnetic Resonance Imaging	165
Human Aging Gene Found In Flies	168
Worms Triple Sperm Transfer When Paternity Is At Risk	170
Female Concave-eared Frogs Draw Mates With Ultrasonic Calls	172
Men More Likely Than Women To Crave Alcohol When They Feel Negative Emotions	174
Braille Converter Bridges The Information Gap	175
Hot-air Balloon Research May Improve Tornado Predictions	177
New Approach Improves Atmospheric Aerosol Measurements On Cloudy Days	179
Binge Drinkers Disconnect Between Assessing Their Driving Abilities And Reality	181
Solar Variability: Striking A Balance With Climate Change	182
Mitral Valve Leak Repaired Through Tiny Puncture Hole Using Live 3D Images	184
Clue to early pre-eclampsia test	185
Catch-up reading scheme 'success'	187
Art in public spaces should be decided by the people	189
Rough Transition to a New Asthma Inhaler	191
A World of Stories From a Son of Vietnam	193
When Artworks Collide	195
Man's Best Friend, Hoofed Department	198

Scientists Discover Why Plague Is So Lethal



Yersinia pestis, direct fluorescent antibody stain (DFA), at 200x magnification. (Credit: CDC / Courtesy of Larry Stauffer, Oregon State Public Health Laboratory)

ScienceDaily (May 5, 2008) — Bacteria that cause the bubonic plague may be more virulent than their close relatives because of a single genetic mutation, according to research published in the May issue of the journal *Microbiology*.

"The plague bacterium *Yersinia pestis* needs calcium in order to grow at body temperature. When there is no calcium available, it produces a large amount of an amino acid called aspartic acid," said Professor Brubaker from the University of Chicago, USA. "We found that this is because *Y. pestis* is missing an important enzyme."

Bubonic plague has killed over 200 million people during the course of history and is thus the most devastating acute infectious disease known to man. Despite this, we are still uncertain about the molecular basis of its extraordinary virulence. "*Y. pestis* evolved from its ancestor *Y. pseudotuberculosis* within the last 20,000 years, suggesting its high lethality reflects only a few genetic changes. We discovered that a single mutation in the genome of *Y. pestis* means the enzyme aspartase is not produced," said Professor Brubaker.

Aspartase is present in almost all bacteria but it is curiously absent in many pathogenic types. These include mycobacteria that are pathogenic to man, *Francisella tularensis* and *rickettsiae* (both of which cause diseases transmitted to humans via insects). "This suggests that the absence of aspartase may contribute to serious disease," said Professor Brubaker.

Aspartase digests aspartic acid. Because *Y. pestis* doesn't have the enzyme, it produces much more aspartic acid than is required by the person infected. This may cause an imbalance to the host amino acid pools. "If this is the case then we might be able to reduce the death rates of these diseases by developing a treatment that removes some of the extra aspartic acid," said Professor Brubaker.

Adapted from materials provided by Society for General Microbiology, via EurekaAlert!, a service of AAAS.

<http://www.sciencedaily.com:80/releases/2008/05/080504194238.htm>

Plants Text Message Farmers When Thirsty

An automated infrared sensor system tells farmers when plants are thirsty or hotter than their ideal growing temperature and need cooling off with irrigation water. (Credit: Photo courtesy of SmartCrop.)

ScienceDaily (May 5, 2008) — Beginning this crop season, farmers will be able to receive text messages on their cell phones from their plants saying whether they are thirsty or not.

Accent Engineering, Inc., of Lubbock, Tex., developed the SmartCrop™ automated drought monitoring system based on a patent held by the Agricultural Research Service (ARS). They are offering it for sale in time for this growing season.

Battery-operated infrared thermometers placed in irrigated fields monitor leaf temperatures and relay that information to a computerized base station. A cell phone modem can be hooked up to the base station to download data to a personal computer. This modem can also send text messages to a farmer's cell phone.

ARS plant physiologist James Mahan at the ARS Plant Stress and Germplasm Development Research Unit in Lubbock is one of the original theorists of the idea behind SmartCrop™. Each plant species has a fairly narrow range of internal temperatures it prefers for best growth. When leaf temperature goes above the upper limit or threshold of that range for too long, the plant needs water, as much for cooling down as to quench its thirst.

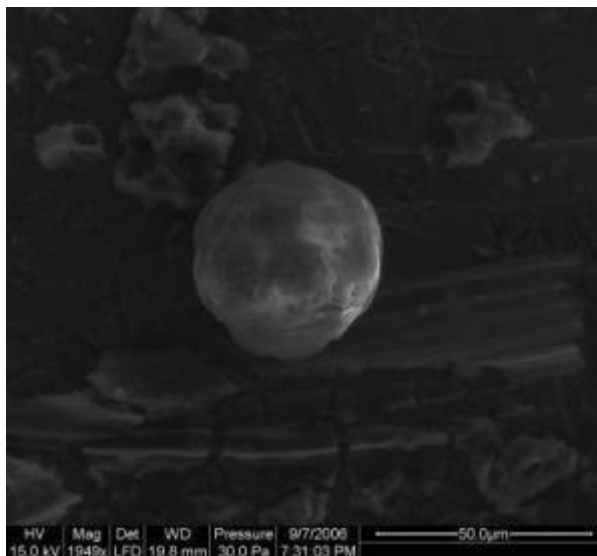
In the Texas High Plains area, for example, Mahan found that cotton begins to suffer from drought if cotton plant leaves stay above 82 degrees Fahrenheit for more than 6-1/2 hours. Farmers can choose the time-temperature threshold at which they would like to receive an alert, and adjust it at any time.

Adapted from materials provided by US Department of Agriculture.

<http://www.sciencedaily.com:80/releases/2008/05/080502171010.htm>



Asteroid Impact 65 Million Years Ago Triggered A Global Hail Of Carbon Beads



Carbon cenospheres are tiny, carbon-rich particles that form when coal and heavy fuel are heated intensely. Scientists have now learned that cenospheres can form in the wake of asteroid impacts, too. (Credit: Mark Harvey)

ScienceDaily (May 5, 2008) — The asteroid presumed to have wiped out the dinosaurs struck the Earth with such force that carbon deep in the Earth's crust liquefied, rocketed skyward, and formed tiny airborne beads that blanketed the planet, say scientists from the U.S., U.K., Italy, and New Zealand in this month's *Geology*.

The beads, known to geologists as carbon cenospheres, cannot be formed through the combustion of plant matter, contradicting a hypothesis that the cenospheres are the charred remains of an Earth on fire. If confirmed, the discovery suggests environmental circumstances accompanying the 65-million-year-old extinction event were slightly less dramatic than previously thought.

"Carbon embedded in the rocks was vaporized by the impact, eventually forming new carbon structures in the atmosphere," said Indiana University Bloomington geologist Simon Brassell, study coauthor and former adviser to the paper's lead author, Mark Harvey.

The carbon cenospheres were deposited 65 million years ago next to a thin layer of the element iridium -- an element more likely to be found in Solar System asteroids than in the Earth's crust. The iridium-laden dust is believed to be the shattered remains of the 200-km-wide asteroid's impact. Like the iridium layer, the carbon cenospheres are apparently common. They've been found in Canada, Spain, Denmark and New Zealand.

But the cenospheres' origin presented a double mystery. The cenospheres had been known to geologists only as a sign of modern times -- they form during the intense combustion of coal and crude oil. Equally baffling, there were no power plants burning coal or crude oil 65 million years ago, and natural burial processes affecting organic matter from even older ages -- such as coals from the 300-million-year-old Carboniferous Period -- had simply not been cooked long or hot enough.

"Carbon cenospheres are a classic indicator of industrial activity," Harvey said. "The first appearance of the carbon cenospheres defines the onset of the industrial revolution."



The scientists concluded the cenospheres could have been created by a new process, the violent pulverization of the Earth's carbon-rich crust.

Geologists do believe the Earth burned in spots as molten rock and super-hot ash fell out of the sky and onto flammable plant matter. But the charcoal-ized products of these fires only appear in some places on Earth, and are more often found near the asteroid impact site of Chicxulub Crater, just west of Mexico's Yucatan Peninsula. Some geologists had thought all carbon particles resulting from the impact was ash from global scale forest fires, but the present research strongly contradicts that assumption.

The scientists examined rock samples from eight marine locations in New Zealand, Italy, Denmark and Spain. They also examined carbon-rich particles from five non-marine locations in the U.S. and Canada. Following chemical and microscopic analysis, the researchers concluded the particles were carbon cenospheres, similar to the ones produced by industrial combustion.

The scientists also found that the farther the sample site was from the Chicxulub Crater, the smaller the cenospheres tended to be. That observation is consistent with the expectation that particles were produced by the asteroid impact, since once the particles are ejected, heavier particles should fall back to Earth sooner (and travel shorter distances) than lighter particles.

Last, the scientists estimated the total mass of carbon cenospheres ejected by the asteroid collision, assuming a global distribution, to be perhaps as much as 900 quadrillion kilograms. Whether or not the carbon cenospheres are truly ubiquitous, however, needs further corroboration.

"There are still clues to unravel about the events occurring around the time of the impact," Brassell said. "And there are aspects of the Earth's natural carbon cycle that we didn't previously consider."

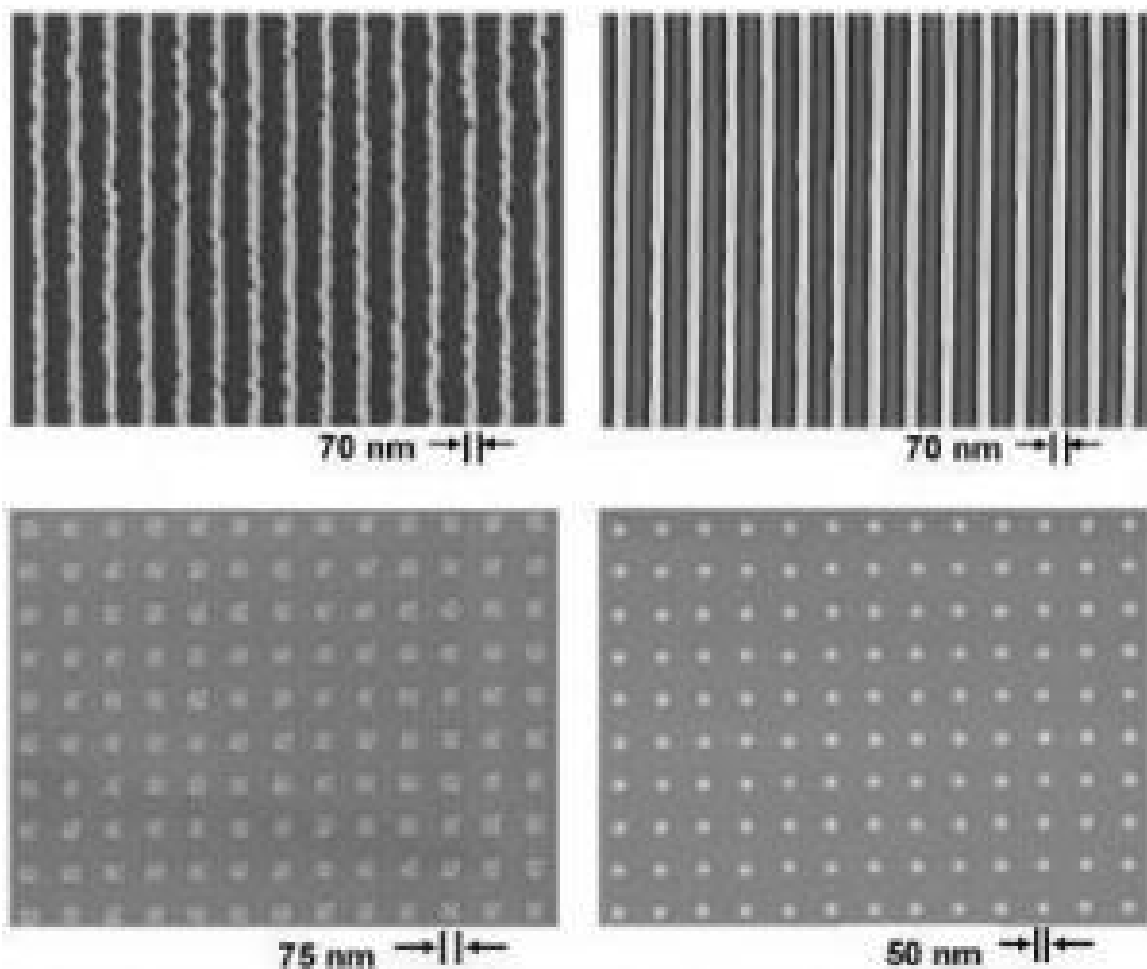
Harvey is interested in the unique properties of the cenospheres themselves. "Perhaps we can generate and study carbon cenospheres to better understand them," he said. "We also need to look for the cenospheres in other parts of the world and also around the time of other extinction events."

Harvey conducted the research while he was a master's student at IU Bloomington. He is now a geoscientist for Sinclair Knight Merz in New Zealand. Claire Belcher (University of London) and Alessandro Montanari (Coldigioco Geological Observatory) also contributed to the study. It was funded by the Geological Society of America, the Indiana University Department of Geological Sciences, and the Society for Organic Petrology.

Adapted from materials provided by Indiana University.

<http://www.sciencedaily.com:80/releases/2008/05/080505120702.htm>

Melting Defects Could Lead To Smaller, More Powerful Microchips



These electron microscope images show before (left column) and after (right column) examples of a new technique, developed at Princeton University, for perfecting nanometer-scale structures. (Credit: Stephen Chou/Nature Nanotechnology)

ScienceDaily (May 5, 2008) — As microchips shrink, even tiny defects in the lines, dots and other shapes etched on them become major barriers to performance. Princeton engineers have now found a way to literally melt away such defects, using a process that could dramatically improve chip quality without increasing fabrication cost.

The method, published in the May 4 issue of *Nature Nanotechnology*, enables more precise shaping of microchip components than what is possible with current technology. More precise component shapes could help manufacturers build smaller and better microchips, the key to more powerful computers and other devices.

"We are able to achieve a precision and improvement far beyond what was previously thought achievable," said electrical engineer Stephen Chou, the Joseph C. Elgin Professor of Engineering, who developed the method along with graduate student Qiangfei Xia. Chou's lab has previously pioneered a number of innovative chip making techniques, including a revolutionary method for making nanometer-scale patterns using imprinting.



Microchips work best when the structures fabricated on them are straight, thin and tall. Rough edges and other defects can degrade or even ruin chip performance in most applications. In integrated circuits, for instance, such flaws could cause current to leak and voltage to fluctuate. In optic devices, they could interfere with the transmission of light. In biological devices, they could impede the flow of DNA and other biomaterials.

"These chip defects pose serious roadblocks to future advances in many industries," Chou said.

To deal with this problem, researchers try to improve the process used to make the microchips. However, Chou said such an approach works only to a point; eventually chip makers will run up against fundamental physical limits of current manufacturing techniques. In particular, the electrons and photons that are used like chisels to carve out the microscopic features on a chip always have some random behavior. This effect becomes pronounced at very small scales and limits the accuracy of component shapes.

"What we propose instead is a paradigm shift: Rather than struggle to improve fabrication methods, we could simply fix the defects after fabrication," said Chou. "And fixing the defects could be automatic -- a process of self-perfection."

Chou's method, termed Self-Perfection by Liquefaction (SPEL), achieves this by melting the structures on a chip momentarily, and guiding the resulting flow of liquid so that it re-solidifies into the desired shapes. This is possible because natural forces acting on the molten structures, such as surface tension -- the force that allows some insects to walk on water -- smooth the structures into geometrically more accurate shapes. Lines, for instance, become straighter, and dots become rounder.

Simple melting by direct heating has previously been shown to smooth out the defects in plastic structures. This process can't be applied to a microchip, for two reasons. First, the key structures on a chip are not made of plastic, which melts at temperatures close to the boiling point of water, but from semiconductors and metals, which have much higher melting points. Heating the chip to such temperatures would melt not just the structures, but nearly everything else on the chip. Secondly, the melting process would widen the structures and round off their top and side surfaces, all of which would be detrimental to the chip.

Chou's team overcame the first obstacle by using a light pulse from so-called excimer laser, similar to those used in laser eye surgery, because it heats only a very thin surface layer of a material and causes no damage to the structures underneath. The researchers carefully designed the pulse so that it would melt only semiconductor and metal structures, and not damage other parts of the chip. The structures need to be melted for only a fraction of a millionth of a second, because molten metal and semiconductors can flow as easily as water and have high surface tension, which allows them to change shapes very quickly.

To overcome the second obstacle, Chou's team placed a plate on top of the melting structures to guide the flow of liquid. The plate prevents a molten structure from widening, and keeps its top flat and sides vertical, Chou said. In one experiment, it made the edges of 70 nanometer-wide chromium lines more than five times smoother. The resulting line smoothness was far more precise than what semiconductor researchers believe to be attainable with existing technology.

The conventional approach to fixing chip defects is to measure the exact shape of each defect, and provide a correction precisely tailored to it -- a slow and expensive process, Chou said. In contrast, Chou's guided melting process fixes all defects on a chip in a single quick and inexpensive step. "Regardless of the shape of each defect, it always gets fixed precisely and with no need for individual shape measurement or tailored correction," Chou said.

One of the big surprises from this work is observed when the guiding plate is placed not in direct contact with the molten structures, but at a distance above it. In this situation, the liquid material from the



structures rises up and reaches the plate by itself, causing line structures to become taller and narrower -- both highly desirable outcomes from a chip design perspective.

"The authors demonstrate improved edge roughness and dramatically altered aspect ratios in nanoscale features," said Donald Tennant, director of operations at the NanoScale Science and Technology Facility at Cornell University. The techniques "may be a way forward when nanofabricators bump up against the limits of lithography and pattern transfer," he said.

Next, Chou's group plans to demonstrate this technique on large (8-inch) wafers. Several leading semiconductor manufacturers have expressed keen interest in the technique, Chou said.

The work was supported by the Defense Advanced Research Projects Agency and the Office of Naval Research.

Adapted from materials provided by Princeton University, Engineering School.

<http://www.sciencedaily.com:80/releases/2008/05/080504153803.htm>

Secondhand Smoke Exposure Can Cause Cell Damage In 30 Minutes



A 30-minute exposure to the level of secondhand smoke that one might normally inhale in an average bar setting was enough to result in blood vessel injury in young and otherwise healthy lifelong nonsmokers, according to a new study. (Credit: iStockphoto)

ScienceDaily (May 5, 2008) — Exposure to secondhand smoke even for a brief period is injurious to health, a new study by researchers at the University of California, San Francisco has found.

According to the study, a 30-minute exposure to the level of secondhand smoke that one might normally inhale in an average bar setting was enough to result in blood vessel injury in young and otherwise healthy lifelong nonsmokers. Compounding the injury to the blood vessels themselves, the exposure to smoke impedes the function of the body's natural repair mechanisms that are activated in the face of the blood vessels' injury, the researchers report. Many of these effects persisted 24 hours later.

Study findings are reported in the online edition of the "Journal of the American College of Cardiology," and will appear in the Journal's May 6 print issue.

The results showed that brief exposure to real-world levels of passive smoke have strong and persistent consequences on the body's vascular system, the researchers conclude.

For the study, subjects were exposed to carefully controlled levels of secondhand smoke in a research setting. The smoke was equivalent to being in a bar where smoking is allowed--as it still is for 51 percent of the US population and in other countries, such as Germany--for 30 minutes. As a control, the same subjects were exposed to clean air on a different day.



In both settings, the researchers evaluated the subjects' blood vessel health through ultrasound to measure blood flow and analysis of blood samples. In the exposure environment, this was done before exposure to establish baseline measures, immediately after exposure, and then 1 hour, 2.5 hours, and 24 hours after exposure. The study involved 10 young adult subjects between the ages of 29 and 31.

The study is the first of its kind to link injury to blood vessels with the decreased efficacy of the body's own repair mechanism, namely the endothelial progenitor cells (EPCs). EPCs are circulating stem cells in the blood that play a key role in the repair mechanism of injured blood vessels.

The researchers examined three effects of secondhand smoke exposure:

- the effect of smoke on the mechanical function of blood vessels
- whether they could detect particles in the blood that are known to be increased in the blood due to blood vessel injury
- whether there was any effect on the stem cells (EPCs) that comprise the body's blood vessel repair mechanisms

"We wanted to study whether even a brief 30 minutes of exposure to second hand smoke in otherwise healthy subjects would result in blood vessel injury and how the body's own repair mechanisms--the EPCs--would be affected by such an exposure," says Yerem Yeghiazarians, MD, director of the Translational Cardiac Stem Cell Program at UCSF.

The secondhand smoke's effect on all measures was profound, he says. "Even brief secondhand smoke exposure not only resulted in blood vessel injury, but it also interfered with the body's ability to repair itself by making the EPCs dysfunctional. It is quite amazing that only 30 minutes of exposure could cause such demonstrable effects." The study also showed that the deleterious effects of the exposure remain in the body for at least 24 hours, much longer than previously thought.

Study results showed that smoke exposure made EPCs less functional. "So it's a double hit: not only does a person develop blood vessel injury, but the cells that are supposed to help repair this damage are themselves also dysfunctional, compounding the injury," he says.

The public health implications of the study findings are significant, according to Yeghiazarians. "Our study helps explain why there is about a 20 percent drop in hospital admissions for heart attacks when cities and states pass laws mandating smokefree workplaces, restaurants and bars."

The study suggests that there is no safe level of exposure to secondhand smoke, he says.

The study was supported by awards from the Flight Attendant Medical Research Institute, the American Heart Association, the Wayne and Gladys Valley Foundation, and the UCSF Cardiac Stem Cell Foundation. In addition to Yeghiazarians, other lead investigators on the study are Christian Heiss, MD, and Nicolas Amabile, MD, who contributed to the work as fellows in the Division of Cardiology, Department of Medicine, at UCSF.

Other investigators in the study are Andrew C. Lee, MD; Wendy May Real, BS; Suzaynn F. Schick, PhD; David Lao, MD; Maelene L. Wong, BS; Sarah Jahn, MB; Franca S. Angeli, MD; Petros Minasi, BA; Matthew L. Springer, PhD; Stanton Glantz, PhD, FACC; William Grossman, MD, FACC; and John Balmes, MD, FACC; all of the Department of Medicine at UCSF. S. Katharine Hammond, PhD, of the Division of Environmental Health Sciences, School of Public Health, UC Berkeley, also contributed to the study.

Adapted from materials provided by [University of California - San Francisco](http://www.sciencedaily.com).

<http://www.sciencedaily.com:80/releases/2008/05/080505094136.htm>

New Polymer Product From Soy Oil, Not Petroleum



A soy-based polymer slurry being tested by chemist Sevim Erhan can be used with or without molds to make small toys or manufacturing parts. (Credit: Photo by Keith Weller)

ScienceDaily (May 5, 2008) — Hair-care products, wound-care dressings and drug encapsulation are among the potential uses of new, soy-oil-based polymers known as "hydrogels," developed by Agricultural Research Service (ARS) scientists in Peoria, Ill.

ARS chemists Sevim Erhan and Zengshe Liu developed the soy-oil-based hydrogels as a biodegradable alternative to the synthetic polymers now used, including polyacrylic acid and polyacrylamide.

Soy oil is an appealing raw material to use because it is chemically versatile, abundant and renewable--meaning the crop can be replanted each year to renew the supply. In 2006, U.S. farmers planted 76 million acres of soybeans, equal to about 38 percent of the world's total oilseed production, notes Erhan. She and Liu both work at ARS' National Center for Agricultural Utilization Research in Peoria.

They first began investigating soy-oil-based hydrogels in 1999 as part of the Peoria center's mission of exploring new, value-added uses for corn, soybeans and other Midwest crops. Using a two-step process--ring-opening polymerization and hydrolysis--they created a squishy but durable hydrogel polymer that expands and contracts in response to changes in temperature and acidity levels.

In tests, they observed that the hydrogel's water-absorbing capacity was lower than that of petroleum-based polymers. But this later proved to be a plus. In collaboration with Erhan and Liu, a University of Toronto scientist successfully formulated the hydrogel into nanoparticles that encapsulate the breast



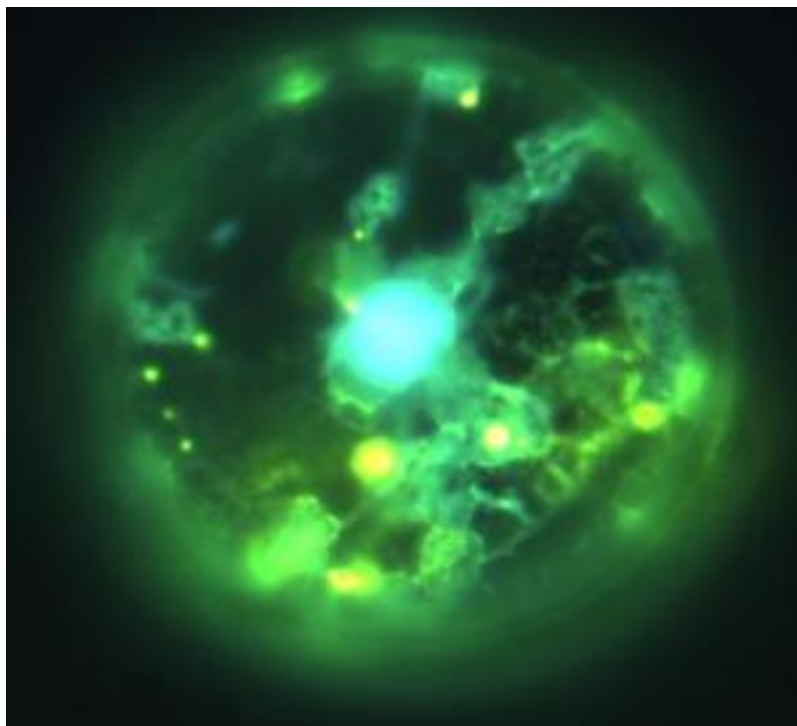
cancer drug doxorubicin. In drug-release experiments, nanoparticle-delivered doxorubicin proved eight times more toxic to cancerous cell lines than when lipid-water solutions were used.

Soy proteins are known allergens, but Erhan doesn't anticipate this posing a problem to the nanoparticles' use as drug-delivery agents. That's because soy oil's chemical structure is completely changed by the two-step manufacturing process used to make the hydrogel.

Adapted from materials provided by US Department of Agriculture.

[http://www.sciencedaily.com:80 /releases/2008/05/080502170413.htm](http://www.sciencedaily.com:80/releases/2008/05/080502170413.htm)

Diatoms Discovered To Remove Phosphorus From Oceans



Georgia Tech researchers found that diatoms naturally remove phosphorus from the oceans. (Credit: Image courtesy of Georgia Institute of Technology)

ScienceDaily (May 5, 2008) — Scientists at the Georgia Institute of Technology have discovered a new way that phosphorus is naturally removed from the oceans – its stored in diatoms. The discovery opens up a new realm of research into an element that’s used for reproduction, energy storage and structural materials in every organism. Its understanding is vital to the continued quest to understand the growth of the oceans. The research appears in the May 2, 2008 edition of the journal *Science*. Ellery Ingall, associate professor in Georgia Tech’s School of Earth and Atmospheric Sciences, along with Ph.D. student Julia Diaz, collected organisms and sediments along an inlet near Vancouver Island in British Columbia. During their investigation on the boat, Diaz used a traditional optical microscope to discover that diatoms, microscopic organisms that live in oceans and damp surfaces, were storing blobs of very dense concentrations of phosphorus called polyphosphates. “These polyphosphates have been missed in classic studies because they haven’t been recovered by the typical measurement techniques,” said Ingall. “No one measured or treated the samples because no one knew they were there – they didn’t even think to look for it.” For a long time, scientists have been unable to account for the difference in the amount of phosphorus that’s in the oceans and the amount that’s washed in from rivers. “We’re getting the initial clues as to how this phosphorus gets to the bottom of the oceans,” said Diaz. “These diatoms are sinking from the top to the bottom of the ocean, and as they’re sinking, they’re transporting the phosphorus in the form of intracellular polyphosphate.” After making their initial discovery, the team made another. They went to Argonne National Laboratory near Chicago to delve deeper and found that some of the blobs were polyphosphate, some were a mineral known as apatite, and some were a transitional material between the two. Now that they’ve proved a link between polyphosphate and apatite, they’re next step is to try and capture the chemical transition between the two by running controlled experiments in the lab.

Adapted from materials provided by [Georgia Institute of Technology](http://www.sciencedaily.com).

<http://www.sciencedaily.com:80/releases/2008/05/080502154252.htm>

Solar Images Show Green And Blue Flashes



Green flash at top of solar image. (Credit: Copyright Stéphane Guisard (ESO))

ScienceDaily (May 5, 2008) — Cerro Paranal, home of ESO's Very Large Telescope, is certainly one of the best astronomical sites on the planet. Stunning images, obtained by ESO staff at Paranal, of the green and blue flashes, as well as of the so-called 'Gegenschein', are real cases in point.

The Earth's atmosphere is a gigantic prism that disperses sunlight. In the most ideal atmospheric conditions, such as those found regularly above Cerro Paranal, this will lead to the appearance of so-called green and blue flashes at sunset. The phenomenon is so popular on the site that it is now the tradition for the Paranal staff to gather daily on the telescope platform to observe the sunset and its possible green flash before starting their long night of observations.

The green and blue flashes are fleeting events that require an unobstructed view of the setting Sun, and a very stable atmosphere. These conditions are very often met at Paranal, a 2635m high mountain in the Chilean Atacama Desert, where the sky is cloudless more than 300 days a year. Paranal is home of ESO's Very Large Telescope, an ensemble of four 8.2-m telescopes and four 1.8-m Auxiliary Telescopes that together form the world's most advanced optical telescope.

ESO staff Stéphane Guisard has been chasing green flashes for many years and has been able to capture them on many occasions. "The most challenging is to capture the green flash while still seeing the rest of the Sun with all its colours," says Guisard.

His colleague Guillaume Blanchard was even luckier. On Christmas Eve, as he was one of the few to follow the tradition of looking at the sunset, he had the chance to immortalise a blue flash using his hobby telescope.



ESO astronomer Yuri Beletsky also likes to take photographs from Paranal, but he prefers the night views. This allows him to make use of the unique conditions above the site to make stunning images. On some of these, he has captured other extremely interesting effects related to the Sun: the so-called Zodiacal light and the 'Gegenschein'.

Both the Zodiacal light and the Gegenschein (which is German for "counter shine") are due to reflected sunlight by interplanetary dust. These are so faint that they are only visible in places free from light pollution.

Most of the interplanetary dust in the Solar System lies in the ecliptic, the plane close to which the planets are moving around the Sun, and the Zodiacal light and Gegenschein are thus seen in the region centred around the ecliptic. While the Zodiacal light is seen in the vicinity of the Sun, the Gegenschein is seen in the direction opposite to the Sun.

Each of the small particles of dust, left over from comets and asteroids, acts as a small Moon reflecting the light coming from our host star. "If you could see the individual dust particles then you would see the ones in the middle of the Gegenschein looking like very tiny full moons, while the ones hidden in the faint part of the dust band would look like tiny crescent moons," explains ESO astronomer Colin Snodgrass. "But even the VLT cannot see such tiny individual dust particles out in space. Instead we see the combined effect, in photos like these, of millions of tiny dust particles reflecting light back to us from the Sun."

Adapted from materials provided by ESO.

<http://www.sciencedaily.com:80/releases/2008/05/080502100033.htm>

A Challenge for the U.S.: Sun Rising on the East

By **MICHIKO KAKUTANI**

THE POST-AMERICAN WORLD

By Fareed Zakaria

292 pages. W. W. Norton & Company. \$25.95.

What a difference five years — and one war — make!



In a [2003 article in Newsweek](#), written on the eve of the invasion of Iraq, [Fareed Zakaria](#) — a columnist for the magazine and the editor of its international edition — wrote: “It is now clear that the current era can really have only one name, the unipolar world — an age with only one global power. America’s position today is unprecedented.” He went on to declare that “American dominance is not simply military. The U.S. economy is as large as the next three — Japan, Germany and Britain — put together,” adding that “it is more dynamic economically, more youthful demographically and more flexible culturally than any other part of the world.” What worries people around the world above all else, he wrote, “is living in a world shaped and dominated by one country — the United States.”

In his new book, “The Post-American World,” Mr. Zakaria writes that America remains a politico-military superpower, but “in every other dimension — industrial, financial, educational, social, cultural — the distribution of power is shifting, moving away from American dominance.” With the rise of China, India and other emerging markets, with economic growth sweeping much of the planet, and the world becoming increasingly decentralized and interconnected, he contends, “we are moving into a post-American world, one defined and directed from many places and by many people.”

For that matter, Mr. Zakaria argues that we are now in the midst of the third great tectonic power shift to occur over the last 500 years: the first was the rise of the West, which produced “modernity as we know it: science and technology, commerce and capitalism, the agricultural and industrial revolutions”; the second was the rise of the United States in the 20th century; and the third is what he calls “the rise of the rest,” with China and India “becoming bigger players in their neighborhoods and beyond,” Russia becoming more aggressive, and Europe acting with “immense strength and purpose” on matters of trade and economics.



Many of this volume's more acute arguments echo those that have been made by other analysts and writers, most notably, the New York Times columnist Thomas L. Friedman on globalization, and Jimmy Carter's national security adviser, Zbigniew Brzezinski, on America's growing isolation in an increasingly adversarial world. But Mr. Zakaria uses his wide-ranging fluency in economics, foreign policy and cultural politics to give the lay reader a lucid picture of a globalized world (and America's role in it) that is changing at light speed, even as he provides a host of historical analogies to examine the possible fallout of these changes.

The irony of the "rise of the rest," Mr. Zakaria notes, is that it is largely a result of American ideas and actions: "For 60 years, American politicians and diplomats have traveled around the world pushing countries to open their markets, free up their politics, and embrace trade and technology. We have urged peoples in distant lands to take up the challenge of competing in the global economy, freeing up their currencies, and developing new industries. We counseled them to be unafraid of change and learn the secrets of our success. And it worked: the natives have gotten good at capitalism."

But at the same time, he goes on, America is "becoming suspicious of the very things we have long celebrated — free markets, trade, immigration and technological change": witness Democratic candidates' dissing of Nafta, Republican calls for tighter immigration control, and studies showing that American students are falling behind students from other developed countries in science and math.

While readers might take recent signs like recession at home, a falling dollar abroad and a huge trade deficit as suggesting that the American economy is in trouble, Mr. Zakaria asserts that the United States (unlike Britain, which was undone as a world power because of "irreversible economic deterioration") can maintain "a vital, vibrant economy, at the forefront of the next revolutions in science, technology, and industry — as long as it can embrace and adjust to the challenges confronting it."

As Mr. Zakaria sees it, the "economic dysfunctions in America today" are the product not of "deep inefficiencies within the American economy," but of specific government policies — which could be reformed "quickly and relatively easily" to put the country on a more stable footing. "A set of sensible reforms could be enacted tomorrow," he says, "to trim wasteful spending and subsidies, increase savings, expand training in science and technology, secure pensions, create a workable immigration process and achieve significant efficiencies in the use of energy" — if only the current political process weren't crippled by partisanship, special-interest agendas, a sensation-driven media, ideological attack groups and legislative gridlock.

As for the United States' role in a world that is rapidly shifting from unipolarity into a far messier and more dynamic system, Mr. Zakaria suggests that it should become a kind of "global broker," forging close relationships with other major countries, while exchanging the peremptory, directive-issuing role of a superpower for "consultation, cooperation, and even compromise" — in short, repudiating the sort of cowboy unilateralism favored by the current Bush administration and embracing a behind-the-scenes power derived from "setting the agenda, defining the issues and mobilizing coalitions."

The central strategic challenge for American diplomacy in the years to come, Mr. Zakaria says, concerns China: how to deter its aggression and expansionism, while at the same time accommodating its legitimate growth. He suggests that in a world in which "the United States is seen as an overbearing hegemon," China might well seek to position itself as "the alternative to a hectoring and arrogant America," gradually expanding its economic ties and enlarging its sphere of influence.

"How will America," he asks, "cope with such a scenario — a kind of cold war but this time with a vibrant market society, with the world's largest population, a nation that is not showcasing a hopeless model of state socialism or squandering its power in pointless military interventions? This is a new challenge for the United States, one it has not tackled before, and for which it is largely unprepared."

There are some curious gaps and questionable assertions in this book. While President Bush's controversial No Child Left Behind program has put increased emphasis on test-taking, and college

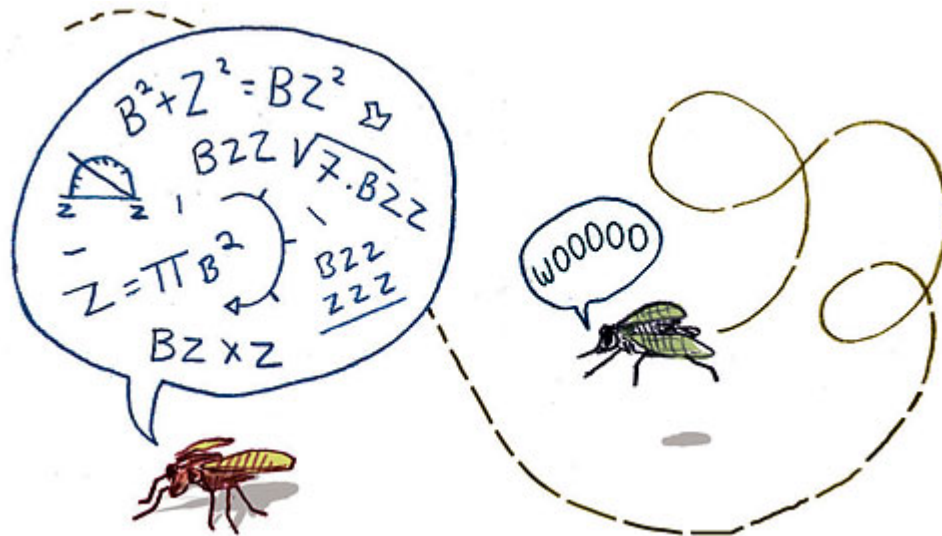


applicants worry about their SAT scores in what Forbes magazine calls “a test-crazed era,” Mr. Zakaria writes: “Other educational systems teach you to take tests; the American system teaches you to think,” adding that “American culture celebrates and reinforces problem solving, questioning authority, and thinking heretically.”

He skims lightly over the critical role that the Iraq war played in shaping America’s current problems on the world stage (he himself supported the effort to oust Saddam Hussein and wrote in March of 2003 that the war “will look better when it is over” and weapons of mass destruction are found). And in sharp contrast to Qaeda experts like the former C.I.A. officer Michael Scheuer (who argue that the Iraq war has served as a recruitment tool for Osama bin Laden) and a new State Department report (which notes the growth of Qaeda affiliates in the Middle East, North Africa and Europe, and the growing ability of al Qaeda itself to plot attacks from Pakistan), Mr. Zakaria contends that “over the last six years, support for bin Laden and his goals has fallen steadily throughout the Muslim world.”

Such dubious assertions distract attention from the many more convincing arguments in this book and the volume’s overall take on the United States’ place in a rapidly changing global landscape — a provocative and often shrewd take that opens a big picture window on the closing of the first American century and the advent of a new world in which “the rest rise, and the West wanes.”

http://www.nytimes.com/2008/05/06/books/06kaku.html?_r=1&th&emc=th&oref=slogin

Lots of Animals Learn, but Smarter Isn't BetterBy **CARL ZIMMER**

“Why are humans so smart?” is a question that fascinates scientists. Tadeusz Kawecki, an evolutionary biologist at the University of Fribourg, likes to turn around the question.

“If it’s so great to be smart,” Dr. Kawecki asks, “why have most animals remained dumb?”

Dr. Kawecki and like-minded scientists are trying to figure out why animals learn and why some have evolved to be better at learning than others. One reason for the difference, their research finds, is that being smart can be bad for an animal’s health.

Learning is remarkably widespread in the animal kingdom. Even the microscopic vinegar worm, *Caenorhabditis elegans*, can learn, despite having just 302 neurons. It feeds on bacteria. But if it eats a disease-causing strain, it can become sick.

The worms are not born with an innate aversion to the dangerous bacteria. They need time to learn to tell the difference and avoid becoming sick.

Many insects are also good at learning. “People thought insects were little robots doing everything by instinct,” said Reuven Dukas, a biologist at McMaster University.

Research by Dr. Dukas and others has shown that insects deserve more respect. Dr. Dukas has found that the larvae of one of the all-time favorite lab animals, the fruit fly, *Drosophila melanogaster*, could learn to associate certain odors with food and other odors with predators.

In another set of experiments, Dr. Dukas discovered that young male flies wasted a lot of time trying to court unreceptive females. It takes time to learn the signs of a receptive fly.

Dr. Dukas hypothesizes that any animal with a nervous system can learn. Even in cases where scientists have failed to document learning in a species, he thinks they should not be too quick to rule it out. “Is it because I’m not a good teacher or because the animal doesn’t learn?” Dr. Dukas asked.

Although learning may be widespread among animals, Dr. Dukas wonders why they bothered to evolve it in the first place. “You cannot just say that learning is an adaptation to a changing environment,” he said.



It is possible to adapt to a changing environment without using a nervous system to learn. Bacteria can alter behavior to help their survival. If a microbe senses a toxin, it can swim away. If it senses a new food, it can switch genes on and off to alter its metabolism.

“A genetic network like the one in *E. coli* is amazingly good in changing environments,” Dr. Dukas said.

Learning also turns out to have dangerous side effects that make its evolution even more puzzling. Dr. Kawecki and his colleagues have produced striking evidence for these side effects by studying flies as they evolve into better learners in the lab.

To produce smarter flies, the researchers present the insects with a choice of orange or pineapple jelly to eat. Both smell delicious to the insect. But the flies that land on the orange jelly discover that it is spiked with bitter-tasting quinine. The flies have three hours to learn that the nice odor of oranges is followed by a nasty taste.

To test the flies, the scientists then present them with two plates of jelly, one orange and one pineapple. This time, neither has quinine. The flies settle on both plates of jelly, feed, and the females lay their eggs.

“The flies that remember they had a bad experience with orange should continue to avoid orange and go to the pineapple,” Dr. Kawecki said.

Dr. Kawecki and his colleagues collect the eggs from the quinine-free pineapple jelly and use them to produce the next generation of flies. The scientists repeat the procedure on the new flies, except that the pineapple jelly is spiked with quinine instead of the orange.

It takes just 15 generations under these conditions for the flies to become genetically programmed to learn better. At the beginning of the experiment, the flies take many hours to learn the difference between the normal and quinine-spiked jellies. The fast-learning strain of flies needs less than an hour.

But the flies pay a price for fast learning. Dr. Kawecki and his colleagues pitted smart fly larvae against a different strain of flies, mixing the insects and giving them a meager supply of yeast to see who would survive. The scientists then ran the same experiment, but with the ordinary relatives of the smart flies competing against the new strain. About half the smart flies survived; 80 percent of the ordinary flies did.

Reversing the experiment showed that being smart does not ensure survival. “We took some population of flies and kept them over 30 generations on really poor food so they adapted so they could develop better on it,” Dr. Kawecki said. “And then we asked what happened to the learning ability. It went down.”

The ability to learn does not just harm the flies in their youth, though. In a paper to be published in the journal *Evolution*, Dr. Kawecki and his colleagues report that their fast-learning flies live on average 15 percent shorter lives than flies that had not experienced selection on the quinine-spiked jelly. Flies that have undergone selection for long life were up to 40 percent worse at learning than ordinary flies.

“We don’t know what the mechanism of this is,” Dr. Kawecki said.

One clue comes from another experiment, in which he and his colleagues found that the very act of learning takes a toll. The scientists trained some fast-learning flies to associate an odor with powerful vibrations. “These flies died about 20 percent faster than flies with the same genes, but which were not forced to learn,” he said.

Forming neuron connections may cause harmful side effects. It is also possible that genes that allow learning to develop faster and last longer may cause other changes.



“We use computers with memory that’s almost free, but biological information is costly,” Dr. Dukas said. He added that the costs Dr. Kawecki documented were not smart animals’ only penalties. “It means you start out in life being inexperienced,” Dr. Dukas said.

When birds leave the nest, they need time to learn to find food and avoid predators. As a result, they are more likely to starve or be killed.

Dr. Dukas argues that learning evolves to higher levels only when it is a better way to respond to the environment than relying on automatic responses.

“It’s good when you want to rely on information that’s unique to a time and place,” Dr. Dukas said. Some bee species, for example, feed on a single flower species. They can find plenty of nectar using automatic cues. Other bees are adapted to many different flowers, each with a different shape and a different flowering time. Learning may be a better strategy in such cases.

Scientists have carried out few studies to test this idea. One study, published this year by scientists at the University of London, showed that fast-learning colonies of bumblebees collected up to 40 percent more nectar than slower colonies.

Dr. Kawecki suspects that each species evolves until it reaches an equilibrium between the costs and benefits of learning. His experiments demonstrate that flies have the genetic potential to become significantly smarter in the wild. But only under his lab conditions does evolution actually move in that direction. In nature, any improvement in learning would cost too much.

Dr. Kawecki and Dr. Dukas agree that scientists need to pinpoint the tradeoffs, and they will have to gauge the role of learning in the lives of many species. As their own knowledge increases, they will understand more about humans’ gift for learning.

“Humans have gone to the extreme,” said Dr. Dukas, both in the ability of our species to learn and in the cost for that ability.

Humans’ oversized brains require 20 percent of all the calories burned at rest. A newborn’s brain is so big that it can create serious risks for mother and child at birth. Yet newborns know so little that they are entirely helpless. It takes many years for humans to learn enough to live on their own.

Dr. Kawecki says it is worth investigating whether humans also pay hidden costs for extreme learning. “We could speculate that some diseases are a byproduct of intelligence,” he said.

The benefits of learning must have been enormous for evolution to have overcome those costs, Dr. Kawecki argues. For many animals, learning mainly offers a benefit in finding food or a mate. But humans also live in complex societies where learning has benefits, as well.

“If you’re using your intelligence to outsmart your group, then there’s an arms race,” Dr. Kawecki said. “So there’s no absolute optimal level. You just have to be smarter than the others.”

<http://www.nytimes.com/2008/05/06/science/06dumb.html?th&emc=th>

Appeasing the Gods, With Insurance

By **JOHN TIERNEY**



Suppose you're preparing to travel by air. Which of these precautions do you think is most likely to prevent your plane from crashing?

- A) Sacrificing a gilt-horned bull on an altar.
- B) Sacrificing two goats on the tarmac.
- C) Buying flight insurance.

I'm guessing you didn't go for the bull sacrifice. Although this preboarding procedure was practiced by ancient Greek travelers, as Homer reported in grisly detail, today there are serious doubts about its efficacy, if only because of the litany of tourist woes in "The Odyssey."

The goat option was tested at Katmandu Airport in September to propitiate Akash Bhairab, the Hindu sky god. Officials of Nepal Airlines told Reuters that they had sacrificed two goats in front of a [Boeing 757](#) whose mechanical problems had forced the airline to suspend some flights.

"The snag in the plane has now been fixed, and the aircraft has resumed its flights," one airline official reported triumphantly. Nevertheless, it is probably premature to put much faith in a single experiment that so far, to my knowledge, has not been replicated.

We do, though, have abundant data regarding option C. Last year, tens of millions of people bought life insurance for scheduled flights of airlines in the United States. Not one of those insured passengers died in a crash — and this was not just a coincidence, at least not to many of the people who bought the insurance.

No, at some level they believed that their insurance helped keep the plane aloft, according to [psychologists](#) with new experimental evidence of just how weirdly superstitious people can be.



We buy insurance not just for peace of mind or to protect ourselves financially, but because we share the ancient Greeks' instinct for appeasing the gods.

We may not slaughter animals anymore to ward off a plague, but we think buying health insurance will keep us from getting sick. Our brains may understand meteorology, but in our guts we still think that not carrying an umbrella will make it rain, a belief that was demonstrated in experiments by Jane Risen of the University of Chicago and Thomas Gilovich of Cornell. "It is an irony of the post-Enlightenment world," they conclude, "that so many people who don't believe in fate refuse to tempt it." The psychologists first identified this reluctance last year by reconsidering a well-known superstition about lottery tickets. Experimenters had repeatedly found that once people were given a lottery ticket, they would refuse to trade it for another ticket despite being offered a cash bonus and reassured that the other ticket was just as likely to win.

This superstitious behavior had been explained with the theory of "anticipated regret": Even though the people realized the odds were no different for any ticket, they anticipated feeling especially stupid if they traded away a winner, so they held on to their ticket just to avoid that regret. But there's also another reason, as Dr. Risen and Dr. Gilovich reported after running a complicated lottery game with cash prizes for competing teams. If a player watched his teammate (who was secretly a confederate of the researchers) trade away a lottery number, the player actually believed the new number was less likely to win, and he would hedge his bet accordingly.

The fear of tempting fate showed up in further experiments with Cornell students. When told about an applicant to graduate school at Stanford who had been given a Stanford T-shirt by his mother, people assumed he would hurt his chances for admission if he had the hubris to wear it. And they believed that a professor was more likely to call on them in class if they didn't do the assigned reading. Even people who consciously reject superstitions seem to have these gut feelings, says Orit Tykocinski, a professor of psychology at the Interdisciplinary Center Herzliya in Israel. She found that rationalists were just as likely as superstitious people to believe that insurance would ward off accidents.

In one of her experiments, players drew colored balls out of an urn and lost all their money if they picked a blue one. Some players were randomly forced to buy insurance policies that let them keep half their money if they drew a blue one. These policies didn't diminish their risk of drawing a blue ball — but the insured players rated their risk lower than the uninsured players rated theirs. That same magical thinking was evident when Dr. Tykocinski asked some people to imagine buying travel insurance before getting on a plane, and others to imagine not buying it because they ran out of time at the airport. Sure enough, the ones with insurance figured they were less likely to lose their bags, get sick or have an accident.

These results presumably come as no surprise to marketers of travel insurance, which is now purchased by half of American leisure travelers — a fivefold increase since 2001, according to the United States Travel Insurance Association. As a purely economic investment, some of this insurance can be dubious, particularly the flight insurance policies. (For more on this, see nytimes.com/tierneylab.)

A magical belief in insurance sounds crazy because at a rational level we realize that our decision to forgo an insurance policy is not going to affect pilots or mechanics. But Dr. Risen and Dr. Gilovich say that there's a logical explanation for this superstition: Because calamities are so vivid and easily brought to mind, we tend to overestimate their probability when we intuitively judge what will happen if we tempt fate.

So when we think about passing up flight insurance, we conjure up disaster just as easily as ancient Greeks imagined a thunderbolt from Olympus, and we too figure we can avert it through the equivalent of a bull sacrifice. Intuitively, we haven't made great strides since Homer's day. But at least our gods take credit cards.

<http://www.nytimes.com/2008/05/06/science/06tier.html?th&emc=th>

Researchers Seek to Demystify the Metabolic Magic of Sled Dogs

By DOUGLAS ROBSON



When humans engage in highly strenuous exercise day after day, they start to metabolize the body's reserves, depleting glycogen and fat stores. When cells run out of energy, a result is fatigue, and exercise grinds to a halt until those sources are replenished.

Dogs are different, in particular the sled dogs that run the annual Iditarod Trail Sled Dog Race in Alaska. This is a grueling 1,100-mile race, and studies show that the dogs somehow change their metabolism during the race.

Dr. Michael S. Davis, an associate professor of veterinary physiology at [Oklahoma State University](#) and an animal exercise researcher, said: "Before the race, the dogs' metabolic makeup is similar to humans. Then suddenly they throw a switch — we don't know what it is yet — that reverses all of that. In a 24-hour period, they go back to the same type of metabolic baseline you see in resting subjects. But it's while they are running 100 miles a day."

Dr. Davis, who studied the sled dogs, found they did not chew up their reserves and avoided the worst aspects of fatigue. He is pursuing the research for the [Defense Advanced Research Projects Agency](#), which gave him a \$1.4 million grant in 2003 to study the physiology of fatigue resistance of sled dogs.

Dr. Davis, who is teaming with researchers at [Texas A&M](#) in a \$300,000 Darpa grant, awarded last fall, has been traveling to Alaska for years to learn why the sled dogs are "fatigue-proof."



“They have a hidden strategy that they can turn on,” he said. “We are confident that humans have the capacity for that strategy. We have to figure out how dogs are turning it on to turn it on in humans.”

Researchers have not demonstrated that ability in other species, but Dr. Davis said migratory mammals or birds could have it. Nor is it similar to the mammalian diving reflex that lets aquatic mammals like seals, otters and dolphins stay under water for long periods of time by slowing metabolic rates.

“The level of metabolism is staying the same,” Dr. Davis said. “It’s not slowing down their calorie burn rate.”

In fact, sled dogs in long-distance racing typically burn 240 calories a pound per day for one to two weeks nonstop. The average Tour de France cyclist burns 100 calories a pound of weight daily, researchers say.

How the dogs maintain such a high level of caloric burn for an extended period without tapping into their reserves of fat and glycogen (and thus grinding to a halt like the rest of us) is what makes them “magical,” Davis says.

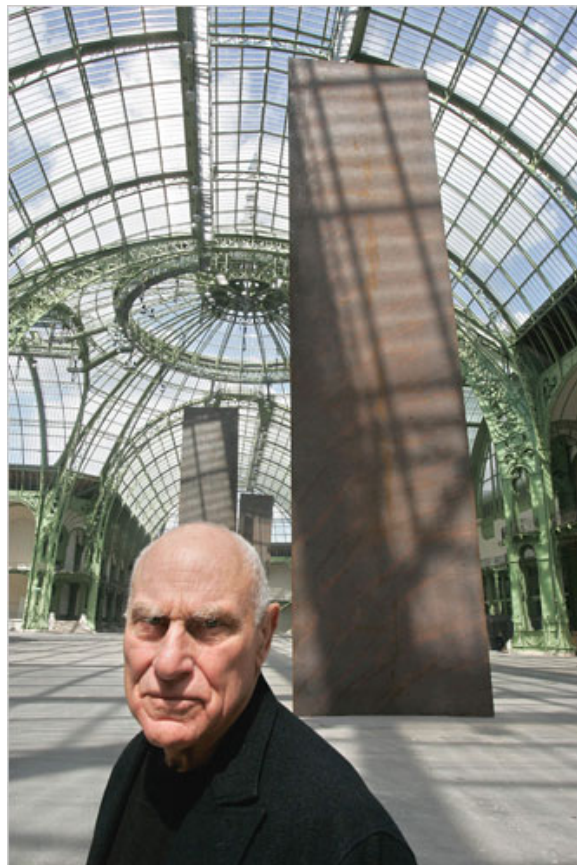
If Dr. Davis and the Texas A&M researchers identify the biomarker, or “switch,” that could help the military understand and develop ways to control and prevent the physiological effects of fatigue in strenuous cases like combat.

“Soldiers’ duties often require extreme exertion, which causes them to become fatigued,” Jan Walker of Darpa wrote in an e-mail message. “Severe fatigue can result in a compromised immune system, making soldiers more susceptible to illness or injury.”

<http://www.nytimes.com/2008/05/06/science/06dogs.html?th=%26emc=th%26pagewanted=print>

Serra's Monumental Vision, Vertical Edition

By **STEVEN ERLANGER**



PARIS — France is making a fuss this week over Richard Serra, the 68-year-old American bantamweight who fashions elegant, gargantuan art out of steel.

On Wednesday Mr. Serra opens the annual solo show called Monumenta in the echoing Grand Palais; the city of Paris has restored one of his earlier works to its proper place in the garden of the Tuileries; and he has been made a commander of the Order of Arts and Letters of the French Academy — a two-rank leap from his previous knighthood, the starter kind usually given to singers like Kylie Minogue, who recently received hers.

France has always welcomed Mr. Serra, even before he became iconic, in the days when some of his work in America was dismantled for scrap. President Nicolas Sarkozy and his wife, Carla, are expected to attend the opening of “Monumenta,” prompting Mr. Serra to ask, “What U.S. president would do that?”

But the sheer scale of Mr. Serra's work has always created difficulties, to which Paris has found two creative solutions — for now, at least.

Monumenta started last year under the French Culture Ministry as a way of filling the enormous Grand Palais, built for the 1900 Universal Exhibition, after a long and expensive restoration.



A cruciform crystal palace of filigreed iron and glass, the Grand Palais rises 197 feet at the nave and covers 775,000 square feet, and filling it is a monumental task. The German sculptor Anselm Kiefer did it last year with seven stand-alone houses, or galleries, each about 50 feet high, and concrete towers.

Mr. Serra began struggling with the problem two years ago. “First, you have to figure out scale,” he said. “I was overwhelmed by the space and wasn’t exactly sure what to do. But I realized you have to deal with the entirety of the space — to think otherwise was to kid myself.”

He couldn’t just deal with the floor plan, he said. “I had to go vertical here.”

His answer is a sculpture called “Promenade,” five enormous slabs of Cor-Ten steel set along the central axis of the floor. The steel slabs are each 56 feet high, 13 feet wide and 5 ½ inches thick, and each weighs some 73 tons. Yet they are precisely placed and angled, leaning 20 inches in or away from their axis, creating shifting lines of sight. As the sun moves over the course of the day, casting different latticed shadows from the building, the plates appear at times to bend toward or away from the viewer. At night, with the ceiling dark, the sculpture becomes “more somber, more of a sanctuary,” Mr. Serra said.

Formalism seems to require words, and Mr. Serra complies. “You have to set up a formal structure; it makes sculpture interesting,” he said, wandering among the slabs in the otherwise empty hall. “If we hang new material on old forms, it’s boring.”

His generation, he said, “wanted to open the entire field — to see something in time and place,” and take sculpture off its pedestal, which “makes it seem like furniture or commodities,” he said.

“People don’t perceive the art but the surplus value of art — art as photographs, as J-PEGs. People talk of art and ask: ‘How much does it cost? What’s its pedigree?’ But people don’t go to see the work in place.”

He wants people to experience the art in a particular time and setting: “It’s about apprehension, how you apprehend the space and the piece,” he said. “It’s part of the experience of walking around the space in which the art appears — you implicate yourself in the space, and the experience is in you, not in the frame or on the wall.”



It's a democratic thought in an elitist field. But it can be troubling too, as his experience with "Clara-Clara" demonstrates.

Mr. Serra met his wife, Clara Weyergraf-Serra, in 1977. In 1983 he created "Clara-Clara," a sculpture commissioned for the pit, or forum, of the Pompidou Center as part of a Serra retrospective show. Two large, inclined steel C's, each roughly 12 feet high by 108 feet long and weighing 105 tons, curve away from each other at the ends and nearly meet in the middle, but allow a viewer to walk through.

But the weight was considered too much for the site, and Dominique Bozo, then the Pompidou Center's director, suggested placing the sculpture at one end of the Tuileries garden, so it would frame the Louvre Museum at one end and the large obelisk from the Temple of Luxor in the Place de la Concorde at the other.

As Michael Brenson wrote in *The New York Times* in 1985, "The sculpture seems both to open like magical doors and to squeeze inward like a trap, both to expose itself like a flower hungry for the sun and to curl up like a sunflower at dusk."

The city of Paris bought the sculpture and later found a place for it in the park of Choisy, in the 13th arrondissement. But the piece was badly scratched, covered with graffiti and used by the homeless for a shelter, and in 1993 the city took it down and put it in storage. Since then Mr. Serra and his wife have rejected various other suggestions for a permanent installation.

Now, under the auspices of the Louvre, "Clara-Clara" is back in the Tuileries, at least until November. But much to Mr. Serra's chagrin, those who visit it, on dusty ground, have decided in a kind of collective fancy to put their footprints on the steel.

The soles of sneakers and athletic shoes may have their own formal design, but the prints look tacky on the orangey patina of the steel. As much as one may admire the dexterity of those who have put their footprints high up on the sculpture, Mr. Serra is not pleased at the way these particular viewers have chosen to "implicate" themselves and "apprehend the space and the piece."

He hopes the city will at least put up a sign. "It bothers me a lot the way they put their feet on it," he said. "But I haven't gone up to anyone to pull them away."

His wife is more philosophical. "Well," Ms. Weyergraf-Serra said, "I prefer that people not step on me!"

The Monumenta show runs through June 15 and will include a variety of evenings with critics, philosophers and filmmakers like Chantal Akerman. On June 7 Mr. Serra's old friend Philip Glass will perform at a solo piano concert in the Grand Palais.

The two men met here in 1965, when Mr. Serra came to Paris on a Yale traveling fellowship. “We used to go to La Coupole and watch Giacometti come in, plaster dust in his hair, like two groupies,” Mr. Serra said. Later Mr. Serra and Mr. Glass returned to New York and worked together as truck drivers and furniture delivery men as they began to fashion their extraordinary careers in the fickle world of art.



Mr. Serra, who lives in TriBeCa, was there on Sept. 11, 2001, and in its aftermath. He was horrified by his own voyeurism, he said, as he and others watched people in the burning towers throw themselves to their deaths, hand in hand.

“People were silent, other people jumped, and people on the ground moaned in unison, like a Greek chorus,” he said.

It had a great impact on him, he said, talking of the random quickness of life, a new desire to be considerate. “You need to keep your wits about you, and you have to acknowledge everyone around you,” he said. “Before, maybe I didn’t. But we’re all here and here together. It made me a stronger person. But also I think a little more open and generous one.”

Mr. Serra, who owns “Promenade,” invested close to \$1 million for its development and construction. But he says he has no idea what will happen to it after Monumenta — or what Paris will decide to do with “Clara-Clara.”

“You have to let it go,” he said. “You have to move on. Otherwise it’s a dog with a bone. Like this piece, ‘Promenade.’ There’s no guarantee of perpetuity. Who can know?”

<http://www.nytimes.com/2008/05/07/arts/design/07serr.html?th&emc=th>



The Private Sector Role in Global Higher Education

In many countries, as in the United States, demand for higher education is growing fast, sometimes outstripping the ability of traditional colleges — which, in many countries, means government-run institutions — to fulfill the need.

The extent to which private institutions, be they for-profit or nonprofit, are the answer (or part of it) to meet the demand varies from country to country, with some openly embracing the private sector, others keeping them out, and still others intrigued but wary. Wednesday night, dozens of international higher education officials, investors, and others gathered in Washington for the start of a three-day meeting sponsored by the International Finance Corporation, a World Bank agency that aims to build the private sector in developing countries.

And to kick off the meeting, the group turned to Douglas L. Becker, chairman and chief executive officer of Laureate Education, Inc., whose company has built a 300,000-student, \$2 billion a year enterprise by focusing solely on creating private institutions in foreign lands — so far, 70 campuses in 17 countries.

Perhaps not surprisingly, given Laureate's bleeding-edge success, Becker sees a bright future for the private sector in international higher education — but not without some likely hiccups along the way, and only if the providers act more as “welcome allies” than as “unbidden guests,” to borrow phrases from the title of his talk.

After briefly describing Laureate's operations (which have grown by 30 percent a year for more than six years now), Becker laid out an international landscape in which demand for higher education among 18- to 24-year-olds is growing by 10 percent a year, drawing ever more institutions into the market seeking to meet the burgeoning demand that countries' government cannot.

Gone, he said, are the days when would-be providers of private higher education were satisfied creating vocational schools; and with the heightened ambition of those institutions has sometimes come more scrutiny and suspicion.

“As institutions have gotten more ambitious,” Becker said, “that has paved the way for some conflict with the public sector” in those countries. ” ‘Wait a minute, it was okay when we were going to let you open a secretarial school. But you want to open a medical school? You want to do sponsored research?’ ” he said, channeling government officials in some countries. (Laureate has both created medical schools and engaged in significant research; in Chile, for example, it is the largest private recipient of federal research funds, he said.)

Becker said that the onus will be (and should be) on would-be private providers of higher education to behave in ways that will ease the suspicions of government officials — and to perform well. Institutions, he said, need to be “relevant to the work place” — they need not be vocational, as many of Laureate's universities are not, but they should focus on producing “workers who can contribute to the economy,” defined locally by the specific needs of each country.

And they must be accountable, he said, to prove that the education they are providing is worthwhile. He applauded efforts under way in Europe, through the Bologna accords, to create a common “qualifications framework” for institutions and their graduates, and in Chile, which has created and already revised a new system of accreditation. Government should set standards high, he said, so that not just anyone can pull into a foreign country “and say, ‘Let's create a university, let's put on a show.’ ”

“Left completely to its own,” Becker said, “the private sector will go into every crack and crevice it can find.... The threat to the reputation of the private sector doesn't come from the people who are in this



room. It comes from the people who, either purposely or accidentally, aren't going to be able to meet the standards set by government."

Some institutions will inevitably run afoul of those standards, he predicted — "we will see cases of universities having their licenses pulled" — and that will be "very painful," but it will be "part of the process" that ultimately leads to full acceptance of the private sector.

The conference continues today.

— Doug Lederman

*The original story and user comments can be viewed online at
<http://insidehighered.com/news/2008/05/15/private>.*



Want to Download? Take the Quiz

For all the high-tech tactics colleges have employed to slow or block students' illegal file sharing activity, few have actually turned to methods used in the classroom to get the message across. A university in Missouri thinks it's found the right solution, combining an age-old teacher's tool with a dash of discipline.

Last academic year, Missouri University of Science and Technology, in Rolla, received some 200 Digital Millennium Copyright Act "takedown" notices from the recording industry, notifying the institution that users of its network had made copyrighted works available for download. This academic year — at a time when colleges across the country have been experiencing sudden spikes in copyright complaints — the university received eight. Karl F. Lutzen, a systems security analyst at the university, chalks it up to Missouri S&T's unusual method of regulating students' network usage: In order to download (or upload) files on any peer-to-peer network whatsoever, all on-campus users have to pass an online quiz on copyright infringement.

But not just once. Passing the test — with a perfect score — enables peer-to-peer access for six hours on the user's on-campus registered machines, presumably enough time to download that (legal) song, TV show or e-book. The next time, the student, staff or faculty member has to go to the intranet Web page and take the randomized test again, for a maximum of eight uses per month (which, kind of like vacation days, can accrue to at most 20).

"The idea is that we had a policy where we permitted peer-to-peer protocols for educational and research use," Lutzen said, and as long as it was for legitimate reasons, "we didn't have a problem with people using it.... This solution, more or less, through educational and technical controls, enforces that policy."

The system works by taking advantage of "traffic shaping" technology used by most campus networks to prioritize certain types of data over others. For example, without traffic shaping that limits outgoing peer-to-peer traffic (regardless of a university's policy on file sharing), a campus network could easily and quickly become a hub for downloaders around the world. By quickly isolating specific users and turning their ability to send and receive peer-to-peer data off or on, Missouri S&T is harnessing the traffic shaping technology to tie access to the online quiz.

"Based on the amount of grumbling it's actually working pretty well," Lutzen said.

When students pass the quiz, P2P access is granted within 10 seconds for use by any program, whether it's a game or software program that needs to download an update, LimeWire, BitTorrent or another program. From that point on, there's no way for the university to monitor whether users' file-sharing activity is legal — but, on the other hand, there's also no way for them to claim ignorance. If a student fails to make a perfect score, though, he or she has a minute or two to try again. But the questions change, and so does the order. Theoretically, students can memorize the questions, Lutzen said, but they'd still have to pay attention to how the answers are arranged (which also changes) and end up learning the material anyway.

Questions include asking students what kinds of works are protected by copyright and the difference between copying a CD and downloading music. The university's sanctions for violations of copyright policy are strict: 14 days of revoked network access for the first offense and 28 days, plus community service, for the second, and so on.

Colleges have taken widely divergent approaches to the problem of illegal file sharing, from a "look the other way" philosophy to complete bans. Most inform their students of the legal aspects of peer-to-peer networks and (sometimes reluctantly) hand over "pre-litigation" letters sent by the recording industry that offer certain students discounted settlements in order to avoid copyright infringement lawsuits. Some



have gone as far as to block peer-to-peer access altogether, and others — like Missouri S&T — offer legal alternatives, such as Ruckus.

But the combination of strict enforcement on the campus network and educational requirements is novel. Last year, the University of Michigan used similar traffic-shaping tools to begin informing students when they were uploading data over peer-to-peer networks, but that hasn't been matched with any blocking mechanisms. Michigan's goal was to prevent students from inadvertently offering copyrighted content for others to download — which is sometimes the default option on file-sharing programs — and becoming susceptible to litigation. (Missouri S&T, formerly the University of Missouri at Rolla, essentially accomplishes the same goal, because uploading on peer-to-peer networks is also limited to the six-hour blocks enabled by the quiz.)

“I think that this is an interesting and new area, I think it's great to have a thousand flowers bloom and try different things,” said Tracy Mitrano, the director of IT policy and the Computer Policy and Law Program at Cornell University. There, she said, students who receive DMCA notices take an intensive educational program that they must pass. Missouri S&T's program was “another layer deeper” than Michigan's system, dubbed BAYU (for Be Aware You're Uploading).

Mitrano added that she and others at Cornell were discussing how to move some of those educational resources to the “front end,” when students enroll, since many come into college with downloading habits ingrained since middle school. It's better “trying to front-load it rather than have it be ‘discipline’ even though it's just education,” she said.

Lutzen agrees: “I think the model of putting education up front and limiting the usage is what needs to be looked at. How that's done is up to the institution.”

— Andy Guess

*The original story and user comments can be viewed online at
<http://insidehighered.com/news/2008/05/15/p2p>.*

Families Shed Light On Likely Causative Gene For Alzheimer's



Dr. Shirley E. Poduslo, neuroscientist in the Medical College of Georgia Schools of Medicine and Graduate Studies. (Credit: Phil Jones)

ScienceDaily (May 15, 2008) — The genetic profile of two large Georgia families with high rates of late-onset Alzheimer's disease points to a gene that may cause the disease, researchers say.

Genetic variations called single nucleotide polymorphisms, or SNPs, are common in DNA, but this pattern of SNPs shows up in nine out of 10 affected family members, says Dr. Shirley E. Poduslo, neuroscientist in the Medical College of Georgia Schools of Medicine and Graduate Studies and the Charlie Norwood Veterans Affairs Medical Center in Augusta.

The 10th family member had half the distinctive pattern. The SNPs also were found in the DNA of 36 percent of 200 other late-onset patients stored in the Alzheimers' DNA Bank.

"We were shocked; we had never seen anything like this before," Dr. Poduslo says of findings published online in the American Journal of Medical Genetics. "If we looked at unaffected spouses, their SNPs were all different. The variants consistently found in affected siblings are suggesting there is something in this gene. Now we have to go back and find what is in this gene that is making it so unique for Alzheimer's patients."

The variation was in the TRPC4AP gene, part of a large family of genes that is not well-studied but is believed to regulate calcium. Calcium is needed throughout the body but its dysregulation can result in inflammation, nerve cell death and possibly plaque formation as well, she says.



The finding provides new directions for research and possibly new treatment targets, Dr. Poduslo says. It also shows the important role large families affected by a disease can have in determining the cause of the disease.

The specific genetic mutation responsible still must be identified and will require sequencing the very large gene, or determining the order of the base pairs that form the rungs of the ladder-like DNA, Dr. Poduslo says. An SNP represents a change in either side of a rung. "The mutation could be a deletion of some of the nucleotides, could be an insertion, or something in the promoter gene that turns the gene off so it's never transcribed. It could be a wide variety of things, and that is what our next step is to identify the mutation." She'll work with The Scripps Research Institute in Jupiter, Fla., to expedite the required high-throughput analysis.

One of the families that provided the sentinel genetic information had 15 members, including five with Alzheimer's that started in their 60s and 70s; the second family had 14 members, six of whom had the disease. The disease incidence itself was notable and the incidence of the pattern of SNPs was equally so. "This to me is very, very striking. Genetics and lifestyle either could be the biggest risk factors," says Dr. Poduslo. "We looked at these families very, very carefully to see what in their background may make them different and we couldn't come up with anything. They were farmers living fairly healthy lifestyles."

Families donate to the Alzheimer's DNA bank to help others at this point and don't get feedback from findings generated by their genetic material, Dr. Poduslo says. "Right now, we have no way of treating it, so it's not going to help them. When we come up with new drugs so we can treat this disease, then it becomes important to identify it early and get treatment."

Adapted from materials provided by Medical College of Georgia, via EurekAlert!, a service of AAAS.

<http://www.sciencedaily.com/releases/2008/05/080514113704.htm>

Gaining Independence For People With Disabilities Through Video Games



Simulation of virtual Price Chopper based on actual store blueprints. (Credit: Rensselaer/CapAbility)

ScienceDaily (May 15, 2008) — Today’s video games serve a multitude of functions ranging from entertainment to exercise and even education. Now, three graduates from Rensselaer Polytechnic Institute’s Class of 2008 have created a game with an even more important purpose—to foster independence among disabled individuals.

Graduating seniors Jennifer Ash, Zach Barth, and Peter Mueller have led an interdisciplinary student team made up of programmers, game designers, character and level artists, electrical engineers, and music composers to create a groundbreaking interactive game simulation to help individuals with disabilities develop life skills and obtain increased autonomy.

Called the CapAbility Games Research Project, the students worked in collaboration with the Adult Services Division of the Center for Disability Services in Albany to develop a game that specifically addresses the needs of the center’s consumers.

The game, called “Capable Shopper,” simulates a shopping trip at a local Price Chopper. Players maneuver through the virtual grocery store—which is based on actual blueprints obtained from an area Price Chopper where the center’s consumers often shop—using a specially designed joystick or a head mouse, depending on their individual mobility.

“The most difficult—and most rewarding—part of the game development process was creating something that was accessible to a large group of people who had varying abilities,” said Zach Barth, a dual



computer systems engineering and computer science major. “Beyond that we created countless iterations of the game until we achieved something educational that was still really fun to play.”

A computer monitor set up directly in front of the user simulates the layout of the store, and a second monitor to the left displays a virtual shopping list. Users start the game by selecting a meal they’d like to make—such as a spaghetti dinner, a holiday ham, or even rotini with alfredo lobster sauce—and complete it when they’ve found all the items on their list.

A player selecting mac ’n’ cheese casserole, for example, is charged with finding ham, cheese, pasta, biscuits, and frozen vegetables to complete the meal.

Consumers at the center have successfully used the “Capable Shopper” game to practice learning their way around the supermarket, identifying the appropriate aisles in which to find items on their shopping list, and selecting specific items off of shelves.

“By creating this simulated learning environment, our students have given individuals with disabilities an engaging way to learn skills directly related to independence in their daily lives. Beyond that, they’ve gotten them excited about engaging with the real world,” said Kathleen Ruiz, associate professor of electronic arts at Rensselaer, and faculty leader of the CapAbility Research Project. “Games like ‘Capable Shopper’ illustrate the potential for new gaming genres such as serious games that combine the strengths of interactivity with multimedia to provide engaging simulations in communication, education, and artistic expression, among others.”

Following the success of “Capable Shopper,” the students were asked to install it in the Center for Disability Service’s Adult Services Division so that it may be accessed by individuals at any time. A permanent installation was completed this week.

“It was great to be a part of the tech group at RPI, designing and organizing a video game for the Center for Disability Services,” said Ron Hill, a consumer at the Center who has been involved in the project.

Barth, Ash, and Mueller worked on the CapAbility Research Project with teammates Darren Domingos ’10, Ben Esposito ’11, and Class of 2004 alumnus Brian Ratta and Class of 2007 alums Ben Frost and Terry Lucas.

Following graduation on May 17, 2008, Ash—a dual psychology and games and simulation arts and sciences major—and Barth plan to take jobs at IBM and Microsoft, respectively. Mueller, a design, innovation and society major, plans to spend the summer traveling in Beijing.

Adapted from materials provided by Rensselaer Polytechnic Institute.

[http://www.sciencedaily.com /releases/2008/05/080513191103.htm](http://www.sciencedaily.com/releases/2008/05/080513191103.htm)



Office Initiative Reduces Headaches And Neck And Shoulder Pain By More Than 40 Percent

ScienceDaily (May 15, 2008) — Office staff who took part in an eight-month workplace initiative reported that headaches and neck and shoulder pain fell by more than 40 per cent and their use of painkillers halved, according to new research.

They also reported that pain levels were less severe at the end of the study than at the start.

Italian researchers compared 169 staff in Turin's registry and tax offices with 175 colleagues who hadn't taken part in the educational and physical programme. Using daily diaries completed by both groups, they compared the baseline results for months one and two of the study with months seven and eight to see if there had been any changes. The study group started following the programme in month three.

They found that:

- At the start of the study, staff in both groups reported an average of six headache days a month and seven and a half days when they were affected by neck and shoulder pain. They needed to take analgesic drugs two days a month.
- By the end of the trial, staff in the study group reported that they suffered from 41 per cent fewer headaches, with staff in the control group reporting a negligible rise of 0.02 per cent.
- Study group staff also reported 43 per cent less neck and shoulder pain, compared with staff in the control group who reported a five per cent reduction.
- When it came to medication, the study group reported a 51 per cent reduction in analgesic use and the control group reported a fall of 15 per cent.
- Subjects with anxiety or depression showed a better than average response when compared with the rest of the study group.

The researchers were also keen to see whether the workplace initiative also reduced the 'global burden' of the employee's headaches and neck and shoulder pain, which is calculated by multiplying intensity by frequency. They found that:

- Employees in the study group reported a 41 per cent reduction in headache burden, compared with a two per cent fall for the control group.
- The burden of neck and shoulder pain was 54 per cent lower in the study group by the end of the study, with the control group recording a reduction of four per cent.

"Staff in the study group were asked to carry out a series of relaxation and posture exercises every two to three hours and provided with red labels to place around their work area to remind them to avoid excessive contraction of their head and shoulder muscles" explains lead author Professor Franco Mongini from the Headache and Facial Pain Unit at the University of Turin, Italy.

"The exercises also included two daily periods of ten to 15 minutes when staff relaxed quietly at home in a comfortable armchair with warming pads placed on their cheeks and shoulders."

The programme was designed by the lead author and was explained using a short film, followed by a practical demonstration and training.

Staff were also provided with information sheets on the exercises and the clinician leading the study revisited the workplace in months four and six to remind staff of the procedures.

The study and control groups were based in separate offices to avoid cross contamination of the results. 90 per cent of the 384 employees who agreed to take part completed the study. Most were female (80 per cent), with an average age of 46.



"Headache and neck and shoulder pain are both a clinical challenge and a major health problem" stresses Professor Mongini, whose research was primarily funded by the Compagnia di San Paolo in Turin, with additional funding from Region Piemonte.

"Last year Cephalalgia published a study by Stovner et al that suggested that the worldwide prevalence of headache was as high as 46 per cent in adults, with 11 per cent suffering from migraine, 42 per cent from tension headaches and three per cent from chronic daily headaches.

"Our study clearly shows that workplace interventions can reduce headaches and neck and shoulder pain.

"The methods adopted were relatively simple and the positive response from the employees, including the low study drop-out rate, suggest that it would prove popular in other workplaces.

"We also believe that employers would support this low-cost initiative as it would improve productivity in the workplace."

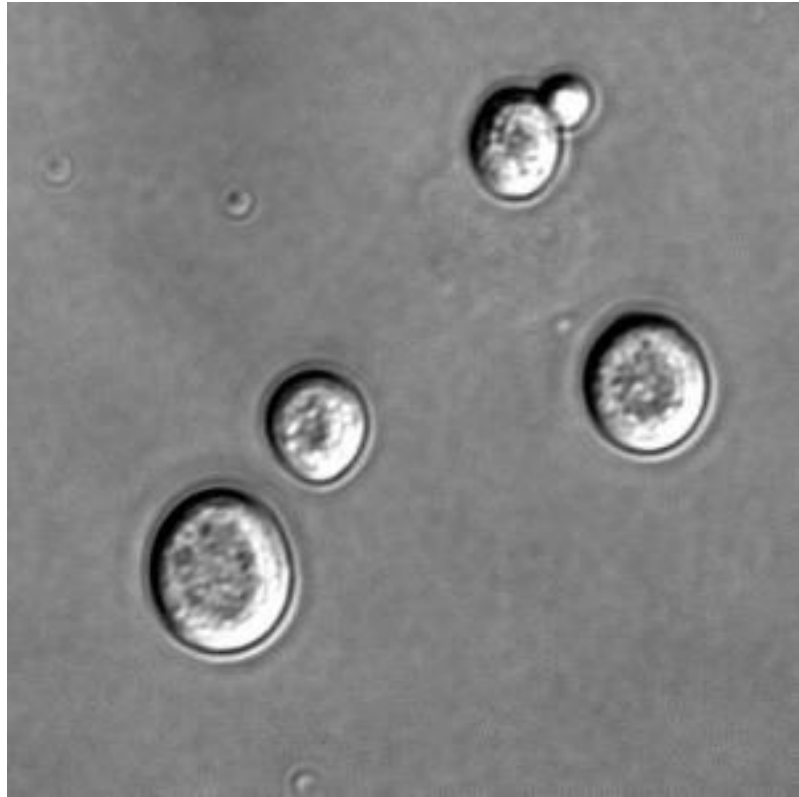
Journal reference:

1. Effectiveness of an educational and physical programme in reducing headache, neck and shoulder pain: a workplace controlled trial. Mongini et al. Cephalalgia. 28, 541-552 (May 2008).
[\[link\]](#)

Adapted from materials provided by [Wiley-Blackwell](#), via [EurekAlert!](#), a service of AAAS.

[http://www.sciencedaily.com /releases/2008/05/080514092319.htm](http://www.sciencedaily.com/releases/2008/05/080514092319.htm)

Architecture For Fundamental Processes Of Life Discovered



Yeast cells (Sacharomyces cerevisiae) seen using DIC microscopy. (Credit: Wikimedia Commons)

ScienceDaily (May 14, 2008) — A team of Canadian researchers has completed a massive survey of the network of protein complexes that orchestrate the fundamental processes of life. In the online edition of the journal *Science*, researchers from the Université de Montréal describe protein complexes and networks of complexes never before observed -- including two implicated in the normal mechanisms by which cells divide and proliferate and another that controls recycling of the molecular building blocks of life called autophagy.

These processes are implicated in diseases such as cancers and autophagy has recently been shown to be involved in degenerative neurological disorders such as Alzheimer's and Huntington's diseases. The discovery will fill gaps in basic knowledge about the workings and evolutionary origins of the living cell and provide new avenues to explore in linking these fundamental processes to human disease.

The study was led by Stephen Michnick, a Université de Montréal biochemistry professor and Canada Research Chair in Integrative Genomics, along with Université de Montréal co-first authors: Kirill Tarassov, Vincent Messier, Christian Landry and Stevo Radinovic. Collaborators from McGill's Department of Biology included Canadian genomics pioneer Prof. Howard Bussey and Prof. Jackie Vogel.

"Our team systematically analyzed the interactions of proteins of bakers yeast, a unicellular organism confirmed to provide insight into fundamental processes shared by most living cells including those of humans," explained Prof. Michnick.

New technology makes discovery possible



The examination of protein complexes was made possible by a unique technology developed by Prof. Michnick with his post-doctoral fellows and graduate students. The novel technology allows interactions between proteins to be studied in their nearly natural state in the cell. With this technology, the scientists performed approximately 15 million pair-wise tests to identify about 3,000 interactions between protein pairs.

Since protein-to-protein association largely defines their function, this is a major advancement towards scientific understanding of the inner life of human cells. Thanks to Prof. Michnick's technology, the researchers also uncovered the architecture of protein complexes -- key information necessary to determine how proteins work together to orchestrate complex biochemical processes.

"The technologies and resources developed for this study can be applied to investigate protein networks in more complex organisms including crop plant and human cells," said Prof. Michnick. "They may also be used to link multiple genes implicated in complex human diseases to common cellular processes. What's more, applications to diagnostic tests and the development of drugs and antibodies against human cancers can be readily envisioned."

Professor Michnick's research was supported by the Canadian Institutes of Health Research (CIHR), Institute of Genetics and the Natural Sciences and Engineering Research Council of Canada (NSERC). The research was also funded by Genome Canada and Génome Québec.

Journal reference:

1. An in Vivo Map of the Yeast Protein Interactome. Kirill Tarassov, Vincent Messier, Christian R. Landry, Stevo Radinovic, Mercedes M. Serna Molina, Igor Shames, Yelena Malitskaya, Jackie Vogel, Howard Bussey, Stephen W. Michnick. Science. May 8, 2008. [[link](#)]

Adapted from materials provided by [University of Montreal](#).

[http://www.sciencedaily.com /releases/2008/05/080513103957.htm](http://www.sciencedaily.com/releases/2008/05/080513103957.htm)

Teen Helps Design Classroom DNA Experiments Using Common Food Dyes



Andrew N. Trigiano, a middle school student, completing an electrophoresis experiment with food dyes. (Credit: Richard D. Maxey, Publications Specialist, Marketing and Communications, University of Tennessee Institute of Agriculture, Knoxville)

ScienceDaily (May 14, 2008) — Agarose gel electrophoresis? Most teenagers wouldn't have a clue what this scientific term means, but middle school student Andrew Trigiano knows the protocol inside and out. When Andrew was 12, his father Robert Trigiano, a professor at the University of Tennessee, was looking for an interesting science project for his son. Setting out to compare differences in popular brands of Easter egg dyes, Trigiano's project soon grew into a full-blown scientific study and set of replicable classroom experiments.

One of the most frequently used tools in biochemistry and biotechnology, agarose gel electrophoresis is a common forensic technique often used in genetic or DNA fingerprinting. The procedure is achieved by moving negatively charged nucleic acid molecules through a gelatinous substance known as agarose by using an electric field.

Andrew, in collaboration with his father and other researchers, completed the study, which is published in the January 2008 issue the American Society of Horticultural Science's journal *HortTechnology*. The youngest author ever to publish in an ASHS journal, Andrew was only 12 when he began the research project and 14 when the study was published.

The resulting experiments were developed for use in middle and high school classrooms or for teachers and undergraduate students who have limited hands-on experience with this technique. As Dr. Trigiano explained, "one experiment, electrophoresis of common food dyes, was designed for secondary and undergraduate students but can be used as an inexpensive means for introducing the main concepts of electrophoresis to anyone. Popular brands of food dyes (red, blue, yellow, and green) purchased at local markets are mixed into a 60% glycerol/water solution and are separated on 1% agarose gels. Mixed colors



are separated into primary colors (e.g., green into blue and yellow) and some apparently single dyes often have extra "surprise" components."

Explaining another experiment from the study, Trigiano continued: "The second laboratory exercise requires more extensive equipment and a more advanced set of skills, but the exercise has been completed successfully by middle school-level through graduate-level students and teachers. In this exercise, the internally transcribed spacer region of the ribosomal subunit for a fungus, plant, and insect are amplified and separated electrophoretically on agarose gels. A simple crime is solved using polymerase chain reaction (PCR) and DNA fingerprinting."

The experiments outlined in the study provide students with hands-on practice assembling master mixes for PCR, using pipettes, and performing the various steps involved in PCR amplification. Instructions for both exercises are formatted in easy-to-follow procedure boxes, and a downloadable presentation is available on the web. The cost of supplies is about one dollar per student, making these exercises relatively inexpensive to conduct.

Dr. Trigiano hopes the experiments will be a vehicle to introduce electrophoresis to students of all ages. "The experiments are fun, engaging and inexpensive compared to most commercially available kits. The downloadable PowerPoint presentation also helps explain the process visually. The techniques are easily understood and completed by students of all ages with a minimum of equipment and other resources."

Trigiano attributes his son Andrew for much of the research study's success. "Andrew did most of the PowerPoint presentation, the dye figures in the article, much of the experimentation with the dyes and helped develop the dye-based forensic exercise." From the results, it's clear that this teenager has science in his DNA.

Journal reference:

1. Trigiano, R.N., Ownley, B.H., Trigiano, A.N., Coley, J., Gwinn, K.D., Moulton, J.K. Two Simple and Inexpensive Laboratory Exercises for Teaching Agarose Gel Electrophoresis and DNA Fingerprinting. *HortTechnology* 2008 18: 177-188 [[link](#)]

Adapted from materials provided by [American Society for Horticultural Science](#).

<http://www.sciencedaily.com/releases/2008/05/080513140139.htm>

Genetic Variation Linked To Preference Sugary Food



People with a specific genetic variation consistently consume more sugary foods, a new study has found. (Credit: iStockphoto)

ScienceDaily (May 14, 2008) — A new study in Physiological Genomics finds that individuals with a specific genetic variation consistently consume more sugary foods. The study offers the first evidence of the role that a variation in the GLUT2 gene -- a gene that controls sugar entry into the cells -- has on sugar intake, and may help explain individual preferences for foods high in sugar.

The study was conducted by Ahmed El-Sohemy, Karen M. Eny, Thomas M.S. Wolever and Benedicte Fontaine-Bisson, all of the Department of Nutritional Sciences, University of Toronto, Toronto, Canada.

*

Summary of the Study

Food preferences are influenced by the environment as well as genetics. Cravings for foods high in sugar vary from person to person, but the reasons why are still unclear. To better understand the mechanism, the research team examined the effect of a common variation in a gene that controls the entry of sugar (glucose) into cells. The gene is called glucose transporter type 2 or GLUT2.

The researchers tested the effects of the genetic variation in two distinct populations. One population consisted of older adults who were all either overweight or obese. The other population consisted of generally healthy young adults who were mostly lean.



The diet of the participants in the first population was assessed by recording all of the foods and beverages consumed over a three day period, and repeating this 3-day food record two weeks later to ensure that the effect was reproducible. All participants were interviewed face-to-face during the two visits to the research centers. For the second population, the study participants used a questionnaire that asked about the foods and beverages typically consumed during a one month period.

Blood was drawn from each participant, and their DNA extracted. The researchers examined the genotype distribution and compared the food intake data each participant provided between individuals with the variation and those without the variation in GLUT2. The DNA samples that carried the variation in GLUT2 were associated with consuming more sugars in both populations studied.

Findings

The results of the study showed that a genetic variation of GLUT2 is associated with differences in the habitual consumption of sugars both within and between two distinct populations. Specifically:

- those individuals with the GLUT2 variation consistently consumed more sugars (sucrose (table sugar)), fructose (simple sugar such as corn syrup) and glucose (carbohydrates), regardless of age or sex.
- the two sets of food records from the older group showed that the older individuals with the variation consumed more sugars than their non-variant older counterparts (112 ± 9 vs. 86 ± 4 grams of sugar per day and 111 ± 8 vs. 82 ± 4 grams per day).
- the individuals in the younger population who carried the variant were found to consume more sweetened beverages (0.49 ± 0.05 vs. 0.34 ± 0.02 servings per day) and more sweets (1.45 ± 0.10 vs. 1.08 ± 0.05 servings per day) than their non-variant counterparts.
- there were no differences in the amount of protein, fat, starch or alcohol that was consumed by those either with or without the variant.

Conclusions

According to Dr. El-Sohemy, the study's senior researcher, "We have found that a variation in the GLUT2 gene is associated with a higher intake of sugars among different populations. These findings may help explain some of the individual variations in people's preference for sugary foods. It's especially important given the soaring rates of obesity and diabetes throughout much of the world."

The study was funded by the Advanced Food and Materials Network (AFMNet) and the Canadian Institutes of Health Research (CIHR).

*The study, entitled Genetic Variant in the Glucose Transporter Type 2 (GLUT 2) is Associated with Higher Intakes of Sugars in Two Distinct Populations, appears in the May 2008 edition of *Physiological Genomics* (<http://physiolgenomics.physiology.org/>).

Adapted from materials provided by American Physiological Society, via EurekaAlert!, a service of AAAS.

<http://www.sciencedaily.com/releases/2008/05/080514064928.htm>

First-Ever Comprehensive Global Map Of Freshwater Systems Released



Alligator chasing turtles on a river bank. This is the first study to compile data on freshwater species -- including fish, amphibians, crocodiles and turtles -- for nearly all of the world's inland water habitats. (Credit: iStockphoto/Steve Byland)

ScienceDaily (May 14, 2008) — Over a decade of work and contributions by more than 200 leading conservation scientists have produced a first-ever comprehensive map and database of the diversity of life in the world's freshwater ecosystems. The map and associated fish data – a collaborative project between World Wildlife Fund and The Nature Conservancy -- are featured in the May issue of the journal *BioScience*.

Freshwater Ecoregions of the World divides the world's freshwater systems into 426 distinct conservation units, many of which are rich in species but under increasing pressure from human population growth, rising water use, and habitat alteration.

Among the highlights:

- This is the first study to compile data on freshwater species -- including fish, amphibians, crocodiles and turtles -- for nearly all of the world's inland water habitats
- Almost 18,000 species have been mapped and placed into freshwater ecoregions.* This species list includes 13,400 fish, 4,000 amphibians, 300 turtles, and 20 crocodile species and their relatives.
- About half of all freshwater fish are endemic, or found in only one ecoregion.
- Portions of major rivers such as the Amazon, Congo, Ganges, Yangtze, and the rivers and streams of the American Southeast were identified as outstanding for rich fish populations and high endemism (species found nowhere else).
- In addition, several smaller systems that had not been identified in previous global assessments, such as Congo's Malebo Pool, the Amazon's western piedmont, and Cuba and Hispaniola, were determined to have high numbers of endemic fish species.
- Excessive water use for agriculture, industry, drinking and livestock are placing freshwater ecosystems in 55 ecoregions under high stress, threatening the species and habitats.



- In another 59 ecoregions more than 50 percent of their area has already been converted from natural habitats to cropland and urban areas.

“Freshwater ecosystems are the least studied parts of our natural world – they are like vast unexplored libraries, brimming with information,” said World Wildlife Fund’s Robin Abell, who headed the study. “Freshwater Ecoregions of the World allows scientists and non-scientists alike to gain a better understanding of this world and help guide efforts to save these systems and species before they are lost.”

Freshwater habitats support more than 100,000 species and provide humans with critical services such as drinking water and fisheries. Yet freshwater habitats and species are among the most imperiled in the world and have often been left out of large-scale conservation planning.

Until now there were no data on global freshwater biodiversity synthesized in a way that was useful to conservation. Collected research tended to focus only on major rivers or select hotspots, leaving out many other freshwater systems. Plus, information was not easy to access and search. As a result, it has been difficult to gain a truly comprehensive understanding of patterns of freshwater biodiversity across the globe.

The Freshwater Ecoregions of the World (FEOW) project was created to address this need. This extensive and easily searchable resource now provides access to information that can help ensure freshwater systems are well understood, promoted and protected.

The Nature Conservancy’s Carmen Revenga said Freshwater Ecoregions of the World could not have come at a more important time as competition for freshwater resources increases around the world. “Our lack of knowledge of freshwater species has hindered our efforts to conserve rivers, lakes and wetlands around the world. Simply having a map that shows areas rich in freshwater species will help us set conservation priorities and begin to put a face to these unique and essential species, which work to keep our freshwater ecosystems alive and running.”

The comprehensive map and database (<http://www.feow.org>) are vital tools for conservationists trying to save the world’s freshwater ecosystems.

*A freshwater ecoregion is a large area encompassing one or more freshwater systems that contains a distinct assemblage of natural freshwater communities and species. The freshwater species, dynamics, and environmental conditions within a given ecoregion are more similar to each other than to those of surrounding ecoregions and together form a conservation unit.

Adapted from materials provided by [World Wildlife Fund](#).

<http://www.sciencedaily.com/releases/2008/05/080512153631.htm>

Discovery Of Most Recent Supernova In Our Galaxy



This artist's impression shows what the supernova explosion that resulted in the formation of the supernova remnant G1.9+0.3 might have looked like. The expanding debris from the supernova explosion is shown in white, including some interaction with the surrounding gas (green). The crowded environment near the center is shown by diffuse gas (red) and dust (brown) as well as large numbers of stars with different masses and colors. (Credit: NASA/CXC/M. Weiss)

ScienceDaily (May 14, 2008) — The most recent supernova in our Galaxy has been discovered by tracking the rapid expansion of its remains. This result, using NASA's Chandra X-ray Observatory and NRAO's Very Large Array (VLA), has implications for understanding how often supernovas explode in the Milky Way galaxy.

The supernova explosion occurred about 140 years ago, making it the most recent supernova in the Milky Way as measured in Earth's time frame. Previously, the last known galactic supernova occurred around 1680, based on studying the expansion of its remnant Cassiopeia A.

The recent supernova explosion was not seen in optical light about 140 years ago because it occurred close to the center of the Galaxy, and is embedded in a dense field of gas and dust. This made it about a trillion times fainter, in optical light, than an unobscured supernova. However, the supernova remnant it caused, G1.9+0.3, is now seen in X-ray and radio images.

"We can see some supernova explosions with optical telescopes across half of the Universe, but when they're in this murk we can miss them in our own cosmic backyard," said Stephen Reynolds of North Carolina State University, who led the Chandra study. "Fortunately, the expanding gas cloud from the explosion shines brightly in radio waves and X-rays for thousands of years. X-ray and radio telescopes can see through all that obscuration and show us what we've been missing."



Astronomers regularly observe supernovas in other galaxies like ours, and based on those rates, estimate that about three should explode every century in our Milky Way, although these estimates have large margins of error.

"If the supernova rate estimates are correct, there should be the remnants of about 10 supernova explosions that are younger than Cassiopeia A," said David Green of the University of Cambridge in the United Kingdom, who led the VLA study. "It's great to finally track one of them down."

The tracking of this source began in 1985 when astronomers, led by Green, used the VLA to identify G1.9+0.3 as the remnant of a supernova explosion near the center of our Galaxy. Based on its small size, it was thought to have resulted from a supernova that exploded about 400 to 1000 years ago.

Twenty two years later, Chandra observations of this object revealed that the remnant had expanded by a surprisingly large amount, about 16% since 1985. This indicates that the supernova remnant is much younger than previously thought.

The young age was confirmed when new radio observations from the VLA were made just within the past several weeks. This "apples to apples" comparison nails the age of the remnant to be about 140 years (less if it has been slowing down), making it the youngest on record in the Milky Way.

Finding such a recent, obscured supernova is a vital first step in making a better estimate of the supernova rate in our Galaxy. Knowing this rate is important because supernovas heat and redistribute large amounts of gas, pump large amounts of heavy elements out into their surroundings, and can trigger the formation of new stars, closing the cycle of stellar death and rebirth. The explosion may also leave behind, in addition to the expanding remnant, a central neutron star or black hole.

In addition to being a record holder for youth, G1.9+0.3 is of considerable interest for other reasons. The high expansion velocities and the extreme particle energies that have been generated are unprecedented and should stimulate deeper studies of this object with Chandra and the VLA.

"No other object in the Galaxy has properties like this," said Reynolds. "Finding G1.9+0.3 is extremely important for learning more about how some stars explode and what happens in the aftermath.

Scientists can also use it to probe the environment into which it exploded. At perhaps only a few thousand light years from the center of the Galaxy, it appears to be embedded in the dense environment near the Milky Way's supermassive black hole.

These results will appear in *The Astrophysical Journal Letters*. NASA's Marshall Space Flight Center, Huntsville, Ala., manages the Chandra program for the agency's Science Mission Directorate. The Smithsonian Astrophysical Observatory controls science and flight operations from the Chandra X-ray Center in Cambridge, Mass.

Journal reference:

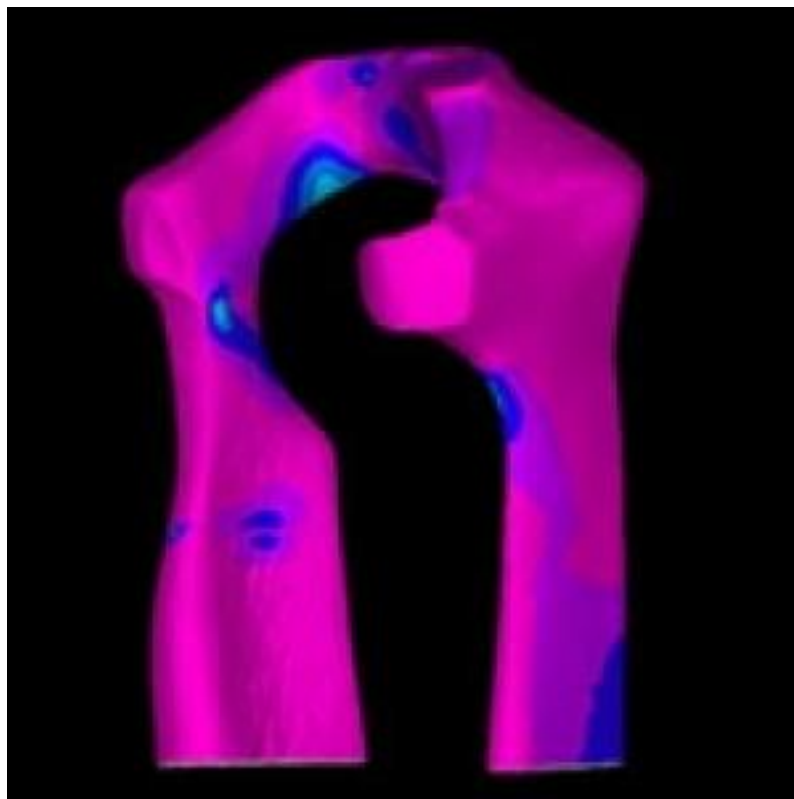
1. Stephen Reynolds, Kazimierz Borkowski, North Carolina State University, et al. The Youngest Galactic Supernova Remnant G1.9+0.3. June 10, 2008 in *Astrophysical Journal Letters*.

Adapted from materials provided by [Chandra X-ray Center](#), via [EurekAlert!](#), a service of AAAS.

[http://www.sciencedaily.com /releases/2008/05/080514131118.htm](http://www.sciencedaily.com/releases/2008/05/080514131118.htm)



Henry Moore Sculpture Could Be Re-erected Thanks To 21st Century Science



The blue and turquoise region in this Arch computer model show areas of high stress. (Credit: Image courtesy of Imperial College London)

ScienceDaily (May 14, 2008) — A dismantled Henry Moore sculpture could be re-erected in Kensington Gardens, London, thanks to the latest rock engineering techniques, says a team of experts.

The Arch, a sculpture dismantled 12 years ago due to safety concerns, could be re-erected at its original site on the banks of the Serpentine Lake following a project exploring the use of rock engineering techniques for cultural heritage conservation.

Engineers at Imperial College London, in collaboration with the International Drawing Institute, Glasgow School of Art, and Tate, carried out a detailed analysis of the Arch to see whether engineering computer simulation and analysis techniques could be used to understand and preserve complex artefacts which experience structural problems.

The Arch, a six metre tall sculpture modelled on sheep collar bones joined together, was created in 1980 by Henry Moore and was dismantled into its seven component pieces in 1996 because of structural instabilities which caused it to be unsafe.

In order to allow the sculpture to be preserved and resurrected, the team needed to find out why it was structurally unsound. By testing rock samples and using laser scanning technologies which examined the large dismantled stone blocks, they gathered data which was used to generate 3D computer simulations of the sculpture for analysis.



By modelling how the structural stresses exerted pressures on the Arch, researchers found that its unusual shape, the poor location of the structural joints which held the blocks together, and the use of brittle travertine stone all contributed to its unsteadiness.

Using this information, the team believes that it has devised a new method to allow the sculpture to be held together without compromising its structure. This includes attaching the rock legs and top section together with fibreglass bolts and dowels and placing the structure on a base of specially reinforced concrete.

Dr John Harrison from Imperial College London's Department of Earth Science and Engineering said:

"Rock engineering techniques are usually used for stabilisation of tunnels and rock slopes, but the basic concepts of understanding how rock behaves when it is subjected to loads are immediately applicable to stone sculptures. We can now apply this knowledge to preserving some of the nation's most important and historic artworks."

Dr Angela Geary from the International Drawing Research Institute, The Glasgow School of Art, added:

"We were delighted when the Henry Moore Foundation invited us to study the Arch as a subject for our research. It was a huge practical challenge, but it was very exciting and motivating to be working on such a significant real-world problem."

Derek Pullen, Head of Sculpture Conservation at Tate, concluded:

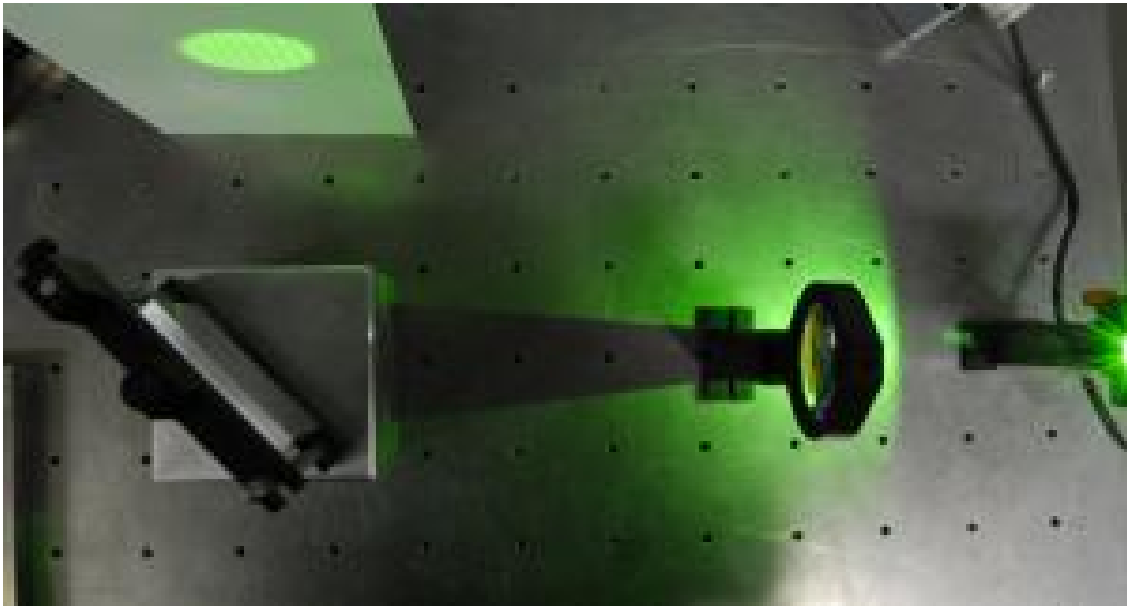
"The outcome is a positive one for everyone involved, and our aim is now to expand across a wide range of artefacts from armoury to pottery and painting. Our methods could remove much of the guesswork from planning conservation treatment and could become an indispensable tool in the care of collections."

The research was funded as part of the Finite Elements with Laser Scanning for mechanical analysis of Sculptural Objects (FELSSO) project by the Arts and Humanities Research Council, the Henry Moore Foundation with assistance also from the Royal Parks. The team is currently waiting for further funding to resurrect the Arch in Kensington Gardens.

Adapted from materials provided by Imperial College London.

[http://www.sciencedaily.com /releases/2008/05/080513101641.htm](http://www.sciencedaily.com/releases/2008/05/080513101641.htm)

Light Emitting Diodes Save Energy And Can Now Concentrate Light Precisely Where Needed



A novel optical component (bottom left) channels the light from light-emitting diodes (right) to the exact place where it is needed. (Credit: Copyright Fraunhofer-Gesellschaft, IPT.)

ScienceDaily (May 14, 2008) — Light-emitting diodes save energy. In terms of their light output, however, they have so far been unable to compete with light bulbs. A new, low-priced optical component is set to change that situation: It concentrates the light and directs it precisely to where it is needed.

Light-emitting diodes are unbeatable in terms of energy efficiency. A one-watt LED delivers roughly the same optical output as a hundred-watt light bulb. If a high light output is required, however, the tiny light sources are not the preferred means of illumination. A novel optical component is set to change that situation. It directs the light to the exact spot where it is needed. In the case of a desk lamp, for instance, the light can be concentrated in such a way that only a DIN-A4-sized surface in the middle of the table is brightly lit. The LED evenly illuminates the required area, while everything else stays in the dark.

“A light-emitting diode is a single-point light source that emits light in a large, uncontrolled area,” says Dr. Christian Wenzel, head of department at the Fraunhofer Institute for Production Technology IPT in Aachen. “We use special lenses to direct all of the light to the place where it is needed, thus increasing the efficiency of the LEDs. The spot of light created by the light source does not therefore fade out at the edges, but has a sharply defined edge.”

This channeling of light is based on a free-form system of optics – a plastic lens whose geometry can be shaped in any way desired. “The lenses are cast using an injection-molding technique. The two halves of the tool that serve as a mold have to be aligned with extreme precision just once – they have an accuracy of a few microns, or less than a tenth of the diameter of a hair. Once the tools have been tared, the lens can be manufactured in large batches at low cost,” says Dr. Wenzel. The researchers at the IPT have optimized the entire process chain: from planning and manufacturing the lens systems to checking their accuracy.

“There’s nothing like it anywhere else in Europe,” the expert claims. There is just one challenge that had to be mastered: The plastic, which is inserted into the mold when hot, shrinks as it cools – the finished lenses are therefore slightly smaller than dictated by the mold. The researchers take this effect into account by repeated, gradual improvement – to an accuracy of a few microns. When the lenses are



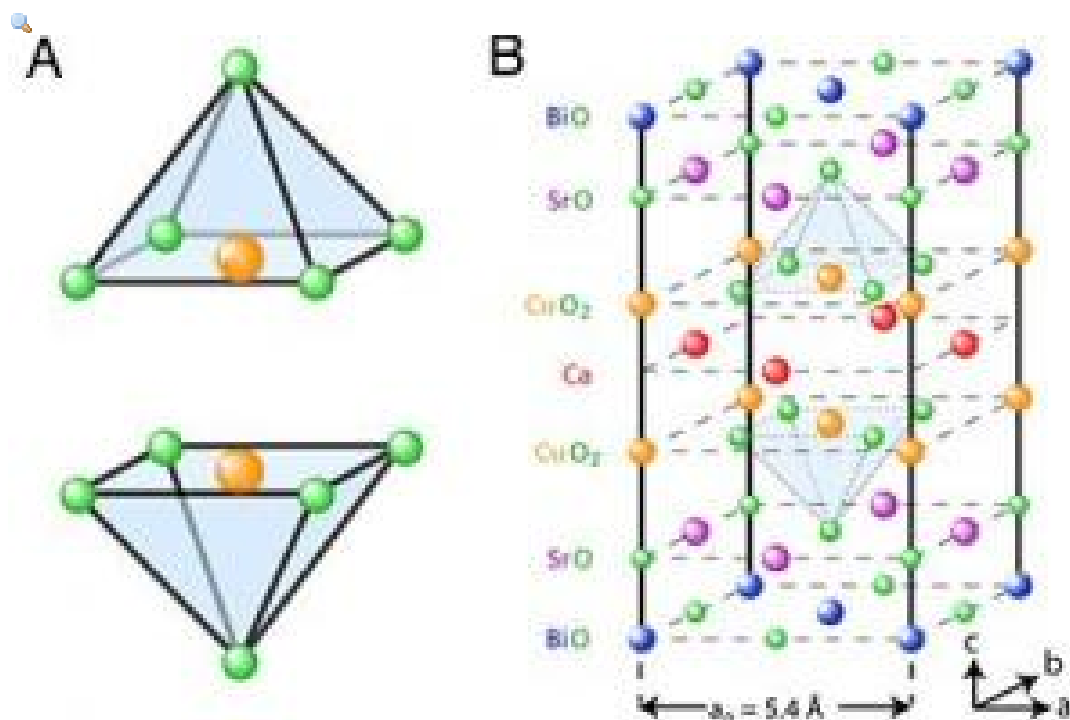
finished, the scientists check them. To do this, they project a pattern of stripes onto the lens. The distortion of the stripes reveals the curvature, inclination and shape of the lens.

The researchers will demonstrate the entire process chain along with optical systems for practical application at the Optatec trade fair in Frankfurt, Germany from June 17 to 20.

Adapted from materials provided by Fraunhofer-Gesellschaft.

[http://www.sciencedaily.com /releases/2008/05/080513101620.htm](http://www.sciencedaily.com/releases/2008/05/080513101620.htm)

Study May Explain Variations In Superconducting Temperatures



Cuprate crystals consist of layers of copper oxide interleaved with layers of other atoms. Copper and oxygen atoms usually form a pyramid with the oxygen atom at the apex located in an adjacent layer. Cornell research now shows that other atoms pushing that oxygen out of position creates superconductivity. (Credit: Davis Lab / Courtesy of Cornell University)

ScienceDaily (May 14, 2008) — New experiments at Cornell have verified a theory that variations in the distance between atoms in cuprate superconductors account for differences in the temperature at which the material begins to superconduct. A better understanding of the process could lead to superconductors that work at higher temperatures.

The research is reported in the March 4 issue of the Proceedings of the National Academy of Sciences.

Superconductors are materials that conduct electricity with virtually no resistance. While many superconductors work only at temperatures within a few degrees of absolute zero and must be cooled with liquid helium, a class of copper oxides known as cuprates, containing "dopant" atoms of other elements in addition to copper and oxygen, superconduct at temperatures ranging from 26 to 148 Kelvin (-248 to -125 Celsius) and can be cooled with less expensive liquid nitrogen. But no one has explained the wide variation in superconducting temperatures, which vary with the combinations of impurities added to the copper oxide.

Within most cuprate crystals, the copper and oxygen atoms are arranged in pyramids, with an oxygen atom at the apex. Theorists have proposed that superconductivity can be modified when dopants alter the crystal structure and push this apex-atom down or sideways, changing the way its electrons interact with those in the atoms in the pyramid base.

To test this idea, a Cornell team led by James Slezak, a graduate student working with J.C. Séamus Davis, Cornell professor of physics, studied a cuprate whose crystal structure varies in repeating waves across the crystal. Using a scanning tunneling microscope that can resolve subatomic distances, the researchers compared a physical image that showed the periodic rising and falling distances between atoms in the



crystal with electrical signals that represent the pairing of electrons. Indeed, electron pairing was stronger in places where the oxygen atom was squeezed down. Theory says that superconductivity happens when electrons join into pairs that can move through the crystal more freely than single electrons.

"This proves that gluing the pairs together is a property of each crystal unit cell, not an overall property of the material," Davis said.

The researchers also verified that electron pairing is more likely in the vicinity of dopant atoms, at completely random locations in the crystal. Both effects are taking place at the same time, Davis said, and both result from the squeezing of the copper-oxide pyramid. "You don't need two different explanations," he said.

Co-authors of the paper include Cornell postdoctoral researcher Jinho Lee and graduate student Miao Wang as well as scientists at the University of Colorado, University of Florida, University of Copenhagen and University of Tokyo. The research was supported by the National Science Foundation, Brookhaven National Laboratory, the Office of Naval Research, the Japanese Ministry of Science and Education and the Japan Society for the Promotion of Science.

Journal reference:

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Adapted from materials provided by [Cornell University](http://www.cornell.edu). Original article written by Bill Steele.

<http://www.sciencedaily.com/releases/2008/05/080512213306.htm>



Using Music To Explore The Neural Bases Of Emotional 'Processing' In The Autistic Brain

ScienceDaily (May 14, 2008) — Music has a universal ability to tap into our deepest emotions. Unfortunately, for children with autism spectrum disorders (ASD), understanding emotions is a very difficult task. Can music help them?

Thanks to funding from the GRAMMY Foundation Grant Program, researchers at UCLA are about to find out. Individuals with ASD have trouble recognizing emotions, particularly social emotions conveyed through facial expressions — a frown, a smirk or a smile. This inability can rob a child of the chance to communicate and socialize and often leads to social isolation. In an innovative study led by Istvan Molnar-Szakacs, a researcher at the UCLA Tennenbaum Center for the Biology of Creativity, music will be used as a tool to explore the ability of children with ASD to identify emotions in musical excerpts and facial expressions.

"Music has long been known to touch autistic children," Molnar-Szakacs said. "Studies from the early days of autism research have already shown us that music provokes engagement and interest in kids with ASD. More recently, such things as musical memory and pitch abilities in children with ASD have been found to be as good as or better than in typically developing children."

In addition, he said, researchers have shown that because many children with ASD are naturally interested in music, they respond well to music-based therapy. But no one has ever done a study to see if children with ASD process musical emotions and social emotions in the same way that typically developing children do.

In this study, Molnar-Szakacs will use "emotional music" to examine the brain regions involved in emotion processing. "Our hypothesis is that if we are able to engage the brain region involved in emotion processing using emotional music, this will open the doorway for teaching children with ASD to better recognize emotions in social stimuli, such as facial expressions."

The overarching goal of the study, of course, is to gain insights about the causes of autism. Molnar-Szakacs will use neuroimaging — functional magnetic resonance imaging, or fMRI — to look at and compare brain activity in ASD children with brain activity in typically developing kids while both groups are engaged in identifying emotions from faces and musical excerpts.

"The study should help us to better understand how the brain processes emotion in children with autism; that, in turn, will help us develop more optimal interventions," Molnar-Szakacs said. "Importantly, this study will also help us promote the use of music as a powerful tool for studying brain functions, from cognition to creativity."

Approximately 15 children with ASD, ranging in age from 10 to 13, will participate in the study, which is being conducted under the auspices of the Help Group–UCLA Autism Research Alliance. The alliance, directed by UCLA's Elizabeth Laugeson, is an innovative partnership between the nonprofit Help Group, which serves children with special needs related to autism, and the Semel Institute for Neuroscience and Human Behavior at UCLA, and is dedicated to enhancing and expanding ASD research. The project is also being conducted in collaboration with Katie Overy, co-director of the Institute for Music in Human and Social Development at the University of Edinburgh, Scotland.

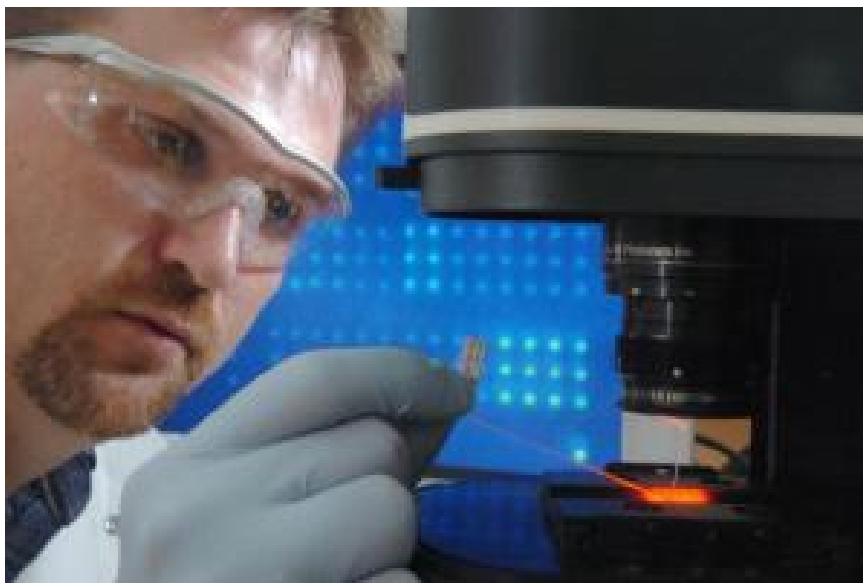
"The hope, of course, is that this work will not only be of scientific value and interest, but most of all, that it will translate into real-life improvements in the quality of the children's lives," Molnar-Szakacs said.

Adapted from materials provided by [University of California - Los Angeles](http://www.sciencedaily.com).

<http://www.sciencedaily.com/releases/2008/05/080513101717.htm>



Biochips Can Detect Cancers Before Symptoms Develop



Argonne biologist Daniel Schabacker prepares to load a biochip onto a scanner developed by one of Argonne's licensees, Aurora Photonics. (Credit: Image courtesy of DOE/Argonne National Laboratory)

ScienceDaily (May 14, 2008) — In their fight against cancer, doctors have just gained an impressive new weapon to add to their arsenal. Researchers at the U.S. Department of Energy's Argonne National Laboratory have developed a chip that can save lives by diagnosing certain cancers even before patients become symptomatic.

The new technology, known as a biochip, consists of a one-centimeter by one centimeter array that comprises anywhere between several dozen and several hundred "dots," or small drops. Each of these drops contains a unique protein, antibody or nucleic acid that will attach to a particular DNA sequence or antigen.

A tumor, even in its earliest asymptomatic phases, can slough off proteins that find their way into a patient's circulatory system. These proteins trigger the immune system to kick into gear, producing antibodies that regulate which proteins belong and which do not.

"Antibodies are the guardians of what goes on in the body," said Tim Barder, president of Eprogen, Inc., which has licensed Argonne's biochip technology to search for new biomarkers that indicate cancer. "If a cancer cell produces aberrant proteins, then it's very likely that the patient will have an antibody profile that differs from that of a healthy person. You can look for similarities and differences in autoantibody profiles to look for clues and markers that provide early indicators of disease."

In their hunt for cancer indicators, Eprogen uses a process called 2-dimensional protein fractionation, which sorts thousands of different proteins from cancer cells by both their electrical charge and their hydrophobicity or "stickiness."

The 2-D fractionation process creates 960 separate protein fractions, which are then arranged in a single biochip containing 96-well grids. Eprogen scientists then probe the microarrays with known serum or plasma "auto-antibodies" produced by the immune systems of cancer patients.

By using cancer patients' own auto-antibodies as a diagnostic tool, doctors could potentially tailor treatments based on their personal autoantibody profile. "This technology is really designed to take



advantage of the information contained within the patient's own biology," Barder said. "What makes this technique unique is that scientists can use the actual expression of the patient's disease as a means of obtaining new and better diagnostic information that doctors could use to understand and fight cancer better. "We're starting to see a way of developing tests and therapies for cancer by bringing the bedside to the laboratory, rather than the other way around," he added.

Biochips have already shown promise in diagnostic medicine, according to Argonne biologist Daniel Schabacker, who developed the technology. In addition to Eprogen, three other companies have licensed biochips, he said. One of these companies, Akonni Biosystems of Frederick, Md., has already produced dozens of assays, which it markets under the TruArray® brand name. Another company, Safeguard Biosystems, licensed biochips for veterinary diagnostic applications. When a biochip tailored to detect upper respiratory diseases is exposed to a swab taken from a patient's mouth, for instance, the binding patterns of the proteins or nucleic acids in the array cause the dots to "light up" when scanned and analyzed with a computer. Computer algorithms decode the dot pattern produced by the biochip, calculate the statistical likelihood of each possible infection and provide this information to the doctor. "Suppose someone shows up to the hospital and they're sick with an upper respiratory infection," said Schabacker. "First thing a doctor is going to want to know is whether the infection is viral or bacterial; this is especially true in pediatrics. And ideally, they'd really like to have a single test that they can run very rapidly that will identify exactly which disease you have from a dozen top targets."

The development of products like TruArray will soon revolutionize doctors' ability to quickly diagnose a number of diseases, Schabacker said. For example, while existing rapid strep tests performed by many pediatricians take only a few minutes to process, they yield so many false negatives that doctors routinely send out the samples for subsequent rounds of more thorough, time-consuming and expensive analysis. "The unique advantage offered by the TruArray platform lies in the fact that we can screen a single sample for multiple viral and bacterial infections at the same time," said Charles Daitch, Akonni's president and CEO. "Soon, doctors will no longer need to order as many expensive and time-consuming tests, and can instead obtain accurate diagnoses that will enable them to quickly provide their patients with targeted treatment strategies."

Though the analysis of a sample on a biochip can take 30 minutes, scientists can have much more confidence in the accuracy of the diagnosis, according to Schabacker. "Biochips give us the ability to run a test that allows your doctor to figure out exactly what you're suffering from during the time that you're in his or her office," he said. While biochips will allow doctors to more quickly and authoritatively explain your sniffles, they might also be used for patients who exhibit symptoms of much more serious infections. By adding just a few more drops to the chip's array, Schabacker claimed, lab technicians could test for a whole slate of biotoxins and especially virulent diseases from the plague to smallpox to anthrax.

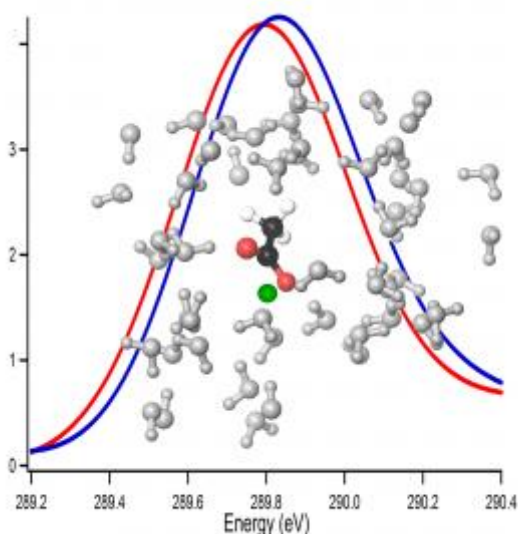
Other infections, such as those caused by Multidrug-Resistant Tuberculosis (MDR-TB) and the often deadly Methicillin-resistant Staphylococcus aureus (MRSA), can be quickly diagnosed with biochips like Akonni's TruArray assay, according to Daitch.

"The most important thing with these types of infections is that you have to be right and get the answer quickly," Schabacker said. "Some of the tests out there, though marginally quicker than ours, are so inaccurate that they're almost useless. Especially when you're talking about anthrax or plague, you have to be confident in your diagnosis or else risk causing a panic."

Adapted from materials provided by DOE/Argonne National Laboratory.

<http://www.sciencedaily.com/releases/2008/05/080513130424.htm>

New Clues To How Proteins Dissolve And Crystallize



X-ray spectroscopy shows that a protein acetate group (molecule at center) prefers binding with sodium (blue curve) over potassium (red curve); the green sphere represents a cation, with surrounding water molecules in white. (Credit: Figure by Janel Uejio)

ScienceDaily (May 14, 2008) — In the late 19th century the Czech scientist Franz Hofmeister observed that some salts (ionic compounds) aided the solution of proteins in egg white, some caused the proteins to destabilize and precipitate, and others ranged in activity between these poles.

Hofmeister proceeded to rank "salt-out" (destabilizing) ions versus "salt-in" ions according to the magnitude of their effects. The resulting "Hofmeister series" governs the strengths of ions in inducing protein unfolding, bubble coalescence, and many other phenomena, and remains vital to protein chemistry and other biological and chemical studies to this day. But its mechanism has never been properly understood.

A team led by Richard Saykally of the Department of Energy's Lawrence Berkeley National Laboratory has now used Berkeley Lab's Advanced Light Source to study how biologically important, positively charged ions (cations) interact with negatively charged groups found in proteins (anions) to form salts. The team's results, which appear in Proceedings of the National Academy of Sciences, lend strong experimental support to a critical part of a proposed new explanation for Hofmeister effects, known as the Law of Matching Water Affinities.

The Law of Matching Water Affinities

"The Law of Matching Water Affinities, recently proposed by Kim Collins, says that the least soluble ion pairs are formed by ions that are closest to each other in their hydration energy — that is, how strongly they hold onto water," says Saykally, who is a faculty scientist in Berkeley Lab's Chemical Sciences Division and a professor of chemistry at the University of California at Berkeley. "This is a classic example of an ion-specific effect: Hofmeister effects depend on the identity of ions rather than just on their concentration."

Hofmeister himself discovered that sodium salts-out egg white protein more efficiently than potassium, as does calcium. It's a difference with profound biological significance. "You don't want to precipitate salts

inside the cells!" Saykally remarks. "That's part of why living organisms spend a lot of energy pumping calcium and sodium out of cells and pumping potassium in."

Computer simulations and quantum calculations of how sodium and potassium bind to proteins were performed by Luboš Vrbka and his colleagues in the Pavel Jungwirth research group, working in the Czech Republic in 2006. Their work indicated that the large difference between the binding efficiency of the two cations (which are otherwise similar in many ways) were consonant with the Law of Matching Water Affinities. In essence, Vrbka's simulations and calculations supported the Law's theoretical predictions.

Still needed was what Saykally calls "a new class of experimental support, stronger than previous experiments." His team, working with colleagues at beamline 8.0.1 of the Advanced Light Source, had developed just such an approach. Incorporating liquid microjet technology into the high-vacuum environment of a synchrotron x-ray experiment has allowed the group to perform near-edge x-ray absorption fine structure (NEXAFS) measurements on liquid samples that would otherwise be difficult or impractical to measure with synchrotron radiation.

Janel Uejio, a graduate student of Saykally's, recalls how she first became involved in the selective-binding investigation. She was working overnight on a different project at the 8.0.1 beamline when the phone rang at three o'clock in the morning.

"Rich had just read Vrbka's paper and had a brainstorm," says Uejio. "He wanted me to use liquid microjet technology to measure the selective binding of sodium and potassium to formate and acetate, two simple carboxylate groups characteristic of proteins. At that hour, all I had on hand were acetic acid and sodium chloride and potassium chloride" — essentially, vinegar and table salt — "but even so, the preliminary results were promising."

With liquid microjet technology, precisely mixed chemicals flow rapidly through a fused silica capillary shaped to a fine tip, a nozzle with an opening only a few micrometers (millionths of a meter) in diameter. The resulting liquid jet travels through a few centimeters of vacuum inside the beam chamber and is intersected by the synchrotron's x-ray beam, then collected by a cold skimmer and condensed out, to prevent any liquid molecules from contaminating the pristine vacuum of the synchrotron.

The great advantages of the system, says Saykally, are that in a vacuum the soft x-ray beam encounters only the liquid target — there's no interference from air or windows or the like — and that the rapid passage of the sample through the beam minimizes x-ray damage, which otherwise can be severe.

"In our NEXAFS experiment, the x-ray beam kicks the lowest-energy core electrons of the carbon on the carboxylate group up into the lowest empty antibonding molecular orbitals," Uejio explains. "The more tightly bound the cation is to the carboxylate, the more energy it takes to promote the electron. Therefore, the x-ray absorption spectra tell you about the relative binding energies of sodium, potassium, and lithium."

Kosmotropes versus chaotropes

The results confirmed Vrbka et al's models and further supported the Law of Matching Water Affinities — thus lending weight to a growing trend in the interpretation of the venerable Hofmeister series. Saykally explains that the ions in the Hofmeister series are traditionally divided into kosmotropes, which bind strongly to water and supposedly structure it, and chaotropes, which bind only weakly to water and destructure it.

"There has been a widely held view that the Hofmeister series reflects changes in the bulk structuring of water — that salting-out results when ions orient water molecules over a long range, reducing their density and allowing the protein to precipitate," he says. "But a more modern view is emerging, one exemplified by the Law of Matching Water Affinities, which suggests that Hofmeister effects are not due



to such long-range perturbations of water but instead operate at a very short range, over a distance of only one or two molecules."

Of the dominant biological cations, for example, calcium and sodium are weak kosmotropes and potassium is a weak chaotrope. Says Saykally, "What matters is not whether individual cations are kosmotropes or chaotropes but how closely they are matched when they pair up with anions — whether, in terms of hydration energy, they are two of a kind."

By using liquid microjet technology and x-ray absorption spectroscopy to characterize how sodium, potassium, and lithium interact with carboxylate groups, which are among the dominant anions in biological systems (and themselves kosmotropes), Saykally and his colleague have opened a new path toward probing selective interactions of ions with biological molecules in the aqueous environments typical of their natural surroundings. And they have gained new insight into the workings of the Hofmeister series, which has been called "as important to protein chemistry as Mendel was to genetics."

Journal reference:

1. Janel S. Uejio, Craig P. Schwartz, Andrew M. Duffin, Walter S. Drisdell, Ronald C. Cohen, and Richard J. Saykally. Characterization of selective binding of alkali cations with carboxylate by x-ray absorption spectroscopy of liquid microjets. Proceedings of the National Academy of Sciences. <http://www.pnas.org/cgi/content/abstract/0800181105v1>. [[link](#)]

Adapted from materials provided by [DOE/Lawrence Berkeley National Laboratory](#).

<http://www.sciencedaily.com/releases/2008/05/080512121227.htm>



Traffic Woes? New Method Allows Traffic Optimization Over Large Geographic Areas

ScienceDaily (May 14, 2008) — How can traffic be monitored and controlled more effectively? In the ORINOKO project, scientists have developed methods of determining the traffic situation across a wide area, and have refined processes that enable traffic to be optimally channeled.

Traffic jams on the way to work, to the shops or to a holiday destination – a common experience for most of us. Traffic management systems can provide help. Various concepts and measures are being tested, for example in the transport research project ORINOKO (Operative Regional Integrated and Optimized Corridor Control). The project received funding to the tune of almost three million euros from the German federal ministry of economics and technology BMWi over a period of about three years.

The Fraunhofer Institute for Transportation and Infrastructure Systems IVI in Dresden was among the project partners. The IVI team led by Ulf Jung and Georg Förster performed a variety of tasks. “One thing we did was set up a central database containing a digital map of the road network. A vast amount of relevant measurement data flows continuously into this database,” says Georg Förster. “We also provided software interfaces that enable dynamic data from a variety of sources, such as journey times, traffic volume or tailback lengths, to be used for control and information purposes within the scope of the traffic management system.”

The team is particularly proud at having established a sensor system based on video cameras, which was installed and tested on a trial basis at ten different sites in Nuremberg over the past few months. It can automatically determine certain traffic statistics such as the number of vehicles on the roads or the length of a tailback. These values are continuously fed into a central computer system where they are processed and used to control the traffic. For instance, traffic lights are switched to suit the situation observed by the cameras. “This combination of advanced computer technology and the image processing software developed by us delivers data of a similar quality to those of conventional induction loops, but is much cheaper and more flexible to use,” says IVI head of department Ulf Jung.

The video detector can determine the number of vehicles, their speed, the length of a tailback, and other factors. At present, it is able to analyze up to six traffic lanes simultaneously. The recorded images are processed and interpreted in real time on the spot by a small computer connected to the camera module, which then sends the traffic data and live images to a control center. The new system fills the gap between the established but expensive induction loops and the journey time measurements obtained using sensors in taxis. The video detectors are not only cost-efficient but also deliver a continuous stream of reliable data.

Adapted from materials provided by Fraunhofer-Gesellschaft.

<http://www.sciencedaily.com/releases/2008/05/080513101610.htm>

Meningitis B trials 'encouraging'

A possible vaccine against meningitis B has shown "encouraging" results in preliminary clinical trials.



The MenB vaccine from pharmaceutical giant Novartis was tested on 150 babies in the UK.

Thousands of deaths and disabilities are caused globally by meningitis B, but a vaccine is difficult to produce because of the many different strains.

Meningitis UK agreed the results were encouraging, but said there was a "long way to go" to produce a broad vaccine.

The meningitis B bacterium is incredibly complex and developing a vaccine to protect against it has always been one of the biggest challenges in meningitis vaccine development

Steve Dayman
Meningitis UK

Meningitis is an inflammation of the membranes that cover the brain and the spinal cord.

Three vaccines against other common infections that cause meningitis are already given to babies as part of the childhood immunisation programme

Babies are immunised against Hib, pneumococcol and meningitis C in their first year of life.

But there is no vaccination yet for meningitis B, which causes most of all cases.

Key antigens

Novartis examined 85 strains of meningitis B while developing the potential vaccine.

This could be the beginning of getting a solution for meningitis B



Professor David Salisbury
Director of immunisation, Department of Health

The vaccine contains bacterial proteins - or antigens - that are believed to be found in most meningitis B strains responsible for the disease globally.

Dr Ray Borrow, head of the vaccine evaluation department at Manchester Royal Infirmary, helped organise the study.

He said: "The preliminary results tell us that the vaccine is likely to kill strains that contain the vaccine's antigens."

The children were immunised at two, four and six months of age, and received a fourth dose at 12 months.

The vaccine's immune response was tested against three strains of meningitis B.

The results showed that one month after the third dose the immune response against the three strains was 89%, 96% and 85%.

A fourth dose given at 12 months of age resulted in the children receiving an immune response of 100%, 98% and 93%.

'Encouraging'

Dr Andrew Pollard, head of the Oxford Vaccine Group at the University of Oxford, who helped run the study, said these initial results were encouraging.

"These initial results from the UK show that the vaccine induces an immune response against strains containing the vaccine components. The next step is to find how broad these responses are against other strains that cause disease."

Professor David Salisbury, director of immunisation at the Department of Health, said this is exciting news.

"We have vaccinations against three of the four causes of bacterial meningitis. The one we have been waiting for is meningitis B. It has been a challenge for the past 20 years.

"This could be the beginning of getting a solution for meningitis B. The challenge has been to find a vaccine that works across different strains of the disease.

"This offers the possibility of protecting against a wide group of strains."

More work needed

Steve Dayman, chief executive of Meningitis UK, agreed this is an encouraging development.

But he added: "We would like to stress that it is vital that research continues as there is still a long way to go to reach a meningitis B vaccine which provides broad coverage against all strains.

"The meningitis B bacterium is incredibly complex and developing a vaccine to protect against it has always been one of the biggest challenges in meningitis vaccine development.



"When developing a vaccine, there are so many avenues that need to be explored and sadly the vast majority of approaches will fail at some stage."

Meningitis C used to be one of the most common types of meningitis in the UK. But since a routine immunisation was introduced in 1999, thousands of deaths have been prevented.

Story from BBC NEWS:

<http://news.bbc.co.uk/go/pr/fr/-/2/hi/health/7400593.stm>

Published: 2008/05/15 00:01:18 GMT



Single anti-flu drug 'not enough'



No single drug alone will be enough to treat all the victims of a global flu pandemic, research has shown.

Tests on the H5N1 strain of bird flu, which has spread in south east Asia, have shown it is developing resistance to the leading anti-viral drug Tamiflu.

The Nature study, by the Medical Research Council, stresses the need to stockpile more than one type of drug.

The UK government - which has stockpiled millions of doses of Tamiflu - is reviewing its position.

It has already received advice that a one-drug strategy may be flawed.

Number of cases

In order not to be outflanked by the virus, it will be necessary to have stocks of both existing drugs

Dr Steve Gamblin

The latest figures for human cases of the H5N1 bird flu virus show 382 people have been infected and 241 killed, mostly in south east Asia.

However the virus cannot easily pass from human to human at present.

So far many of those who have been infected have been poultry workers who have come into intimate contact with infected birds.

Experts warn that if the virus acquires the ability to pass from human to human, then it will pose a potential threat to millions across the globe.



Health chiefs in the UK have warned that if such a modified strain does emerge, tens of thousands of people could die in Britain alone.

In this instance health authorities hope stockpiles of anti-viral drugs will help treat those affected.

Tamiflu and another drug, Relenza, work by inhibiting a key part of flu called neuraminidase (N1) which is responsible for the release of the virus from infected human cells and allows the disease to spread.

The team at the National Institute for Medical Research found that when they used a method called X-ray crystallography they were able to characterise a mutation in the structure of N1 that has been observed in human cases of H5N1.

The scientists discovered that when this mutation occurred the virus became resistant to Tamiflu, while still remaining susceptible to Relenza.

Seasonal flu

They also looked at samples from seasonal influenza, that affected people across Europe earlier this year, and found that samples showing this mutation were also resistant to Tamiflu.

Dr Steve Gamblin, who led the research team said it shows that stockpiling any one drug to prepare for a potential H5N1 pandemic is unlikely to provide adequate cover.

He said: "In order not to be outflanked by the virus, it will be necessary to have stocks of both existing drugs.

I don't think it should worry people because these drug resistant mutant strains of H5N1 don't spread very much"

Professor John Oxford, Queen Mary College

"There is a huge imperative to develop further drugs and it is likely a future pandemic will need to be tackled using a three or four-pronged approach, much as we tackle HIV today."

Professor John Oxford, an expert in Virology at Queen Mary College School of Medicine London, said: "I don't think it should worry people because these drug resistant mutant strains of H5N1 don't spread very much and are not in the majority, they are still very much in the minority. The majority are still susceptible to anti-viral drugs."

A spokesperson for the Department of Health said: "We are considering how much of our stockpile should consist of a back-up anti-viral."

Story from BBC NEWS:

<http://news.bbc.co.uk/go/pr/ft/-/2/hi/health/7398369.stm>

Published: 2008/05/15 00:20:34 GMT



Rauschenberg and Dance, Partners for Life

By ALASTAIR MACAULAY



Something inherently theatrical about Robert Rauschenberg's talent — always evident in his radical feeling for color, light, composition and new ingredients and juxtapositions —prompted him to his boldest and freshest conceptions when he worked onstage. From the early 1950s until 2007 he designed for dance. And in the late '50s and early '60s, when he first came to fame, he was recurrently (at times constantly) occupied in dance theater.

When he won the international grand prize at the Venice Biennale in 1964, he said he regarded the Merce Cunningham Dance Company as his biggest canvas. Although the remark offended some in Cunningham circles (primarily the composer John Cage, who seems to have felt it sounded too proprietorial), it was completely justified. At that time there was no better place to see the range of Mr. Rauschenberg's inventiveness than the Cunningham repertory.

Mr. Rauschenberg wasn't just the designer of most pieces Mr. Cunningham had choreographed in the previous 10 years; he was also a permanent colleague. He toured America and, in 1964, the world as stage manager to the Cunningham company, adjusting the lighting and costumes, making several of the dancers into his long-term friends, helping turn the itinerary of a dance company into a fulcrum of ideas.

In 1954 Mr. Rauschenberg was the first stage designer to follow the principle of artistic independence already established by Mr. Cunningham and Cage. All he needed to know was which dancer to design costumes for, and if Mr. Cunningham had any further specifications. So when Mr. Cunningham asked (in 1954) for décor around which the dancers could move, Mr. Rauschenberg placed a large red free-standing combine center stage in "Minutiae"; though the choreography has not survived, the décor is still used in some Cunningham Events.

Sometimes Mr. Cunningham gave not specifications but poetic clues. For example, for "Winterbranch" (1964) he said to Mr. Rauschenberg, "Think of the night as if it were day." Mr. Rauschenberg's response was to think of images like being caught in the headlights of a car, and he made all-black costumes and lighting that sometimes threw the stage into darkness while viewers were shielding their eyes from the light.

When Mr. Cunningham was experimenting with new definitions of stage space in “Summerspace” (1958), suggesting both that the stage was just a section of a vaster landscape and that the mood was that of a summer idyll, Mr. Rauschenberg responded with impressionistic pointillism. The costumes of the dancers matched the backdrop view in near camouflage, and the work evoked scenes by Monet and Seurat while also suggesting a wildlife documentary.

In “Crises” (1960) the dancers wore single-color all-over tights that glowed fiercely against the surrounding blackness. In such works Mr. Rauschenberg also became one of the all-time masters of theatrical lighting.



Mr. Rauschenberg had come to know the young [Paul Taylor](#) in 1953, while Mr. Taylor was a Cunningham dancer. When Mr. Taylor began to choreograph in the succeeding years, Mr. Rauschenberg was his designer; works like “Three Epitaphs” (1956, all-black costumes again) survive in Taylor repertory today. In the 1960s Mr. Rauschenberg was involved in the radical dance-theater experiments at and around Judson Memorial Church in Greenwich Village and was close to Cunningham-connected experimentalists like Carolyn Brown, Viola Farber and Steve Paxton; he even choreographed himself.

Mr. Rauschenberg’s full-time connection to the Cunningham company ended with its 1964 world tour. Though he and Cage had stimulated each other profoundly and were in many ways like-minded, their egos had clashed; Mr. Rauschenberg’s “my biggest canvas” remark sounded like colonization in a dance theater where the point was independence.

But others led him back to dance theater, nobody more beautifully than [Trisha Brown](#). Her “Set and Reset” (1983) was an instant masterpiece, largely thanks to Mr. Rauschenberg’s astonishingly imaginative designs. Three screens simultaneously broadcast separate video collages in black and white (more than 20 years before a video component became the norm in new choreography), while the dancers rippled around the stage in part-translucent costumes marked with gray and black figures that resembled newsprint.



Mr. Rauschenberg and Mr. Cunningham did collaborate again — though collaboration may have always been too tight a word for the freedom they gave each other — on several pieces over the decades. The last of these was only last October, “XOVER” (pronounced “Crossover”), which had its premiere at the Hopkins Center at [Dartmouth College](#). (It has yet to be seen in New York or most other cities.) The white costumes against a largely white backdrop recall the all-white paintings of 50 years before; the nonwhite parts of the backdrop, combining silk-screen photography and painting, connect isolated images (a bicycle, a fence, an industrial view) with beautiful color and details of light.

More glorious yet — the most marvelous Rauschenberg stage designs I have seen, and supremely theatrical — were what he made for Mr. Cunningham’s “Interscape” (2000). This work begins with a black-and-white curtain that is already a classic Rauschenberg collage of eclectic images: it proves translucent, and lighting allows the dancers to be seen warming up onstage.

When that curtain lifts, however, the backdrop is a full-color version of the same collage, so that we seem to have gone from a shadow realm to a new plane of more intense being, in which the main choreography occurs. Each costume was individual (Mr. Cunningham said he knew the dancers were happy from the noises he could hear them making as they returned from their fittings) and demonstrated Mr. Rauschenberg’s extraordinary feeling for color combinations. (One stinging green hangs in the memory.)

Impresarios have occasionally assembled programs that illustrate “Picasso and the Dance,” but Mr. Rauschenberg’s work for dance was far more prolific than Picasso’s, as a whole season could be presented to demonstrate. If only that could happen, its range of designs — from “Three Epitaphs” to “Summerspace,” from “Set and Reset” to “Interscape,” from “Crises” to “Glacial Decoy” (another Trisha Brown collaboration) — would easily establish his place in the forefront of architects of theater.

http://www.nytimes.com/2008/05/14/arts/dance/14coll.html?_r=1&adxnnl=1&oref=slogin&adxnnlx=1210857947-b71z+27ZqpU9xPSzv0pD9g

The Bachelor's Degree Is Obsolete?

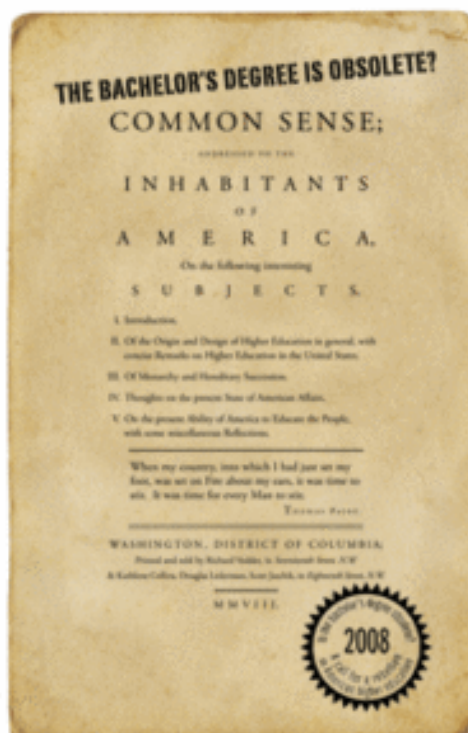
Peter Agoos

[Click here](#) to download the pamphlet.

By [Wick Sloane](#)

Why don't we declare the bachelor's degree obsolete? No, not education, not colleges and universities, not professors or libraries or students, just the four-year bachelor's degree. (You might turn on your iPod while you read. You'll see why.)

Western history traces this four-year package back to the University of Bologna, before Gutenberg, when the pedagogical constraint was the shortage of books. Students had to gather in large rooms while the professor read from one of the scarce books. Only Wikipedia, in my scrounging around, notes that the University of Al-Karaouine in Morocco and Al-Azhar University in Egypt preceded Bologna in their founding and in granting multi-year degrees.



Before dismissing any questions, note that this academic year has not been kind to U.S. higher education. Dead canaries litter the coal mines and the executive suites of U.S. colleges and universities as another academic year draws to a close. The capital markets have pulled out of major segments of lending for college loans. Wouldn't even a Finance 101 student say this exit means the capital markets are challenging the value of a college degree? The U.S. Senate Finance Committee has demanded explanations about outcomes from the wealthiest colleges and universities.

Charles Miller, the Spellings Commission chair, gutted the College Board for poor math after the College Board offered the old chestnut that college is a good investment because graduates will earn \$1 million more in their lifetimes. In Massachusetts, legislators, unable to find the public good from the nation's wealthiest and self-described best colleges and universities, had the temerity to wonder about taxing endowments. A problematic solution (taxing endowments) does not erase a solid question.

The latest trend in higher education is how many students need five and even six years to arrange four years of college. Half the nation's twenty million college students are in two-year community colleges, with the odds of achieving a four-year degree against them. The price of the degree, what customers pay in tuition, discounted or not, keeps rising. This cripples families in cost and debt and shuts out those whose income prohibit them from even thinking about college. This nation, any nation, needs all the educated citizens we can create. We seem to be failing.

I am the first to agree that students fortunate enough to go to an Ivy League school, Stanford, Duke, Williams, Amherst, Grinnell, or the flagship state universities are part of what any gathering of one or more educational leaders calls "the best higher education system in the world." I am one of those graduates. What, though, does that greatness do for those the millions shut out or struggling as part-time students? All the undergraduate spots in all those fine institutions amount to a tiny fraction of the 20 million students now in college.



I keep looking for how to describe what's going on. I keep reading the fine anthologies of war reporting and civil rights reporting from the Library of America. In metaphor, I feel closer to the war correspondents. People are dying in the rest, the "not the best in the world," segment of U.S. higher education today. In the civil rights comparison, I keep looking for the James Farmer, the Julian Bond, the Martin Luther King, the Thurgood Marshall to speak out for the students whom we, the people, are failing to educate. I keep looking for the Justice Department officials — the Nicholas Katzenbach, the John Doar, the Burke Marshall — or someone who will stand up for equality and against a federal system that allocates tens of thousands of federal dollars in tax benefits and other subsidies to students at Yale and Williams and Harvard while arcane rules and impenetrable paperwork prevent a student working two jobs at a community college from receiving a \$4,000 federal Pell Grant. I keep asking in my reporting, "Never mind how Yale and Princeton spend their own money. What about just what the federal government spends on each student who has found his or her way to college? Aren't the Yale student and the community college student both U.S. citizens?" I know, I know how many people are weary of that question from me. I'm left to wonder what I'm missing. Perhaps the next unasked question is about this product we call college, the four-year bachelor's degree. In defending the high cost of education, college and university presidents and business officers have taken everything into account except the fundamental cost of delivery. In MBA speak, the central cost driver of a college education is not health insurance, salaries, rising oil costs, or even costly academic journals. It is the four-year, 36-course structure that determines the cost of a college degree. This model, leading to annual tuitions and fees of \$25,000 at public colleges and \$50,000 at many private ones, crushes families with \$100,000 to \$200,000 in cost and debt.

Impossible to imagine the end of the bachelor's degree packaged into four years? Most of us — households or other enterprises — from time to time take a look at the fundamentals of our budgets and ask, "Is there another way?" As an example, consider the bloodless iPod and MP3 revolution. What happened? A demographic cohort, people roughly 16 to 25 years old who wanted access to one song at a time in a form that could easily be shared among friends, revolted and created a new market when the music industry refused any modifications or price breaks. How can I present this outlandish question, and some solutions, with any hope of a hearing? I put my "greatest education in the world" to use and pulled out Thomas Paine (1737-1809), a man with a mind and a pen who did get us, the people, thinking. Using Paine's structure to think these issues through, I wrote a pamphlet. I asked Frank Kramer, owner of the independent Harvard Bookstore, what a price would be that's low enough for an impulse purchase but high enough to make the pamphlet worth ringing up if the store keeps all the proceeds. "Three dollars, but you need endorsements," he said. Columnists cannot be choosy. I accepted damnations, too.

Inside Higher Ed and the Center for College Affordability and Productivity invite you to download the pamphlet (and sell if you wish) for free. (To make and distribute your own pamphlets, print this version on 8x11 paper, run through a double-sided copier, and fold in half.)

Before cashing in this question about ending the bachelor's degree, consider a passage from the introduction to patriot Thomas Paine's pamphlet *Common Sense*, published in 1776.

"Perhaps the sentiments contained in the following pages, are not yet sufficiently fashionable to procure them general favor; a long habit of not thinking a thing wrong, gives it a superficial appearance of being right, and raises at first a formidable outcry in defence of custom. But the tumult soon subsides. Time makes more converts than reason."

Wick Sloane, who writes *The Devil's Workshop*, won a fellowship to write about community colleges from the Hechinger Institute at Teachers College, Columbia University. This column and the attached pamphlet flow from that work.

The original story and user comments can be viewed online at <http://insidehighered.com/views/2008/05/13/sloane>.

Artist mixed paint, sculpture, cast-offs

His 'combines,' which incorporated objects such as tires, newspaper clippings and stuffed animals, established new directions and prominence for American art.

By Christopher Knight
Times Art Critic

May 14, 2008

Robert Rauschenberg, the protean artist from small-town Texas whose imaginative commitment to hybrid forms of painting and sculpture changed the course of American and European art between 1950 and the early 1970s, died Monday night, according to New York's PaceWildenstein Gallery, which represents his work. He was 82.

According to the gallery, Rauschenberg died of heart failure at his home in Captiva, Fla., after a brief illness.

FOR THE RECORD:

Rauschenberg obituary: The news obituary of artist Robert Rauschenberg in Wednesday's Section A said only that he died after a brief illness. He died of heart failure after a brief illness. —



Rauschenberg was widely regarded as a principal bridge between Abstract Expressionism in the 1950s and Pop art in the 1960s, but he did not subscribe to any narrow doctrine. His work also influenced the emergence of Neo-Dada, Minimal, Conceptual, Post-minimal, Process and performance art. His deep and abiding interest in printmaking facilitated a major revival in the medium, and his achievements in lithography were instrumental in the creation of a contemporary market for prints. In Europe, the humble, everyday objects of the Arte Povera ("poor art") movement expanded on his use of cast-off materials retrieved from the trash bin and the attic.

Rauschenberg's art was instrumental in reintroducing representational imagery into common usage. Until then, avant-garde art on both sides of the Atlantic was most closely identified with pure abstraction, which the general public regarded with skepticism. Rauschenberg mixed traditional forms of modern painting and sculpture with photographs, found objects, studio printmaking techniques and mass-produced pictures gathered in postcards, postage stamps and newspapers. In one of the most often repeated, yet frequently misquoted statements in postwar American art, he asserted: "Painting relates to

both art and life. . . . (I try to act in that gap between the two)."

Together with painter Jasper Johns, with whom he was romantically linked, Rauschenberg was the most important American artist to emerge into prominence in the 1950s. When he was awarded the grand prize for painting at the 1964 Venice Biennale in Italy -- only the third American to receive the distinguished honor, after James Whistler and Mark Tobey -- the surprise selection ignited a firestorm of controversy in Europe but secured his international reputation. Rauschenberg had been using commercially made silk screens to reproduce photographic images on his canvases, a technique that he picked up from Andy Warhol, and the imagery mingled with energetic brushwork in brilliant colors. The day after the Venice Biennale announcement, he had all the silk screens in his New York studio destroyed, to forestall any temptation to repeat himself.

Rauschenberg's voracious appetite for experimentation characterized his working method, which employed new techniques and unusual materials. In 1954, a decade before his Venice triumph, he began to make a new kind of art that combined traditional elements of painting and sculpture, together with collage and printing. He dubbed these works "combine paintings." Two of the most famous are "Bed" (1955) and "Monogram" (1955-1959). For "Bed," he scribbled pencil marks and smeared paint on a well-worn pillow, sheets and a quilt, which hang on the wall like a traditional painting. "Monogram" is a floor piece featuring a stuffed Angora goat with a used automobile tire around its middle; the goat is mounted atop a low platform covered with painted and collaged images.



Rauschenberg's combines were inspired by the work of the German Dada artist Kurt Schwitters (1887-1949), who affixed ticket stubs, dishes, old bicycle wheels, wood scraps and other refuse to canvas and paper. Both artists made a highly refined effort to reclaim beauty through the formal rearrangement of society's everyday waste. "I often had a house rule," Rauschenberg explained about his working method in the shabby downtown Manhattan neighborhood where he lived. "If I walked completely around the block and didn't find enough [trash] to work with, I could take one other block and walk around it in any direction -- but that was it. The works [I made] had to be at least as interesting as anything going on outside the window." With that house rule, Rauschenberg assumed the role of an American *flâneur*, eyeing chance juxtapositions on the street and incorporating them into his art.

The materials for "Bed" didn't even require a walk outside the studio. The sleeping stuff was piled over in a corner, since Rauschenberg's studio was located in an old industrial building not zoned for residential use.

The influential critic Clement Greenberg, who championed the Abstract Expressionists, wrote a 1955

essay extolling the rise of those artists and the decline of the School of Paris. Europe had been the home of the avant-garde, but Greenberg unfavorably compared postwar developments in Paris to the distinctive work he described as "American-type painting." Conforming to Greenberg's idea, Johns began to use the American flag and the map of the United States as subjects, while Rauschenberg made his canvas for "Bed" from a pieced quilt -- a unique bit of traditional Americana.

The rumpled combine, with its gestural smears and dribbles of oil paint, also made wry fun of the sometimes-grandiose claims for the Abstract Expressionist paintings of the generation that preceded him. Rauschenberg was friendly with many of those artists, including Willem de Kooning, Franz Kline and Barnett Newman, and he admired the fusion of liberating gesture, precise control and conceptual complexity embodied in their paintings. But he was equally ready to be sardonic and amusing.

The intimate precinct of a bed is inevitably associated with dreams, sexual activity and the private inner life of its inhabitant -- all subjects that figured prominently in the mythologies of Abstract Expressionist art. The much-romanticized notion of the social alienation of the Modern artist was even reflected in Rauschenberg's choice of a single rather than a double bed as a painting support. His "Bed" is a bed for one.

While conforming to one aspect of Greenberg's thought, combines such as "Bed" and "Monogram" also contradicted the critic's central idea, which held that a good painting is one that articulates its unique characteristics as a flat, illusion-free surface that is covered with colored marks and hangs on a wall. "Bed" took Greenberg at his literal word, but the result didn't look anything like an ordinary abstract painting.

The goat for "Monogram" was found in the commercial window display of a neighborhood store that sold used typewriters. The animal stands atop a collaged painting that lies flat on the floor. Like Rauschenberg rummaging on the streets of the city, the goat is grazing in a field of ordinary debris, prepared to consume just about anything. The artist later recalled that, as a child in rural Texas, he suffered emotional scars when his father killed his pet goat for food.



The candidly titled "Monogram" is also an unconventional declaration of identity. Western art has used goats as a symbol for priapic sexual energy ever since the Dionysian satyrs of ancient Greece -- half man and half goat, always merrily drinking and dancing. The outrageous interlace formed by the goat and the tire astride a landscape of cast-off debris dates from the conformist social atmosphere of the Eisenhower years, when an anti-Communist "Red Scare" was accompanied by an anti-homosexual "Pink Scare."

Critic Robert Hughes described the unforgettable "Monogram" as "one of the few great icons of male homosexual love in modern culture" -- the complement to Meret Oppenheim's famous Surrealist sculpture of a phallic spoon in a fur teacup.

Rauschenberg made 162 combines between 1954 and 1964, and they remain the most highly regarded and influential body of work by the unusually prolific artist. (During his career he produced about 6,000 unique paintings and sculptures, along with a sizable number of prints and multiples.) The largest collection of combines -- 11 works -- is housed in Los Angeles at the Museum of Contemporary Art. Chief curator Paul Schimmel organized an exhibition of 70 combines in 2005, which traveled to New York's Metropolitan Museum of Art and to museums in Paris and Stockholm.

The month before the show opened, the Met acquired its first important work by the artist, the 1959 combine "Winter Pool." Rauschenberg's 1959 "Canyon," which employs a stuffed eagle carrying an empty cardboard box to suggest an American version of the Ganymede myth, is the most important combine not in a public collection; long on loan to Washington's National Gallery of Art, it is currently on loan to the Los Angeles County Museum of Art.



Milton Ernest Rauschenberg was born on Oct. 22, 1925, in the Texas oil-refining town of Port Arthur, on the Gulf Coast near the Louisiana border. His mother, Dora Carolina Matson, and father, Ernest Rauschenberg, who worked at the local power and light company, were of Dutch, Swedish, German and Cherokee descent. Raised in the fundamentalist Church of Christ, which forbade dancing, drinking and card playing, he was encouraged by his deeply religious mother to become a preacher. Instead, after public school he enrolled at the University of Texas at Austin to study pharmacology. But he soon dropped out, unaware that dyslexia was contributing to his difficulties as a student.

With World War II raging in Europe and the Pacific, he was drafted into the United States Navy in the spring of 1944. Given his pacifist commitments, Rauschenberg was assigned as a neuropsychiatric technician in a San Diego hospital, while stationed at nearby Camp Pendleton. "This is where I learned how little difference there is between sanity and madness," Rauschenberg later recalled, "and realized that a combination of both is what everybody needs."

A fateful visit to the Huntington Library, Art Collections and Botanical Gardens in San Marino would change the so-far rather aimless direction of his life. At the Huntington, Rauschenberg saw Thomas Gainsborough's celebrated 1770 painting of young Jonathan Buttall, famously known as "The Blue Boy." He knew the illustrious painting from calendar reproductions and playing cards, but like many people from rural and small-town America, he was thunderstruck by an otherwise obvious fact: Pictures are painted by people.

"That just never occurred to me before," he said, recalling the epiphany, even though he had been drawing avidly since the age of 10. Rauschenberg decided on the spot to become an artist.

After the war ended and he was discharged from the Navy, Rauschenberg settled in Los Angeles, where he worked briefly as an illustrator for a Westwood newspaper and as a packing clerk in a bathing suit factory. In 1947, Rauschenberg used the GI Bill to enroll at the Kansas City Art Institute. With his identity in flux and creativity his chosen direction, he decided to pick a new name. After carefully considering which one might be the most ordinary in the English language, he dropped Milton in favor of Bob (subsequently Robert).



Further convinced that real artists studied in Europe, he left Missouri for Paris the following year and enrolled in the Academie Julian. There he was shocked by the lethargy of the old-fashioned program, whose faculty and students produced works that differed markedly from those of Picasso, Matisse and the Surrealist artists that he saw in Parisian galleries. But it wasn't a total loss. He did meet fellow student Susan Weil, whom he would later marry, and together they spent productive time in the city's museums and galleries.

After reading an article in Time magazine, the two art students decided to return to the United States and enroll in the adventurous program at Black Mountain College near Asheville, N.C., where Rauschenberg continued to study off and on through 1952. German emigre Josef Albers, formerly an instructor at the

Bauhaus, ran the avant-garde school when Rauschenberg arrived, and he taught the basic Bauhaus principles of *Werklehre* -- or working with the inherent properties of materials. Although their relationship was often tense, and sometimes even combative -- Albers loathed the younger artist's work -- Rauschenberg later identified Albers as his most important teacher.

He also learned from Weil, who showed him how to make "drawings" on blueprint paper by exposing it to light, and from the young composer John Cage and choreographer Merce Cunningham, who courted elements of chance and random accident as central ingredients of their music and dance. Rauschenberg later designed sets and costumes for performances by Cage and Cunningham, as well as for choreographer Paul Taylor, and he collaborated with the Judson Dance Theater, the Trisha Brown Dance Company and other theatrical groups. On occasion he also performed.

Among the more outlandish and memorable performances was "Pelican," which Rauschenberg devised when his name was erroneously listed as a choreographer (rather than a technician) for the Judson Dance Theater at the 1963 Pop Festival, held at a Washington, D.C., skating rink. Taking advantage of the

unplanned opportunity and the unusual location, he choreographed a work performed on roller skates and with a large, 10-foot-diameter circle of parachute silk strapped to his back. (Carolyn Brown and Per Olof Ultvedt completed the trio of dancers.) Pelicans are graceful swimmers and fliers but ungainly when earthbound; Rauschenberg's "skating dance" created a similar metaphor for human beings, transformed through art.

Rauschenberg's first solo exhibition was held in May 1951 at Betty Parsons Gallery, where Newman, Jackson Pollock, Mark Rothko and Clyfford Still also showed. It was not well received, but it did include works that anticipated critical features of what later became the combines. He showed "grass paintings," made with bundles of soil and seedlings held onto the surface with chicken wire and in need of regular watering, as well as white paintings that reflected light and the shadows of passing viewers. The surface as a changing, impartial collector of transient images would become a key to his mature work.

Married and with a son on the way, Rauschenberg was supporting his small family (and his studies at the Art Students League) by doing window displays for designer Gene Moore at Bonwit Teller and Tiffany & Co. But strains in the marriage were starting to show. Divorce came in the fall of 1952. Rauschenberg left





with fellow artist Cy Twombly for Rome, Casablanca, Tangier and Spain. Resettling in New York eight months later, the pair moved into an industrial loft on Fulton Street.

A concurrent exhibition with Twombly at the Stable Gallery, where Rauschenberg also worked as a janitor, was greeted with half a dozen reviews, mostly negative. Undeterred, he went into creative overdrive and began experimenting with materials. He asked his friend De Kooning, now one of the most esteemed artists in New York, to give him a drawing for a project he had in mind. He wanted to see whether a work of art could be created by subtracting lines rather than adding them. "Erased de Kooning Drawing" required nearly a month of careful labor to remove every trace of pencil, crayon and ink from the sheet, which Rauschenberg then carefully matted and placed in a 25-by-22-inch gold-leafed frame.

He also enlisted the aid of Cage to make "Automobile Tire Print" in 1953. Coincidentally, it recalled the original 1951 manuscript for "On the Road," which Beat Generation writer Jack Kerouac typed on a continuous 120-foot-long scroll. Laying down 20 sheets of paper on the pavement outside his studio on Fulton Street, Rauschenberg kept applying black ink to the rear tire of his friend's Model A Ford, which Cage drove slowly across the 22-foot length of taped-together sheets. The environmentally scaled mono-print recalls a Japanese scroll, while also revealing the process by which it was made. "Erased de Kooning Drawing" had been an homage to an established aesthetic achievement, as well as a poetic act of artistic patricide; likewise, the tire track made a deft industrial parody of his friend Barnett Newman's metaphysical "zip" paintings, in which a stripe of color delineated the space within a canvas.

Rauschenberg was also creating nominally monochrome paintings at the time -- canvases dominated by red, black or gold and incorporating bits of paper collage and swaths of fabric. These directions came together in "Untitled" (circa 1954), which he considered his first true combine and a work that is now in MOCA's collection. "Untitled" moved the collage into three dimensions. The boxy sculpture, taller than a standing person, is covered inside and out with photographs, newspaper clippings, a found painting and small drawings by Twombly and painter Jack Tworikov.

The leg of a table, which makes the construction like a piece of common furniture, holds up part of the work. A mirror on the bottom reflects a large black and white photograph of a dapper man dressed in a white suit, suggesting Narcissus at the pool; a pair of empty shoes further alludes to a disembodied person. A stuffed Plymouth Rock hen adds an all-American element. "Untitled" mixed references to personal experiences with functional elements that invited viewers' participation.

Following his international triumph in Venice, Rauschenberg pushed the experimental edges of his work. He founded E.A.T. -- Experiments in Art and Technology -- to collaborate with scientists and engineers from Bell Laboratories and elsewhere, just as he collaborated with master printers at Gemini G.E.L. to produce 1968's "Booster," at 6 feet the largest lithograph printed to date. For the 1971 "Art and Technology" exhibition at LACMA, he made "Mud Muse," a glass and aluminum vat filled with liquefied clay that, responding to a sound-activated compressed-air system, bubbled like the La Brea tar pits outside the museum. In the early 1970s, at his permanent residence and studio on Captiva Island, Fla., he began making large wall-reliefs from dismantled cardboard boxes and ethereal constructions of layered, printed silks. The gauzy fabrics, titled the "Hoarfrost Series," proved to be the final body of Rauschenberg's work to receive general acclaim.

Although political issues were almost never an obvious subject for his art, Rauschenberg expressed concern over the devastating uses of military technology arising from the Vietnam War. He preferred rockets to the moon over rocket-propelled missiles. Scientific energies should instead produce "the joy of art," as a Time magazine cover story about him described his artistic pursuit. He launched ROCI -- the Rauschenberg Overseas Culture Interchange -- in 1985, spending five years traveling the world to collaborate with artists and non-artists alike. The ROCI agenda was well received by more than 2 million participants in China, the Soviet Union and elsewhere, although few projects resulted in significant art.

In 2004, an illness left him partially paralyzed, severely impairing his ability to use his right arm and hand. Rauschenberg also struggled with the debilitating effects of alcohol, which almost certainly had an effect on his art in the last decades of his life. He enjoyed numerous museum retrospectives during the last 30 years, the most recent an enormous show of more than 300 works that traveled the United States



and Europe in 1997 and 1998. His art is in the collection of virtually every important museum that surveys contemporary culture.

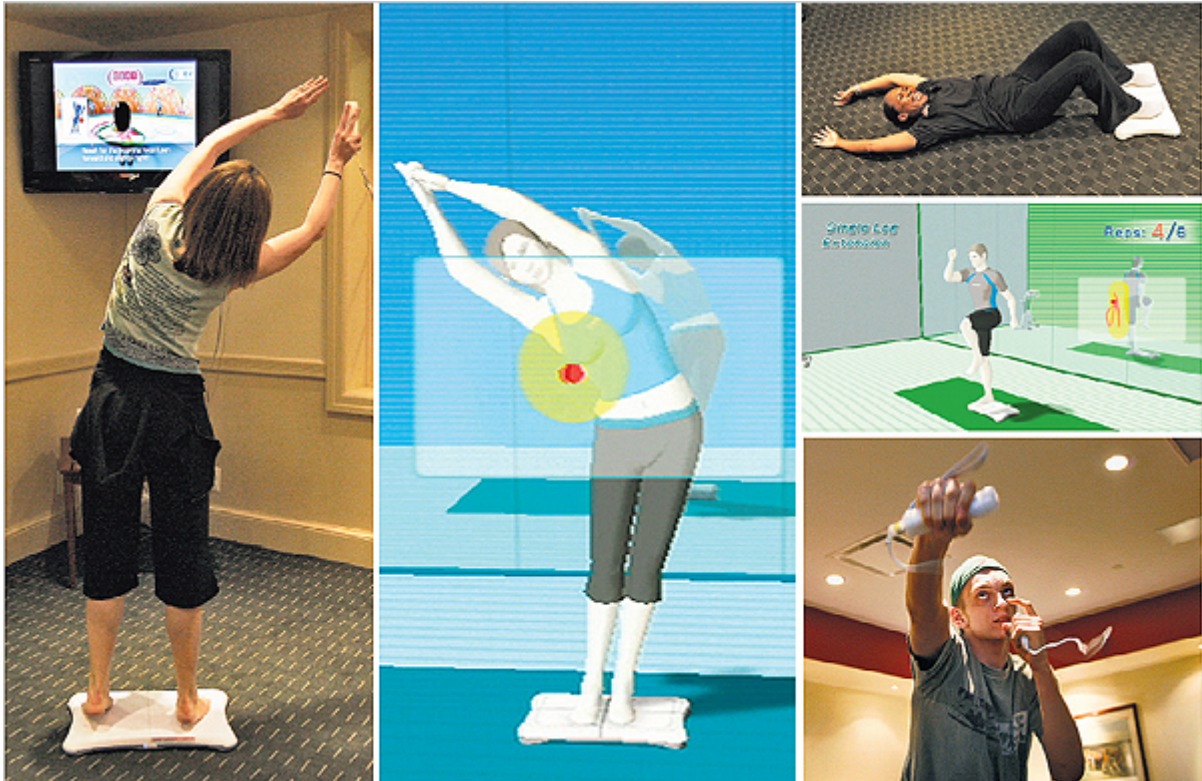
Rauschenberg is survived by his son, Christopher; a sister, Janet Begneaud; and his companion and frequent collaborator, artist Darryl Pottorf.

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<http://www.latimes.com/entertainment/news/arts/la-me-rauschenberg14-2008may14,0,753285.story?track=rss>

O.K., Avatar, Work With Me

By **SETH SCHIESEL**



WHEN Nintendo released the Wii 18 months ago, it upended the notion of what video games could be. Moving beyond the sunlight-deprived young men at gaming's core, Nintendo appealed to the rest of the world with an intuitive, family-friendly entertainment experience.

Women, parents, even nursing-home residents have been drawn to the Wii's simple evocations of games such as tennis and bowling. The Wii has become the best-selling game machine of the current generation, selling more than 25 million worldwide, and remains scarce on store shelves across the nation.

Now Nintendo's latest brainchild, Wii Fit, could send similar ripples through the home-fitness market. Scheduled to be released in North America next week, Wii Fit is not meant to replace a gym. But in a world of \$3,000 elliptical machines and \$150-an-hour personal trainers, it has at least a chance of becoming a global, affordable, mass-market interactive home-fitness system. (On its overseas debut last month, it became one of the fastest-selling games ever in Britain.)

Exercising with Wii Fit is like having a Bob Harper or a Denise Austin who talks back — gently cajoling you through exercises, praising, nudging, even reminding you to eat a banana once in a while. It also lets you see how you stack up against friends or family members; each user creates a cartoony avatar called a "Mii."

The system costs \$90, plus \$250 for the basic Wii console. It uses a television and a sensitive "balance board" placed on the floor to present a few dozen activities, from push-ups to yoga, to more entertaining challenges like balance games and aerobic contests. Nintendo is not aiming Wii Fit at people with a serious exercise regimen. Rather, it is meant to appeal to the person busy with work and family who just wants to have fun getting a little toned at home.

Believe me, I could use some help. As a video game journalist, I live in a world where Buffalo wings, potato chips and jalapeño poppers are considered food groups. The closest I get to serious exercise is flopping around at concerts like a lumpy, overeducated flounder.

Then again, most Americans aren't really in great shape either. So I felt I could reasonably reflect the broad mass market (if you will) in testing whether a silicon coach has the potential to rescue millions of Americans from decrepitude.

To help me evaluate the system, Thursday Styles recruited two fitness professionals, an avid exerciser and one work-at-home parent to try Wii Fit at the Chelsea Piers sports complex in Manhattan. Here is what we thought:

THE MULTITASKER

Shira Weiss, a 33-year-old mother of two who works out of her home in Teaneck, N.J., as a publicist for small businesses, wants Wii Fit because it fits both her lifestyle and her doorway. "Before having the kids, I used to work out every day — I belonged to a gym — but now it's really only when I have a chance," she said. "Let me put it this way: I clean with vigor. I like aerobic exercise and would like a treadmill. But we tried to get one, and the door of our house was too narrow. It just wouldn't fit, and my husband was like, 'Forget the treadmill.'"

She eyed the 12" by 20" Wii Fit board. "But this could work," she said.

Wii Fit's almost 50 exercises are divided among four categories: strength training, aerobics, balance games and yoga. Each user creates a personal profile, including a potential weight loss (or gain) goal. The system tracks a user's weight and body-mass index as well as their performance on individual exercises. To help prevent novices from overextending or frustrating themselves, only a few exercises are initially available in each category; more advanced activities are unlocked only after completing simpler options.

Ms. Weiss found her groove in Wii Fit's aerobics section. She proved a quick study with the hula hoop game (gyrating in circles), before finding her long-sought treadmill replicated in the running game. In Wii Fit, running does not use the board. Rather, the user puts the TV-remote-size Wii controller in her pocket or hand and runs in place while the motion-sensitive controller serves as a pedometer. On screen, the user runs through a bucolic park while a pacesetter beckons the player onward. For longer runs, users can watch television while the Wii tracks their progress.





“I enjoyed it,” Ms. Weiss said. “It’s more interesting than running on a treadmill because it gives you something to look at. It’s like an interactive exercise game. In some ways, it’s like playing Nintendo, but with your body.”

BOTTOM LINE Wii Fit could be the right choice for exercise amateurs trying to get in shape in the living room.

THE SWEAT HOUND

Luke McCambley, 18, knows he is an anomaly.

“You don’t find many art-school gym rats, but I guess I qualify,” he said.

Mr. McCambley, a student at the School of Visual Arts in New York, was the only Wii Fit tester who actually owns a Wii. But he also belongs to a Crunch downtown, works out six days a week, and is studying to become a personal trainer.

So it wasn’t surprising he had little problem with various strength exercises like push-ups and leg twists. He aced balance games like skiing and heading soccer balls, and looked like he could punch through the screen in his aerobic boxing session.

“I go to the gym, so I don’t need this, but for someone who doesn’t want to leave the living room it would be great,” he said. “Over all, I liked it a lot. It seems really well-designed for the people it’s for. I worked up a sweat with a couple of the exercises.”

He added: “If you really committed to the strength exercises, you could actually get some results. That said, if you’re really looking to get fit, join a gym. But this would be great for mothers, or if they want their kids to get a little more in shape.”

BOTTOM LINE Serious athletes don’t need Wii Fit, but you (or your children) might like it.

THE YOGA MASTER

Wii Fit is not, however, the right choice if you want to impress Cyndi Lee, 54, the founder of Om Yoga in New York.

Before trying the system, she eyed the board and declared, “It’s too small.” Nonetheless, she sailed through a progression of Wii Fit’s yoga poses, including the half-moon, warrior, tree and sun salutation. For each pose, at least one of the user’s feet or hands is usually on the board.

Afterward, her main concern seemed to be that Wii Fit reduces yoga to a collection of physical exercises rather than presenting yoga as a comprehensive approach to physical, mental and emotional wellness.

“This is a little dumbed down and they are teaching more from a fitness or gym perspective,” she said. “They’re saying things like, ‘Tighten your glutes,’ which we would never say in yoga.”

Ms. Lee also spied what she called incorrect elements within some poses. “Like with the warrior pose they show the knee going past the foot, which is a big no-no,” she said.

BOTTOM LINE Wii Fit will not make you a yogi.

THE FITNESS PROFESSIONAL



Sharone Huey, 51, an exercise physiologist at the Sports Center at Chelsea Piers, spent the most time with Wii Fit. Over two days, she watched most other sessions and spent at least two and a half hours with the system herself.

Her initial skepticism evolved into a somewhat surprised admiration.

“Actually I think it’s pretty good,” she said. “You can definitely get a workout. When I started doing it, I realized all the activities were pretty much on point. There were some things I didn’t like, like the alignment in a couple of places. But over all, I thought they did a good job and this will be a good tool for people who can’t make it to the gym.”

“I can see this in a seniors center or senior community and it would be very interesting to be able to set up a whole class of people on boards, tracking their progress,” said Ms. Huey, who reigned supreme as the week’s hula-hoop champion.

“The big thing is so many people buy a treadmill or some other exercise machine and in two weeks it becomes an expensive clothes rack,” she said. “This makes exercise fun and I think it will help to motivate a lot of lazy folks.”

Among them, potentially other members of the Huey family. “I’ll get this for my lazy sisters,” she said.

BOTTOM LINE Watch for the Chelsea Piers Wii Fit class coming soon (maybe, just maybe).

THE COUCH POTATO

And what about Mr. Lumpy Flounder himself? Around this time last year, I went to West Virginia to write about a plan there to install the aerobic video game Dance Dance Revolution in every school in the state. When I got back I thought, “O.K. let’s see if I’ll exercise regularly at home on D.D.R.”

I lasted a week. The problem was there were days when I just didn’t want to dance to electronic house music for half an hour. Wii Fit just might be different (though more than one tester commented on Wii Fit’s somewhat cheesy music). For me, the key is that one can approach Wii Fit like a game. In its sheer variety of activities, you can always find something to do. It beckons me to unlock the different exercises, to get four stars in snowboarding, to get through six more jackknife crunches.

I’ve spent about seven hours with Wii Fit recently and I’m still doing it. The step exercises remain my strong suit, though I’m still trying to figure out how to use my balance to navigate my floating bubble through the canyon without popping. I’m even running a little.

But I realize that in an exercise program no manner of electronic frippery (or fancy workout clothes) can make up for old-fashioned motivation. If I stop using Wii Fit, it won’t be because the graphics or the sound were bad. It will just mean I got tired of exercising, and no mere product will be at fault. Will I achieve the modest weight loss goal I’ve set? I can only hope so.

And no, I won’t tell you what it is.

http://www.nytimes.com/2008/05/15/fashion/15fitness.html?_r=1&th&emc=th&oref=slogin

Bacon Triptych Auctioned for Record \$86 Million

By CAROL VOGEL



A 1976 triptych by Francis Bacon brought \$86.3 million on Wednesday night at Sotheby's, becoming the most expensive work of contemporary art ever sold at auction and a retort to doomsayers who had predicted that the art market would falter seriously this season because of broad economic anxieties.

"Recession? What recession?" Barbara Gladstone, a Chelsea dealer, said jokingly as she was leaving the salesroom.

Although the sale had top-quality art and dealers predicted it would be a success, it went well beyond even the auction house's expectations, bringing in \$362 million, above the sale's high \$356 million estimate. Only 10 of the 83 works failed to sell, and 18 artist records were set for names ranging from Yves Klein and Piero Manzoni to Tom Wesselmann and Takashi Murakami.

By far the most exciting moment of the evening was when "Triptych," Mr. Bacon's comment on his own angst — a vast (each of the three panels measures about 6 ½ feet by 5 feet) and densely painted allegorical painting came up for sale. Three telephone bidders went for the painting, which was being sold by the Moueix family, producers of Château Pétrus wines. Hailing the painting as "a landmark of the 20th-century canon," Sotheby's had estimated it would sell for \$70 million.

(Final prices include the commission paid to Sotheby's: 25 percent of the first \$20,000, 20 percent of the next \$20,000 to \$500,000 and 12 percent of the rest. Estimates do not reflect commissions.)

Two monochrome works by the artist Yves Klein fetched giant prices. Offered from the collection of Walther Lauffs, a German industrialist who died in 1981, and his wife, Helga, "MG9" (1962), a gold leaf on panel, proved wildly popular. It carried an estimate of \$6 million to \$8 million, but Philippe Ségalot, a Manhattan dealer, bought the painting for \$23.5 million. Mr. Ségalot, who spoke French on a cellphone as he bid, also bought "IKB1," a 1960 deep blue canvas that had been expected to bring \$5 million to \$7 million but fetched \$17.4 million. (As soon as the hammer fell on both paintings, speculation started spreading through the salesroom that Mr. Ségalot was bidding for François Pinault, the luxury goods magnate and owner of Christie's, but Mr. Ségalot declined to comment on the buyer for whom he was bidding.)

Abstract images have been strong sellers in general this week. Gerhard Richter's "Abstract Picture" from 1990, a dreamy canvas of yellows, violets, blues and orange, went for \$15.1 million, far above its \$5 million to \$7 million estimate. The buyer was yet another mystery telephone bidder.



Marianne Boesky, who for years had represented Mr. Murakami before he jumped to the powerhouse Gagosian Gallery two years ago, was selling one of the artist's outrageous sculptures, "My Lonesome Cowboy," another cast of which is on view as part of the artist's retrospective that opened last month at the Brooklyn Museum of Art. The sculpture of the naked cowboy brought another record price, selling to a telephone bidder for \$15.1 million, nearly four times its \$4 million high estimate.

Mr. Murakami, wearing his signature baggy blue jeans and his hair in a ponytail, was standing in the back of the salesroom on Wednesday night. People in the audience believed he spent \$1.1 million for a 2001 sculpture by the Japanese artist Yoshitomo Nara, "Light My Fire," a sculpture of a child on a tree stump holding a flame. Three works by the art world titan Robert Rauschenberg were on offer Wednesday night, and his death this week at 82 prompted avid speculation on how they would fare. Historically, auction prices tend to dip immediately after an artist dies in anticipation that long-withheld works will flood the market.

But "Overdrive," a 1963 silkscreen collage incorporating images of a bird, a stop sign, a one-way street sign and other objects, made yet another record price, bringing \$14.6 million. Sotheby's had thought it would make \$10 million to \$15 million. The evening had one particularly pricey bump: "Orange, Red, Yellow," an abstract Rothko in dense tones from 1956, was expected to fetch \$35 million. It was being sold by Heinz Eppler, a philanthropist and collector from New York and Palm Beach, Calif. There were no bids for the painting, which failed to sell. A small triangle by the lot number indicated that Sotheby's had a financial interest in the painting. Before the sale, some contemporary-art dealers said they had heard that Sotheby's had purchased it in partnership with Robert Mnuchin, a Manhattan dealer. Perhaps there were too many red Rothkos for sale this week. On Tuesday night at Christie's, a Rothko in reds and yellows went for \$50.4 million, a highlight of that sale.

But Pop Art was still had its day. A Tom Wesselmann, "Great American Nude No. 48," a 1963 roomlike assemblage that includes a radiator and window illumination, brought another record price, selling for \$10.6 million, above its \$8 million high estimate. (Another Wesselmann, "Smoker #9, 1973," a painting in the shape of a woman's red lips inhaling smoke, set a record for the artist's work at auction on Tuesday night at Christie's, going for \$6.7 million.

Jose Mugarabi, the Manhattan dealer, bought Warhol's "Detail of the Last Supper (Christ 112 Times)" from 1986 for \$9.5 million. Measuring 6 feet by 35 feet, it presents a black grid with the face of Christ outlined in yellow. It seemed like a good price considering the low estimate was \$10 million.

Peter Brant, the newsprint magnate, was a big seller last night. One of Richard Prince's early supporters he was parting with "Millionaire Nurse," from 2002. one of the artist's paintings inspired by the covers of erotic pulp fiction from the 1940s. In this painting, his nurse is wearing a white surgical mask. While it had been estimated to sell for \$3.5 million to \$4.5 million, five bidders went for the work which ended up selling for \$4.2 million or \$4.7 million including Sotheby's fees. (On Tuesday night, Christie's auctioned a Prince nurse painting from the same year for a record \$7.3 million.) Even more subtle canvases had their appeal. "Achrome," a sensual, layered white canvas by Piero Manzoni, also brought a record price. Franck Giraud, Mr. Ségalot's partner, beat out five bidders to buy the painting for \$10.1 million, well above its \$6.5 million estimate.

After the sale, as the crowds were milling around talking about the evening, everyone seemed stunned by the large sums of money that were spent. "I don't understand why it did so well if the economy was mediocre," said Mr. Mugarabi. "Maybe people feel safer with art."

<http://www.nytimes.com/2008/05/15/arts/design/15auction.html?th&emc=th>



Earthquake in China Highlights the Vulnerability of Schools in Many Countries

By **ANDREW C. REVKIN**

The enormous loss of life in collapsed schools around China's quake-stricken Sichuan Province could have been significantly reduced using known methods for designing or retrofitting structures in earthquake zones, several experts on global hazards said Tuesday.

But China is just one of many countries with known earthquake vulnerability that has been slow to transform schools — a keystone of any community — from potential death traps into havens, these experts and some community campaigners for school safety said.

Hundreds of students are thought to have perished in schools during the earthquake, among more than 13,000 deaths in all.

Experts on earthquake dangers have warned for years that tens of millions of students in thousands of schools, from Asia to the Americas, face similar risks, yet programs to reinforce existing schools or require that new ones be built to extra-sturdy standards are inconsistent, slow and inadequately financed.

While earthquakes can sometimes exact a far wider toll on other public buildings, school collapses are particularly wrenching, development officials and experts say, because students are often what propel a struggling nation from poverty to prosperity.

In 2004, the 30-nation Organization for Economic Cooperation and Development released a study, "Keeping Schools Safe in Earthquakes," concluding that schools "routinely" collapsed in earthquakes around the world because of avoidable design or construction errors, or because existing laws and building codes were not enforced.

"Unless action is taken immediately to address this problem, much greater loss of life and property will occur," the report says.

The risks are growing, experts say, as populations in poor regions continue to rise and the world, rich and poor, shifts ever more toward urban centers, many with well-charted seismic threats.

In recent years, there have been deadly school collapses after earthquakes in Italy, Algeria, Morocco and Turkey. Most notably, in Pakistan on Oct. 8, 2005, at least 17,000 children died as more than 7,000 schools collapsed after a powerful jolt shook a mountainous region near the Indian border.

Similar risks, and delays in reducing them, exist in countries rich and poor from the Americas across Europe and Asia.

In 2006, Brian E. Tucker, an earthquake expert who runs a private group, GeoHazards International, presented a study on schools to the Economic Cooperation Organization, a group of 10 countries in Europe and Asia. The analysis found that 180 million people, including 40 million school-age children, faced "an earthquake risk equal to that of northern Pakistan." Dr. Tucker also was a co-author of the 2004 O.E.C.D. report.

Delays in addressing such threats sometimes result less from financing and engineering than from societal inertia, given competing problems and the unpredictable nature of earthquakes, said Ben Wisner, a former geography professor at California State University, Long Beach, and a founder of the Coalition for Global School Safety.



Often, money and technology are not the issue, he said, so much as access to basic information about risks and simple ways to bolster buildings.

“On the whole, the cost of designing and building a school, say, a three-story junior high school in Mexico City, is only about 5 percent higher,” Dr. Wisner said. “You don’t necessarily design a building to avoid collapse, but design so that it’s a survivable collapse. You want large voids so they can be accessed by rescuers.”

There have been some successful efforts to reinforce schools, in places including Katmandu, Nepal, and parts of Turkey, he said. Progress often is a result of persistent pressure by a particular engineer or safety campaigner.

The successes are far outnumbered by places that still face calamity on the scale of that seen in Sichuan, he and others said.

And the risks are not limited to poor or emerging countries. In Vancouver, British Columbia, parents’ groups have been agitating to accelerate a decades-long program aimed at bringing schools up to modern earthquake standards.

While there is no reliable global tally of unsafe schools in quake zones, regional snapshots are chillingly clear. A report being presented at an international conference on school safety, coincidentally beginning on Wednesday in Islamabad, Pakistan, says that more than 80 percent of schools in Pakistan are unprotected from shocks like the one in October 2005.

The inertia is one result of a range of factors, including deep poverty in some places and political immobility in others. In some countries and cultures, inaction is shaped by a fatalism that somewhat indemnifies governments from responsibility for what are seen as “celestial” acts, said Thomas Parsons, a geophysicist with the United States Geological Survey in Menlo Park, Calif.

“It’s so disappointing to see these things happening again and again — little kids caught in a collapsed school building,” Dr. Parsons said. “As always, in the short term we are balancing the probable event against real, right-now problems. But in the long term, probable becomes inevitable.”

Around Sichuan, the earthquake may well have raised the danger level on nearby faults, Dr. Parsons said, noting a 2007 paper mapping the region’s unstable underpinnings.

David Barboza contributed reporting from Shanghai.

http://www.nytimes.com/2008/05/14/world/14codes.html?_r=1&ref=science&oref=login



Students Fail — and Professor Loses Job

Who is to blame when students fail? If many students fail — a majority even — does that demonstrate faculty incompetence, or could it point to a problem with standards?

These are the questions at the center of a dispute that cost Steven D. Aird his job teaching biology at Norfolk State University. Today is his last day of work, but on his way out, he has started to tell his story — one that he suggests points to large educational problems at the university and in society. The university isn't talking publicly about his case, but because Aird has released numerous documents prepared by the university about his performance — including the key negative tenure decisions by administrators — it is clear that he was denied tenure for one reason: failing too many students. The university documents portray Aird as unwilling to compromise to pass more students.

A subtext of the discussion is that Norfolk State is a historically black university with a mission that includes educating many students from disadvantaged backgrounds. The university suggests that Aird — who is white — has failed to embrace the mission of educating those who aren't well prepared. But Aird — who had backing from his department and has some very loyal students as well — maintains that the university is hurting the very students it says it wants to help. Aird believes most of his students could succeed, but have no incentive to work as hard as they need to when the administration makes clear they can pass regardless.

“Show me how lowering the bar has ever helped anyone,” Aird said in an interview. Continuing the metaphor, he said that officials at Norfolk State have the attitude of “a track coach who tells the team ‘I really want to win this season but I really like you guys, so you can decide whether to come to practice and when.’ ” Such a team wouldn't win, Aird said, and a university based on such a principle would not be helping its students.

Sharon R. Hoggard, a spokeswoman for Norfolk State, said that she could not comment at all on Aird's case. But she did say this, generally, on the issues raised by Aird: “Something is wrong when you cannot impart your knowledge onto students. We are a university of opportunity, so we take students who are underprepared, but we have a history of whipping them into shape. That's our niche.”

The question raised by Aird and his defenders is whether Norfolk State is succeeding and whether policies about who passes and who fails have an impact. According to [U.S. Education Department data](#), only 12 percent of Norfolk State students graduate in four years, and only 30 percent graduate in six years.

Aird points to a Catch-22 that he said hinders professors' ability to help students. Because so many students come from disadvantaged backgrounds and never received a good high school education, they are already behind, he said, and attendance is essential. Norfolk State would appear to endorse this point of view, and official university policy states that a student who doesn't attend at least 80 percent of class sessions may be failed.

The problem, Aird said, is that very few Norfolk State students meet even that standard. In the classes for which he was criticized by the dean for his grading — classes in which he awarded D's or F's to about 90 percent of students — Aird has attendance records indicating that the average student attended class only 66 percent of the time. Based on such a figure, he said, “the expected mean grade would have been an F,” and yet he was denied tenure for giving such grades.

Other professors at Norfolk State, generally requesting anonymity, confirmed that following the 80 percent attendance rule would result frequently in failing a substantial share — in many cases a majority — of their students. Professors said attendance rates are considerably lower than at many institutions — although most institutions serve students with better preparation.



One reason that this does not happen (outside Aird's classes) is that many professors at Norfolk State say that there is a clear expectation from administrators — in particular from Dean Sandra J. DeLoatch, the dean whose recommendation turned the tide against Aird's tenure bid — that 70 percent of students should pass.

Aird said that figure was repeatedly made clear to him and he resisted it. Others back his claim privately. For the record, Joseph C. Hall, a chemistry professor at president of the Faculty Senate, said that DeLoatch "encouraged" professors to pass at least 70 percent of students in each course, regardless of performance. Hall said that there is never a direct order given, but that one isn't really needed.

"When you are in a meeting and an administrator says our goal is to try to get above 70 percent, then that indirectly says that's what you are going to try to do," he said. (Hoggard, the university spokeswoman, said that it was untrue that there was any quota for passing students.)

Hall agreed that both attendance and preparation are problems for many students at Norfolk State. He said that he generally fails between 20 and 35 percent of students, and has not been criticized by his dean. But Hall has tenure and the highest failure rate he can remember in one of his classes was 45 percent.

Dean DeLoatch's report on Aird's tenure bid may be the best source of information on how the administration views the pass rate issue. The report from the dean said that Aird met the standards for tenure in service and research, and noted that he took teaching seriously, using his own student evaluations on top of the university's. The detailed evaluations Aird does for his courses, turned over in summary form for this article, suggest a professor who is seen as a tough grader (too tough by some), but who wins fairly universal praise for his excitement about science, for being willing to meet students after class to help them, and providing extra help.

DeLoatch's review finds similarly. Of Aird, she wrote, based on student reviews: "He is respectful and fair to students, adhered to the syllabus, demonstrated that he found the material interesting, was available to students outside of class, etc."

What she faulted him for, entirely, was failing students. The review listed various courses, with remarks such as: "At the end of Spring 2004, 22 students remained in Dr. Aird's CHM 100 class. One student earned a grade of 'B' and all others, approximately 95 percent, earned grades between 'D' and 'F.'" Or: "At the end of Fall 2005, 38 students remained in Dr. Aird's BIO 100 class. Four students earned a grade of 'C-' or better and 34, approximately 89 percent, received D's and F's."

These class records resulted in the reason cited for tenure denial: "the core problem of the overwhelming failure of the vast majority of the students he teaches, especially since the students who enroll in the classes of Dr. Aird's supporters achieve a greater level of success than Dr. Aird's students."

DeLoatch also rejected the relevance of 16 letters in Aird's portfolio from students who praised him as a teacher. The students, some of whom are now in medical or graduate school or who have gone on to win research awards, talked about his extra efforts on their behalf, how he had been a mentor, and so forth. DeLoatch named each student in the review, and noted their high grade point averages and various successes. Some of the students writing on his behalf received grades as low as C, although others received higher grades.

But although DeLoatch held Aird responsible for his failures, she wrote that he did not deserve any credit for his success stories and these students, by virtue of their strong academic performance, shouldn't influence the tenure decision. "With the exception of one of these students, it appears that all have either excelled or are presently performing well at NSU. Given their records, it is likely that that would be the case no matter who their advisors or teachers were."

Aird stressed that he does not believe Norfolk State should try to become an elite college. He said he believes that only about 20 percent of the students who enroll truly can't do the work. He believes another



20 percent are ready from the start. Of the middle 60 percent, he said that when the university tells them that substandard work and frequent class skipping are OK, these students are doomed to fail his courses (and not to learn what they need from other professors).

“I think most of the students have the intellectual capacity to succeed, but they have been so poorly trained, and given all the wrong messages by the university,” he said.

The problem at Norfolk State, he said, isn't his low grades, but the way the university lowers expectations. He noted that in the dean's negative review of his tenure bid, nowhere did she cite specific students who should have received higher grades, or subject matter that shouldn't have been in his courses or on his tests. The emphasis is simply on passing students, he said.

“If everyone here would tell students that ‘you are either going to work or get out,’ they would work, and they would blossom,” he said. “We've got to present a united front — high academic standards in all classes across the institution. Some students will bail, and we can't help those, but the ones who stay will realize that they aren't going to be given a diploma for nothing, and that their diploma means something.”

Reaction in Norfolk has been mixed. After *The Virginian-Pilot* wrote about the case last week, it received numerous online comments — some calling Aird a hero, others saying he was denigrating the university.

Faculty leaders have a range of views about Aird's case. Cassandra L. Newby-Alexander, an associate professor of history and secretary of the Faculty Senate, led a grievance committee that found Aird's first tenure review was flawed and that ordered a second review. Newby-Alexander said that the problems Aird has raised about preparedness are real. She said that she fails about 20 percent of her students on average, some for just not showing up and others for not doing the work at appropriate levels.

“He's not the first to raise the issue of preparedness. This is a national problem that a lot of faculty have been raising throughout the country,” she said.

In addition, while she has not experienced being told that she must pass a greater percentage of students, she said she was troubled by the implication that someone could be denied tenure for making sincere analyses of the grades he thought students deserved. Even if presidents or vice presidents would prefer different grades, she said that it “smacks of an issue of academic freedom” to punish a professor for giving low grades.

Hall, the head of the Faculty Senate, asked if Aird has been treated fairly or unfairly, said: “My father used to say that no matter how long you cook a pancake it still has two sides.”

Along those lines, he said that it was important to see the responsibility for getting students to acceptable levels of knowledge as a team process, not something that falls only on students or only on professors. “Every faculty member has to decide how they are going to take a group of students and bring them up to a particular standard. Some faculty members feel that ultimately the responsibility of having students come up to that standard is the university's, and the university should bring students up. It's a very complicated issue.”

For his part, Hall said that “one of the things I have been objecting to is administrators trying to constantly tell you the responsibility for student success is only the faculty member's responsibility. It really isn't. Success is four-pronged — the student, the university administration, parents, and the faculty.”

Added Hall: “A faculty member can't make a student come to class. A faculty member can't spend all of his or her time teaching students how to study. A faculty member teaching chemistry can't deal with some of the social problems these students have, and that the students are working 30-40 hours a week. There are a lot of things that are not in the control of the faculty member.”



But at the same time, he added that “whenever you have 80-90 percent of your students failing, politically that’s going to cause some administrators to begin to question what’s going on.”

Jonathan Knight, who handles academic freedom issues for the American Association of University Professors, said that he has no problem per se with administrators asking questions about such a high failure rate. “It is not improper for an administration to be concerned about it,” he said.

But he cautioned against automatic assumptions. He said the questions to be asked are why so many students are failing, what is being done to help students succeed, what is taking place in the classroom, and so forth.

While Knight did not see academic freedom issues related to asking such questions, he said he would be concerned about orders to pass certain percentages of students. “Professors obviously should have the right to determine what grades the students should have,” he said.

Aird — who is applying for teaching jobs — acted on such a belief and stuck to it. While administrators have noted that they urged him to change his ways, his defenders note that he was always clear with his students about his belief in high standards. In a letter he sent to students at the beginning of last January’s semester, he wrote: “You can only develop skills and self-confidence when your professors maintain appropriately rigorous standards in the classroom and insist that you attain appropriate competencies. You cannot genuinely succeed if your professors pander to you. You will simply fail at the next stage in life, where the cost of failure is much greater.”

Today, Steve Aird is packing up his office.

— Scott Jaschik

*The original story and user comments can be viewed online at
<http://insidehighered.com/news/2008/05/14/aird>.*

Facebook, Meet Blackboard



Courtesy of Blackboard

In the Facebook app, students can look up classmates' profiles

Blackboard, the course management giant, is hoping that a Facebook application will help it reach students even when they're trying to avoid studying.

Deploying a central fact of students' work life into Facebook could be tricky business, but the social networking behemoth did start out as a college-oriented site complete with a popular course-schedule display, after all. The application, called Blackboard Sync, certainly raises questions about what a course-enabled Facebook would do: Send constant News Feed updates that "Adam received a B+ in Introduction to Statistics" or "Robyn dropped out of Intermediate Microeconomics"? Add the ability to "poke" one's professor? Remind students not to forget their homework?

The answer, so far, is none of the above. The [Facebook app](#), released today, mainly replicates the functionality of colleges' (and high schools') Blackboard sites, where students can log in, download course materials, post to message boards, upload assignments and check grades. Rather than add social networking functionality to the existing interface, Blackboard's strategy is to bring its services where the students already are and capitalize on Facebook's ubiquity and collaboration capabilities.

In doing so, the company is implicitly conceding that students are less inclined to flip through Blackboard pages to kill a few spare minutes. "This is specifically to take advantage of the fact that college students spend a tremendous amount of time on Facebook," said Karen Gage, Blackboard's vice president of product strategy. "I think that what we know is that socializing with your friends is more fun than studying."



“Let’s face it,” the app’s introduction page says. “You would live on Facebook if you could. Imagine a world where you could manage your entire life from Facebook — it’s not that far off!”

But there’s one exception: “You have to access a different system to get your course information and you don’t always know when something new has been posted or assigned, so it’s difficult for you to stay on top of your studies. We get it. That’s why Blackboard is offering Blackboard Sync™, an application that delivers course information and updates from Blackboard to you inside Facebook.”

When it was still open only to college students, Facebook profiles often featured users’ course schedules with links to their classmates. Sync offers similar functionality, but within the private space of the application itself. In other words, it doesn’t show up on profiles at all.

“It’s a private application, so there’s sensitive information there that you wouldn’t want published to all your friends,” Gage said. Still, she said Blackboard hopes that students will use the application to connect with classmates and form study groups in what Michael L. Chasen, Blackboard’s president and CEO, referred to as “a new kind of social learning community” in the company’s announcement.

Sync comes at a time when colleges and other players in the education arena are looking to connect with students while they’re enrolled — and beyond — in ways that are more personalized. Some colleges are experimenting with proprietary social networks for fund raising purposes, among other reasons, and Web designers are thinking more about Web 2.0 features when redesigning their institutions’ online presence. Blackboard’s gambit represents an acknowledgment that so far, at least, no independent effort to capture the impulses fed by Facebook (and, to some extent, MySpace) has shared its success.

Meanwhile, technology companies — including Facebook — are beginning to realize that the key to expanding social networking’s reach is to open such connections to other platforms and to bring content to where users already are, rather than add to a growing number of Web sites (with their own usernames and logins) with separate profiles and lists of friends.

The application is part of a larger Web 2.0 initiative, Blackboard Beyond, that also includes the Scholar social bookmarking tool. Sync integrates with Scholar, allowing students to post relevant links to share with classmates. Some of Sync’s other features include integration with Blackboard’s message boards, access to grades and a page with announcements and recent course updates — viewable only to the student who’s both logged on to Facebook and enrolled in the given courses.

— Andy Guess

*The original story and user comments can be viewed online at
<http://insidehighered.com/news/2008/05/14/sync>.*

Calling All Kids: Take Tough Courses



Publicis

A gladiator-like figure, Algebra II is 7'2" and single. He's "quite good on the bongos" and enjoys the ocean, if only so he can assign variables to the sea gulls swirling in the sky like "some sort of crazy math problem."

Algebra II is one of several warrior-like characters featured in the second phase of the [KnowHow2GO advertising campaign](#), which stresses the need for college-bound kids to take tough classes (algebra II, foreign languages and biology, specifically). The college access campaign, which features television and radio public service advertisements, print publications and posters, and a significant Web presence (complete with character-specific MySpace pages, the source of Algebra II's profoundly personal information above), aims to reach students in grades 8 through 10, especially low-income and would-be first generation college attendees. In a television spot, characters representing each of the three school subjects are called into a steel cage, before students step in and up to the academic challenges that the characters personify. "Sign me up."

"We asked ourselves, 'What kid doesn't like a challenge?'" said Shawn Gauthier, a vice president and creative director for the New York ad agency Publicis USA, which created the advertisements on a pro bono basis. "When they're playing video games, they're taking on different characters and we wanted to borrow from that mentality."

The four-phase campaign, which launched in January 2007, is a joint project of the Advertising Council, the Lumina Foundation for Education and the American Council on Education. In the first year of the campaign, which focused on encouraging students to tell others that they wanted to go to college, media markets donated \$69.6 million in advertising time and space, according to ACE. The campaign's resource-rich Web site — to which the advertisement directs viewers — attracted more than half a million visits.

The new ads will be distributed to 33,000 media outlets, and about 820,000 brochures have been distributed through a partnership with the U.S. Department of Education.



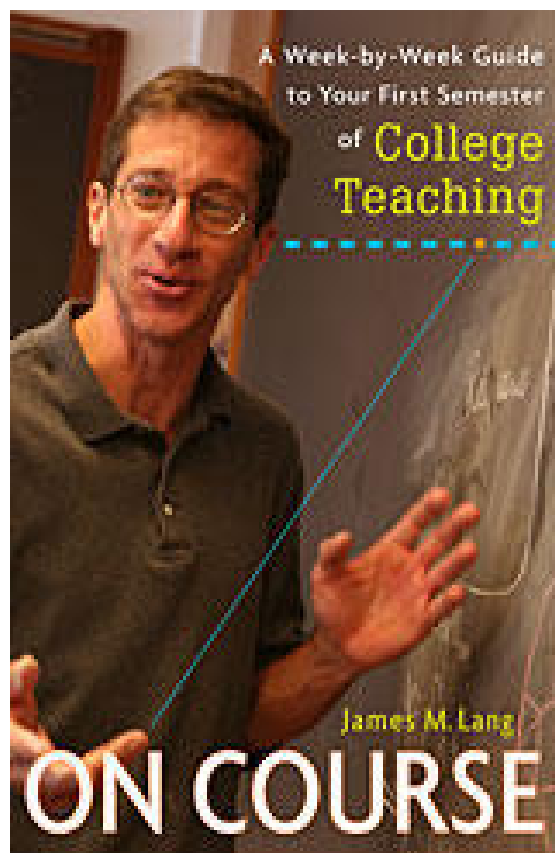
“They’re entertaining but they send a real, solid message,” Molly Corbett Broad, ACE’s president, said of the new ads. “This really is an important message that we have not been giving to 8th through 10th graders in the past. We have not said to them directly that in order to be college-ready and be admissible to college you have to take the tough courses.”

“This is definitely not the image that my generation would have imagined, but I think it is aimed directly at the digital native generation. These characters now have MySpace pages, they’re on YouTube, they have fan pages on Facebook. They are part of the culture,” Broad said.

And does she, an economist, have a favorite character? Why, Algebra II.

— Elizabeth Redden

*The original story and user comments can be viewed online at
<http://insidehighered.com/news/2008/05/14/adcampaign>.*

‘On Course’: New Guide to First Semester of Teaching

A frequent refrain of new faculty members, fresh from graduate school, is that earning a Ph.D. didn't train them to lead a course. A new book — *On Course: A Week-by-Week Guide to Your First Semester of College Teaching* (Harvard University Press) — aims to help such professors. The author is James M. Lang, an associate professor of English at Assumption College and former assistant director of the Searle Center for Teaching Excellence at Northwestern University. Lang responded to a series of questions about his new book.

Q: One of the first topics you discuss is attire and the instructor-student relationship. What's your advice and how do these topics relate?

A: The main function that I think attire can play in the classroom is to help define the relationship between instructor and student. Excessively casual dress implies that you're (trying to be) not much different from the students, and that your classroom is more of a level playing field; if you're up there in a three-piece suit, by contrast, and they're all in jeans and T-shirts, you are making it clear that you are holding the scepter.

One of the first challenges that new instructors will face — and especially new instructors who are close in age to their students — will be to define a clear boundary between themselves and their students, and to establish that they ultimately are responsible for what happens in the room, as well as for the grades that conclude the semester. For that reason, I would suggest that new instructors choose a minimum attire



of business casual. Anything shy of that, in my opinion, may compromise the authority of a new teacher in the classroom, and potentially encourage students into behaviors that disrupt learning.

However, for folks who have been teaching for a few years, and who are comfortable and confident in their authority in the classroom, I don't think attire makes that much of a difference. I've been wearing jeans and a collared shirt to class every day now for many years. Sometimes I even wash them.

Q: You write a lot about the importance of variety — in lectures, assignments, etc. Why is this so important? Is this difficult for people who see themselves as having a particular lecturing style or strength?

A: Most academics can easily point out hasty generalizations when they appear in arguments in their disciplines, but then seem to have a blind spot for this logical fallacy when it comes to their teaching. In other words, while they would never argue that one experiment establishes a truth about the universe, they operate in the classroom as if their one experience as a student has established the correct way to teach. So if they learned best by reading and listening to lectures, they assign lots of reading and give lectures.

But of course while they were hungrily lapping up lectures, the student next to them was bored to tears, desperately hoping for a chance to speak with his peers or the instructors. So I always suggest that instructors need to move beyond whatever worked for them in the classroom, and continue to experiment with new teaching styles, and vary their teaching formats. Every time you try a new format, you will lose some students and gain some. The only way to reach them all, it seems to me, is to have a range of teaching strategies that you use on a regular basis.

I would also suggest that even for a student who loves lectures, forcing that student out of her comfort zone — asking her to engage in a discussion or work with her peers — has benefits as well. That's what education is about, after all: pushing us beyond our comfortable places, and helping us see the world in new ways.

Q: In your discussion of classroom discussions that don't necessarily work, you note the factor of groggy students who may or not be prepared and/or fully awake. What are the best ways for professors to think about their students' real ability to be engaged? How do you balance empathy for students' lives with the need for a prepared classroom?

A: You should have understanding and empathy for their complicated lives outside of the classroom—students are wrestling with new freedoms, falling in and out of love, taking four other classes, dealing with family situations, etc. — but you also have to maintain your standards. If a student comes to me and says they pulled an all-nighter for another class, and therefore didn't get the reading done, I assure them that it doesn't offend me personally, and I know stuff happens — but they still have to take the quiz. Obviously when students have more serious problems outside of the classroom, I'm willing to offer other options, but I don't think we should excuse work for extracurricular activities or life events. If you sign up for the class, you have to do the work I laid out in the syllabus. I may give you some extra time, but you still have to do the work.

Q: What are the most common mistakes new professors make in grading, and how can they avoid them?

A: One very common mistake stems from great intentions—offering students too much commentary or feedback on their work. I've seen instructors who have written more on student papers than the students wrote themselves. Research on student responses to instructor feedback suggests that offering more than a couple of specific suggestions on an exam or piece of writing causes students simply to shut down and put the work aside and hope for better on the next one.



Most of us, though, want students to read our responses to their work and to learn from them, to incorporate our suggestions into their next piece of writing or exam. We can facilitate that by holding our tongues a bit — don't enumerate the 12 problems in a student's paper; identify the two or three that are most crucial, and ask them to focus on those issues in the next paper. Once they have resolved those issues, you can move on to the next two or three. This strategy not only should lead to better learning, but it should save new instructors some time as well!

Q: Your section on student ratings focuses on official evaluations. What about unofficial evaluations? Do you advise professors to check RateMyProfessors.com? Do you check out your ratings there?

A: I would advise new instructors not to look at their ratings, but this advice will probably meet with the same acceptance as the "advice" I give my 3-year old twins not to throw the ball in the house. Some things in life are impossible to resist. They're going to throw that ball, and new teachers, who of course will want to know how they are doing, are going to look at RMP.

In my opinion, RMP operates on the GIGO principle — garbage in, garbage out. The questions they ask are ill-defined and unrelated to whether or not students learn anything in a course, so the answers you get are irrelevant at best and harmful at worst. Do your best either to resist looking or to take whatever you see there with a massive grain of salt.

Q: You have a chapter on staying fresh during the course of a semester — what about a career. Based on thinking so much about the first year of teaching, what would you advise those in their 20th years?

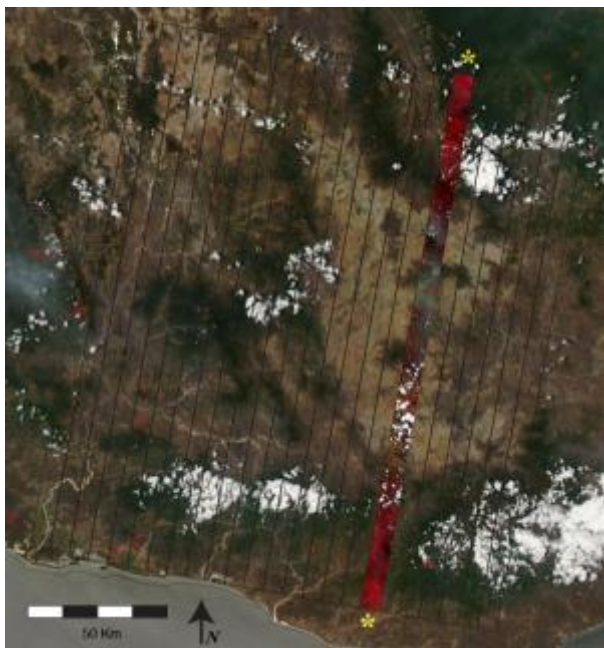
A: Become a student again. The farther away you get from the position of students, the easier it can be to fall into familiar teaching patterns and forget about whether students are learning from your teaching. The musician Tom Waits once said that, for a musician, your fingers can become like dogs on your instrument—they keep wanting to go to the same familiar places. The same is true with teachers; when you find teaching strategies that are comfortable and seem to work, you keep going back to them, even though what feels comfortable and effective to you might not seem that way to your students.

When you put yourself back into a formal teaching-learning transaction as the student, it can really force you to think about the process in a new way. In recent years I've taken a drawing class, a scuba diving class, and piano lessons. Each of those courses or lessons led to a change in what I was doing in the classroom that semester, as I saw my own teachers using strategies that either seemed very stale or very innovative to me.

— Scott Jaschik

*The original story and user comments can be viewed online at
<http://insidehighered.com/news/2008/05/14/lang>.*

Archaeologist Uses Satellite Imagery To Explore Ancient Mexico



In a novel archeological application, multi- and hyperspectral data will help build the most accurate and most detailed landscape map that exists of the southern state of Oaxaca, where the Zapotec people formed the first state-level and urban society in Mexico. (Credit: Image courtesy of Rochester Institute of Technology)

ScienceDaily (May 14, 2008) — Satellite imagery obtained from NASA will help archeologist Bill Middleton peer into the ancient Mexican past. In a novel archeological application, multi- and hyperspectral data will help build the most accurate and most detailed landscape map that exists of the southern state of Oaxaca, where the Zapotec people formed the first state-level and urban society in Mexico.

“If you ask someone off the street about Mexican archeology, they’ll say Aztec, Maya. Sometimes they’ll also say Inca, which is the wrong continent, but you’ll almost never hear anyone talk about the Zapotecs,” says Middleton, acting chair of the Department of Material Culture Sciences and professor in the Department of Sociology and Anthropology at Rochester Institute of Technology. “They had the first writing system, the first state society, the first cities. And they controlled a fairly large territory at their Zenith—250 B.C. to 750 A.D.”

The process of state formation varied across the Zapotec realm. Sometimes it involved conquest, and other times it was more economically driven. Archeologists like Middleton are interested in different aspects of society that emerged in the process, such as social stratification and the development and intensification of agriculture and economic specialization.

Middleton’s study will explore how the Oaxacan economy and environment changed as the Zapotec state grew and then collapsed into smaller city-states. Funding from NASA and National Geographic will also help Middleton build a picture of how climate and vegetation patterns have changed over time.

“For the past 4,000 years, human activities have been a factor in environmental change,” Middleton says. “And there are some parts of Mesoamerica that we have pretty good evidence that the environment we see today is the catastrophic result of ancient agricultural practices.” Middleton will focus on two sites in the Chichicapam Valley located in between two of the major arms of the central valleys of Zapotec. The National Geographic-funded portion of the study began last summer when he documented important archeological sites and selected candidates for excavation.



Imagery from Earth Observing 1 and Landsat satellites obtained over three years will help Middleton identify the natural resources found at archeological sites. He will work with colleagues John Kerekes and David Messinger along with graduate student Justin Kwon in RIT's Chester F. Carlson Center for Imaging Science to analyze the large amounts of data taken at different wavelengths of the electromagnetic spectrum. Their own research uses similar techniques to analyze urban landscapes, and inspired Middleton to apply the technology to archeological landscapes.

"We are excited to be collaborating with Bill in this application of remote sensing technology to archaeological study," says Kerekes. "This project shows a true strength of RIT with an environment that allows physical scientists and engineers like us to easily work together with a social scientist like Bill."

Adds Messinger: "Applications of remote sensing have long been a motivating factor for our technology work in the field of remote sensing, and the chance to work closely with an end-user here at RIT is a fantastic opportunity for our students and faculty. By learning more about how the technology can help in this application, we will be in a much better position to guide our future sensor development and algorithmic research."

The technology works by differentiating materials on the ground on the basis of reflected light. Objects that look the same in visible light may have very different reflective properties when sampled across the spectrum.

"When you put the data back together as a picture you begin to see things you couldn't see before, and you can make distinctions that to your eyes look the same," Middleton says.

Satellite imagery covering more than 30,000 square kilometers will help Middleton identify different plant species, environments and ecosystems, and acres of arable land or mineral resources surrounding particular sites.

"We can start looking at the relationship between ancient cities and ancient human settlements in a way that no one has really been able to do before," Middleton says.

The new landscape map will also show how development has changed the region since the first survey conducted 30 years ago.

"We will be able to compare the then-and-now images and be able to make a very good assessment of what we have lost in the past several decades as a result of development," Middleton says.

Another aspect of the NASA-funded project will focus on environmental change. This part of the study, done in conjunction with colleagues at the University of Colorado at Boulder will analyze plant microfossils in sediment samples collected from a variety of locations, including areas where streams expose sediment layers 10,000 years old.

"Roughly 10,000 years ago, Oaxaca was wetter than it is today," Middleton says. "Today it's classified as semi-arid, and the dominant vegetation in the valley is thorn-scrub forest. Ten thousand years ago, it was a grassland and there were horses there."

Adapted from materials provided by Rochester Institute of Technology.

<http://www.sciencedaily.com/releases/2008/05/080513112348.htm>





Satellite Communications By Laser Looks Promising

ScienceDaily (May 14, 2008) — Satellites currently use radio waves to exchange data. Now the data rate has been increased a hundredfold by using lasers instead of radio signals. Two test satellites each carried a diode laser pump module developed with the help of Fraunhofer researchers.

The data whizzed back and forth at the speed of light between German satellite TerraSAR-X and US satellite NFIRE, covering more than 5000 kilometers in space without any errors. What was special about this space test recently performed by Tesat-Spacecom was that the data was transmitted by laser. The bandwidth achieved in the test was a hundred times greater than during conventional communication by radio waves, enabling a data rate equivalent to roughly 400 DVDs per hour.

This could make it possible to transmit large data packets between several satellites in the future, for instance to send image data from Earth observation satellites to a ground station. That has not been possible until now, as the bandwidth of radio waves is not large enough. Another advantage of this new form of communication is that lasers are easier to focus than radio waves, which means that data transmissions can be directed more accurately.

The communication lasers on board the satellite are actuated by pump modules, which were developed to a large extent by researchers at the Fraunhofer Institute for Laser Technology ILT in Aachen on behalf of Tesat GmbH & Co. KG as part of a program financed by the German Aerospace Center (DLR). “The modules have to withstand the vibrations and forces of acceleration on board the satellites during the launch and must then survive the inhospitable conditions in space – such as extreme radiation and strong temperature differences,” says Martin Traub, who led the developments at the ILT.

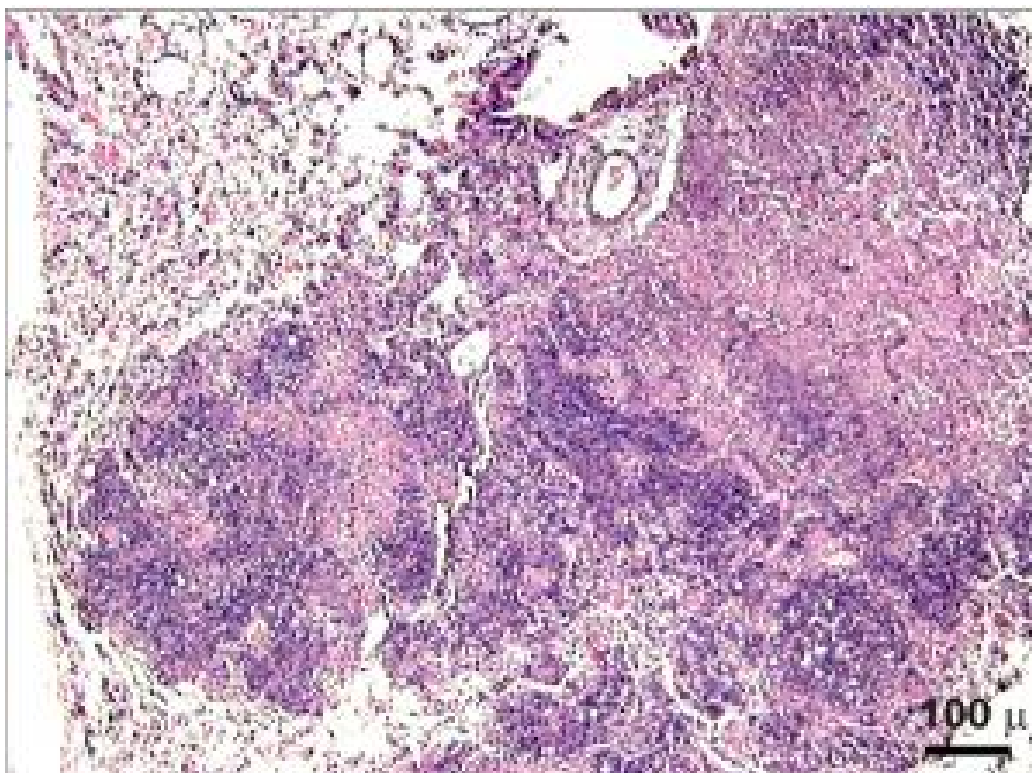
“We therefore tested the pump modules under extreme conditions in advance, subjecting them to temperatures of -35°C to 60°C, acceleration forces 1300 times as strong as those of the Earth, and gamma rays.”

The modules mustn't be too big or too heavy for use in space: Measuring 5 x 5 x 2 centimeters, they are barely larger than a matchbox, and weigh little more than a bar of chocolate at 130 grams. “We achieved this minimal weight by selecting the right materials and a sophisticated housing: Any material that wasn't absolutely essential was milled away,” says Traub. The major challenge is that, despite the reduced weight, the heat generated by the laser's several-watt output still has to be dissipated.

Adapted from materials provided by Fraunhofer-Gesellschaft.

<http://www.sciencedaily.com /releases/2008/05/080513104004.htm>

Air Pollution, Smoking Affect Latent Tuberculosis



TB lung lesions stained to show CO fingerprint biology. (Credit: UAB)

ScienceDaily (May 14, 2008) — A toxic gas present in air pollution and tobacco smoke plays a significant role in triggering tuberculosis infection, according to a new study from researchers at the University of Alabama at Birmingham (UAB).

The UAB study focused on carbon monoxide (CO), a colorless, odorless gas present in tobacco smoke, and vehicle and manufacturing plant emissions. Also, CO is produced naturally in brushfires and volcanic gas.

The study showed that CO triggers *Mycobacterium tuberculosis* (Mtb), the causative agent of tuberculosis, to shift from active infection to a drug-resistant dormant state. This is called latency, a global problem that results in tuberculosis escaping detection and treatment, and which contributes to overall tuberculosis transmission.

"This is the first description of a role for CO in mycobacterial pathogenesis, and may explain why smoking and air pollution contributes to TB," said Adrie Steyn, Ph.D., assistant professor in UAB's Department of Microbiology and lead author on the study.*

In the study, the researchers worked with Mtb cells under biosafe laboratory conditions and found Mtb proteins 'sense' CO at the molecular level, much like the bacteria's proteins sense other gases in the lungs. The CO interaction is what led to a series of biological steps that sent Mtb into latency.

The finding holds political and social implications for speeding up clean-air measures as a way to improve public health, in addition to the environmental significance. The study holds promise for helping to discover new ways to fight extreme drug-resistant tuberculosis, or XDR TB, the UAB researchers said.



"We're talking about huge socio-economic and public health implications," said Steyn. One third of the world's population is infected with undetectable forms of tuberculosis, which hinders screening and eradication efforts.

The finding adds to a growing understanding that exposure to high levels of CO through air pollution and cigarette smoke plays a role in tuberculosis infection rates. Also, the study showed that low levels of CO present in the body are capable of triggering tuberculosis latency, Steyn said. Inflammation, infection and oxidative stress are among contributors to CO in the body.

Research published by Steyn in 2007 showed that combined production of CO, oxygen and nitric oxide should be used in future models of Mtb persistence.

Tuberculosis is the leading cause of death in the world from a single bacterial infection, and it kills 1.5 million people per year. The rate of infection in Alabama is slightly lower than the United States. Tuberculosis infection rate: 4.3 (Alabama) per 100,000 people compared to 4.6 (U.S.) per 100,000 people.

*The findings were published online in The Journal of Biological Chemistry.

Adapted from materials provided by University of Alabama at Birmingham.

<http://www.sciencedaily.com/releases/2008/05/080513101721.htm>

Designing Bug Perception Into Robots



SPARK Robots Optimised Image. (Credit: Image courtesy of ICT Results)

ScienceDaily (May 13, 2008) — Insects have provided the inspiration for a team of European researchers seeking to improve the functionality of robots and robotic tools.

The research furthers the development of more intelligent robots, which can then be used by industry, and by emergency and security services, among others. Smarter robots would be better able to find humans buried beneath the rubble of a collapsed building, for example.

The EU-funded SPARK project set out to develop a new robot control architecture for roving robots inspired by the principles governing the behaviour of living systems and based on the concept of self-organisation.

Basing their work on the basic functions of the insect brain, the team developed a new architecture for artificial cognitive systems that could significantly increase the ability of robots to react to changing environmental conditions and to ‘learn’ behaviour in response to external stimuli.

The research team calls their new software architecture a spatial-temporal array computer based structure (SPARC).

Robots are complex systems that rely on software, hardware and mechanical systems all working together. One of the challenges facing researchers is to develop robots, or moving artefacts, that are capable of several different behaviours, that are able to sense or perceive external signals and, most importantly, are able to ‘learn’ and react appropriately to changing conditions.



For example, a robot travelling over unknown terrain may need to adapt its way of moving depending on whether it is navigating flat, rocky or wet ground. Or it may need to modify its course to reach a defined target.

The objective is to enable a robot to do this without human intervention, based on its own powers of perception and ability to adapt.

Powers of perception

Within the SPARC software architecture, the robot's powers of perception are enhanced by its ability to use information derived from visual, audio and tactile sensors to form a dynamically evolving pattern. The pattern is in turn used to determine the movements of the device.

The researchers' technical objective was to produce a moving artefact able to actively interact with its environment to carry out a set task.

The research so far has already provided a new theoretical framework, or paradigm, for active robot perception. The paradigm is based on principles borrowed from psychology, synergetics, artificial intelligence and non-linear dynamical systems theory.

Learning as you go

One of the researchers' central objectives was to develop a machine with the ability to build knowledge independent of human control. Researchers based the proposed architecture for artificial cognitive systems on the basic building blocks of the insect brain.

"The SPARC architecture is a starting step toward emulating the essential perception-action architecture of living beings, where some basic behaviours are inherited, like escaping or feeding, while others are incrementally learned, leading to the emergence of higher cognitive abilities," notes Paolo Arena, the project coordinator.

The cognitive system allows the device to autonomously 'learn' based on a combination of basic reflexive behaviours and feedback from external environmental data.

Once the robot is assigned a mission, compatible with its structural and mechanical capabilities – for example 'find people alive' – it is able to work out how best to do this itself in a particular external context.

"The robot will initially behave by using primarily the basic inherited behaviours," says Arena. "Higher knowledge will be incrementally formed in the higher layer of the architecture, which is a neuron lattice based on the Reaction-Diffusion Cellular Non-linear Network (RD-CNN) paradigm, able to generate self-organising dynamic patterns."

Basic behaviours incorporated in the demonstrations so far include, for example, the ability of a robot to direct itself towards a specific sound source. This optomotor reflex allows the robot to maintain heading and avoid obstacles.

During the course of the demonstration, the robot 'learns' how to safely reach the sound source. This it does while it is properly modulating its basic behaviours so it does not become trapped into the deadlock situations that are typical of complex and dynamically changing environments.

Next steps



The project's experimental robots used some of the partners' technologies, such as the real-time visual processing features of the Eye-RIS vision system, one of the lead products of Spain-based Innovaciones Microelectrónicas (Anafocus).

The project also attracted the interest of other commercial enterprises, including STMicroelectronics, which provided components and boards for Rover II, one of the robots developed by SPARK.

Altera, another company, supplied field-programmable gate array (FPGA) devices for the development and implementation of perceptual algorithms.

The advances made have led to a number of software and hardware innovations for the improvement of machine perception. The project's industrial partners are continuing to work on the innovations.

The cognitive visual algorithms designed and improved by the project's researchers have, for example, already been integrated into products produced by some of the project's partners.

Hungary-based Analogic Computers, a partner in the project, has launched its InstantVision software package based on some of the research. The package has become one of the company's lead products.

The work of the SPARK project is continuing with the SPARK II project, which will look more deeply into the details of insect brain neurobiology to refine, assess and generalise the SPARK cognitive architecture.

Further down the line, the research is expected to lead to the introduction of powerful and flexible machines suitable for use in dynamically changing environments where conditions are unstable or unpredictable, such as war zones or disaster areas.

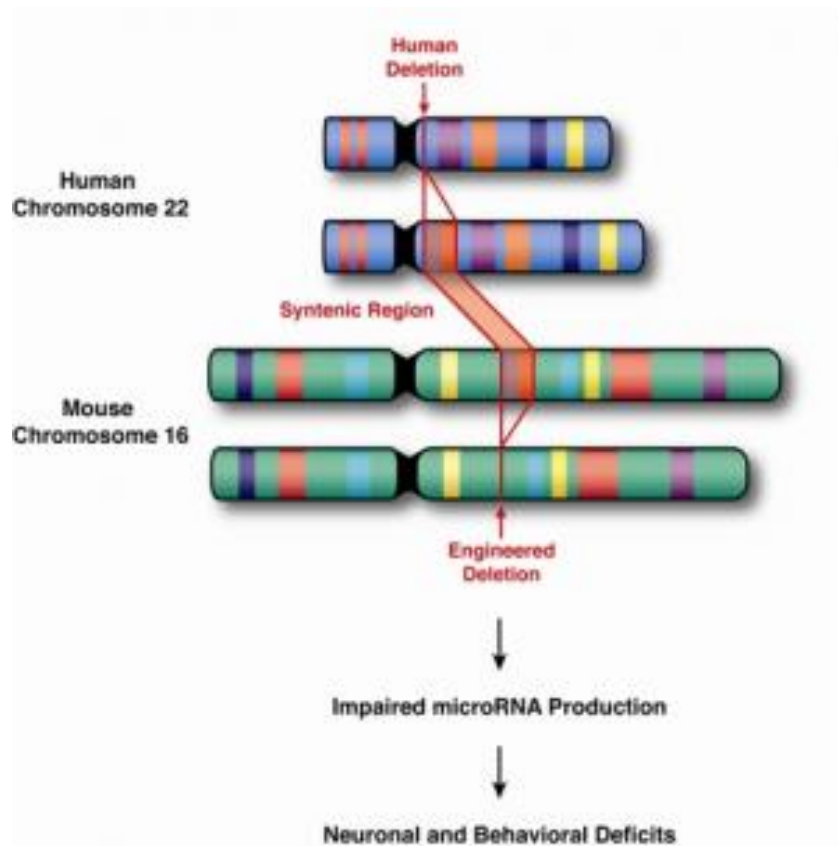
The project has introduced a new model for action-oriented perception. Ongoing work will focus on assessing this model and on expanding it to a larger family of moving machines.

The SPARK project received funding from the EU's Sixth Framework Programme for research.

Adapted from materials provided by [ICT Results](#).

from <http://www.sciencedaily.com/releases/2008/05/080512141718.htm>

Digging Deeper Into The Genetics Of Schizophrenia By Evaluating MicroRNAs



Shown here is human chromosome 22 and the piece of the chromosome missing in some patients with schizophrenia. Loss of this chromosomal piece (22q11) is the only known recurrent copy number mutation associated with schizophrenia. The corresponding region on mouse chromosome 16 is indicated along with the position of the engineered deletion in the mouse model. The engineered deletion results in alterations in microRNA production and as a result neuronal and behavioral deficits. (Credit: Copyright 2008, Columbia University Medical Center)

ScienceDaily (May 13, 2008) — Researchers at Columbia University Medical Center have illuminated a window into how abnormalities in microRNAs, a family of molecules that regulate expression of numerous genes, may contribute to the behavioral and neuronal deficits associated with schizophrenia and possibly other brain disorders.

In the May 11 issue of *Nature Genetics*, Maria Karayiorgou, M.D., professor of psychiatry, and Joseph A. Gogos, M.D., Ph.D., associate professor of physiology and neuroscience at Columbia University Medical Center explain how they uncovered a previously unknown alteration in the production of microRNAs of a mouse modeled to have the same chromosome 22q11.2 deletions previously identified in humans with schizophrenia.

"We've known for some time that individuals with 22q11.2 microdeletions are at high risk of developing schizophrenia," said Karayiorgou, who was instrumental in identifying deletions of 22q11.2 as a primary risk factor for schizophrenia in humans several years earlier. "By digging further into this chromosome, we have been able to see at the gene expression level that abnormalities in microRNAs can be linked to the behavioral and cognitive deficits associated with the disease."



The investigators modeled mice to have the same genetic deletion as the one observed in some individuals with schizophrenia and examined what happens in the expression of over 30,000 genes in specific areas of the brain. When they discovered that the gene family of microRNAs was affected, they suspected that the Dgcr8 gene was responsible. The Dgcr8 gene is one of the 27 included in the 22q11.2 microdeletion and has a critical role in microRNA production, so this was a logical hypothesis. Indeed, when they produced a mouse deficient for the Dgcr8 gene, and tested it on a variety of cognitive, behavioral and neuroanatomical tests, they observed the same deficits often observed in people with schizophrenia.

"Our studies show that alterations in microRNA processing result in synaptic and behavioral deficits," said Dr. Gogos. Drs. Karayiorgou and Gogos have partnered together to decipher the role of individual genes from 22q11.2 in the development of schizophrenia by using human genetics and animal model approaches.

The significance of this work is that it implicates a completely novel, previously unsuspected group of susceptibility genes and brings investigators a step closer to understanding the biological mechanisms of this disorder. Implication of such a large family of genes (the most recent estimate puts the number of human microRNAs at at least 400 that influence the expression of as many as a third of all genes) could partly account for the genetic complexity associated with this devastating disorder and explain some of the difficulties that the researchers have encountered in their efforts to pinpoint individual genes.

"Our hope is that the more we know about the genes involved in schizophrenia, the more targeted treatment can be," said Dr. Gogos.

"Much in the way that cancer patients who have tested for a particular gene, such as BRAC1, can be tested and then treated with protocols designed specifically for them, we want to be able to know enough about the schizophrenic brain to target treatments to individual patients."

The next step for the researchers is to find the many genes whose expression is controlled by the identified deficient microRNAs, which could in turn be involved in the pathogenesis of schizophrenia. Much more study and identification of other genetic variants must be done to further illuminate the disease's genetic underpinnings, according to Drs. Karayiorgou and Gogos.

In this study, in addition to their colleagues from Columbia, first authors Kimberly Stark and Bin Xu, as well as co-authors Wen-Sung Lai, Ruby Hsu and Hui Liu, Drs. Karayiorgou and Gogos collaborated with Anindya Bagchi and Alea Mills at Cold Spring Harbor Laboratory and Xiang Wan and Paul Pavlidis at the University of British Columbia.

This research was supported by the National Institutes of Health, the Lieber Center for Schizophrenia Research at Columbia University Medical Center, New York Academy of Sciences, a McKnight Brain Disorders Award, the National Alliance for Research on Schizophrenia and Depression, and the EJLB Foundation.

Adapted from materials provided by [Columbia University Medical Center](#).

<http://www.sciencedaily.com/releases/2008/05/080511190849.htm>

Alternative To Silicon Chip Invented By Student



Weixiao Huang and new GAN transistor. (Credit: Rensselaer Polytechnic Institute)

ScienceDaily (May 13, 2008) — Even before Weixiao Huang received his doctorate from Rensselaer Polytechnic Institute, his new transistor captured the attention of some of the biggest American and Japanese automobile companies. The 2008 graduate's invention could replace one of the most common pieces of technology in the world—the silicon transistor for high-power and high-temperature electronics.

Huang, who comes from humble roots as the son of farmers in rural China, has invented a new transistor that uses a compound material known as gallium nitride (GaN), which has remarkable material properties. The new GaN transistor could reduce the power consumption and improve the efficiency of power electronics systems in everything from motor drives and hybrid vehicles to house appliances and defense equipment.

"Silicon has been the workhorse in the semiconductor industry for last two decades," Huang said. "But as power electronics get more sophisticated and require higher performing transistors, engineers have been seeking an alternative like gallium nitride-based transistors that can perform better than silicon and in extreme conditions."

Each household likely contains dozens of silicon-based electronics. An important component of each of those electronics is usually a silicon-based transistor known as a silicon metal/oxide semiconductor field-effect transistor (silicon MOSFET). To convert the electric energy to other forms as required, the transistor acts as a switch, allowing or disallowing the flow of current through the device.

Huang first developed a new process that demonstrates an excellent GaN MOS (metal/oxide/GaN) interface. Engineers have known that GaN and other gallium-based materials have some extremely good electrical properties, much better than silicon. However, no useful GaN MOS transistor has been developed. Huang's innovation, the first GaN MOSFET of its kind in the world, has already shown world-record performance according to Huang.



In addition, Huang has shown that his innovation can integrate several important electronic functions onto one chip like never before. "This will significantly simplify entire electronic systems," Huang said. Huang has also designed and experimentally demonstrated several new novel high-voltage MOS-gated FETs which have shown superior performance compared to silicon MOSFET in terms of lower power consumption, smaller chip size, and higher power density.

The new transistors can greatly reduce energy loss, making energy conversion more efficient. "If these new GaN transistors replaced many existing silicon MOSFETs in power electronics systems, there would be global reduction in fossil fuel consumption and pollution," Huang said.

The new GaN transistors can also allow the electronics system to operate in extremely hot, harsh, and high-power environments and even those that produce radiation. "Because it is so resilient, the device could open up the field of electronic engineering in ways that were not previously possible due to the limitations imposed by less tolerant silicon transistors," he said.

Huang has published more than 15 papers during his time as doctoral student in the Department of Electrical, Computer, and Systems Engineering at Rensselaer. Despite obvious difficulties, his parents worked tirelessly to give Huang the best possible educational opportunities according to Huang. And when school wasn't enough, Huang's father woke him up early every morning to practice mathematical calculations without a calculator, instilling in Huang a lifelong appreciation for basic, theoretical mathematics and sciences.

He received a bachelor's in electronics from Peking University in Beijing in 2001 and a master's in physics from Rensselaer in 2003. He will receive his doctorate from Rensselaer on May 17, 2008 and plans to work as a device engineer in the semiconductor industry.

Adapted from materials provided by Rensselaer Polytechnic Institute, via EurekAlert!, a service of AAAS.

<http://www.sciencedaily.com/releases/2008/05/080513112341.htm>



Beijing Game For Clean Air Challenge

ScienceDaily (May 13, 2008) — With the Olympic Games in sight, the Chinese Government is committed to improving the air quality in Beijing, and has had measures in place since 1998 which have already made a difference. However, there is still some way to go to meet national air quality standards in the Chinese capital, according to Professor Wang Wen-Xing and his team from the Chinese Research Academy of Environmental Sciences in Beijing, in the People's Republic of China.

Since the 1980s, the rapid industrial development, urbanization and increase in traffic have resulted in severe air pollution in Beijing. And with the Olympic Games around the corner, international attention has focused on the quality of the air in the capital.

Wen-Xing and colleagues measured the concentrations of well-known air pollutants in Beijing in August and September 2007, the same summer period the Olympic Games will be taking place this year, in order to get a picture of the likely air quality during the Games. They compared their results against The National Ambient Air Quality Standard. The purpose of their study was to inform measures to improve the air quality of the capital, in anticipation of the Olympic Games.

The researchers found that average daily concentrations of sulphur dioxide and carbon monoxide were lower than the National Ambient Air Quality Standard for China. Nitrogen dioxide levels met the Standard, whereas concentrations of ozone and inhalable particles were higher than the Standard. The concentrations of air pollutants were also higher at night than during the day. According to the authors, the main causes of this air pollution are vehicle emissions – in recent years, the number of cars in Beijing has increased sharply at a rate of 10-20% a year - and weather conditions, particularly dry air and lack of rain which hinder the diffusion and deposition of pollutants.

A series of measures such as reducing vehicle emissions, encouraging the use of public transport, eliminating polluting factories, and improving fuel quality have been in place since 1998 to reduce the emissions and concentrations of air pollutants in Beijing. These measures have already significantly reduced air pollution in the Chinese capital.

However, in comparison to other Olympic sites around the world, including Helsinki and Los Angeles, “Beijing’s air quality needs to improve” says Wen-Xing. He concludes that the Chinese Government is committed to reducing the air pollution in Beijing further, for cleaner air in time for the Games this summer.

Journal reference:

1. Wen-Xing W et al (2008). Study on ambient air quality in Beijing for the summer 2008 Olympic Games. *Air Quality, Atmosphere & Health*; DOI [10.1007/s11869-008-0003-1](https://doi.org/10.1007/s11869-008-0003-1)

Adapted from materials provided by Springer.

[http://www.sciencedaily.com /releases/2008/05/080513101634.htm](http://www.sciencedaily.com/releases/2008/05/080513101634.htm)

Treatment For Severe Blood Loss: Less Is More



Intravenous administration of isotonic fluids is the standard emergency treatment in the U.S. for patients with severe blood loss, but UC San Diego bioengineering researchers have reported improved resuscitation with a radically different approach. (Credit: Image courtesy of UC San Diego)

ScienceDaily (May 13, 2008) — Intravenous administration of isotonic fluids is the standard emergency treatment in the U.S. for patients with severe blood loss, but UC San Diego bioengineering researchers have reported improved resuscitation with a radically different approach. Building on earlier studies in humans that have shown benefits of intravenous fluids that are eight times saltier than normal saline, the researchers combined hypertonic saline with viscosity enhancers that thicken blood. Reporting in the journal *Resuscitation*, the researchers describe dramatic increases in beneficial blood flows in the small blood vessels of hamsters with the combined hypertonic saline and viscosity enhancement approach. The fluid was given to animals after as much as half of their blood was removed to simulate human blood losses on the battlefield, in traffic accidents and in operating rooms.

The team led by Marcos Intaglietta, a professor of bioengineering at the Jacobs School of Engineering, reported that the new approach sharply improved the animals' functional capillary density, a key measure of healthy blood flow through tissues and organs. "Of course, trauma physicians want to get the blood flowing as soon as possible, and increasing the viscosity of blood may not make any sense to them," said Intaglietta. "However, our results are highly suggestive that increasing viscosity rather and partially restoring blood volume is a better way to increase blood flow through tissues. These findings also are consistent with recent discoveries showing that higher shear forces of more viscous blood leads to dilation of small blood vessels."

Treating blood loss is a critical medical issue because trauma is the leading cause of death among North Americans 1 to 44 years old. Whether injured on the freeway or wounded in battlefield, loss of 40 percent or more of a patient's blood is immediately life-threatening. Physicians and emergency workers must act quickly.

The majority of trauma deaths are due to severe brain injury or a dangerous condition resulting from blood loss called hypovolemic shock. When too little blood flows through the body's organs, the heart



begins beating rapidly, the skin becomes cold and pale, blood pressure plummets, and patients exhibit mental confusion. Hypovolemic shock can progress within a matter of one or two hours to organ failure and death.

The bible of trauma physicians and emergency workers, the Advanced Trauma Life Support (ATLS) guidelines, emphasize that physicians first control bleeding and then provide limited fluid resuscitation, a strategy known as "permissive hypotension" until control of hemorrhage is obtained. The ATLS guidelines, developed by the American College of Surgeons and adopted in more than 30 countries, were modified to lower the volume of isotonic fluids given after several studies demonstrated that sudden increases in blood pressure (without immediate bleeding control) would "pop" clots that the body forms to control bleeding. Over several decades, studies involving humans and animals have evaluated hypertonic saline (up to 7.5 percent sodium chloride) versus isotonic saline (0.9 percent sodium chloride). Given intravenously, hypertonic solutions act like magnets, drawing fluid from tissues into the bloodstream, thereby increasing blood volume. Such hypertonic saline has not received the approval of the Food and Drug Administration for clinical use in the United States. Therefore, it is not part of ATLS guidelines.

However, several medical research teams, including one led by Dr. Raul Coimbra, professor of surgery and chief, Division of Trauma, Surgical Critical Care and Burns at UC San Diego Medical Center, have investigated the effects of hypertonic saline for almost 20 years. "Our level-1 trauma center at UC San Diego is participating in a study of hypertonic saline as part of a multicenter trial sponsored by the National Institutes of Health," said Coimbra. "Unfortunately, it will take us two to three more years to finish the trial and determine whether hypertonic saline is superior to conventional isotonic resuscitation." In Intaglietta's study with hamsters in the Jacobs School of Engineering's Department of Bioengineering, 90 minutes after hypertonic saline was given to blood-depleted hamsters about 30 percent of normal flow was reconstituted through skin arterioles, tiny branches of arteries that lead to the even smaller capillaries. The bioengineering researchers quantified blood flow with special microscopic procedures. In blood-depleted hamsters given both hypertonic saline and a small volume of a commercially available viscosity enhancer called Hextend®, blood flow through arterioles improved to 40 percent of normal. When the hypertonic saline, Hextend®, and a small volume of another viscosity enhancer called alginate were given, arteriole blood flow improved to 55 percent of normal. Hextend® and alginate are plasma volume expanders, substances transfused to maintain the fluid volume of blood.

"Our findings suggest that elevating the viscosity of blood after severe blood loss is beneficial in resuscitation," said Intaglietta. "In fact, our studies indicate that Hextend and similar plasma extenders could produce even greater benefit if they were formulated with higher viscosities." Arterioles regulate blood flow by constricting and dilating. A variety of factors in the body influence the process, including the viscosity of plasma, the fluid portion of blood. For example, higher viscosity plasma causes arterioles to dilate. "For centuries, dating back to the time of the early Greeks, the idea has always been that blood is thick, so the sick should be treated by bleeding in order to thin the blood," said Intaglietta. "Even as late as World War II and the Vietnam War, it was thought that adding isotonic fluids to replace blood lost on the battlefield would be good because it lowered blood viscosity, making it easier for the heart to pump."

Intaglietta said that while more research is needed, "Our findings and others suggest that the ATLS guidelines need to be modified."

"Studies such as Intaglietta's are important because it uses not only hypertonic saline," said Coimbra, "but also other adjuncts which may increase the effects of hypertonic saline in treating those patients and in advancing our knowledge about shock resuscitation."

Adapted from materials provided by UC San Diego.

<http://www.sciencedaily.com/releases/2008/05/080512174547.htm>



Hot Climate Could Shut Down Plate Tectonics



New findings may explain why Venus (shown above using radar to peer through Venus' thick clouds and map the planet's surface) evolved differently from Earth. (Credit: NASA/JPL)

ScienceDaily (May 13, 2008) — A new study of possible links between climate and geophysics on Earth and similar planets finds that prolonged heating of the atmosphere can shut down plate tectonics and cause a planet's crust to become locked in place.

"The heat required goes far beyond anything we expect from human-induced climate change, but things like volcanic activity and changes in the sun's luminosity could lead to this level of heating," said lead author Adrian Lenardic, associate professor of Earth science at Rice University. "Our goal was to establish an upper limit of naturally generated climate variation beyond which the entire solid planet would respond."

Lenardic said the research team wanted to better understand the differences between the Earth and Venus and establish the potential range of conditions that could exist on Earth-like planets beyond the solar system. The team includes Lenardic and co-authors Mark Jellinek of the University of British Columbia in Vancouver and Louis Moresi of Monash University in Clayton, Australia. The research is available online from the journal *Earth and Planetary Science Letters*.

The findings may explain why Venus evolved differently from Earth. The two planets are close in size and geological makeup, but Venus' carbon dioxide-rich atmosphere is almost 100 times more dense than



the Earth's and acts like a blanket. As a result, Venus' surface temperature is hotter than that of even Mercury, which is twice as close to the sun.

The Earth's crust -- along with carbon trapped on the oceans' floors -- gets returned to the interior of the Earth when free-floating sections of crust called tectonic plates slide beneath one another and return to the Earth's mantle. The mantle is a flowing layer of rock that extends from the planet's outer core, about 1,800 miles below the surface, to within about 30 miles of the surface, just below the crust.

"We found the Earth's plate tectonics could become unstable if the surface temperature rose by 100 degrees Fahrenheit or more for a few million years," Lenardic said. "The time period and the rise in temperatures, while drastic for humans, are not unreasonable on a geologic scale, particularly compared to what scientists previously thought would be required to affect a planet's geodynamics."

Conventional wisdom holds that plate tectonics is both stable and self-correcting, but that view relies on the assumption that excess heat from the Earth's mantle can efficiently escape through the crust. The stress generated by flowing mantle helps keep tectonic plates in motion, and the mantle can become less viscous if it heats up. The new findings show that prolonged heating of a planet's crust via rising atmospheric temperatures can heat the deep inside of the planet and shut down tectonic plate movement.

"We found a corresponding spike in volcanic activity could accompany the initial locking of the tectonic plates," Lenardic said. "This may explain the large percentage of volcanic plains that we find on Venus."

Venus' surface, which shows no outward signs of tectonic activity, is bone dry and heavily scarred with volcanoes. Scientists have long believed that Venus' crust, lacking water to help lubricate tectonic plate boundaries, is too rigid for active plate tectonics.

Lenardic said one of the most significant findings in the new study is that the atmospheric heating needed to shut down plate tectonics is considerably less than the critical temperature beyond which free water could exist on the Earth's surface.

"The water doesn't have to boil away for irrevocable heating to occur," Lenardic said. "The cycle of heating can be kicked off long before that happens. All that's required is enough prolonged surface heating to cause a feedback loop in the planet's mantle convection cycle."

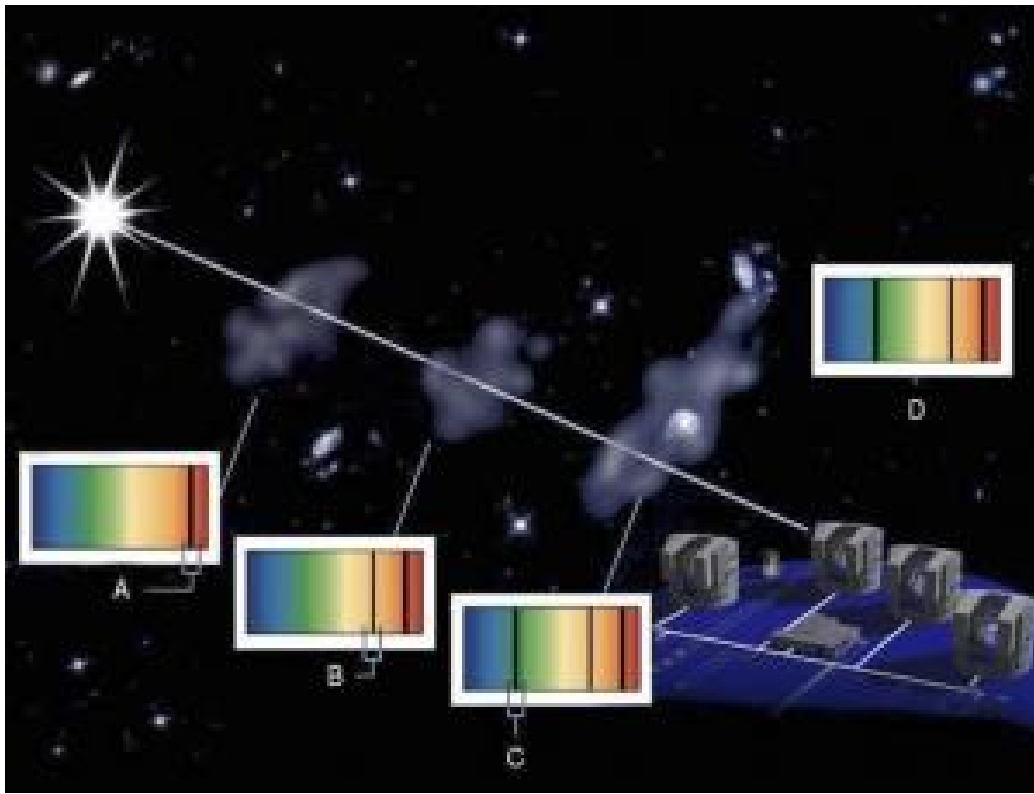
The research was supported by the National Science Foundation and the Canadian Institute for Advanced Research.

Adapted from materials provided by [Rice University](#), via [EurekAlert!](#), a service of AAAS.

<http://www.sciencedaily.com/releases/2008/05/080512135102.htm>



A Molecular Thermometer For The Distant Universe



Well-hidden galaxies can be discovered through the imprint their interstellar gas leave on the spectrum of an even more remote quasar. Interstellar clouds of gas in galaxies, located between the quasars and us on the same line of sight, absorb parts of the light emitted by the quasars. The resulting spectrum consequently presents dark 'valleys' that can be attributed to well-known elements and possibly molecules. In this schematic representation, the VLT observes (D) the features associated with three systems, located at different distances (A, B, and C), and whose light is therefore shifted by different amounts. The quasar, which acts as a beacon, is the bright object at the left of the image. (Credit: Image courtesy of ESO)

ScienceDaily (May 13, 2008) — Astronomers have made use of ESO's Very Large Telescope to detect for the first time in the ultraviolet the carbon monoxide molecule in a galaxy located almost 11 billion light-years away, a feat that had remained elusive for 25 years. This detection allows them to obtain the most precise measurement of the cosmic temperature at such a remote epoch.

The team of astronomers ^[1] aimed the UVES spectrograph on ESO's VLT for more than 8 hours at a well-hidden galaxy whose light has taken almost 11 billion years to reach us, that is about 80% of the age of the Universe.

The only way this galaxy can be seen is through the imprint its interstellar gas leaves on the spectrum of an even more remote quasar ^[2]. "Quasars are here only used as a beacon in the very distant Universe. Interstellar clouds of gas in galaxies, located between the quasars and us on the same line of sight, absorb parts of the light emitted by the quasars. The resulting spectrum consequently presents dark 'valleys' that can be attributed to well-known elements and possibly molecules," explains Raghunathan Srikanand (Pune, India), who led the team making the observations.

Thanks to the power of the VLT and a very careful selection of the target - the target was selected among about ten thousands quasars - the team was able to discover the presence of normal and deuterated



molecular hydrogen (H₂, HD) and carbon monoxide (CO) molecules in the interstellar medium of this remote galaxy. "This is the first time that these three molecules have been detected in absorption in front of a quasar, a detection that has remained elusive for more than a quarter century," says Cédric Ledoux (ESO), member of the team. The same team had already broken the record for the most distant detection of molecular hydrogen in a galaxy that we see as it was when the Universe was less than 1.5 billion years old (see ESO 16/06). The interstellar gas is the reservoir from which stars form and, as such, is an important component of galaxies. Furthermore, because the formation and the state of molecules are very sensitive to the physical conditions of the gas, which in turn depend on the rate at which stars are formed and their influence, the detailed study of the chemistry of the interstellar medium is an important tool to understand how galaxies form.

Based on their observations, the astronomers showed that the physical conditions prevailing in the interstellar gas in this remote galaxy are similar to what is seen in our Galaxy, the Milky Way. But most importantly, the team was able to measure with the best ever precision the temperature of the cosmic background radiation in the remote Universe^[3]. "Unlike other methods, measuring the temperature of the cosmic background using the CO molecule involves very few assumptions," declares co-author Pasquier Noterdaeme. If the Universe was formed in a 'Big Bang', as most astrophysicists infer, the glow of this primeval fireball should have been warmer in the past. This is exactly what is found by the new measurements. "Given the current measured temperature of 2.725 K, one would expect that the temperature 11 billion years ago was about 9.3 K," says co-author Patrick Petitjean. "Our unique set of VLT observations allows us to deduce a temperature of 9.15 K, plus or minus 0.7 K, in excellent agreement with the theory." "We believe our analysis pioneers interstellar chemistry studies at high redshift and demonstrates that it is possible, together with the detection of other molecules such as HD or CH, to use interstellar chemistry to tackle important cosmological issues," adds Srianand.

Notes

[1] The team is composed of Raghunathan Srianand (IUCAA, Pune, India), Pasquier Noterdaeme and Cédric Ledoux (ESO), and Patrick Petitjean (IAP, France). The same team already made the first measurement of the temperature of the cosmic microwave background radiation, at a time when the Universe was only about 2.5 billion years old, also using UVES on the VLT (see ESO 27/00). At that time, they could only measure a temperature in the range between 6 and 14 K. [2] Quasars are extraordinarily luminous objects in the distant Universe, thought to be powered by supermassive black holes at the heart of galaxies. A single quasar could be a thousand times brighter than an entire galaxy of a hundred billion stars, and yet this remarkable amount of energy originates from a volume smaller than our Solar System.

[3] One of the fundamental predictions of the Hot Big Bang theory for the creation of the Universe is the existence of the Cosmic Microwave Background Radiation (CMBR). This relic radiation of the primeval fireball was discovered in 1964 by means of radio observations by American physicists Arno A. Penzias and Robert W. Wilson, who were rewarded with the Nobel Prize in 1978. Precision measurements by the COBE and WMAP satellites later showed that this ancient radiation fills the Universe, with a present-day temperature of slightly less than 3 degrees above absolute zero (2.725 K [Kelvin], or -270.4 °C). A particular prediction of the Big Bang theory is that the Universe cools when expanding, the temperature scaling with the dilution factor of the Universe (1 + redshift). At the redshift of the galaxy (2.41837), one would thus expect a temperature of $2.725 \times (1 + 2.41837) = 9.315$ K or -263.835 degree Celsius.

Adapted from materials provided by ESO.

<http://www.sciencedaily.com/releases/2008/05/080512191135.htm>





Nearly One-third Of All Inexpensive Earrings Examined Tested Positive For Nickel

ScienceDaily (May 13, 2008) — For the estimated 82 percent of women with pierced ears, earrings are an important fashion accessory that many women wear, and change, daily. However, a new study suggests that women may be getting more than they bargained for when purchasing inexpensive earrings. Nickel exposure from these earrings is a common cause of dermatitis on the earlobes and repeated exposure can make treatment difficult.

Dermatologist Howard I. Maibach, MD, FAAD, professor of dermatology at the University of California, San Francisco, has presented evidence that nickel exposure from inexpensive earrings purchased from various stores and vendors is frequent in the United States and does not correlate with the price of the earrings within the "inexpensive" price range.

“Sensitization to nickel is quite common in the United States, with studies estimating that 5.8 percent of American adults tested positive to nickel allergy through a routine skin test,” said Dr. Maibach. “In the early 1990s, the European Union Nickel Directive was passed in an effort to decrease the prevalence of nickel sensitization in consumer and occupational products in Europe, with results indicating the directive is working. However, no such regulations exist in the United States to limit nickel exposure – leaving millions of people at risk for dermatitis from common goods, such as earrings.”

For the study, Dr. Maibach and his collaborator, Jacob Pontoppidan Thyssen, MD, purchased inexpensive earrings from 34 different stores and artists in San Francisco in October 2007. Inexpensive earrings were classified as those under \$50; in contrast, expensive earrings were classified as those made of gold or platinum available from fine jewelry stores. A total of 277 earrings were purchased from four different categories of vendors – a downtown market with licensed local artists producing custom-made jewelry; jewelry stores in China Town targeting mainly tourists; national and international clothing and accessory chain stores targeting mainly girls and women under age 40; and similar stores targeting mainly women over age 40.

All earrings purchased were examined with the dimethylglyoxime (DMG) test – a routine spot test using solutions to detect the presence of nickel and other alloys. Of the 277 earrings that were tested, 85 (or 30.7 percent) demonstrated at least one spot that tested DMG-positive for nickel. Dr. Maibach noted that the highest proportion of DMG-positive earrings was purchased from local artists, with 69 percent of these earrings testing positive for nickel. A large portion (42.9 percent) of earrings purchased from stores in China Town also tested positive for nickel.

When the number of DMG-positive earrings was examined from accessory and clothing stores targeting younger women under age 40 and those stores targeting women over age 40, Dr. Maibach found a large discrepancy. Specifically, 24.1 percent of the earrings purchased at the stores targeting younger women tested positive for nickel; whereas only 1.7 percent of earrings from stores targeting women over 40 tested DMG positive.

“Except for one store targeting girls and young women where a significant number of DMG-positive earrings were found, the proportion of earrings that tested positive for nickel was generally higher among individual China Town stores and local artists than in individual national and international chain stores,” said Dr. Maibach. “We also found no correlation between the country where the earrings were manufactured and the frequency of DMG-positive reactions or whether the price of the inexpensive earrings correlated with testing positive for nickel exposure.”

Dr. Maibach added that in one accessory store, none of the 44 earrings priced between \$5 and \$8 were DMG positive, whereas numerous earrings priced between \$15 and \$25 in another accessory store were DMG positive.



“From our findings, we could not establish a ‘safe-limit price’ as a guide for consumers who want to avoid excessive nickel exposure when purchasing inexpensive earrings,” said Dr. Maibach. “But it’s safe to say that young customers purchasing earrings at a considerable price range in U.S. chain stores are potentially at risk of nickel exposure and sensitization.”

Studies show that nickel sensitization increases the risk of hand eczema, but Dr. Maibach argued that avoiding nickel – which is found almost everywhere – can be difficult. He acknowledged that there are some patients with nickel dermatitis who refuse to give up their jewelry, even when they know it is the cause of their condition. Since the best way to avoid nickel sensitization and subsequent dermatitis is to prevent nickel exposure, Dr. Maibach suggested the following tips:

- Look for jewelry and clothing labeled “nickel-free” or “hypoallergenic”
- Wear only stainless steel, platinum or gold jewelry if you know you are allergic to nickel
- Discontinue wearing jewelry that causes any noticeable skin irritation, such as redness or itching
- Use 1% hydrocortisone cream or ointment, which can be purchased over-the-counter, to treat nickel-induced dermatitis
- See your dermatologist if symptoms worsen or do not improve within three to five days of not wearing jewelry

Journal reference:

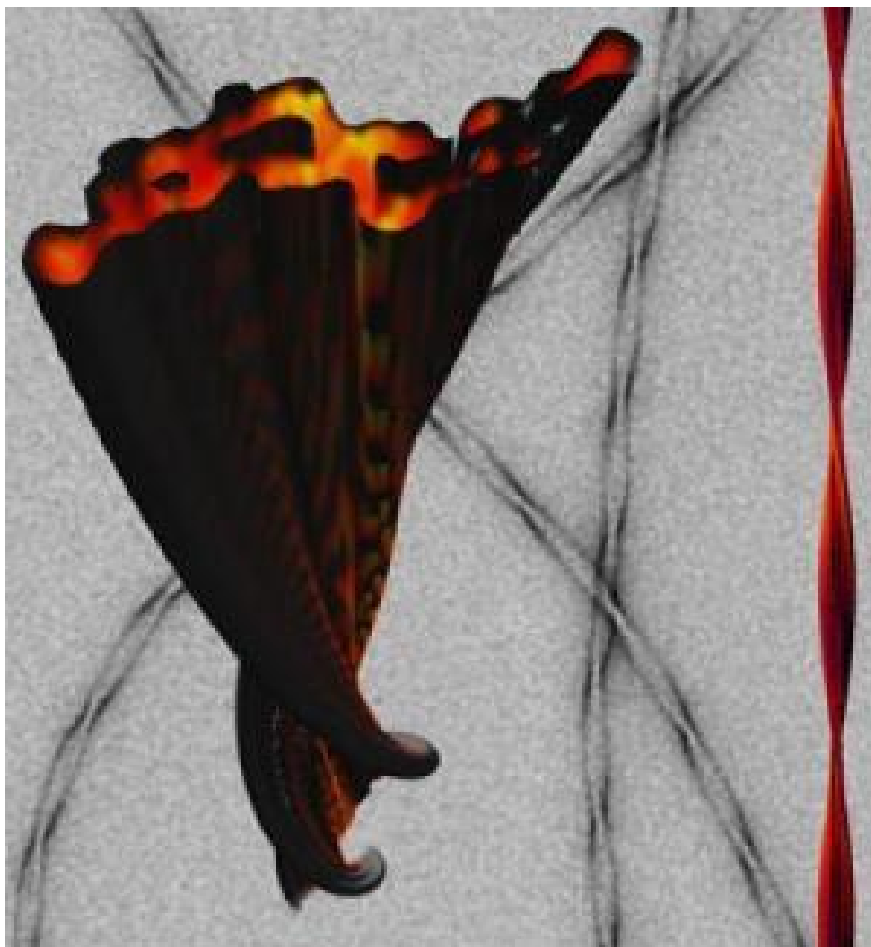
1. Nickel release from earrings purchased in the United States: The San Francisco earring study. *Journal of the American Academy of Dermatology*. 2008.

Adapted from materials provided by American Academy of Dermatology, via Newswise.

[http://www.sciencedaily.com /releases/2008/05/080512144306.htm](http://www.sciencedaily.com/releases/2008/05/080512144306.htm)



Seeing Alzheimer's Amyloids With Electron Microscopy For First Time



A-beta peptide fibril shown using electron microscopy. (Credit: Nikolaus Grigorieff, Brandeis University)

ScienceDaily (May 13, 2008) — In an important step toward demystifying the role protein clumps play in the development of neurodegenerative disease, researchers have created a stunning three-dimensional picture of an Alzheimer's peptide aggregate using electron microscopy. The study, in this week's issue of the Proceedings of the National Academy of Sciences, reports that researchers from Brandeis University in Waltham, Mass., and the Leibniz Institut in Jena, Germany, have shown--for the first time--how A-beta peptide, found in the brains of Alzheimer's patients, forms a spaghetti-like protein mass called an amyloid fibril.

"This study is a significant advance regarding our understanding of how these fibrils are built from the A-beta peptide (Alzheimer's peptide)," said co-author Nikolaus Grigorieff, a biophysicist at Brandeis University and an investigator with the Howard Hughes Medical Institute. "People have been guessing for decades what these fibrils look like, but now we have an actual 3D image."

In healthy people A-beta peptide does not aggregate, but in Alzheimer's patients it clumps first and then forms long fibrils, like tentacles, in a so-called cross-beta structure. Scientists disagree whether it is the clumps that kill neurons in the brain or the fibrils. Grigorieff wants to discover which part of the amyloid structure is toxic; that would be an important step in designing drugs to prevent or treat disease.

Amyloid structure--the particular way a protein or peptide clumps together--is linked to other neurodegenerative conditions as well, including Parkinson's and Creutzfeldt-Jakob disease. "The amyloid



way of folding and aggregation seems to be a fundamental property of proteins and peptides" explained Grigorieff. "We know how most normal proteins fold, but what drives amyloid formation?"

It's a question that has dogged structural biologists and biochemists for a long time but stubbornly refuses elucidation. Researchers using x-ray crystallography have so far been unable to obtain crystals from fibrils of full-length polypeptide chains. Structural models based on NMR data have also come up short. Scientists have made do with studying fragments of the A-beta peptide. The major barrier to determining the structure of A-beta fibrils is that the same peptide will exasperatingly assemble differently from fibril to fibril—unlike normal proteins, which reliably fold up the same way every time.

Grigorieff and his colleagues overcame this barrier by generating fibrils in a test tube under conditions that reduce the variability between fibrils, and by selecting about 200 images of fibrils that were most similar to each other and averaging them on a computer.

An expert at high resolution electron cryo-microscopy of protein complexes and macromolecular machines, Grigorieff said his lab made an image of the A-beta fibril at a resolution of eight Angstroms, revealing useful detail at a magnification of roughly a million times. Short of atomic resolution by a factor of 2.5 to 3, the image revealed how the peptide, a series of linked amino acids, was arranged in the tape-like fibril.

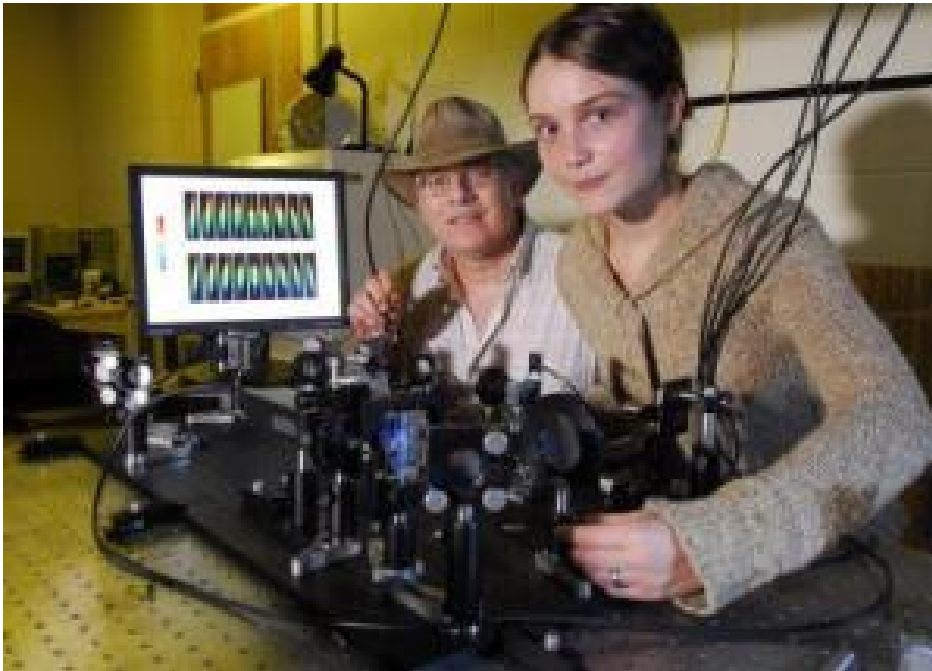
"The next step will be a 3-D image that tells us exactly where all the amino acids are," postulates Grigorieff. "This will tell us more about the chemical and biological properties of A-beta fibrils that we need to know to understand their role in Alzheimer's."

Adapted from materials provided by Brandeis University, via EurekAlert!, a service of AAAS.

<http://www.sciencedaily.com/releases/2008/05/080512170723.htm>



New Technique Measures Ultrashort Laser Pulses At Focus



Georgia Tech physics professor Rick Trebino and graduate student Pam Bowlan make slight adjustments to the device they developed that directly measures complex ultrashort light pulses in space and time at and near the focus. (Credit: Georgia Tech Photo/Gary Meek)

ScienceDaily (May 13, 2008) — Lasers that emit ultrashort pulses of light are used for numerous applications including micromachining, microscopy, laser eye surgery, spectroscopy and controlling chemical reactions. But the quality of the results is limited by distortions caused by lenses and other optical components that are part of the experimental instrumentation.

To better understand the distortions, researchers at the Georgia Institute of Technology developed the first device to directly measure complex ultrashort light pulses in space and time at and near the focus. Measuring the pulse at the focus is important because that's where the beam is most intense and where researchers typically utilize it. Knowing how the light is distorted allows researchers to correct for the aberrations by changing a lens or using a pulse shaper or compressor to manipulate the pulse into the desired form.

"Researchers have always measured the pulse immediately as it exited the laser, so they didn't realize the extent to which the pulse became distorted by the time it reached the focus after traveling through the optics and lenses in the system," said Rick Trebino, a professor in the Georgia Institute of Technology's School of Physics and Georgia Research Alliance Eminent Scholar in Ultrafast Optical Physics.

It is difficult to measure ultrashort pulses because they typically last between a few femtoseconds and a picosecond, which are 10-15 and 10-12 of a second, and faster than the response time of the fastest electronics.

"The light comes out as a train of extremely short bursts. The laser crams all of the energy of a continuous laser into a few femtoseconds, which creates really intense laser pulses," said Pam Bowlan, a graduate student supported by the Technological Innovation: Generating Economic Results (TI:GER) program.



To achieve the highest possible intensity of the laser, the pulse must be as small as possible in space and as short as possible in time. However, focused pulses nearly always have distortions in time that vary significantly from point to point in space due to lens aberrations in focusing optics.

To address those issues, the new device, called SEA TADPOLE (Spatial Encoded Arrangement for Temporal Analysis by Dispersing a Pair of Light E-fields), allows researchers to measure complicated ultrashort pulses simultaneously in space and time as they go through the focus.

"A lot of chemists and biologists use ultrafast lasers, so it was important that our device be easy to use because non-laser scientists don't want to spend all day measuring their laser pulses," noted Bowlan.

The research team -- which also included former graduate students Pablo Gabolde and Selcuk Akturk -- used the concept of interferometry to measure a pulse in space and time. Two pulses, one reference and one unknown, were sent through optical fibers. The fibers were mounted on a scanning stage so that the pulses could be measured at many locations around the focus. The pulses were crossed and an interference pattern was recorded for each color of the pulse at each location with a digital camera. The patterns were used to determine the shape of the unknown pulse in space and time and to create movies showing how the intensity and color of the pulse changed in space and time as it focused.

"Because the laser pulses enter SEA TADPOLE through optical fibers, which only collect a very small portion of the light, the device naturally measures pulses with high spatial resolution and can measure them at a focus spot size smaller than a micron," explained Bowlan. To further improve the spatial resolution of the device, the research team began to use specialized fibers, called near-field scanning optical microscopy fibers, which can resolve features smaller than the wavelength of the light.

The researchers tested the device by measuring ultrashort pulses focused by various lenses, since each lens can cause different complex distortions. To validate the measurements, Bowlan performed simulations of pulses propagating through the experimental lenses. Results showed that a common plano-convex lens displayed chromatic and spherical aberrations, whereas more expensive aspheric and doublet lenses exhibited mostly chromatic aberrations. Spherical aberrations occur when the light that strikes the edges of the lens gets focused to a different point than the light that strikes the center, creating a larger, inhomogeneous focused spot size. Chromatic aberrations occur because the many colors in the laser travel at different speeds and do not stay together in space and time as the pulse passes through glass components in the experimental setup, such as lenses. As a result, each color arrives at the focus at a different time, creating a rainbow of colors in the electric field images.

Aberrations can drastically increase the pulse length, which decreases the laser intensity. A lower intensity forces researchers to increase the power of the laser, increasing the possibility of damaging the sample. Aberrations can also yield odd pulse and beam shapes at the focus, which complicate the interpretation of the experiment or application.

"Our system tells researchers what types of aberrations are present in instrumentation, which then allows them to test different lenses in the instrumentation setup or use a pulse shaper to create the desired pulse at the focus that's free of distortions," added Bowlan.

The device was described in a presentation at the Conference on Lasers and Electro-Optics on May 8. This research was funded by the National Science Foundation and published in the August 2007 issue of the journal *Optics Express*.

Adapted from materials provided by Georgia Institute of Technology.

<http://www.sciencedaily.com/releases/2008/05/080508151505.htm>



Extinction fear for butterflies

The UK's only mountain dwelling species of butterfly could be wiped out in Scotland because of climate change, experts have warned.



Warmer temperatures are driving the mountain ringlet higher up hillsides in the search for cooler conditions. Butterfly Conservation Scotland (BCS) has appealed to the public to report sightings as part of a Scottish Natural Heritage-funded project.

People are also asked to look for northern dart and netted mountain moth. Paul Kirkland, BCS director, said ringlet faced a very real threat.

It is essential that we find out exactly what is hiding in the hills

Paul Kirkland
Butterfly Conservation Scotland

He said: "This butterfly is retreating higher up the hillsides as the warmer weather makes lower habitats unsuitable. "The fear is that as climate change continues, this rare species will run out of mountain, and become extinct in Scotland." m The flip side of global warming has seen species which have died out in the south surviving in Scotland. They include chequered skipper butterfly, Kentish glory and New Forest Burnet moth. Mr Kirkland said: "There are already parts of Scotland harbouring butterflies that have become extinct in England, and the largely unspoilt landscape found in the uplands is an increasingly important habitat.

"It is essential that we find out exactly what is hiding in the hills." There are 33 species of butterfly that regularly breed in Scotland and about 1,300 species of moths. Story from BBC NEWS:
http://news.bbc.co.uk/go/pr/fr/-/2/hi/uk_news/scotland/highlands_and_islands/7392243.stm

Published: 2008/05/13 23:48:52 GMT



Benefits of bedtime reading

James Randerson, science correspondent

Tuesday May 13, 2008

The Guardian

Reading to young children stimulates their development and gives them a head start when they reach school, according to researchers who have reviewed studies on the effects of reading. Apart from helping their reading, sharing a bedtime story with a child promotes their motor skills, through learning to turn the pages, and their memory. It also improves their emotional and social development.

"You can imagine if someone technologically came up with a widget that would stimulate all aspects of a two-year-old's development, everyone would want to buy it," said Professor Barry Zuckerman, of the department of paediatrics at Boston University school of medicine, who led the study.

Studies show that children who are read to from an earlier age have better language development and tend to have better language scores later in life. Getting children to grip pages with their thumb and forefinger improves their motor skills.

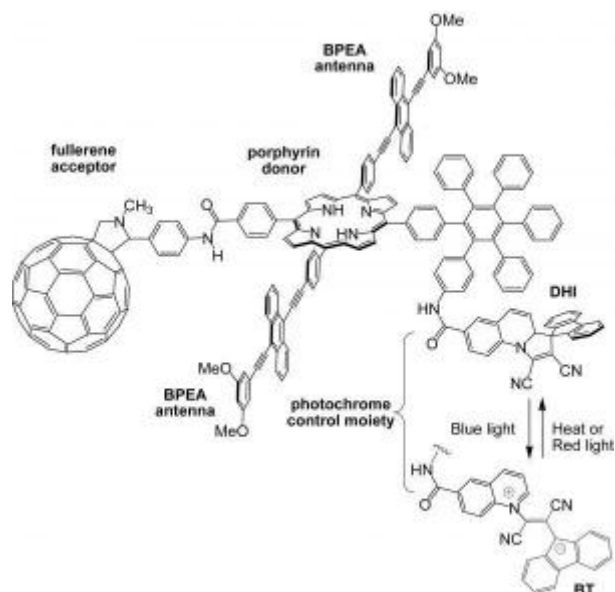
Most important, though, said Zuckerman, is that reading aloud is a period of shared attention and emotion between parent and child. This reinforces reading as a pleasurable activity.

"Children ultimately learn to love books because they are sharing it with someone they love," he said. The research is published in the journal *Archives of Disease in Childhood*.

<http://books.guardian.co.uk/news/articles/0,,2279621,00.html>



Molecule With 'Self-control' Synthesized



ASU researchers synthesize molecule with self-control. (Credit: Image courtesy of Arizona State University)

ScienceDaily (May 13, 2008) — Plants have an ambivalent relationship with light. They need it to live, but too much light leads to the increased production of high-energy chemical intermediates that can injure or kill the plant.

The intermediates do this because the efficient conversion of sunlight into chemical energy cannot keep up with sunlight streaming into the plant.

"The intermediates don't have anywhere to go because the system is jammed up down the line," says ASU chemist Devens Gust. Plants employ a sophisticated process to defend against damage.

To better understand this process, Gust, along with fellow ASU researchers Thomas Moore and Ana Moore, both professors of chemistry and biochemistry, designed a molecule that mimics what happens in nature.

In nature, plants defend against this sunlight overload process using non-photochemical quenching (NPQ). This process drains off the excess light excitation energy as heat so that it cannot generate the destructive high-energy species.

The ASU-designed molecule works in a similar fashion in that it converts absorbed light to electrochemical energy but reduces the efficiency of the conversion as light intensity increases. The ASU-designed molecule has several components including two light gathering antennas -- a porphyrin electron donor, a fullerene acceptor and a control unit that reversibly photoisomerizes between a dihydroindolizine (DHI) and a betaine (BT).

When white light (sunlight) shines on a solution of the molecules, light absorbed by the porphyrin (or by the antennas) is converted to electrochemical potential energy. When the white light intensity is increased, the DHI on some molecules change to a different molecular structure, BT, that drains light excitation energy out of the porphyrin and converts it to heat, avoiding the generation of excess electrochemical potential. As the light becomes brighter, more molecules switch to the non-functional



form, so that the conversion of light to chemical energy becomes less efficient. The molecule adapts to its environment, regulating its behavior in response to the light intensity.

"One hallmark of living cells is their ability to sense and respond to surrounding conditions," explains Thomas Moore. "In the case of metabolic control this process involves molecular-level recognition events that are translated into control of a chemical process."

"Functionally, this mimics one of the processes in photosynthesis that severely limits the energy conversion efficiency of higher plants," he added. "One way in which this work is important is that by understanding these events at the molecular level one can imagine redesigning photosynthesis to improve energy conversion efficiency and thereby come closer to meeting our energy needs."

The research is also important to one aspect of the exploding field of nanotechnology, that of regulation, Gust adds. Biological systems are known for their ability to engage in adaptive self-regulation. The nanoscale components respond to other nanoscale systems and to external stimuli in order to keep everything in balance and functioning properly. The ASU research shows how a bio-regulation system has been captured in a non-biological molecular scale analog process.

"Achieving such behavior in human-made devices is vital if we are to realize the promise of nanotechnology," adds Gust. "Although the mechanism of control used in the ASU molecule is different from that employed in NPQ, the overall effect is the same as occurs in the natural photosynthetic process."

Results were reported in the advanced online publication of Nature Nanotechnology (May 4, 2008).

In addition to Gust, Thomas Moore and Ana Moore, the ASU work was carried out by Stephen Straight, Gerdenis Kodis, Yuichi Terazono and Michael Hamburger.

Adapted from materials provided by [Arizona State University](#), via [EurekAlert!](#), a service of AAAS.

from <http://www.sciencedaily.com/releases/2008/05/080512172317.htm>



Identifying Abnormal Protein Levels In Diabetic Retinopathy

ScienceDaily (May 13, 2008) — Researchers in Massachusetts are reporting an advance in bridging huge gaps in medical knowledge about the biochemical changes that occur inside the eyes of individuals with diabetic retinopathy (DR) -- a leading cause of vision loss and blindness in adults. They report discovery of 37 proteins that were increased or decreased in the eyes of patients with DR compared to patients without the disease.

Edward P. Feener and colleagues point out that DR is a complication of diabetes that affects the eyesight of millions of people. It involves damage to blood vessels in the retina, the light sensitive tissue in the back of the eye. Physicians know that vessels grow abnormally, swell, and leak in DR. However, they have little understanding of the biochemical changes underlying those damaging events.

The researchers studied eye fluid from individuals with and without DR who were undergoing eye surgery. They analyzed proteins in the vitreous, the gel-like material inside the eye between the retina and the lens. The study found 252 proteins in the fluid, including 37 proteins that showed changes that were associated with proliferative diabetic retinopathy, the most severe form of the disease. The study could lead to new insights into disease mechanisms and new treatments, the article states.

Journal reference:

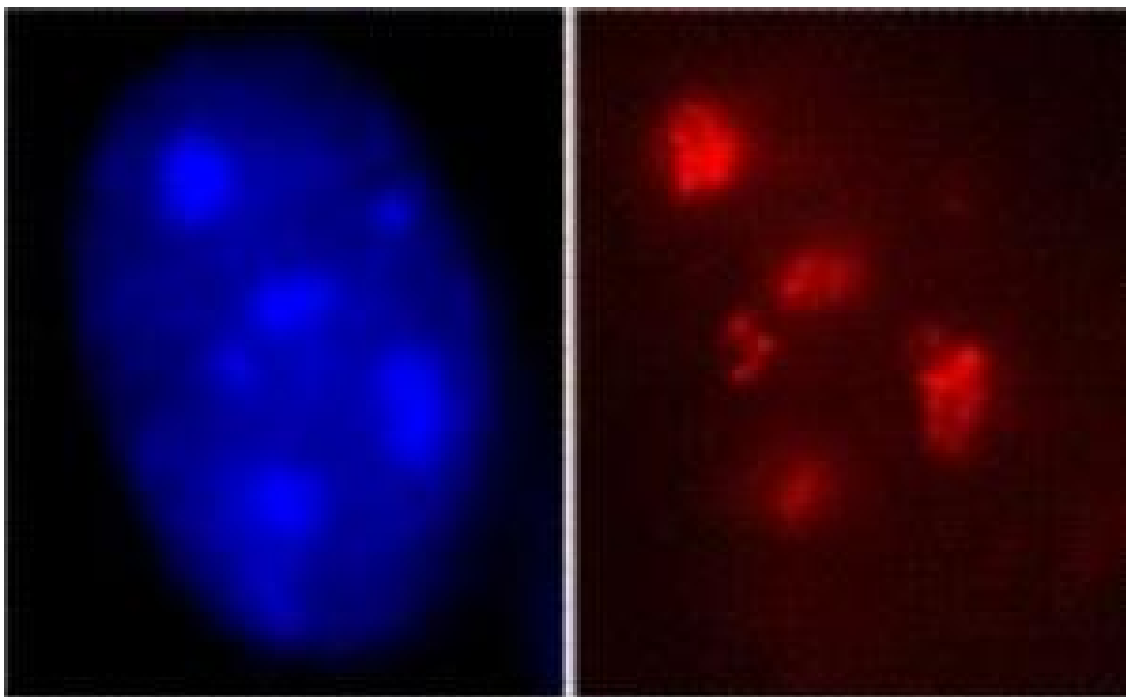
1. Characterization of the Vitreous Proteome in Diabetes without Diabetic Retinopathy and Diabetes with Proliferative Diabetic Retinopathy" *Journal of Proteome Research*. June 6, 2008. <http://dx.doi.org/10.1021/pr800112g> [[link](#)]

Adapted from materials provided by American Chemical Society.

<http://www.sciencedaily.com/releases/2008/05/080512092214.htm>



How Embryonic Stem Cells Develop Into Tissue-specific Cells Demonstrated



An embryonic stem cell labeled with a DNA-binding dye (blue, left) and a red probe which signals expression of normally silenced repetitive elements (red, right) (Credit: Photo courtesy Dr. Eran Meshorer, the Hebrew University)

ScienceDaily (May 13, 2008) — While it has long been known that embryonic stem cells have the ability to develop into any kind of tissue-specific cells, the exact mechanism as to how this occurs has heretofore not been demonstrated. Now, researchers at the Hebrew University of Jerusalem and elsewhere have succeeded in graphically revealing this process, resolving a long-standing question as to whether the stem cells achieve their development through selective activation or selective repression of genes.

The collaborative research group, which included Dr. Eran Meshorer of the Department of Genetics at the Silberman Institute of Life Sciences at the Hebrew University of Jerusalem, has revealed that the embryonic stem (ES) cells express large proportions of their genome "promiscuously." This permissive expression includes lineage-specific and tissue-specific genes, non-coding regions of the genome that are normally "silent," and repetitive sequences in the genome, which comprise the majority of the mammalian genome but are also normally not expressed.

When ES cells differentiate into specific cell tissue-types, they undergo global genetic silencing. But until this occurs, the ES cells maintain an open and active genome. This might very well be the secret of their success, since by maintaining this flexibility they maintain their capacity to become any cell type. Once silencing, or genetic repression, occurs, this ability is gone.

Thus, one can say that the ES cells stand at the ready until the "last minute" -- prepared to engage in selective activation into specific cells -- holding "in abeyance" their ability to become any kind of cells at the point and time required.

To reveal the process as to how this occurs, the researchers created the first full-mouse genomic platform of DNA microarrays. Microarrays are glass-based chips that allow simultaneous detection of thousands of genes. The microarrays used in the study were not confined to specific genes only but spanned the entire genome.



Hundreds of such microarrays were required in the study to cover the entire genome in different time points during stem cell differentiation. It was by observation of these sequences that the researchers were able to establish exactly how and at what point the stem cells developed into specific tissue cells and when the silencing occurs.

The project carried out by the researchers appears in the latest issue of the journal *Cell Stem Cell*. The collaborators in addition to Dr. Meshorer who participated in the project include Tom Misteli, Ron McKay, Stuart Le Grice, Sol Efroni and Kenneth Buetow of the US National Institutes of Health, Thomas Gingeras of Affymetrix Inc. of Santa Clara, Calif., and David Bazett-Jones of The Hospital for Sick Children, Toronto.

Adapted from materials provided by The Hebrew University of Jerusalem.

[http://www.sciencedaily.com /releases/2008/05/080512105729.htm](http://www.sciencedaily.com/releases/2008/05/080512105729.htm)



Beyond Fashion: Why You Gotta Wear Shades



Cheap sunglasses may cost you less, but are they just as likely to protect against the effects of harmful UV rays as expensive sunglasses? (Credit: iStockphoto/Jim DeLillo)

ScienceDaily (May 13, 2008) — Sunglasses are not just a fashion statement; their lenses block harmful UV rays that, in severe cases, can cause permanent damage to the eyes in the form of cataracts, pterygium and possibly retinal degeneration.

Cheap sunglasses may cost you less, but are they just as likely to protect against the effects of harmful UV rays as expensive sunglasses?

According to Dr. Donald J. D'Amico, chair of ophthalmology at NewYork-Presbyterian Hospital/Weill Cornell Medical Center, there is no certain way for consumers to be sure they are getting ultraviolet or UV protection from their sunglasses -- even if they are labeled "UV absorbing" or "UV blocking." Cost is no indicator of UV protection. An expensive pair of sunglasses does not guarantee sufficient protection from the sun.

"There is no government regulating power for the classification of sunglasses," says Dr. D'Amico. As a result, company information may misrepresent how much protection their sunglasses offer; and, unfortunately, consumers sometimes assume all sunglasses have protection if they are dark in color.

Dr. Stephen Trokel, an ophthalmologist at NewYork-Presbyterian Hospital/Columbia University Medical Center, advises that consumers buy sunglasses from reputable companies to ensure that they block both UVA and UVB rays. Another tip is to pair sunglasses with a large-brimmed hat to protect the eyes from sunlight that may enter from above and from the sides of glasses. Wraparound sunglasses and those with large temples also provide important side protection.



Sunglasses are not just a fashion statement; their lenses block harmful UV rays that, in severe cases, can cause permanent damage to the eyes in the form of cataracts, pterygium and possibly retinal degeneration.

Dr. D'Amico and Dr. Trokel caution that consumers should be aware of the following:

- Persons with light-colored eyes, such as blue and green, are often more sensitive to bright sunlight than darker eye shades.
- Individuals who wear contact lenses are least likely to want to wear sunglasses; however, sunglasses are helpful from preventing the drying effect most contact lens wearers get from warm wind; UV protection in contact lenses are the most effective in blocking all UV entering the eye.
- While not always true, the darkness of sunglasses will indicate greater UV protection -- at least if they comply with the ANSI Z80.3 industry standard.
- Automobile window tints are not a replacement for sunglasses; however, windshields screen out and are very effective in absorbing both UVA and UVB rays (because of the internal shatter-proof laminate).

In addition, Dr. D'Amico and Dr. Trokel emphasize that you are never too young to protect your eyes from the sun's harmful rays. Parents should purchase UV-protected sunglasses for their children with wraparound design and keep infants' eyes shaded.

*Adapted from materials provided by NewYork-Presbyterian Hospital, via Newswise.
[http://www.sciencedaily.com /releases/2008/05/080509165641.htm](http://www.sciencedaily.com/releases/2008/05/080509165641.htm)*

New Process May Convert Toxic Computer Waste Into Safe Products



Researchers in Romania have created a way to transform bits and pieces of printed circuit boards from jettisoned computers into clean raw materials for consumer products, such as fuel and plastics. (Credit: Courtesy of ago.mo.gov)

ScienceDaily (May 12, 2008) — Discarded computer parts could one day wind up fueling your car. That's because researchers in Romania and Turkey have developed a simple, efficient method for recycling printed circuit boards into environmentally-friendly raw materials for use in fuel, plastic, and other useful consumer products.

The boom in the use of computers has also created one of the world's biggest environmental headaches: What to do with all the discarded circuit boards, which contain high levels of pollutants such as heavy metals and flame retardants that can potentially harm humans? Researchers are seeking ways to remove these toxins so that these scrap materials can be safely recycled.

In the new study, Cornelia Vasile and colleagues collected printed circuit boards from discarded computers and processed the boards with a combination of high temperatures, catalysts, and chemical filtration. The processing method removed almost all of the toxic substances from the scraps, resulting in oils that can be safely used as fuel or raw materials called feedstocks for a wide variety of consumer products, the researchers say.

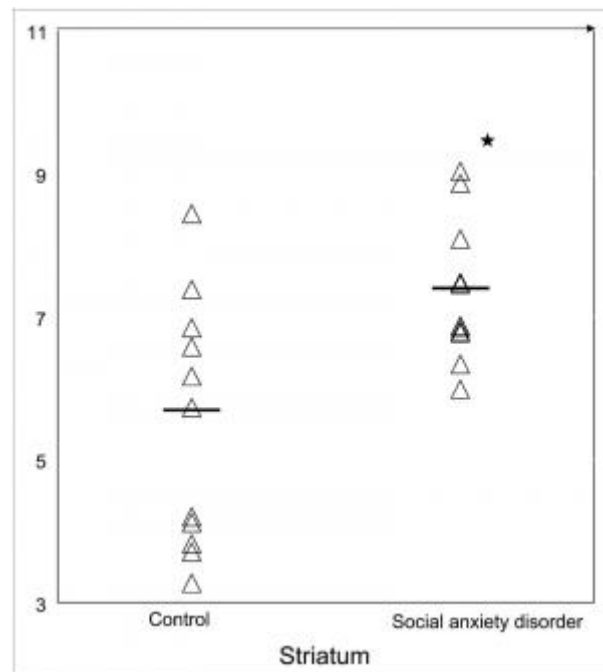
Journal reference:

1. Feedstock Recycling from the Printed Circuit Boards of Used Computers. *Energy & Fuels*. May 21, 2008. <http://dx.doi.org/10.1021/ef700659t> [[link](#)]

Adapted from materials provided by [American Chemical Society](#).

<http://www.sciencedaily.com/releases/2008/05/080512090630.htm>

Are Anxiety Disorders All In The Mind?



Binding ratios for DAT in striatum. (Credit: Image courtesy of Society of Nuclear Medicine)

ScienceDaily (May 12, 2008) — Using single-photon emission computed tomography (SPECT), researchers in The Netherlands were able to detect biochemical differences in the brains of individuals with generalized social anxiety disorder (also known as social phobia), providing evidence of a long-suspected biological cause for the dysfunction.

The study compared densities of elements of the serotonin and dopamine neurotransmitter systems in the brains of 12 people diagnosed with social anxiety disorder, but who had not taken medication to treat it, and a control group of 12 healthy people who were matched by sex and age.

Both groups were injected with a radioactive compound that binds with elements of the brain's serotonin and dopamine systems. Once administered, the radiotracer revealed functional alterations in these systems by measuring the radioactive binding in the thalamus, midbrain and pons (known to be acted upon by serotonin) and in the striatum (known to be acted upon by dopamine). The altered uptake activity in these regions indicated a greater level of disordered function.

"Our study provides direct evidence for the involvement of the brain's dopaminergic system in social anxiety disorder in patients who had no prior exposure to medication," said Dr. van der Wee, M.D., Ph.D., at the department of psychiatry and the Leiden Institute for Brain and Cognition at the Leiden University Medical Center, Leiden (and previously at the Rudolf Magnus Institute of Neuroscience, University Medical Center in Utrecht, The Netherlands). "It demonstrates that social anxiety has a physical, brain dependent component."

Serotonin and dopamine (neurotransmitters, or substances responsible for transferring signals from one neuron to another) act upon receptors in the brain. If the neurotransmitters are out of balance, messages cannot get through the brain properly. This can alter the way the brain reacts to normal social situations, leading to anxiety.



Other neuroimaging studies have shown abnormalities in glucose and oxygen consumption in the brain, according to van der Wee, who also points to causality as an additional issue. "Most of the people involved in these earlier studies were known to be already suffering from the disorder, so we do not know if the abnormalities were present before the onset of the disorder," he said.

Based on earlier studies, some researchers have suggested that social anxiety disorder is a result of the interplay between a genetic or acquired biological vulnerability and environment. More recent research has indicated that social anxiety disorder might be related to an imbalance of the neurotransmitter serotonin. This is the first time the brain's dopaminergic system was examined directly.

"Although there are no direct implications for treatment as a result of this study yet, it is another piece of evidence showing biological abnormalities, which may lead to new therapeutic approaches and insight into the origins of the disorder," said Dr. van der Wee.

According to the National Institute of Mental Health, social anxiety disorder affects approximately 15 million American adults and is the third most common mental disorder in the United States, after depression and alcohol dependence. The essential feature of the disorder is the fear of being evaluated by others, with the expectation that such an assessment will be negative and embarrassing. It tends to run a chronic and unremitting course and often leads to the development of alcoholism and depression. The disorder most often surfaces in adolescence or early adulthood, but it can occur at any time, including childhood.

Co-authors of the study include J. Frederieke van Veen, Irene M. van Vliet, Herman G. Westenberg, Department of Psychiatry; and Henk Stevens, Peter P. van Rijk, Department of Nuclear Medicine, all from the Rudolf Magnus Institute of Neuroscience, University Medical Center Utrecht, Utrecht, The Netherlands.

Journal reference:

1. Nic J. van der Wee, J. Frederieke van Veen, Henk Stevens, Irene M. van Vliet, Peter P. van Rijk, and Herman G. Westenberg. Increased Serotonin and Dopamine Transporter Binding in Psychotropic Medication–Naive Patients with Generalized Social Anxiety Disorder Shown by 123I-b-(4-Iodophenyl)-Tropane SPECT. *Journal of Nuclear Medicine*. May 2008. doi: [10.2967/jnumed.107.045518](https://doi.org/10.2967/jnumed.107.045518)

Adapted from materials provided by [Society of Nuclear Medicine](http://www.sciencedaily.com).

[http://www.sciencedaily.com /releases/2008/05/080512105719.htm](http://www.sciencedaily.com/releases/2008/05/080512105719.htm)



Children Better Prepared For School If Their Parents Read Aloud To Them

ScienceDaily (May 12, 2008) — Young children whose parents read aloud to them have better language and literacy skills when they go to school, according to a review published online ahead of print in the Archives of Disease in Childhood.

Children who have been read aloud to are also more likely to develop a love of reading, which can be even more important than the head start in language and literacy. And the advantages they gain persist, with children who start out as poor readers in their first year of school likely to remain so.

In addition, describing pictures in the book, explaining the meaning of the story, and encouraging the child to talk about what has been read to them and to ask questions can improve their understanding of the world and their social skills.

The review brings together a wide range of published research on the benefits of reading aloud to children. It also includes evidence that middle class parents are more likely to read to their children than poorer families.

The authors explain that the style of reading has more impact on children's early language and literacy development than the frequency of reading aloud. Middle class parents tend to use a more interactive style, making connections to the child's own experience or real world, explaining new words and the motivations of the characters, while working class parents tend to focus more on labelling and describing pictures. These differences in reading styles can impact on children's development of language and literacy-related skills.

The Reach Out and Read programme in Boston has improved the language skills of children in low income families by increasing the proportion of parents reading to their children.

The programme provides books and advice to the parents about the importance of reading aloud. Parents who have been given books were four times more likely to say they had looked at books with their children or that looking at books was one of their child's favourite activities, and twice as likely to read aloud to their children at least three times a week.

Adapted from materials provided by BMJ-British Medical Journal, via EurekAlert!, a service of AAAS.

[http://www.sciencedaily.com /releases/2008/05/080512191126.htm](http://www.sciencedaily.com/releases/2008/05/080512191126.htm)



How the brain detects the emotions of others

- 12:45 12 May 2008
- NewScientist.com news service
- Alison Motluk

People who are good at interpreting facial expressions have "mirror neuron" systems that are more active, say researchers. The finding adds weight to the idea that these cells are crucial to helping us figure out how others are feeling.

Mirror neurons are brain cells that fire both when you do something and when you watch someone else do the same thing.

Because they allow us to mimic what others are doing, it is thought that these neurons may be responsible for why we can feel empathy, or understand others' intentions and states of mind. People with autism, for instance, show reduced mirror neuron activity during social cognition tasks.

Now Peter Enticott at Monash University in Melbourne, Australia, and his colleagues have found evidence supporting this theory. They asked 20 healthy adults to look at pairs of images. In one task, they had to decide if paired images of faces were the same person. In another, they had to decide if both faces were showing the same emotion.

In a separate task, volunteers watched video clips of thumb movement, a hand grasping a pen and a hand while writing, while the activity in the primary motor cortex of the brain, which contains mirror neurons, was recorded.

Emotional link

Now the team had a measure of the "motor potential" in the thumb muscles – for example, how much the thumb was primed to move just by watching another thumb moving. This measure is a proxy for mirror neuron activity, say the researchers.

Enticott's team found that the volunteers who were better at judging people's emotions had higher mirror neuron activity in the thumb task. There was no correlation, however, between the ability to recognise faces and mirror neuron activity. This suggests that mirror neurons are involved in understanding emotions as well as in the mimicry of actions.

"[The study] connects the two different functions – the motor aspect with the emotional processing aspect," says Lindsay Oberman, at Beth Israel Deaconess Hospital in Boston, Massachusetts, US. "They show that mirror neurons for motor activity are related to mirror neurons for emotions," she adds.

Journal reference: *Neuropsychologia* (DOI: 10.1016/j.neuropsychologia.2008.04.022)

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Religion a figment of human imagination

- 00:01 28 April 2008
- NewScientist.com news service
- Andy Coghlan



[Enlarge image](#)

(Image: stock.xchng)

Humans alone practice religion because they're the only creatures to have evolved imagination.

That's the argument of anthropologist [Maurice Bloch](#) of the London School of Economics. Bloch challenges the popular notion that religion evolved and spread because it promoted social bonding, as has been argued by some anthropologists. Instead, he argues that first, we had to evolve the necessary brain architecture to imagine things and beings that don't physically exist, and the possibility that people somehow live on after they've died. Once we'd done that, we had access to a form of social interaction unavailable to any other creatures on the planet. Uniquely, humans could use what Bloch calls the "transcendental social" to unify with groups, such as nations and clans, or even with imaginary groups such as the dead. The transcendental social also allows humans to follow the idealised codes of conduct associated with religion.

"What the transcendental social requires is the ability to live very largely in the imagination," Bloch writes. "One can be a member of a transcendental group, or a nation, even though one never comes in contact with the other members of it," says Bloch. Moreover, the composition of such groups, "whether they are clans or nations, may equally include the living and the dead."

Modern-day religions still embrace this idea of communities bound with the living and the dead, such as the Christian notion of followers being "one body with Christ", or the Islamic "Ummah" uniting Muslims.



Stuck in the here and now

No animals, not even our nearest relatives the chimpanzees, can do this, argues Bloch. Instead, he says, they're restricted to the mundane and Machiavellian social interactions of everyday life, of sparring every day with contemporaries for status and resources.

And the reason is that they can't imagine beyond this immediate social circle, or backwards and forwards in time, in the same way that humans can. Bloch believes our ancestors developed the necessary neural architecture to imagine before or around 40-50,000 years ago, at a time called the Upper Palaeological Revolution, the final sub-division of the Stone Age. At around the same time, tools that had been monotonously primitive since the earliest examples appeared 100,000 years earlier suddenly exploded in sophistication, art began appearing on cave walls, and burials began to include artefacts, suggesting belief in an afterlife, and by implication the "transcendental social".

Once humans had crossed this divide, there was no going back. "The transcendental network can, with no problem, include the dead, ancestors and gods, as well as living role holders and members of essentialised groups," writes Bloch. "Ancestors and gods are compatible with living elders or members of nations because all are equally mysterious invisible, in other words transcendental."

Nothing special

But Bloch argues that religion is only one manifestation of this unique ability to form bonds with non-existent or distant people or value-systems.

"Religious-like phenomena in general are an inseparable part of a key adaptation unique to modern humans, and this is the capacity to imagine other worlds, an adaptation that I argue is the very foundation of the sociality of modern human society."

"Once we realise this omnipresence of the imaginary in the everyday, nothing special is left to explain concerning religion," he says. [Chris Frith](#) of University College London, a co-organiser of a "Sapient Mind" meeting in Cambridge last September, thinks Bloch is right, but that "theory of mind" – the ability to recognise that other people or creatures exist, and think for themselves – might be as important as evolution of imagination.

"As soon as you have theory of mind, you have the possibility of deceiving others, or being deceived," he says. This, in turn, generates a sense of fairness and unfairness, which could lead to moral codes and the possibility of an unseen "enforcer" - God – who can see and punish all wrong-doers.

"Once you have these additions of the imagination, maybe theories of God are inevitable," he says.

Journal reference: *Philosophical Transactions of the Royal Society B*, (DOI:10.1098/rstb.2008.0007)

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Live and let DIY

We're told pirates are "killing" the entertainment biz. But without them we'd have no pop radio, no Hollywood and rubbish trainers, says Matt Mason

Matt Mason
Saturday May 10, 2008

Guardian

Just over 40 years ago in a recording studio in Kingston, Jamaica, a sound engineer named Byron Smith was busy cutting a new song, *On The Beach* by the Paragons. Recording straight from the master tape on to an acetate disc, also known as a dubplate, the track was for a local deejay named Ruddy Redwood to play at a dance that evening. In his haste, Smith forgot to pan up the vocals on the mixing desk, cutting just the backing track on to the dubplate, and accidentally recording the world's first "12-inch instrumental". Apologising for his mistake, Smith was about to throw the faulty disc out when Redwood stopped him. Intrigued by the instrumental version, he took it with him. That night, using two turntables, he switched between the original mix and the vocal-less version of the song, giving the MC more room to manoeuvre and the crowd space to sing along between verses, sending them crazy in the process and hacking the structure of a song live for the first time. That night the crowd made him play the dubplate so many times it got completely worn out. The remix was born. Forty years later, the idea behind the remix is everywhere you look. Video game code is deliberately left unlocked so fans can tweak and improve it. Boeing's new Dreamliner airplane was designed in collaboration with 120,000 volunteers who signed up to help through the corporation's website. Companies like Facebook that are based on user-generated content are worth more than manufacturing giants like Ford. People have their cars "remixed" on MTV's *Pimp My Ride*, while people are busy illicitly re-editing and reposting television clips online every day. Thanks to the efforts of people like Ruddy Redwood pushing new ideas from the fringes of pop culture, the way we use information looks very different today. In many cases we implicitly understand the value in remixing, redistributing and making copies of other people's content. But in others, we don't. Sometimes we see people like Redwood as innovators, while in other instances they are regarded as pirates. This is happening in the music business right now, even though the industry was created by a "pirate" in the first place. When Thomas Edison invented the phonographic record player, musicians branded him a pirate, out to steal their work and destroy the live music business. That opinion prevailed until a system was established so everyone could be paid royalties; a system that formed the backbone of the recording industry and which is still in place today.

Edison, in turn, went on to invent film-making, and demanded a licensing fee from those making movies with his technology. This caused a band of film-making pirates, including a man named William, to flee New York for the then still wild West, where they thrived, unlicensed, until Edison's patents expired. These pirates continue to operate there, albeit legally now, in the town they founded: Hollywood. William's last name? Fox. From CEOs to struggling artists, in everything from health care to entertainment to education, many of us are being challenged by the problem of others sharing and using our intellectual property without permission. This challenge requires a change of attitude, because sometimes piracy isn't the problem, it's the solution, as my new book, *The Pirate's Dilemma*, explains. Here's what the pirates have done for us lately...

Pirates brought pop music to the UK

In the 1950s - despite the best efforts of Elvis - there wasn't much to listen to on UK radio besides the shipping forecast. The radio waves were seen as being far too powerful to be turned over to the people, so there were no commercial stations. Instead, radio was used for broadcasting news and education by the BBC, with only *Pick Of The Pops* on the Light Programme catering for pop fans. That all changed when European pirate radio ships like *Radio Mercur* took to the seas in the late 1950s, broadcasting rock'n'roll to Europe from huge radio masts attached to old fishing and military boats anchored in waters outside state jurisdiction. The pirate sector exploded in the Beatles-fuelled pop boom of the 1960s when Radio



London and Radio Caroline, along with other, smaller stations, raised their masts, making a ton of ad revenue in the process. These new stations reached millions of people across Europe; people who liked being able to listen to free rock'n'roll on their radios. European governments realised this was a battle they couldn't win - there was too much support for what the pirates were doing - and that they couldn't close them down without offering an alternative. So they did the only thing they could: they decided to co-opt them. Commercial radio soon became legal all over the continent, and many of the pirates were able to go legit and set up on land. In the UK, the BBC hired DJs from Radio London (such as Tony Blackburn and John Peel), and created their own imitation, which they called Radio 1. Rock'n'roll radio was here to stay.

Pirates make cooler trainers

Nike's Air Force 1 is a basketball shoe that has been customised and re-released by the company themselves over 900 times since its launch in 1982. But this didn't stop 22-year-old Tokyo hip-hop DJ, Nigo, from creating his own version. Nigo (who released an album, *Ape Sounds*, on James Lavelle's *Mo Wax* label in 2000) redesigned the Air Force 1 specifically for hip-hop fans, never intending it to be used as a basketball shoe. Taking the Air Force 1 design as his base, Nigo ripped off the "swoosh" logo and stitched on his own shooting star-like emblem. He used materials and colour combinations even Nike hadn't experimented with at the time, and sold them in very limited quantities for upwards of \$300 a pair. Nigo's fashion label, *A Bathing Ape*, which produces the shoes, is now a multimillion dollar streetwear brand with more than 16 stores in Japan, London and New York. But what Nike did next is where it gets interesting. There was a clear case of trademark infringement here, but Nike didn't sue Nigo, because it could see commercial value in what he was doing. It recognised that his shoe wasn't detracting from the Air Force 1 brand, it was actually adding value. In music, good remixes make the original tracks more popular - the same thing was happening here. So instead of suing him, Nike looked at Nigo's remixed shoes, and created their own remixes in response, using a wider variety of materials and colours. They didn't view Nigo as a pirate, but as a competitor who pushed them to innovate. And while Nigo's trainers continue to do well, the ever-evolving Nike Air Force 1 remains the world's most popular basketball shoe franchise over 25 years after its release.

Pirates create better ads

When an online copy of Scrabble called *Scrabulous* appeared on Facebook, it quickly amassed 2.3 million fans who played it every day. It was an amazing user-generated ad campaign, and sales of real Scrabble boards increased. All Hasbro and Mattel (the owners of Scrabble) had to do was swoop in with their cheque books and make it legit; instead they treated *Scrabulous* as a simple case of piracy and threatened to sue. It may have been smarter to cut a deal rather than anger potential customers. Thousands signed up to the "Save *Scrabulous*" Facebook group. One fan threatened a hunger strike. Hasbro and Mattel are still talking tough, but if the backlash continues they may be forced to eat their words. Managing directors take note! Don't let your legal department make a decision about pirates without talking to marketing first, because pirates can sometimes refresh the parts other ad strategies cannot reach. Pirates can create awareness for brands, and some large companies are starting to recognise the value in letting people mash up their content, becoming increasingly tolerant of unofficial remixes. Last year Soulja Boy's *Crank Dat* was one of the major hits of the summer and the video was a YouTube sensation. Soon, remixed videos were appearing, featuring clips of a variety of copy-protected cartoon characters lip-synching along. *SpongeBob*, *Shrek*, *Super Mario*, *South Park* and *The Simpsons* all got "super-manned". Every major Hollywood studio had at least one of their cartoon franchises ripped off, but not one of them bothered to issue a cease and desist notice. Likewise, when comedy rock band *Guyz Nite* made a video for their song *Die Hard* using nothing but clips from the 20th Century Fox-produced *Die Hard* movies (and put them online), Fox's legal team initially got them taken down. But when the marketing bods at Fox found out about the video, they got in touch with *Guyz Nite* and offered them money to put the video back up, and invited them to the premiere of *Die Hard 4.0*. William Fox would be proud.

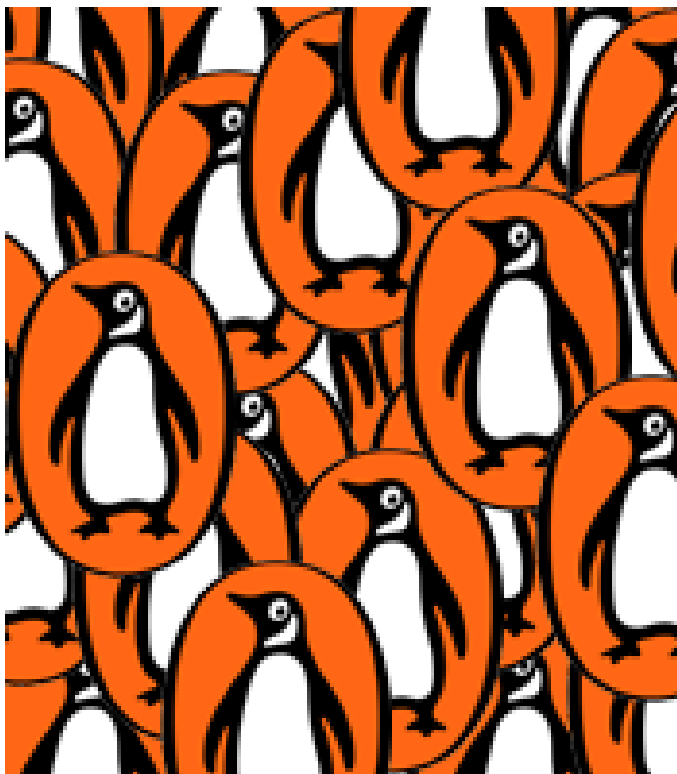
- Matt Mason's *The Pirate's Dilemma* (Penguin) is out now

<http://music.guardian.co.uk/pop/story/0,,2278736,00.html?gusrc=http://www.artsjournal.com/newsletters/rss&feed=39>



Penguin Books Proves The Entire Internet Can't Write A Novel

Before inviting the web to create a collaborative novel using a wiki in 2007, Jeremy Ettinghausen asked, "Can a community write a novel?" The answer is yes but a terrible one! A year later the Penguin publisher told researchers at De Montfort University (Penguin's partner in the project), "It's the best thing I've ever done...but I would never do it again." Which means "The book was awful but I'm not going to insult the 1500 people who wrote it for me." Of course no one expected the novel to be any good — the excerpt below is about as terrible as one would guess. That's why this was a great project for Penguin. After all, you release some trendy high-concept book, and for every person who reads it there are a hundred who just enjoy the concept and ten people who buy it just to put on the bookshelf. Hell, I had more to say about *Freakonomics* before I read it than after — I got the point by the time I'd read a review and half of the dust jacket. So if the book doesn't have to live up to its publicity, why not come up with a clever idea and outsource the actual writing?



The text itself is terrible. Here's the opening paragraph:

The deep waters, black as ink, began to swell and recede into an uncertain distance. A gray ominous mist obscured the horizon. The ocean expanse seemed to darken in disapproval. Crashing tides sounded groans of agonized discontent. The ocean pulsed with a frightening, vital force. Although hard to imagine, life existed beneath. It's infinite underbelly was teeming with life, a monstrous collection of finned, tentacled, toxic, and slimy parts. Below its surface lay the wreckage of countless souls. But we had dared to journey across it. Some had even been brave enough to explore its sable velveteen depths, and have yet to come up for precious air...." But the project itself is ripe for sociological study. It's a fully and publicly documented interaction between over a thousand would-be authors, a postmodern literary critic's orgiastic wet dream. And the recently released analysis from De Montfort is a good read. The researchers study the actions and psychology of the most active editor, "Pabruce," picking apart certain edits, describing his relations with other editors, and guessing at his motives.

This is also the only research paper to ever include the heading "YellowBanana — genius, vandal or troll?"

So Penguin gets some academic attention, some PR, and no real lost respect for this side project. Plus they get to test some tools that might help when they really are farming books out to writing groups. I wish I got that much out of *my* last terrible novel.

<http://gawker.com/387731/penguin-books-proves-the-entire-internet-cant-write-a-novel>



Measure for Measure

Literary criticism could be one of our best tools for understanding the human condition. But first, it needs a radical change: embracing science

By Jonathan Gottschall | May 11, 2008

IT'S NOT SUCH a good time to be a literary scholar.

For generations, the study of literature has been a pillar of liberal education, a prime forum for cultural self-examination, and a favorite major for students seeking deeper understanding of the human experience.

But over the last decade or so, more and more literary scholars have agreed that the field has become moribund, aimless, and increasingly irrelevant to the concerns not only of the "outside world," but also to the world inside the ivory tower. Class enrollments and funding are down, morale is sagging, huge numbers of PhDs can't find jobs, and books languish unpublished or unpurchased because almost no one, not even other literary scholars, wants to read them.

The latest author to take the flagging pulse of the field is Yale's William Deresiewicz. Writing recently in *The Nation*, he described a discipline suffering "an epochal loss of confidence" and "losing its will to live." Deresiewicz's alarming conclusion: "The real story of academic literary criticism today is that the profession is, however slowly, dying."

Not every literary scholar is so pessimistic, but most would agree that the field's vital signs are bad, and that major changes will be needed to set things right.

Though the causes of the crisis are multiple and complex, I believe the dominant factor is easily identified: We literary scholars have mostly failed to generate surer and firmer knowledge about the things we study. While most other fields gradually accumulate new and durable understanding about the world, the great minds of literary studies have, over the past few decades, chiefly produced theories and speculation with little relevance to anyone but the scholars themselves. So instead of steadily building a body of solid knowledge about literature, culture, and the human condition, the field wanders in continuous circles, bending with fashions and the pronouncements of its charismatic leaders.

I think there is a clear solution to this problem. Literary studies should become more like the sciences. Literature professors should apply science's research methods, its theories, its statistical tools, and its insistence on hypothesis and proof. Instead of philosophical despair about the possibility of knowledge, they should embrace science's spirit of intellectual optimism. If they do, literary studies can be transformed into a discipline in which real understanding of literature and the human experience builds up along with all of the words.

This proposal may distress many of my colleagues, who may worry that adopting scientific methods would reduce literary study to a branch of the sciences. But if we are wise, we can admit that the sciences are doing many things better than we are, and gain from studying their successes, without abandoning the things that make literature special.

The alternative is to let literary study keep withering away, and that would be a tragedy. *Homo sapiens* is a bizarre literary ape - one that, outside of working and sleeping, may well spend most of its remaining hours lost in landscapes of make-believe. Across the breadth of human history, across the wide mosaic of world cultures, there has never been a society in which people don't devote great gobs of time to seeing, creating, and hearing fictions - from folktales to film, from theater to television. Stories represent our biggest and most preciously varied repository of information about human nature. Without a robust study



of literature there can be no adequate reckoning of the human condition - no full understanding of art, culture, psychology, or even of biology. As Binghamton University biologist David Sloan Wilson says, "the natural history of our species" is written in love poems, adventure stories, fables, myths, tales, and novels.

The study of literature is worth doing - and worth doing well. No one should be content to watch it fading gently into that good night.

I'm not the first to argue for a closer engagement of literary studies with science. For instance, in his famous 1959 essay on "The Two Cultures," the British physicist and novelist C.P. Snow lamented the scientific ignorance of "literary intellectuals," identifying it as a main reason for the yawning divide between the cultures of literature and science.

But I would go beyond Snow's suggestion that literary scholars should know more about science. Literary scholars should actually do science. "Literary science" may seem laughably, even pathetically, oxymoronic, but in fact it is already being done, with real results.

In some cases, it's possible to use scientific methods to question cherished tenets of modern literary theory. Consider the question of the "beauty myth": Most literary scholars believe that the huge emphasis our culture places on women's beauty is driven by a beauty myth, a suite of attitudes that maximizes female anxiety about appearance in order, ultimately, to maintain male dominance. It's easy to find evidence for this idea in our culture's poems, plays, and fairy tales: As one scholar after another has documented, Western literature is rife with sexist-seeming beauty imagery.

Scholars tend to take this evidence as proof that Western culture is unusually sexist. But is this really the case? In a study to be published in the next issue of the journal *Human Nature*, my colleagues and I addressed this question by collecting and analyzing descriptions of physical attractiveness in thousands of folktales from all around the globe. What we found was that female characters in folktales were about six times more likely than their male counterparts to be described with a reference to their attractiveness. That six-to-one ratio held up in Western literature and also across scores of traditional societies. So literary scholars have been absolutely right about the intense stress on women's beauty in Western literature, but quite wrong to conclude that this beauty myth says something unique about Western culture. Its ultimate roots apparently lie not in the properties of any specific culture, but in something deeper in human nature.

Or consider this shibboleth of modern literary theory: the author is dead. Roughly speaking, this statement means that authors have no power over their readers. When we read stories we do not so much yield to the author's creation as create it anew ourselves - manufacturing our own highly idiosyncratic meanings as we go along. This idea has radical implications: If it is true, there can be no shared understanding of what literary works mean. But like so much else that passes for knowledge in contemporary literary studies, this assertion has its basis only in the swaggering authority of its asserter - in this case, Roland Barthes, one of the founding giants of poststructuralist literary theory.

Is this one of those squishy, unfalsifiable literary claims? No, it is also testable. Hijacking methods from psychology, Joseph Carroll, John Johnson, Dan Kruger, and I surveyed the emotional and analytic responses of 500 literary scholars and avid readers to characters from scores of 19th-century British novels. We wanted to determine how different their reading experiences truly were. Did reactions to characters vary profoundly from reader to reader? As we write in "Graphing Jane Austen," a book undergoing peer review, there were variations in what our readers thought and felt about literary characters, but it was expertly contained by the authors within narrow ranges. Our conclusion: rumors of the author's demise have been greatly exaggerated.

Another type of investigation exploits the massive processing power of computers to generate new information and ideas about literary history. Great gains have been made in recent years with stylometric studies, the computerized crunching of sentences that can establish an author's stylistic fingerprint. As



Brian Vickers explains in his book, "Shakespeare, Co-Author," stylometry has helped settle long, angry debates about whether or not Shakespeare wrote some of his plays with coauthors (the answer is that he very probably did). Similarly, Colin Martindale's book "The Clockwork Muse" used computer algorithms and experimental simulations to challenge conventional views of how literary traditions change over time. Instead of changing quickly in response to large-scale sociopolitical shifts, as has frequently been argued, Martindale found that literary traditions actually change gradually and predictably. From this Martindale provocatively argues that the principal driver of artistic change is not social, political, or religious upheaval, but the steady pressure on individual artists to "make it new."

Studies like these showcase the promise of applying a scientific approach: Relatively simple experiments can upend decades' worth of untethered theoretical speculation, exposing flawed assumptions and focusing scholars' attention on fresh and productive questions.

But to emerge from the present crisis, literary studies must borrow more from the sciences than the habit of experimentation. We must also study its theories, its evidentiary standards, and its optimistic philosophy of knowledge.

Contemporary literary theory, for instance, is deeply rooted in the "blank slate" theory of the mind - the idea that the human mind is overwhelmingly shaped by social and cultural influences, rather than by biology. But this theory has perished in the sciences, killed off by advances in evolutionary biology, cognitive science, neuroscience, and other related fields. So most of the "big ideas" in contemporary literary studies have been flawed from their inception - they have been based, at least in part, on failed theories of human nature. Armed with a current understanding of the sciences of the mind, literary scholars could develop surer interpretations of individual works, answer larger questions, such as why literary plots vary within such narrow bounds, and even plumb the ultimate wellsprings of the human animal's strange, ardent love affair with story.

But if ideas like "the beauty myth" or "the death of the author" arise from loose theorizing and defunct models of human psychology, how have they managed to thrive for decades in the world's top literature departments? The answer lies partly in our standards of evidence: Instead of forcing professors to rigorously test their big ideas, as scientific methods do, literary methods encourage us merely to collect and highlight evidence that seems to confirm them. The result of this laxity, as Berkeley's Frederick Crews points out, is that "our bogus experiments succeed every time." And since it is so hard to be wrong in literary studies, it is equally hard to be right. So books and papers pile up but, more often than not, genuine advances in knowledge do not. To fix this problem, literary scholars need to develop more rigorous ways of testing their ideas, demand a higher standard of proof from their colleagues, and be willing to discard the theories that fail.

These problems with our theories and methods are compounded by problems of attitude. Over the last several decades literary studies has been deeply colored by postmodern skepticism about the possibility of developing new ideas or knowledge that are in any sense "truer" than what came before. It has also aggressively committed itself to the idea that scholarship can - and should - be a means to achieve political ends. Though well intentioned, this subordination of scholarship to political activism has distorted almost everything we've produced over the last several decades.

So bring together obsolete theory, inadequate methods, unbridled ideological bias, and a spirit of surrender to "unknowability," and you have the modern situation in academic literary study - a system that seems to be designed not to generate reliable and durable knowledge.

Setting things right will require an embrace not only of science's theories and methods but also of its ethos - its aspiration to disinterested inquiry and its measured optimism that the world can, in the end, be better understood.

The thought of moving literary studies closer to the model of the sciences may feel unsettling to scholars who have been trained to interpret the nuances of literature. Applying statistics to great literary works, for



example, seems a bit like performing brain surgery with a cudgel: The tool is just not up to the delicacy of the operation.

But everything that is available in literary works for discussion, analysis, or awe-struck celebration is left intact by scientific analysis. A proper scientific process doesn't diminish, it adds. I'm not arguing that scientific tools can replace judgment, imagination, or good scholarship. I'm suggesting that combining these humanistic virtues with scientific tools would be like giving them growth hormones.

The changes I'm recommending would constitute a paradigm shift. They would require deep alterations in what literature departments teach and how students are trained. Of course, graduate students would still take the familiar courses on Shakespeare, Victorian novels, and 20th-century poetry, but they would also take courses covering scientific research methods, the basics of statistics and probability, and current thinking in the sciences of the mind.

As the field developed, it would build a methodological tool kit that retained an honored place for the old skills of close reading and careful reasoning, but also included new scientific tools of study design and statistical testing. Literary scholars would keep their long shelves of books and their habits of good scholarship, but would also avail themselves of sophisticated text-analysis software, the psychology lab, and collaboration with researchers from scientific fields.

Above all, these changes would require looking with fresh eyes on the landscape of academic disciplines, and noticing something surprising: The great wall dividing the two cultures of the sciences and humanities has no substance. We can walk right through it.

If we literary scholars can summon the courage and humility to do so, the potential benefits will reverberate far beyond our field. We can generate more reliable and durable knowledge about art and culture. We can reawaken a long-dormant spirit of intellectual adventure. We can help spur a process whereby not just literature, but the larger field of the humanities recover some of the intellectual momentum and "market share" they have lost to the sciences. And we can rejoin the oldest, and still the premier, quest of all the disciplines: to better understand human nature and its place in the universe.

It's a good time to be a literary scholar after all.

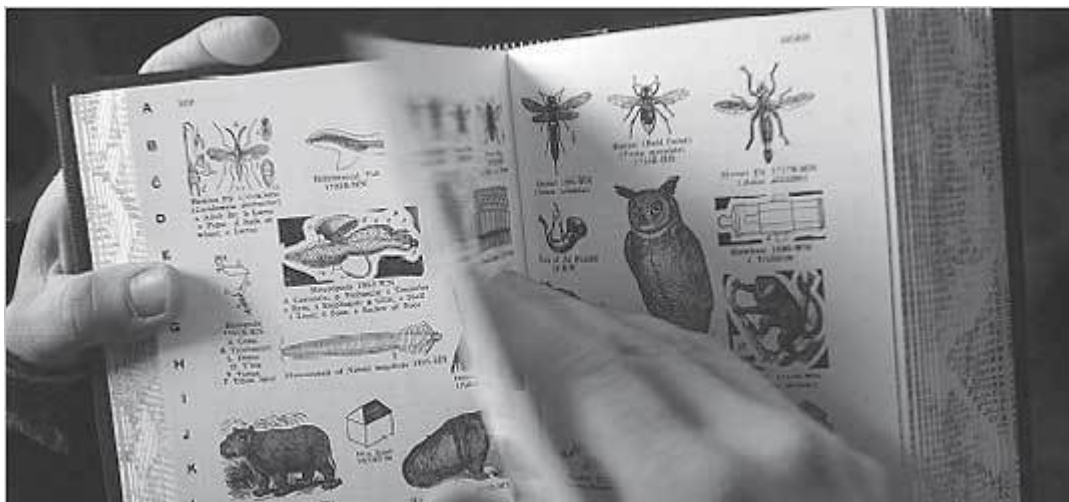
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http://www.boston.com/bostonglobe/ideas/articles/2008/05/11/measure_for_measure/

Pictionary

Why people are paying \$2,600 for a dictionary with no definitions.

By Erin McKean | May 11, 2008



IT HAS THE name Webster's on the cover, and the impressive binding of a traditional dictionary, but there aren't any definitions inside - only pages and pages of illustrations, detailed black-and-white engravings of birds, plants, architectural elements, parts of the body, geometric figures, heraldic devices.

The book costs \$2,600, and that's the least-expensive edition. It took the artist nearly a dozen years to create. And - perhaps most strangely for a dictionary whose entries are images - it has become an overwhelming object of desire for lexicographers.

The Pictorial Webster's may be the most curious of the many volumes that have borne the name Webster's over the years. It's the creation of Johnny Carrera, an artist, letterpress printer, and bookbinder who lives in Waltham. Inspired by the beauty of the illustrations in early dictionaries, he painstakingly reprinted more than 400 pages of engravings from the 1859 edition of Merriam-Webster's American Dictionary of the English Language, the first illustrated dictionary published in America.

Carrera found the original engravings - more than 12,000 - at the Sterling Library at Yale, and then spent 12-hour days organizing and cleaning them. He set and printed them by hand, 16 pages at a time, on a letterpress. The book's pages are hand-sewn; the indented thumb tabs on the page edges are cut by hand as well. The label on the spine is printed with gold leaf. Carrera's process, laborious and painstaking, gives you the feeling it could have been just as well accomplished by candlelight.

The Pictorial Webster's powerfully evokes a kind of reference work that, if not already gone, is fast disappearing. Carrera's work feels more like a dictionary than any modern Webster's - it embodies all the tropes of dictionaryhood, without actually being one. It speaks to the longing we have for familiar shapes, even when we know that pure functionality is better served through different means: It is a dictionary for those of us who might want, at the same instant, an iPhone for our pocket and a retro-styled black faux-rotary dial telephone for the bedside table. The Pictorial Webster's represents a dictionary in the same way that the TV series "Mad Men" represents the New York of the 1960s. It feels more true than the truth.

To lexicographers, the appeal is immediate and visceral. "I want it," said Grant Barrett, editor of the online-only Double-Tongued Dictionary. Steve Kleinedler, an editor at the American Heritage Dictionary, bought his soon after seeing a presentation by Carrera at a Dictionary Society of North



America meeting last June in Chicago. "It's a lot of art, bound into one volume, which itself is art, creating one total piece of art," he said. Charles Hodgson, of Podictionary, a daily dictionary podcast, likes the book because it "stretches and bends the meaning of the word 'dictionary.' "

Carrera calls his book a "visual Finnegans Wake of 19th-century America." By arranging the illustrations in alphabetical order, without their distracting definitions, he said he wanted to force readers to make involuntary connections between the images, to create a kind of sense out of nonsense.

Michael Hancher, a professor of English at the University of Minnesota and an expert on the history of dictionary illustrations, says that the 1859 dictionary that was the source of the engravings would have had a similar effect on its readers - "a sense of pleasure at staring into the book" - and it was a pleasure that the Merriam salespeople were happy to emphasize (although they called it learning).

What would Noah Webster himself think of this book? Probably not much: In his 1843 book, "Modes of Teaching the English Language," Webster quoted criticisms of images in children's schoolbooks: They made the children handle the books too much, so that they tore the books and dirtied them. "Gentlemen observe," he wrote, that images "have very much promoted superficial learning."

Erin McKean is a lexicographer (dictionaryevangelist.com) and blogger (dressaday.com). ■

<http://www.boston.com/bostonglobe/ideas/articles/2008/05/11/pictionary/>

Microwaves 'cook ballast aliens'

By Mark Kinver

Science and nature reporter, BBC News

US researchers say they have developed an effective way to kill unwanted plants and animals that hitch a ride in the ballast waters of cargo vessels.

Tests showed that a continuous microwave system was able to remove all marine life within the water tanks.

The UN lists "invasive species" dispersed by ballast water discharges as one of the four main threats to the world's marine ecosystems.

The findings will appear in the journal *Environmental Science and Technology*.

Shipping moves more than 80% of the world's commodities and transfers up to five billion tonnes of ballast water internationally each year, data from the UN shows.

Vessels, especially large container ships, need ballast tanks to provide stability in the water and correct any shift in the ships' mass.

When a ship's cargo is unloaded, it fills with ballast water; when it is later reloaded, often on the other side of the world, the water is discharged.



Co-author Dorin Boldor, from Louisiana State University's Agricultural Center, said the team envisaged the microwave device being fitted to the exit valve of a ballast tank.

It is extremely fast and very efficient at transferring the energy from the microwaves into heat

Dr Dorin Boldor,

Louisiana State University

"The basic idea is that you take the ballast water and pump it through a microwave cavity."

He added that the system would follow the same principle as a household microwave oven.

"The power level is much higher and a different frequency, but it creates a very high intensity electric field in the centre of the cavity that oscillates rapidly.



"The water molecules are going to start spinning around very fast and they are going to create a lot of friction that generates heat," Dr Boldor explained.

"But it generates heat in the whole volume at the same time, unlike if you try to use another heating mechanism where you have to take the heat from somewhere else and conduct it through the liquid."

This means that the researchers have a high degree of confidence that the system is treating all of the water to remove the unwanted organisms.

"It is extremely fast and very efficient at transferring the energy from the microwaves into heat," he told BBC News.

Biological stowaways

For thousands of years, marine species have been dispersed throughout the oceans by natural means, such as currents and drifting on debris. But natural barriers, such as temperature differences and land masses, have limited the range of some species' dispersal and allowed different marine ecosystems to evolve.

Since the emergence of the modern shipping fleet and growing trade between nations, these natural barriers have been broken down, allowing the introduction of alien species that upset the equilibrium of ecosystems. The UN-led Global Ballast Water Management Programme (GloBallast) estimates that at least 7,000 species are able to be carried across the globe in ships' ballast tanks. While many of these plants and creatures do not survive the journey, some find the new environment favourable enough to establish a reproductive population and go on to undermine native species.

For example, GloBallast says, European zebra mussels (*Dreissena polymorpha*) have infested more than 40% of the US's inland waterways. Between 1989 and 2000, up to \$1bn (£500m) is estimated to have been spent on controlling the spread of the alien invader. The arrival of an invasive jellyfish-like organism, *Mnemiopsis leidyi*, led to a major ecological "regime change" in the Black Sea, which contributed to the collapse of commercial fisheries in the region.

At one stage, the species accounted for about 90% of the sea's entire biomass. Its appetite for native plankton stocks meant that other fish species were unable to compete and re-establish viable populations.

In February 2004, the international shipping community agreed to establish tougher measures to prevent discharges of ballast water releasing potentially invasive species. The International Convention for the Control and Management of Ships' Ballast Water and Sediment requires all vessels over 400 tonnes to eventually fit systems to treat ballast water.

The team's development, which was funded by NOAA and engineering firm Laitram LLC, is ideally suited to help commercial operators meet their obligation under this legislation, Dr Boldor explained.

"It will probably work very well for it to be installed on very large ships themselves, but when you are talking about smaller vessels it may be more cost effective to have some sort of barge system based in the ports.

"It can just pull up to the ship, take and treat the ballast water while the ships are waiting to berth at the dock."

Story from BBC NEWS:

<http://news.bbc.co.uk/go/pr/fr/-/2/hi/science/nature/7392072.stm>

Published: 2008/05/12 09:17:28 GMT



Frigid robot eyes top tech prize

A robotic system designed to care for millions of biological samples in sub-zero temperatures has been chosen as a finalist for a top engineering award.



The Polar system is already used at the UK Biobank, a facility that aims to shed light on debilitating diseases.

The robot system will guard 10 million human blood and fluid samples at -80C for 25 years, whilst also allowing scientists to access them at any time. It is one of four finalists which will compete for the annual MacRobert award.

The prize is given out by the UK's Royal Academy of Engineering for technological and engineering innovation. The other finalists are the first commercially available bionic hand, an advanced filter to remove soot from diesel engines and a tiny silicon sensor which can detect explosives or toxic chemicals.

Deep breath

The Polar system, designed by the Automation Partnership, consists of a series of ultra-low temperature compartments designed to hold blood and urine samples, which can be accessed automatically by robotic arms. The liquid-nitrogen cooled store has been designed so that researchers do not have to enter a refrigerated area to retrieve or load samples.

It has been used by pharmaceutical companies as well as the UK Biobank, a medical research facility which intends to collect samples and data from more than 500,000 volunteers. This will be used as tool by researchers investigating a range of life-threatening illnesses including cancer, heart disease and diabetes.

It already contains data from more than 100,000 volunteers.



It is one of three technologies with potential medical benefits that have been picked as finalists for this year's awards.

A novel kind of chemical sensor, designed by Owlstone, a spin-out of Cambridge University, also has therapeutic uses.

The chemical chips are able to detect trace amounts of a wide variety of chemicals using a patented technique called Field Asymmetric Ion Mass Spectroscopy (FAIMS).

It fingerprints compounds by analysing how their charged forms move through a gas when subjected to electric fields. Each substance has its own characteristic signature. The sensor can be reprogrammed to look for different chemical fingerprints, such as those found in pre combustion fumes during the initial stages of a fire. However, one potential use is as a "breathalyser" to detect and diagnose illness by analysing chemicals on a patient's breath.

It is known that asthma sufferers, those with cystic fibrosis and some forms of cancer breathe out chemical markers of their condition.

Double win

The third medical technology selected by a panel of judges was the i-LIMB hand, a prosthetic device with five individually powered digits. The design started life in 1963 when researchers at Edinburgh's Princess Margaret Rose Hospital proposed a design to help children affected by Thalidomide.

It has taken more than 40 years to build a commercial product.

"Since we launched it in July 2007 over 200 patients have been fitted with it all over the world," said Stuart Mead, chief executive of the firm. One of the first patients to be fitted with a device was Donald McKillop who had to have his right hand amputated after complications following an accident. "The most important thing is the movement of the fingers, that's what really makes the difference," he said. "It's truly incredible to see the fingers moving and gripping around objects that I haven't been able to pick up before."

The final contender for the prize is a compact, soot filter for diesel cars, designed by engineers at Johnson Matthey.

The design uses heat from the engine to control hydrocarbon, carbon monoxide as well as soot emissions. It improves the efficiency of filters fitted inside the lower temperature exhaust.

"We have already exported over 1.5 million of these filters for use in European cars ahead of new emissions control legislation which comes into force from 2009", Dr Martyn Twigg of the firm. "These alone will stop millions kilograms of soot entering the atmosphere over the life of these vehicles."

The firm has previously won a MacRobert award for technology used to control soot emissions from trucks and buses.

The team will find out if it is a winner again - along with the other finalists - at a ceremony in London on 9 June.

Story from BBC NEWS:

<http://news.bbc.co.uk/go/pr/fr/-/2/hi/science/nature/7396317.stm>

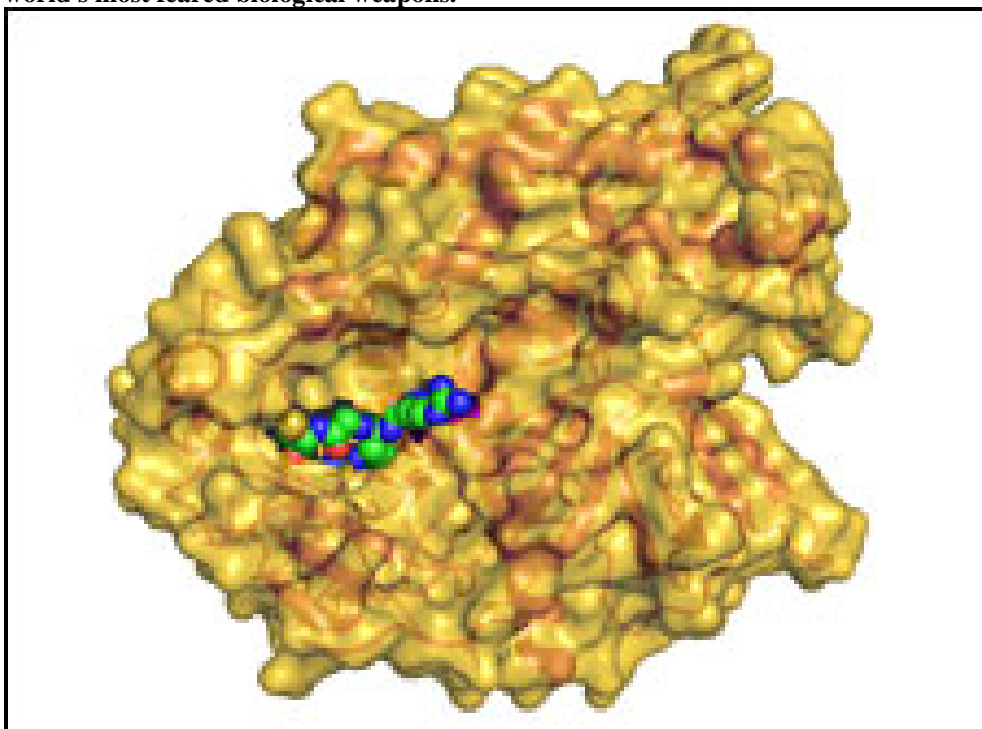
Published: 2008/05/12 15:32:02 GMT



Antidote to lethal germ 'closer'

By Angela Saini
BBC News

Scientists are on their way to developing an effective antidote for botulinum toxin - one of the world's most feared biological weapons.



Defence experts say that just one gram of the poison can kill hundreds of thousands of people.

Several people each year fall victim to "botulism" from food poisoning, but the toxin is also used as Botox - injected into brows to relax wrinkles.

The US team's findings appear in the Journal of Biological Chemistry.

With funding from the US government, researchers at the Brookhaven National Laboratory, New York, and the United States Army Medical Research Institute of Infectious Diseases (USAMRIID), Maryland, have broken through a barrier towards developing an effective antidote against the most potent form of the toxin.

The researchers have developed a protein that blocks the effects of the toxin by tricking it into not attacking cells in the body.

Biologist Subramanyam Swaminathan, who led the research, told BBC News: "We anticipate at least four to five years before this can be turned into an approved drug."



The *Clostridium botulinum* bacterium produces seven different neurotoxins, which attach to proteins inside human nerve cells and blocks the chemicals they use to communicate with each another and with muscles. This can paralyse breathing muscles, which eventually suffocates the victim.

The new protein developed at the Brookhaven National Laboratory acts on the most powerful of these seven toxins, for which there is no medical treatment.

It behaves as a decoy to proteins in the nerve cells, which means that the toxin chooses not to attach itself to the nerve cells when it enters the body. This prevents paralysis.

"It is about 10 to 15 times better than the best one available so far," said Subramanyam Swaminathan.

Vaccines for botulinum toxin already exist, designed to be administered before an attack, but this research could produce a drug that would work afterwards.

The US government has proposed increasing funding for research into defence against bioweapons such as botulinum to \$9bn (£4.5bn; 5.8bn euros) in 2009. This is a rise of more than 5% on the previous year.

Although botulinum toxin has never been successfully used as a bioweapon, the Japanese terrorist cult, Aum Shinrikyo, tried three times between 1990 and 1995.

Also, in the run-up to the 1991 Gulf War, Iraq reportedly produced thousands of litres of the toxin.

Story from BBC NEWS:

<http://news.bbc.co.uk/go/pr/fr/-/2/hi/science/nature/7395731.stm>

Published: 2008/05/12 10:40:49 GMT



Pollution 'ups blood clot risk'

Breathing in air pollution from traffic fumes can raise the risk of potentially deadly blood clots, a US study says.



Exposure to small particulates - tiny chemicals caused by burning fossil fuels - is known to increase the chances of heart disease and stroke.

But the Harvard School of Public Health found it also affected development of deep vein thrombosis - blood clots in the legs - in a study of 2,000 people.

Researchers said the pollution made the blood more sticky and likely to clot.

The team looked at people living in Italy - nearly 900 of whom developed DVT.

Blood clots which form in the legs can travel to the lungs, where they can become lodged, triggering a potentially fatal pulmonary embolism.

The risk of DVT is known to be increased by long periods of immobility. In particular, passengers on long-haul flights have been shown to be vulnerable, but so are people who spend long periods of time sitting at their office desk without exercising, or walking around.

It's an exciting finding because air quality is something we can improve on through tightening air quality legislation

Dr Beverley Hunt, of Lifeblood



Researchers obtained pollution readings from the areas they lived and found those exposed to higher levels of small particulates in the year before diagnosis were more likely to develop blood clots.

The Archives of Internal Medicine report said for every 10 microgrammes per square metre increase in small particulates, the risk of developing a DVT went up by 70%.

Air quality guidelines generally state that small particulate concentrations should not exceed 50 microgrammes.

Risk factor

Lead researcher Dr Andrea Baccarelli said: "Given the magnitude of the effects, our findings introduce a novel and common risk factor into the development of DVT.

"And, at the same time, they give further substance to the call for tighter standards and continued efforts aimed at reducing the impact of urban air pollutants on human health."

Dr Beverley Hunt, medical director of the DVT charity Lifeblood, said: "We have known for some time that air pollution has been associated with increased risk of heart attack and stroke.

"This study shows for the very first time that air pollution also increases the risk of clots in the veins and tells us why.

"It's an exciting finding because air quality is something we can improve on through tightening air quality legislation."

Story from BBC NEWS:

<http://news.bbc.co.uk/go/pr/fr/-/2/hi/health/7396733.stm>

Published: 2008/05/12 23:02:43 GMT



Breastfeeding 'may cut arthritis'

Women who breastfeed for more than a year reduce their chance of rheumatoid arthritis by half, research suggests.



Sweden's Malmo University Hospital compared 136 women with the condition to 544 without for the Annals of Rheumatic Diseases study.

They found women who had breastfed for 13 months or more were half as likely to develop rheumatoid arthritis as those who had never breastfed.

Those who breastfed for between one and 12 months had a 25% decreased risk.

The study also found that simply having children and not breastfeeding did not seem to protect the women against developing rheumatoid arthritis.

Around 400,000 people in the UK have the condition.

The surprising results from this research demonstrate how much more we need to know about rheumatoid arthritis and its causes

Rachel Haynes, Arthritis Care

The study notes that women have more than a two-fold higher incidence of rheumatoid arthritis than men.

It is known that breastfeeding is linked to raised levels of a hormone called oxytocin, which can reduce stress hormone levels, lower blood pressure and induce well-being.



However, breastfeeding also raises levels of another hormone - prolactin - which is known to stimulate the immune system, and may actually raise the risk of rheumatoid arthritis.

Different results

Professor Alan Silman, medical director of the Arthritis Research Campaign, said the study shows different results from previous studies.

"In the past we have shown that breastfeeding was a risk factor for developing rheumatoid arthritis in a small group of women soon after giving birth to their first child.

"This is slightly different in that it looks at longer-term risk. One explanation could be that women who breastfeed may lead healthier lifestyles than women who don't, but we don't know the mechanisms that would explain this fully, and not enough work has been done in this area."

Rachel Haynes, from the voluntary organisation Arthritis Care, said: "The surprising results from this research demonstrate how much more we need to know about rheumatoid arthritis and its causes."

But she added: "It is important that women feel able to make informed choices by balancing their lifestyle with the full range of evidence about the pros and cons of breastfeeding."

The Infant Feeding Survey, published in May last year, showed that most women are failing to follow government advice, with fewer than one in 100 women breastfeeding exclusively for the first six months.

While 76% of UK mothers started out breastfeeding - a rise of 7% since 2000 - most resort to formula milk within weeks.

Fewer than half of mothers are still breastfeeding by the time their child is six weeks old, and only a quarter do so at six months.

The study also looked at the role of the contraceptive pill, which has been previously suspected of cutting the risk of rheumatoid arthritis.

It has been thought the pill could offer a protective effect because it contains hormones that are also raised in pregnancy.

But the research found that taking oral contraceptives did not offer the women less chance of developing the disease.

Story from BBC NEWS:

<http://news.bbc.co.uk/go/pr/fr/-/2/hi/health/7395810.stm>

Published: 2008/05/12 23:03:34 GMT



Adults 'dropping out of learning'

Thousands of adults targeted by government skills-boosting schemes have dropped out of evening classes, a survey of 5,000 people suggests.



Those in the lowest income groups have been hit the hardest, with the share of skilled manual workers on courses falling by a fifth to 33% in one year.

This reverses the participation gains of the last 12 years, the figures show.

Young adults have also been hit hard, with a 16% fall in the number of 25 to 34-year-olds on courses in 2007-08.

Any small rises in the share of unskilled, unemployed and retired people on adult learning courses since Labour came to power have also been reversed.

We have stopped funding many short courses and are focusing this money

David Lammy
Skills minister

Just 26% of social groups D and E are on such courses - the same figure as in 1996.

Since then, the National Institute of Adult and Continuing Education has been counting the proportion of adults participating in learning through an annual survey.

Its director, Professor Alan Tuckett, said this year's survey findings posed sharp challenges for a government trying to improve the nation's skills.



The government is committed to a major programme of increasing the skills of working adults and youngsters, so that Britain can compete with the fast growing economies of China and elsewhere.

It has re-focused much of its funding away from short courses, in areas like foreign languages, towards improving basic skills such as literacy and numeracy.

And it has mounted several high-profile TV advertising campaigns to try to boost retraining. The government plans to spend £20m on advertising adult education before 2012.

'Complex picture'

Professor Tuckett said: "The very groups identified as key to the achievement of the skills strategy and in the Leitch Review are bearing the heaviest burden of the re-balancing of funding.

"The findings suggest that the price of investment in key groups of adults in workplace learning is being paid for by reduced participation by other adults from exactly the same groups.

"This is either because other workplace learning opportunities have declined, or because those adults can no longer access public provision they previously chose for themselves."

He added that there was a great deal of demoralisation among providers of adult education as more and more classes were closing.

The Department for Universities, Innovation and Skills (Dius) said the figures hid a more complex picture.

Skills minister David Lammy said the government was committed to ensuring those in the greatest need could access the skills training they needed to help them get a job or advance at work.

He said the government had invested £3bn in the last seven years and had helped more than 1.75 million adults improve their literacy and numeracy skills - though these government statistics count "adults" as being those over 16.

Mr Lammy added that funding for English as a Second Language courses had trebled since 2001, and that the budget for work-based learning was being raised to £1bn a year.

"To improve value for money we have stopped funding many short courses and are focusing this money towards, higher quality courses that directly improve people's employability," he added.

It is from these courses that many of the learners had been lost, Dius said.

Story from BBC NEWS:

<http://news.bbc.co.uk/go/pr/fr/-/1/hi/education/7396956.stm>

Published: 2008/05/12 23:01:27 GMT



DNA tests open a Pandora's Box of flies

- 19:00 15 May 2008
- NewScientist.com news service
- Mason Inman

Tropical rainforests pack animals into every nook and cranny but even so, they may host an even more diverse menagerie than meets the eye.

A new DNA analysis showed that one group of tropical flies, which all look basically the same, actually comprise at least 52 different species.

Marty Condon of Cornell College in Mount Vernon, US, and colleagues collected the larvae of flies from the genus *Blepharoneura*, in Costa Rica, Ecuador, Peru, French Guiana and Bolivia.

The flies were living on the succulent flowers of two dozen different species of plants in the cucumber family (Cucurbitaceae), which go through a sex change during their lives. When small, these plants sport lots of male flowers, and when large, they have a few female flowers.

Species glut

Earlier work had suggested there were a few fly species, each specialised for different parts of these plants. "We thought we had it down," Condon says. "One species in female flowers, one species in male flowers, one species in seeds." Then biologists thought there were actually six fly species.

Now we've opened a Pandora's Box of flies, Condon says. The team raised nearly 3,000 flies from larvae, and constructed DNA profiles.

They found a surprising amount of diversity. Using a conservative cut-off for what to consider separate species, they estimate that they have 52 different species of flies.

They often found multiple species of fly living on the same plant. In one case, a single flower held three males doing courtship displays –and they turned out to be three different species.

This sexual selection may be what keeps the species separate, Condon says.

Narrow niches

A closer look may reveal even more species within this set of flies, Condon says. "We think there are probably more species, and that more of them are specialists, than we're reporting here."

"Most naturalists who work in the tropics, from Darwin to E O Wilson, have recognised that tropical animals are very specialised," says Lee Dyer of Tulane University in New Orleans, US. "So it is surprising that this is one of only a few studies that have convincingly demonstrated this high level of tropical specialisation."

David Bickford of the National University of Singapore says the findings suggest that with destruction of tropical forests, the planet is losing more species than we even knew existed. "The biggest implication, besides our utterly shocking level of ignorance, is that conservation has got to become more of a priority," Bickford says.



However, Vojtech Novotny, of the Academy of Sciences of the Czech Republic, Ceske Budejovice, is more reticent. "Is the magnitude of tropical biodiversity going to be revised again, based on this paper? I do not think so," he says.

Genetic studies of common insect groups, such as moths, beetles, and caterpillars, have not revealed a lot of previously hidden species, Novotny argues, so the *Blepharoneura* flies might be exceptional.

Journal reference: *Science*, DOI: 10.1126/science.1155832

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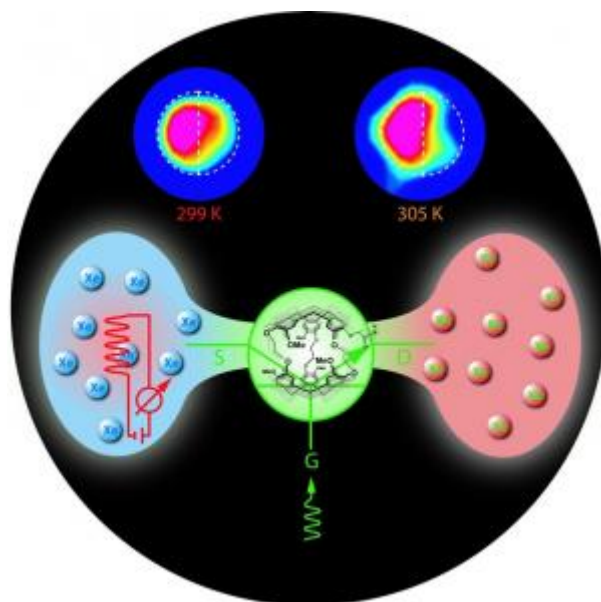
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Warming Up For Magnetic Resonance Imaging

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In the technique known as "temperature-controlled molecular depolarization gates," an atom of hyperpolarized xenon from the pool at left enters a cryptophane cage, center, which is part of a biosensor attached to a specific molecular target. A burst of tuned rf energy depolarizes the xenon, which is then ejected back into the pool by chemical exchange with the next incoming xenon atom. Depolarized xenon (right) stands out in the larger hyperpolarized pool and thus enhances the contrast of the nearby target molecule. At top, a phantom half-filled with agarose beads, to which biosensors are attached, shows how image contrast can be enhanced and controlled by temperature: a 6-K temperature increase quickly depolarizes the xenon in the vicinity of the target beads. (Credit: Image courtesy of DOE/Lawrence Berkeley National Laboratory)

ScienceDaily (May 12, 2008) — Standard magnetic resonance imaging, MRI, is a superb diagnostic tool but one that suffers from low sensitivity, requiring patients to remain motionless for long periods of time inside noisy, claustrophobic machines. A promising new MRI method, much faster, more selective — able to distinguish even among specific target molecules — and many thousands of times more sensitive, has now been developed in the laboratory by researchers at the Department of Energy's Lawrence Berkeley National Laboratory and the University of California at Berkeley.

The key to the new technique is called "temperature-controlled molecular depolarization gates." It builds on a series of previous developments in MRI and the closely related field of nuclear magnetic resonance, NMR (which instead of an image yields a spectrum of molecular information), by members of the laboratories of Alexander Pines and David Wemmer at Berkeley Lab and UC Berkeley. Pines is the Glenn T. Seaborg Professor of Chemistry at the University of California at Berkeley and a senior scientist in Berkeley Lab's Materials Sciences Division. Wemmer is Professor of Chemistry at UC Berkeley and a member of Berkeley Lab's Physical Biosciences Division.

The technique was developed by a team of past and present Pines and Wemmer lab members headed by Leif Schröder of Berkeley Lab's Materials Sciences Division and including Lana Chavez, Tyler Meldrum, Monica Smith, and Thomas Lowery.

"The new method holds the promise of combining a set of proven NMR tools for the first time into a practical, supersensitive diagnostic system for imaging the distribution of specific molecules on such targets as tumors in human subjects," says lead author Schröder, "or even on individual cancer cells."



Laying the groundwork: hyperpolarization and cryptophane biosensors lead to Hyper-CEST MRI

MRI and NMR make use of the quantum-mechanical phenomenon known as nuclear spin; nuclei with odd numbers of protons or neutrons have net magnetic moment and will orient themselves like tiny bar magnets, spin "up" or spin "down," in a strong magnetic field. If the spinning nuclei are knocked off-axis by a jolt of radio-frequency (rf) energy, they wobble or precess at a characteristic rate, a rate that is strongly conditioned by their immediate chemical neighbors. During a certain relaxation time (typical of each atomic species in a specific environment), the nuclei reorient themselves and emit a radio signal that reveals both their position and their chemical surroundings.

The spin-up state requires fractionally less energy, so there's typically a slight excess of spin-up nuclei, about one in a hundred thousand (.001 percent), and it's this tiny difference that yields a useful signal. In clinical settings MRI is usually done using hydrogen nuclei, protons, which are ubiquitous in the human body. But other nuclear species, notably the noble gas xenon, offer advantages over hydrogen that in the case of xenon include a virtual absence of background signal, since there is no xenon in biological systems.

Xenon is particularly useful in MRI and NMR because the spins of its nuclei are readily polarized, in a process involving contact with rubidium vapor irradiated with a laser beam. In such "hyperpolarized" xenon, the excess of spin-up nuclei can be as much as 20 percent, which gives a far stronger signal than hydrogen's .001 percent spin-up excess. Moreover, hyperpolarized xenon has a much longer relaxation time than hydrogen.

Now add the ability to associate a single xenon nucleus with a specific molecular target, for example a protein or sugar on the surface of a cancer cell. To do this, the Pines and Wemmer labs have created biosensors equipped with cages that take up and hold onto xenon atoms; the cages, molecules called cryptophanes, are linked to ligands that target specific molecules of interest. Xenon biosensors engineered with several different ligands can be used at the same time; once in place, biosensors carrying hyperpolarized xenon can localize the MRI signals from a range of different molecules on the target.

The final advance underlying the new technique is called Hyper-CEST: hyperpolarized xenon chemical-exchange saturation transfer. While biosensors can bring the xenon to specific molecular targets, in realistic applications relatively few of these are present, only about one percent compared to the total amount of free xenon injected near that target. The signal from the polarized xenon inside the biosensor cages is consequently much fainter than that from the uncaged polarized xenon nearby.

"About 60 percent of the biosensor cages are filled with xenon," says Schröder, "but the problem is, you get only a tiny, broad NMR signal from the xenon when it is inside the cage. On the other hand, you have thousands of xenon nuclei just sitting around the cage."

The trick then is to depolarize the xenon nuclei in the immediate vicinity of the cages, which will serve to outline the target in high contrast against the surrounding hyperpolarized xenon pool. This is done through chemical exchange, as xenon atoms are constantly entering and leaving the biosensor cages.

A polarized xenon atom from the pool enters the cryptophane cage, which alters the xenon's resonance frequency, allowing it to be depolarized by rf radiation tuned to a specific frequency. The depolarized xenon atom is then exchanged for a new, incoming polarized atom and reenters the pool. In this way the buildup of nearby depolarized nuclei quickly outlines the target.

Because it produces a much stronger signal, Hyper-CEST acquires images thousands of times faster than would imaging the caged xenon directly. Yet it retains the great advantages of cryptophane biosensors, including their ability to "multiplex," or detect different targets at the same time.

"Slight differences in cage composition, involving only a carbon atom or two, affect the frequency of the signal from the xenon and produce distinct peaks in the NMR spectrum," says team member Tyler

Meldrum, of the Materials Sciences Division. "If we design different cages for different xenon frequencies, we can put them all in at once and, by selectively tuning the rf pulses, see peaks at the frequencies corresponding to each kind of cage."

The final step

The processes described above — hyperpolarizing the xenon, caging it in biosensors, and building up depolarized xenon in the immediate vicinity of the target through chemical exchange and selective bursts of rf radiation — led to the development of Hyper-CEST MRI. But until now, Hyper-CEST MRI has only been tested at room temperature.

Using biosensor cages as temperature-controlled molecular depolarization gates makes Hyper-CEST MRI possible at a range of higher-than-room temperatures. Because the technique regulates the exchange rate of hyperpolarized-to-depolarized nuclei through the cages, biosensors regulated this way have been nicknamed "transpletors," by analogy to the transistors that act as gates for the flow of electrons from source to drain in electronic systems. Hyper-CEST at a range of temperatures has many advantages. Most basic is that biomedical MRI must operate at body temperature. Aside from this practical consideration, temperature determines the rates at which different kinds of cryptophane-cage hosts react with their xenon-atom guests. And increasing temperature dramatically increases chemical exchange rates.

"At room temperature, a xenon atom will stay approximately 50 milliseconds inside the cage before it leaves again," says team member Monica Smith, of Berkeley Lab's Physical Biosciences Division. "Approaching body temperature, the time inside the cage decreases by at least factor of 10." The ability to achieve high-contrast images, multiplexed to identify a range of molecular targets, and to do so in a short time, offers many benefits to patients and physicians.

"Doctors attempting to characterize tumors very often have to take biopsies, and that's painful for the patient, so they usually prefer to take only one biopsy," says Schröder. "But then they have to run all their tests on this very little tissue. So they would be happy with a method where you have a toolbox of sensors, you throw them all in and wait to let them bind, and then do your tests at the different frequencies and you see what sensors are present, detecting the different proteins. We showed that the exchange rate is so high at increased temperature that you can use a very selective rf pulse." Enabling fast, sensitive, molecule-specific NMR and MRI in humans and other living subjects is perhaps the most evident advantage of the new technique, but possible applications don't end there. For example, the method offers a better way to study chemical exchange in nanostructures like zeolites, which are important in catalysis, or in versatile carbon nanotubes. Temperature-controlled depolarization is a breakthrough for NMR and MRI that will find uses in a variety of fields.

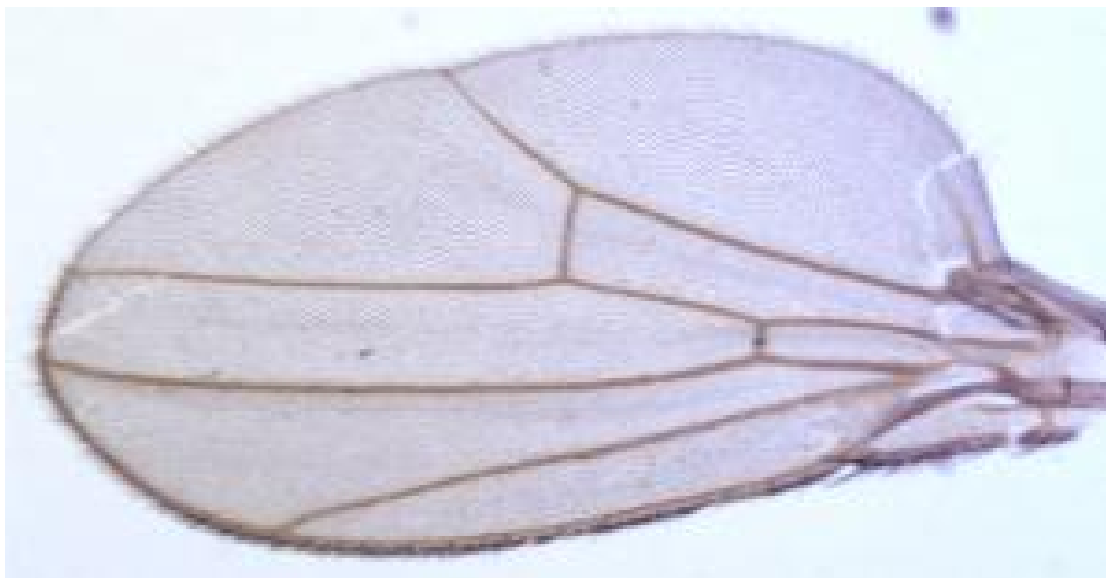
This research was supported by the Department of Energy's Office of Science, Office of Basic Energy Sciences; by the Deutsche Forschungsgemeinschaft; and by the University of California's Biotechnology Research and Education Program.

Journal reference:

1. Temperature-controlled molecular depolarization gates in nuclear magnetic resonance. Leif Schröder, Lana Chavez, Tyler Meldrum, Monica Smith, Thomas J. Lowery, David E. Wemmer, and Alexander Pines. International edition of *Angewandte Chemie*. <http://dx.doi.org/10.1002/anie.200800382>. [[link](#)]

Adapted from materials provided by [DOE/Lawrence Berkeley National Laboratory](http://www.sciencedaily.com/releases/2008/05/080508164408.htm).

Human Aging Gene Found In Flies



Images of fruit fly wings showing tufts of hairs, which is an indicator used to highlight instability of DNA in the corresponding cells. Instability of DNA is one of the key similarities found between the fruit flies studied and human patients with premature aging condition Werner syndrome. (Credit: Dr. Robert Saunders)

ScienceDaily (May 12, 2008) — Scientists funded by the Biotechnology and Biological Sciences Research Council (BBSRC) have found a fast and effective way to investigate important aspects of human aging. Working at the University of Oxford and The Open University, Dr Lynne Cox and Dr Robert Saunders have discovered a gene in fruit flies that means flies can now be used to study the effects aging has on DNA. In new work published today in the journal *Aging Cell*, the researchers demonstrate the value of this model in helping us to understand the aging process. This exciting study demonstrates that fruit flies can be used to study critical aspects of human aging at cellular, genetic and biochemical levels.

Dr Lynne Cox from the University of Oxford said: "We study a premature human aging disease called Werner syndrome to help us understand normal aging. The key to this disease is that changes in a single gene (called WRN) mean that patients age very quickly. Scientists have made great progress in working out what this gene does in the test tube, but until now we haven't been able to investigate the gene to look at its effect on development and the whole body. By working on this gene in fruit flies, we can model human aging in a powerful experimental system."

Dr Robert Saunders from The Open University added: "This work shows for the first time that we can use the short-lived fruit fly to investigate the function of an important human aging gene. We have opened up the exciting possibility of using this model system to analyse the way that such genes work in a whole organism, not just in single cells."

Dr Saunders, Dr Cox and colleagues have identified the fruit fly equivalent of the key human aging gene known as WRN. They find that flies with damage to this gene share important features with people suffering from the rapid aging condition Werner syndrome, who also have damage to the WRN gene. In particular, the DNA, or genetic blueprint, is unstable in the flies that have the damaged version of the gene and the chromosomes are often altered. The researchers show that the fly's DNA becomes rearranged, with genes being swapped between chromosomes. In patients with Werner syndrome, this genome instability leads to cancer. Cells derived from Werner syndrome patients are extremely sensitive



to a drug often used to treat cancers: the researchers show that the flies that have the damaged gene are killed by even very low doses of the drug.

Professor Nigel Brown, Director of Science and Technology, Biotechnology and Biological Sciences Research Council said: "The aging population presents a major research challenge to the UK and we need effort to understand normal aging and the characteristics that accompany it."

"Fruit flies are already used as a model for the genetics behind mechanisms that underlie normal functioning of the human body and it is great news that this powerful research tool can be applied to such an important area of study into human health."

Journal reference:

1. Saunders et al., Identification and characterization of a *Drosophila* ortholog of WRN exonuclease that is required to maintain genome integrity, *Ageing Cell* (2008), doi: [10.1111/j.1474-9726.2008.00388.x](https://doi.org/10.1111/j.1474-9726.2008.00388.x)

Adapted from materials provided by [Biotechnology and Biological Sciences Research Council](#).

[http://www.sciencedaily.com /releases/2008/05/080511205328.htm](http://www.sciencedaily.com/releases/2008/05/080511205328.htm)



Worms Triple Sperm Transfer When Paternity Is At Risk



Earthworm copulation. (Credit: SINC / Jorge Domínguez)

ScienceDaily (May 12, 2008) — Scientists used to think that hermaphrodites, due to their low position in the evolutionary scale, did not have sufficiently developed sensory systems to assess the “quality” of their mates. A new work has shown, however, that earthworms are able to detect the competition by fertilising the eggs that is going to find its sperm, tripling its volume when there is rivalry. This ability is even more refined as they are able to transfer more sperm to more fertile partners.

Hermaphrodites, organisms that have both female and male reproductive organs, such as earthworms, are denied the right to choose their partner. However, a study by researchers at the University of Vigo has shown that worms are capable of telling whether another worm is a virgin or not, and triple the volume of sperm transferred during copulation if they detect a fertilisation competition risk.

According to the study, which appears in the latest edition of the magazine *Proceedings of Royal Society B-Biological Sciences*, the partner’s assessment ability, which has often been considered incompatible with invertebrates, is a firm characteristic of worms when their sperm is competing for fertilisation. Authors of the study explained to SINC that “in high sperm competition situations, partner assessment is subject to strong selection in hermaphrodites, making these organisms very selective when choosing to whom and how much sperm to transfer”.

In total, scientists analysed 42 mature and virgin worms, allowing researchers to reach their conclusions. When worms detect a risk of their sperm competing with their rivals, these invertebrates are able to determine whether their partners have copulated previously, in which case they increase the volume of sperm donated. “This increase is even higher when worms mate with much larger partners, as they are more fertile”, explains Jorge Domínguez, one of the authors of the study.

Worms control their sperm volume

Thanks to the double mating experiment carried out by the scientists, the results show that worms have a refined control over the volume of sperm transferred during copulation according to the sex of the partner



they are mating with. The advantage of donating such amounts of sperm is due to the highly competitive environment in which these hermaphrodites live.

Multiple mating is common amongst worms and the reason why they have developed specific strategies to deal with strong sperm competition in fertilisation. Researchers suggest that “sperm competition in fertilisation is an evolutionary force which has affected worm mating behaviour”.

Worm courting can last up to an hour during which time the organisms secrete large amounts of mucus and press against each other with short, repetitive rubbing actions for subsequent exchange of sperm. If there is no fertilisation competition, worms are prudent in how much sperm they release, even waiting to mate with high-quality partners. “Worms can control copulation time or, alternatively, can have mechanisms which prevent all their sperm being released in a single mating event”, stress the authors.

The results of the study conclude that the volume of sperm donated to worms that are not virgins has been more variable than that transferred to virgin partners. In this respect, researchers estimated that the volume transferred to larger size partners which had previously copulated was five times greater than that transferred to virgin worms.

Journal reference:

1. Velando A., Eiroa J., Domínguez J. “Brainless but not clueless: earthworms boost their ejaculates when they detect fecund non-virgin partners” *Proceedings of The Royal Society B-Biological Sciences* 275(1638): 1067-1072

Adapted from materials provided by Plataforma SINC, via AlphaGalileo.

[http://www.sciencedaily.com /releases/2008/05/080508174651.htm](http://www.sciencedaily.com/releases/2008/05/080508174651.htm)

Female Concave-eared Frogs Draw Mates With Ultrasonic Calls



O. tormota lives in a noisy environment on the brushy edge of streams in the Huangshan Hot Springs, in central China, where waterfalls and rushing water provide a constant din. (Credit: Photo courtesy of Albert Feng)

ScienceDaily (May 12, 2008) — Most female frogs don't call; most lack or have only rudimentary vocal cords. A typical female selects a mate from a chorus of males and then --silently -- signals her beau. But the female concave-eared torrent frog, *Odorrana tormota*, has a more direct method of declaring her interest: She emits a high-pitched chirp that to the human ear sounds like that of a bird.

This is one of several unusual frog-related findings reported recently in the journal *Nature*.

O. tormota lives in a noisy environment on the brushy edge of streams in the Huangshan Hot Springs, in central China, where waterfalls and rushing water provide a steady din. The frog has a recessed eardrum, said Albert Feng, a professor of molecular and integrative physiology at the University of Illinois and team leader on the new study.

"In the world we know of only two species -- the other one in southeast Asia -- that have the concave ear," Feng said. "The others all have eardrums on the body surface."

Earlier studies, conducted by Feng, Jun-Xian Shen at the Institute of Biophysics at the Chinese Academy of Sciences and Peter Narins at the University of California, Los Angeles, found that *O. tormota* males emit -- and respond to -- unusual chirping calls from other males. These calls are audible, but also have energy in the ultrasonic range. The recessed ear structure protects an eardrum that is 1/30 the thickness of that of a normal frog, allowing it to detect very high frequency sounds.

The unusual ear structure and the high-pitched calls are likely an evolutionary adaptation to the noisy environment, Feng said. The waterfalls and streams produce a steady racket predominantly in a lower frequency range than that used by the frogs.



Laboratory experiments showed that the frogs could hear most of the audible and ultrasonic frequencies emitted by other *O. tormota* frogs. The only other animals known to use ultrasonic communication are bats, dolphins, whales and some insects.

The calls are quite complex. A single *O. tormota* frog broadcasts its message over several frequencies at once, at harmonic intervals, like a chord strummed simultaneously on several strings.

The new analysis, conducted by Shen, Feng and Narins, found that female *O. tormota* frogs also emit a call that spans audible and ultrasonic frequencies. The team has not observed females vocalizing in the wild (these frogs are nocturnal and can leap up to 30 times their body length), but in laboratory settings the females emitted calls only when they were carrying eggs.

Male *O. tormota* frogs exposed to recorded female calls were quite responsive, usually chirping within a small fraction of a second.

"The frog's response is instantaneous -- right after the stimulus," Feng said.

In the laboratory, the males usually chirped and then leapt directly at the source of the female call. Their ability to home in on the sound call was astonishingly precise, Feng said. A typical male could leap toward the sound with an accuracy of over 99 percent.

"This is just unheard of in the frog kingdom," he said.

Only elephants, humans, barn owls and dolphins are known to detect sound with similar precision. The small distance between the frog's ears (about one centimeter) makes its ability to localize the sound that much more impressive, Feng said.

How the female picks a mate in the wild is still unknown, however.

"We have a lot of work to do to figure out whether she directs the signal to one male or whether she lets a bunch of males come and compete, or whether there is any kind of dueting session during which she then decides: 'OK, You're my guy. Hop on my back and I'll take you to the creek!'" Feng said.

These studies likely have implications for human health. Earlier research into the mechanics of frog hearing and directional hearing helped Feng and his colleagues at the U. of I.'s Beckman Institute for Advanced Science and Technology design an "intelligent" hearing aid that boosts sound signals of interest embedded in other sounds in the immediate environment of the listener.

Adapted from materials provided by [University of Illinois at Urbana-Champaign](http://www.science.illinois.edu), via [EurekAlert!](http://www.eurekalert.com), a service of AAAS.

[http://www.sciencedaily.com /releases/2008/05/080511190843.htm](http://www.sciencedaily.com/releases/2008/05/080511190843.htm)



Men Are More Likely Than Women To Crave Alcohol When They Feel Negative Emotions

ScienceDaily (May 12, 2008) — Women and men tend to have different types of stress-related psychological disorders. Women have greater rates of depression and some types of anxiety disorders than men, while men have greater rates of alcohol-use disorders than women. A new study of emotional and alcohol-craving responses to stress has found that when men become upset, they are more likely than women to want alcohol.

"We know that women and men respond to stress differently," said Tara M. Chaplin, associate research scientist at Yale University School of Medicine and first author of the study. "For example, following a stressful experience, women are more likely than men to say that they feel sad or anxious, which may lead to risk for depression and anxiety disorders. Some studies have found that men are more likely to drink alcohol following stress than women. If this becomes a pattern, it could lead to alcohol-use disorders." As part of a larger study, the researchers exposed 54 healthy adult social drinkers (27 women, 27 men) to three types of imagery scripts -- stressful, alcohol-related, and neutral/relaxing -- in separate sessions, on separate days and in random order. Chaplin and her colleagues then assessed participants' subjective emotions, behavioral/bodily responses, cardiovascular arousal as indicated by heart rate and blood pressure, and self-reported alcohol craving.

"After listening to the stressful story, women reported more sadness and anxiety than men," said Chaplin, "as well as greater behavioral arousal. But, for the men ... emotional arousal was linked to increases in alcohol craving. In other words, when men are upset, they are more likely to want alcohol." These findings -- in addition to the fact that the men drank more than the women on average -- meant that the men had more experience with alcohol, perhaps leading them to turn to alcohol as a way of coping with distress, added Chaplin. "Men's tendency to crave alcohol when upset may be a learned behavior or may be related to known gender differences in reward pathways in the brain," she said. "And this tendency may contribute to risk for alcohol-use disorders."

There is a greater societal acceptance of "emotionality," particularly sadness and anxiety, in women than in men, noted Chaplin.

"Women are more likely than men to focus on negative emotional aspects of stressful circumstances, for example, they tend to 'ruminate' or think over and over again about their negative emotional state," she said. "Men, in contrast, are more likely to distract themselves from negative emotions, to try not to think about these emotions. Our finding that men had greater blood pressure response to stress, but did not report greater sadness and anxiety, may reflect that they are more likely to try to distract themselves from their physiological arousal, possibly through the use of alcohol."

Journal reference:

1. Kwangik Hong, Keri Bergquist, and Rajita Sinha of the Department of Psychiatry at the Yale University School of Medicine. Gender Differences in Response to Emotional Stress: An Assessment across Subjective, Behavioral and Physiological Domains and Relations to Alcohol Craving. *Alcoholism: Clinical & Experimental Research*. July 2008.

Adapted from materials provided by Alcoholism: Clinical & Experimental Research, via EurekAlert!, a service of AAAS.

<http://www.sciencedaily.com/releases/2008/05/080511190834.htm>



Braille Converter Bridges The Information Gap

ScienceDaily (May 12, 2008) — A free, e-mail-based service that translates text into Braille and audio recordings is helping to bridge the information gap for blind and visually impaired people, giving them quick and easy access to books, news articles and web pages.

Developed by European researchers, the RoboBraille service offers a unique solution to the problem of converting text into Braille and audio without the need for users to operate complicated software.

“We started working in this field 20 years ago, developing software to translate text into Braille, but we discovered that users found the programs difficult to use – we therefore searched for a simpler solution,” explains project coordinator Lars Ballieu Christensen, who also works for Synscenter Refsnaes, a Danish centre for visually impaired children.

The result of the EU-funded project was RoboBraille, a service that requires no more skill with a computer than the ability to send an e-mail.

Users simply attach a text they want to translate in one of several recognised formats, from plain text and Word documents to HTML and XML. They then e-mail the text to the service’s server. Software agents then automatically begin the process of translating the text into Braille or converting it into an audio recording through a text-to-speech engine.

“The type of output and the language depends on the e-mail address the user sends the text to,” Christensen says. “A document sent to .org would be converted into spoken British English while a text sent to .org would be translated from Portuguese into six-dot Braille.”

The user then receives the translation back by e-mail, which can be read on a Braille printer or on a tactile display, a device connected to the computer with a series of pins that are raised or lowered to represent Braille characters.

RoboBraille can currently translate text written in English, Danish, Italian, Greek and Portuguese into Braille and speech. The service can also handle text-to-speech conversions in French and Lithuanian.

Christensen notes that the RoboBraille partners are constantly working on adding new languages to the service and plan to start providing Braille and audio translations for Russian, Spanish, German and Arabic. They are also working on making the service compatible with PDF documents and text scanned from images.

Up to 14,000 translations a day

At present, the service translates an average of 500 documents a day, although it could handle as many as 14,000. RoboBraille can return a simple text in Braille in under a minute while taking as long as 10 hours to provide an audio recording of a book.

As of January, the RoboBraille system had carried out 250,000 translations since it first went online.

The team have won widespread recognition for their work, receiving the 2007 Social Contribution Award from the British Computer Society in December while in April they were awarded the 2008 award for technological innovation from Milan-based Well-Tech.

“We initially started offering the service only in Denmark but to make it viable commercially we needed to broaden our horizons. Hence the eTen project which allowed us to involve other organisations across





Europe in developing and expanding the service, not only geographically but also in terms of users,” Christensen says.

In addition to the blind and visually impaired, the service can also help dyslexics, people with reading difficulties and the illiterate. The project partners plan to continue to offer the service for free to such users and other individuals, while in parallel developing commercial services for companies and public institutions.

“Pharmaceutical companies in Europe will soon be required to ensure all medicine packaging is labelled in Braille and we are currently working with three big firms to provide that service,” Christensen explains. “Banks and insurance companies are also interested in using it to provide statements in Braille as too is the Danish tax office. In Italy there is interest in using it in the tourism sector.”

The RoboBraille team, which recently received an €1.1 million grant over four years from the Danish government, expect the service to be profitable within four or five years.

And although they are not actively seeking investors, they are interested in partnerships with organisations interested in collaborating on specific social projects.

RoboBraille was funded under the EU's eTEN programme for market validation and implementation.

Adapted from materials provided by ICT Results.

[http://www.sciencedaily.com /releases/2008/05/080508174310.htm](http://www.sciencedaily.com/releases/2008/05/080508174310.htm)

Hot-air Balloon Research May Improve Tornado Predictions

UA Huntsville graduate students and staff attach a bundle of asphalt shingles to Randy Sedlak's balloon as part of an experiment to help scientists improve tornado forecasting. (Credit: Mariana Felix)

ScienceDaily (May 12, 2008) — Three hot-air balloons dropped asphalt shingles, lumber, sticks, leaves and pine needles onto a north Alabama landfill, so scientists at The University of Alabama in Huntsville could gather data needed to improve tornado warnings.

The payloads dropped by the balloons were similar to the types of debris thrown into the air by tornados that touch the ground. Scientists at UAHuntsville's Earth System Science Center hope the Doppler radar data collected will be a first step toward programming National Weather Service Doppler radar to recognize tornado debris, so more timely and precise tornado warnings might be issued.

"We still have to inspect and analyze the data," said Dr. Walt Petersen, a UAHuntsville research scientist, "but there is a real possibility that we got useful data. We have to go back through and take out the balloons' radar signatures. We should be able to do that and, if we can, whatever is left was the debris."

"I'm just glad to finally do something useful through ballooning," said Dave Knoblock, a hot-air balloon pilot from Montgomery, Ala., whose payload included scrap lumber and wooden shutters.

A dozen balloon pilots and their ground crews volunteered to take part in the experiment, but marginal wind conditions at the experiment site grounded most of the aircraft.

"We did learn more about how we might pursue this in the future," Petersen said. "The experiment provided us with several questions we can answer and several we might not be able to answer. We're trying to do something difficult. We're trying to simulate a tornado."

The balloon experiment was the follow-up to a Feb. 6 tornado in nearby Lawrence County, Alabama. Debris from that killer storm was picked up by an experimental weather radar jointly operated by UAHuntsville and WHNT-TV.





Two of Petersen's UAH graduate students, Chris Schultz and Elise Johnson, monitored the radar that morning from the safety of their temporary operations center -- the bathroom in Schultz' apartment, "in case we had to dive into the bathtub."

Schultz later suggested to Petersen that there might be a debris signature associated with the Lawrence County storm.

That was the first time a significant tornado hit within range of the advanced radar unit at the Huntsville (Ala.) International Airport put into service in late 2004. Other storm-related debris sightings using similar radar technology near Enterprise, Ala., and at the National Severe Storms Laboratory in Norman, Okla., have been rare, so every sighting adds substantially to the paltry information previously available.

The Advanced Radar for Meteorological and Operational Research (ARMOR) was developed jointly, with UAHuntsville and WHNT collaborating to upgrade a decommissioned former National Weather Service Doppler radar unit.

ARMOR is a dual polarimetric radar, while most other weather radar units are single polarity. Dual polarization gives ARMOR the ability to gather more data about the size and shape of particles in the air. Initially it was thought that the dual polarization capability would help scientists learn more about severe storms, identify hail or snow, and better estimate rainfall. The ability to recognize flying debris wasn't something scientists expected.

If computers can be programmed to recognize debris in the radar data, that programming might be a standard feature when the National Weather Service upgrades its existing nationwide NEXRAD radar network to dual polarimetric capabilities beginning in 2009.

While the debris feature might not reduce the number of false tornado warnings, it could add a level of urgency and precision to warnings when tornadoes do occur, Petersen said.

"The real advantage would be the precision," he said. "These events are usually going to be associated with large scale mesocyclones, so tornado warnings would probably already have been issued. But those large-scale rotation features can cover several miles.

"With this debris signal, we might be able to pinpoint the precise spot where a tornado is on the ground. It would be great to be able to say, 'The tornado is right there, at that town.' If you could automate a system to do that, it would be quite handy and useful."

ARMOR picked up the radar reflection of debris thrown as much as two miles into the air by the tornado. The funnel-shaped plume first shows up on the radar screen above the Pinhook community, close to the time that the tornado was rated as very intense (EF-3 on the extended Fujita scale).

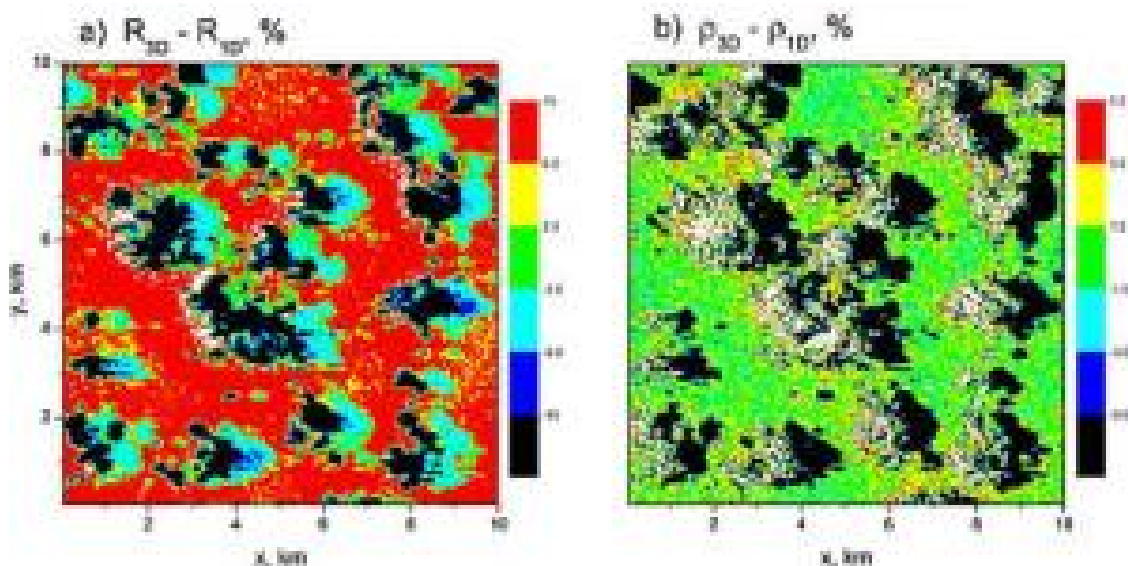
"There's nothing else we can come up with to explain this," Petersen said. "Things match up so well, this is not coincidence. We think our first impressions were correct, that this is indeed a debris signature."

The data analysis and related work are supported by funding secured by U.S. Sen. Richard Shelby for the Tornado and Hurricane Observations and Research Center (THOR) test bed facility at The University of Alabama in Huntsville.

Adapted from materials provided by [University of Alabama Huntsville](http://www.sciencedaily.com).

[http://www.sciencedaily.com /releases/2008/05/080508182435.htm](http://www.sciencedaily.com/releases/2008/05/080508182435.htm)

Seeing Clearly Despite The Clouds: New Approach Improves Atmospheric Aerosol Measurements On Cloudy Days



Clearly cloudy: Using the ratio method (right) clears up the satellite view (left) of a partly cloudy sky. (Credit: Image courtesy of Pacific Northwest National Laboratory)

ScienceDaily (May 12, 2008) — Satellites taking atmospheric measurements might now be able to see blue skies as clearly as optimists do. Researchers have found a way to reduce cloud-induced glare when satellites measure blue skies on cloudy days, by as much as ten-fold in some cases. The result might lead to more accurate estimates of the amount of sunlight penetrating the atmosphere. Because clouds represent one of the largest areas of uncertainty, eventually this could lead to improved climate models.

Sunlight bouncing off clouds blinds satellites trying to determine how much the blue sky between is actually reflecting. Researchers at the Department of Energy's Pacific Northwest National Laboratory have found that using an indirect measurement of that reflected light can bring the measurements of cloud-bordered blue skies to within about 10 percent of what other instruments indicate, the researchers report March 28 in *Geophysical Research Letters*.

"When researchers try to apply satellite technology originally developed for clear skies to partly cloudy conditions, they find additional light reflected from clouds," says PNNL atmospheric scientist Evgenii Kassianov. "We can't use the same technology we use for clear skies for complex cloudy skies."

Blue skies might seem empty, but they are full of naked-to-the-eye particles called aerosols, which are made up of water and bits of matter. These aerosols reflect sunlight. The more aerosols, the more sunlight is reflected back to the satellite. But on cloudy days, clouds bounce sunlight all around and make nearby aerosols seem brighter than they really are. Previous research has shown that clouds can brighten aerosols even up to three kilometers (almost two miles) away.

Atmospheric scientists convert the brightness of those aerosols into a value called the aerosol optical depth. This is roughly how far light can penetrate the air, sometimes thought of as visibility: skies with few aerosols appear clear and skies with many appear hazy. Previous work has shown that nearby clouds can increase the brightness of blue skies by 10 to 15 percent, underestimating the visibility by 140 percent.

To address the problem, Kassianov and his fellow PNNL researcher Mikhail Ovtchinnikov took advantage of the fact that clouds largely reflect the same amount of light regardless of the wavelength of



light. Aerosols, on the other hand, reflect sunlight at different wavelengths to differing degrees. So, the two tested whether using ratios of sunlight reflectance at different wavelengths might allow the extra reflectance from clouds to drop out of their atmospheric images.

The idea worked. The researchers constructed two images of a patch of cloudy sky using cumbersome computational methods that can subtract out estimated cloud-induced glare. One was based on total reflected light, and the other was based on ratios of how much light was reflected at two different wavelengths. The ratio image provided a view of the cloudy sky with much better contrast than the reflected light one, indicating that ratios better delineate blue sky from cloud.

But a pretty picture won't help anyone recreate aerosols in a computer model. So the team devised an innovative way to convert the ratios back into aerosol optical depths. The team created a database that related wavelength ratios, particles sizes, number of particles and aerosol optical depth. From this database, two ratios would allow them to determine their aerosol properties of interest.

The two then determined the accuracy of the ratio method. They selected data from a typical summer day in the southern Great Plains, gathered via the DOE's Atmospheric Radiation Measurement Climate Research Facility (ACRF) in Oklahoma. Using the ratio method, they retrieved the aerosol optical depth at three wavelengths (470, 660 and 870 nanometers) and compared this to the original data. The ratio method estimated aerosol optical depth under partly cloudy conditions with an error of only about 10 percent.

If the results hold up with additional testing, Kassianov says this approach could be applied to data being collected by NASA's Earth Observing System in skies near clouds.

"Researchers use different models and try to incorporate aerosol effects. The models are so inaccurate that we don't know how much aerosols change cloud properties," he says. "This tool could potentially increase the accuracy of our climate models."

Journal reference:

1. E. I. Kassianov, M. Ovtchinnikov, On reflectance ratios and aerosol optical depth retrieval in the presence of cumulus clouds, *Geophys Res Lett*, March 28, 2008, doi: [10.1029/2008GL033231](https://doi.org/10.1029/2008GL033231).

Adapted from materials provided by [Pacific Northwest National Laboratory](http://www.pnl.gov).

<http://www.sciencedaily.com/releases/2008/05/080512124408.htm>



Binge Drinkers Have A Disconnect Between Assessing Their Driving Abilities And Reality

ScienceDaily (May 12, 2008) — While many people believe that alcohol-impaired (AI) drivers are usually alcoholics, in fact, 80 percent of AI incidents are caused by binge drinkers. A recent study conducted among college students has found that binge drinkers, even when legally intoxicated, nonetheless believe they having adequate driving abilities. "Binge drinkers are individuals who, when they drink, typically drink to get drunk," explained Cecile A. Marcziński, assistant professor in the department of psychology at Northern Kentucky University and first author of the study. "Binge drinkers are often young individuals, like college students, who are drinking irresponsibly and most of them are not alcohol dependent." College students, as a population, are most likely to binge drink, Marcziński added. "Binge drinking is widespread on college campuses, with almost half of students reporting binge drinking," she said. "They are also particularly prone to AI driving. Thus, we needed to understand why a population that knows better than to engage in impaired driving still does.

Participants in this study were 20 male and 20 female social-drinking college students (24 binge drinkers, 16 non-binge drinkers) between 21 and 29 years of age. All participants attended two sessions: one during which they received a moderate dose of alcohol (0.65 g/kg), and one during which they received a placebo. Following each session/dose, researchers measured the students' performance during a simulated driving task, and also measured their subjective responses, including ratings of sedation, stimulation and driving abilities. "After being given an intoxicating dose of alcohol, all of these individuals -- both binge and non-binge drinkers -- were very poor drivers when tested on a driving simulator," said Marcziński. "However, when all of the participants are asked to rate their driving ability, the binge drinkers reported that they had a greater ability to drive compared to the non-binge drinkers."

The authors hypothesize that binge drinkers lack an "internal sedation cue" that allows an accurate assessment of their driving abilities after drinking. "Furthermore," said Marcziński, "the dose of alcohol we gave resulted in a blood alcohol concentration (BAC) of .08g percent, which is the legal limit for driving. If these binge drinkers had been driving and were stopped by police, they would have been prosecuted for impaired driving." Marcziński said that these findings might help policy and law makers understand why the standard message of "don't drive when your BAC reaches .08 or more" may be not be as straight forward to follow as one might think. "A BAC of .08 may feel differently depending on how much you typically drink," she said. "If you often drink to get drunk, as many young people do, you will be very bad at determining whether or not you should drive. Thus, prevention programs where college students are stopped leaving bars and given a breathalyzer reading may help many individuals learn what .08 feels like. In addition, we might also entertain a lower BAC limit for driving. Many European countries have had great success in decreasing impaired driving rates and related accidents by lowering their BAC limit to .05." There is some good news, however. "While a small portion of young binge drinkers may develop serious problems with alcohol, most of them will mature out of this behavior," she said. The study was funded by the Alcoholic Beverage Medical Research Foundation.

Journal reference:

1. Effects of Alcohol on Simulated Driving and Perceived Driving Impairment in Binge Drinkers. *Alcoholism: Clinical & Experimental Research*. Emily L.R. Harrison of the Department of Psychiatry at Yale University; and Mark T. Fillmore of the Department of Psychology at the University of Kentucky. July 2008.

Adapted from materials provided by Alcoholism: Clinical & Experimental Research, via EurekAlert!, a service of AAAS.

<http://www.sciencedaily.com/releases/2008/05/080511190840.htm>



Solar Variability: Striking A Balance With Climate Change



The sun radiates huge amounts of electromagnetic energy in all directions. Earth is only one small recipient of the sun's energy; the sun's rays extend far out into the solar system, illuminating all the other planets. (Credit: NASA)

ScienceDaily (May 12, 2008) — The sun has powered almost everything on Earth since life began, including its climate. The sun also delivers an annual and seasonal impact, changing the character of each hemisphere as Earth's orientation shifts through the year. Since the Industrial Revolution, however, new forces have begun to exert significant influence on Earth's climate. "For the last 20 to 30 years, we believe greenhouse gases have been the dominant influence on recent climate change," said Robert Cahalan, climatologist at NASA's Goddard Space Flight Center in Greenbelt, Md. For the past three decades NASA scientists have investigated the unique relationship between the sun and Earth. Using space-based tools, like the Solar Radiation and Climate Experiment (SORCE), they have studied how much solar energy illuminates Earth, and explored what happens to that energy once it penetrates the atmosphere. The amount of energy that reaches Earth's outer atmosphere is called the total solar irradiance. Total solar irradiance is variable over many different timescales, ranging from seconds to centuries due to changes in solar activity.

The sun goes through roughly an 11-year cycle of activity, from stormy to quiet and back again. Solar activity often occurs near sunspots, dark regions on the sun caused by concentrated magnetic fields. The solar irradiance measurement is much higher during solar maximum, when sunspot cycle and solar activity is high, versus solar minimum, when the sun is quiet and there are usually no sunspots.

"The fluctuations in the solar cycle impacts Earth's global temperature by about 0.1 degree Celsius, slightly hotter during solar maximum and cooler during solar minimum," said Thomas Woods, solar scientist at the University of Colorado in Boulder. "The sun is currently at its minimum, and the next solar maximum is expected in 2012."

Using SORCE, scientists have learned that about 1,361 watts per square meter of solar energy reaches Earth's outermost atmosphere during the sun's quietest period. But when the sun is active, 1.3 watts per square meter (0.1 percent) more energy reaches Earth. "This TSI measurement is very important to climate models that are trying to assess Earth-based forces on climate change," said Cahalan. Over the

past century, Earth's average temperature has increased by approximately 0.6 degrees Celsius (1.1 degrees Fahrenheit). Solar heating accounts for about 0.15 C, or 25 percent, of this change, according to computer modeling results published by NASA Goddard Institute for Space Studies researcher David Rind in 2004. Earth's climate depends on the delicate balance between incoming solar radiation, outgoing thermal radiation and the composition of Earth's atmosphere. Even small changes in these parameters can affect climate. Around 30 percent of the solar energy that strikes Earth is reflected back into space. Clouds, atmospheric aerosols, snow, ice, sand, ocean surface and even rooftops play a role in deflecting the incoming rays. The remaining 70 percent of solar energy is absorbed by land, ocean, and atmosphere.

"Greenhouse gases block about 40 percent of outgoing thermal radiation that emanates from Earth," Woods said. The resulting imbalance between incoming solar radiation and outgoing thermal radiation will likely cause Earth to heat up over the next century, accelerating the melting polar ice caps, causing sea levels to rise and increasing the probability of more violent global weather patterns.

Non-Human Influences on Climate Change

Before the Industrial Age, the sun and volcanic eruptions were the major influences on Earth's climate change. Earth warmed and cooled in cycles. Major cool periods were ice ages, with the most recent ending about 11,000 years ago. "Right now, we are in between major ice ages, in a period that has been called the Holocene," said Cahalan. "Over recent decades, however, we have moved into a human-dominated climate that some have termed the Anthropocene. The major change in Earth's climate is now really dominated by human activity, which has never happened before."

The sun is relatively calm compared to other stars. "We don't know what the sun is going to do a hundred years from now," said Doug Rabin, a solar physicist at Goddard. "It could be considerably more active and therefore have more influence on Earth's climate." Or, it could be calmer, creating a cooler climate on Earth similar to what happened in the late 17th century. Almost no sunspots were observed on the sun's surface during the period from 1650 to 1715. This extended absence of solar activity may have been partly responsible for the Little Ice Age in Europe and may reflect cyclic or irregular changes in the sun's output over hundreds of years. During this period, winters in Europe were longer and colder by about 1 C than they are today. Since then, there seems to have been on average a slow increase in solar activity. Unless we find a way to reduce the amount of greenhouse gases we put into the atmosphere, such as carbon dioxide from fossil fuel burning, the solar influence is not expected to dominate climate change. But the solar variations are expected to continue to modulate both warming and cooling trends at the level of 0.1 to 0.2 degrees Celsius (0.18 to 0.26 Fahrenheit) over many years.

Future Measurements of Solar Variability

For three decades, a suite of NASA and European Space Agency satellites have provided scientists with critical measurements of total solar irradiance. The Total Irradiance Monitor, also known as the TIM instrument, was launched in 2003 as part of the NASA's SORCE mission, and provides irradiance measurements with state-of-the-art accuracy. TIM has been rebuilt as part of the Glory mission, scheduled to launch in 2009. Glory's TIM instrument will continue an uninterrupted 30-year record of solar irradiance measurements and will help researchers better understand the sun's direct and indirect effects on climate. Glory will also collect data on aerosols, one of the least understood pieces of the climate puzzle.

Adapted from materials provided by National Aeronautics and Space Administration. Original article written by Rani Gran.

<http://www.sciencedaily.com/releases/2008/05/080512120523.htm>



Mitral Valve Leak Repaired Through Tiny Puncture Hole Using Live 3D Images

ScienceDaily (May 12, 2008) — Physicians at the Methodist DeBakey Heart & Vascular Center at The Methodist Hospital in Houston now close certain types of leaky heart valves through a tiny puncture in the groin, using live 3D imaging for precise guidance. Methodist offers this combination treatment as an alternative to open heart surgery.

Drs. Sashi Guthikonda and Neal Kleiman, interventional cardiologists at Methodist, recently used a catheter to close a leak surrounding a 65 year old patient's mitral valve, rather than exposing her to a potential 4th open heart surgery. The leak was causing such damage to her blood that she was constantly weak and needed multiple blood transfusions.

“Many physicians and cardiologists don't know this procedure is available at all, but closing a leaky valve this way saves our patients from the trauma of open heart surgery,” said Guthikonda, who learned this procedure during his fellowship at Emory University Medical Center. “This procedure, which only requires a 3 mm incision, leads to significantly less pain, much faster recovery and much lower overall risk than surgery.”

Marisa Helfrich's heart disease stemmed from a bout with rheumatic fever when she was a young child growing up in Italy. By the time she was 20, both her mitral valve and her aortic valve had hardened. She had both valves replaced with mechanical valves, then her mechanical mitral valve failed and she had to have it replaced a second time. When it recently began leaking, she was referred to Methodist because of the high risk associated with an additional open heart surgery.

During the procedure, the cardiologist snaked a catheter from Helfrich's groin into her heart, where a small device called a duct occluder was deployed, like an umbrella, to close the leak around the mitral valve.

Live 3D transesophageal echo (TEE) imaging helped guide the movement and placement of the device to accurately close the leak. This advanced visualization provided the cardiologist with a more precise view of the leak from all sides. Methodist is the only hospital in Texas/Houston/the Texas Medical Center to offer this advanced imaging technology to patients.

“Live 3D images help us quantify the severity of the injury like never before,” said cardiologist Dr. Stephen Little, who specialized in cardiac imaging and participated in the treatment. “It also provides us with a higher degree of confidence in the placement of the device and enables us to better assess the success of the repair.”

The minimally invasive technique is called a percutaneous paravalvular leak repair, and it is performed in a catheterization lab rather than in an operating room. The duct occluder is made of a metal mesh that holds its place once deployed in the leak.

The Heart Valve Service at the Methodist DeBakey Heart & Vascular Center provides patients like Ms. Helfrich with a true multidisciplinary approach to treatments of valvular disease. The Heart Valve Institute includes cardiologists with specialties in interventional cardiology, cardiac imaging, cardiac surgery, basic sciences and translational research.

Adapted from materials provided by Methodist Hospital, Houston, via Newswise.

from <http://www.sciencedaily.com/releases/2008/05/080512143019.htm>



Clue to early pre-eclampsia test

Researchers have discovered a gene which may be linked with pre-eclampsia in some women - raising hopes of a diagnostic test and early treatment.



Mice, genetically-engineered to be deficient in an enzyme called COMT, were found to develop pre-eclampsia.

Writing in *Nature*, the US researchers said low levels of COMT are also seen in pregnant women with the condition - which is dangerous for mother and baby.

But obstetric experts said a test would still be a long way off.

Pre-eclampsia accounts for 15% of all premature deliveries in the UK.

This is because the only way to completely cure pre-eclampsia is to deliver the baby. Left untreated, the condition can lead to convulsions, kidney failure, serious liver problems and death.

The researchers from Harvard Medical School looked at proteins which may be involved in pre-eclampsia by affecting the level of oxygen delivered to the placenta.

If this is a gene responsible for pre-eclampsia in some families then it would be a nice genetic test

Dr Raghu Kalluri, study leader

They settled on COMT (catechol-O-methyltransferase), an enzyme involved in the development of new blood vessels and a compound it produces called 2-methoxyoestradiol (2-ME).



Mice without any COMT also failed to produce 2-ME, which normally increases during the last three months of human pregnancy.

They found when mice were given back the COMT it cured their pre-eclampsia. The researchers say this has important implications for a potential treatment.

Measurement

As well as the potential for a genetic test to identify women at risk, it is possible to measure 2-ME in blood or urine, which could identify those who need more close monitoring, they added.

"If this is a gene responsible for pre-eclampsia in some families then it would be a nice genetic test," said study leader Dr Raghu Kalluri. "But also levels of 2-ME can be measured in pregnant women and they can be supplemented with a pill.

"We would be giving back what is missing in the mothers and babies."

The team are now planning a large clinical trial in women to look at the effect of COMT.

Professor Andrew Shennan, consultant obstetrician at St Thomas' Hospital in London said currently all women are closely monitored for signs of pre-eclampsia.

"If you had a very good test which said 'you don't have to see this woman but you need to monitor this woman' it would be very useful."

But he stressed other markers had been found in the past and turned out not to be useful.

Professor James Walker, spokesperson for the Royal College of Obstetricians and Gynaecologists agreed it was a potentially interesting new area of research.

"There's a lot of big studies at the moment looking at this area but the problem is that screening is very expensive for the small percentage who have the disease."

Story from BBC NEWS:

<http://news.bbc.co.uk/go/pr/fr/-/2/hi/health/7392726.stm>

Published: 2008/05/11 23:05:53 GMT

Catch-up reading scheme 'success'

BBC News, education reporter

Struggling young readers make lasting progress on a scheme that offers one-to-one support, a study suggests.



The government-funded Reading Recovery gives six-year-olds tailored coaching from specially-trained teachers for half an hour a day for 12 to 20 weeks.

A study of 500 pupils found those on the programme not only caught up with their age-group but were out-performing the national average within two years. Problem readers on other catch-up schemes remained a year or more behind. About 5,000 children are currently on the government-backed scheme which is part of its national Every Child a Reader programme, and ministers aim to roll out to 30,000 pupils by 2010.

Pupils talk about their intensive reading lessons The Institute of Education study assessed the progress of 500 of the poorest young readers at 42 schools in 10 inner London boroughs.

The ability of the eight poorest readers in each class was assessed at the beginning of the first year of primary school, at the end of the first and second years.

Some 87 were on the intensive Reading Recovery scheme while the rest were on other catch-up schemes.

After the first year, those doing Reading Recovery had caught up and met the reading standards for their age group. By the end of the second year, 86% of those who had received Reading Recovery in the first year went on to achieve the expected reading level for a seven-year-old in their national tests.

This compared to 57% of those on other schemes and the national average of 80%.

What this study shows is that schools could enable almost every child to read and write appropriately for their age

Dr Sue Burroughs-Lange

Lead researcher Dr Sue Burroughs-Lange said the kind of children the study looked at were some of the poorest readers of their age-group in the country. She said: "They probably can write their first name, they usually can't read a book at all and they probably know five to eight letters - and that's after they have been in school for a year or more.

"What this study shows is that schools could enable almost every child to read and write appropriately for their age if those who were failing were given access to expert teaching in Reading Recovery at an early age."



If the scheme was rolled out to the estimated 30,000 children who leave primary school unable to read properly, then all but the 1 or 1.5% of children who have long term special learning needs could be reading properly, she said. Reading Recovery costs around £2,500 per pupil - about the same amount primary schools have for one child's education for a year.

The results are particularly striking given that children on the programme are in the bottom 5% nationally when they start

Lord Adonis, Schools Minister

But its evangelists argue that the total spend during a struggling reader's primary school life is almost as much, at around £2,400. Dr Burroughs-Lange argues that the money is already being spent but on schemes that do not work, so it would be better to spend it more wisely. Schools minister Andrew Adonis said: "Through our literacy programmes we are making huge strides in getting those children who are really struggling up to the same standard as their peers by the time they are seven years old. "The results are particularly striking given that children on the programme are in the bottom 5% nationally when they start."

Story from BBC NEWS:

http://news.bbc.co.uk/go/pr/fr/-/2/hi/uk_news/education/7390143.stm

Published: 2008/05/08 23:17:11 GMT



Art in public spaces should be decided by the people

Communication between commissioners and the public will make for better art, and the Ebbsfleet project will benefit from it

May 11, 2008 7:00 AM

Art in public spaces really gets the juices flowing: informed critical juices, deeply felt uncritical ones, preciously held sheer prejudice. What matters is that the presence of a work of art in a public space - "our" space, "free" space perhaps - invites a feeling of ownership, of involvement of a very direct kind.

Despite the huge numbers who visit galleries and museums, most people don't go. If they do, the convention of the art gallery is that the work is entitled to be there and your right to question it is correspondingly limited. But in the street where you live, the supermarket where you shop, the square where you sit, you have a right to state an opinion.

And do we have opinions! At a debate at the National Gallery this week, organised by the University of the Arts London, the panellists had to name their best and worst piece of public art. Sandy Nairne, Director of the National Portrait Gallery, named the Royal Artillery Memorial at Hyde Park Corner as his favourite; The Boy with a Dolphin at the Chelsea end of Albert Bridge as the worst. Joan Bakewell, Chair of the National Campaign for the Arts, chose Antony Gormley's Another Place on Liverpool's Crosby Beach as her best; the 8ft marble statue of Mrs Thatcher as the worst. The 2006 Turner Prize nominee, Mark Titchner, thought Jeremy Deller's Battle of Orgreave the most resonant, and Industry and Genius in Centenary Square, Birmingham the worst. The critic Giles Waterfield saw the Berlin Memorial to the Nazi book burning campaign - rows of empty shelves in a glass covered underground cell - as the most haunting, and pre-empted others by naming and shaming The Meeting Place at St Pancras as the worst, a choice greeted by the audience with loud cheers.

My own choices were Gormley's haunting skyline figures on London's city roofs - in part because they were not permanent - and the infamous Diana Fountain in Hyde Park as a piece that undermines space and location rather than enhances it. So we all have views and we all care. And everyone is going to care about the choice of the work for the £2m Angel of the South to be put up on the site of the future Ebbsfleet development in Kent. Judging by responses to last week's announcement of the five shortlisted artists' proposals - ranging from Mark Wallinger's heroic White Horse to Richard Deacon's cerebral metal polyhedrons - the public art in public spaces debate will reignite with an entirely welcome intensity.

One of the best things about the Ebbsfleet project is that the shortlist will be put out for comment in the nearby Bluewater shopping mall. It is a long time since shoppers were asked their views on anything to do with art; but as with the public consultation over the Fourth Plinth in Trafalgar Square, all the signs are that the process hugely consolidated support for the idea, and for the individual pieces themselves, making due allowances for personal responses.

Talking to the public must be one lesson to be learned in the decade since Antony Gormley's Angel of the North drew our attention to the notion that a symbol of a place becomes part of its identity, both summing it up and driving it forward.

Given that art in public spaces is increasingly fashionable, it has never been so important to make it better. There are warning signals aplenty about uncertain quality ranging from our streets being filled with a "sheer proliferation of Frankenstein monster memorials" (Tim Knox, Sir John Soane's Museum) to "a lot of public art is gunge" (Gormley).

One of the problems is that public art is such an amorphous category. There is certainly no single solution to the question of what makes a successful piece. But a commission is more likely to succeed if its purpose and function are questioned at the start.



Is the work to be a sculpture or an installation? Is it for an existing community with an existing identity, or a new community whose identity can be influenced by the commission? Is it to be permanent or temporary? If temporary, what follows? Is the commission primarily a sop to a developers' conscience, a blatant attempt to gloss over a basically mediocre development? How is the community to be involved? How is the artist involved? What is the process for choosing a short list of artists for the commission - if this is the route chosen? And finally, who chooses the actual commission?

One of the lessons of the St Pancras horror is that the committee decided it was "inappropriate" for the boy and girl to be kissing. Apart from the intrinsic stupidity of the observation (isn't travelling to Paris all about romance?) - the committee was second-guessing the artist, which they were absolutely unqualified to do.

There is a further danger. It is often asserted that Frank Gehry's Bilbao Guggenheim Museum "regenerated Bilbao". As common is the assertion that the Angel of the North regenerated the north east of England. Neither is true as stated - Gehry's truly iconic building came as the climax to a huge programme of investment in the city's infrastructure of which it became the public expression. Similarly, the interplay between a huge totemic metal structure and the economic revival of the north east of England is far more complex than a crude "put up the art and the economy will follow" proposition. Anyone considering a public art commission, especially one intended to lead or to signal the transformation of a region or an environment, should be cautious about expecting too much.

Yet we should expect a great deal of a public work of art at the level where it really matters - in our interaction with the places where we live, work and play. They should be enjoyable; we should be cheered by what we see, perplexed perhaps, made curious certainly; a daily encounter should not become dull routine. And there is a deep reason why we respond to such objects and images as we do.

It was the artist Michael Craig-Martin who observed this week that, "most space is undifferentiated. Once you have a sculpture there, you see the rest of the space differently." He was talking about the impact of the Gormley figures on Crosby Beach, but it applies to urban space - often featureless and undifferentiated just as strongly.

Public art at its best helps us to see the rest of the space differently. It is an extraordinary quality, a remarkable opportunity and a huge prize for anyone commissioning public art. Which is why it must be good, and why the more we all take part in the process of choosing, the healthier it will be for art as a whole.

http://blogs.guardian.co.uk/art/2008/05/art_in_public_spaces_should_be.html

Rough Transition to a New Asthma Inhaler

By LAURIE TARKAN



Millions of people with asthma and other lung diseases will have to switch inhalers by the end of the year. And for many, the transition will not be smooth.

The change — mandated by the federal government in 2005, to go into effect next Jan. 1 — is to comply with the 1987 treaty to protect the earth's ozone layer. It bans most uses of chlorofluorocarbons, or CFCs, which are used as propellants in many inhalers.

CFC-free inhalers have been available for more than a decade. But four million to five million users have yet to switch, according to the consumer advocacy group Allergy and Asthma Network Mothers of Asthmatics.

For one thing, the old inhalers cost much less — an average of \$13.50, or one-third the price of a CFC-free inhaler, which uses propellants called HFAs, for hydrofluoroalkanes. (CFC inhalers are generic; HFA inhalers are brand-name.) People with asthma use an average of three or four inhalers a year, but some patients use one a month.

Moreover, the new and old inhalers differ in feel, force and taste, and how they are primed and cleaned. Advocates for people with asthma say doctors and patients have not been educated about the changes.

“What the government failed to do is to mandate anyone to tell patients and physicians this transition was happening,” said Nancy Sander, president of the asthma group. “There is no education, no monitoring of patients, no financial assistance to patients who have to pay higher prices for the new drugs.”

As a result, she and others say, there have been unnecessary fears about the newer inhalers, preventable trips to the emergency room and even some hoarding of CFC inhalers.

Callers to a hot line run by Ms. Sander's group have complained that when they were switched to the new inhalers, the differences between the two types were never explained. Many thought that their device was broken or that their symptoms were not being relieved by the new inhalers.

The Food and Drug Administration says that since January 2007 it has received 415 complaints about HFA inhalers' costing too much or not working properly. After a public meeting last month in which doctors and patients said most people were unaware of the transition, the agency has been stepping up educational efforts, with several public service announcements expected by the end of this month, said Deborah Henderson, an official at the Center for Drug Evaluation and Research.



Both types of inhalers use albuterol, a short-acting medication that can prevent an asthma attack when used preventively — before exercising, for example — or at the first sign of breathing trouble.

But the cost difference has meant huge gains for drug companies. As people switched to HFA inhalers in 2006 and 2007, sales of all albuterol inhalers jumped from about \$500 million to \$1.1 billion, according to I.M.S. Health, a health care information company. Of the 40.5 million prescriptions written for albuterol inhalers last year, it said, about half were CFC and half were HFA inhalers.

And even though there are important differences between the four brands of HFA inhalers, some insurers cover only one of the four. Advocates say the higher cost may keep patients from buying inhalers or force them to cut back on other medications or switch to a less effective over-the-counter inhaler that uses epinephrine.

Several members of Congress are asking the Bush administration to require insurers, including the Medicare and Medicaid programs, to cover the new inhalers equally. Representative Steve Kagen, a Wisconsin Democrat who is also an allergy and asthma physician, said it was important “to make sure there’s as little co-pay as possible.”

The four HFA inhalers are Ventolin by GlaxoSmithKline, ProAir by Teva, Proventil by Schering-Plough and Xopenex by Sepracor. (Xopenex uses a different chemical, levalbuterol.) All companies have give-away programs for those in need and are providing free samples that doctors give to their patients. There is also financial assistance available through the Partnership for Prescription Assistance (1-888-477-2669).

Studies show that HFA inhalers are as effective as CFC inhalers and have the same rate of side effects. But if they are not used properly, patients will not get adequate doses. There are three critical differences.

HFA inhalers must be pumped four times to prime them — a number that was not so critical with the more forgiving CFC inhalers, said Dr. Leslie Hendeles, professor of pharmacy and pediatrics at the University of Florida. And each brand of the newer inhaler requires a different frequency of priming.

HFA inhalers have a weaker spray. “It’s very soft so people think it’s not working,” Dr. Stoloff said. Where CFC inhalers deliver a powerful force that feels as if the airway is being pushed open, the newer ones provide a warm, soft mist that also has a distinct taste.

They also require a slower inhale. “You have to take a nice slow, deep breath and hold it,” Ms. Sander said. If people worry that it’s not working, they may not take the second puff, may fail to wait the necessary 30 seconds between puffs or may take too many puffs. ,And their anxiety may rise, further constricting their airways.

HFA inhalers need to be washed with warm water and air dried once a week. The medication is stickier and will clog the hole, reducing the amount of medication the spray delivers.

There are also important differences among the brands, though some doctors simply write Albuterol HFA on the prescription, leaving the pharmacist to choose the brand. Only one, Ventalin, has a dose counter, which helps users keep track of how much medication is left. ProAir appears to be on many insurance companies’ lists of approved medications, but it has the softest spray, Dr. Stoloff said.

http://www.nytimes.com/2008/05/13/health/13asth.html?_r=1&nl=8hlth&emc=hltha1&oref=slogin

A World of Stories From a Son of Vietnam

By **MICHIKO KAKUTANI**

THE BOAT

By Nam Le

272 pages. Alfred A. Knopf. \$22.95.

The boat in the title story of this remarkable collection is filled with Vietnamese refugees, 200 people squashed into a space meant for 15, going on two weeks at sea, racked by thirst and hunger and illness, their skin blistered by the unrelenting sun on deck, the quarters below awash in vomit and human waste. There is no medicine and little water for the ill; the dead, bundles of skin and bones, are thrown overboard into the shark-infested waters. After days on the boat, Mai, the teenage heroine of this story, realizes that she now understands why her father — who spent five years fighting the Communists and two years in a re-education camp — tried to live on the surface, in the now of the moment, not looking backward or inside:

“Because beneath the surface was either dread or delirium. As more and more bundles were thrown overboard she taught herself not to look — not to think of the bundles as human — she resisted the impulse to identify which families had been depleted. She seized distraction from the immediate things: the weather, the next swallow of water, the ever-forward draw of time.”



This story, like many in “The Boat,” catches people in moments of extremis, confronted by death or loss or terror (or all three) and forced to grapple at the most fundamental level with who they are and what they want or believe. Whether it’s the prospect of dying at sea or being shot by a drug kingpin or losing family members in a war, Nam Le’s people are individuals trapped in the crosshairs of fate, forced to choose whether they will react like deer caught in the headlights, or whether they will find a way to confront or disarm the situation.

The opening story of this volume, “Love and Honor and Pity and Pride and Compassion and Sacrifice,” and its singular masterpiece, features a narrator who shares a name and certain biographical details with the author: both attended the Iowa Writers’ Workshop, both were born in Vietnam and both grew up in Australia. The other tales in this book, however, circumnavigate the globe, demonstrating Mr. Le’s astonishing ability to channel the experiences of a multitude of characters, from a young child living in Hiroshima during World War II to a 14-year-old hit man in the barrios of Medellín to a high school jock in an Australian beach town. Mr. Le not only writes with an authority and poise rare even among longtime authors, but he also demonstrates an intuitive, gut-level ability to convey the psychological conflicts people experience when they find their own hopes and ambitions slamming up against familial expectations or the brute facts of history.

By far the most powerful, most fully realized story in this collection, “Love and Honor” begins as a fairly conventional account of a young writer suffering from writer’s block and trying to cope with an unwanted visit from his father, who has flown in from Australia to see him. The narrator, Nam, recounts how his strict father tolerated no weakness in him: “No personal phone calls. No female friends. No extracurricular reading.” He recounts how his father caned him for deviating from a “daily 10-hour study



timetable for the summer holidays,” and how he would lash him 20 times and then rub Tiger Balm into the wound. And he recounts how he learned that his father, then 14, witnessed the massacre at My Lai, surviving in a ditch, buried under the body of his mother, who was machine-gunned down with dozens of others.

After My Lai, the narrator’s father was conscripted into the South Vietnamese Army and fought alongside the American Army: asked how he could fight on the side of the Americans, after what he witnessed at My Lai, he replies: “I had nothing but hate in me, but I had enough for everyone.” After the fall of Saigon, he was sent to re-education camp, tortured, indoctrinated and starved. In 1979 he organized the family’s escape to Australia.

As for the narrator, he left home at 16, fell in love with a girl and experimented with crystal meth. Eventually, he returned home, went to college and law school and became a lawyer in Melbourne — a job he hated, knowing it gave his father pride. At 25, he announced that he was quitting and going to America to become a writer.

As this story unfolds, it becomes a meditation not just on fathers and sons, but also on the burdens of history and the sense of guilt and responsibility that survivors often bequeath to their children.

“Here is what I believe,” the narrator says. “We forgive any sacrifice by our parents, so long as it is not made in our name. To my father there was no other name — only mine, and he had named me after the homeland he had given up. His sacrifice was complete and compelled him to everything that happened. To all that, I was inadequate.”

Some of the narrator’s friends and teachers don’t understand why he doesn’t write more stories about Vietnam: “Ethnic literature’s hot,” a writing instructor glibly says. “And important too.” Another student, however, says: “I know I’m a bad person for saying this, but that’s why I don’t mind your work, Nam. Because you could just write about Vietnamese boat people all the time” but “instead, you choose to write about lesbian vampires and Colombian assassins and Hiroshima orphans — and New York painters with hemorrhoids.”

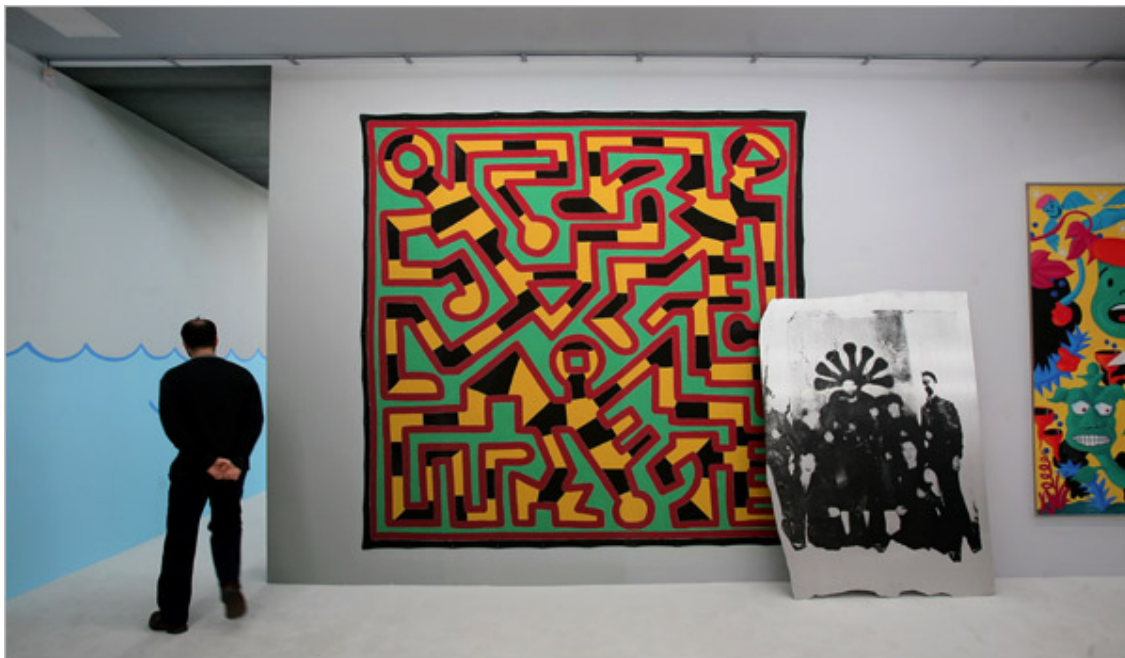
This, of course, is exactly what Mr. Le has done in this volume. Some of his attempts at ventriloquism — like his portrait of an ailing New York painter, who is about to see his estranged daughter for the first time in 17 years (“Meeting Elise”) — can feel strained, like creative-writing class exercises in point of view. But in most cases his sympathy for his characters and his ability to write with both lyricism and emotional urgency lend his portraits enormous visceral power.

He conveys what it might be like to be a young American woman visiting Tehran and comparing her own life of romantic disappointments and career satisfactions to that of an Iranian friend, who has chosen to commit herself to a life of politics and dissent (“Tehran Calling”). He conveys what it might be like to be an Australian teenager, preparing to face off against a thuggish rival’s claims to a girl, even as he tries to cope with his ailing mother’s impending death (“Halflead Bay”). And in the two stories that bookend this collection, he conveys what it might be like to have the Vietnam War as an inescapable fact of daily life, infecting every relationship and warping the trajectory of one’s life. In “The Boat” he does so directly with devastating results; in “Love and Honor” he does so elliptically, creating a haunting marvel of a story that says as much about familial dreams and burdens as it does about the wages of history.

<http://www.nytimes.com/2008/05/13/books/13kaku.html?th&emc=th>

When Artworks Collide

By **ROBERTA SMITH**



g“Who’s Afraid of Jasper Johns?,” a group show at the Tony Shafrazi Gallery in Chelsea, is the latest proof that you don’t have to be a museum to shake things up. It was organized by Gavin Brown, who has a downtown gallery of his own, and Urs Fischer, a Swiss artist he represents.

Demonically aerobic for brain and eye, the show conflates two exhibitions and several different times, styles, art markets and notions of transgression. Highly site specific, it may also be one of the last words in appropriation art, institutional critique and artistic intervention, not to mention postmodern photography and, especially, wallpaper.

The histories entwined here begin with Mr. Shafrazi, an infamous one-hit-wonder graffiti artist and longtime graffiti art dealer. In 1974 he spray-painted, in red, the words “Kill Lies All” on Picasso’s “Guernica,” then at the Museum of Modern Art (he meant to write “All Lies Kill”). By 1982 he had a SoHo gallery known for showing graffiti-related artists like Keith Haring, Kenny Scharf, Jean-Michel Basquiat and Donald Baechler. In 2004 Mr. Shafrazi relocated to an austere second-floor gallery in Chelsea, putting up long-running shows and concentrating mostly on the resale market: not only the graffitiists but also blue-chip works by Picasso, Picabia and Francis Bacon. In October he reprised his glory days with “Four Friends,” an echt-’80s exhibition of paintings and a few sculptures by Haring, Basquiat, Mr. Scharf and Mr. Baechler.

Mr. Brown and Mr. Fischer had been lobbying Mr. Shafrazi to let them organize a show at his gallery, and “Four Friends” only spurred their determination. “The show had been up for six months,” Mr. Brown said. “There needed to be an intervention.” About six weeks ago Mr. Shafrazi finally agreed; Mr. Brown and Mr. Fischer went to work.

The resulting exhibition is an adventure in juxtaposition and visual argumentation; either way it’s a far cry from the quiet contemplation of isolated art objects. Nothing escapes unimplicated or unmanipulated, least of all the show’s announcement: a picture of Mr. Shafrazi being arrested at MoMA in 1974.

You suspect that curatorial limits will be tested even before you ascend the gallery's broad concrete staircase. Water is cascading down half of it like a mountain stream in April. The work, "Viagra Falls," by Rob Pruitt, is sophomorically titled but noisily invigorating.

But the dominant fact, stage-setter and to some extent gimmick of the show is Mr. Fischer's wraparound wallpaper extravaganza. It continues his penchant for radically altering art spaces by knocking holes in large walls (as he did for the 2006 *Whitney Biennial*) and in floors (as he did last winter at Mr. Brown's Greenwich Street gallery, creating a 10-foot-deep wall-to-wall pit that was part earthwork, part bomb crater). What he has done at Shafrazi is much gentler and far more pervasive; it unsettles perception by subtly confusing original and copy.

To begin, Mr. Fischer had every square inch of the "Four Friends" show photographed: not only paintings, frames and their shadows, but also blank walls, windows, ceilings, views through various doorways and the gallery's two guards. He then converted the images into trompe l'oeil wallpaper that, meticulously applied, lines the gallery with a same-size simulacrum of itself, which enables "Four Friends" to stay in place while a second show is installed on top of it.

All this is a lot less obvious than it sounds. The oeil is really tromped in a veritable echo chamber of stylistic and generational clashes: real artworks "deface" real-looking copies of other works, evoking Mr. Shafrazi's transgression against "Guernica."



In the first gallery, for example, Malcolm Morley's 1976 "Age of Catastrophe" — a vibrant blue painting of a mangled airliner and colliding ships that is a precursor to both 1980s Neo-Expressionism and appropriation art — hangs atop a Haring graffiti canvas of purple and green figures on yellow. The Haring is only an image on the wallpaper, but it's a sharp, convincing one.

A Picabia pulp-fiction portrait of a woman is affixed to a Baechler depicting an old-fashioned man in a top hat. A gray-on-gray Bacon portrait is atop the wallpaper copy of a bright Scharf painting, which is also partly draped by a pink dripping blob. This is actually painted directly on the wallpaper by the Dutch artist Lily van der Stokker. The Bacon has some of the Scharf's cartoonishness, but its Expressionism



also counters the kitschy cool of the Picabia, which in turn presages the Morley. Finally, a thin bundle of wood studs — a sculpture by the German maverick Georg Herold — leans against a wall that is bare except for two trompe l’oeil wood wall mounts. A painting was removed from the “Four Friends” show before the photographer arrived.

In the second gallery, an enormous wallpaper Basquiat triptych, “Gastruck” (1984), is seemingly stamped with a piquant word piece by Lawrence Weiner — the phrase “As Long as It Lasts” — in big letters of a bright red that matches the fiery hues of the burning truck. On other walls a more classically photorealist painting by Mr. Morley, as well as works by Christopher Wool, Richard Prince, Sue Williams, Mike Bidlo, Robert Ryman, Gilbert & George, Cindy Sherman, Cady Noland and Sarah Lucas, argue among themselves and also with the “Four Friends” paintings. Topics include appropriation, high and low, art and history, materials and abstraction.

Ms. Van der Stokker returns in the third gallery, swamping especially handsome efforts by the four friends in what appear to be bright blue waves: perhaps the 1980s art market, or our present one, going under. Other than the guards standing next to their own images, this room contains the only matchup of art and double: a real Keith Haring white-on-black subway drawing, cut from its original site and framed under glass, on top of two similar Harings (which also include the reflection of the Baechler across the way). In a little space where even the windows, brick walls and view of the stairs are actually wallpaper, a Jeff Koons painted wood sculpture of flowers from 1991 hangs like a big corsage on a 1982 Scharf of Fred and Wilma Flintstone.

The summary of found-object sculpture that began with Mr. Herold’s work in the first gallery continues — on the show’s smudged wall-to-wall carpet piece by Rudolf Stingel — in works by Rirkrit Tiravanija, Robert Morris and John Chamberlain. The show might be seen as concluding with Mr. Pruitt’s “Eternal Bic,” a perpetually burning cigarette lighter that answers the elemental waterworks at the show’s start with fire.

There is a refreshing fearlessness to this exhibition, which takes its title from a story that Mr. Shafrazi told Mr. Brown and Mr. Fischer: that the original title of Barnett Newman’s four primary-colored abstractions, “Who’s Afraid of Red, Yellow and Blue?,” was “Who’s Afraid of Jasper Johns?” The kicker — that Mr. Johns objected — is probably apocryphal.

Objections are overruled in this show. The network of references it unleashes defies any coherent visual or interpretive cartography, and it is pleasantly impossible to know which of them are on purpose, which are dumb luck and which are simply your own reading. It can’t be by chance, for example, that Mr. Prince’s “Spiritual America” (1983) — a photograph of a photograph of an under-age, overly sexy Brooke Shields — and “Dessert” (1990), an acidly feminist early painting by Ms. Williams, share a wallpaper Basquiat like two strangers on a beach blanket.

With their play of copies and originals, Mr. Brown and Mr. Fischer might mean to imply the triumph of appropriation art over 1980s painting. But then you realize that quite a bit of the visual firepower is coming from the works in, not on, the wallpaper. On top of the exhibition’s view of art as a continuing form of argument is a visceral reminder that art history’s books are never closed.

“Who’s Afraid of Jasper Johns?” continues through July 12 at the Tony Shafrazi Gallery, 544 West 26th Street, Chelsea; (212) 274-9300, tonyshafrazigallery.com.

<http://www.nytimes.com/2008/05/16/arts/design/16shaf.html?ref=design>



Man's Best Friend, Hoofed Department

By **EDWARD ROTHSTEIN**



Without horses, where would we be? Trousers might never have become fashionable. The violin might never have come into existence. The Aztecs might have thrived another few centuries. The Industrial Revolution might have sputtered out before its time. No one would have to get off his high horse, and no political race would have a dark horse candidate. And the American Museum of Natural History would have had to find another subject for its sprawling, charming and illuminating exhibition that is opening on Saturday: “The Horse.”

The opening festivities will include demonstrations of horseshoeing and horse grooming; an appearance by Thumbelina, a creature billed as the world’s smallest horse (17 1/2 inches tall); and a visit by a vintage horse-drawn ambulance. But the exhibition itself relies far less on country fair spectacle and far more on a provocative history of the ways in which humans and horses became, as the show says, “powerfully linked.” Those links may be as slight as fashions in clothing (trousers, we are told, developed specifically for the riding of horses) and as important as the fate of empires (“Next to God,” Cortés is supposed to have said about the conquest of Mexico, “we owed our victory to the horses”).

The exhibition is suggestive about the evolution of the arts. (The 13th- and 14th-century Mongols, who held their immense empire together with the aid of the horse, also used hair from its tail to create the ancestor of the modern violin bow.) And it invites speculation about the course of technology. (The Industrial Revolution ultimately displaced horse power with horsepower, but not before horses shared the burden with machines: on display is a horse-drawn, steam-powered firetruck from 19th-century Pennsylvania.)

Created by Ross MacPhee, the curator of mammalogy in the Division of Vertebrate Zoology at the museum, and Sandra Olsen, the curator of anthropology at the Carnegie Museum of Natural History in Pittsburgh, this show makes it clear just how crucial a role the horse has played. With the aid of dioramas, interviews, marvelous computer graphics, varied skeletons, archaeological finds, reproductions of cave paintings and objects including a World War I gas mask for a horse and Triple Crown trophies, the history of the horse becomes humanized. The ancient Greeks, the show points out, might have been so surprised by their first sight of warriors on horseback that they imagined that they were centaurs. The

exhibition almost seems to suggest that this mythology touches on a deeper truth: The connection is so strong, we are all of us centaurs.

At one time the relationship could hardly have been ignored. Horses, the show reminds us, “have cleared forests, plowed land, herded cattle and driven machines.” From the moment they were first used to pull chariots into battle (perhaps 1500 B.C.) until their valedictory cavalry campaigns in the Second World War, horses were bound up in human warfare. Similarly with human welfare: in 1900 130,000 horses were working in Manhattan alone (and their presence must have been palpable: each horse, the show says, produced up to 45 pounds of manure and 2 gallons of urine every day).



Now we are mainly aware of horses through the remnants of horse-inspired vocabulary, by the persistence of sports like polo, and, as a video shows, from ceremonies from around the world that use the horse to display power and grace. But the show reminds us just how recent a phenomenon this diminution of importance is, and how difficult it is to think of any human activity untouched by the powers of the horse.

But the horse, of course, is equally unthinkable without the human, which the exhibition also points out, but humans don't enter the story for a while. The opening diorama shows ancient horses of North America, some 50 million years ago: a three-toed Hypohippus feeds on forest shrubs as a large, modern-looking Dinohippus grazes in the grasses. A large number of horse species were “forest browsers” with three toes. But with the changes in climate about 35 million years ago, the predecessor of the modern horse became dominant, his two outer toes yielding to the single hoof, suited to the harder grasslands.

In outlining the evolution of the horse, the exhibition also traces the animals' mass migrations, which are almost the inverse of human pathways. Instead of beginning in Africa and migrating to Europe, Asia and finally to the Americas, like mankind's ancestors, horses took just the opposite path: the majority of horse species began in the Americas. Some 20 million years ago, three-toed horses crossed into Asia and then into Europe and Africa. About 10,000 years ago, horses became extinct in the Americas — perhaps because of environmental change and overhunting — which is one reason they had such a forceful impact when the Spanish took them back to the Americas, in conquest.

That expansive family tree was pruned over time and not, it seems, by human forces. The show argues that all contemporary horses — perhaps even the Asiatic wild horse, the Przewalski — are part of a single species, *Equus caballus*. Even the genus *Equus* is small, containing only seven living species, including donkeys and zebras.

The impact of the horse, though, is apparent in the earliest surviving human evidence. The show reproduces some of the extraordinary cave paintings of Southern Europe, which are perhaps 16,000 years old. One, in Lascaux Cave, shows a horse looking exactly like the Przewalski wild horse of Central Asia, with its pale stomach and dark mane.

Recent archaeological research in northern Kazakhstan, displayed in a diorama, suggests that the Botai people of Central Asia were among the first to domesticate horses. Digs have yielded evidence of ancient



fences, along with soil components suggesting a high concentration of manure. In domestication, horses were remade into human companions and human tools, but physiologically they didn't change much—something that, as the exhibition notes, cannot be said of the boar when it was transformed into a domesticated pig, or the wolf into a domesticated dog. Horses were also “good partners”: herd animals that could also show intense loyalties. They were easily trained and relatively free from the territorial viciousness of related species, like zebras.

Human planning split this single species into numerous branches and over 200 breeds. One ambition was to increase the animal's size, so it could become a more imposing war-beast, strong enough to bear its own 50 pounds of armor along with the hundreds of pounds of a mounted warrior. So important was the size of warrior horses that in the 16th century, King Henry VIII, coveting the larger animals on the Continent, decreed that all landowners must keep at least two large mares.

Among the gentry of Europe, the domestication of the horse, and the formal display of ownership and mastery, also came to reflect personal cultivation and accomplishment. The French, Spanish and English words for gentleman, the show points out — *chevalier*, *caballero* and *cavalier* — also mean horseman.

Some parts of this show are too brief — the transformation of the American West could have been more imaginatively presented — and some parts are less than revelatory: the presence of horses in sports is familiar. The show might also have provided more extensive glimpses of the horse in the arts: in Remington's famous 19th-century images, in plays like “*Equus*,” in Hollywood westerns or even in vintage television comedies like “*Mister Ed*.” Horses have generally been imagined not as alien beings, but as reflections of ourselves. They are almost never demonic; they seem to represent the best of humanity's animal nature.

Despite weaknesses, though, the show's impact is strong. And could interaction between humans and any other animal bear this sort of examination? Dogs may inspire more intense and complex friendships, but horses were almost more than companions; they were partners in agriculture, war, industry and commerce.

The final gallery contains a remarkable life-size sculpture of a horse, “*Isbelle*,” by Deborah Butterfield. It seems constructed out of scraps of driftwood, but is actually cast bronze, its weathered skeleton looking worn and ancient. It seems old, haphazardly shaped with its random relics and remnants, but the creature



is so tautly formed, its skeletal innards seem charged with dynamism and power. It's not a bad image for this presentation of the horse's history: it might seem a collection of ancient and random facts, but when brought together as smartly as it is, it almost comes to life, reminding us of the centaurs we all once were.

<http://www.nytimes.com/2008/05/16/arts/design/16hors.html?ref=design>