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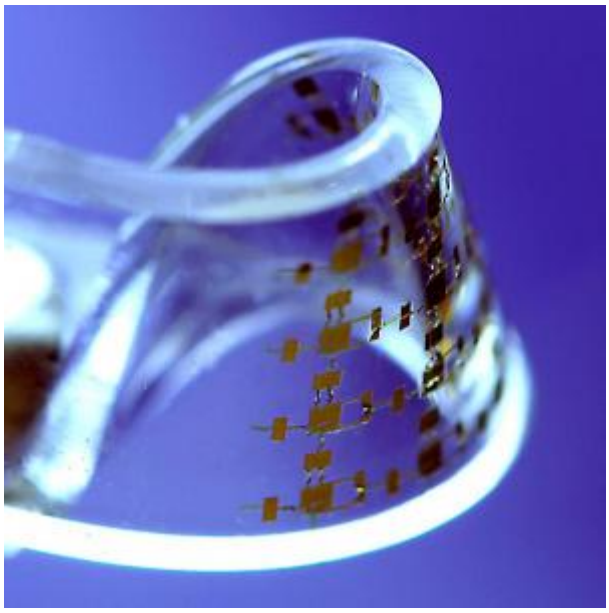
CONTENTS

Researchers Make New Electronics -- With A Twist



An optical image of an electronic device in a complex deformation mode. (Credit: Image courtesy of Northwestern University)

ScienceDaily (Nov. 21, 2008) — They've made electronics that can bend. They've made electronics that can stretch.

And now, they've reached the ultimate goal -- electronics that can be subjected to any complex deformation, including twisting.

Yonggang Huang, Joseph Cummings Professor of Civil and Environmental Engineering and Mechanical Engineering at Northwestern University's McCormick School of Engineering and Applied Science, and John Rogers, the Flory-Founder Chair Professor of Materials Science and Engineering at the University of Illinois at Urbana-Champaign, have improved their so-called "pop-up" technology to create circuits that can be twisted. Such electronics could be used in places where flat, unbending electronics would fail, like on the human body.

Their research is published online by the Proceedings of the National Academy of Sciences.

Electronic components historically have been flat and unbendable because silicon, the principal component of all electronics, is brittle and inflexible. Any significant bending or stretching renders an electronic device useless.

Huang and Rogers developed a method to fabricate stretchable electronics that increases the stretching range (as much as 140 percent) and allows the user to subject circuits to extreme twisting. This emerging technology promises new flexible sensors, transmitters, new photovoltaic and microfluidic devices, and other applications for medical and athletic use.

The partnership -- where Huang focuses on theory, and Rogers focuses on experiments -- has been fruitful for the past several years. Back in 2005, the pair developed a one-dimensional, stretchable form of single-crystal silicon that could be stretched in one direction without altering its electrical properties; the results were published by the journal Science in 2006. Earlier this year they made stretchable integrated circuits, work also published in Science.

Next, the researchers developed a new kind of technology that allowed circuits to be placed on a curved surface. That technology used an array of circuit elements approximately 100 micrometers square that were connected by metal "pop-up bridges."

The circuit elements were so small that when placed on a curved surface, they didn't bend -- similar to how buildings don't bend on the curved Earth. The system worked because these elements were connected by metal wires that popped up when bent or stretched. The research was the cover article in Nature in early August.

In the research reported in PNAS, Huang and Rogers took their pop-up bridges and made them into an "S" shape, which, in addition to bending and stretching, have enough give that they can be twisted as well.

"For a lot of applications related to the human body -- like placing a sensor on the body -- an electronic device needs not only to bend and stretch but also to twist," said Huang. "So we improved our pop-up technology to accommodate this. Now it can accommodate any deformation."

Huang and Rogers now are focusing their research on another important application of this technology: solar panels. The pair published a cover article in Nature Materials this month describing a new process of creating very thin silicon solar cells that can be combined in flexible and transparent arrays.

Adapted from materials provided by Northwestern University, via EurekAlert!, a service of AAAS.

http://www.sciencedaily.com/releases/2008/11/081119171324.htm

New Life Beneath Sea And Ice

Sample of ice core recovered from Vostok ice core. Studying ice cores has provided a way to examine the biology of icy environments buried beneath kilometers of ice for millions of years. (Credit: Image courtesy of Brent C. Christner)

ScienceDaily (Nov. 21, 2008) — Scientists have long known that life can exist in some very extreme environments. But Earth continues to surprise us.

At a European Science Foundation and COST (European Cooperation in the field of Scientific and Technical Research) 'Frontiers of Science' meeting in Sicily in October, scientists described apparently productive ecosystems in two places where life was not known before, under the Antarctic ice sheet, and above concentrated salt lakes beneath the Mediterranean. In both cases, innumerable tiny microbes are fixing or holding onto quantities of organic carbon large enough to be significant in the global carbon cycle.

Lakes under the ice

Brent Christner of Louisiana State University, in the US, told the conference about the microbes living within and beneath the ice on Antarctica. In the last decade, scientists have discovered lakes of liquid water underneath the Antarctic ice sheet. So far we know of about 150 lakes, but this number will probably increase when the entire continent has been surveyed. These lakes occur as a result of geothermal heat trapped by the thick ice, melting it from underneath, and the great pressure from the ice above, which lowers the melting point of water.

The largest subglacial lake, Lake Vostok, lies beneath the coldest place on the planet, where the temperature at the surface often falls below minus 60 degrees Celsius. "It's the sixth largest freshwater

lake on the planet by volume, and about the size of Lake Ontario," says Christner. "If you were on a boat in the middle of the lake, you would not see shores."

Christner has examined microbial life in ice cores from Vostok and many other global locations. While direct samples of water from subglacial Antarctic lakes have yet to be obtained, the lower 80m or so of the Vostok ice core represents lake water that progressively freezes onto the base as the ice sheet slowly traverses the lake. "Microbial cell and organic carbon concentrations in this accreted ice are significantly higher than those in the overlying ice, which implies that the subglacial environment is the source," says Christner.

Based on accumulating measurements of microbes in the subglacial environment, he calculates that the concentration of cell and organic carbon in the Earth's ice sheets, or 'cryosphere', may be hundreds of times higher than what is found in all the planet's freshwater systems. "Glacial ice is not currently considered as a reservoir for organic carbon and biology," says Christner, "but that view has to change."

Salt below the sea

Beneath the Mediterranean lurks a similar surprise. Michail Yakimov of the Institute of the Coastal Marine Environment, Messina, Italy is a project leader for the European Science Foundation's EuroDEEP programme on ecosystem functions and biodiversity in the deep sea. His team studies lakes of concentrated salt solution, known as anoxic hypersaline basins, on the floor of the Mediterranean. They have discovered extremely diverse microbial communities on the surfaces of such lakes.

The anoxic basins, so called because they are devoid of oxygen, occur below 3,000 m beneath the surface and are five to ten times more saline than seawater. One theory says they exist uniquely in the Mediterranean, because this sea entirely evaporated after it was cut off from the Atlantic around 250 million years ago. Its salt became a layer of rock salt, called evaporite, which was then buried by windblown sediment. Now the sea is filled again, the salt layer has been exposed in some places, perhaps by small seaquakes, and the salts from the ancient Mediterranean have dissolved again, making the water very salty.

Despite the harsh conditions, hypersaline brines have been shown to possess a wide range of active microbial communities. Together with other international partners, Yakimov's team has already identified more than ten new lineages of bacteria and archaea (these are ancient bacteria-like organisms), which they have named the Mediterranean Sea Brine Lake Divisions.

There is ample life at the boundary between the concentrated basin and the ordinary seawater. "Because of the very high density of the brine, it does not mix with seawater," he explains, "and there is a sharp interface, about 1m thick."

In that layer, microbial diversity is incredibly rich. The research shows that these microbes largely live by sulphide oxidation. Like the communities at hydrothermal vents in the deep ocean, they can survive independently of sunlight and oxygen. But they are an important store for organic carbon. "The deep-sea microbial communities in the Mediterranean fix as much or even more carbon dioxide each year as those in the surface layers," says Yakimov. "This carbon sink should be taken into account at the global scale."

This research was presented at the "Complex Systems: Water and Life" Frontiers of Science conference, organized by European Science Foundation and COST, 29-31 October, Taormina, Sicily.

Adapted from materials provided by European Science Foundation.

http://www.sciencedaily.com/releases/2008/11/081117103653.htm

Long-term Secondary Prevention Program May Help Reduce Cardiovascular Risks After Heart Attack

ScienceDaily (Nov. 21, 2008) — An intensive, comprehensive, long-term secondary prevention program lasting up to three years after cardiac rehabilitation appears to reduce the risk of a second non-fatal heart attack and other cardiovascular events, according to a new article.

Cardiac rehabilitation programs after a heart disease diagnosis have evolved over two decades from solely exercise-based interventions, according to background information in the article. Now, rehabilitation includes helping patients with smoking cessation, diet, risk factors, and lifestyle habits. However, current rehabilitation procedures rely on short-term interventions that are unlikely to yield long-term benefits because patients never reach therapeutic goals.

Pantaleo Giannuzzi, M.D., of the Associazione Nazionale Medici Cardiologi Ospedalieri Research Center, Florence, Italy, and colleagues conducted the Global Secondary Prevention Strategies to Limit Event Recurrence After Myocardial Infarction (GOSPEL) study, in which they randomly assigned 1,620 patients who had a heart attack to receive a long-term, reinforced, multifactorial educational and behavioral intervention after a standard period of rehabilitation.

"The intervention was aimed at individualizing risk factor and lifestyle management, and pharmacological treatments were based on current guidelines," the authors write. Comprehensive sessions with one-on-one support were held monthly for six months, then once every six months for three years. Results of patients in this program were compared with those of 1,621 who were randomly assigned to receive usual care.

Overall, 556 patients (17.2 percent) experienced a cardiovascular event. The intervention did not significantly reduce the risk of combined heart events (which occurred in 261 [16.1 percent] of patients in the intervention group and 295 [18.2 percent] in the usual care group), including cardiovascular death, non-fatal heart attack, non-fatal stroke and hospitalization for chest pain, heart failure or an urgent revascularization procedure to restore blood flow. However, the program did significantly decrease incidence of individual heart events and some combinations of outcomes, including a 33 percent reduction in cardiovascular death plus non-fatal heart attack and stroke (3.2 percent in the intervention group vs. 4.8 percent in the usual care group), a 36 percent reduction in cardiac death plus non-fatal heart attack (2.5 percent vs. 4 percent) and a 48 percent reduction in non-fatal heart attack (1.4 percent vs. 2.7 percent).

"A marked improvement in lifestyle habits (i.e., exercise, diet, psychosocial stress, less deterioration of body weight control) and in prescription of drugs for secondary prevention was seen in the intervention group," the authors write.

"After three years, the integrated, multifactorial, reinforced approach proved effective in countering the risk factors and medication adherence deterioration over time and was able to induce a considerable improvement in lifestyle habits," the authors conclude. "In line with such results, all the clinical end points were reduced by the intensive intervention." The results reinforce previous findings that gains achieved with short-term cardiac rehabilitation are not maintained over time and suggest that a more comprehensive, sustained intervention is needed to reduce cardiovascular risks after a heart attack.

The GOSPEL Study was supported by Società Prodotti Antibiotici with an unrestricted research grant.

Journal reference:

1. Pantaleo Giannuzzi; Pier Luigi Temporelli; Roberto Marchioli; Aldo Pietro Maggioni; Gianluigi Balestroni; Vincenzo Ceci; Carmine Chieffo; Marinella Gattone; Raffaele Griffo; Carlo Schweiger; Luigi Tavazzi; Stefano Urbinati; Franco Valagussa; Diego Vanuzzo; for the GOSPEL Investigators. **Global Secondary Prevention Strategies to Limit Event Recurrence After Myocardial Infarction: Results of the GOSPEL Study, a Multicenter, Randomized Controlled Trial**. *Arch Intern Med.,* 2008;168(20):2194-2204 [link]

Adapted from materials provided by JAMA and Archives Journals.

http://www.sciencedaily.com/releases/2008/11/081110163758.htm

Darwin Was Right About How Evolution Can Affect Whole Group

Worker ants of the world, unite! You have nothing to lose but your fertility. (Credit: iStockphoto/Mark Evans)

ScienceDaily (Nov. 20, 2008) — Worker ants of the world, unite! You have nothing to lose but your fertility. The highly specialized worker castes in ants represent the pinnacle of social organization in the insect world. As in any society, however, ant colonies are filled with internal strife and conflict. So what binds them together? More than 150 years ago, Charles Darwin had an idea and now he's been proven right.

Evolutionary biologists at McGill University have discovered molecular signals that can maintain social harmony in ants by putting constraints on their fertility. Dr. Ehab Abouheif, of McGill's Department of Biology, and post-doctoral researcher, Dr. Abderrahman Khila, have discovered how evolution has tinkered with the genes of colonizing insects like ants to keep them from fighting amongst themselves over who gets to reproduce.

"We've discovered a really elegant developmental mechanism, which we call 'reproductive constraint,' that challenges the classic paradigm that behaviour, such as policing, is the only way to enforce harmony and squash selfish behaviour in ant societies," said Abouheif, McGill's Canada Research Chair in Evolutionary Developmental Biology.

Reproductive constraint comes into play in these ant societies when evolutionary forces begin to work in a group context rather than on individuals, the researchers said. The process can be seen in the differences between advanced ant species and their more primitive cousins. The study was published in the Nov. 18 edition of the Proceedings of the National Academy of Sciences.

Ants – organized in colonies around one or many queens surrounded by their specialized female workers – are classic examples of what are called eusocial organisms.

"More primitive, or ancestral, ants tend to have smaller colony sizes and have much higher levels of conflict over reproduction than the more advanced species," Abouheif explained. "That's because the workers have a much higher reproductive capacity and there is conflict with the queen to produce offspring."

To their surprise, Khila and Abouheif discovered that "evolution has tinkered with the molecular signals that are used by the egg to determine what's going to be the head and what's going to be the tail, to stop the worker ants from producing viable offspring," Abouheif explained. "Different species of ants have different levels of this "reproductive constraint," and we believe those levels provide a measure of how eusocial the colony is. The less the workers reproduce, the more coherent the group becomes."

The existence of sterile castes of ants tormented Charles Darwin as he was formulating his Theory of Natural Selection, and he described them as the "one special difficulty, which at first appeared to me insuperable, and actually fatal to my theory." If adaptive evolution unfolds by differential survival of individuals, how can individuals incapable of passing on their genes possibly evolve and persist?

Darwin proposed that in the case of ant societies natural selection applies not only to the individual, because the individual would never benefit by cutting its own reproduction, but also to the family or group. This study supports Darwin's prescient ideas, and provides a molecular measure of how an entire colony can be viewed as a single or "superorganism."

Adapted from materials provided by McGill University.

http://www.sciencedaily.com/releases/2008/11/081119122634.htm

Biomarkers Used To Predict Chronological And Physiological Age

ScienceDaily (Nov. 20, 2008) — Scientists at the Buck Institute for Age Research have identified for the first time biomarkers of aging which are highly predictive of both chronological and physiological age. Biomarkers are biochemical features that can be used to measure the progress of disease or the effects of treatment. The research involves nematode worms, microarrays which measure changes in gene expression, and complex computer algorithms.This is the first step toward identifying similar biomarkers in humans which would provide a means of scientifically validating anti-aging therapies.

Chronological and physiological age are rarely in sync. Determining chronological age in both worms and humans is easy – count forward from birth. Determining physiological age remains subjective – based on how someone looks or functions. Some 70 year old humans function at the level of those in their 50's, others become frail elderly sooner than would be expected. C. elegans, the nematode worm, is a similar creature. With an average lifespan of three weeks, some nematodes remain spry much longer than then their similarly-aged brethren, while others show signs of premature aging (lack of symmetrical appearance, uncoordinated motion, and the need to be prodded into movement).Buck researchers were able to predict the age of the worms by doing whole-genome expression profiles of 104 individual wild-type worms covering the entire nematode lifespan and correlating that profiling with age-related behavior and survival. The study revealed a suite of genes that are actively involved in the aging process. The research was the largest study of aging utilizing gene profiling to date.

"This is the first evidence that physiological age can be predicted non-subjectively," said Simon Melov, PhD, Buck faculty member and lead author of the study. "This is a first step; our results were not perfect, but we were able to predict the ages of the animals 70% of the time, which is far better than anything that has been done before."The findings have major implications for age research in humans. Examining biomarkers over time would provide a scientific baseline for clinical trials of anti-aging medicines, which is currently impossible to determine given the lengthy lifetime of human beings. The technology would also provide a means of determining whether an individual is aging faster or slower than would normally be expected.

Melov and his Buck Institute colleagues are considering several options for further studies. The next step is to do a larger study involving wild-type nematodes to see if the same suite of genes remains active in the aging process and to see if the predictive rate can be increased. Scientists are also considering comparing biomarkers in wild-type worms with mutant long-lived strains of the worms. Mouse studies may focus on gene expression profiling in different types of body tissue – for example, does heart muscle age faster than liver tissue given a certain set of environmental or nutritional factors. Melov also plans on utilizing this biomarker technology in studies involving humans who undertake various forms of exercise over a set length of time. Melov published a study in 2007 showing that regular strength training reversed aspects of aging in skeletal muscle in healthy seniors."I am optimistic that we will be able to pursue this line of research further," said Melov. "Research into the biology of aging in humans has been hampered by the lack of irrefutable biomarkers that correlate with the aging process". He added, "I am confident that at some point there will be a non-subjective method of determining how old someone is with a high level of confidence." The research is due to appear in the November 20, 2008 online edition of Aging Cell.

Other researchers involved in the study include Buck scientist Tamara Golden; Alan Hubbard, University of California Berkeley, School of Public Health, Division of Biostatistics; and Caroline Dando and Michael Herren, both with the Fluidigm Corporation. The work was funded by grants from the National Institutes of Health.

Adapted from materials provided by Buck Institute for Age Research, via EurekAlert!, a service of AAAS.

http://www.sciencedaily.com/releases/2008/11/081119171316.htm

Works Of Art Shed New Light On Climate Change

'View from Portsdown Hill' by William Daniell, 1824. This view looks across an open vista of creeks and islnds before the expansion of 19th century development. In the mid-distance is Porchester Castle with the Solent and the Isle of Wight beyond. (Credit: Image courtesy of University of Portsmouth)

ScienceDaily (Nov. 20, 2008) — Paintings, watercolours and prints can be used by those who manage Britain's coastlines to look back in time and better understand the threat of rising sea levels and climate change.

The risks of flooding, marine erosion and landslips are a hot topic for engineers, planners and coastal managers as well as for people who live on vulnerable coasts.

In the past seawalls, groynes and breakwaters have been used to hold back the sea and such structures protect many of Britain's coastal towns and resorts. But this often had the effect of moving the problem further along the coast.

Thanks to an inspired idea, scientists now have a new tool to better understand how to tackle the threats to Britain's coastal populations, assets and natural resources. A model has been drawn up to turn one man's hunch into hard science that can be used in Britain – and other parts of Europe – to help decide whether to defend the coast or allow nature to take its course.

The result can be used to look back in time with much greater clarity to study the impact mankind has had on coasts to help determine what works and what doesn't. It will give planners, engineers and people who live on coasts insight into the long-term effects of providing coastal defences to help prevent erosion and flooding.

Dr Robin McInnes, who runs Isle of Wight-based consultancy Coastal and Geotechnical Services, had the idea to combine his two passions, geography and a love of art, to test his theory that we could learn a lot about coastal evolution over the centuries by examining paintings, drawings, prints and engravings.

He and his fellow researchers from the University of Portsmouth examined the work of 400 artists who painted, drew or engraved coastal scenes on the Isle of Wight and the adjacent stretch of mainland coast from Hurst Spit to Selsey Bill between 1770 and 1920. They drew up a shortlist of those artists whose could be considered reliable witnesses and then developed a ranking system for those remaining. They were left with 22 artists whose works could be trusted as a fair and accurate depiction of the coastline.

Dr McInnes said: 'Using art in this way gives us a clear picture of the scale and pace of coastal evolution as well as environmental and developmental change. It helps us understand how it has been necessary for people who live on coasts to adapt to changing conditions over the centuries; in some locations this has involved retreating to higher or more stable ground further back from the coast.'

Dr Jonathan Potts, a specialist in coastal policy at the University of Portsmouth's School of Environmental Design and Management, said: 'Being able to demonstrate how the coastline is changing by using art helps local people and planners and engineers see the bigger picture on the coast.

'You can monitor erosion and measure beaches and tell people how the coast is changing but these artworks are dramatic and immediate and because some are even familiar, much loved paintings, they jolt people into taking notice. It is a really novel way of using art and it strikes a chord with local people because they can see straight away how their natural environment has changed.

'This is a qualitative approach which helps support other more familiar scientific and technical tools available to coastal scientists.'

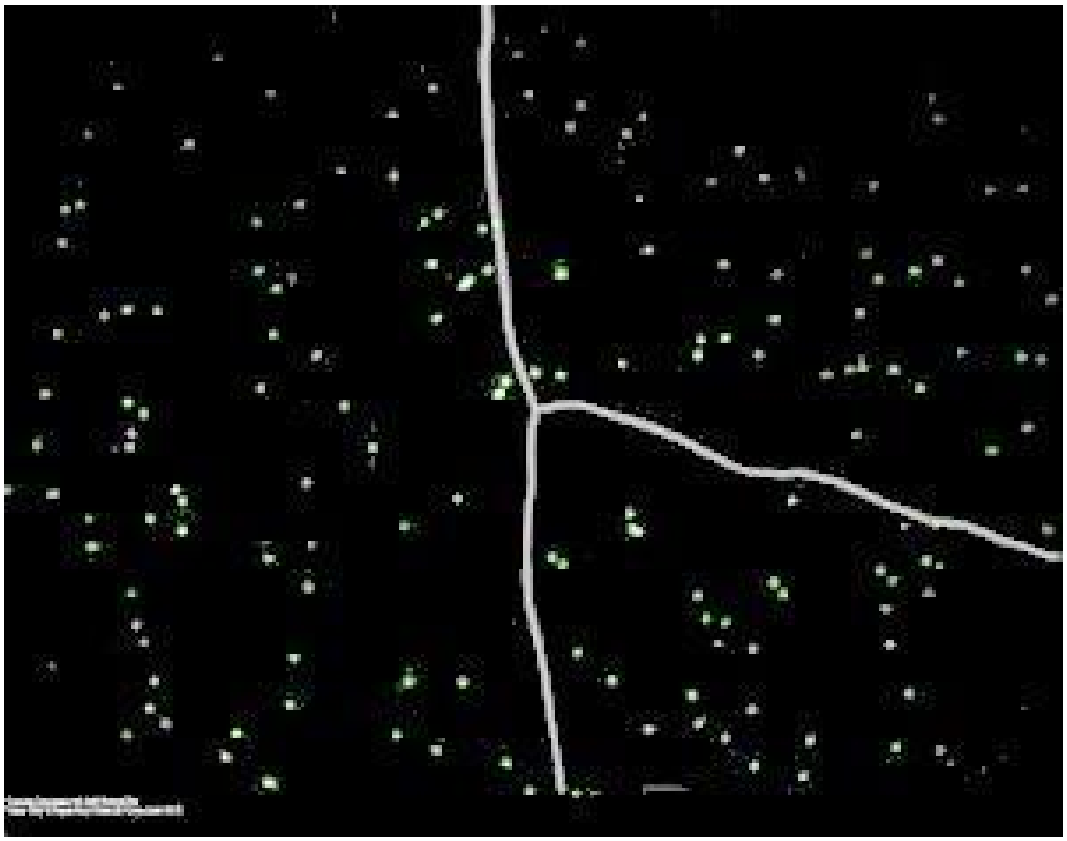
Dr McInnes, Dr Potts and Lindsey Bates, a Masters student at Portsmouth and environment officer with Chichester District Council, will present their research findings at an international conference in Venice next week (NOVEMBER 26). They anticipate interest in their research from other European countries including France, Spain and Italy which face similar problems arising from coastal natural hazards and which also have a rich art history.

The research was funded by Dr McInnes's award under The Crown Estate's Caird Fellowship 2008, which is sponsored by The Crown Estate and National Maritime Museum. The full report is expected to be published next month.

Adapted from materials provided by University of Portsmouth.

http://www.sciencedaily.com/releases/2008/11/081119084841.htm

Potential Sources Of 'Rain-Making' Bacteria In The Atmosphere Identified



Cells of ice-nucleating bacteria (dots) entrapped in ice crystals. (Credit: Image courtesy of Louisiana State University)

ScienceDaily (Nov. 20, 2008) — Brent Christner, assistant professor of biological sciences at LSU, recently found evidence that bacteria and biological cells are the most efficient ice-forming catalysts in precipitation from locations around the globe. The formation of ice in clouds is important in the processes that lead to snow and rain. Ice-nucleating bacteria – which have been referred to as "rain-making bacteria" – may be significant triggers of freezing in clouds and influence the water cycle.

These findings, which take a big step toward filling the gaps in scientific understanding of ice nuclei in the atmosphere, will be published in the Proceedings of the National Academy of Sciences during the week of Nov. 17.

Christner's team, which includes Kevin McCarter and Rongman Cai of LSU's Department of Experimental Statistics, and collaborators at INRA in France and Montana State University, had previously demonstrated the presence of ice nucleating bacteria in precipitation. However, the source remained elusive.

"To address this, we examined the correlations between the presence of biological ice nuclei in precipitation and the composition of aerosols co-deposited in the precipitation," said Christner. The chemical composition of the aerosols revealed information on their source and the potential environments from which the biological ice nuclei could have originated.

"Our models can accurately predict the concentrations of cells and biological ice nucleators in precipitation using a relatively small number of variables," he said. "The data provides a first glimpse of

the conditions that appear to favor the distribution of biological ice nuclei in the atmosphere and will be useful for predicting their abundance in other contexts."

The study concludes that vegetation and soils are an important source of biological ice nuclei to the atmosphere at some geographical locations. Though they were detected in snow from places as remote as Antarctica, ice nucleating bacteria may also exist in the ocean, or alternatively, are able to travel large distances in the atmosphere. "The atmosphere provides an efficient conduit for microbial dispersal on a global scale," said Christner.

Most known ice-nucleating bacteria are plant pathogens, which are basically germs that can cause disease and freezing injury in plants. According to Christner, agricultural losses from ice nucleating bacteria, such as Pseudomonas syringae, often exceed $1 billion dollars per year in the United States, so understanding their mode of dispersal is essential for mitigating their impact on crops. It is possible that dissemination through precipitation is a crucial facet of the life cycle for some plant bacteria, allowing them to colonize new hosts.

The new results provide much territory for further study. For example, many of the variables important for predicting the cell and biological ice nuclei concentration in precipitation are nutrients vital for growth and production of these ice nucleators.

"Previous work has shown that microbes can metabolize and grow in clouds, meaning that the atmosphere may represent an environment for life," said Christner. "It is possible that cloud-borne microbes could 'turn on' their ice nuclear in the atmosphere and subsequently be returned to the ground in snow or rain. This is a very exciting possibility that further research could unearth."

Adapted from materials provided by Louisiana State University.

http://www.sciencedaily.com/releases/2008/11/081119171523.htm#

Removing Part Of Brain Controls Girl's Epilepsy

Brooklyn Bauer and her mom, Jessica Nelson. (Credit: Image courtesy of University of Chicago Medical Center)

ScienceDaily (Nov. 20, 2008) — Surgeons at the University of Chicago Comer Children's Hospital told Jessica Nelson one of the scariest things she will ever hear as a parent: they wanted to treat her daughter's epilepsy by cutting out or disconnecting half of her brain. Then something extraordinary happened: it worked.

Suffering from seizures, her daughter, Brooklyn Bauer, had undergone different treatments and tried different medications for more than three years with no success. Her speech and motor skills were extremely delayed. She walked on her knees and spoke in two-word phrases.

Now after surgery and recovery, Brooklyn is in kindergarten. She has come a long way from the time when she was heavily medicated and lethargic, and has even become a spokesperson for the Epilepsy Foundation's Northern Illinois region.

Nelson remembered how her daughter's seizures were barely visible, but she had that sense as a mother that they were happening. "She would show facial twitches and her eyes would glaze over. She was on Valium all the time, had little energy, slept a lot, and missed so much preschool because of doctor visits and hospital stays," Nelson said.

When it became clear that Brooklyn was not making progress, Jessica brought her daughter from Rockford to Comer Children's Hospital, where pediatricians discovered just how extensive the seizures were.

EEG scans showed Brooklyn was experiencing nearly constant epileptic activity every one to two seconds -- whether she was awake or asleep. The left hemisphere of her brain showed significant damage with little positive brain function. The injury was related to brain hemorrhaging that occurred when she was born 12 weeks premature.

Michael Kohrman, MD, a pediatric epileptologist and associate professor of pediatrics and neurology, said that after a child fails with two or three anti-seizure medications, there is little chance that another medication will work. However, he still desperately wanted to give Brooklyn relief.

Kohrman, along with David Frim, MD, PhD, chief of neurosurgery, reviewed her case and concluded that Brooklyn's brain would function better without the left hemisphere. The right hemisphere of Brooklyn's brain was healthy.

"The seizing tissue in Brooklyn's brain had lost its capability to function productively, so disconnecting or removing it paradoxically allows the remaining brain to function better," Frim said. "Once we identified Brooklyn as a candidate for surgery, we were able to move within two months to complete all testing and perform the surgery."

Everyone involved recognized the gravity of the surgery and the need to support the family. Patti Ogden, APN, a nurse practitioner and epilepsy coordinator for the Children's Hospital, was instrumental in managing the many details related to Brooklyn's diagnostics, surgery and medical treatment--acting as a key point person for physicians and the girl's family. She educated Jessica about the diagnosis, procedure, and Brooklyn's subsequent care. "When we're asking to cut away part of your child's brain, it's essential to gain the family's trust," Ogden said.

Lead surgeon Frim, along with the pediatric neurology team, performed a functional hemispherectomy: removing most of the brain's left temporal and occipital lobes, and severing all neuronal connections from the left parietal and frontal lobes to the healthy right hemisphere and to other parts of Brooklyn's body. Within a few weeks after surgery, her speech returned, her personality blossomed, and her motor skills gained strength.

Kohrman explained, "The left hemisphere of Brooklyn's brain may still be active electrically, but it can no longer communicate with, or harm, the rest of the brain."

November 2008, two years after surgery, was a milestone and good indication that Brooklyn has gained remarkable function. After her medications were readjusted, Brooklyn's seizures are under control. She's even running now--something her family never thought would be possible.

"She is right on track developmentally now, and started kindergarten this fall in a regular classroom--not a special-ed class. I can't describe how far Brooklyn has come from where she was. She just shines now," Nelson said.

After such a dramatic surgery, Brooklyn continues to be monitored by her physicians and her brain and motor functions are frequently reassessed. Kohrman continues to evaluate her neurological function, and Frim monitors her brain shunt that was implanted after the surgery.

It was an agonizing decision to have part of her daughter's brain removed, but Jessica knows she made the right choice.

"My daughter is the epitome of an epilepsy success story," Jessica says.

Adapted from materials provided by University of Chicago Comer Children's Hospital.

http://www.sciencedaily.com/releases/2008/11/081120091133.htm

Anthropological Engagement, for Good and for Bad?

SAN FRANCISCO – At the American Anthropological Association's annual meeting, which ended Sunday, the official theme was "Inclusion, Collaboration and Engagement." That final word – "engagement" – inspired lively and at times prickly debates and discussions, with sessions and meetings focused on the Human Terrain System and other controversial forms of collaboration with the U.S. military, secret research, and a planned comprehensive review of the association's decade-old Code of Ethics.

Other forms of engagement discussed were less controversial and included the need for anthropologists to apply their talents in real-world settings and to better interact with the publics that support their research.

Among these discussions and others, questions of what it means to be a public intellectual, what it means to be an engaged scholar – and which forms of "engagement" are to be encouraged and which might be flat-out unethical – dominated.

The Human Terrain System

One panel Friday afternoon featured two scholars who work with the Human Terrain System, a controversial initiative, opposed by the AAA's executive board last year, in which social scientists are embedded with the U.S. military in Afghanistan and Iraq in order to help units understand the local population. The program has raised questions about issues of voluntary informed consent and potential uses, or misuses, of anthropological information for targeting purposes.

When asked why she joined HTS, Kathleen Roedy, a Virginia-based analyst with the program who has a Ph.D. in social anthropology, said she wanted to apply her anthropological knowledge. "You can actually see the results of your work in a day-to-day environment."Her colleague at HTS on the panel, Marcia Hartwell, added: "It's a chance to change the military; it's a chance to change the Army. It's a challenge. When I say that to soldiers they laugh, but they get it.

"In many ways the Army's ready to do things in a different way, for different reasons. And we'll see how this all works out."

Yet, during a generally civil but at times pointed and consistently unorthodox question and answer session (during which the moderator, Rob Borofsky of Hawaii Pacific University, cut off follow-up questions and at one point barked at an audience member "That's, it! Down!" as if addressing a dog), many questioners grew unsettled with the panelists' answers.

Roedy, in particular, seemed genuinely ready and willing to "engage" with her audience — and even in good faith shared her salary, which, at $70,000, was $11,000 higher than that of the assistant professor who raised the question. But the panelists deferred to unspecified superiors on a number of questions, including inquiries about programmatic matters like the budget and about allegations of unethical behavior by HTS team members in the field. (Neither panelist has been deployed, and Roedy has no plans to go overseas with HTS.) Hartwell stressed several times that the intention of the HTS program is that the information gathered should not be used for targeting purposes.

"The moment of truth is they were asked twice why anthropologists had concerns about [HTS], and they didn't know the answer," said Hugh Gusterson, a professor at George Mason University and founding member of the Network of Concerned Anthropologists, which opposes anthropologists' participation in counterinsurgency efforts. Gusterson pointed out that, in their answers, the panelists cited misinterpretations of what they do, and concerns about militarization of the discipline, but didn't reference the AAA executive board's short statement, and, specifically, concerns about potential dangers to the populations being studied.

"I'm really concerned that you didn't understand the reason for our concern," Gusterson told the panelists.

Roberto J. Gonzales, an associate professor at San Jose State University who has written a forthcoming book on HTS (University of Chicago Press), added that, given the AAA's official opposition to the project, "My immediate impression was, 'Why are they even here?' "

Other Military Matters

Another panel was notable in part for the conspicuous absence of the senior social scientist for HTS, Montgomery McFate, who was scheduled to present a paper but recently canceled because of obligations overseas, according to the session organizer. The conversation at this particular session, "Anthropology, the Military and War," moved beyond HTS to focus on anthropologists' engagement with the military more generally.

"I do not work for HTS, nor is that the approach that I have advocated in my little corner of the world," said Kerry B. Fosher, who works at the Marine Corps Intelligence Activity writing classified and unclassified analyses on cultural matters for Marine Corps commanders and intelligence agencies (Fosher stressed in her comments that she was not speaking on behalf of the MCIA). Fosher said that she has come up with a three-pronged strategy to navigate the ethical terrain she treads — by positioning herself so she can leave immediately if needed ("I have to have a pot of money so I can walk out the door at any point"), by being constantly vigilant about her position on various slopes, and by widely consulting with others. Speaking of concerns that anthropological knowledge could be used for unintended purposes, "At a certain point we become like priests of some involuted religion deciding who does and does not count themselves worthy of the particular knowledge we hold," she said. If anthropologists weren't so "tight-fisted" with their knowledge for fear of its misuse, she suggested, "Maybe the world would look a lot different than it does."

"More fundamentally, I accept that causing unintentional harm is possible, and that's a very difficult pill to swallow," said Brian R. Selmeski, who teaches anthropology at Air University, an Air Force-run university in Alabama. "How do I counterbalance that — by putting in the balance the possibility of doing good."

In a formal response, David H. Price, of St. Martin's University, criticized what he described as an "unjustified innocence," especially given anthropology's sorry past in this domain. "There is a belief that their own agency can break through historical forces that they admit have abused anthropology in past conflicts," he said.

"In these contexts, intentions matter little beyond functioning as a sort of gateway drug."

Asked whether any forms of engagement with the military would be acceptable to him, Price said sure. "Personally I'm not working for the military for a number of reasons, one of which is the larger mission as it's being carried out is unacceptable to me. For myself, that's my answer."

'Anthropology's Little Secrets'

The association is set to begin a two-year process to revise its entire ethics code, prompted by debates about clandestine research and these collaborations with the military in particular. The issues of secret research are multi-pronged, involving not only anthropologists' responsibilities to be honest with and do no harm to the groups they study, but also questions of whether they have an ethical obligation to publish or otherwise share their research more broadly. Many practicing anthropologists work for the federal government or corporations, where restrictions on disseminating research findings, proprietary or otherwise, can apply.

"Many anthropologists who are railing against [secret research] have absolutely no experience dealing with government agencies," said Laura McNamara, who researches intelligence analysts and their slow

transitions into post-Cold War postures for Sandia National Laboratories. “I think a calm and empirical assessment of what it actually means to work in a classified environment is important.”

McNamara, who sits on the AAA’s Commission on the Engagement of Anthropology with the U.S. Security and Intelligence Communities, said she would argue that anthropologists working in universities “also face choices about who they’re going to be disseminating to and why.” She noted that in her own doctoral research, she negotiated with Los Alamos National Laboratory about what she could publish. “I could write about absolutely anything I wanted as long as I didn’t give any technical details about the width of the spheres that were being used,” she said. “I could disseminate anything I wanted to as long as I didn’t deal with those tiny technical details, and I don’t think anyone in this room would think that matters.”

She added, however: “That does not mean that all classified research is benign.” Particularly problematic is compartmentalized research, she said, where scholars engage in one piece of a project but lack a sense of the total purpose of the study. “I think those are really dangerous projects. I won’t participate in them.”

Nevertheless, ethically studying shifts in bureaucratic cultures like U.S. intelligence agencies “is the kind of thing that anthropologists really should be doing,” McNamara argued at the end of her talk.

“It’s the difference between politicized scholarship and really politically engaged scholarship.”

Encouraging Engagement

While the AAA conference featured discussions of some controversial forms of engagement, at the same time, many speakers stressed an urgent need for anthropologists to more productively and positively engage with the world outside the academy.“The whole idea of engagement in anthropology comes out of a larger set of higher education aspirations that have sort of been out in the ether for the last 10 years, and that is, ‘What is the role of an engaged university?’ ” said Yolanda T. Moses, an anthropologist and administrator at the University of California at Riverside and a former college and association president.

“That is, to what extent are institutions like higher education motivators or triggers for building civil society and for integrating diverse folks? So there’s also on the national scene an issue of higher education for whom, higher education for what, and higher education as a public good or higher education as a private enterprise.”

On the other hand, an earlier conference session on “The Academy and the Publics” focused largely on the barriers to engaged and public scholarship faced by anthropologists in academe. The three pillars of the faculty rewards system are research, teaching and service — service as narrowly defined. “Service usually means service to the academy rather than service to the publics. That is, people are awarded for service to the discipline or university more so than [to] the publics,” said Paula L.W. Sabloff, a museum administrator and adjunct associate professor at the University of Pennsylvania.

“The political economy of academia demands that people’s value depends on their production. How do we judge that production? With numbers, numbers of scholarly productions only?

“How can we get our public outreach efforts included in faculty evaluations also? For example, we can count the numbers of books sold, the number of visitors to a museum exhibit or lecture… or the number of issues of a magazine sold in which anthropological work has appeared.”

Nancy Scheper-Hughes, a professor at the University of California at Berkeley whose research interests include the trafficking of human organs, offered some advice for young scholars interested in public anthropology.

“You do double time, keeping up on the expected home front duties… that is, keep on publishing those scholarly articles… while you’re simultaneously doing your international human rights work or serving on international panels or giving speeches at places that don’t matter a hoot to the academy,” Scheper-

Hughes said. “If you want to be a public anthropologist, then do it, I always did. But don’t expect to be rewarded for it.

“Be grateful… that we still live in a democratic enough society that we can do it and get away with it.”

Scheper-Hughes said that, over time, the university withdraws from you, the administration pulls back – and, in her case, the more activist she became, the less she was asked to serve on university committees (that traditional form of “service"). “We all want to have roles on search committees; we all want to see changes. That’s one of the sacrifices that you make, but in the end it might be a good bargain. It might be a good enough bargain.”

Lastly, she advised, “Don’t wait to jump into the public fray until you’re safely tenured. If you do so, you’ll find you’ve lost the habit of courage.”

— Elizabeth Redden

The original story and user comments can be viewed online at http://insidehighered.com/news/2008/11/24/anthro.

Power Grab at DuPage

Periodically, colleges debate such questions as the future of the curriculum, the role of the student newspaper, how outside speakers should be selected, and so forth. At the College of DuPage, a community college outside of Chicago, the board recently proposed major overhauls on all these issues with a common theme — power that currently rests elsewhere would be moved to the trustees.

Not only did the board set out to change the power structure at the college, but it moved to adopt as official college policy a version of David Horowitz's controversial "Academic Bill of Rights."

Last week, faculty members and students — the latter with tape over their mouths to symbolize what they say the trustees are doing to their freedoms — flocked to a board meeting to protest the plans that appear to be dividing the college. Not only do the critics say that academic freedom is in danger, but they charge that the board's policies in some instances would violate state law.

Both faculty members and students say that the proposed overhaul of most college rules adds to uncertainty about the college and its leadership. The past two presidents of the college have been ousted with minimal explanation (a new president has just been appointed). And the chair of the board of the college this year sued three former board members, charging them with defamation in their allegations of sexual harassment against him — charges he denies.

As unusual as it is to have a board member sue ex-trustees and to see back-to-back presidencies ending mysteriously, the current debate seems to be upsetting more people at DuPage because it speaks directly to what goes on in the classrooms and on campus every day. "This is really an attempt by the board to gain complete control over everything," said Glenn Hansen, a professor of photography who is president of the College of DuPage Faculty Association, a unit of the National Education Association.

Trustees could not be reached or did not respond for comment about this article. But Kory Atkinson, one of the trustees who wrote the controversial plans, told *The Naperville Sun* that there was "a lot of unjustified paranoia and suspicion regarding the board and its policies"; that "there's not much to be concerned about" and that "90 percent of the proposed manual is noncontroversial."

Many of the 230 planned changes in policy are indeed noncontroversial. But amid all the routine updates are changes that stunned faculty members. Indeed, DuPage is probably not the only college where professors would object if what was billed as a routine updating of board rules ended up including the Academic Bill of Rights.

That document, framed as a measure to protect academic freedom, is widely viewed by professors as an attack on their autonomy because of its call for faculty members to expose students to a wide variety of views on most topics and its implication that there is a widespread problem of faculty members punishing job candidates or students whose political views differ from their own. Faculty groups say that the measure would lead to professors constantly looking over their shoulders, make it impossible for them to express strong views, and force them to include conservative interpretations of everything or face criticism for not doing so.

In the board's list of policy changes, the section that mirrors the Academic Bill of Rights is not labeled as such; it is simply called "Educational Philosophy," and faculty members say that they were not told that the board wanted to include this measure. But the section (Section 25-135 if you follow this link and go toward the bottom) largely mirrors the language drafted by Horowitz.

A letter to the board from the faculty association notes that the trustees have never (in public) debated the Academic Bill of Rights or expressed concerns to professors about the issues it claims to address, and questions why the measure was "surreptitiously" included in the update of board rules. The letter notes that the college has a policy in place that allows students to file complaints if they believe a professor is treating them unfairly and that no complaints are known to have been filed raising concerns about political or other viewpoint discrimination.

Referring to the Academic Bill of Rights by its acronym, the letter says: "ABOR supporters apparently hope that the bill will give elected officials the power to dictate, for example, whether creationism should be taught alongside evolution in college biology. Let us be clear: The [College of DuPage] faculty supports teaching conflicting views on a subject where those views are supported by sufficient evidence. But it is the responsibility of college professors, who are trained experts in their fields, to evaluate that evidence. It's not the job of politicians.... Given the controversial nature of ABOR and its lack of acceptance in Illinois, it's especially troubling that the Board would try to use a revision in Board policies to impose it ... without due debate or consideration."

Adding to the concerns of professors are statements in the proposed revisions that give the board exclusive power over the curriculum, the initial pay of individual faculty members, and all educational programs. While there are some references to the board seeking input of faculty members, statement after statement says that the board has full power. Hansen, in an interview, said that professors understood that the board has ultimate authority, but that the phrasing of many proposed changes undercuts the norms of shared governance, where the faculty role in educational matters is much more than an opportunity to provide an opinion. The board appears to be moving beyond the traditional role for setting broad policy, he said, when it demands approval of pay for every faculty member.

The letter from faculty leaders to the board also notes that shared governance is an idea embraced not only by professors but by the college's accreditor, the Higher Learning Commission of the North Central Association of Colleges and Schools.

Still other provisions attracted the most anger from students, who say that the board appears to want to limit their exposure to ideas and their ability to express them. One proposed rule gives the board the right to approve or reject all proposed outside speakers, and the right to control the way speaker events are planned.

Another proposed rule change would put control of the content of the student newspaper — currently students have autonomy, but work with an adviser — directly under the college's president. It is hard to believe it is a coincidence, Hansen said, that this provision should appear after board members have complained that the student newspaper, *The Courier*, is sometimes critical of trustees.

The Courier asked for advice from the Student Press Law Center, and that organization wrote back that the board would be foolish to adopt the proposed policy change because doing so would probably violate Illinois law and freedom of speech guaranteed by the First Amendment. Illinois has a strong statute protecting the rights of college newspapers not to be subject to direct control by administrations, noted the letter from Frank D. LoMonte, executive director of the center.

LoMonte, noting that the proposed new rule directly followed comments from board members about critical coverage, said that the newspaper would have little legal difficulty showing that it was being punished for exercising its free speech — and that such punishment would likely be found to violate the First Amendment.

Following the meeting with faculty members speaking out and students taping their mouths shut, board members said that they would be happy to talk more before adopting all the rules changes. But they also insisted that there was nothing wrong with what they were proposing.

— Scott Jaschik

The original story and user comments can be viewed online at http://insidehighered.com/news/2008/11/24/dupage.

Doctorate Production Continues to Grow

The number of research doctorates awarded by American universities grew for the sixth straight year and reached another record high in 2007, according to the National Science Foundation's first report from the annual Survey of Earned Doctorates. The overall rate of growth was 5.4 percent.

But while the increases showed strength in many fields, particularly the science and engineering disciplines that have been a source of growing public policy concerns, the number of Ph.D.'s awarded in the humanities dropped by 4.6 percent, to their lowest point since 1994.

And the overall gains continued to be driven by significant numbers of Ph.D.s and other doctorates awarded to non-Americans.

The data on doctorates awarded — which will be amplified in coming weeks by the release of the Survey on Earned Doctorates, an annual study sponsored by the science foundation and five other federal agencies and conducted by the University of Chicago's National Opinion Research Center — is closely watched as an indicator of the health and vitality of the American research enterprise and of graduate education in the United States.

As such, much of the data will be heartening — but with several significant asterisks. At the broadest level, the picture is a positive one: American universities continue to crank out growing numbers of scientists and other researchers to fill college faculties and staff research university, corporate and other laboratories, among other things. And perhaps most importantly, much of the growth is occurring in fields about which there has been significant concern expressed by a slew of recent reports that have inspired increased federal support for research, particularly in the physical sciences.

Over all, the number of research doctorates awarded in 2007 grew to 48,079, up 5.4 percent from 45,598 in 2006. About 80 percent of that gain of 2,500 doctoral recipients came in science and engineering fields, led by increases of 14.4 percent in computer sciences, 13.5 percent in physics, and 7.8 percent in engineering (including 12.9 percent in electrical and 19.7 percent in industrial/manufacturing). Social science fields (which are lumped together — details will follow in the Survey of Earned Doctorates) grew by 3.3 percent, and psychology by 1.1 percent over 2006.

Only two scientific fields suffered declines from 2006 to 2007 — chemistry and mechanical engineering, both of which dropped by 1.5 percent, as seen in the table below (chemistry, though, has seen an overall increase of 5.1 percent in the number of doctorates awarded in the field since 1998):

Doctorates Awarded by American Universities, 2006 and 2007

Field	2006	2007	Pct. Change
All fields	45,598	48,079	5.4%
Science and engineering	29,855	31,801	6.5%
—Science	22,672	24,056	6.1%
——Agricultural sciences	1,033	1,137	10.1%
——Biological sciences	6,641	7,173	8.0%
——Computer sciences	1,453	1,662	14.4%
——Earth, atmospheric, and ocean sciences	757	876	15.7%
——Mathematics	1,325	1,393	5.1%
——Physical sciences	3,929	4,106	4.5%

———Astronomy	197	224	13.7%
———Chemistry	2,363	2,328	-1.5%
———Physics	1,369	1,554	13.5%
——Psychology	3,258	3,294	1.1%
——Social sciences	4,276	4,415	3.3%
—Engineering	7,183	7,745	7.8%
——Aeronautical/astronautical engineering	238	267	12.2%
——Chemical engineering	891	921	3.4%
——Civil engineering	803	865	7.7%
——Electrical engineering	2,132	2,408	12.9%
——Industrial/manufacturing engineering	234	280	19.7%
——Materials/metallurgical engineering	625	679	8.6%
——Mechanical engineering	1,146	1,129	-1.5%
——Other engineering	1,114	1,196	7.4%
Non-science and engineering	15,743	16,278	3.4%
—Education	6,120	6,429	5.0%
——Education administration	2,050	2,154	5.1%
——Education research	2,750	2,653	-3.5%
——Teacher education	250	298	19.2%
——Teaching fields	707	881	24.6%
——Other education	363	443	22.0%
—Health	1,905	2,134	12.0%
—Humanities	5,125	4,890	-4.6%
——Foreign languages and literature	615	604	-1.8%
——History	917	890	-2.9%
——Letters	1,457	1,357	-6.9%
——Other humanities	2,136	2,039	-4.5%
—Professional fields	2,593	2,825	8.9%
——Business management/administrative services	1,310	1,505	14.9%
——Communication	510	557	9.2%
——Other professional fields	731	698	-4.5%
—Unknown	42	65	54.8%

Source: National Science Foundation

The data were decidedly mixed in non-science and engineering fields. The number of doctorates awarded in the burgeoning field of health grew 12 percent, an outcome almost certainly tied to the growth in the number of public health programs and schools emerging in recent years. Doctorates in the field have grown by 42.4 percent since 1998.

The number of doctorates in professional fields (such as business and communication) grew by 8.9 percent, while those awarded in education grew by about 5 percent.

The steepest drop occurred in the humanities, with declines of 6.9 percent in letters (English language and literature, classics, etc.), 2.9 percent in history, and 4.5 percent in "other humanities."

Other highlights of the NSF report include the following:

The number of science and engineering doctorates awarded to non-U.S. citizens (permanent residents and temporary visa holders) grew at a faster rate (6.0 percent) than did those to U.S. citizens (3.6 percent). In non-science fields, the proportion of doctorates earned by non-U.S. citizens rose by 7.1 percent, while the proportion earned by U.S. citizens grew by just 0.1 percent.

While men continued to outpace women in the number of science and engineering doctorates they received, the rate of growth in the number of doctorates awarded to women (6.9 percent) was greater than for men (6.2 percent).

All of the major racial groups except for Asian Americans saw increases in the number of doctorates they received in 2007, with the greatest proportional growth coming among African Americans (9.8 percent) and Hispanic Americans (8.7 percent).

— Doug Lederman

The original story and user comments can be viewed online at http://insidehighered.com/news/2008/11/24/doctorates.

In Qatar, an Art Museum of Imposing Simplicity

By NICOLAI OUROUSSOFF

DOHA, Qatar — There is nothing timid about the ambitions of the new Museum of Islamic Art that opens here next week. Rising on its own island just off the city's newly developed waterfront corniche, it is the centerpiece of an enormous effort to transform Qatar into an arts destination. The inaugural festivities on Saturday, including a performance by Yo-Yo Ma, attracted art-world luminaries from around the globe.

Viewed under the light of a spectacular evening fireworks display, the museum's colossal geometric form has an ageless quality, evoking a past when Islamic art and architecture were a nexus of world culture. At the same time it conveys a hope for reconnecting again.

The building seems austere by the standards of the flashy attention-grabbing forms that we have come to associate with Persian Gulf cities like Dubai and Abu Dhabi. Designed by I. M. Pei, 91, who has described it as his last major cultural building, it recalls a time when architectural expression was both more earnest and more optimistic, and the rift between modernity and tradition had yet to reach full pitch.

The museum, which houses manuscripts, textiles, ceramics and other works mostly assembled over the last 20 years, has emerged as one of the world's most encyclopedic collections of Islamic art. The origins of its artifacts range from Spain to Egypt to Iran, Iraq, Turkey, India and Central Asia. (Among the exquisite works on view at the opening were a bronze Andalusian fountainhead in the form of a doe with a heart-shaped mouth, and an ornate spherical brass plate from Persia or Mesopotamia used to measure the position of the stars. Both date from the 10th century.)

Taking his cue from the diversity of the collections, Mr. Pei sought to create a structure that would embody the "essence of Islamic architecture." He spent months traveling across the Middle East searching for inspiration. He visited the ninth-century Ahmad ibn Tulun Mosque in Cairo, a sober structure organized around a central court with a templelike central fountain, and ancient fortresses in Tunisia.

"Islam was one religion I did not know," Mr. Pei said in an interview. "So I studied the life of Muhammad. I went to Egypt and Tunisia. I became very interested in the architecture of defense, in fortifications."

"The architecture is very strong and simple," he added. "There is nothing superfluous."

The imposing simplicity of his new museum is brought to life by the play of light and shadow under the gulf's blazing sun. Mr. Pei visited several proposed sites in downtown Doha before settling on the area just off the end of the seafront corniche. Worried that his building might one day be hemmed in by new construction, he asked Qatar's Emir, Sheikh Hamad bin Khalifa al-Thani, chairman of the museum's board, to build him a private island so that his monument would be isolated from the rest of the city.

"I worried a lot about what will come after," Mr. Pei said. "Even a beautiful piece of work can be overshadowed, destroyed by something else."

For now, "Doha in many ways is virginal," he said. "There is no real context there, no real life unless you go into the souk. I had to create my own context. It was very selfish."

The resulting structure is a powerful Cubist composition of square and octagonal blocks stacked atop one another and culminating in a central tower. An esplanade of giant palm trees leads to the island. Inside the museum, 41,000 square feet of galleries are organized around a towering atrium capped by a dome, with a narrow beam of light descending from its central oculus.

Seen from across the water its massive sand-colored stone blocks call to mind the Tunisian fortresses it is modeled after.

"The museum is an object," Mr. Pei said. "It should be treated as a piece of sculpture."

http://www.nytimes.com/2008/11/24/arts/design/24muse.html?_r=1

Layers of Devotion (and the Scars to Prove It)

By JORI FINKEL

Santa Monica, Calif.

IMAGINE you're an artist finishing work for a big gallery show. You're standing on a ladder trying to reach the top of a wooden sculpture with a chain saw; the next thing you know, you've sliced open your left hand. You've severed the tips of two fingers and nearly cut your thumb to the bone. You've hit an artery. Blood is spurting everywhere.

This is the scene that played out in June for the artist Enrique Martínez Celaya, when he was preparing for his first exhibition at the L.A. Louver gallery in Venice, Calif., which opened on Thursday and runs through Jan. 3.

To make matters worse, he had attached the chain-saw blade to a grinder for speed.

He credits his studio manager, Catherine Wallack, with thinking quickly, pressing his paper-towel-wrapped hand in hers, almost tourniquet-style, to staunch the bleeding and letting emergency paramedics know he was an artist. (Pity the studio intern, three days on the job, who had the unglamorous task of finding the fingertips.)

He also credits his reconstructive surgeon, Jerry Haviv, with skillfully repairing his ligaments and tendons. (Mr. Martínez Celaya says he now has 80 percent function in his left hand — which is not his dominant hand — and expects a full recovery within a year.)

As for his own reaction that day, he described it as strangely calm. "I said to Catherine as the paramedics were taking me away: 'Don't throw away the paper towels. I might want to use them in an artwork.' "

It was the reaction of an artist who has often used unorthodox materials like tar, blood, hair and feathers in his paintings. It was also the response of a highly rational, self-disciplined scientist who once worked on the femtosecond laser as a physicist at the Brookhaven National Laboratory on Long Island.

Mr. Martínez Celaya is one of the rare contemporary artists who trained as a physicist. He studied quantum electronics as a graduate student at the University of California, Berkeley, until he found himself more and more often sneaking away to paint, something he had considered a hobby.

"I found that the kinds of questions I wanted to tackle were not the questions of physics," he said. "Art is usually described as a luxury, but I felt the opposite. I just couldn't go the lab anymore and ignore everything going on emotionally with me."

The questions he explores in painting (and in his related writings) belong to religion and philosophy: the meaning of life and death, the purpose of consciousness, and what it means to be good or do good. He is as likely to talk about Schopenhauer and Wittgenstein, or Herman Melville and Paul Celan, as Joseph Beuys and Lucian Freud.

Although he shows regularly with John Berggruen Gallery in San Francisco and Sara Meltzer in New York (and has a retrospective that will open next year at the State Russian Museum in St. Petersburg), he recognizes that he is not exactly of the moment.

"So many contemporary paintings have this wink to say we're both in on the joke," he said. "Any time I find myself being witty or clever, I paint over it."

For instance, the wooden sculpture that cost him so much blood — carved from a single, 4,000-pound log of Paulownia tomentosa, also known as the Empress tree — has the gravitas of a medieval Pietà. Only there is no body of Jesus, just a stiff girl sitting alone on a big rock in a penitent pose.

"The robe that she wears is too big for her," he said. "I wanted her to have this awkward, vulnerable feeling."

The other works in his Santa Monica studio that day, another sculpture and a dozen good-size paintings now at L.A. Louver, are also lessons in isolation — sparse landscapes and astringent snowscapes, boyish figures that seem lost against the wide horizon, and animals holding their own, sometimes with no humans in sight.

The idea of exile and, more broadly, the existential condition of being separated from home haunts Mr. Martínez Celaya's work. Born in Cuba, he emigrated with his family to Madrid in childhood and to Puerto Rico as a teenager before moving to the United States for college.

Even today at 44, with a wife and three young children, he remains mobile. He has been shuttling for the past five years between Los Angeles and Delray Beach, Fla., a town, he said, that he and his wife picked out on a map. (The current plan is to live in Delray Beach year-round, and he has just sold his Santa Monica studio.) An exhibition of his work last year at the Miami Art Museum was aptly named "Nomad."

"Someone asked me a while back why I paint all of these images of coldness and snow," he said. "I think that's the temperature I feel inside. Isolation, solitude and loneliness, I'm always feeling the condition of things — or what you could call the illusion of things — being separate."

He walked over to a painting that shows a thin sliver of a naked boy trapped inside a tall block of ice, an image he worked on for more than two years. Part of what took so long, he said, was the inherent melodrama of the image, more surreal than most of his scenes.

"It seemed like a remarkably stupid painting to me," he said. "I even painted pine cones trying to get him out of the ice. I created cracks in the ice, but I couldn't get him out."

For all of the paintings in his studio that day, he relied on the same basic technique. He mixed wax into oil paint (about a 1-to-3 ratio), building up one thin layer after another to achieve a matte finish and translucency of color. ("Shiny paint makes me feel like I can't breathe," he said.) Some paintings have as many as 20 layers.

In the process he often painted over shapes or even human figures so that the finished canvas could contain less by way of content than it once did. One muddy, mountainous painting originally showed a boy sitting off to one corner holding the head of a deer. Now both the boy and head are gone.

In another canvas a boy stands in a deep field of dandelions, his face popping out like an overgrown flower. But the more you look, the less the image yields. There is no expressive or virtuosic brush stroke, and little realistic detail, to flesh out the figure or reveal the boy's age or size. Mr. Martínez Celaya said it was intentional. "There's not enough there to hold you emotionally. You begin to sink into a black hole."

"It's strange to love painting and be so much anti-painting," he added. "I'm not interested in luscious, sexy, virtuosic painting, but the destruction of the image, undermining the certainty of the image."

Near that work hung a darker painting of a horse in front of a forest, tethered to something out of sight. Here too there are signs of a painter making himself less painterly, as well as an empathy for animals. "It's clunky, like I like," he said. "It was hard to paint a horse as aggressively as I wanted. It wanted to be treated better than that."

This painting originally featured a white deer, but he ended up instead making a bronze sculpture of a deer, which stood near the large western stretch of windows in his studio. From a distance it looked as though the deer was pulling a sled, in a possible reindeer reference.

Only this is no garden ornament. The sled turns out to be a small bronze model of a Rocky Mountain-style landscape, complete with peaks and lakes. And the deer has moments of realism, not to mention testicles.

Still, the creature, now installed in the roof garden at L.A. Louver, remains elusive in many ways. Its bronze surface is highly reflective (waxed, not patinated), and the artist imagines that it will shimmer like a mirage for visitors.

"It's a little like a magic trick," he said, "trying to make something as solid as metal vanish a bit."

Then there are the seams on the deer's legs and torso, where the welding process has etched faint rainbows into the metal. Mr. Martínez Celaya decided not to smooth these seams so he could "expose the sculpture's constructed nature."

And now, after his accident, the ridges have new meaning for him.

He glanced down at the deer's legs, then held up his left hand.

"The seams on the deer look like scars to me," he said. "I feel even more of a connection to him now."

http://www.nytimes.com/2008/11/23/arts/design/23fink.html?ref=design

Drawings With a Message About Political Power

By BENJAMIN GENOCCHIO

The run of splendid exhibitions devoted to contemporary drawing continues at the Anthony Giordano Gallery at Dowling College with a small-scale retrospective of the work of Melanie Baker, a New York-based artist. The exhibition, appropriate given the recent elections, is all about the symbols and trappings of political office.

For the most part, Ms. Baker's drawings are faithful transcriptions of news media photographs of generic American politicians. She does not alter or embellish them, but through cropping and use of heightened scale draws attention to details like gestures and accouterments that suggest power and authority. These include microphones, notes for speeches and tailored suits.

The drawings often dwell on body language, making us aware of the ways that image and message often connect in politics. "Sixteen Words" (2003) shows a man in a dark suit and white shirt standing behind a lectern, one hand gripping the edge in a gesture of strength. Presumably this is the president of the United States; the presidential seal is on the front of the lectern.

While Ms. Baker's drawings show us the trappings of political power, they also involve us in the drama and showmanship of politics. "Sixteen Words" has genuine psychological weight, a focused intensity suggesting that something important is about to happen. For the artist, it is all about capturing the aura of political power.

Intimacy is also a main element here, for much of the success of these drawings is the sense they give that we are getting privileged access to the subjects. The works take us up close to the players, even behind the scenes. “The Art of Woo” (2007), for instance, zeros in on the velvety pinstriped suit and checkered tie of a man, his notes on the table before him; I imagine him about to give testimony at a Senate hearing.

Money, power and success are often in the air in these drawings. So is duplicity. “Electioneering” (2005), a large, vertical charcoal and pastel on paper, shows a close-up of the smiling mouth of an aging male politician, his identity obscured. The smile doesn’t seem real to me, more a mask of disarmament and seduction.

About halfway through the exhibition, the mood changes. A large detail of the torso of a man, wearing a soft red, button-up tunic and pants, a sword strapped to his waist, appears. The wall label tells us its source is Charles Willson Peale’s history painting “George Washington at the Battle of Princeton” (1779).

Although Ms. Baker’s preoccupations are with contemporary manifestations of power, she occasionally looks at historical imagery of political leaders. In it, curiously enough, she finds the same sorts of symbols used to reinforce their position as rulers, from their stance and physical gestures to their attire and accessories, like swords, guns and scepters.

It is all about conveying an image of the man in charge. I say man because all the pictures here depict male leaders of one kind or another, something I find strange given the number of women in the upper ranks of American politics, even if no woman has reached the Oval Office so far.

Some symbols, like the eagle, have been reused over the centuries by societies and rulers seeking to assert imperial power. The largest and the most impressive work in the show by far is a charcoal and pastel of an eagle with spread wings, appropriated from a famous sculpture, “Apotheosis of Napoleon” (1830), by the Danish artist Bertel Thorvaldsen (circa 1770-1844). It is visually transporting.

Ms. Baker’s compositions are transparently complicated, with the drawing elements elegantly and deftly set down. To me, her drawings are simultaneously radical and conservative, the artist inviting us to pay close attention to the subliminal messages contained in generic news media pictures that we might otherwise take for granted.

Looking at this show is like glimpsing the core of political power. It reminds us how much the imagery associated with politics is linked to pageantry; it is simplistic and melodramatic, with the aim to manipulate.

“Totems of Empire: Drawings by Melanie Baker,” Anthony Giordano Gallery at Dowling College, Idle Hour Boulevard, Oakdale, through Dec. 14; (631) 244-3016 or www.dowling.edu.

http://www.nytimes.com/2008/11/23/nyregion/long-island/23artsli.html?ref=design

In Her Hands, Naturalism Won Out

By BENJAMIN GENOCCHIO

There weren't many female sculptors in late-19th-century America, or the early years of the 20th century for that matter. Among their ranks, however, was Bessie Potter Vonnoh (1872-1955), the subject of a national touring retrospective now at the Florence Griswold Museum in Old Lyme. To say it is eye opening is an understatement.

Organized by the Cincinnati Art Museum, the show throws a Klieg light on the artist's small sculpture and garden statuary, most of which portray women and children, or sometimes both of them together. Ms. Vonnoh and her husband, the painter Robert William Vonnoh, lived and worked in Lyme for years, which gives the show added resonance.

Opening the exhibition are portraits of the artist by her husband, one of which belongs to the Florence Griswold Museum. From 1907, it shows the artist at work in her studio surrounded by clay models for her bronze sculptures, some of which are included in the show. Ms. Vonnoh is young here, barely 35, but already a prodigious talent.

Her gifts were apparent at a young age. She was born in St. Louis, but her family moved to Chicago, where, in 1886, at 14, she enrolled in classes at the Art Institute. Upon graduation she assisted the French-trained sculptor Lorado Taft, later traveling to France and Italy to gain exposure to classical sculpture and the latest currents in art. She returned to Chicago (and later moved to New York), got married and embarked on a solo career as a sculptor.

The show brings together about 35 works created by Ms. Vonnoh from 1895 to 1930, some on loan from major museums like the Metropolitan Museum of Art in New York and the Corcoran Gallery of Art in Washington. Together they offer visitors an unusual opportunity to study the work of this talented yet largely forgotten artist. They also hint at why she has been overlooked.

Naturalism is the hallmark of Ms. Vonnoh's sculptures, insofar as she produces naturalistic-looking representations of her subjects. But there are times, especially in the early years, when she allows herself the freedom of greater artistic interpretation. These are her best works, in my opinion, for they possess individual character. They also align the artist more closely with progressive, early modernist experiments in sculpture.

In contrast to the stylized academic naturalism of the figures that characterize her later work, early pieces like "Bust of Baby," modeled in 1901, is looser and freer, the rugged and irregular surface of the sculpture revealing finger and tool marks. Note also the way the baby's head seems to emerge turtlelike from within a blanket. I love this vigorously expressive work, which out of all the pieces here is especially engaging.

Something of this expressiveness is also apparent in another small portrait bust of a child, titled "Hester" and modeled the same year. It is an evocative, individualized portrait of a young girl, down to little details like the unbalanced arrangement of her frock and messy hair, pulled back asymmetrically off her face with the aid of a bow. She has also expertly captured the sitter's blank, seemingly bored stare.

There are other highlights in Ms. Vonnoh's early years, some of which are here. But as the show progresses you see a retreat from the raw experimentation of her youth. Several of the later works, especially her figures for garden fountains, look like copies of Grecian sculptures, or at the very least are inspired by Art Nouveau, an influential turn of the 20th century art and design style predicated on a revival of classical imagery and ideals.

The influence of Art Nouveau can be seen in the tabletop sculpture "In Arcadia," made in 1925 or 1926, depicting Pan playing a flute for a nymph with tendrils of hair framing her face. It is also clearly apparent in "Garden Figure (or Bird Bath Fountain)" (1928), in which the more contemporary hairstyle of the girl in a sculpture like "Hester" has been replaced by curls with a bandeau, a look typical of Grecian sculpture.

By the 1930s, Modernism was beginning to influence American art and sculpture, pushing out the late-19th-century embrace of neo-Classical and colonial styles. Artists who looked forward found a place in art history, while those who clung to old ways and ideals, like Ms. Vonnoh, found themselves increasingly out of favor.

"Bessie Potter Vonnoh: Sculptor of Women," Florence Griswold Museum, 96 Lyme Street, Old Lyme, through Jan. 11. Information: (860) 434-5542 or www.flogris.org.

http://www.nytimes.com/2008/11/23/nyregion/connecticut/23artsct.html?ref=design

A Whisper, Perhaps, From the Universe's Dark Side
By DENNIS OVERBYE

Is this the dark side speaking?

A concatenation of puzzling results from an alphabet soup of satellites and experiments has led a growing number of astronomers and physicists to suspect that they are getting signals from a shadow universe of dark matter that makes up a quarter of creation but has eluded direct detection until now.

Maybe.

"Nobody really knows what's going on," said Gordon Kane, a theorist at the University of Michigan. Physicists caution that there could still be a relatively simple astronomical explanation for the recent observations.

But the nature of this dark matter is one of the burning issues of science. Identifying it would point the way to a deeper understanding of the laws of nature and the Einsteinian dream of a unified theory of physics.

The last few weeks have seen a blizzard of papers trying to explain the observations in terms of things like "minimal dark matter" or "exciting dark matter," or "hidden valley" theory, and to suggest how to look for them in particle accelerators like the Large Hadron Collider, set to begin operation again outside Geneva next summer.

"It could be deliriously exciting, an incredibly cool story," said Nima Arkani-Hamed of the Institute for Advanced Study in Princeton, N.J., who has been churning out papers with his colleagues. "Anomalies in the sky tell you what to look for in the collider."

On Thursday, a team of astrophysicists working on one of the experiments reported in the journal Nature that a cosmic ray detector onboard a balloon flying around the South Pole had recorded an excess number of high-energy electrons and their antimatter opposites, positrons, sailing through local space.

The particles, they conceded, could have been created by a previously undiscovered pulsar, the magnetized spinning remnant of a supernova explosion, blasting nearby space with electric and magnetic fields. But, they say, a better and more enticing explanation for the excess is that the particles are being spit out of the fireballs created by dark matter particles colliding and annihilating one another in space.

"We cannot disprove that the signal could come from an astrophysical object. We also cannot eliminate a dark matter annihilation explanation based upon current data," said John P. Wefel of Louisiana State University, the leader of the team, adding, "Whichever way it goes, for us it is exciting."

The results came on the heels of a report earlier this fall from Pamela, a satellite built by Italian, German, Russian and Swedish scientists to study cosmic rays. Pamela scientists reported in talks and a paper posted on the Internet that the satellite had recorded an excess of high-energy positrons. This, they said, "may constitute the first indirect evidence of dark matter particle annihilations," or a nearby pulsar.

Antimatter is rare in the universe, and so looking for it is a good way of hunting for exotic phenomena like dark matter.

Another indication that something funny is happening on the dark side of the universe is evident in maps of the cosmic background radiation left over from the Big Bang. Those maps, produced most recently this year by the Wilkinson Microwave Anisotropy Probe satellite, show a haze of what seem to be charged particles hovering around the Milky Way galaxy, according to an analysis by Douglas Finkbeiner of the Harvard-Smithsonian Center for Astrophysics.

Adding to the mix and mystery, the European Space Agency's Integral satellite detected gamma rays emanating from the center of the Milky Way, suggesting the presence of positrons there, but with much lower energies than Pamela and Dr. Wefel's experiments have seen.

What all this adds up to, or indeed whether it all adds up to anything at all, depends on which observations you trust and your theoretical presumptions about particle physics and the nature of dark matter. Moreover, efforts to calculate the background level of high-energy particles in the galaxy are beset with messy uncertainties. "The dark matter signal is easy to calculate," Dr. Kane said. "The background is much harder."

Dark matter has teased and obsessed astronomers since the 1930s, when the Caltech astronomer Fritz Zwicky deduced that some invisible "missing mass" was required to supply the gravitational glue to hold clusters of galaxies together. The idea became respectable in the 1970s when Vera C. Rubin of the Carnegie Institution of Washington and her collaborators found from studying the motions of stars that most galaxies seemed to be surrounded by halos of dark matter.

The stakes for dark matter go beyond cosmology. The most favored candidates for its identity come from a theory called supersymmetry, which unifies three of the four known forces of nature mathematically and posits the existence of a realm of as-yet-undiscovered particles. They would be so-called wimps — weakly interacting massive particles — which feel gravity and little else, and could drift through the Earth like wind through a screen door. Such particles left over from the Big Bang could form a shadow universe clumping together into dark clouds that then attract ordinary matter.

The discovery of a supersymmetric particle would also be a boost for string theory, the controversial "theory of everything," and would explicate the nature of a quarter of the universe. But until now, the dark matter particles have mostly eluded direct detection in the laboratory, the exception being a controversial underground experiment called Dama/Libra, for Dark Matter/Large Sodium Iodide Bulk for Rare Processes, under the Italian Alps, where scientists claimed in April to have seen a seasonal effect of a "dark matter wind" as the Earth goes around its orbit.

The sky could be a different story. Dark matter particles floating in the halos around galaxies would occasionally collide and annihilate one another in tiny fireballs of radiation and lighter particles, theorists say.

Dr. Wefel and his colleagues have been chasing sparks in the sky since 2000, when they flew an instrument known as ATIC, for Advanced Thin Ionization Calorimeter, around Antarctica on a balloon at an altitude of 23 miles, looking for high-energy particles known as cosmic rays raining from space.

In all they have made three flights, requiring them to spend the winter at the National Science Foundation's McMurdo Station, which Dr. Wefel described as very pleasant. "It's not bad until a storm moves in. You put your hand out till you can't see it. Then you go out and start shoveling snow," he explained.

The Nature paper includes data from the first two balloon flights. It shows a bump, over theoretical calculations of cosmic ray intensities, at energies of 500 billion to 800 billion electron volts, a measure of both energy and mass in physics. One way to explain that energy bump would be by the disintegration or annihilation of a very massive dark particle. A proton by comparison is about one billion electron volts.

Dr. Wefel noted, however, that according to most models, a pulsar could generate particles with even more energy, up to trillions of volts, whereas the bump in the ATIC data seems to fall off at around 800 billion electron volts. The ATIC results, he said, dovetail nicely with those from Pamela, which recorded a rising number of positrons relative to electrons, but only up to energies of about 200 billion electron volts.

Reached in China, where he was attending a workshop, Neal Weiner of New York University, who is working with Dr. Arkani-Hamed on dark matter models, said he was plotting ATIC data gleaned from the Web and Pamela data on the same graph to see how they fit, which was apparently very well.

But Piergiorgio Picozza, a professor at the University of Rome and the Pamela spokesman, said in an e-mail message that it was too soon to say the experiments agreed. That will depend on more data now being analyzed to learn whether Pamela continues to see more positrons as the energy rises.

Moreover, as Dr. Kane pointed out, Pamela carries a magnet that allows it to distinguish electrons from positrons — being oppositely charged, they bend in opposite directions going through the magnetic field. But the ATIC instrument did not include a magnet and so cannot be sure that it was seeing any positrons at all: no antimatter, no exotic dark matter, at least at those high energies.

But if he is right, Dr. Wefel said that the ATIC data favored something even more exotic than supersymmetry, namely a particle that is lost in the fifth dimension. String theory predicts that there are at least six dimensions beyond our simple grasp, wrapped up so tightly we cannot see them or park in them. A particle in one of these dimensions would not appear to us directly.

You could think of it as a hamster running around on a wheel in its cage. We cannot see the hamster or the cage, but we can sort of feel the impact of the hamster running; according to Einsteinian relativity, its momentum in the extra dimension would register as mass in our own space-time.

Such particles are called Kaluza-Klein particles, after Theodor Kaluza and Oscar Klein, theorists who suggested such an extra-dimensional framework in the 1920s to unify Einstein's general theory of relativity and electromagnetism.

Dr. Wefel's particle would have a mass of around 620 billion electron volts. "That's the one that seems to fit the best," he said in an interview. The emergence of a sharp edge in the data, he said, "would be a smoking gun" for such a strange particle.

But Dr. Arkani-Hamed said that Kaluza-Klein particles would not annihilate one another at a fast enough rate to explain the strength of the ATIC signal, nor other anomalies like the microwave haze. He and his colleagues, including Dr. Weiner, Dr. Finkbeiner and Tracy Slatyer, also of Harvard, drawing on work by Matthew Strassler of Rutgers, have tried to connect all the dots with a new brand of dark matter, in which there are not only dark particles but also a "dark force" between them.

That theory was called "a delightful castle in the sky" by Dr. Kane, who said he was glad it kept Dr. Arkani-Hamed and his colleagues busy and diverted them from competing with him. Dr. Kane and his colleagues favor a 200 billion-electron-volt supersymmetric particle known as a wino as the dark matter culprit, in which case the Pamela bump would not extend to higher energies.

Dr. Wefel said he had not kept up with all the theorizing. "I'm just waiting for one of these modelers to say here is the data, here is the model," he said. "Fit it out. I'm not sure I've seen it yet."

Dr. Picozza said that it was the job of theorists to come up with models and that they were proliferating.

"At the end of the story only one will be accepted from the scientific community, but now it is too early," he said in an e-mail message.

Sorting all this out will take time, but not forever.

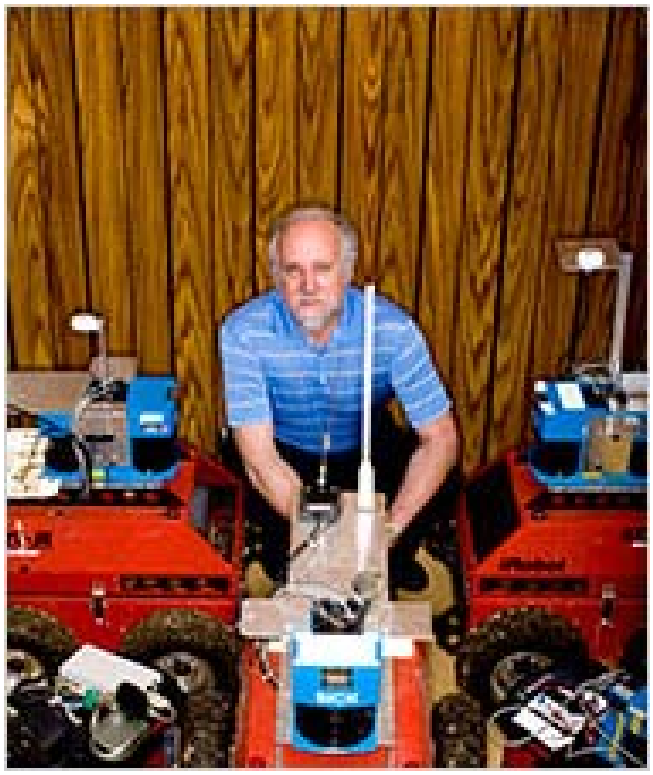
Pamela is expected to come out with new results next year, and the first results from the Fermi Gamma-ray Space Telescope, launched last summer, should also be out soon. Not to mention the Large Hadron Collider, which will eventually smash together protons of seven million electron volts. It is supposed to be running next summer.

"With so many experiments, we will soon know so much more about all of this," Dr. Weiner said. "In a year or two, we'll either not be talking about this idea at all, or it will be all we're talking about."

http://www.nytimes.com/2008/11/25/science/25dark.html?ref=science

A Soldier, Taking Orders From Its Ethical Judgment Center

By CORNELIA DEAN



ATLANTA — In the heat of battle, their minds clouded by fear, anger or vengefulness, even the best-trained soldiers can act in ways that violate the Geneva Conventions or battlefield rules of engagement. Now some researchers suggest that robots could do better.

"My research hypothesis is that intelligent robots can behave more ethically in the battlefield than humans currently can," said Ronald C. Arkin, a computer scientist at Georgia Tech, who is designing software for battlefield robots under contract with the Army. "That's the case I make."

Robot drones, mine detectors and sensing devices are already common on the battlefield but are controlled by humans. Many of the drones in Iraq and Afghanistan are operated from a command post in Nevada. Dr. Arkin is talking about true robots operating autonomously, on their own.

He and others say that the technology to make lethal autonomous robots is inexpensive and proliferating, and that the advent of these robots on the battlefield is only a matter of time. That means, they say, it is time for people to start talking about whether this technology is something they want to embrace. "The important thing is not to be blind to it," Dr. Arkin said. Noel Sharkey, a computer scientist at the University of Sheffield in Britain, wrote last year in the journal Innovative Technology for Computer Professionals that "this is not a 'Terminator'-style science fiction but grim reality."

He said South Korea and Israel were among countries already deploying armed robot border guards. In an interview, he said there was "a headlong rush" to develop battlefield robots that make their own decisions about when to attack.

"We don't want to get to the point where we should have had this discussion 20 years ago," said Colin Allen, a philosopher at Indiana University and a co-author of "Moral Machines: Teaching Robots Right From Wrong," published this month by Oxford University Press.

Randy Zachery, who directs the Information Science Directorate of the Army Research Office, which is financing Dr. Arkin's work, said the Army hoped this "basic science" would show how human soldiers might use and interact with autonomous systems and how software might be developed to "allow autonomous systems to operate within the bounds imposed by the warfighter."

"It doesn't have a particular product or application in mind," said Dr. Zachery, an electrical engineer. "It is basically to answer questions that can stimulate further research or illuminate things we did not know about before."

And Lt. Col. Martin Downie, a spokesman for the Army, noted that whatever emerged from the work "is ultimately in the hands of the commander in chief, and he's obviously answerable to the American people, just like we are."

In a report to the Army last year, Dr. Arkin described some of the potential benefits of autonomous fighting robots. For one thing, they can be designed without an instinct for self-preservation and, as a result, no tendency to lash out in fear. They can be built without anger or recklessness, Dr. Arkin wrote, and they can be made invulnerable to what he called "the psychological problem of 'scenario fulfillment,' " which causes people to absorb new information more easily if it agrees with their pre-existing ideas.

His report drew on a 2006 survey by the surgeon general of the Army, which found that fewer than half of soldiers and marines serving in Iraq said that noncombatants should be treated with dignity and respect, and 17 percent said all civilians should be treated as insurgents. More than one-third said torture was acceptable under some conditions, and fewer than half said they would report a colleague for unethical battlefield behavior.

Troops who were stressed, angry, anxious or mourning lost colleagues or who had handled dead bodies were more likely to say they had mistreated civilian noncombatants, the survey said (PDF). (The survey can be read by searching for 1117mhatreport at www.globalpolicy.org.)

"It is not my belief that an unmanned system will be able to be perfectly ethical in the battlefield," Dr. Arkin wrote in his report (PDF), "but I am convinced that they can perform more ethically than human soldiers are capable of."

Dr. Arkin said he could imagine a number of ways in which autonomous robot agents might be deployed as "battlefield assistants" — in countersniper operations, clearing buildings of suspected terrorists or other dangerous assignments where there may not be time for a robotic device to relay sights or sounds to a human operator and wait for instructions.

But first those robots would need to be programmed with rules about when it is acceptable to fire on a tank, and about more complicated and emotionally fraught tasks, like how to distinguish civilians, the wounded or someone trying to surrender from enemy troops on the attack, and whom to shoot.

In their book, Dr. Allen and his coauthor, Wendell Wallach, a computer scientist at the Yale Interdisciplinary Center for Bioethics, note that an engineering approach "meant to cover the range of challenges" will probably seem inadequate to an ethicist. And from the engineer's perspective, they write, making robots "sensitive to moral considerations will add further difficulties to the already challenging task of building reliable, efficient and safe systems."

But, Dr. Allen added in an interview, “Is it possible to build systems that pay attention to things that matter ethically? Yes.” Daniel C. Dennett, a philosopher and cognitive scientist at Tufts University, agrees. “If we talk about training a robot to make distinctions that track moral relevance, that’s not beyond the pale at all,” he said. But, he added, letting machines make ethical judgments is “a moral issue that people should think about.”

Dr. Sharkey said he would ban lethal autonomous robots until they demonstrate they will act ethically, a standard he said he believes they are unlikely to meet. Meanwhile, he said, he worries that advocates of the technology will exploit the ethics research “to allay political opposition.” Dr. Arkin’s simulations play out in black and white computer displays. “Pilots” have information a human pilot might have, including maps showing the location of sacred sites like houses of worship or cemeteries, as well as apartment houses, schools, hospitals or other centers of civilian life.

They are instructed as to the whereabouts of enemy materiel and troops, and especially high-priority targets. And they are given the rules of engagement, directives that limit the circumstances in which they can initiate and carry out combat. The goal, he said, is to integrate the rules of war with “the utilitarian approach — given military necessity, how important is it to take out that target?” Dr. Arkin’s approach involves creating a kind of intellectual landscape in which various kinds of action occur in particular “spaces.” In the landscape of all responses, there is a subspace of lethal responses. That lethal subspace is further divided into spaces for ethical actions, like firing a rocket at an attacking tank, and unethical actions, like firing a rocket at an ambulance.

For example, in one situation playing out in Dr. Arkin’s computers, a robot pilot flies past a small cemetery. The pilot spots a tank at the cemetery entrance, a potential target. But a group of civilians has gathered at the cemetery, too. So the pilot decides to keep moving, and soon spots another tank, standing by itself in a field. The pilot fires; the target is destroyed.

In Dr. Arkin’s robotic system, the robot pilot would have what he calls a “governor.” Just as the governor on a steam engine shuts it down when it runs too hot, the ethical governor would quash actions in the lethal/unethical space.In the tank-cemetery circumstance, for example, the potentially lethal encounter is judged unethical because the cemetery is a sacred site and the risk of civilian casualties is high. So the robot pilot declines to engage. When the robot finds another target with no risk of civilian casualties, it fires. In another case, attacking an important terrorist leader in a taxi in front of an apartment building, might be regarded as ethical if the target is important and the risk of civilian casualties low.

Some who have studied the issue worry, as well, whether battlefield robots designed without emotions will lack empathy. Dr. Arkin, a Christian who acknowledged the help of God and Jesus Christ in the preface to his book “Behavior-Based Robotics” (MIT Press, 1998), reasons that because rules like the Geneva Conventions are based on humane principles, building them into the machine’s mental architecture endows it with a kind of empathy. He added, though, that it would be difficult to design “perceptual algorithms” that could recognize when people were wounded or holding a white flag or otherwise “hors de combat.”

Still, he said, “as the robot gains the ability to be more and more aware of its situation,” more decisions might be delegated to robots. “We are moving up this curve.”

He said that was why he saw provoking discussion about the technology as the most important part of his work. And if autonomous battlefield robots are banned, he said, “I would not be uncomfortable with that at all.”

http://www.nytimes.com/2008/11/25/science/25robots.html?ref=science

New Arena for Testing of Drugs: Real World

By GINA KOLATA

Sylvia Syvenky went for a routine dental appointment in early October, expecting to have two caps on her teeth replaced. But something went terribly wrong.

“I felt like I was choking,” Mrs. Syvenky said. “I couldn’t take a breath. All sorts of gurgly sounds were coming out of me.”

She was rushed by ambulance to University Hospital near her home in Edmonton, Alberta, where doctors placed a mask on her face and forced air into her lungs. They told her she had heart failure. After her condition improved, they asked her to sign up for a study of a new drug to help with breathing.

Mrs. Syvenky is like many with heart failure who arrive at hospitals, unable to breathe. Yet she is the last person who would normally be asked to join a research study. At age 70, she was much older than typical study participants and her symptoms were too complex.

But now there is a growing movement to gather a new kind of evidence, the kind that will fill some of the biggest gaps in medical science: What treatment is best for typical patients with complex symptoms, like Mrs. Syvenky? Many are elderly with several chronic conditions and taking several unrelated medications. And what are the long-term effects of a treatment — death rates, side effects, progression of the disease?

A group of advocates, including medical researchers, medical societies and insurers, is lobbying Congress to pay for an Institute for Comparative Effectiveness Research that would assess treatments and identify gaps in evidence. When there are gaps, the institute would initiate what are being called “real world,” or “pragmatic,” clinical research trials to gather the evidence.

Some leading researchers who used to defend the status quo say they have switched.

"There has been a 90-degree turn" in thinking, said Dr. Eugene Braunwald, an eminent cardiologist at Harvard Medical School. "I personally have swung around."

Although thousands of medical studies are completed every year, most have relatively limited goals. They often carefully select patients who have few medical problems other than the one under study, making it easier to get one clear result. They may not look at effects over the long term, assuming that if a treatment helps initially, patients will be better off.

But while such studies can help a drug acquire approval or answer a restricted research question, they can leave patients and doctors in a lurch because they may not tell how the new drug or treatment will work once it is tried in real patients with complex problems. Such limited studies, while they can have value, may no longer be enough, particularly when care has become so expensive and real evidence more crucial.

"They are at the heart of why we have trouble making decisions," said Dr. Scott Ramsey, a professor of medicine at the University of Washington.

It is an issue that arises again and again. For example, it is one reason for the debate over the popular diabetes drug Avandia, or rosiglitazone. When the drug was tested, the main question was whether it lowered blood sugar, which it did. Then, after it was on the market, some researchers found hints of increased risks for heart attacks, the major killer in diabetes. But there was no way to know for sure from the studies that led to the drug's approval.

At the same time, a move to conduct many more pragmatic trials would involve nothing less than a rethinking of how medical research is financed and managed.

"There's this gulf between what questions researchers have found interesting to study and what questions industry and the N.I.H. have chosen to fund and what users of information most want to know," said Dr. Sean Tunis, director of the Center for Medical Technology Policy, a nonprofit group that studies ways to get better medical evidence.

"One starts from the head and the other starts from the tail and they don't meet in the middle."

Dr. Robert Califf, a cardiology professor at Duke University School of Medicine and principal investigator in the heart failure study, cites the study Mrs. Syvenky entered as a model of what is so urgently needed in medicine.

The study, the largest ever in heart failure, is 15 times larger than any previous study of nesiritide. Unlike those that led to the drug's approval, it is enrolling patients like those doctors see every day. Anyone showing up at one of 450 medical centers around the world, unable to breathe because of heart failure, is eligible. Participants are randomly assigned to get an infusion of nesiritide or a placebo, a saltwater infusion. And the study, comparing the treatments, asks two simple questions: Are patients still alive a month later? And were they readmitted to the hospital?

Dr. Califf knows the evidence problem all too well. He spent years working on committees that formulate medical guidelines for treating heart disease patients. And over and over again, he says, he and other committee members ran into a problem. The studies did not ask whether one treatment was better than another and they did not ask what happened over long periods in typical patients with their complicated medical problems.

"We looked at the A.C.C. and A.H.A. guidelines," Dr. Califf said, referring to the American College of Cardiology and the American Heart Association. "Fifteen percent of the guidelines were based on good clinical evidence. And cardiology is where we have the most evidence."

He added that he was not indicting studies that looked at a more limited group of patients and often studied a drug's effects for a shorter time.

"You have to figure out the right dose. Is there a chance it could work?" Dr. Califf said. But something more is needed.

The Food and Drug Administration does not have a hard and fast rule about what it takes to show that a drug is effective, said Dr. Robert Temple, director for medical policy at the F.D.A.'s Center for Drug Evaluation and Research. A lot depends on what is known about the drug's short-term effects and how well they predict long-term outcomes.

But, he added, there are practical concerns with large pragmatic trials because companies have to look at a wide range of possible effects when they test a drug. "If you do a large outcome study in 10,000 people in the same way you do short-term studies, you'll never finish," Dr. Temple said.

"There's no white hat, black hat here," said Dr. Kevin Weiss, president and chief executive of the American Board of Medical Examiners. "Pharmaceutical companies are trying to do what they are supposed to do. The F.D.A. is trying to do what it is supposed to do. But they are not fully connected to what the public needs."

That was part of the problem with nesiritide. At first, all was well. The drug dilates blood vessels, making it easier for the heart to pump blood into the rest of the body. Patients breathed better.

The F.D.A. approved the drug in 2001 based on studies that asked about breathing in the first few hours and excluded patients with symptoms as complex as Mrs. Syvenky's, even though she is typical of half of all people with heart failure. The patients in the original studies, mostly white men, had an average age of 60. Yet more than 800,000 Americans aged 65 and older were hospitalized for heart failure in 2006, the most recent year for which statistics are available.

In 2005, questions arose. Researchers lumped together data from several nesiritide studies. One analysis reported damage to kidney functions and the other found increased death rates. Sales plummeted.

But no single study was large enough to determine if those risks were real, and merging smaller studies in a so-called meta-analysis can be misleading.

In fact, said Dr. Adrian Hernandez, a cardiologist at Duke University, meta-analyses have been a risky business. When their conclusions were tested in subsequent studies, they have been correct just 60 percent of the time. They are good for generating hypotheses or perhaps when clinical trials are impractical. But as evidence? They are about as accurate as tossing a coin.

With fears about the drug growing, Johnson & Johnson, the drug's maker, asked Dr. Braunwald to put together an expert panel to advise it.

The questions about nesiritide were so pressing, Dr. Braunwald's panel concluded, that the drug should be given to only the sickest patients in a hospital setting. In the meantime, the company needed to conduct a large pragmatic trial looking at clinical outcomes in typical patients.

"The data on which the drug was approved were very sketchy," Dr. Braunwald said in a recent interview. "And since the question had been raised by these two meta-analyses, which in themselves were controversial, the idea of a pragmatic, outcomes-based clinical trial was very natural."

Dr. Steven Goodman, an oncologist and biostatistician at Johns Hopkins University School of Medicine, wants to insert a reality check on large pragmatic clinical trials.

"When they are first described, they sound wonderful," he said. But, he added, there's a rub. "You often give up the 'why.' "

Pragmatic trials, he explains, are most feasible when they are as simple as possible, measuring important outcomes like hospitalizations or deaths but not things like how much medication is taken, how well a procedure is performed or how accurately an X-ray is read.

An operation, for example, may not work well in the real world because it takes more skill and training than is typically found outside a few medical centers. A pragmatic trial will show the surgery is not working but not why.

Scientists, Dr. Goodman added, do not like giving up on the why. And that leads to a question of who is going to pay for these studies. Medicare pays for medical care but does not sponsor studies. Insurance companies, said Dr. Goodman, who helps review evidence for Blue Cross Blue Shield, may be seen as having a conflict if they sponsor studies because they may have to pay for treatments that are shown to be effective.

Drug companies sometimes do pragmatic studies, said Alan Goldhammer, the vice president for regulatory affairs at Pharma, a trade group for drug companies. But usually that is when "there are issues relating to the drug and the ability to affect drug and marketplace."

At the National Institutes of Health, said Dr. Elizabeth Nabel, director of the National Heart, Lung and Blood Institute, "many of us would love to do many more of these studies." But, she added, "we have a limited budget and there is only so much that we can do."

The nesiritide study was a direct result of Dr. Braunwald's panel's recommendation. Johnson & Johnson is paying for it. But the study's overall conduct, design and analysis are coordinated at Duke University through an academic consortium and led by an independent academic executive and steering committee.

When the study began, some heart specialists said it could never enroll enough patients. Who would agree to be randomly assigned to a placebo or a drug to ease breathing?

So far, however, recruitment is ahead of schedule, Dr. Hernandez said, which he attributes to the researchers' enthusiasm. And, he adds, there are already more patients from North America in this study than in any acute heart failure study ever done.

http://www.nytimes.com/2008/11/25/health/research/25trials.html?ref=science

Point Toe, Click Mouse

By ROSLYN SULCAS

THE choreographer Chris Elam makes strange, contorted dances in which people knot themselves into compact sculptural forms, tangling their limbs with another's in what can look like a fervent attempt at human connection. His company, Misnomer, tends to perform in downtown sites with few frills, and his apartment in Park Slope, Brooklyn, is also his office headquarters.

These details would suggest that Mr. Elam is yet another talent pursuing his personal vision on the fringes of the contemporary dance scene. That definition would be far too limiting for Mr. Elam.

Over the last few years, in addition to garnering critical kudos for his choreography, Mr. Elam has become a pioneer in a challenging endeavor for an art form reliant on live performance: enabling dance to use the Internet as effectively as music and film have.

In October, Misnomer received just over $1 million, one of 10 grants of from the Doris Duke Charitable Foundation, to pursue Mr. Elam's idea of developing an online model for arts organizations. And in early November, the Rockefeller Foundation gave its annual New York City Cultural Innovation Award to Misnomer, adding $150,000 to the company coffers.

The money will go toward what Mr. Elam calls his Audience Engagement Platform. Borrowing a page from indie-rock bands that have little means for marketing or distribution, he envisions Web sites with streaming video of rehearsals and viewer comments; live video chats with dancers and audiences; and user profiles that are maintained in a database.

The aim is to nurture a following that can view the course of creating a show, virtually, and even help direct it as well as comment on it afterward. Mr. Elam's embrace of the Internet, even before this project, has made him the public face of contemporary dance within the technology world and beyond. In the past year he has choreographed the music video "Wanderlust" for the Icelandic pop singer Bjork; spoken at the Fortune magazine Brainstorm: Tech conference; been the subject of a short Sundance film and featured in an Apple documentary and a Business Week online interview; and received a $10,000 Ideablob award for inventive business ideas.

But he hasn't forgone his first love. Somehow he has also found time to choreograph a new full-length work, "Being Together," for his company's two-week season, which opens on Dec. 4 at the Joyce SoHo.

Mr. Elam, 32, started dancing in high school and has been interested in the possibilities of the Internet since he formed Misnomer in 1998, while he was studying public policy and computer science at Brown.

"We really started to recognize what a powerful tool the Web could be about three and a half years ago," said Mr. Elam, who is tall and thin and speaks at high speed with evangelistic intensity. "The live arts share a common challenge here. In music or video it's completely different because there is a product to sell. Those of us who are selling ourselves on a stage need to invent a new model."

That's just what Mr. Elam is attempting to do, with the help of the money from the Duke foundation, awarded specifically to explore new business practices. (Misnomer, which employs six dancers, will still have to raise money for its artistic needs.) He is creating the platform with some 15 "test artists," arts-service organizations, a software-development company and an advisory board drawn from the arts and technology.

Misnomer is by far the smallest of the 10 organizations that received the Duke award; other recipients include dance luminaries like the Alvin Ailey Dance Foundation, the Cunningham Foundation and Jacob's Pillow Dance Festival, as well as theater companies like Steppenwolf and the Wooster Group.

"What was striking for the panel was the degree to which Chris was rigorously thoughtful about technology and audiences," Ben Cameron, the foundation's director for the arts, said in a telephone interview. "He was very up front in early proposals about how attracting and engaging audiences was the single biggest challenge that dance companies face. We felt that he was potentially blazing new ground by thinking about a platform for multiple arts organizations, not just his own."

Mr. Elam's project has two goals. One is to create a supple online system that performing arts organizations can use to their own ends. The other is nothing less than redefining the role of the audience member.

People spend a great deal of time online, Mr. Elam said, and to some degree that offers an alternative to going to see a live performance. "In the traditional process audiences and artists only interact for one or two moments a year in a theater," he said. "Perhaps that's the most important moment, but they don't get the interaction or participation they can have in other ways now. The key issue right now for dance companies is, where do we start? How do we find features we like? What are the possibilities? It's a huge time investment for people to figure out how to use the Internet well."

Mr. Elam said that an Internet-focused approach has worked on his company's Web site, misnomer.org, which constantly posts links to his projects, offers blogs from dancers, shows rehearsal footage and attempts to engage new audiences by posting videos on social-networking sites. "We get between 300 and 400 messages a month from all sorts of people, a large proportion of whom have never seen our work live," he said. "It speaks to the fact that there is an inherent value to the Web."

For his new project he has scores of other ideas: among them, ways for audiences to request bookings in their towns or regions, which will let companies show presenters how many supporters they have in a particular area; a database so that user profiles are continuously updated; easier ways to respond personally to the audience's e-mail messages; and building in metrics, or accountability tools, so that companies can see where growth — in audience development, online activity and fund raising — is occurring, or not.

The choreographer Doug Elkins he would be interested in Mr. Elam's system. "I do think it would be a way of extending audience participation. An extended dialogue would be wonderful."

Mr. Elam posits that his system will primarily benefit the personal, engaged relationship that can develop between artists and the public. And if choreographers or dancers don't particularly like the idea of outsiders putting in their two cents? No problem, Mr. Elam said, since the system will be flexible, allowing organizations to use only those tools that interest them.

His project is also — perhaps even principally — about innovations in fund-raising and marketing. "Not everyone wants to, or can, donate money," he said. "But someone might be a lawyer, willing to look at contracts. Someone else might have branding experience or be able to offer rehearsal space. This system will give companies a way to tap into a support base."

Brian Rogers, the artistic director of the Chocolate Factory, compared the effort to practices serving other mediums. "In many ways it's following the model of the independent music world," he said. "A lot of bands are successful without major labels behind them because they have really strong relationships with audiences online. But it has to feel very genuine, and that's not easy in the dance world. There's a limited amount of people who want to see a certain kind of contemporary dance, and there is no point in trying to expand that audience in a huge way. That's a larger question than the Internet can resolve."

Mr. Elam sees things differently. "Contemporary dance is never going to be as popular as, say, Michael Jackson," he said. "But we have had huge increases in our audience simply from being featured on the Sundance site (sundancechannel.com/spotlights) and in the Bjork video. Sometimes people simply don't know that dance can be like this."

http://www.nytimes.com/2008/11/23/arts/dance/23sulc.html?ref=dance

For Laid-Off Journalists, Free Blog Accounts

By JENNA WORTHAM

It's a long way from $700 billion, but the media start-up Six Apart is introducing its own economic bailout plan.

The TypePad Journalist Bailout Program offers recently terminated bloggers and journalists a free pro account (worth $150 annually) on the company's popular blogging platform. In addition to the free yearly membership, the 20 to 30 journalists who are accepted will receive professional tech support, placement on the company's blog aggregation site, Blogs.com, and automatic enrollment in the company's advertising revenue-sharing program.

Anil Dash, a former blogger and current vice president at Six Apart, announced the program Nov. 14, shortly after the company made its own staff cuts. Mr. Dash fired off a blog post: "Hello, recently-laid-off or fearful-of-layoffs journalist! We're Six Apart (you know us as the nice folks who make Movable Type or TypePad, which maybe you used for blogging at your old newspaper or magazine) and we want to help you."

On Monday morning, he had roughly 50 e-mail applications in his inbox, and they have continued to pour in, totaling nearly 300 so far. "It was a bit of a surprise how quickly word got out," Mr. Dash said. "This has struck a nerve."

Brooke-Sidney Gavins, a broadcast journalism student at the University of Southern California, is hoping to be chosen to help her nascent writing career. "I understand that there may not be a 'guaranteed' job with a major media organization after I graduate," Ms. Gavins said. "A lot of new journalists are going to have to build their careers more guerrilla-style by selling their stories and promoting their work all the time."

For Johanna Neuman, a veteran White House reporter and blogger who was recently laid off by The Los Angeles Times, the program would be a chance to continue writing about politics and float book ideas in the hopes of landing a publishing deal. "I might just start putting chapters up and see who salutes," Ms. Neuman said.

Mr. Dash says he hopes to eventually accept every applicant. "How do we do right by all these people?" he said. "That's exactly what's keeping me up at night." JENNA WORTHAM

http://www.nytimes.com/2008/11/24/technology/internet/24apart.html?th&emc=th

Skye's dinosaur connection to US

Footprints found on Skye and in Wyoming, in the US, were left by the same dinosaurs or a similar species, recently-published research has found.

Dr Neil Clark, of Glasgow's Hunterian Museum and Art Gallery, said some tracks at the two sites were "indistinguishable".

Great Britain and the United States formed part of the same land-mass hundreds of millions of years ago.

Dr Clark said further investigation into the link was needed.

The preliminary research by the curator of palaeontology and Dr Michael Brett-Surman, of the department of paleobiology at the Smithsonian Institution in Washington, is published in the Scottish Journal of Geology.

The scientists studied tracks from the Middle Jurassic - about 170 million years ago - found in rock formations.

If they are not from the same species, they are a very similar kind of dinosaur
Dr Neil Clark
Hunterian Museum

Analysis included measurements of footprints for comparison, looking at the length of digits and the distance between them.

Data gathered suggested that smaller footprints from the Valtos Sandstone and Kilmaluag formations on Skye were indistinguishable from those in the Sundance Formation in Wyoming.

Four different groupings of dinosaur footprints were identified and the scientists said they may represent at least four different types of animal.

Dr Clark said: "The footprints were indistinguishable to me. If they are not from the same species, they are a very similar kind of dinosaur.

"This was preliminary research, but opens up the potential for further investigation. It really needs a full-scale study."

Dr Clark ruled out a mass migration of the dinosaurs as the distance involved was between 2,000 and 3,000 miles.

The Hunterian Museum and Art Gallery holds collections covering medicine, Scottish art and science.

The Smithsonian Institution is the world's largest museum complex and research organisation, composed of 19 museums, nine research centres, and a zoo.

Story from BBC NEWS:
http://news.bbc.co.uk/go/pr/fr/-/2/hi/uk_news/scotland/highlands_and_islands/7740343.stm

Published: 2008/11/24 00:32:31 GMT

Many keeping babies with Down's

Please turn on JavaScript. Media requires JavaScript to play.

Two parents on changing attitudes to Down's syndrome

More Down's syndrome babies are being born than before pre-natal screening became widespread, figures show.

The UK saw 749 Down's births in 2006, up from 717 in 1989 when tests came in.

The Down's Syndrome Association surveyed 1,000 parents to find out why they had pressed ahead with a pregnancy despite a positive test result.

A fifth said they had known somebody with Down's, a third cited religious or anti-abortion beliefs and 30% felt life had improved for people with Down's.

DOWN'S SYNDROME
One in 1,000 babies born in the UK has Down's syndrome
People with the syndrome will have some degree of learning difficulty
Life expectancy is on average between 50 and 60 years old
Down's syndrome is not classed as a disease, but does lead to a higher chance of developing a host of illnesses
Nearly half of those with the syndrome will have heart defects, while hearing and sight problems are also more likely
There is also a greater risk of dementia, leukaemia and testicular cancer

Almost one in five said they simply did not believe the results of the test.

Most respondents said they felt supported by their family and friends and considered that the future was far better today for those with Down's syndrome.

They pointed to integrated education in particular and a greater acceptance of what it means to be different.

One respondent said: "I don't subscribe to the notion of the 'perfect human being' and found the idea of selecting one child in preference to another abhorrent."

Another said: "I already felt a strong sense of responsibility for my unborn child and knew that I would love it and want it regardless of any additional needs it might have. I knew I could count on friends and family for support."

The survey was compiled to coincide with the BBC Radio 4 documentary Born With Down's.

Acceptance

Carol Boys, chief executive of the Down's Syndrome Association, said the survey showed how much changes in society were influencing people.

She said: "When I and others had our babies it was a very different world - those with Down's syndrome were treated very differently.

"Now there is much greater inclusion and acceptance, with mainstream education having a huge role.

"We think this plays a part in the decisions parents make - there's even been a baby with Down's syndrome on EastEnders."

> **At the back of our minds we did keep alive the possibility that she might not have Down's syndrome but we knew that we would be able to cope if she did**
> Frances Dine

Following the widespread introduction of pre-natal testing for the syndrome, the number of babies born with Down's fell from 717 in 1989 to 594 at the start of this decade.

But during the current decade the birth rate has increased, reaching 749 births of children with Downs Syndrome in 2006, the latest year for which figures are available. In general, the overall birth rate has been increasing in recent years.

But figures from the National Down's Syndrome Cytogenetic Register suggest Down's births have risen by approximately 15% as a proportion of all live births since 2000.

Quality of life

Frances Dine was 12 weeks pregnant when a scan revealed the condition but she and her husband, Paul, gave little thought to termination. She said: "Things have moved on and babies with Down's syndrome can have a great quality of life.

"At the back of our minds we did keep alive the possibility that she might not have Down's syndrome but we knew that we would be able to cope if she did - there's so much out there for her.

"Schools are integrated and there are even actors with Down's syndrome.

"There's a worker at our local supermarket who has Down's syndrome and we think that it doesn't need to hold you back." *Born with Down's will be transmitted on Radio 4 at 2000 GMT on Monday 24 November.*

Do you have a child with Down's syndrome? How has your experience been like? Send us your story using the form below:

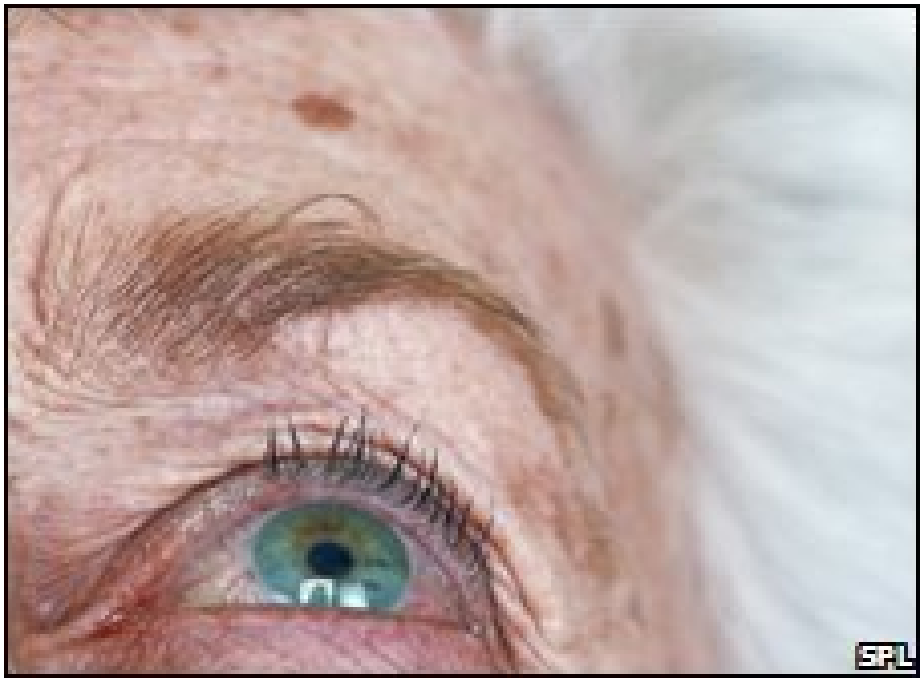
In most cases a selection of your comments will be published, displaying your name and location unless you state otherwise in the box below.

Name
Your E-mail address
Town & Country
Phone number (optional):
Comments
Story from BBC NEWS:
http://news.bbc.co.uk/go/pr/fr/-/2/hi/health/7741411.stm

Published: 2008/11/24 00:51:36 GMT

Centenarians 'depression prone'

It may bring a congratulatory telegram from the Queen but reaching 100 is no guarantee of a happy, contented, old age, US research suggests.



A study by researchers at Temple University in Philadelphia of 244 people aged 100 or over found one in four showed clear signs of depression.

However, fewer than a third of these had been officially diagnosed by a GP.

Age Concern painted a similar picture, with its figures showing two million UK pensioners affected by depression.

> **People who suffer from depression tend to have a high risk of mortality, so it's puzzling to see higher numbers among the oldest old**
> Dr Adam Davey
> Temple University

The US has about 60,000 people over 100 and this is expected to quadruple as general life expectancy rises and the "baby boomer" generation arrives at extreme old age.

In the UK there are thought to be more than 9,000, the majority of them women, and that figure is currently rising at 5% a year, with some population predictions suggesting a total of more than 58,000 by 2032.

Despite this, studies focusing entirely on centenarians are still relatively uncommon.

The Temple study, presented at the Gerontological Society of America's annual meeting, found 25% of their subjects had "clinically relevant" levels of symptoms, yet only 8% reported having a current diagnosis of depression.

Dr Adam Davey, who led the study, said: "Centenarians are still rare, and depression hasn't been studied thoroughly in this group.

"We've found that it's a very under-diagnosed condition among people over 100 years old, yet it's one of the most easily treated forms of mental illness.

"People who suffer from depression tend to have a high risk of mortality, so it's puzzling to see higher numbers among the oldest old."

Fastest growing age-group

In the UK, mental health charities and those catering for older people both complain that depression is not taken seriously in the elderly.

Marjorie Wallace, from Sane, said: "It should come as no surprise that people of all ages can suffer from depression, and we welcome this contribution to our understanding of this condition amongst those aged 100 or more.

"With an increasingly ageing population it is vital that governments in the UK and elsewhere provide appropriate treatment for this illness regardless of how old someone is.

"Untreated depression can have profound consequences, yet with the right support it is possible to prevent much unnecessary suffering."

Gordon Lishman, from Age Concern, said: "Despite people aged 85 and over being the fastest growing age group in Britain, many NHS services are not tailored to meet the needs of our ageing society.

"The neglect of older people's mental health ruins lives and must no longer be ignored."

The charity is running a campaign, "Down but Not Out", which aims to draw attention to the mental health of older people.

Story from BBC NEWS:
http://news.bbc.co.uk/go/pr/fr/-/2/hi/health/7741906.stm

Published: 2008/11/24 00:06:22 GMT

'Sticky cell' clues to epilepsy

A faulty immune reaction may be responsible for the development of epilepsy, research suggests.

Studies in mice by US and Italian researchers linked seizures to brain changes which made immune cells stick inside its blood vessels.

This, in turn, the journal Nature Medicine reported, helped break down a vital filter which protects the brain from harmful chemicals.

"Unsticking" these cells helped prevent the development of epilepsy in mice.

Recent research has focused on problems with the "blood brain barrier" as a possible key to epilepsy, which, if poorly controlled, can mean regular and potentially damaging seizures.

Many molecules circulating in the bloodstream could cause damage if they reach the brain, and the role of the barrier is to keep them away.

The loss of the barrier is known to be connected to the "excitability" of neurons which may be the trigger for epileptic seizures, but the root cause of why the barrier could be breached remains mysterious.

The latest research may have found how an initial, non-epileptic, seizure could lead to a lifetime of epilepsy.

It looked at the behaviour of white blood cells - leukocytes - whose job it is to defend the body from threats such as bacteria and viruses.

The scientists found that, in mice at least, the initial seizure caused the release of a body chemical within the blood vessels which increased the "adhesion" of leukocytes, keeping them in the vessels for longer.

Normally, the mice would then go on to develop full epilepsy, but when this "stickiness" chemical was blocked using antibodies or by genetically changing the mice, the frequency of subsequent seizures was markedly reduced.

Analysis of brain tissue from people with epilepsy found a far greater abundance of leukocytes than in those without the condition, adding further weight to the idea.

The researchers suggested that drugs targeting this "stickiness" might be a good way of preventing, or perhaps even treating, epilepsy in humans.

Existing drugs

Professor Matthew Walker, a neuroscientist from University College London, and a member of Epilepsy Research UK's scientific advisory board, said the research was "interesting and exciting".

"It provides a further piece of evidence for a breakdown in the blood brain barrier in the development of epilepsy."

He said it was possible that the "stickiness" of immune cells contributed to the development of epilepsy in previously unaffected people who suffered brain injuries, strokes or prolonged seizures.

While it was not clear whether this same mechanism was at work in humans, it might reveal a "whole new range" of drug targets.

"Importantly there are already drugs in use that may target this process, but which have not been tested in epilepsy and so this study could lead to trials of novel treatments for epilepsy in the near future."

Story from BBC NEWS:
http://news.bbc.co.uk/go/pr/fr/-/2/hi/health/7741680.stm

Published: 2008/11/23 18:05:07 GMT

Can China's Future Earthquakes Be Predicted?

Heavily damaged school in Yingxiu, where 77 percent of the population of Yingxiu is believed to be dead. On Monday the 12th May, an earthquake hit the province of Sichuan. This image was taken in Yingxiu, Sichuan, China on the 19th of May 2008. (Credit: iStockphoto/Rui Pestana)

ScienceDaily (Nov. 24, 2008) — Ji ShaoCheng of the Université de Montréal's affiliated engineering school École Polytechnique is part of a team studying last May's devastating earthquake in China.

On May 12, 2008, at 2:28 p.m., China's Szechwan province changed forever. In the space of 90 seconds, an earthquake equivalent to 1,200 H-bombs pulverized the earth's crust for more than 280 kilometers. Entire cities disappeared and eight million homes were swallowed up. This resulted in 70,000 deaths and 20,000 missing.

Two months later, ShaoCheng arrived in Szechwan province to study the damage first hand. The extent of the damage was unimaginable: roads and bridges collapsed, schools turned into rubble, and bodies of men and women everywhere.

According to ShaoCheng this tragedy could have been avoided. "There hasn't been one earthquake in Szechwan province for 300 years. Chinese authorities thought the fault was dead," he says.

The problem is that China relied on GPS data, which showed movements of 2 mm per year in certain areas when in reality the shifts were much bigger. "GPS is high-tech, but do we really know how to interpret its data?," he questions.

ShaoCheng was recruited by one of his ex-colleagues with whom he completed his PhD in Montpellier and who now works for the Chinese Academy of Geological Sciences. His mission is to dig three narrow wells, 3-kilometers deep, into the earth's crust for a whopping $75 million.

"The drilling will allow us to see the characteristics of the rocks before and after the earthquake. We will also measure their thermal properties and fluid pressure," says ShaoCheng. "One of these wells will have a seismometer and another will be equipped with a device similar to a stethoscope designed to listen to the earth's heartbeat."

It is expected to take five years of hard labour to rebuild the devastated region.

Adapted from materials provided by University of Montreal.

http://www.sciencedaily.com/releases/2008/11/081118122103.htm

Networks Of Small Habitat Patches Can Preserve Urban Biodiversity

Sets of small and seemingly insignificant habitat patches that are within reach for mobile species may under certain circumstances, as a group, provide an acceptable alternative to larger and contiguous habitats. (Credit: iStockphoto/Merijn Van Der Vliet)

ScienceDaily (Nov. 24, 2008) — Sets of small and seemingly insignificant habitat patches that are within reach for mobile species may under certain circumstances, as a group, provide an acceptable alternative to larger and contiguous habitats. This finding can make preservation of important ecological functions possible even in urban and other heavily exploited areas.

The study by Dr. Erik Andersson and Dr. Örjan Bodin at the Department of Systems Ecology, and Stockholm Resilience Centre, both at Stockholm University, is unique in the sense that they empirically test and verify an often used modelling approach where habitat fragments are seen as individual nodes in larger networks of interconnected habitat patches.

According to the study, sets of small habitat patches can host species that require much larger habitat patches for their daily needs than what each patch itself can provide. Many species are actually capable of moving back and forth between neighbouring patches, given that they are not perceived as being too far apart. Thus, many species are able to make use of the total of the habitat fragments in the network instead of relying on the individual habitat patches for their persistence.

“By defining the habitat patches as parts of a larger network, spatially explicit analyses of how the sum of the patches contributes to species dynamics on the level of landscapes are possible” said Dr. Andersson.

In human dominated areas, such as cities or intensively cultivated landscapes, it is often impossible to set aside large contiguous areas of natural vegetation. Instead, when multiple users compete for a limited area of land, only smaller pockets of natural vegetation (or just green areas) can realistically be preserved.

"Land managers need comprehensive and reliable tools that could help them to direct their conservation efforts to habitat patches where they get as much biodiversity as possible given a limited budget. Our study empirically shows that the network modeling approach is a good candidate for developing such a tool" said Dr. Bodin.

The study combines empirical field studies of birds with theoretical and statistical modelling. A range of bird species were surveyed in various green areas of different size and type in the urban area of Stockholm, Sweden. Geographical Information System (GIS) techniques were deployed to model the urban landscape as a network of individual habitat fragments. The field data were then used to test and verify the assumptions behind the network model.

Modelling a landscape as a network provides for many new analytical possibilities. However, the network modelling approach as such has, until now, rarely been tested empirically.

"Our study gives strength to the network perspective of landscapes, and thus supports further development of new and exiting network-based analyses that could help managers to preserve valuable ecological functions even in very fragmented landscapes" said Dr. Andersson.

The study also showed that it is important to differentiate between different types of green areas when constructing a habitat network since many species have quite different habitat preferences. In addition, the effect of movement barriers and the existence of stepping stones should be included in the analysis, a fact which is particularly relevant in urban areas.

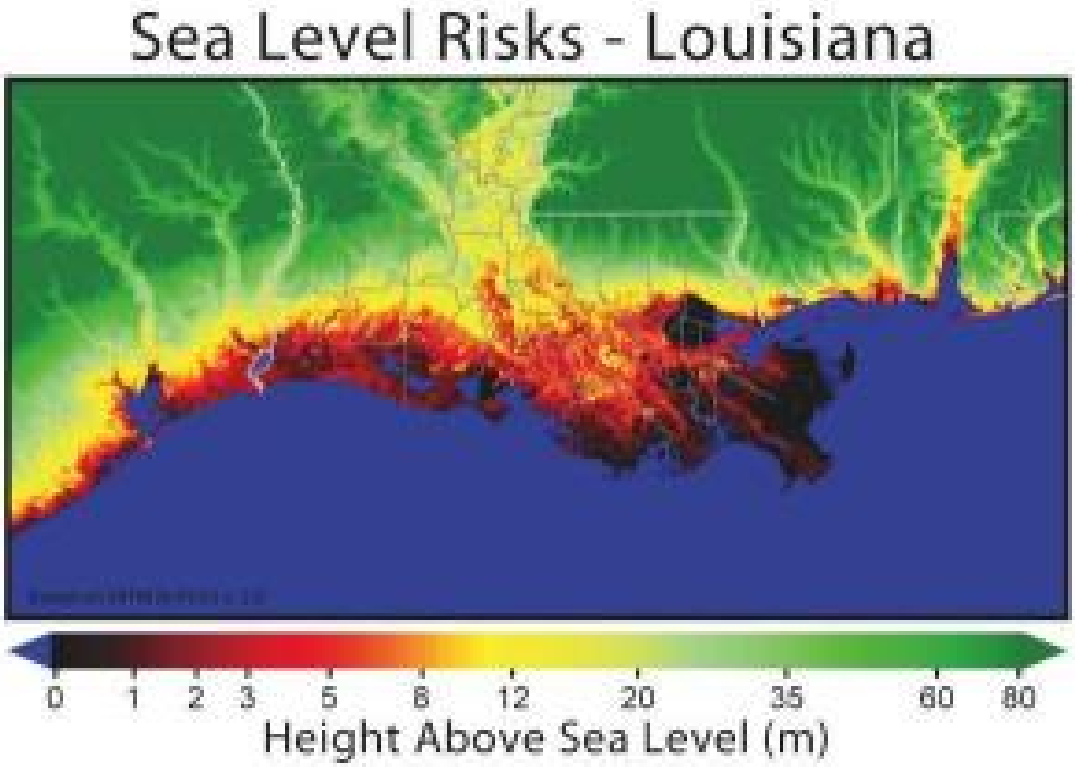
Journal reference:

1. Erik Andersson and Örjan Bodin. **Practical tool for landscape planning? An empirical investigation of network based models of habitat fragmentation**. *Ecography*, Online 12 Nov 2008 DOI: 10.1111/j.1600-0587.2008.05435.x

Adapted from materials provided by Wiley - Blackwell, via AlphaGalileo.

http://www.sciencedaily.com/releases/2008/11/081113080004.htm

How Global Warming May Affect U.S. Beaches, Coastline



The Louisiana coastline could feel the impacts of hurricanes, even those that don't make landfall. (Credit: Image courtesy of Global Warming Art)

ScienceDaily (Nov. 24, 2008) — In "Dover Beach," the 19th Century poet Matthew Arnold describes waves that "begin, and cease, and then again begin…and bring the eternal note of sadness in."

But in the warming world of the 21st Century, waves could be riding oceans that will rise anywhere from 0.5 meters (19 inches) to 1.4 meters (55 inches), and researchers believe there's a good chance they will stir stronger feelings than melancholia.Several scientists from Scripps Institution of Oceanography at UC San Diego are finding that sea level rise will have different consequences in different places but that they will be profound on virtually all coastlines. Land in some areas of the Atlantic and Gulf coasts of the United States will simply be underwater.

On the West Coast, with its different topography and different climate regimes, problems will likely play out differently. The scientists' most recent conclusions, even when conservative scenarios are involved, suggest that coastal development, popular beaches, vital estuaries, and even California's supply of fresh water could be severely impacted by a combination of natural and human-made forces.

Scripps climate scientists often consider changes in average conditions over many years but, in this case, it's the extremes that have them worried. A global sea level rise that makes gentle summer surf lap at a beachgoer's knees rather than his or her ankles is one thing. But when coupled with energetic winter El Niño-fueled storms and high tides, elevated water levels would have dramatic consequences.

The result could transform the appearance of the beaches at the heart of California's allure."As sea level goes up, some beaches are going to shrink," said Scripps oceanographer Peter Bromirski. "Some will probably disappear."

Sea level has been trending upward for millennia. For the last 6,000 years, it is estimated that global sea levels have rising an average of five centimeters (2 inches) per century. Before that, between 18,000 and 6,000 years ago, the seas rose a full 120 meters (400 feet). Step by step, they bit into rocky coastlines like California's by smashing cliffs, creating beaches with the debris, rising a bit more, and repeating the process over and over again.

Humans are speeding up the pace of that assault. The United Nations-sponsored Intergovernmental Panel on Climate Change (IPCC) reported that sea level rose, on average, 1.7 millimeters (0.07 inches) per year over the entire 20th Century. But recent estimates from satellite observations find a marked increase, at 3.1 millimeters (0.12 inches) per year since 1993.The oceans are rising because the warming ocean water increases in volume and because water is being added from melting glaciers and land-based ice sheets. The complex difficult-to-predict contribution of the latter is such a matter of controversy that the recent IPCC Fourth Assessment report didn't factor glacial melt into its sea level rise estimates. Today there is quite broad-based opinion that the IPCC estimates are considerably lower than the higher range of possible sea level rise. Some individuals, pointing to the quantity of water frozen in Greenland and Antarctica and to ancient sea level evidence, have suggested that sea level rise could reach several meters by the end of the 21st Century. However, an August paper in the journal Science co-authored by former Scripps postdoctoral researcher Shad O'Neel suggests that some of the more exaggerated claims that water could rise upwards of 10 meters (33 feet) by century's end are not in the realm of possibility. O'Neel and co-authors indicate that the realities of physics impose a cap of 2 meters (6.6 feet) for possible sea level rise by 2100.

"That's fine," said Scripps climate researcher Dan Cayan, who is leading an analysis of climate change scenarios for the state of California, "but two meters is still enough to do a lot of damage."

Recent news footage of overtopped levees makes it easy to envision what two meters' difference means to low-lying cities like New Orleans, especially when extreme events like hurricanes are factored in. Any flooding would be proportionately higher than it is now. Additionally Bromirski recently showed that sea level rise will amplify the power and frequency of hurricane-generated waves that reach shore, even if the storms themselves don't make landfall.In contrast to the beaches of the East Coast, many of which are covered with vast expanses of sand, California's coastline is predominantly bedrock covered by a relatively thin veneer of sand. That sand can shift or disappear during storms. Thus, preserving the precious supply that keeps the tourists coming has for decades been a priority for state officials. Resource management, however, has required them to make trade-offs. They have constructed seawalls to protect houses built on ocean cliffs. They have dammed rivers to create supplies of water for drinking and to prevent floods and debris from damaging downstream developments.

In so doing, nature's two primary sources of beach replenishment have been muted in a process known as passive erosion. Managers have compensated through artificial beach replenishment projects but at a costs that approach $10 per cubic yard. Since usually millions of cubic yards of sand need to be moved, there are monetary limits to what they can reasonably accomplish.Reinhard Flick, who received his doctorate in oceanography from Scripps in 1978, needs only to look out his office window to watch the losing battle of beaches unfold. During his student days, he used to play volleyball on stretches of sand that are now underwater except during low tide. Rocks buried under several feet of sand four decades ago are now exposed for large parts of the year.

The staff oceanographer for the California Department of Boating and Waterways, Flick said that seawalls causing passive erosion will likely combine with sea level rise to doom some Southern California beaches. The change will become most apparent during El Niño events, when a pool of warm Pacific Ocean water settles off the coast for a year or two. El Niño has a dual effect on the West Coast. It not only feeds more intense storms but the warm ocean water itself causes a temporary spike in sea level that is above and beyond the rise that climate change is causing. During the 1997-98 El Niño, for instance, tide gauges off San Francisco recorded that sea level was 20 centimeters (8 inches) above

normal for more than a year, including the winter storm season. That temporary rise is about equal to the rise observed for the entire 20th Century.

If sea levels rise substantially, when a large storm coincides with a high tide during an El Niño event, there could be widespread inundation along the California coast. Effects could range from a submersion of areas of San Diego's Mission Beach to an inundation of the Sacramento-San Joaquin Delta. There, an overtopping of the delta's levees by brackish water could paralyze the main component of the state's water delivery system. Cayan noted that repairs to the system could take months.

The threat resonates with state officials, who have tasked Scripps and other institutions with creating and updating sea level rise scenarios.

"There's no clear path forward with sea level rise," said Tony Brunello, deputy secretary for climate change and energy at the California Resources Agency, a key Scripps partner in developing the state's response to manifestations of global warming. "You typically want to work with one number (but) what we want people to do is work with the whole range of estimates."

Cayan and other Scripps researchers who are collaborating to study sea level rise emphasize that there remains a great deal of uncertainty in the creation of estimates for the coming century. The range of rise estimated by Cayan is based on scenarios of global air temperatures over the next 100 years, which range from about 2° C (3.6° F) to about 6° C (10° F). By 2100, global sea level rise reaching a half-meter seems likely, and if the higher rates of potential warming occur it could rise by more than one meter. The potential cost of any government project or policy change puts a high premium on narrowing this range. As O'Neel and his co-authors observed in their paper, the cost of raising Central Valley levees only 15 centimeters (6 inches) to prepare for higher sea levels has been estimated at more than $1 billion.

"These are very broad-brush preliminary kinds of studies right now, but you have to start somewhere," said Scripps coastal oceanographer Bob Guza.

Flick said it will be essential for scientists to be able to study the effects of the next El Niño so they can begin to understand not just where damage will happen on the California coast but to what extent. He only had surveyor's equipment and aerial photos available to him to measure beach changes after the 1982-83 El Niño, but Guza and his collaborators now have light detection and ranging (LIDAR) and GPS technologies to make precise surveys of beach and cliff damage. Guza and Flick hope that Scripps can not only enhance its use of such technology but to deploy it within hours of a major storm event.

"We need to be geared up to quantify what beach changes are," said Flick. "We have to do an even better job of studying wave forces and wave climate."

If there's any good news for Southern California, Scripps climate scientist Nick Graham has estimated that ocean warming trends will drive storm tracks farther north, perhaps sparing the state's lower half from the full brunt of buffeting El Niño waves the 21st Century will generate. Graham compared winds produced in three different simulations of climate change with those generated in the late 20th Century. The models showed that Southern California can expect a moderate decrease in wave size of about 0.25 meters (10 inches). But even there, Graham sees a problem.

"I'm a surfer. I think that's horrible," he said.

Adapted from materials provided by University of California, San Diego, Scripps Institution of Oceanography, via Newswise.

http://www.sciencedaily.com/releases/2008/11/081122083051.htm

Hope For Treating Relapse To Methamphetamine Abuse

Stephen Dewey (right) and Amy DeMarco. (Credit: Image courtesy of DOE/Brookhaven National Laboratory)

ScienceDaily (Nov. 24, 2008) — A new study at the U.S. Department of Energy's (DOE) Brookhaven National Laboratory suggests that vigabatrin (a.k.a. gamma vinyl-GABA, or GVG) blocks drug-seeking behavior in animals previously trained to associate methamphetamine with a particular environment.

Specifically, animals pre-treated with vigabatrin lost interest in spending time in a location where they had previously been given methamphetamine. The results will appear in the February 2009 issue of Synapse, now available online.

"Reinstatement of drug-seeking behavior after an extended period of abstinence is the number-one cause of drug-addiction relapse," said Brookhaven neuroanatomist Stephen Dewey, who led the research team. "This animal study suggests that vigabatrin could potentially prevent human methamphetamine addicts from relapsing."

According to the National Institute on Drug Abuse, methamphetamine is a very addictive stimulant that is quickly becoming an American public health epidemic. There is currently no effective treatment for methamphetamine addiction.

Vigabatrin is a pharmaceutical agent first tested as a possible treatment for a variety of addictions in animal studies led by Dewey at Brookhaven Lab. It is the only drug that has been shown to block any behavior associated with methamphetamine use, and is currently being tested by Catalyst Pharmaceutical Partners for safety and efficacy against cocaine and methamphetamine addiction in humans in Phase II clinical trials across the U.S.

"In human drug abusers, many things can cause relapse — exposure or access to drugs, environmental cues that trigger thoughts of the drug, or stress," said Dewey. "If vigabatrin can prevent relapse, it could have a huge impact by helping drug abusers regain control over their lives."

In the current study, rats were first put through a series of conditioning tests that taught them to expect methamphetamine in one chamber of a three-chamber apparatus and saline solution in another chamber. The researchers then allowed the rats to roam freely among the three chambers. If the rats spent the majority of their time in the chamber where they had been given methamphetamine, the scientists knew they had established a "conditioned place preference."

Once this preference was established, the researchers extinguished it by giving the rats saline injections in both chambers, again allowing the animals to have free access to all chambers until the rats had no preference for the previously methamphetamine-associated chamber for at least six consecutive days.

Once extinguished, however, it is possible for a conditioned preference to be reinstated — just as it is possible for a recovered drug addict to relapse. To reinstate the place preference in this experiment, Brookhaven scientists injected the rats with methamphetamine in the neutral chamber. Immediately, rats went to the chamber where they had received methamphetamine and remained there for the duration of the exposure period.

Then, once the reinstatement of a preference was clearly demonstrated, the researchers tested the effectiveness of vigabatrin at blocking it. They pre-treated animals with vigabatrin two-and-a-half hours before giving them another priming dose of methamphetamine followed by free access to all three chambers. When pre-treated with vigabatrin, the rats no longer showed any preference for one chamber over another.

Dewey's group is now conducting studies to examine whether GVG will also block an environmental cue previously shown to produce relapse to drug-seeking behavior.

"These studies have wide implications for addressing the number-one cause of relapse to drug seeking behavior. If we can successfully block drug-induced reinstatement, then our ability to block environmental cue-induced relapse is significantly enhanced," Dewey said.

Collaborators on this study included: Amy DeMarco, now an M.D./Ph.D. student at Stony Brook University, who conducted the research while working in Dewey's lab at Brookhaven last summer and is lead author on the paper; Reema Dalal, Jessica Pai, and Jonathan Brodie of New York University; Stefanie Aquilina of Cornell University; Uma Mullapudi of Dartmouth College; Shiva Kothari of Duke University; Milan Kahanda of Rensselaer Polytechnic Institute; and Crystie Hammel, Courtney Liebling, Vinal Patel, and Wynne Schiffer of Brookhaven Lab. The research was funded by the National Institute on Drug Abuse and the Office of Biological and Environmental Research of DOE's Office of Science.

Adapted from materials provided by DOE/Brookhaven National Laboratory.

http://www.sciencedaily.com/releases/2008/11/081113091625.htm

Breakthrough Technique Unlocks Secret Of Plasmas

The Earth's upper atmosphere is a plasma, as are lightning bolts and virtually all stars that light up the night sky. (Credit: iStockphoto/Chee Ming Wong)

ScienceDaily (Nov. 23, 2008) — University of British Columbia researchers have developed a technique that brings scientists a big step closer to unlocking the secrets of the most abundant form of matter in the universe.

A plasma – or ionized gas – can be as commonplace as in fluorescent light bulbs, or exotic in the extreme, as a thermonuclear explosion. The Earth's upper atmosphere is a plasma, as are lightning bolts and virtually all stars that light up the night sky.

For nearly a hundred years, physicists have worked to develop intricate mathematical theories for dealing with the plasma state, but detailed knowledge about plasma constituents and their precise interaction dynamics has been hard to come by. Conventional plasmas are hot, complex and difficult to characterize either in the natural world or in the laboratory.

Recently, a handful of laboratories have begun work on a new class of plasma so simple that it promises to take our understanding to a new level. Termed ultracold plasmas, these systems start with trapped atoms, cooled to a fraction of a degree above absolute zero, to form clouds of ions and electrons that are nearly standing still. With this control, scientists have found it possible to study the elementary steps by which atomic plasmas are born and grow.

Now, for the first time, UBC researchers have found a way to make ultracold plasmas out of molecules. Starting with a gaseous sample cooled in a supersonic molecular beam, a team led by Ed Grant, Professor and Head of the Department of Chemistry, has formed a plasma of nitric oxide that has ion and electron temperatures as cold as plasmas made from trapped atoms.

These plasmas last 30 microseconds or more even though, unlike atoms, molecular ions can quickly dissociate by recombining with electrons. "It's amazing that our plasmas have sustained life at all," says Grant. "We think that the high charged particle density we create interferes with ion-electron recombination."

Their technique, detailed in the current issue of the journal Physical Review Letters, not only produces plasmas three orders of magnitude denser than those made with trapped atoms, but appears to reach much higher levels of correlation, a factor describing the onset liquid-like collective motion.

"Molecules represent a holy grail of ultracold science," says Grant. "The ability to break out of the atom 'trap' is tremendously liberating and could lead to a whole new field of physics."

Grant adds that further understanding of ultracold plasma on a molecular level could lead to new knowledge about gas planets (Jupiter, Saturn, Uranus, and Neptune in our solar system), White Dwarf stars, thermonuclear fusion and X-ray lasers.

Adapted from materials provided by University of British Columbia, via EurekAlert!, a service of AAAS.

http://www.sciencedaily.com/releases/2008/11/081121140526.htm

How Red Wine Compounds Fight Alzheimer's Disease

Researchers discover how compounds found in wine thwart disease in mice. (Credit: iStockphoto)

ScienceDaily (Nov. 23, 2008) — Scientists call it the "French paradox" — a society that, despite consuming food high in cholesterol and saturated fats, has long had low death rates from heart disease. Research has suggested it is the red wine consumed with all that fatty food that may be beneficial — and not only for cardiovascular health but in warding off certain tumors and even Alzheimer's disease.

Now, Alzheimer's researchers at UCLA, in collaboration with Mt. Sinai School of Medicine in New York, have discovered how red wine may reduce the incidence of the disease. Reporting in the Nov. 21 issue of the Journal of Biological Chemistry, David Teplow, a UCLA professor of neurology, and colleagues show how naturally occurring compounds in red wine called polyphenols block the formation of proteins that build the toxic plaques thought to destroy brain cells, and further, how they reduce the toxicity of existing plaques, thus reducing cognitive deterioration.

Polyphenols comprise a chemical class with more than 8,000 members, many of which are found in high concentrations in wine, tea, nuts, berries, cocoa and various plants. Past research has suggested that such polyphenols may inhibit or prevent the buildup of toxic fibers composed primarily of two proteins — Aß40 and Aß42 — that deposit in the brain and form the plaques which have long been associated with Alzheimer's. Until now, however, no one understood the mechanics of how polyphenols worked.

Teplow's lab has been studying how amyloid beta (Aß) is involved in causing Alzheimer's. In this work, researchers monitored how Aß40 and Aß42 proteins folded up and stuck to each other to produce aggregates that killed nerve cells in mice. They then treated the proteins with a polyphenol compound extracted from grape seeds. They discovered that polyphenols carried a one-two punch: They blocked the

formation of the toxic aggregates of Aß and also decreased toxicity when they were combined with Aß before it was added to brain cells.

"What we found is pretty straightforward," Teplow said. "If the Aß proteins can't assemble, toxic aggregates can't form, and thus there is no toxicity. Our work in the laboratory, and Mt. Sinai's Dr. Giulio Pasinetti's work in mice, suggest that administration of the compound to Alzheimer's patients might block the development of these toxic aggregates, prevent disease development and also ameliorate existing disease."

Human clinical trials are next.

"No disease-modifying treatments of Alzheimer's now exist, and initial clinical trials of a number of different candidate drugs have been disappointing," Teplow said. "So we believe that this is an important next step."

This work was supported by the National Institutes of Health; the Department of Veterans Affairs; the James J. Peters Veterans Affairs Medical Center Geriatric Research Education Clinical Center Program, Polyphenolics (to Giulio Pasinetti); grants from the Japan Human Science Foundation and the Mochida Memorial Foundation for Medical and Pharmaceutical Research; grants from the Alzheimer's Association; and the Jim Easton Consortium for Alzheimer's Drug Discovery and Biomarkers at UCLA (to David Teplow). Teplow reports no conflict of interests.

Adapted from materials provided by University of California - Los Angeles.

http://www.sciencedaily.com/releases/2008/11/081121092454.htm

Lactic Acid Found To Fuel Tumors

ScienceDaily (Nov. 23, 2008) — A team of researchers at Duke University Medical Center and the Université catholique de Louvain (UCL) has found that lactic acid is an important energy source for tumor cells. In further experiments, they discovered a new way to destroy the most hard-to-kill, dangerous tumor cells by preventing them from delivering lactic acid.

"We have known for more than 50 years that low-oxygen, or hypoxic, cells cause resistance to radiation therapy," said senior co-author Mark Dewhirst, DVM, Ph.D., professor of radiation oncology and pathology at Duke. "Over the past 10 years, scientists have found that hypoxic cells are also more aggressive and hard to treat with chemotherapy. The work we have done presents an entirely new way for us to go after them."

Many tumors have cells that burn fuel for activities in different ways. Tumor cells near blood vessels have adequate oxygen sources and can either burn glucose like normal cells, or lactic acid (lactate). Tumor cells further from vessels are hypoxic and inefficiently burn a lot of glucose to keep going. In turn, they produce lactate as a waste product.

Tumor cells with good oxygen supply actually prefer to burn lactate, which frees up glucose to be used by the less-oxygenated cells. But when the researchers cut off the cells' ability to use lactate, the hypoxic cells didn't get as much glucose.

For the dangerous hypoxic cells, "it is glucose or death," said Pierre Sonveaux, professor in the UCL Unit of Pharmacology & Therapeutics and lead author of the study, published in the Nov. 20 online edition of the Journal of Clinical Investigation. He formerly worked with Dr. Dewhirst at Duke.

The next challenge was to discover how lactate moved into tumor cells. Because lactate recycling exists in exercising muscle to prevent cramps, the researchers imagined that the same molecular machinery could be used by tumor cells.

"We discovered that a transporter protein of muscle origin, MCT1, was also present in respiring tumor cells," said Dewhirst. The team used chemical inhibitors of MCT1 and cell models in which MCT1 had been deleted to learn its role in delivering lactate.

"We not only proved that MCT1 was important, we formally demonstrated that MCT1 was unique for mediating lactate uptake," said Professor Olivier Feron of the UCL Unit of Pharmacology & Therapeutics.

Blocking MCT1 did not kill the oxygenated cells, but it nudged their metabolism toward inefficiently burning glucose. Because the glucose was used more abundantly by the better-oxygenated cells, they used up most of the glucose before it could reach the hypoxic cells, which starved while waiting in vain for glucose to arrive.

"This finding is really exciting," Dewhirst said. "The idea of starving hypoxic cells to death is completely novel."

Even though hypoxic tumor cells have been identified as a cause of treatment resistance for decades, there has not been a reliable method to kill them. "They are the population of cells that can cause tumor relapse," said Professor Feron.

A significant advantage of the new strategy is that a new drug does not need to reach hypoxic cells far from blood vessels and it does not need to enter into cells at all – it merely needs to block the transporter

molecule that moves the lactose, which is outside of the cells. "This finding will be really important for drug development," said Sonveaux.

The researchers also showed in mice that radiation therapy along with MCT1 inhibition was effective for killing the remaining tumor cells, those nearest the blood vessels. This proved to be a substantial antitumor approach.

The study was funded by grants from the National Institutes of Health; the Belgian American Educational Foundation (BAEF); from governmental foundations, F.R.S.-FNRS, Communauté française de Belgique and Région wallonne; and the J. Maisin and St. Luc Foundations in Belgium.

Other authors included, from Duke University Medical Center: Thies Schroeder, Melanie C. Wergin, Zahid N. Rabbani, and Kelly M. Kennedy from the Department of Radiation Oncology; Michael J. Kelley, from the Division of Hematology and Medical Oncology; and Miriam L. Wahl from the Department of Pathology. And from the Université catholique de Louvain (UCL), in Brussels, Belgium: Frédérique Végran, Julien Verrax, and Christophe J. De Saedeleer from the Unit of Pharmacology & Therapeutics; and Caroline Diepart, Bénédicte F. Jordan, and Bernard Gallez of the Unit of Biomedical Magnetic Resonance.

Adapted from materials provided by Duke University Medical Center, via EurekAlert!, a service of AAAS.

http://www.sciencedaily.com/releases/2008/11/081120171325.htm

Glacial Erosion Changes Mountain Responses To Plate Tectonics

Picture looking south across the Bagley ice field. This ice field is believed to cover a large fault (Bagley fault) discovered by the STEEP project, which is thought to have become very active in response to accelerated glacial erosion in the last million years. (Credit: Aaron L. Berger, 2006)

ScienceDaily (Nov. 23, 2008) — Intense glacial erosion has not only carved the surface of the highest coastal mountain range on earth, the spectacular St. Elias range in Alaska, but has elicited a structural response from deep within the mountain.

This interpretation of structural response is based on real-world data now being reported, which supports decades of model simulations of mountain formation and evolution regarding the impact of climate on the distribution of deformation associated with plate tectonics.

A team of researchers from seven universities report the results of their field studies, on the structural response of the St. Elias range to glacial erosion, in Nature Geosciences*. The paper was a partnership of Aaron L. Berger, whose Ph.D. research it encompassed, his major professor, James A. Spotila, both with the Virginia Tech geosciences department; Sean P.S. Gulick of the Institute for Geophysics, Jackson School of Geosciences, at the University of Texas at Austin; and other colleagues. Berger and Spotila headed the land-based erosion research team. Gulick headed the ocean-based seismic reflection and sedimentation research team. The project is part of the National Science Foundation-funded St. Elias Erosion-Tectonics Project (STEEP), lead by Terry L. Pavlis of the University of Texas, El Paso.

The St. Elias range is a result of 10 million years of the North American plate pushing material up as it overrides the Pacific plate, then the material being worn down by glaciers. A dramatic cooling across the earth about three million years ago resulted in the onset of widespread glaciation. A million years ago, glacial conditions became more intense and glaciers grew larger over longer periods, and transitioned into

more erosive ice streams that changed the shape and evolution of the mountains. The process continues today, resulting in the particularly active and dramatic St. Elias "orogen" – geologists' word for mountains that grow from collision of tectonic plates.

"The collisions of tectonic plates over millions of years leave a record in the sediments, but it is a history that is difficult to extract. The signals of the impact of climate are even more difficult to track. Which is why scientists have used mathematical models," said Spotila.

Models create a simplified numeric version of an orogen. Then scientists can change variables in the mathematical formula to determine what happens as a result of climate – whether rain or glaciers. "Models are important in that they showed us that climate change can effect mountain growth," Spotila said. "And the St. Elias orogen behaves very differently than ones that are at lower latitudes and receive most of their precipitation as rain," he said.

Armed with the insight of the models, Spotila, his Virginia Tech students, and colleagues at other universities have braved the mountain over many years to collect physical evidence. They have been dropped in remote and dangerous locations by helicopter to place instruments and collect samples to determine bedrock cooling rates and sedimentation.

"But our data set wouldn't have shown the complete picture," said Spotila. "We looked at the erosion history onshore and Gulick's team looked at the record off shore – the shelf where the eroded sediment rest."

Offshore seismic and borehole data indicate that the increase in offshore sedimentation corresponds to a one-million-year ago change in glaciation and deformation.

How does a change of the mountain surface result in a change of its internal structure? Spotila explained, "If you push snow with a plow, it will always pile up in front of the plow with the same shape," called the Coulomb wedge when applied to the making of mountains. As the North America plate slips over the Pacific plate, it piles up material for the St Elias orogen with a short side toward the plow inland and a long slope down to the ocean, with the toe dipping into the sea.

Enter the glacier. As glacial conditions took hold across the St. Elias orogen, the landscape began to be defined by glacial landforms left on its surface. However, the more extreme glacial cycles, and associated increased erosion, of the last million years pushed the orogen to a tipping point, beyond which the orogen was forced to totally restructure itself, Berger said. There are deformation zones where as much as half of the wedge was removed, the researchers report in the journal article.

Due the onset of accelerated glacial erosion, the St. Elias orogen struggled to maintain its wedge shape. "Rock faulting and folding has become more intense as the orogen internally deforms to adjust to the intensified erosion," said Spotila. "The flux of rock from the mountains to the sea is increasing dramatically."

Berger uses an analogy of a bulldozer pushing sand across the ground. "As the glaciers erode the top of the mountains (the top of the pile of sand), the orogen – or entire body of sand, begins readjusting itself internally to maintain its wedge-shape. If you could remove the glaciers and watch the process, the flank of the mountain range where the largest glaciers are located would begin to get planed away by erosion, reducing mean elevation. The removal of this rock would change the local tectonic stress fields, resulting in focused deformation, which would begin to push the mountains back up to replace the eroded material.".

The research showed how a change in climate led to a change in the way the motion of tectonic plates is accommodated by structural deformation within the orogen, Spotila said. "The wedge is still present but

has narrowed with the eroded material deposited across the toe. Some faults, which previously responded to the push of the plow or tectonic plate, are relocated to respond to the erosion."

Spotila concludes, "It is remarkable that climate and weather and the atmosphere can have such a profound impact on tectonics and the behavior of the solid earth."

Journal reference:

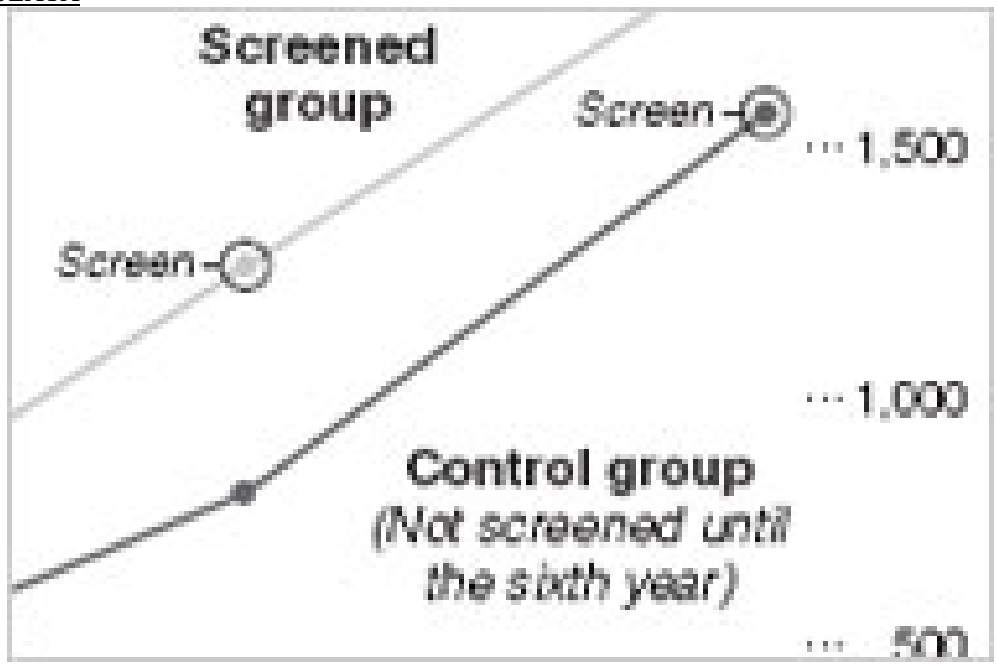
1. Berger et al. **Quaternary tectonic response to intensified glacial erosion in an orogenic wedge**. *Nature Geoscience*, 2008; 1 (11): 793 DOI: 10.1038/ngeo334

Adapted from materials provided by Virginia Tech, via Newswise.

http://www.sciencedaily.com/releases/2008/11/081114201603.htm

Study Suggests Some Cancers May Go Away

By GINA KOLATA



Cancer researchers have known for years that it was possible in rare cases for some cancers to go away on their own. There were occasional instances of melanomas and kidney cancers that just vanished. And neuroblastoma, a very rare childhood tumor, can go away without treatment.

But these were mostly seen as oddities — an unusual pediatric cancer that might not bear on common cancers of adults, a smattering of case reports of spontaneous cures. And since almost every cancer that is detected is treated, it seemed impossible even to ask what would happen if cancers were left alone.

Now, though, researchers say they have found a situation in Norway that has let them ask that question about breast cancer. And their new study, to be published Tuesday in The Archives of Internal Medicine, suggests that even invasive cancers may sometimes go away without treatment and in larger numbers than anyone ever believed.

At the moment, the finding has no practical applications because no one knows whether a detected cancer will disappear or continue to spread or kill.

And some experts remain unconvinced.

“Their simplification of a complicated issue is both overreaching and alarming,” said Robert A. Smith, director of breast cancer screening at the American Cancer Society.

But others, including Robert M. Kaplan, the chairman of the department of health services at the School of Public Health at the University of California, Los Angeles, are persuaded by the analysis. The implications are potentially enormous, Dr. Kaplan said.

If the results are replicated, he said, it could eventually be possible for some women to opt for so-called watchful waiting, monitoring a tumor in their breast to see whether it grows. “People have never thought that way about breast cancer,” he added.

Dr. Kaplan and his colleague, Dr. Franz Porzsolt, an oncologist at the University of Ulm, said in an editorial that accompanied the study, "If the spontaneous remission hypothesis is credible, it should cause a major re-evaluation in the approach to breast cancer research and treatment."

The study was conducted by Dr. H. Gilbert Welch, a researcher at the VA Outcomes Group in White River Junction, Vt., and Dartmouth Medical School; Dr. Per-Henrik Zahl of the Norwegian Institute of Public Health; and Dr. Jan Maehlen of Ulleval University Hospital in Oslo. It compared two groups of women ages 50 to 64 in two consecutive six-year periods.

One group of 109,784 women was followed from 1992 to 1997. Mammography screening in Norway was initiated in 1996. In 1996 and 1997, all were offered mammograms, and nearly every woman accepted.

The second group of 119,472 women was followed from 1996 to 2001. All were offered regular mammograms, and nearly all accepted.

It might be expected that the two groups would have roughly the same number of breast cancers, either detected at the end or found along the way. Instead, the researchers report, the women who had regular routine screenings had 22 percent more cancers. For every 100,000 women who were screened regularly, 1,909 were diagnosed with invasive breast cancer over six years, compared with 1,564 women who did not have regular screening.

There are other explanations, but researchers say that they are less likely than the conclusion that the tumors disappeared.

The most likely explanation, Dr. Welch said, is that "there are some women who had cancer at one point and who later don't have that cancer."

The finding does not mean that mammograms caused breast cancer. Nor does it bear on whether women should continue to have mammograms, since so little is known about the progress of most cancers.

Mammograms save lives, Dr. Smith said. Even though they can have a downside — most notably the risk that a woman might have a biopsy to check on an abnormality that turns out not to be cancer — "the balance of benefits and harms is still considerably in favor of screening for breast cancer," he said.

But Dr. Suzanne W. Fletcher, an emerita professor of ambulatory care and prevention at Harvard Medical School, said that it was also important for women and doctors to understand the entire picture of cancer screening. The new finding, she said, was "part of the picture."

"The issue is the unintended consequences that can come with our screening," Dr. Fletcher said, meaning biopsies for lumps that were not cancers or, it now appears, sometimes treating a cancer that might not have needed treatment. "In general we tend to underplay them."

Dr. Welch said the cancers in question had broken through the milk ducts, where most breast cancers begin, and invaded the breast. Such cancers are not microscopic, often are palpable, and are bigger and look more ominous than those confined to milk ducts, so-called ductal carcinoma in situ, or DCIS, Dr. Welch said. Doctors surgically remove invasive cancers and, depending on the circumstances, may also treat women with radiation, chemotherapy or both.

The study's design was not perfect, but researchers say the ideal study is not feasible. It would entail screening women, randomly assigning them to have their screen-detected cancers treated or not, and following them to see how many untreated cancers went away on their own.

But, they said, they were astonished by the results.

"I think everybody is surprised by this finding," Dr. Kaplan said. He and Dr. Porzsolt spent a weekend reading and re-reading the paper.

"Our initial reaction was, 'This is pretty weird,' " Dr. Kaplan said. "But the more we looked at it, the more we were persuaded."

Dr. Barnett Kramer, director of the Office of Disease Prevention at the National Institutes of Health, had a similar reaction. "People who are familiar with the broad range of behaviors of a variety of cancers know spontaneous regression is possible," he said. "But what is shocking is that it can occur so frequently."

Although the researchers cannot completely rule out other explanations, Dr. Kramer said, "they do a good job of showing they are not highly likely."

A leading alternative explanation for the results is that the women having regular scans used hormone therapy for menopause and the other women did not. But the researchers calculated that hormone use could account for no more than 3 percent of the effect. Maybe mammography was more sensitive in the second six-year period, able to pick up more tumors. But, the authors report, mammography's sensitivity did not appear to have changed.

Or perhaps the screened women had a higher cancer risk to begin with. But, the investigators say, the groups were remarkably similar in their risk factors. Dr. Smith, however, said the study was flawed and the interpretation incorrect. Among other things, he said, one round of screening in the first group of women would never find all the cancers that regular screening had found in the second group. The reason, he said, is that mammography is not perfect, and cancers that are missed on one round of screening will be detected on another.

But Dr. Welch said that he and his colleagues considered that possibility, too. And, he said, their analysis found subsequent mammograms could not make up the difference.

Dr. Kaplan is already thinking of how to replicate the result. One possibility, he said, is to do the same sort of study in Mexico, where mammography screening is now being introduced.Donald A. Berry, chairman of the department of biostatistics at M. D. Anderson Cancer Center in Houston, said the study increased his worries about screenings that find cancers earlier and earlier. Unless there is some understanding of the natural history of the cancers that are found — which are dangerous and which are not — the result can easily be more treatment of cancers that would not cause harm if left untreated, he said.

"There may be some benefit to very early detection, but the costs will be huge — and I don't mean monetary costs," Dr. Berry said. "It's possible that we all have cells that are cancerous and that grow a bit before being dumped by the body. 'Hell bent for leather' early detection research will lead to finding some of them. What will be the consequence? Prophylactic removal of organs in the masses? It's really scary."But Dr. Laura Esserman, professor of surgery and radiology at the University of California, San Francisco, sees a real opportunity to figure out why some cancers go away.

"I am a breast cancer surgeon; I run a breast cancer program," she said. "I treat women every day, and I promise you it's a problem. Every time you tell a person they have cancer, their whole life runs before their eyes.

"What if I could say, 'It's not a real cancer, it will go away, don't worry about it,' " she added. "That's such a different message. Imagine how you would feel."

http://www.nytimes.com/2008/11/25/health/25breast.html?_r=1&nl=8hlth&emc=hltha1

Statins May Lower Odds of Pneumonia Death

By NICHOLAS BAKALAR

Danish researchers have found that statins, the drugs widely used to control cholesterol, may have another beneficial effect: lowering the risk of death from pneumonia.

Scientists examined medical records of 29,000 Danish patients hospitalized for pneumonia over a six-year period. Using regional prescription databases, they found 1,372 who had filled prescriptions for statins within four months of being admitted. Then they calculated mortality rates for statin users and nonusers.

After controlling for age, sex, heart disease, stroke, pulmonary illness, diabetes and 15 other disorders, they found that among statin users the odds of death were reduced by 31 percent within the first 30 days after admission and 25 percent within 90 days.

The study, published Oct. 27 in The Archives of Internal Medicine, includes a large number of subjects, and very accurate records of diagnosis, hospital discharge dates and statin use, all of which give it considerable strength.

Previous investigations of statins' effect on pneumonia have produced mixed results, and the reasons for the Danish results are unclear. An editorial published with the study suggests that the drugs modify the production of certain proteins that cause the inflammatory response.

These same proteins may also be used by bacteria to help them enter cells and reproduce. By lowering the production of these substances, statins may reduce the number of bacteria that can gain entry into cells.

A study published online Nov. 9 in The New England Journal of Medicine suggested that statins' anti-inflammatory properties might be useful in lowering the risk of heart disease, stroke and death even in patients with low cholesterol.

The average age of statin users in the Danish study was 73, and more than 60 percent were taking simvastatin, a drug sold in the United States as Zocor.

Statin users may be a generally healthier population that has had better preventive health care than nonusers, and would therefore be more likely to survive pneumonia in any case. But, the authors write, Denmark's universal health care system makes this conclusion unlikely.

Still, Dr. Reimar W. Thomsen, the lead author, advised caution in interpreting the finding. "Our results show that the chance of survival of infection might be better if you are already taking statins," he said, "but it's too early to make recommendations about starting statin use to prevent infection. You should take statins for the present indications only." Dr. Thomsen is a clinical associate professor of epidemiology at Aarhus University Hospital in Aalborg, Denmark.

Other experts found the work convincing. "This is a rigorous study," said Dr. Eric M. Mortensen, who has done research in the same field. "It has solved some of the problems of previous work, and I agree with its conclusions," said Dr. Mortensen, an assistant professor of medicine at the University of Texas Health Science Center at San Antonio, who was not involved in the Danish study.The Danish government paid for the study, and there was no pharmaceutical industry involvement.

http://www.nytimes.com/2008/11/25/health/research/25pneu.html?nl=8hlth&emc=hltha2

Longevity Linked to Heart Disease Protection

By RONI CARYN RABIN

Older adults whose parents lived 100 years or longer are healthier than others their age and have dramatically lower risks of heart attack, stroke, diabetes or dying from any other cause, researchers at the Boston University School of Medicine report in a new study.

Still, the healthy seniors appeared to be just as susceptible as their peers to other illnesses, including hypertension, heart arrhythmias, dementia, cancer, depression, bone fractures, glaucoma, macular degeneration, osteoporosis and thyroid disease, according to the study, which appeared in The Journal of The American Geriatrics Society.

The finding lends credence to the idea that a predisposition to a long lifespan may be inherited, the investigators said, and suggests that it may be due in large part to protection from cardiovascular disease.

“The most dramatic difference we’ve seen among centenarian offspring, one that’s been consistent throughout the period we’ve been following them, is the decreased prevalence of heart disease and its risk factors,” said Dr. Dellara F. Terry, assistant professor of medicine at Boston University School of Medicine and the paper’s lead author.

The study followed 440 adult children of centenarians and 192 of their peers for an average of 3.5 years. The median age of all participants was 72 at the beginning of the study. They were “survivors who had lived to a reasonably old age,” Dr. Terry said.

After accounting for a variety of other factors that affect death rates, the researchers found that the children of centenarians were 78 percent less likely to have heart attacks, 83 percent less likely to have strokes and 86 percent less likely to develop diabetes, compared to those with shorter-lived parents. The children of long-lived parents were 81 percent less likely to die from any cause during the study period, the researchers found.

But whether the subjects’ hardiness is due to family genetics or to healthful habits acquired from their parents in childhood is hard to say, Dr. Terry acknowledged.

“Just because something is familial doesn’t mean it’s all genetic,” she said. “It could be there are health-related behaviors they have learned from their parents. It’s also possible it’s genes, or the absence of bad genes, they inherited from their parents.”

“My personal feeling is it’s probably a mixture of behavior and genes and the environment,” she added.

Similar findings were reported in an earlier study of the children of centenarians who were part of the Longevity Genes Project at Yeshiva University. In that study, the adult children of long-lived parents suffered no strokes at all, as well as 50 percent fewer cases of diabetes, 60 percent fewer heart attacks and 23 percent fewer cases of hypertension, compared to a control group of their spouses.

That study, authored by Dr. Nir Barzilai, director of the Institute for Aging Research at the university’s Albert Einstein College of Medicine, also looked back at the parents of centenarians and found that they were seven times more likely than their peers to have had parents who lived until they were in their 90s.

“What we’re doing now is identifying longevity genes,” Dr. Barzilai said, adding that having parents who lived to 100 also seemed to predict protection against age-related cognitive impairment.

http://www.nytimes.com/2008/11/25/science/25old.html?nl=8hlth&emc=hltha2

Patterns: Better Health for Religiously Observant

By ERIC NAGOURNEY

Many people believe that going to religious services may be good for the afterlife. But researchers have found that it may not be so bad in the here and now.

A new study, which followed the health of more than 90,000 women over an average of more than seven years each, found that those who attended services were one-fifth less likely to die than those who did not.

The subject has been controversial, and the authors of the study, which appears in Psychology & Health, were at pains not to appear to be making a link between religion itself and health.

“I don’t want to go beyond what the facts are showing us, and I want to be cautious,” said the lead author of the study, Eliezer Schnall of Yeshiva University.

Whatever the explanation, the researchers found a significant difference over the course of the study in the death rate of women who reported attending the services of Christian, Jewish and other faiths at least once a week.

The researchers used information from the Women’s Health Initiative, a long-term study looking at women 50 to 79 at 40 locations around the United States.

The researchers also looked to see if religious observance played a role in reducing heart disease. Though the findings did not support that, they did show a lower rate of death from all causes.

The reason is not clear, although earlier studies have suggested that people who are part of strong social networks tend to be healthier. Some religious people may also be more likely to refrain from tobacco or alcohol.

Those who are moved by the findings to make their way to church, temple or mosque should note that the researchers did not provide the answer to one question: which religion had the healthiest members.

http://www.nytimes.com/2008/11/25/health/research/25patterns.html?nl=8hlth&emc=hltha2

Too Much Information

By PAULINE W. CHEN, M.D.

During medical school, I went to see a doctor who came highly recommended from a classmate. This doctor had not only found the cause of my friend's pain, but she had also offered insight on how to juggle a successful medical career with a busy family life. My friend was rapturous with praise about how human this doctor was — "She's so real" were the words I remember my friend using — and she urged me to give the doctor a try.

But my visit was not how I had imagined it would be. The doctor did help me medically, but along the way I learned about her training, her kids and her health problems. I even learned about a brewing personal issue when she let me in on some of the details before leaving the exam room to take a personal phone call. While she might have let her guard down more than usual because I was a budding physician, I wasn't so sure she had focused on me during the exam and I felt overwhelmed by all the information she had shared.

It was, as they say, "T.M.I.," too much information.

How much should doctors tell their patients?

Up until recently there has been little systematic research regarding physician self-disclosure and patient satisfaction. Historically, doctors erred on the side of saying little or nothing about themselves, positioning themselves as a "blank slate" against which patients could freely discuss concerns.

By the time I was in medical school in the late 1980s, those boundaries between doctors and patients had become more porous. Lecturers now told us that it was impossible to be a truly blank slate, as doctors and patients unconsciously pick up on one another's personal cues. Even the most discreet doctors unintentionally reveal something during their interactions with patients. Patients might notice the kinds of

shoes their doctor wears, the presence or absence of a wedding ring, and even the photographs or trinkets on his or her desk.

Some of my classmates took the idea of "no blank slates" one step further. They believed that by sharing more, by acting more "human," doctors could strengthen the bonds with their patients.

But whatever our individual leanings were in practice, there was also very little research or evidence for young doctors to fall upon for guidance. The doctor-patient interaction was firmly part of the "art" and not the "science" of our work, so we based our ideas on anecdotal evidence, usually our own experiences. For me, the singular experience with my friend's doctor made me less enthusiastic about disclosing my personal life to patients. And after a few more years of training, I found that I rarely brought my own life into the clinic or hospital room except when a patient specifically asked.

Over the last four years, there have been several studies on the effects of physician self-disclosure on patient satisfaction. It turns out that patients don't always want to know about their doctors' personal experiences. And doctors don't always do a great job when they do choose to share their personal information.

Susan H. McDaniel and her colleagues at the University of Rochester School of Medicine and Dentistry found that doctors made self-disclosure statements in approximately a third of patient visits, but almost 40 percent of these statements were unrelated to the patient's symptoms, family or feelings. In addition, in the vast majority of cases, doctors never returned to the topic that inspired the personal reference in the first place.

Interestingly enough, there is also a difference in how patients react to doctors from different specialties. Dr. Mary Catherine Beach and her colleagues at the Johns Hopkins School of Medicine in Baltimore found that when surgeons revealed something personal, patients were significantly more satisfied with their quality of care than when surgeons kept mum. But when primary care doctors disclosed a fact from their own lives, their patients were significantly less satisfied.

I was intrigued by these findings and called Dr. Beach.

"No, I did not expect those results," Dr. Beach responded. "And we didn't see a difference in what the surgeons were saying to their patients versus what the primary care doctors were saying."

Dr. Beach offered a few possible explanations for the difference. Patients may not expect surgeons to share such personal information or may feel more vulnerable and anxious as they face the possibility of an operation. With primary care physicians, on the other hand, patients might interpret a personal disclosure like, "Don't worry about the pain in your knee; I get that all the time, too," not as reassuring but as dismissive or as an attempt to invalidate concerns.

As a doctor, I have often wondered if those of us who disclose little seem less "real" to our patients. At the same time, as Dr. Beach notes, there may be "a little bit of narcissism and self-centeredness going on in physician self-disclosure." *I* may feel a better sense of rapport with a patient after inserting a personal note into the conversation. But at that point the focus of the discussion begins to center on me, or how I am like the patient, rather than on the patient.

When I consider my experiences as a patient, I find that my favorite doctors rarely offer their own information in the exam room. Nonetheless, I do feel a deep personal connection with them and can even reel off a few facts about their lives. But I have learned about my gynecologist and my children's pediatrician because I have asked them specific questions during our office visits on terms that I, the patient, have set.

"Doctors should think about it before they make a self-disclosure statement," Dr. Beach said, "because most of the time these statements occur reflexively and without much thought. Doctors should make sure the statement has some purpose in the conversation and that it is either helpful to the patient or is about empathy. And they must transfer the focus of the conversation quickly back to the patient, so they don't run on and on about themselves."

I asked Dr. Beach how her research affected her practice.

"I don't spontaneously disclose as much anymore," she answered. "As I was writing the study, I began to pay attention to my own behavior. I found that self-disclosure wasn't really as useful as I believed it might have been."

"Having people see your emotional commitment is not a bad thing, but self-disclosure in practice is not as effective as people think it might be in building rapport," she said.

Join the discussion on the Well blog, "When the M.D. Shares T.M.I."

http://www.nytimes.com/2008/11/21/health/chen11-20.html?nl=8hlth&emc=hltha8

Taming Menstrual Cramps in Adolescents

By CAROLYN SAYRE

Kirk Irwin for The New York Times

Monica Patel has been using a combination of Excedrin and prescription birth control pills to help reduce the pain associated with her menstrual cycle.

In Brief:

Menstrual cramps, a condition known as dysmenorrhea, affect 20 to 90 percent of adolescent girls.

Many teenagers with severe cramps suffer for years before they seek treatment because they think painful periods are just part of growing up.

Nonsteroidal anti-inflammatory drugs and low-dose oral contraceptives can help alleviate debilitating cramps.

Monica Patel, 18, thought it was just part of becoming a woman. Seven years ago, she started having painful cramps that kept her bedridden for the first three days of her menstrual cycle.

“It felt like someone was stabbing me,” said Ms. Patel, who started experiencing painful periods, along with vomiting and fevers, when she was only 11 — nearly a year after her first period. “I would spend most of the day in bed, curled up in a little ball because it hurt so badly.”

Stories like Ms. Patel’s are all too common. Dysmenorrhea — a menstrual disorder that is characterized by painful cramps in the lower abdomen, sometimes accompanied by vomiting, diarrhea, dizziness or fainting — affects 20 to 90 percent of adolescent girls in some way and severely impacts another 14 to 42 percent.

It is difficult to determine exactly how prevalent the condition is, because the definition varies so widely. Some consider dysmenorrhea to be any menstrual pain at all, while others say it is excessive cramping that causes a woman to miss school or work.

"Dysmenorrhea is a major problem in adolescent girls," said Dr. Pamela J. Murray, chief of adolescent medicine at the Children's Hospital of Pittsburgh. "There is a huge population of girls out there whose quality of life could be better one to two days a month — that's two to three weeks a year."

Despite an era of sophisticated drugs and diagnostic tests, dysmenorrhea remains the leading cause of school absences among teenage girls, beating out even the common cold. Only a small percentage of those affected actually seek medical treatment. Ms. Patel, of West Chester, Ohio, lived with it for nearly six years before she saw a physician.

"I thought it was something all girls went through," she said. "My mom didn't think twice about it. So I told myself I would just have to learn to live with it."

Twenty years ago, that was understandable; there were fewer tests and drugs that could help diagnose and treat menstrual disorders. But today, experts say, the problem is simply a lack of awareness among teenagers, parents, school nurses and even some physicians that dysmenorrhea is a condition that needs medication attention, rather than just a natural part of growing up.

"Girls think it is their cross to bear," said Dr. Stephanie Gordon, a gynecologist who founded The Women's Center in Conyers and Stockbridge, Ga. "No one talks to them about what is and isn't normal. Sure, a little cramping is normal. But being doubled over in pain, throwing up and having diarrhea isn't."

In the last decade or so, more and more doctors have begun to recognize that dysmenorrhea isn't just a fancy name for girls who have a tough time dealing with menstrual cramps. Increasingly, it is seen as a medical condition that has a physiological effect on the body.

Studies show that women with primary dysmenorrhea — painful periods that are not caused by a pre-existing medical illness — have higher levels of hormone-like chemicals known as prostaglandins than women who do not have symptoms. These prostaglandins cause the smooth muscles in the uterus to contract and stimulate an inflammatory response, which causes pain and cramping to occur. "Their discomfort is very real," Dr. Murray said.

Physicians say it is disconcerting to think there are so many adolescents out there just living in pain. But of even greater concern, they say, are the estimated 5 to 10 percent of women with severe pain who suffer from what doctors refer to as secondary dysmenorrhea — painful periods that are caused by an underlying medical condition like uterine fibroids, pelvic inflammatory disease or, most commonly, endometriosis.

"Women need to speak up," said Dr. Marc R. Laufer, chief of gynecology at Children's Hospital Boston. "If they learn to live with the symptoms and ignore the pain, then their endometriosis may progress to a more severe stage and adversely affect their future fertility."

Even if adolescents can be persuaded to speak up, doctors still face the challenge of making sure that parents and teenagers are aware of the right treatments.

Nonsteroidal anti-inflammatory drugs like ibuprofen (Advil, Motrin) and naproxen (Aleve), which block the effects of pain-producing prostaglandins, are more effective than other painkillers like acetaminophen (Tylenol). And even when adolescents do take the right kind of medication, a study published in The Archives of Pediatrics and Adolescent Medicine showed that more than half do not take enough to curb the pain.

Of course, Nsaids don't work for everyone. When over-the-counter medications fail, most physicians recommend a low-dose oral contraceptive, which can prevent the production of prostaglandins altogether. But many parents are concerned about putting their daughters on the pill at such a young age.

"Some say it is for medical reasons," said Dr. Frank Biro, director of the division of adolescent medicine at Cincinnati Children's Hospital Medical Center. "Others say they don't want to give their child a license to have sex."

But the pill, which experts say is medically safe, can also work wonders. It certainly did for Ms. Patel, who finally decided to see a gynecologist after spending too many menstrual periods curled up on her bed. Today her periods are virtually painless.

"I didn't realize it before, but there are things that can be done to help with the pain," she said. "Girls need to know that. None of us are alone in this."

http://health.nytimes.com/ref/health/healthguide/esn-menstrualcramps-ess.html

A Berkeley Museum Wrapped in Honeycomb

By NICOLAI OUROUSSOFF

BERKELEY, Calif. — I have no idea whether, in this dismal economic climate, the University of California will find the money to build its new art museum here. But if it fails, it will be a blow to those of us who champion provocative architecture in the United States.

Designed by the Japanese architect Toyo Ito, the three-story structure suggests an intoxicating architectural dance in which the push and pull between solitude and intimacy, stillness and motion, art and viewer never ends. Its contoured galleries, whose honeycomb pattern seems to be straining to contain an untamed world, would make it a magical place to view art.

Beyond its aesthetic appeal, however, Mr. Ito's design underscores just what is at stake as so many building projects hang in the balance. On a local level, the museum could help break down the divide between the ivory tower at the top of the hill and the gritty neighborhood at the bottom. More broadly, it could introduce an American audience to one of the world's greatest and most underrated talents, sending out creative ripples that can only be imagined.The museum would replace the existing Berkeley Art Museum and Pacific Film Archive, a bunkerlike building completed in 1970 that was badly damaged in the 1989 Loma Prieta earthquake.

Standing on a rough commercial strip at the campus's southern edge, the old building is still marred by the big steel columns that were installed after the quake to support its cantilevered floors. Its rough, angular concrete forms and oddly shaped galleries are awkward settings for art.The new museum would rise several blocks away, at the seam between the main entrance to the university's leafy hillside campus and Berkeley's downtown area. Mr. Ito conceived the design as part of a drawn-out public promenade, and he has packed the bookstore, a cafe, a gallery, a 256-seat theater and a flexible "black box" onto the ground floor. The more contemplative galleries, which include spaces for temporary exhibitions and the museum's permanent collections of Western and Asian art, are on the second and third floors.

In the renderings the building's creamy white exterior vaguely resembles a stack of egg cartons that has been sliced off at one end to expose the matrix of contoured chambers inside. The forms peel away at

various points to create doorways and open up tantalizing, carefully controlled views into the interiors, as if the building's facade had been slowly eroding over the millenniums.

Teasingly voyeuristic, the effect brings to mind partly demolished buildings and the aura of intimate secrets about to be revealed. But Mr. Ito is not interested in simply obliterating boundaries, as you would with a conventional glass box. His aim is to create a relaxed relationship between private and public life: while acknowledging that contemporary museums are often hives of social activity, he understands that they can also be places where we want to hide from one another and lose ourselves in the art.

The ground floor is conceived as an intense, compressed version of the surrounding street grid. Once inside, visitors will have to pay to enter a formal temporary gallery just to the right of the main entry. Or they can slip around it and follow the procession through the more informal interstitial spaces, which will be used for video art and site-specific installations. The theater and black box space are tucked away in the back.Mr. Ito once said that he would like to create spaces that are like "eddies in a current of water." The interstitial spaces seem to swell open and close up to regulate the movement of people through the building; the self-contained, honeycomblike spaces, by contrast, produce a sense of suspension rather than enclosure, as if you were hovering momentarily before stepping back into the stream.As you ascend through the museum, this effect intensifies, and the spaces become more contemplative. The main staircase is enclosed in one of the contoured volumes, giving you psychological distance from the activity below. Once you reach the main gallery floors, the experience becomes more focused: the rhythm through the rooms is broken only occasionally, when a wall peels back to allow glimpses of the city.

Mr. Ito has positioned most of the doorways in the galleries' contoured corners, which allows for a maximum of uninterrupted wall space for the art while emphasizing the rooms' sensual curves. Most of the galleries have a single opening; others are contained in interstitial spaces, part of the general flow through the building. The contrast, which creates unexpected perspectives, has more to do with Tiepolo's heavens than with Mondrian's grids.

As with all of Mr. Ito's work, the building's structural system is not an afterthought but a critical element of the ideas that drive the design. The honeycomb pattern gives the building a remarkable structural firmness, allowing for walls only a few inches thick. Made of steel plates sandwiched around concrete, they will have a smooth, unbroken surface that should underscore the museum's fluid forms. The tautness of the bent steel should also heighten the sense of tension.Of course, Mr. Ito is still fine-tuning his design, and critical decisions have yet to be made. Museum officials plan to eliminate two 30-foot-high galleries that were part of the original proposal to add wall space and cut costs. This is unfortunate: the soaring spaces would tie the building together vertically and create voids on the upper floors that would add to the sense of mystery.

The museum is also pushing to make the curved corners in the galleries more compact to add still more wall space, which could create an impression that the art is crammed in.For decades now, Mr. Ito has ranked among the leading architects who have reshaped the field by infusing their designs with the psychological, emotional and social dimensions that late Modernists and Post-Modernists ignored. They have replaced an architecture of purity with one of emotional extremes. The underlying aim is less an aesthetic one than a mission to create a more elastic, and therefore tolerant, environment.

These ideas have found their firmest footing in Europe and Japan and are now filtering into the mainstream here. It would be a shame to leave Mr. Ito out of that cultural breakthrough. The museum would not only be an architectural tour de force but would also introduce him to a broad American audience, stirring an imaginative reawakening in a country that sorely needs it.

http://www.nytimes.com/2008/11/25/arts/design/25ito.html?th&emc=th

Marine life faces 'acid threat'

By Julian Siddle
Science Reporter, BBC News

Man-made pollution is raising ocean acidity at least 10 times faster than previously thought, a study says.

Researchers say carbon dioxide levels are having a marked effect on the health of shellfish such as mussels.

They sampled coastal waters off the north-west Pacific coast of the US every half-hour for eight years.

The results, published in the journal PNAS, suggest that earlier climate change models may have underestimated the rate of ocean acidification.

Ocean pH

Professor Timothy Wootton from the department of ecology and evolution, University of Chicago, in Illinois, says such dramatic results were unexpected as it was thought that the huge ocean systems had the ability to absorb large quantities of CO2.

"It's been thought pH in the open oceans is well buffered, so it's surprising to see these fluctuations," he said.

The findings showed that CO2 had lowered the water pH over time, demonstrating a year-on-year increase in acidity.

The research involved taking daily measurements of water pH levels, salinity and temperature, off the coast of Tatoosh island, a small outcrop lying in the Pacific Ocean, just off the north-western tip of Washington state, US.

As well as measuring physical factors, the health of marine life present in the coastal ecosystem was also tracked.

Professor Wootton says biological factors were missing from previous models of ocean climate systems - and that life in the ocean, or in this case on the ocean edge, can also affect seawater pH.

"Over a short time, biology is affecting pH, through photosynthesis and respiration, but current models don't include biological activity as part of the story," he explained.

Calcium carbonate

Every summer, Professor Wootton returned to the same sites on Tatoosh island's windswept coasts, to look at the abundance and distribution of life at the water's edge. He was especially interested in barnacles, algae and the dominant species, the Californian mussel.

The mussel has a calcium carbonate -based shell, which can be weakened or even dissolved by exposure to acid. Professor Wootton says the increase in acidity may be responsible for the decline in mussels noted in the study.

"Patterns show the chances of mussels being replaced are higher than for species without calcified shells," he said.

Other species quickly move into the space previously occupied by the mussels - though one of these species, the barnacle, also has calcified shells.

To explain this apparent anomaly, Professor Wootton says the decline of the dominant species allows a window where another species may thrive - though he expects this to be temporary as the interloper too will eventually be affected by the increasing acidity.

"In the short term, the long term decline is offset by the release from competition," he explained.

It's going down 10 to 20 times faster than the previous models predicted

Professor Timothy Wootton, University of Chicago

Chemical oceanography

The researchers say they were surprised that the plants and animals in their study are so sensitive to CO2 changes. These organisms live in the harsh inter-tidal zones, they may be submerged under water, exposed to the sun, then lashed by waves and storms.

Professor Wootton says the most troubling finding is the speed of acidification, with the pH level dropping at a much greater rate than was previously thought.

"It's going down 10 to 20 times faster than the previous models predicted," he says.

The research team are now working together with chemical oceanographers to see how their coastal observations can be matched with large scale observations, to try to explain why the decline in pH levels seems to be happening so quickly.

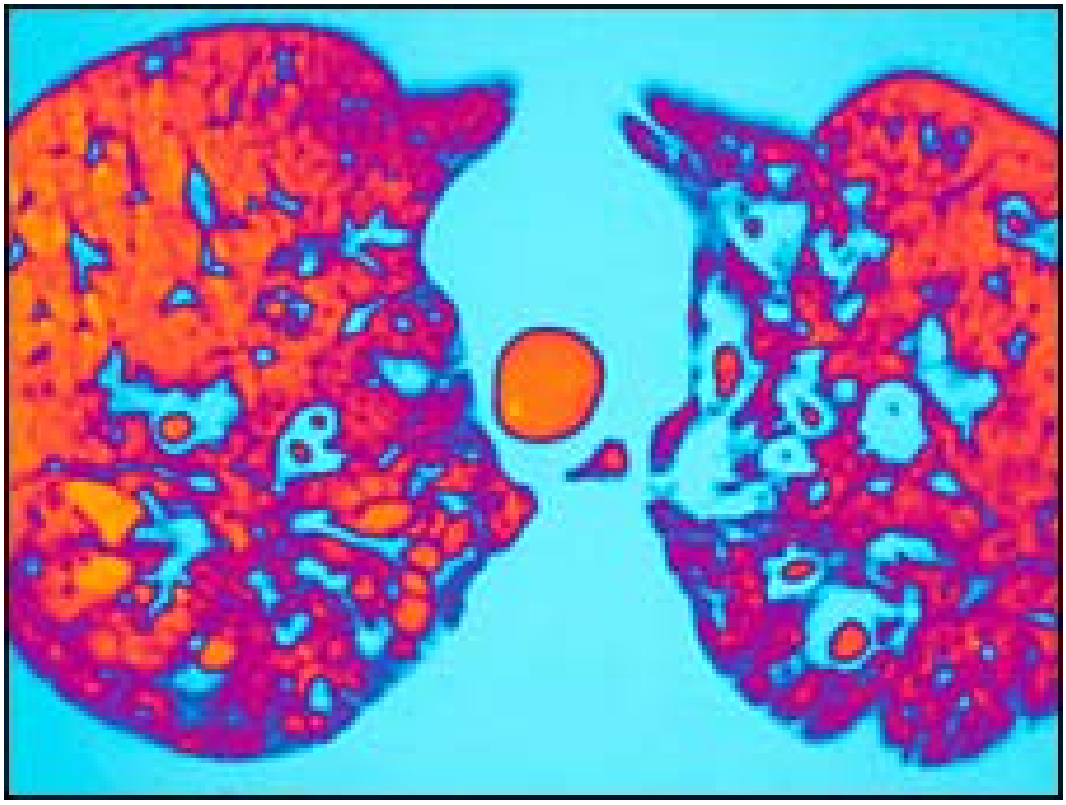
"We actually know surprisingly little about how ocean acidity is changing over time, we need a broader network of measurements," said Professor Wootton.

Story from BBC NEWS:
http://news.bbc.co.uk/go/pr/fr/-/2/hi/science/nature/7745714.stm

Published: 2008/11/25 00:51:28 GMT

Genetic disease testing advance

Blood taken from a pregnant woman may reveal if her baby has a wide range of genetic diseases, researchers claim.



A Chinese University of Hong Kong team said the technique could identify cystic fibrosis, beta-thalassemia and sickle cell disease.

The only checks currently available carry a high risk of miscarriage.

The test works by checking foetal DNA in the mother's blood against her own, the Proceedings of the National Academy of Sciences reported.

> **This addresses a problem that has been puzzling investigators in the field of non-invasive prenatal diagnosis over the past 10 years**
> Professor Dennis Lo
> Lead researcher

People have two copies of every gene, one from their father and one from their mother. When they conceive a child they pass on one of these gene copies.

However, couples trying for a baby may be oblivious to a hidden threat posed by "recessive" genetic disorders.

An estimated one in 25 people in the UK carries one copy of the gene for cystic fibrosis, but only people who have two "bad" copies will actually develop the disease.

However, if both parents carry a single disease gene, there is a 25% chance that a child they produce will inherit both, and become ill.

Parents who suspect or know they carry one or two copies of the disease gene can use IVF techniques to produce embryos, and test the genetic make-up of each one before implantation to check it is free of the condition.

Foetal DNA

The discovery that DNA from the unborn child can be found in the mother's plasma - the part of the blood once cells have been removed - opened new possibilities for testing.

About 10% to 15% of the DNA in the plasma comes from the baby, and the rest belongs to the mother.

Scientists can look for defective DNA sequences passed from the father this way, but it is far more difficult to check for faulty sequences passed on by the mother - as they are identical to the "background noise" - the faulty sequences in the mother's DNA.

The Hong Kong team may have overcome this, by devising a method to check for minute differences in the amount of faulty DNA carried in the mother's plasma compared to the sample derived from the unborn baby.

In a healthy non-pregnant woman carrying the disease, with one normal and one faulty gene, exactly half the DNA sequences will be faulty and half non-faulty, mirroring her genetic makeup.

If she is pregnant, and the baby also has inherited the same genetic make-up, these proportions will remain the same.

However, if the child has two copies, and is destined to develop the disease, the numbers of faulty genes in the mixture will be very slightly higher, and by using digital technology to count this, an accurate assessment can be made, say the scientists.

'Substantial promise'

Professor Dennis Lo, who led the study, said that the advance meant that the test could, in theory, be used by doctors. "This addresses a problem that has been puzzling investigators in the field of non-invasive prenatal diagnosis over the past 10 years," he said.

A spokesman for the Cystic Fibrosis Trust said: "We are very interested to hear about this new research, which in principle should make it easier and less risky to test a foetus for cystic fibrosis.

"At present parents who wish to know if their foetus has cystic fibrosis can have chorionic villus sampling or amniocentesis. "As this carries a risk of miscarriage, it is usually only recommended for those who know they are carriers of the gene, often those who already have one child with cystic fibrosis."

Story from BBC NEWS:
http://news.bbc.co.uk/go/pr/fr/-/2/hi/health/7742873.stm

Published: 2008/11/25 00:49:49 GMT

Bad bosses may damage your heart

Inconsiderate bosses not only make work stressful, they may also increase the risk of heart disease for their employees, experts believe.

A Swedish team found a strong link between poor leadership and the risk of serious heart disease and heart attacks among more than 3,000 employed men.

And the effect may be cumulative - the risk went up the longer an employee worked for the same company.

The study is published in Occupational and Environmental Medicine.

Stressful environment

Experts said that feeling undervalued and unsupported at work can cause stress, which often fosters unhealthy behaviours, such as smoking, that can lead to heart disease.

Previous work has shown that unfair bosses can drive up their employees' blood pressure, and persistent high blood pressure can increase heart disease risk.

For the latest study, researchers from the Karolinska Institute and Stockholm University tracked the heart health of the male employees, aged between 19 and 70 and working in the Stockholm area, over a period of nearly a decade.

During this time 74 cases of fatal and non-fatal heart attack or acute angina, or death from ischaemic heart disease, occurred.

All the participants were asked to rate the leadership style of their senior managers on competencies such as how clearly they set out goals for their staff and how good they were at communicating and giving feedback.

The staff who deemed their senior managers to be the least competent had a 25% higher risk of a serious heart problem.

And those working for what was classed as a long time - four years or more - had a 64% higher risk.

The findings held true, regardless of educational attainment, social class, income, workload, lifestyle factors, such as smoking and exercise, and other risk factors for heart disease, such as high blood pressure and diabetes.

The researchers, which included experts from University College London in the UK and the Finnish Institute of Occupational Health, said that if a direct cause and effect was confirmed, then managers' behaviour should be targeted in a bid to stave off serious heart disease among less senior employees.

They said managers should give employees clear work objectives and sufficient power in relation to their responsibilities.

Cathy Ross, cardiac nurse for the British Heart Foundation, said: "This limited, male-only study suggests that a good, clear working relationship with your manager may help to protect against heart disease.

"Feeling undervalued and unsupported can cause stress, which often leads to unhealthy behaviours such as smoking, eating a poor diet, drinking too much alcohol and not getting enough exercise - adding to your risk of developing heart problems.

"Being fit and active can give you the double benefit of busting work stress and boosting your heart health at the same time."

Story from BBC NEWS:
http://news.bbc.co.uk/go/pr/fr/-/2/hi/health/7745324.stm

Published: 2008/11/25 00:13:23 GMT

Fieldwork with Three Children

ELIZABETH REDDEN

The "Mothering (in) the Field" panel — and two future anthropologists, too?

SAN FRANCISCO – When L. Kaifa Roland brought her then 9-month-old child to a (successful) interview at the University of Colorado at Boulder, she alternated between her professional, interview-appropriate voice and — she pitched her voice up, *"Oh, honey"* — a more motherly tone.

"When I am somewhere, my daughter's going to be there. If she's not welcome, I won't be there," said Roland, an assistant professor of anthropology at Boulder. "I don't know if I should consider that the Sarah Palin model…" she joked.

Roland spoke last week at an inter-generational panel on mothering, anthropology and fieldwork, held at the American Anthropological Association's annual meeting, which ended Sunday, in a tiny but crowded room. "I think it's somewhat telling that we're all packed in this tiny little room because there mustn't be mothers who are anthropologists here," the session chair, Colleen M. Scanlan Lyons said. "My experiences in anthropology and mothering were concurrent," said Scanlan Lyons, a doctoral candidate at Boulder who deferred graduate school a semester when she learned she was pregnant.

Posing what was, for her, anything but a rhetorical question, Scanlan Lyons framed the panel's discussion by asking, "How do you plan field work in Brazil with three children and a husband with a U.S.-based career who, when he asked for a sabbatical, got the reply, 'We don't really do that here'?"

"How do we mix our passion for anthropology, which is rooted in fieldwork, and our passion for parenting, which is often rooted in schedules and routines and a sense of normalcy?"

Donna Goldstein, an associate professor at Boulder, described two extended field trips with children – the most recent being a venture to Buenos Aires this summer with her daughter and partner, a linguistic anthropologist. "I got off the plane in Buenos Aires, [my daughter] had thrown up on me three or four times before we landed. I thought, 'This is going to be an interesting trip.' "

But, Goldstein said, relying in part on some excellent contacts for childcare, "I managed to get done the things I wanted to get done…. There's a mathematical equation you need to do with fieldwork with children: Six weeks with children is equal to three weeks alone and use a multiplier for how many children you have."

"The good thing is I knew not to skimp over things that would make everyone happy," she said – including plenty of trips to museums, parks and zoos.

Meanwhile, Alma Gottlieb, a professor of anthropology at the University of Illinois at Urbana-Champaign, described how it was unexpectedly easier to bring her son to an African fieldwork site at age 5 than her daughter to Portugal at 11. For adolescents (or pre-adolescents) who lack fluency in a particular language, "a lot of problematic things can happen when you're inserted in a school system," said Gottlieb.

Panelists described work-balance issues in shifting to U.S.-based field sites — where, depending on how close they are to home, anthropologists might always feel "on call," so to speak. Panelists also discussed condensing field work abroad into shorter spurts, although Scanlan Lyons acknowledged the problems that can arise — both practically speaking (research takes much longer, and requires more trips), and academically speaking (she described having left her site just when she felt she was getting really deep).

As the cornerstone of anthropology as a discipline, fieldwork, she continued, is not something to be tinkered with cavalierly.

In response to many comments about barriers to mothering in anthropology, one audience member pointed out the advantages of academic life for parenting. "It is more flexible. You can be doing major work at midnight," she said, adding that arranging one's schedule to pick children up from school is "doable," whereas in other fields it may not be. Plus, she said of her own fieldwork in rural Bolivia, "To be a woman with a child [there] is normal. To be a woman without a child is to be immature and strange and not normal."

"There were places I never could have gone if my daughters hadn't gone there first, if they hadn't wandered into X house where people had been kind of cold to me," the audience member said.

While children can break through certain barriers abroad, in the academy back home other barriers can abound. In her talk, Boulder's Carole McGranahan cited data from Mary Ann Mason, of the University of California at Berkeley, finding that women who have babies within five years of receiving a Ph.D. are 20 percent less likely to receive tenure in the humanities and social sciences than men with "early babies," who are actually more likely to achieve tenure than others.

The session's title — "Mothering (in) the Field" suggested a focus on parenting and individual fieldwork, and, more broadly, a need to parent the entire field of anthropology on these matters. Panelists focused on a need for the "buffering" of female faculty within the academy. Laura M. DeLuca, an adjunct at Boulder, called for attention not only to women on the tenure track, but to those in adjunct faculty positions as well.

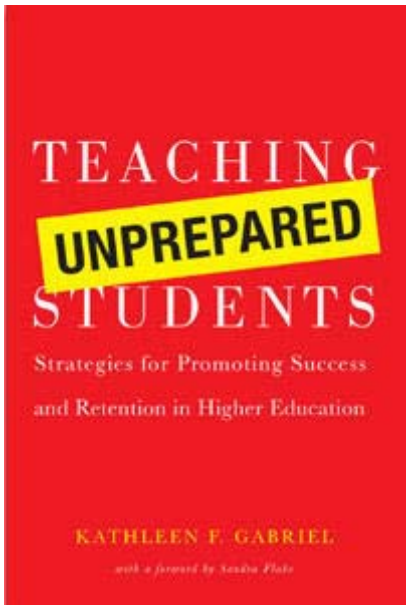
Threaded throughout the panel discussion were references to ties between the women who spoke, professors to students, and advisers to advisee – the lineages "a source of great joy for us," said Mary Moran, a professor at Colgate University. Moran recalled starting graduate school at Brown University in fall 1979 and meeting Louise Lamphere, a panelist and now professor at the University of New Mexico (who's been in the news of late for donating $1 million for a visiting assistant professorship at Brown, 32 years after filing a landmark sexual discrimination suit against her former employer).

The first thing Moran noticed was that Lamphere was pregnant. Said Moran, who completed her undergraduate degree at Mount Holyoke College, "I had never seen a pregnant professor."

— Elizabeth Redden

The original story and user comments can be viewed online at http://insidehighered.com/news/2008/11/25/anthro.

'Teaching Unprepared Students'



Many experts say that the United States can only truly see gains in the percentages of adults who have a college degree if colleges and universities get better at teaching students who arrived on campus unprepared for college-level work. But many professors find themselves frustrated by teaching such students — and many of the students drop out. Kathleen F. Gabriel's new book is designed to help such faculty members and, ultimately, their students. *Teaching Unprepared Students: Strategies for Promoting Success and Retention in Higher Education* was just published by Stylus. In an e-mail interview, Gabriel, a professor of education at California State University at Chico, explained some of the key points of the book.

Q: Many professors would love to avoid this subject, saying that high schools need to do a better job, or remedial classes should provide the solution. You write that professors need to be engaged on this issue. Why?

A: I certainly agree that high schools need to do a better job of preparing their students for college level curriculums. However, the reality is that right now we have freshmen and transfer students who are not prepared, but who are enrolled in our classes and want to learn. Many colleges do have some remedial courses, summer bridge programs, and tutoring centers to assist at-risk and unprepared students and attempt to increase their chances of being successful. Still, those who have historically been underserved — including those who are the first in their family to be able to go to college — have the lowest graduation rate. Furthermore, we should not turn our backs on students who were not adequately prepared for college in our current public high school system regardless of the reasons.

If we are sincere about giving at-risk students who are enrolled in our classes a real chance of success, then professors must also be engaged and not just refer these students to academic support or tutoring centers. If we, the professors, are not reaching out to at-risk or unprepared students who are enrolled in our classes, then we are simply setting these students up for failure and, at the same time, only pretending our colleges have somehow fulfilled a moral obligation of providing opportunities to our diverse population in today's society.

Furthermore, several studies have proven that professors do make a difference in their students' intellectual development. Unprepared students can achieve an increased level of performance with the encouragement and support of their professors.

Q: Your work stresses the importance of expectations and the way a course starts off. What's the key to reaching students early?

A: I give several suggestions in my book, but I would say that there are three very important things professors can do on the first day and during first week of classes. First, on the first day of class, professors should have their students participate in an engaging, yet educational, activity. The activity should be one where professors and students are learning information about the people enrolled in the class. It is very important to start learning the students' names and allow students to meet each other. Learning students' names is key to creating a community atmosphere for a class.

Second, require students to be in class from the first day, which means dropping students who are absent on the first day and not allowing students to add unless they have attended the first class since it is on the first day that professors should hand out and review the course syllabus. On the syllabus, professors can include a "welcoming" statement, along with course policies, expectations, reading assignments, grading policies, etc. (A syllabus checklist is provided in my book to assist professors along with a discussion for each of these subtopics.) Grading policies should include a variety of ways that students can demonstrate what they are learning as well as an accompanying rubrics for all assignments.

Third, on the first day, have students fill out an information card that not only includes their contact information, but also has them write why they signed up for the class and lists their personal goals for the course. By reaching out to students and asking them to provide information about themselves, professors can begin creating a positive and inviting atmosphere. (Additional engaging activities that can be used early in the semester are discussed in my book.)

Q: What are the common mistakes professors make when confronted with students who aren't prepared?

A: There are many different ways to help students step-up to higher standards and make significant gains in their academic performance. *Teaching Unprepared Students* is not about lowering standards; it is about how professors can use different techniques that will help student grow and improve and how to help the students learn. The biggest mistake a professor can make is to provide a "false" sense of progress and success to a student who has not done the work or complied with the expectations that are outlined on syllabi. I have seen this happen primarily in three different scenarios.

First, it is a mistake to excuse an unprepared student from a class assignment or grade his/her work differently from other students in the class. Professors must hold all of their students to a fair and equal grading system. There should never be a special deal, or "secret" extra credit after the fact. Any kind of extra credit or revision that is offered should be available to every single person enrolled in the class — and announced publicly in class and well before the last few weeks of a semester — or after classes have ended. Not holding all students to the same standards and requirements is unfair to everyone — especially the unprepared students.

A second mistake is to treat the unprepared students with pity, disrespect, or considering them academically incapable of improving. Regardless of a students' academic history, professors should maintain high levels of expectations for unprepared students since most students tend to respond to how they are treated and the expectations that are set for them. It is a mistake not to let students know that you expect their best effort, hard work, extra time spent on assignments, and make a commitment to the class if they are behind.

A third mistake is failing to provide students with detailed rubrics for all assignments, especially written ones. We need to provide the opportunity for undergraduate students to revise their written assignments. Unless it is impossible to do, I highly recommend this practice with specific guidelines.

Q: What kind of out-of-classroom support do colleges need to provide to reinforce what professors are doing in class?

A: There are many ways colleges can support their faculty. Colleges should have faculty development programs for faculty, and second, colleges need to have academic support centers available for the students. Faculty development programs can provide pedagogical workshops and support as professors develop learner-centered teaching methods to engage students, broaden their use of assessments and rubrics to improve learning, develop and improve clear and thorough syllabi, incorporate universal learning design techniques, etc.

Professors are also supported when colleges have academic support for students. Having tutoring centers, writing labs, and supplement instruction programs for targeted classes can help any students who are struggling and seeking support.

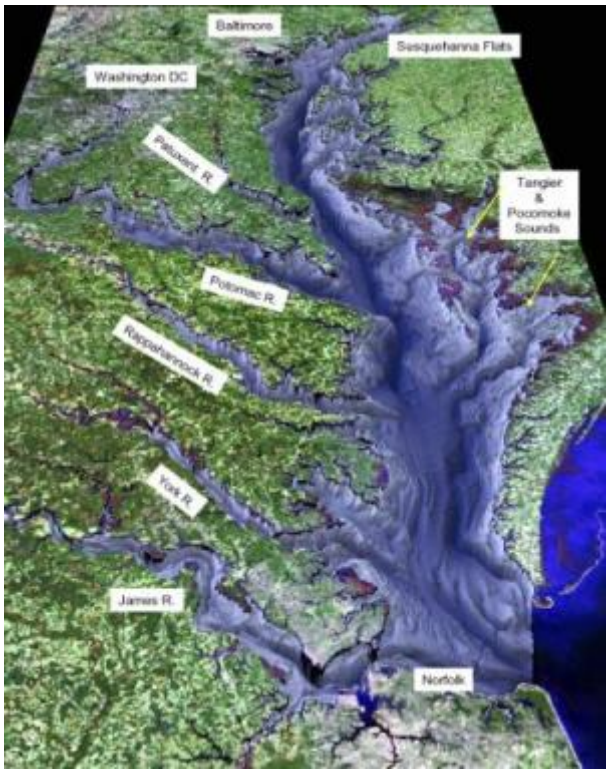
Q: Many fear that too much emphasis on the poorly prepared will detract from the experience of those who are prepared. How would you respond?

A: The teaching strategies presented in my book are ones that support the Seven Principles of Good Practice in Undergraduate Education, by Chickering and Gamson, which are positive and beneficial for all students whether they are highly prepared for college or unprepared. In addition, several research studies have found that when we engage all students in "educationally purposeful activities" then all students can benefit. In one study, "Connecting the Dots," by Kuh et. al. (2005), they report that the traditionally underserved students made greater gains but did not do so at the expense of other more prepared students. Using learner-centered teaching practices and other techniques that I discuss in my book does not required faculty to lower their expectations or do anything that would detract from more prepared students.

— Scott Jaschik

The original story and user comments can be viewed online at http://insidehighered.com/news/2008/11/25/gabriel.

Sea Level Rise Alters Chesapeake Bay's Salinity



This is a map of the Chesapeake Bay estuary. (Credit: NOAA)

ScienceDaily (Nov. 25, 2008) — While global-warming-induced coastal flooding moves populations inland, the changes in sea level will affect the salinity of estuaries, which influences aquatic life, fishing and recreation.

Researchers from Penn State and the University of Maryland Center for Environmental Science are studying the Chesapeake Bay to see how changes in sea level may have affected the salinity of various parts of the estuary.

"Many have hypothesized that sea-level rise will lead to an increase in estuarine salinity, but the hypothesis has never been evaluated using observations or 3-D models of estuarine flow and salinity," says Timothy W. Hilton, graduate student in meteorology at Penn State.

"The Chesapeake is very large, the largest estuary in the U.S. and it is very productive," says Raymond Najjar, associate professor of meteorology. "It has been the site of many large fisheries and supported many fishermen. A lot of money has gone into cleaning up the bay and reducing nutrient and sediment inputs. Climate change might make this work easier, or it could make it harder."

The Chesapeake is naturally saltier near its mouth and fresher near the inflow of rivers. The researchers, who also included Ming Li and Liejun. Zhong of the University of Maryland Center for Environmental Science, studied the Chesapeake Bay, using two complementary approaches, one based on a statistical analysis of historical data and one based on a computer model of the bay's flow and salinity.

They looked at historical data for the Susquehanna River as it flows into the Chesapeake Bay from 1949 to 2006. The flow of this fresh water into the bay naturally changes salinity. After accounting for the

change in salinity due to rivers, the researchers found an increasing trend in salinity. The researchers reported their results in a recent edition of Journal of Geophysical Research.

The team then ran a hydrodynamic model of the Bay using present-day and reduced sea level conditions. The salinity change they found was consistent with the trend determined from the statistical analysis, supporting the hypothesis that sea-level rise has significantly increased salinity in the Bay. However, the Penn State researchers note that historical salinity data is limited and sedimentation reshapes the bed of the Bay. There are also cyclical effects partially due to Potomac River flow, Atlantic Shelf salinity and winds.

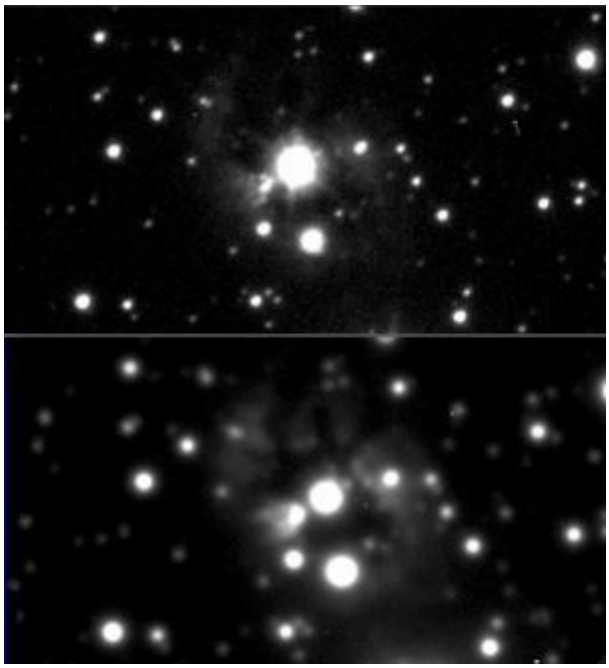
"Salt content affects jelly fish, oysters, sea grasses and many other forms of aquatic life," says Hilton. "The Chesapeake Bay is a beautiful place, used for recreation and for people's livelihoods. It is a real jewel on the East Coast and changes in salinity can alter its uses. Our research improves our understanding of the influence of climate change on the Bay and can therefore be used to improve costly restoration strategies."

The National Science Foundation supported this work.

Adapted from materials provided by Penn State.

http://www.sciencedaily.com/releases/2008/11/081120122157.htm

Binary Star Explosion Inside Nebula Challenges Star Theory



V458 Vul: Images taken in May 2008 (top) and September 2008 (bottom) show the dramatic changes occurring in the nebula as a result of the central star's explosion. (Credit: Courtesy of Roger Wesson / University College London)

ScienceDaily (Nov. 25, 2008) — The explosion of a binary star inside a planetary nebula has been captured by a team led by UCL (University College London) researchers – an event that has not been witnessed for more than 100 years. The study, published in Astrophysical Journal Letters, predicts that the combined mass of the two stars in the system may be high enough for the stars to eventually spiral into each other, triggering a much bigger supernova explosion.

A planetary nebula is an astronomical object consisting of a glowing shell of gas and plasma formed by many stars as they approach the end of their lives, while a nova is a cataclysmic nuclear explosion caused by the accretion of hydrogen onto the surface of a nearly-dead white dwarf star in a close binary.

Dr Roger Wesson, UCL Physics and Astronomy, says: “At the ends of their lives, some stars undergo nova explosions, caused by nuclear reactions on their surface. In August 2007, one such exploding star was discovered in a part of the sky that had serendipitously been observed by us only a few weeks previously. The pre-explosion images showed that this particular star was surrounded by a planetary nebula.

“Although several novae are discovered each year in our Galaxy, this is only the second time that a nova has been seen inside a planetary nebula, the first being over 100 years ago. Now, the light flash from the explosion is passing through and illuminating the surrounding nebula. This object poses a major challenge to current theories of how stars evolve and could be a Rosetta Stone in understanding some aspects of the lives of stars.”

“The pre-explosion images were taken as part of the Isaac Newton Telescope Photometric HAlpha Survey (IPHAS), the first digital survey of the Milky Way in visible light, and the most comprehensive yet in the light emitted by hydrogen (the most abundant element in the universe).

"The star which erupted was a nova, an event caused when matter is transferred from one star in a close binary system onto its companion, eventually triggering a runaway thermonuclear explosion. The nebula surrounding this nova is a planetary nebula, which must have formed during an earlier phase in the binary star's existence, when the outer layers of one of the companions were expelled. Only one previous nova has been seen to occur inside a planetary nebula – Nova Persei in 1901. The opportunity to watch in detail as the nova flash interacts with the nebula is a first in astronomy.

"The new nova, known as V458 Vulpeculae, provides an important test for models of how stars evolve. Our analysis also suggests that the combined mass of the two stars which produced the explosion could be high enough that eventually, the two stars will spiral into each other, producing a much larger supernova explosion. The role of novae as potential future supernovae has thus far been difficult to analyse in detail, and so V458 Vul provides an opportunity to learn more about this aspect of stellar evolution."

Journal reference:

1. Wesson et al. **A Planetary Nebula around Nova V458 Vulpeculae Undergoing Flash Ionization**. *The Astrophysical Journal*, 2008; 688 (1): L21 DOI: 10.1086/594366

Adapted from materials provided by University College London - UCL.

http://www.sciencedaily.com/releases/2008/11/081119084533.htm

New Clinical Study Will Help Doctors Assess Abnormal Bleeding

ScienceDaily (Nov. 25, 2008) — How do you know if you bleed normally? Scientists at The Rockefeller University Hospital's Center for Clinical and Translational Science (CCTS) aim to answer that question more definitively with the launch of an assessment tool designed to help physicians and researchers more accurately determine what is inside and outside the normal range of bleeding symptoms.The Phenotype Recording and Analysis Tool (PRAT), a Web-based questionnaire designed by Physician in Chief Barry S. Coller, Clinical Scholar Andreas C. Mauer and their colleagues, is the subject of a new pilot study that may change the way we diagnose and deal with bleeding disorders.

Mauer, principal investigator on the study and instructor in clinical investigation in Coller's Allen and Frances Adler Laboratory of Blood and Vascular Biology, is currently recruiting 500 participants with no known bleeding-related disease and no recent use of medication with anti-coagulant or anti-platelet properties. Participants will answer an hour-long questionnaire detailing their history of everyday bleeding symptoms — e.g., shaving nicks, nosebleeds and menstruation — and uncommon ones — unexplained bruises, coughing blood or bleeding in joints or muscles.The primary aim of the study is to extrapolate characteristics and ranges of bleeding symptoms for normal individuals, parameters that could eventually be used as a tool in diagnosing bleeding disorders and improving screening standards for assessing preoperative risk. "Many subtle bleeding diatheses manifest only after an individual is exposed to a hemostatic challenge such as surgery, when a problem occurs," says Mauer. The study carries implications for research as well, as the results may allow investigators to draw correlations between lab results or genetic analyses and bleeding symptoms, which will in turn allow them to identify patients who may have genetic or environmental factors that influence their bleeding symptoms.

Mauer and his colleagues, including Ed Barbour, Nickolay Khazanov, Natasha Levenkova and Shamim Mollah of the CCTS's informatics department, will also break down the range of what's normal for subgroups classified by age, sex, medication use, race, ethnicity and history of trauma or surgeries — factors that may affect the bleeding score. Further delineation of "normal" bleeding will assist the team with its secondary aim of validating and refining the questionnaire.Screening for bleeding symptoms is hardly a new thing, but PRAT is an improvement on standard tests and questionnaires in a number of ways. Certain questions — have you ever had a skin disorder that manifests in little red dots, for example — are much easier to get across with the aid of photographs, which PRAT's Web-based interface allows for. Participants complete the survey with the assistance of a physician or nurse practitioner, who helps properly interpret all questions. The questions themselves are highly specific and cover a comprehensive gamut of symptomology. "What we're applying here is something that pollsters are very familiar with, that how you ask the question makes a big difference in the answer," says Mauer.

Being a Web-based, open-source, HTML-coded interface, the questionnaire can also be administered at sites outside The Rockefeller University Hospital. "Our ultimate vision is that researchers worldwide will be interested in using our tool and downloading their data into our database, which will then be available to all investigators," says Coller, who is also director of the CCTS, established in 2006 by an inaugural Clinical and Translational Science Award from the National Institutes of Health. "By standardizing the way clinical information is collected and organized on large numbers of patients, the correlations with genetic and biochemical data will be much clearer."The current study will be followed next year by a study involving patients with diagnosed bleeding disorders. "We'll then be able to test out various scoring combinations in order to evaluate which scoring cutoffs are optimal for the purposes of separating the normal population from the population of individuals with a bleeding disorder," says Mauer. "This will make it more likely that only those individuals who are likely to have a disorder undergo the inconvenience and expense of further evaluation."

Adapted from materials provided by Rockefeller University.

http://www.sciencedaily.com/releases/2008/11/081111213541.htm

Mineral Oil Contamination In Humans: A Health Problem?

ScienceDaily (Nov. 24, 2008) — From a quantitative standpoint, mineral oil is probably the largest contaminant of our body. That this contaminant can be tolerated without health concerns in humans has not been proven convincingly.

The current Editorial of the European Journal of Lipid Science and Technology reflects on this and concludes that this proof either has to be provided or we have to take measures to reduce our exposure – from all sources, including cosmetics, pharmaceuticals and the environmental contamination.

In Ukraine recently around 100,000 tonnes of sunflower oil were contaminated with mineral oil at concentrations often above 1000 mg/kg. Much of the contaminated oil was withdrawn, but there are products on the market which were produced before this contamination was detected; and this autumn there are still several 10,000 tonnes of contaminated oil in Ukraine and other parts of the world. To protect consumers, a broad analytical campaign was initiated throughout Europe. The European Commission decided to apply a legal limit of 50 mg/kg to the mineral paraffins in Ukrainian sunflower oil and in September 2008 it organized a workshop together with the Official Food Control Authority of Zurich, Switzerland, to promote this campaign.

The editorial by Dr. Koni Grob from the Official Food Control Authority of the Canton of Zurich, Switzerland discusses the situation. Dr. Koni Grob says that in many more foods more than 50 mg/kg mineral oil components from other sources will be found and the enforcement authorities will then be in difficulty to decide how to react. Certain edible oils, but also certain other foods, like canned fish, frequently contain more than 50 mg/kg mineral oil components, some products us much as 1000 mg/kg. Although known for some time, so far no measures were taken to stop this. He continued, our lab works for the safety of the consumers. Presently there is insufficient knowledge about potential negative effects of mineral oil on human health. We are heading for data regarding the material we are exposed to and which is accumulated in our bodies, in order to provide toxicological data for an improved safety evaluation."

It has been shown that the molecular mass of the mineral paraffins resorbed by our body is higher than assumed by the safety evaluation of the European Food Safety Authority (EFSA). Further, probably a majority of the mineral oil products are not "white paraffin oils": they easily contain 30 % aromatic components, a substantial portion being alkylated adding to the health risk. This unerringly questions the current official safety evaluation – which, admittedly, is a difficult task because of the complexity of the material. It can only be hoped that the mineral oil contamination of the Ukrainian sunflower oil and the inconsistencies regarding the effects of mineral oil on the human body will make the responsible industry, science and authorities more aware of this smouldering problem.

Journal reference:

1. Dr. Koni Grob. **Does the Ukrainian sunflower oil contaminated with mineral oil wake up sleeping dogs?** *European Journal of Lipid Science and Technology*, Vol. 110, Issue 11; November 2008 DOI: 10.1002/ejlt.200800234

Adapted from materials provided by Wiley-Blackwell, via EurekAlert!, a service of AAAS.

http://www.sciencedaily.com/releases/2008/11/081124102706.htm

Quantum Computing Spins Closer

Physics graduate student David Press at the optical bench where his current experiments are running. (Credit: L.A. Cicero)

ScienceDaily (Nov. 24, 2008) — The promise of quantum computing is that it will dramatically outshine traditional computers in tackling certain key problems: searching large databases, factoring large numbers, creating uncrackable codes and simulating the atomic structure of materials.

A quantum step in that direction, if you'll pardon the pun, has been taken by Stanford researchers who announced their success in a paper published in the journal Nature. Working in the Ginzton Laboratory, they've employed ultrafast lasers to set a new speed record for the time it takes to rotate the spin of an individual electron and confirm the spin's new position.

Why does that matter? Existing computers, from laptops to supercomputers, see data as bits of information. Each bit can be either a zero or a one. But a quantum bit can be both zero and one at the same time, a situation known as a superposition state. This allows quantum computers to act like a massively parallel computer in some circumstances, solving problems that are almost impossible for classic computers to handle.

Quantum computing can be accomplished using a property of electrons known as "spin." A single unit of quantum information is the qubit, and can be constructed from a single electron spin, which in this experiment was confined within a nano-sized semiconductor known as a quantum dot.

An electron spin may be described as up or down (a variation of the usual zero and one) and may be manipulated from one state to another. The faster these electrons can be switched, the more quickly numbers can be crunched in a quantum fashion, with its intrinsic advantages over traditional computing designs.

The qubit in the Stanford experiment was manipulated and measured about 100 times faster than with previous techniques, said one of the researchers, David Press, a graduate student in applied physics.

The experiments were conducted at a temperature of almost absolute zero, inside a strong magnetic field produced by a superconducting magnet. The researchers first hit the qubit with laser light of specific frequencies to define and measure the electron spin, all within a few nanoseconds. Then they rotated the spin with polarized light pulses in a few tens of picoseconds (a picosecond is one trillionth of a second). Finally, the spin state was read out with yet another optical pulse.

Similar experiments have been done before, but with radio-frequency pulses, which are slower than laser-light pulses. "The optics were quite tricky," Press said. The researchers had to find a single, specific photon emitted from the qubit in order confirm the spin state of the electron. That photon, however, was clouded in a sea of scattered photons from the lasers themselves.

"The big benefit is to make quantum computing faster," Press said. The experiment "pushed quantum dots up to speed with other qubit candidate systems to ultimately build a quantum computer."

Quantum computers are still years away. In the shorter term, Press said, researchers would like to build a system of tens or hundreds of qubits to simulate the operation of a larger quantum system.

The other authors of the Nature paper were Bingyang Zhang of the Ginzton Lab, and Thaddeus Ladd and Yoshihisa Yamamoto of the Ginzton Lab and the National Institute of Informatics in Tokyo.

Adapted from materials provided by Stanford University.

http://www.sciencedaily.com/releases/2008/11/081121101007.htm

Complex Systems Science: How Do Math And Intuition Help Us Understand Whole Systems?

ScienceDaily (Nov. 24, 2008) — Peter Dodds is lost. Well, not exactly. He knows he's going to meet me at 2:30 in the Davis Center. But just where? He doesn't remember. And yet, without hesitation, he walks into the atrium, past crowds of people, up the sweeping staircase and directly into Henderson's coffee shop.

There I sit, gulping a latte. How did he figure out where to go?

"t's an interesting kind of search problem," he says. "It just seemed like the right place to go. I figured you wouldn't be hanging out with the students, and that coffee might have something to do with this. I was right."

That kind of intuitive problem solving, he thinks, is not simple to explain and even harder to replicate with a computer. It's way beyond the best artificial intelligence programs, and it would be charitable to say that neuroscience has a firm grasp of how the brain manages such a task. But it's not magical either.

"It's complex," he says.

And complexity lies at the heart of Dodd's research and teaching as an assistant professor of mathematics and statistics. He's part of a group of researchers who make up UVM's Complex Systems Center launched in 2006 by the College of Engineering and Mathematical Sciences.

"In its most simple form, a complex system is many distributed parts interacting in some distributed way," Dodds says, "giving rise to some interesting, often unexpected, macrophenomena." Take a neuron. Alone, it's a cell that conducts a chemical signal. But billions together, each woven with thousands of links that adapt and change over time, emerge as a brain capable of following a hunch and the smell of coffee.

Big Band, no conductor

While the human brain may be the ultimate complex system, other examples appear everywhere. Take army ants. Despite their name, they have no general, and their queen sends out no instructions. No ant is aiming to get across that gully, and there is no blueprint or traffic light. Yet millions of ants, following the same instinctive rules of individual behavior, can build bridges with their bodies and forage for food along vast efficient highways.

"That's emergence," says computer scientist Maggie Eppstein, director of the UVM Complex Systems Center. "You can't just look at the rules each little thing is following and then describe what is going to happen in the whole system. You've got to run the model or observe the whole to understand what happens at the next scale."

Ferociously chaotic air currents resolve into a tornado that moves across the landscape maintaining its form. "In complex systems, through local interactions and self-organization, stable or semi-stable patterns emerge at a next level or a higher scale," she says, "but they are difficult to predict because they are so sensitive to small changes in the system or initial conditions."

Applying insights like these, Eppstein and her colleagues across the university are helping to lead the rapidly developing field of complex systems science. They aim to bring new approaches to some of the world's most vexing problems like improving hurricane forecasts, understanding the effects of phosphorous pollution in a watershed, slowing the spread of invasive species, making robots that can start to discern the intentions behind an action, and untangling the genetic and environmental threads that lead to heart disease.

The lights are on

Recall what happened on the afternoon of Aug. 14, 2003. In a cascade, the lights went out in Cleveland, New York City, Baltimore, Albany and Detroit. Eventually, more than 50 million people were without power across the Northeast and Canada as 265 power plants shut down.

This famous blackout was a complex systems failure. No one pulled the plug; numerous local problems and mistakes created a series of dynamic feedback loops. The result: an unpredictable regional disaster.

"Nobody's in charge of the electric grid," says Paul Hines, a power engineer who is part of the UVM complex systems group, "there are hundreds of companies and entities who all have a role. What's amazing is that in the midst of this system, with millions of human and non-human actors — a lot that we can't predict — we still get order. Most of the time, when you flip the switch, you get light."

Or, as Dodds says, complex systems are "typically highly balanced, flexible, and robust, but are also susceptible to systemic collapse."

Decades of work to improve overall control of this patchwork of operators, powerplants, substations, and transmission wires — a product of history more than rational design — haven't gotten very far. "The reliability of the grid has basically been constant for the last 25 years," Hines says. He recently presented data that shows the frequency of blackouts has remained the same since 1984, and also that very large blackouts are more frequent than would be expected from traditional exponential statistics and risk assessments.

"Traditional methods have tried to estimate the reliability of the system by taking each component individually," Hines says. Any one substation is pretty straightforward and may not appear to be hard to manage. "But this misses what happens when combinations of components fail," he says.

In a complex system, one plus one might add up to a lot more than you'd guess. These kinds of nonlinear interactions don't show up in a static model that simply describes the electric grid. Which is why Hines is developing dynamic graph-based models instead that draw on new methods from network theory.

"Our goal is not to create a complex model, our goal is to create a useful model," he says, "a simple model that helps us understand a complex system." He's feeding data from actual power systems into his model, seeking sets of components that cluster together when he runs the model since these may be particularly important to maintaining the robustness of electricity delivery systems.

Parts is not parts

"Complex systems science is just the evolution of science," Dodds says. Since the revolution that Newton and Descartes helped launch, the main thrust of so-called normal science has been to look for smaller pieces and more fundamental laws. Molecules yield atoms yield quarks.

"There are many problems that we figured out by breaking things into little pieces," Dodds says. "Scientists figured out DNA with its double helix. And then they figured out the human genome by measuring like crazy. There was a sense conveyed that once we understood all the bits of the genome, we'd understand everything human," he says, "but that's totally insane."

"It's like saying once we understand atoms we understand matter," he says, "But we don't."

Of course, many of the underlying ideas behind complex systems are far older than the name. It was Aristotle who stated that the "whole is more than the sum of the parts." But complex systems science

takes this realization further. As physicist PW Anderson wrote in a seminal 1972 paper in Science, in a complex system â€œthe whole becomes not only more than, but very different from the sum of its parts."

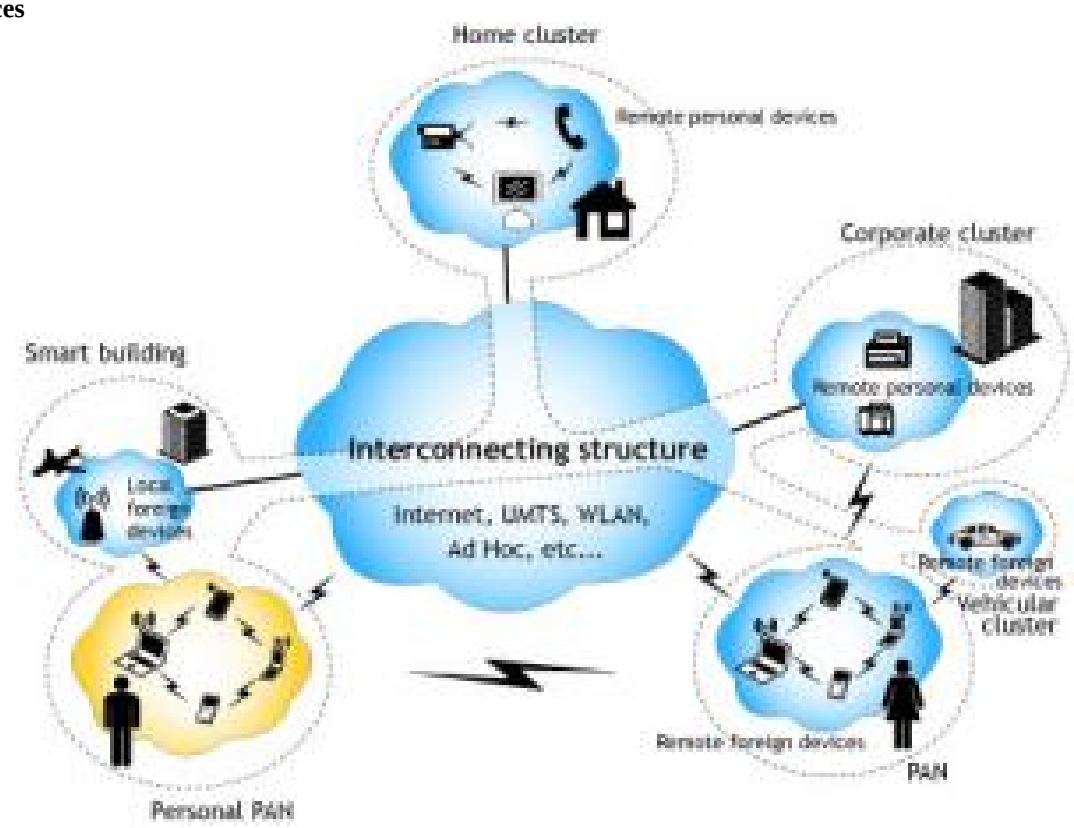
"The ability to reduce everything to simple fundamental laws does not imply the ability start from those laws and reconstruct the universe," Anderson wrote.

Peter Dodds stands at the bottom of the Davis Center stairs and watches students playing pool. One after the other, they rub their cue sticks with chalk and lean over the table. "If you want to understand how humans behave collectively you have to understand what their psychology is: and you will never get that from studying quarks or DNA or cells," he says, as a stream of students pass around him like he's a rock in a river. "Never."

Adapted from materials provided by University of Vermont.

http://www.sciencedaily.com/releases/2008/11/081122092708.htm

The Network Of Everything: Personal Networks Will Have To Cope With At Least A Thousand Devices



MAGNET Beyond is an Integrated Project (IP) supported within the Sixth Framework Programme (FP6) of the EU Commission. The project acronym stands for "My personal Adaptive Global NET and Beyond". Some of the main focus areas of MAGNET Beyond are user-centricity, personalization and personal networking. (Credit: Copyright MAGNET Beyond)

ScienceDaily (Nov. 24, 2008) — Wireless experts believe that, by 2017, personal networks will have to cope with at least a thousand devices, like laptops, telephones, mp3 players, games, sensors and other technology. To link these devices will require a 'Network of Everything'. It represents an astonishing challenge, but European researchers believe that they are moving towards the solution.

European researchers have just completed work on a networking project to perfect what will become known, perhaps, as the Smart Personal Network. Personal Networks, or PNs, are seen as essential for a world where many different devices must work in sync together, known as 4G (fourth generation). It will mean personalised services, low power devices with cheap, ubiquitous and broadband connectivity.

The EU-funded MAGNET Beyond project tackled all the issues surrounding PNs. MAGNET stands for 'My personal Adaptive Global NET' and the project further developed the concept of Personal Area Networks (PANs), first introduced in earlier PN projects PACWOMAN and MAGNET.

While the PANs link together all the devices and technology within a person's reach, the PNs spread the networking domain transparently towards the personal devices reachable via different network infrastructures. A PN belongs to and serves a private entity, a person, a fire fighter, or eventually a car, an aeroplane.

In the future, there will be hundreds, even as many as a thousand devices in a PN. It may seem an impossible figure, but in the near future the number of personal devices will multiply enormously. One

person might have dozens of sensors, monitoring vital signs like heart rate and temperature, and even the electrolytes present in perspiration. And then there are sensors and actuators in the home, including light switches, and more again in cars.

People will be able to link with TVs, stoves and spectacles, which could double as a personal TV screen, and even clothing. They will have a home gateway, to manage all their home devices, and a car gateway while driving.

A person may access remotely personal files from almost anywhere in the world as if he or she were at the office. People will be able to include others in their PN and exchange personal information, or patch into a presentation in another conference room and watch it remotely. Many of these technologies already exist, but over time, they will become more widespread and connected.

In reality, it is hard to know what kind of devices or technology might be around for sure, but one thing is certain… there will be a lot of them. Hence the World Wireless Research Forum's (WWRF) prediction of 7 trillion devices for 7 billion people by 2017 – in other words, around a thousand devices for every man, woman and child on the planet.

"In the industry, 2017 is like slang for a future where there will be many, many more devices that people use in their day-to-day life," explains Professor Liljana Gavrilovska, Technical Manager of the MAGNET Beyond project. "This project prepares for that future."

Crossed-fingers

Right now, PNs usually involve fiddling around with Bluetooth settings and crossing your fingers. If it does work, users typically try to complete simple tasks by trial and error, like hunting for photos on your mobile or trying to transfer a tune from your computer to a PDA.

But in the MAGNET model, users are able to easily set up their Personal Networks with all their devices.

"We have a user-centric approach," reveals Gavrilovska, "with the overall objective to design, develop, demonstrate and validate the concept of a flexible PN that supports resource-efficient, robust, ubiquitous personal services in a secure, heterogeneous networking environment for mobile users."

In the MAGNET Beyond vision, the devices will be self-organising and will be able to form geographically distributed secure networks of personal devices. This vision includes a platform for a multitude of personal applications and services to support private and professional activities in an unobtrusive, but dependable and trustworthy way.

United federation of PNs

Better yet, these networks will be able to 'federate' with other PNs on a permanent or ad-hoc basis. Users will be able to link their PNs permanently with those of their friends and family, or temporarily with other people and companies depending on some purpose or joint interest (see photo 2). Users will be able to control precisely what devices and information other people can link with.

Four fundamental principles guided the consortium's work: ease of use, trustworthiness, ubiquity and low cost.

"For example, the system is designed to be user friendly, with little or no training required and no need for system administrators," Gavrilovska explains. "It will ensure security and protect privacy, and it will work everywhere, even without any additional infrastructure, but still be able to exploit any available resources, like wifi or cellphone networks, for example."

The key elements to achieving these goals were personalisation and a tailored security, privacy and trust framework, including identity and the management of credentials. Credentials establish the trustworthiness of services outside the PN.

Future-proof

"We also designed it to be a future-proof architecture, to be self-organising, self-managing and aware of the context," Gavrilovska notes. The consortium even developed new hardware prototypes with optimised air interfaces, to ensure the MAGNET Beyond platform worked efficiently.

It was an enormous challenge, but MAGNET Beyond enjoys substantial resources, too. The consortium includes 35 companies from 16 countries on two continents. It has a budget of over €16m, with €10.3m from the EU – and that is just phase two.

Phase one, called simply MAGNET, had 32 partners in 17 countries on three continents with a budget of €17.4m (€10m from the EU).

Both phases featured many of the world's leading corporations and research institutes, like Nokia, NEC, Alcatel-Lucent, Samsung, TeliaSonera, Telefonica, CEA LETI, VTT, CSEM, France telecom, Telefonica, Fraunhofer FOKUS, Delft University of Technology, NICT, University of Surrey, Rome and Kassel, Aalborg, GET-INT, and many others.

The effort was worth it, with a vast range of innovative technologies now delivering Smart Personal Networks. Personal Networks that can be easily integrated into the future generations of wireless networks, and co-operate in the unfolding Future Internet and Internet of Things.

The MAGNET Beyond project received funding from the ICT strand of the Sixth Framework Programme for research.

Adapted from materials provided by ICT Results, via AlphaGalileo.

http://www.sciencedaily.com/releases/2008/11/081117082425.htm

New Mechanism For Superconductivity?

Quantum "Alchemy": Formation of superconductivity in the vicinity of a singular critical point defies the conventional belief that turbulent electronic fluctuations are not beneficial to form the macroscopic quantum state. The unheralded source of superconductivity holds promise for the design of a room temperature superconductor. (Credit: Image courtesy of DOE/Los Alamos National Laboratory)

ScienceDaily (Nov. 24, 2008) — Laboratory researchers have posited an explanation for superconductivity that may open the door to the discovery of new, unconventional forms of superconductivity.

In a November 20 Nature letter, research led by Tuson Park and Joe D. Thompson describes a new explanation for superconductivity in non-traditional materials—one that describes a potentially new state of matter in which the superconducting material behaves simultaneously as a nonmagnetic material and a magnetic material.

Superconducting materials carry a current without resistance, usually when cooled to temperatures nearing the liquid point of helium (nearly 452 degrees below zero Fahrenheit). Superconductors are extremely important materials because they hold promise for carrying electricity from one place to another without current loss or providing indefinite electric storage capacity. However, the cost of cooling materials to such extremely low temperatures currently limits the practicality of superconductors. If superconductors could be designed to operate at temperatures closer to room temperature, the results would be revolutionary.

Traditional theories of superconductivity hold that electrons within certain nonmagnetic materials can pair up when jostled together by atomic vibrations known as phonons. In other words, phonons provide the “glue” that makes superconductivity possible.

Park and his colleagues now describe a different type of "glue" giving rise to superconducting behavior.

Park and his colleagues cooled a compound of Cerium, Rhodium and Indium to just above absolute zero, nearly minus 459 degrees Fahrenheit. At this temperature, the material exhibits superconducting behavior. However, they also subjected the crystal to pressure changes and a magnetic field to perturb the alignment of electrons within the material.

"We introduced very high quantum fluctuations in the material," Park said. "In other words, we made the electrons like a traffic jam, where it would be very difficult for them to move."

This electronic traffic jam would discourage electron pairing by phonons; nevertheless, the material continued to exhibit superconducting behavior.

Based on the material's behavior under different pressures and temperatures, researchers believe that the material reaches a quantum critical point near absolute zero. At this quantum critical point, the material retained properties of a metal with highly ordered electrons and highly disordered ones—a previously undescribed state of matter.

Park and his colleagues believe that this quantum critical point provides a mechanism to pair electrons into a quantum state that gives rise to superconducting behavior. In other words, the research helps explain a mechanism for superconductivity without phonons.

"This quantum critical point could be analogous to a black hole," said Park. "We can see what is happening at or near the event horizon—superconductivity—but we cannot yet see inside to understand why."

A new mechanism for the electron-pairing glue that gives rise to superconductivity could allow researchers to design new materials that exhibit superconducting materials at higher temperatures, perhaps even opening the door to the "Holy Grail" of superconducting materials—one that works at room temperature.

Park's colleagues include: Vladimir Sidorov, Filip Ronning, Jian-Xin Zhu, Yoshifumi Tokiwa, Hanoh Lee, Eric Bauer, Roman Movshovich, John Sarrao and Joe D. Thompson.

The research was supported by the U.S. Department of Energy's Office of Science and Office of Basic Energy Science and funded in part by Los Alamos National Laboratory.

Adapted from materials provided by DOE/Los Alamos National Laboratory.

http://www.sciencedaily.com/releases/2008/11/081121132930.htm

Seismometer Able To Measure Earth Tremors Over Longer Periods Is Unveiled

OBS developed by the UPC and CSIC. (Credit: UPC)

ScienceDaily (Nov. 24, 2008) — Researchers from the Polytechnic University of Catalonia (UPC) and the Spanish Council for Scientific Research (CSIC) have developed an ocean bed seismometer that operates using a data acquisition and storage system based on CompactFlash memory cards such as those used in commercial digital cameras. The machine's low energy consumption means it can operate independently for two months at depths of up to 6,000 metres.

A group of researchers has presented the new ocean bottom seismometer (OBS) in the magazine IEEE Transactions on instrumentation and measurement. Thanks to its low consumption batteries, the machine can monitor earth tremors using passive seismic techniques for long continuous periods in the ocean depths.

"Until not long ago, OBS were only able to operate independently for periods of 15 days or a month, but this model can carry on collecting data for up to two months," Shahram Shariat Panahi, one of the report's authors and a scientist at the UPC's Department of Electronic Engineering, told SINC.

The seismometer has already been trialled in the waters off Tarragona and Vigo at depths of 1,000 metres, but it is able to withstand pressures in ocean trenches up to 6,000 metres below the surface. During the trials, 20 teams worked in the area to gather information about the thickness of each layer in the ocean floor and the materials from which these were made, down to a depth of 40 kilometres.

The potential of passive seismics

A compressed air cannon is used to periodically simulate small artificial tremors in the form of acoustic waves that are reflected and refracted within the different layers of the sea bed, and are then picked up by the OBS' sensors. The seismometer converts the analogical signal into digital data, which are stored on memory cards.

The seismometer also performs well because of its small size, low weight, low electronic noise levels, and the use of CompactFlash memory cards similar to commercial ones that act like hard discs, and can store up to 56 GB of information.

The researchers are currently developing 10 more OBS, which they hope will permit even longer independent functioning of up to six months. This project, which will involve new tests around the Spanish coast, will last for two years and will use the new design during seismic refraction campaigns on the sea bed.

Journal reference:

1. Panahi et al. **A Low Power Datalogger based on Compactflash memory for Ocean Bottom Seismometers (OBS)**. *2005 IEEE Instrumentationand Measurement Technology Conference Proceedings*, 2005; 21278 DOI: 10.1109/IMTC.2005.1604353

Adapted from materials provided by Plataforma SINC, via AlphaGalileo.

http://www.sciencedaily.com/releases/2008/11/081113101426.htm

Beauty Is Truth In Mathematical Intuition: First Empirical Evidence

ScienceDaily (Nov. 24, 2008) — Rolf Reber, together with mathematician Morten Brun and psychologist Karoline Mitterndorfer, all from the University of Bergen, Norway, have reported first empirical evidence for the use of beauty as truth and they have provided an explanation for this phenomenon, based on the processing fluency theory of beauty.Mathematicians and scientists reportedly used beauty as a cue for truth in mathematical judgment. French mathematician Jacques Hadamard, for example, wrote in 1954 in his famous book, “The Psychology of Invention in the Mathematical Field," that a sense of beauty seems to be almost the only useful “drive” for discovery in mathematics. However, evidence has been anecdotal, and the nature of the beauty-truth relationship remained a mystery.

In 2004, Rolf Reber (University of Bergen), Norbert Schwarz (University of Michigan), and Piotr Winkielman (University of California at San Diego) suggested – based on evidence they reviewed – that the common experience underlying both perceived beauty and judged truth is processing fluency, which is the experienced ease with which mental content is processed. Indeed, stimuli processed with greater ease elicit more positive affect and statements that participants can read more easily are more likely to be judged as being true. Researchers invoked processing fluency to help explain a wide range of phenomena, including variations in stock prices, brand preferences, or the lack of reception of mathematical theories that are difficult to understand.Applied to mathematical reasoning, processing fluency, stemming either from familiarity with problems or from attributes of a task, is predicted to increase intuitively judged truth. As a first step towards testing this assumption, the authors of the study demonstrated in two experiments that symmetry, a feature known to facilitate mental processing and to underlie perceived beauty, is used as heuristic cue to correctness in arithmetic problems.

The researchers constructed additions, consisting of dots. For example, 12 dots plus 21 dots equaled 33 dots. Half of the additions were correct; the others were wrong, such as 12 dots plus 21 dots equaled 27 dots. Half of the additions had symmetric dot patterns (symmetric additions), the other half asymmetric patterns (asymmetric additions). These additions were presented briefly, e.g., in one experiment 1800 milliseconds, and student participants without training in mathematics had to decide immediately after the addition disappeared whether it was correct or incorrect. Participants were more likely to judge symmetric additions than asymmetric additions to be correct. As this was also the case when additions in fact were incorrect, the finding cannot be explained by the fact that symmetric additions were easier to count or to estimate: In this case, symmetric additions that were incorrect would have been less likely to be judged correct. The results clearly show that participants used symmetry as an indication to correctness, or beauty as truth.

The authors have shown that people who do not have enough time to analyze the problem use heuristic cues in order to assess the correctness of a proposed solution. This simple setup serves as a model for the more complicated situation where a mathematician has discovered a plausible solution to a problem and now wants a quick assessment of whether this solution “feels” right. These findings suggest a solution to the mystery why beauty serves as a cue for truth in the context of mathematical discovery.

Journal reference:

1. Reber et al. **The use of heuristics in intuitive mathematical judgment**. *Psychonomic Bulletin & Review*, 2008; 15 (6): 1174 DOI: 10.3758/PBR.15.6.1174

Adapted from materials provided by University of Bergen, via AlphaGalileo.

http://www.sciencedaily.com/releases/2008/11/081120073130.htm

Randy Scandinavia? Calm Down, Boys, You're Misinformed

By MICHAEL KIMMELMAN

OSLO — Despite the come-on of its irresistible title, the show here called "Whatever Happened to Sex in Scandinavia?" turns out to be not quite as advertised. It's as erotic as pickled herring. Two 30-something men looked crestfallen recently at the sight of so many documents and so much high-minded art. Noticing a lone naked young woman in a video across the room, they positioned themselves discreetly before it, full of hope, then realized it was a German documentary about the making of a Playboy photo shoot, meant to deflate all erotic illusions.

Dreaming of the young Britt Ekland but encountering instead yellowing editions of Herbert Marcuse and fabric knit into Rorschach patterns by the Conceptualist Rosemarie Trockel, they retreated, forlorn, into the gray autumn.

It's a good question, though. What did happen to the image of Scandinavia as the frigid tundra of hot sex?

The show is organized by the Office for Contemporary Art. Call it a virtuous mess, really an essay masquerading as an exhibition, unearthing a wealth of historic information. It tracks the roots of sexual liberation in Scandinavia to longstanding state-sponsored social movements, like women's rights, sex education, health care and freedom of expression. Naturally, when the cold war arrived, the United States began casting an increasingly wary eye on this calm, liberal, peace-loving region of saunas, socialism and smorgasbord, neighboring the Soviet Union.

A "lack of moderation discernible on all fronts" is how Dwight D. Eisenhower assessed Sweden in 1960, seeing Scandinavia in general as a cautionary tale about extended social welfare. "We don't sin any more than other people, but we probably sin more openly," responded an irate Swedish baker, when approached by a journalist. Other Swedes noted that the Kinsey Report and tales of wife swapping exposed an America no less fixated on sex than Scandinavia, only more furtive and hypocritical about it. True enough.

As the columnist C. L. Sulzberger observed in The New York Times after Denmark, the most libertine of the Scandinavian constellation, legalized pornography, "There is nothing in the least bit either unwholesome or immoral about the Danes who simply share with Benjamin Franklin, an American never renowned for excessive Puritanism, a belief that honesty is the best policy."

But calling out American criticism of Scandinavia for its hypocrisy missed one point: to many Americans, procreation aside, sex was supposed to be naughty. Making it wholesome spoiled the fun. Anyone who has had to acclimate to the obligatory nakedness (supposedly for health reasons) of saunas in this part of the world knows that to be true. There is nothing sexy, believe me, I know, about sweating in a small, dark sauna with a half dozen large, middle-aged Germans.

But I digress. While Eisenhower was taking his swipe at Scandinavia, Federico Fellini was casting Anita Ekberg as the wet wench in the Trevi Fountain in "La Dolce Vita." Even Bob Hope, in the mid-1960s, flirted with Scandinavian free love. In "I'll Take Sweden" the eternally square Hope played a single father who brings his daughter (Tuesday Weld) on a trip to Europe to separate her from her boyfriend (Frankie Avalon), only to decide that marriage is better than time in swinging Sweden.

Too bad the show doesn't slum a bit in sexploitation films like "The Seduction of Inga," "Maid in Sweden" and "My Swedish Cousins," which flooded the American marketplace, alongside pornographic movies, like "The Language of Love," presenting themselves as sex educational. Now dimly recalled for the censorship ruckus caused by its full-frontal male nudity, "I Am Curious (Yellow)" became the ultimate Scandinavian sex film. Its naked couplings, involving notably ordinary lovers, were punctuated by ponderous disquisitions on Swedish labor law, interviews with Olaf Palme, the Swedish labor minister, and a section with the Soviet poet Yevgeny Yevtushenko. Norman Mailer championed it as "one of the most important pictures." There you go. Even "Bonanza" was sexier, in retrospect.

How did Scandinavia turn from "Maid in Sweden" to Ikea, from the purveyor of earnest free love into the purveyor of affordable love seats, from the home of Christina Lindberg (the maid) into the home of Abba?

Marta Kuzma, who organized the exhibition, kindly rounded up a few local experts the other day to mull over an answer at lunch. Berge Ragnar Furre, a Norwegian historian, theologian and a politician in the Socialist Left Party, now on the Nobel Committee, offered this thought: "You have to remember that here in Norway we have also had a strong tradition of liberal democracy that is against sexuality, so we are historically divided as a liberal society." In other words, Norwegians have long split between being sexually liberated and puritanical, while remaining politically liberal in both cases.

Havard Nilsen, a fellow historian specializing in Wilhelm Reich, the psychiatrist and sexologist, nodded. "There has always been a moral high-mindedness here about sexuality, connected, like the labor movement and teetotaling, with issues of reform and salvation," he said. "It used to be that even prominent actors in Scandinavia acted in pornographic movies because it was socially acceptable here, being linked to liberal politics."

But already by the late 1970s, as Wencke Mühleisen, who teaches women's studies at the University of Oslo, pointed out, "feminism in Norway turned against sexuality and toward the family, the winning political line cooperating with the state in looking for equality laws that meant a gradual cleansing of sexual promiscuity." Culture generally became more globalized in the following years, along with patterns of social behavior, meaning that "while it was normal to see women here in the '70s on the beach without a bikini top, now it is very seldom," Ms. Mühleisen added. "The commercial ideal body has replaced the desexualized healthy body."

Scandinavian parents today think twice about bathing nude with their children. And at the same time the role of the blue-eyed blond in the sexual pantheon of pornographic commerce has been diluted by the Web and multiculturalism.

Which is to say that Scandinavia has become more like everywhere else. As further proof there has been a fuss here lately over the influx of Nigerian prostitutes. They fill the main street in Oslo at night. Sexual freedom today is bound up with immigration and nationalism, the big issues across Europe.

"Suddenly we are very proud of our native prostitutes," Ms. Mühleisen said, shaking her head. "They're supposedly cleaner, more law-abiding, they stay out of the tourist center in Oslo. So a whole new discussion about good Norwegian sexuality — which, this being Scandinavia, includes equal rights for women — has arisen in contrast to bad sexuality, which is now the sexuality of the 'other.' "

Lunch over, the sun already had started to set by midafternoon. Bjorn Blumenthal, a founder of the European Association for Body Psychotherapy, said, “You should go to Vigeland Park before it gets dark.” He had a wry smile and a shock of white hair.

Vigeland was Gustav Vigeland, who filled a park in the middle of Oslo during the early decades of the last century with hundreds of his sculptures of naked men and women, young and old. They’re vaguely Aryan, cartoonish blimps, muscled and smooth.

In America just the idea of showing naked sculptures in public would invite a scandal. Here Vigeland thought nothing of installing 58 of his figures atop granite pedestals along a bridge at the heart of the park. Cuddling, waving their arms, tossing their hair, suckling babies, they assume elastic poses just shy of the Kama Sutra, always in the altogether, all Scandinavian metaphors for good health and social welfare.

There they stood against the orange-purple sky before a silhouette of barren trees, oblivious to the cold. A busker played a doleful tune on his accordion. The park was empty. Then a mother pushing a baby carriage and few joggers crossed the bridge. Nobody gave the naked sculptures a second glance.

Some things, it turns out, never change.

http://www.nytimes.com/2008/11/27/arts/27abro.html?_r=1&th&emc=th

How the turtle's shell evolved

A newly discovered fossil from China has shed light on how the turtle's shell evolved.

The 220 million-year-old find, described in Nature journal, shows that the turtle's breast plate developed earlier than the rest of its shell.

The breast plate of this fossil was an extension of its ribs, but only hardened skin covered its back.

Researchers say the breast plate may have protected it while swimming.

The turtle fossil, found near Guangling in south-west China, is thought to be the ancestor of all modern turtles, although it differs markedly; it has teeth rather than a bony plate, the shell only covers its underside and it has a long tail.

The fossil find helps to answer key questions about the evolution of turtles, Dr Xiao-Chun Wu from the Canadian Museum of Nature was one of the first to examine the fossil.

Aquatic life

"Since the 1800s, there have been many hypotheses about the origin of the turtle shell," explained Dr. Wu. "Now we have these fossils of the earliest known turtle. They support the theory that the shell would have formed from below as extensions of the backbone and ribs, rather than as bony plates from the skin as others have theorised," Dr Wu explained.

The researchers say this idea is supported by evidence from the way modern turtle embryos develop. The breast plate grows before the shell covering their backs.

The fossilised turtle ancestor, which has been named *Odontochelys semitestacea*, meaning half-shelled turtle with teeth, probably inhabited the river deltas or coastal shallows of China's Nanpanjiang trough basin - the area where the fossil was unearthed.

Researchers say the development of the shell to first protect the underside points to a mainly aquatic lifestyle.

Dr Olivier Rieppel from Chicago's Field Museum also examined the fossil.

"This strongly suggests Odontochelys was a water dweller whose swimming exposed its underside to predators. Reptiles living on the land have their bellies close to the ground with little exposure to danger," he said.

The researchers say further evidence to support the idea that this species lived mainly in water comes from the structure and proportions of the fossil's forelimbs, which closely resemble those of modern turtles that live in similar conditions.

Story from BBC NEWS:
http://news.bbc.co.uk/go/pr/fr/-/2/hi/science/nature/7748280.stm

Published: 2008/11/26 20:07:41 GMT

UK weighs into Earth-check system

By Jonathan Amos
Science reporter, BBC News, The Hague

Britain says it will put substantial investment into the world's biggest environmental monitoring project.

The UK delegation to the European Space Agency ministerial meeting in The Hague has pledged 102m euros (£86m) to GMES.

The Global Monitoring for Environment and Security (GMES) programme will use satellites to build a full picture of the state of the planet.

The UK contribution should position its national scientists and engineers to play an important role in the project.

GMES, sometimes also referred to as Kopernikus, is a joint venture between the European Union and Esa, and will cost in total in excess of 2bn euros.

The project's quest is to generate continuous, cross-calibrated, long-term data-sets that can be used to inform European policies to deal with global change, and will become a key tool to monitor the effects of the shifting climate.

"This is vital for us to make sure that we develop both an understanding of the science of climate change but also the effectiveness of the measures the world is now taking to reduce global warming," said UK science minister, Lord Drayson, who led the British delegation to the Esa meeting.

"Again, this is an area of space science that we see as a real priority for the UK. We are a global leader in the debate about the world's response to what I believe is the greatest challenge of our generation," he told BBC News.

GMES will pull together all the information gathered by ground-based monitoring equipment and combine it with observations from many satellites.

New spacecraft, known as the Sentinels, are being ordered to fill in science gaps and guarantee the data stream into the future.

The UK passed up the opportunity to lead GMES when it was initiated in 2005, contributing just 4.5% to the cost of the Esa segment offered at that time. This surprised many observers who expected Britain to fund the project in a way that reflected its economic weight within the space agency and its interest in climate matters.

The new British money will go into the second segment of the project, and puts UK industry and academia in a much better position to have some influence on GMES' evolution.

UK industry is keen to help build Sentinel 5, which will gather information on atmospheric composition. It had been worried that another low subscription from Britain might lock companies out of the contracts to make the satellite.

Richard Peckham, the chairman of trade group UKspace, told BBC News: "I am very pleased that the UK has joined at a significant level, especially after the last ministerial when Britain very nearly dropped out of GMES; and we're grateful for the efforts of Lord Drayson.

"We're disappointed the subscription wasn't a bit more but [British space officials] believe the subscription will be enough, coupled with an under-return on Earth observation in other areas from Esa, for the UK to be given the lead on Sentinel 5."

The 18 member states of the European Space Agency have been meeting here in Holland to approve policies and programmes for the next three to five years.

They have sanctioned funding for ongoing activities, such as Esa's involvement in the space station and the Ariane rocket project; but they have also initiated a range of new ventures.

These cover new space technologies and science missions to the planets.

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Story from BBC NEWS:
http://news.bbc.co.uk/go/pr/fr/-/2/hi/science/nature/7747539.stm

Published: 2008/11/26 13:31:50 GMT

Spam on rise after brief reprieve

In the world of spam, what goes down must come up.

Two weeks after the shutdown of web hosting firm McColo, which saw a two-thirds drop in spam worldwide, spam numbers are creeping up again.

Industry experts disagree on the degree to which spam has returned, but most say that prior levels will soon be reached.

Some 450,000 infected computers have been spotted trying to connect to the largest of the networks McColo hosted.

Messaging security firm IronPort Systems reckons that for now, spam remains at a level below half that prior to the McColo shutdown, whereas MessageLabs sees the level at about two-thirds.

In any case, spam is on the rise again.

McColo served as host to a number of "command and control" centres for botnets, networks of infected computers called bots that send spam and engage in other malicious activities.

With the shutdown of McColo, these botnets have been left without a centralised command, and the botnets' owners will be on the hunt for new hosts and bandwidth.

Phoning home

But the bots will remain infected with the malware that recruited them, and may soon be recruited anew.

Internet security firm FireEye has spotted some 450,000 infected computers from the Srizbi botnet - alleged to account for as much as half of all the spam on Earth - trying to "phone home" and reach their command and control servers.

According to an ongoing investigation by the Washington Post, who initiated the McColo shutdown, the Srizbi bots have been programmed with a mathematical formula that in the event of a shutdown generate a random but unique web address to check for updates.

That suggests that as soon as Srizbi's owners find a new web hosting firm, they need only set up a site at that unique address and the botnet will be fully functional again.

And MessageLabs reports that another large botnet called Cutwail, unaffected by the McColo shutdown, has increased its efforts in response to the "spam vacuum" of recent weeks.

In combination with the typical spam cycle that sees rises around the Christmas season, it would seem that the scourge of spam will return to its former strengths soon.

Story from BBC NEWS:
http://news.bbc.co.uk/go/pr/fr/-/2/hi/technology/7749835.stm

Published: 2008/11/26 12:27:51 GMT

'Meat intake cut' on cancer fears

One in 10 people has tried to cut down on processed meats such as bacon in the wake of a report linking them to cancer, a survey suggests.

Older people among the 2,124 questioned were most likely to have done this.

A World Cancer Research Fund report last year said those eating two rashers of bacon and two sausages a day faced a 63% higher risk of bowel cancer.

A bowel cancer charity said other factors, including smoking and alcohol, were also key.

The cancer prevention report highlighted the evidence for the potential dangers of processed meat, but also pointed to other elements of diet and lifestyle which could either reduce or increase cancer risk.

A quarter of those questioned in the online survey said they had tried to eat more fruits and vegetables as a result of media coverage of the report, while 18% of people said they were making more effort to watch their weight, after the report described evidence linking excess weight to six forms of cancer.

Heavy consumption of red meat has already been linked to bowel cancer, and 11% of those asked said they had been trying to cut down.

Gut chemicals

However, scientists believe that chemicals created during the curing or processing of meat pose an additional threat to the cells lining the gut.

Among the over-55s, 37% said they had tried to reduce their intake of processed meat.

Younger people were less motivated, with only 6% of them doing this.

Richard Evans, the head of communications for the World Cancer Research Fund, said: "This survey shows that if people are told how they can reduce their risk of cancer then many of them will make changes.

"However, recent market research has shown that despite the wall-to-wall media coverage of our report, many people are still unaware of how things like diet and physical activity affect cancer risk."

The survey also found nearly two in five people were trying to be more physically active, and 9% were trying to cut down on alcohol in response to health messages.

A spokesman for Bowel Cancer UK said: "There is increasing evidence that lifestyle issues such as poor diet, obesity and lack of exercise are directly linked to an increased risk of the disease.

"We recommend that people who eat a diet high in processed meats cut down and eat more fruit and vegetables, but it is also important to remember to not focus on this alone.

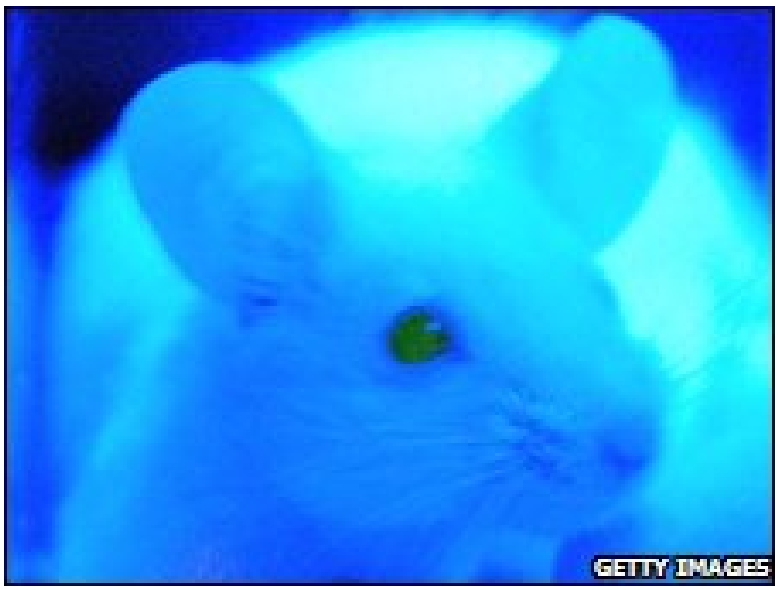
"There are many other factors that might contribute to an increased risk of bowel cancer, such as smoking and an excess of alcohol, which should not be ignored."

Story from BBC NEWS:
http://news.bbc.co.uk/go/pr/fr/-/2/hi/health/7750016.stm

Published: 2008/11/27 01:33:51 GMT

Mouse Down's 'eased in the womb'

An experiment in mice has raised hopes of halting some of the effects of Down's syndrome before birth, New Scientist magazine reports.



Down's starves developing nerve cells of two key proteins, leading to problems with mental development.

But when US researchers injected the proteins into mice pregnant with "Down's" pups, the offspring seemed free of these problems.

However, experts warned success in mice was no guarantee of the same in humans.

Down's syndrome in humans is caused in children who inherit an extra copy of one of the body's chromosomes - bundles of genetic material which help control how we develop and live.

Children with Down's can suffer from higher rates of heart and developmental problems, as well as learning difficulties to different degrees.

Statistics in the UK suggest that more children than in recent years are being born with the condition, with some parents encouraged by the fact that life expectancy is higher than in previous decades.

However, the research carried out at the National Institute of Health in Bethesda, Maryland, hints at the possibility of preventing some of the damage the extra chromosome causes.

One of the problems detected by earlier research is a malfunction in a type of brain cell which causes them to produce less of two proteins - NAP and SAL.

Normally these body chemicals help regulate the development of nerve cells.

Permanent hope

The US researchers used mice pregnant with pups who also had a extra copy of a segment of one of their chromosomes.

These pups also show signs of developmental delay in their early months.

The mothers were injected with NAP and SAL, and when the pups were born, the speed with which they reached their "developmental milestones" - such as grasping a rod, righting themselves and responding to touch - matched that of normal mice.

The brains of the treated mice showed normal levels of another protein which is under-produced by Down's-affected brain cells.

The US team published its findings in the journal Obstetrics and Gynaecology, and is now following the mice further into childhood to see if the effects are long-lasting, or even permanent.

However, other US experts warned that experiments in mice did not necessarily mean that the treatment would be effective in humans.

Carol Boys, the chief executive of the Down's Syndrome Association, said: "We welcome research that may have a positive impact on people with Down's syndrome.

"However, it must be recognised that this research doesn't herald a 'cure' or 'treatment' for Down's syndrome. We'll be following how it develops with great interest."

Story from BBC NEWS:
http://news.bbc.co.uk/go/pr/fr/-/2/hi/health/7749883.stm

Published: 2008/11/27 01:42:44 GMT

14 Drugs Identified As Most Urgently Needing Study For Off-label Use

Rank	Drug (brand name)	Most common on-label use	Most common off-label use
1	Quetiapine (Seroquel)	Schizophrenia	Bipolar, maintenance
2	Warfarin (Coumadin)	Atrial fibrillation	Hypertensive heart disease
3	Escitalopram (Lexapro)	Depression	Bipolar
4	Risperidone (Risperdal)	Schizophrenia	Bipolar, maintenance
5	Montelukast (Singulair)	Asthma	COPD
6	Bupropion (Wellbutrin)	Depression	Bipolar
7	Sertraline (Zoloft)	Depression	Bipolar
8	Venlafaxine (Effexor)	Depression	Bipolar
9	Celecoxib (Celebrex)	Joint sprain/strain	Fibromatosis
10	Lisinopril (Prinivil, Zestril)	Hypertension	Coronary artery disease
11	Duloxetine (Cymbalta)	Depression	Anxiety
12	Trazodone (Desyrel)	Depression	Sleep disturbance
13	Olanzapine (Zyprexa)	Schizophrenia	Depression
14	Epoetin alfa (Procrit, Epogen)	Chronic renal failure	Anemia of chronic disease

Clinical indications associated with on-label and off-label uses for top 14 drugs. (Credit: Image courtesy of Stanford University Medical Center)

ScienceDaily (Nov. 26, 2008) — Physicians and policy-makers know that drugs are frequently prescribed to treat certain diseases despite a lack of FDA approval — a practice known as off-label prescribing. Yet they say the problem is so big they don't know how to begin tackling it.

But a potential game plan now exists. In a paper to be published in the December issue of Pharmacotherapy, a group of researchers has developed a list of 14 widely prescribed medications most urgently in need of additional study to determine how effective and safe they are for their off-label uses. Antidepressants and antipsychotics are the most prominent classes of drugs on the list, which specifically targets drugs that have high levels of off-label use without good scientific backing.

"Off-label prescribing means that we're venturing into uncharted territory where we lack the usual level of evidence presented to the FDA that tells us these drugs are safe and effective," said Randall Stafford, MD, PhD, associate professor of medicine at the Stanford Prevention Research Center, who is the senior author of the study. "This list of priority drugs might be a start for confronting the problem of off-label use with limited evidence."

Stafford collaborated on the research with lead author Surrey Walton, PhD, assistant professor of pharmacy administration at the University of Illinois-Chicago, and other researchers at UIC and the University of Chicago.

At the top of the list was quetiapine (brand name Seroquel), an antipsychotic approved by the U.S. Food and Drug Administration in 1997 for treating schizophrenia. Not only did this drug lead all others in its high rate of off-label uses with limited evidence (76 percent of all uses of the drug), it also had features that raised additional concerns, including its high cost at $207 per prescription, heavy marketing and the presence of a "black-box" warning from the FDA, Stafford said.

Rounding out the top five were warfarin, escitalopram, risperidone and montelukast.

The most common off-label use for six of the 14 drugs on the list was for bipolar disorder. "Many of the drugs and the conditions on the list represent situations where inadequate response to treatment is common and where drug side-effects are frequent," Stafford said. "Not only are these areas where patients

and physicians are naturally interested in trying off-label therapies, but areas targeted for expansion by the makers of these drugs.

"When the volume of off-label use of any drug reaches the magnitude that we're documenting, it suggests a role of the pharmaceutical industry in facilitating these types of uses," he added.

Although companies are largely prohibited from marketing off-label uses to physicians and consumers, they make use of exceptions or may market drugs illegally, Stafford said. Companies are allowed to share with physicians any published research that supports off-label uses. Several recent lawsuits have identified systematic plans on the part of some companies to market their products for off-label uses, he noted.

Previous studies have demonstrated the breadth of off-label prescribing. A 1985 study found that of the 100 most common uses of marketed drugs, 31 of those uses did not have approval from the FDA. And a study that Stafford led in 2006 showed that of the estimated 21 percent of off-label drug uses in 2001, 73 percent did not have strong scientific support.

To get a drug approved by the FDA, a pharmaceutical company must complete three rounds of testing in human subjects to demonstrate its safety and effectiveness in treating a specific condition. Once a drug is approved and on the market, though, physicians may choose to prescribe it for any condition. But this carries unknown risks because often the drug hasn't been rigorously tested on patients with that condition.

"Many patients and physicians assume that the FDA has scrutinized all of the different ways a drug can be used, but they've only examined those uses that have gone through the approval process," Stafford said.

And pharmaceutical companies aren't often interested in spending money to investigate additional conditions that the drug might treat. Stafford said the companies may consider it risky to invest in additional testing that could show undesired results, especially when a drug is already widely used off-label.

To come up with a plan for determining which drugs were most in need of additional research for off-label use, Stafford and his colleagues convened a panel of nine experts from the FDA, the health-insurance industry, the pharmaceutical industry and academia. Based on the panel's input, the researchers identified three factors to help them prioritize the drugs that should appear on the list, including:

- The volume of off-label drug use with inadequate evidence supporting that use (based on a large, ongoing national survey of physician prescribing patterns conducted by IMS Health, a private market-research company).
- The safety of the drug (based on any safety warnings issued by the FDA).
- A composite of the drug's cost, how long it had been on the market and the amount spent marketing the drug.

After collecting the information, the researchers computed the drug rankings in each category and then came up with an overall list of the 14 drugs most in need of additional study. "Despite examining the data in a variety of ways by providing more or less emphasis on certain factors, we still came up with a very consistent list of drugs," Stafford said.

He said that in addition to prompting the FDA and other government agencies to study the priority drugs on the list, he hopes the research spurs patients to ask their doctors why they are prescribing a particular drug. "A dialogue needs to occur more frequently between physicians and patients regarding the level of evidence that supports a particular use of a drug."

Stafford also noted the societal costs associated with off-label drug use. With the prescription drug benefit now available through Medicare, taxpayers are getting the bill for costly drugs that may not be proven for the conditions they're prescribed to treat.

The study was funded by the U.S. Agency for Healthcare Research and Quality.

Adapted from materials provided by Stanford University Medical Center.

http://www.sciencedaily.com/releases/2008/11/081124130939.htm

Acid Soils In Slovakia Tell Somber Tale

Western Tatra Mountains Slovakia. (Credit: Photo by Zdeno Kostka; courtesy of William D. Bowman, University of Colorado)

ScienceDaily (Nov. 26, 2008) — Increasing levels of nitrogen deposition associated with industry and agriculture can drive soils toward a toxic level of acidification, reducing plant growth and polluting surface waters, according to a new study published online in Nature Geoscience.

The study, conducted in the Tatra Mountains of Slovakia by the University of Colorado, University of Montana, Slovak Academy of Sciences, and the U.S. Geological Survey, shows what can happen when nitrogen deposition in any part of the world increases to certain levels—levels similar to those projected to occur in parts of Europe by 2050, according to some global change models.

On the basis of these results, the authors warn that the high levels of nitrogen deposited in Europe and North America over the past half century already may have left many soils susceptible to this new stage of acidification. The results of this further acidification, wrote the authors, are highly reduced soil fertility and leaching of acids and toxic metals into surface waters.

A long history of human-influenced nitrogen deposition has left soils in the Western Tatra Mountains of Slovakia highly acidic. The study reveals that the increased nitrogen load in the region triggers the release of soluble iron into alpine grassland soils. This iron release is indicative of extreme soil acidification, comparable to conditions seen in soils exposed to acid mine drainage.

"Recovery from such extreme chemical change could only occur in geologic time, which is why soil is considered a non-renewable resource," said USGS scientist Jill Baron, who helped analyze and interpret the study results.

In addition to this research, Dr. Baron has investigated the impacts of nitrogen deposition in Rocky Mountain National Park for 26 years. "The Rocky Mountains and the Tatra Mountains represent the two ends of the atmospheric deposition effects trajectory," Dr. Baron said. "The effects of nitrogen deposition

in Rocky Mountain National Park are just beginning to be observed, allowing resource managers the opportunity to help the region recover if deposition is reduced. In the Tatra Mountains National Park, however, soils are far beyond natural recovery in human time frames."

Much of the eastern U.S. and Northern Europe fall in the middle of the effects spectrum, she added.

Rocky Mountain and Tatra National Parks are sister parks, with scientists and managers beginning to cooperate in studies to understand both. Dr. Baron's work in Rocky Mountain National Park led to the establishment of a nitrogen threshold for the park in 2006, the first time the nation has established a critical load of a pollutant for any park environment. An agreement in 2007 between the Environmental Protection Agency, National Park Service, and Colorado Department of Health and Environment enabled the agencies to set target loads for reducing nitrogen emissions by 2012 to improve ecological conditions.

Journal reference:

1. Bowman et al. **Negative impact of nitrogen deposition on soil buffering capacity**. *Nature Geoscience*, 2008; 1 (11): 767 DOI: 10.1038/ngeo339

Adapted from materials provided by United States Geological Survey.

http://www.sciencedaily.com/releases/2008/11/081117153158.htm

Two Antidepressants Taken During Pregnancy Linked To Heart Anomalies In Babies

ScienceDaily (Nov. 26, 2008) — Women who took the antidepressant fluoxetine during the first three months of pregnancy gave birth to four times as many babies with heart problems as women who did not and the levels were three times higher in women taking paroxetine.

Although some of the conditions were serious, others were not severe and resolved themselves without the need for medical intervention, according to a three-country study in the November issue of the British Journal of Clinical Pharmacology.

Researchers have advised women taking the drugs to continue unless they are advised to stop by their doctor or consultant. But they are being urged to give up smoking, as the study also found that more than ten cigarettes a day was associated with a five-fold increase in babies with major heart problems.

The team has also suggested that women on fluoxetine should be given a foetal echocardiogram in their second trimester to diagnose possible heart anomalies.

International researchers from Israel, Italy and Germany followed the pregnancies of 2,191 women - 410 who had taken paroxetine during pregnancy, 314 who had taken fluoxetine and 1,467 controls who hadn't taken either of the drugs.

"After we excluded genetic and cytogenic anomalies, we found a higher rate of major heart anomalies in the women who had been taking the antidepressants" says lead author Professor Asher Ornoy from the Israeli Teratology Information Service in Jerusalem, Israel.

"Further analysis showed a strong association between major heart anomalies and taking fluoxetine in the first trimester. Women who smoked more than 10 cigarettes a day also had more babies with heart anomalies."

Women taking paroxetine or smoking less than ten cigarettes a day also faced elevated risks, but not to the same extent.

The women had all contacted either the Israeli Teratology Information Service in Jerusalem, Israel, the Servizio di Informazione Teratologica in Padua, Italy, or the Pharmakovigilanz-und Beratungszentrum fur Embryonaltoxikologie in Berlin, Germany.

All three belong to the European Network of Teratology Information Services, which comprises organisations that investigate, and provide counselling on, environmental exposure during pregnancy.

The women in the control group had contacted the services because of concerns about exposure to substances that are not known to cause birth defects and the women in the medication groups because of their use of paroxetine and fluoxetine.

When the researchers looked at the outcomes of all of the pregnancies they found that:

- The prevalence of major heart anomalies was 2.8% in the fluoxetine group, 2% in the paroxetine group and 0.6% in the control group. There was no increase in other major congenital anomalies.
- Previous pregnancy terminations were also higher in the fluoxetine and paroxetine groups than the control group (7.8%, 4.8% and 2.8%). All groups included some terminations because of diagnosed anomalies.
- Birth weights were slightly lower in the fluoxetine and paroxetine groups than the control group (3200g, 3250g and 3300g).

- Women taking fluoxetine and paroxetine were more likely to smoke than women in the control group (20.1%, 20.7% and 7.5%) and more likely to smoke more than ten cigarettes a day (12.3%, 14% and 4.4%).

Taking all the factors into account, the authors calculated that the overall risk posed by antidepressant use and cigarette consumption was as follows:

- Women who took fluoxetine during pregnancy were 4.47 times more likely to have a baby with a heart anomaly and women who took paroxetine were 2.66 times more likely.
- Those smoking more than ten cigarettes a day were 5.40 times more likely to have a baby with a heart anomaly and women smoking less than ten cigarettes a day were 2.75 times more likely.

“These findings clearly show a significant association between major heart anomalies and taking fluoxetine and smoking during pregnancy” says Professor Ornoy.

“There is an ongoing debate in the medical literature about the possible association between women taking one of these two drugs during pregnancy and having a baby with a heart anomaly and we are keen to see further research in this area.

“We should point out that there is no evidence of any increased risk posed by citalopram and sertraline, which belong to the same group of antidepressants.”

The authors say that it is important that women are aware of these findings, especially if they smoke. However if they are taking fluoxetine, they should speak to their family doctor or consultant and should not stop taking their medication unless advised to do so.

“It’s estimated that as many as one in seven women suffer from clinical depression during pregnancy and clinicians need to weigh up the individual risks of pregnant women taking, or not taking, drugs like fluoxetine” stresses Professor Ornoy.

“Many heart anomalies can now be treated, so it is important to bear that in mind when making a decision about whether or not to continue with one of these drugs during pregnancy. The health of the mother and the baby are both important.

“We hope that this study will provide both doctors and pregnant women on antidepressants with some of the information they need to help them make those difficult decisions.”

Journal reference:

1. Diav-Citrin et al. **Paroxetine and fluoxetine in pregnancy: a prospective, multicentre, controlled, observational study**. *British Journal of Clinical Pharmacology*, 2008; DOI: 10.1111/j.1365-2125.2008.03261.x

Adapted from materials provided by Wiley - Blackwell, via AlphaGalileo.

çhttp://www.sciencedaily.com/releases/2008/11/081124081150.htm

Controlling Bad Cholesterol: Finding May Herald Scientific Breakthrough

ScienceDaily (Nov. 26, 2008) — A study performed by the team of Dr. Nabil G. Seidah, Director of the Biochemical Neuroendocrinology Research Unit at the IRCM, shows for the very first time that the degradation by PCSK9 of the LDLR receptor, which is responsible for removing the bad cholesterol (LDL-cholesterol) from the bloodstream, may be inhibited by a third protein, annexin A2.

This major discovery co-authored by Gaétan Mayer, a postdoctoral fellow, Steve Poirier, a doctoral student, and Dr. Seidah was published on November 14 in the Journal of Biological Chemistry (JBC).

Genetic studies on humans have clearly shown that PCSK9 is a prime therapeutic target for the prevention and treatment of cardiovascular diseases. PCSK9 proprotein convertase promotes the degradation of the receptor responsible for eliminating LDL-cholesterol particles. Thus, the presence of PCSK9 leads to a surplus of bad cholesterol in the bloodstream and contributes to plaque formation, leading to blockage of blood vessels and arteries.

This phenomenon is a major risk factor that can lead to cardiovascular diseases, such as heart attack, atherosclerosis and stroke. Mutations of human genes have demonstrated that a rise in PCSK9 activity results in a major increase in LDL-cholesterol and familial hypercholesterolemia. Conversely, in people with a non-functional mutation in the gene coding for PCSK9, a decrease in its activity brings down the LDL-cholesterol concentration levels in the bloodstream and diminishes by up to 88% the risks of developing cardiovascular diseases.

"By performing a series of biochemical experiments, we discovered that annexin A2 binds strongly to PCSK9 and inhibits its function," remarks Gaétan Mayer, the article's first author.

This discovery should pave the way toward the development of a new drug that would lower blood cholesterol to recommended levels. Currently, cholesterol lowering drugs known as "statins" are used by more than 25 million people worldwide. Statins decrease cholesterol synthesis and increase the number of LDL-receptors, thus efficiently decreasing plasma cholesterol levels; however, they also increase the amount of PCSK9, which degrades those receptors, thus reducing the effect of statins.

A drug that would block PCSK9 could either be used alone or jointly with statins and would be highly beneficial to patients in whom statins do not work or are unable to take this drug.

This work was supported by the Canadian Institutes of Health Research (CIHR) and by a Canada Research Chair.

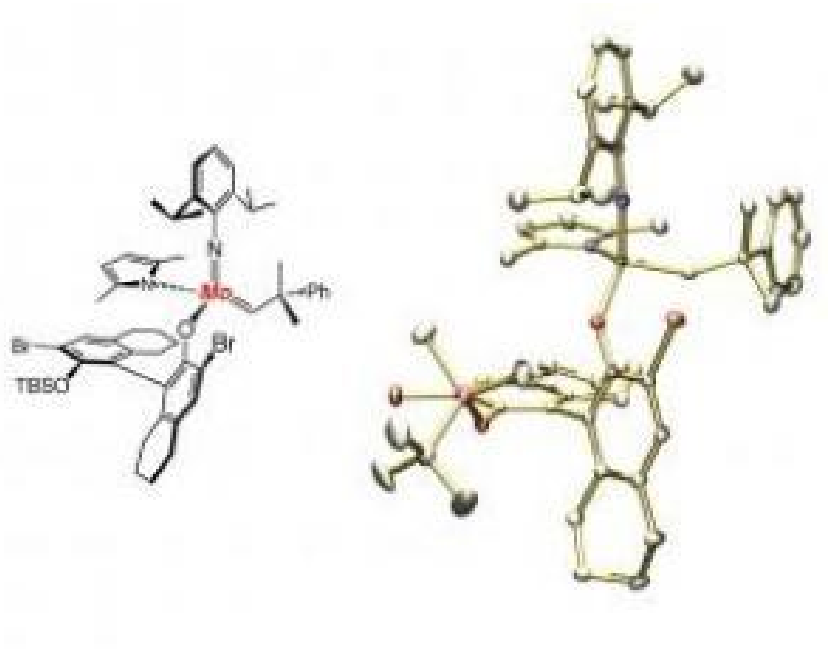
Journal reference:

1. Mayer G, Poirier S, and Seidah NG. **Annexin A2 Is a C-terminal PCSK9-binding Protein That Regulates Endogenous Low Density Lipoprotein Receptor Levels**. *Journal of Biological Chemistry*, 2008; 283 (46): 31791 DOI: 10.1074/jbc.M805971200

Adapted from materials provided by Institut de recherches cliniques de Montreal.

http://www.sciencedaily.com/releases/2008/11/081124130953.htm

New Catalysts Promise Faster, Cleaner And More Efficient Research Platform



A team of researchers led by Boston College Prof. Amir H. Hoveyda and MIT Prof. and Nobel laureate Richard R. Schrock have discovered a new class of catalysts for the powerful olefin metathesis reaction, illustrated here, which transforms simple molecules into complex ones. The process is critical to new research in medicine, biology and materials science. (Credit: Illustration courtesy of Nature)

ScienceDaily (Nov. 26, 2008) — A new class of exceptionally effective catalysts that promote the powerful olefin metathesis reaction has been discovered by a team of Boston College and MIT scientists, opening up a vast new scientific platform to researchers in medicine, biology and materials.

The new catalysts can be easily prepared and possess unique features never before utilized by chemists, according to findings from a team led by Boston College Prof. Amir H. Hoveyda and MIT Prof. and Nobel laureate Richard Schrock, who shared the 2005 prize in Chemistry for early discoveries of catalytic olefin metathesis. The team's findings are reported in the current online edition of the journal Nature.

"In order for chemists to gain access to molecules that can enhance the quality of human life, we need reliable, highly efficient, selective and environmentally friendly chemical reactions," said Hoveyda, the Joseph T. and Patricia Vanderslice Millennium Professor and Chemistry Department chairman at BC. "Discovering catalysts that promote these transformations is one of the great challenges of modern chemistry."

Catalytic olefin metathesis transforms simple molecules into complex ones. But a chief challenge has been developing catalysts to this organic chemical reaction that are practical and offer exceptional selectivity for a significantly broader range of reactions.

Schrock, the Frederick G. Keyes Professor of Chemistry at MIT, said the unprecedented level of control the new class of catalysts provides will advance research across multiple fields.

"We expect this highly flexible palette of catalysts to be useful for a wide variety of catalytic reactions that are catalyzed by a high oxidation state alkylidene species, and to be able to design catalytic metathesis reactions with a control that has rarely if ever been observed before," Schrock said.

Highly versatile molecules that contain carbon–carbon double bonds, alkenes, or olefins, are ubiquitous in medicinally relevant and biologically active molecules. Tetrahedral in constitution, the new catalysts are the first to exploit a metal with four different ligands – molecules that bond to the central metal – which in turn dictate the catalysts' high level of reactivity and selectivity.

"For the first time these catalysts take advantage of the configuration of a metal with four different ligands attached to it, an untested situation that has long been predicted to be a strong director of asymmetric catalytic reactions that take place at the metal center," said Schrock.

Unique to this catalyst is the metal molybdenum as a source of chirality, also known as "handedness." Like the mirror image of left hand and right, molecules can come in two variations, one a reflection of the other. But these two variations often function in entirely different ways – sometimes one proves harmful, while the other is benign.

With molybdenum at its core, the new catalyst gives chemists a simple, unique and efficient way to produce one form of the molecule or the other in order to yield the desired reactions.

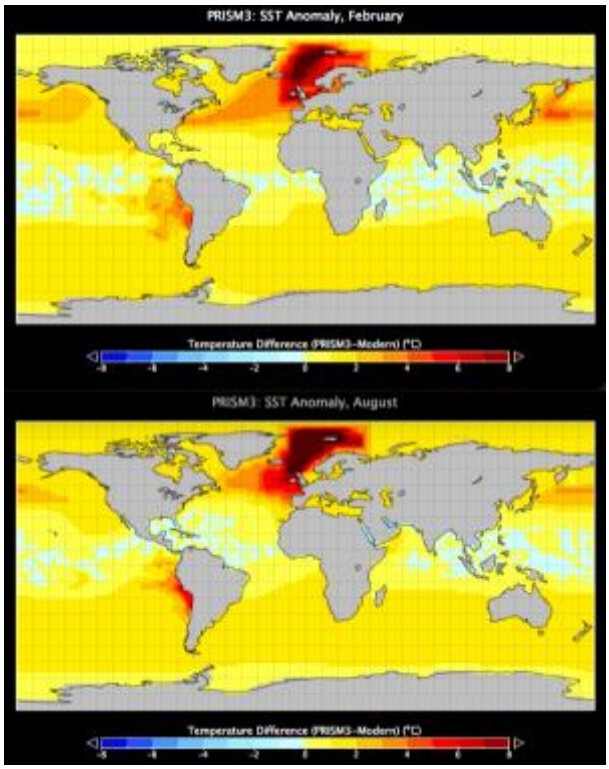
The new catalysts are also structurally flexible, a relatively unconventional attribute that lends them exceptional chemical activity. The discovery of catalysts with stable configurations and flexible structures is expected to allow chemists to design, prepare and develop new chemical transformations that furnish unprecedented levels of reactivity and selectivity, according to the co-authors, which include BC researchers Steven J. Malcolmson, Simon J. Meek, and Elizabeth S. Sattely.

The findings mark the latest discovery from the long-standing collaboration between the Hoveyda and Schrock labs, work that has been supported by more than $3.5 million in funding from the National Institutes of Health for nearly a decade.

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

http://www.sciencedaily.com/releases/2008/11/081116142336.htm

Getting Warmer? Prehistoric Climate Can Help Forecast Future Changes



Pliocene vs. modern sea surface temperature anomaly. (Credit: Image courtesy of United States Geological Survey)

ScienceDaily (Nov. 25, 2008) — The first comprehensive reconstruction of an extreme warm period shows the sensitivity of the climate system to changes in carbon dioxide (CO_2) levels as well as the strong influence of ocean temperatures, heat transport from equatorial regions, and greenhouse gases on Earth's temperature.

New data allow for more accurate predictions of future climate and improved understanding of today's warming. Past warm periods provide real data on climate change and are natural laboratories for understanding the global climate system.

Scientists examined fossils from 3.3 to 3.0 million years ago, known as the mid-Pliocene warm period. Research was conducted by the Pliocene Research, Interpretation and Synoptic Mapping (PRISM) group, led by the U.S. Geological Survey.

"PRISM's research provides objective, unbiased data for climate modelers to better understand the environment in which we live and for decision makers to make informed adaptation and mitigation strategies that yield the greatest benefits to society and the environment," said Senior Advisor to USGS Global Change Programs Thomas Armstrong. "This is the most comprehensive global reconstruction for any warm period and emphasizes the importance of examining the past state of Earth's climate system to understand the future."

The mid-Pliocene experienced the most extreme warming over the past 3.3 million years. Global average temperatures were 2.5°C (4.5°F) greater than today and within the range projected for the 21st century by the Intergovernmental Panel on Climate Change.

"Exploring the mid-Pliocene will further understanding on the role of ocean circulation in a warming world, the impacts of altered storm tracks, polar versus tropical sensitivity, and the impacts of altered atmospheric CO_2 and oceanic energy transport systems," said USGS scientist Harry Dowsett, also lead scientist for PRISM. "We used fossils dated to the mid-Pliocene to reconstruct sea surface and deepwater ocean temperatures, and will continue research by studying specific geographic areas, vegetation, sea ice extent and other environmental characteristics during the Pliocene."

Since CO_2 levels during the mid-Pliocene were only slightly higher than today's levels, PRISM research suggests that a slight increase in our current CO_2 level could have a large impact on temperature change. Research also shows warming of as much as 18°C, bringing temperatures from -2°C to 16°C, in the high latitudes of the North Atlantic and Arctic Oceans during the mid-Pliocene. Warming in the Pacific, similar to a present day El Niño, was a characteristic of the mid-Pliocene. Global sea surface and deep water temperatures were found to be warmer than those of today, impacting the ocean's circulation system and climate. Data suggest the likely cause of mid-Pliocene warmth was a combination of several factors, including increased heat transport from equatorial regions to the poles and increased greenhouse gases.

PRISM has been chosen by the Pliocene Model Intercomparison Project of Paleoclimate Modelling Intercomparison Project Phase II as the dataset against which to run and test the performance of climate models for the Pliocene.

PRISM's primary collaborators are Columbia University, Duke University, the University of Leeds and the British Antarctic Survey.

For more information and to view the compiled data, visit http://geology.er.usgs.gov/eespteam/prism/index.html.

Adapted from materials provided by United States Geological Survey.

http://www.sciencedaily.com/releases/2008/11/081124141055.htm

Chinese Forest Project Could Reduce Number Of Environmental Disasters

ScienceDaily (Nov. 25, 2008) — A study published in Journal of the American Water Resources Association states that the "Green Great Wall," a forest shelterbelt project in northern China running nearly parallel to the Great Wall, is likely to improve climatic and hydrological conditions in the area when completed.

The project, which relies on afforestation (a process that changes land without dense tree cover into forest), could lead to an increase in precipitation by up to 20 percent and decrease the temperature in the area. The findings could have important implications for similar projects throughout the world.

"Many regions in the world are facing climate-related environmental disasters such as persistent drought, dust storms and water shortage," says Dr. Yongqiang Liu, lead author of the study. "Furthermore, it is very likely that disasters will become more severe in the future due to projected climate change in response to greenhouse effects."

Many climate models predict an increased occurrence of environmental disasters in the future because of expected hotter and drier conditions. A recent study, for example, projects that the dust bowls in the 1930s could return to the southwestern U.S. as a result of climate change. Forests have the ability to regulate regional climate. Afforestation, therefore, may be a useful approach to mitigate the effects of the environmental disasters and climate change.

The study used a regional climate model to simulate the potential of improving regional hydroclimate conditions resulting from the afforestation project. The results show that, in addition to precipitation and temperature changes, the project also will improve relative humidity, soil moisture and reduce prevailing winds and air temperature.

Forests play an important role in mitigating the effects of greenhouse gases. While their effect on the carbon cycle has received the most attention from environmental conservation groups, this study provides evidence for the importance of water and heat exchange. The effect of these processes on temperature and precipitation could be equally important in offsetting greenhouse effects.

Adapted from materials provided by Wiley-Blackwell, via EurekAlert!, a service of AAAS.

http://www.sciencedaily.com/releases/2008/11/081124165134.htm

Overuse Of Narcotics And Barbiturates May Make Migraine Attacks More Frequent

Certain commonly-prescribed medications may have the unintended consequence of increasing the frequency of migraine attacks. (Credit: iStockphoto)

ScienceDaily (Nov. 25, 2008) — A team of researchers led by investigators at the Albert Einstein College of Medicine of Yeshiva University has determined that certain commonly-prescribed medications may have the unintended consequence of increasing the frequency of migraine attacks. This important finding could alter the way doctors prescribe migraine medicines.

In a recent article published in the journal Headache, the Einstein-led study of more than 8,000 migraine sufferers nationwide, found that the use of medications containing barbiturates or narcotics — which relieve migraine short-term — may make migraine worse if these medications are overused. Treatment with these classes of medicines was associated with an increased risk of transformed migraine (TM) headaches, a form of migraine characterized by 15 or more days of headache per month.

The finding is significant because 35 million Americans suffer from migraine headaches and an additional 5 million suffer from transformed migraine. Migraine symptoms include throbbing head pain, most commonly on one side. The pain can worsen with physical activity. Attacks most commonly last from 4 to 72 hours, but may persist for longer. More severe attacks are overwhelming and hinder daily activities. In addition to personal suffering, lost labor costs in the U.S. due to migraine are in excess of $13 billion per year according to an earlier study from the Einstein team.

Principal investigator and senior author of the study, Richard Lipton, M.D. noted, "This confirms the longstanding feeling among many doctors that certain medications used to treat migraine may increase the frequency of headaches if overused. These findings have important public health implications." Dr. Lipton is professor and vice chair of neurology at Einstein and also directs the Montefiore Headache Center.

The objective of the study was to assess the role of specific classes of acute medications in the development of transformed migraine (TM) in people with episodic migraine (EM). In the study, 8,219

people with episodic migraine were followed for one year; 2.5% developed chronic migraine (TM) over the course of the year. The use of commonly prescribed medications, particularly narcotics (such as acetaminophen with codeine or Percocet), or barbiturates (such as Fiorinal, Fioricet and Esgic) were associated with a dose-dependent increased risk of new onset of chronic migraine (TM). That means episodic or occasional migraine sufferers who took narcotics or barbiturates more frequently were more likely to develop transformed migraine.

Conversely, for those study participants that suffered less than 10 headaches per month (EM sufferers), a class of drugs called triptans — known to relieve migraine — did not increase the risk of transformed migraine. NSAIDs (ibuprofen and naproxen sodium, for example) were protective against transition to TM for those suffering less than 10 headache days per month, but were associated with increased risk of transition to TM for those with high levels of monthly headache days.

"Proper treatment with the appropriate medicines can bring relief to most people with migraine," said Dr. Lipton. "Primary care practitioners and patients should try to avoid the use of narcotic or barbiturate medications that may exacerbate migraine; if these drugs are necessary, patients should be advised of the risks of medication overuse and dose limits should be applied."

The American Migraine Prevalence and Prevention Study is funded through a research grant to the National Headache Foundation from Ortho-McNeil Neurologics, Inc., Titusville, New Jersey. The study won the 2008 Harold Wolff Award for excellence in headache research, a prize given by the American Headache Society.

Adapted from materials provided by Albert Einstein College of Medicine.

http://www.sciencedaily.com/releases/2008/11/081119092941.htm

Pinning Down The Fleeting Internet: Web Crawler Archives Historical Data For Easy Searching

Zoetrope shows the increase in pre-order sales of the last Harry Potter book in May 2007. (Credit: University of Washington)

ScienceDaily (Nov. 25, 2008) — The Internet contains vast amounts of information, much of it unorganized. But what you see online at any given moment is just a snapshot of the Web as a whole -- many pages change rapidly or disappear completely, and the old data gets lost forever.

"Your browser is really just a window into the Web as it exists today," said Eytan Adar, University of Washington computer science and engineering doctoral student. "When you search for something online, you're only getting today's results."

Now, Adar and his colleagues at UW and Adobe Systems Inc. are grabbing hold of the fleeting Web and storing historical sites that users can easily search using an intuitive application called Zoetrope.

"There are so many ways of finding and manipulating and visualizing data on what we call 'the today Web' that it's kind of amazing that there's no way to do anything similar to the ephemeral Web," said Dan Weld, a UW computer science and engineering professor who also worked on the application. One service, the Internet Archive, has been capturing old versions of Web sites for years, but the records for the stored sites are inconsistent, Weld said. More importantly, there's no easy way to search the archive.

With Zoetrope, anyone will be able to use easy keyword searches to find archived Web information or look for patterns over time. The research was presented Oct. 22 by Mira Dontcheva, the system's co-creator and a recently graduated UW computer science and engineering doctoral student now at Adobe Systems Inc., at the ACM Symposium on User Interface Software and Technology in Monterey, Calif.

There are a variety of ways people might want to search the historical Internet. For example, to find a history of traffic patterns in the Seattle area, you'd have to sort through lengthy PDF files from the state Department of Transportation, Adar said. With Zoetrope, you could easily view past versions of any traffic Web site, and getting more specific, search for drive-times on Interstate 90 at 6 p.m. on rainy Fridays. Zoetrope can also capture and help analyze information that might otherwise not be available anywhere.

Sports fanatics could use the program to check historical rankings of their favorite teams or players, information that currently may not be easy to find. The application can do more than just simple keyword searches, Adar said. It also can be used to analyze historical data or link information from different sites. For example, Adar wondered whether air pollution conditions could affect the performance of Olympic athletes, so he used Zoetrope to find daily records of pollution levels in Beijing and the number of world records broken in the 2008 Olympics on each day, and looked to see whether fewer records were broken on days with high pollution levels.

"Zoetrope is aimed at the casual researcher," Weld said. "It's really for anyone who has a question."

Zoetrope could eventually be built in to any other Web browser, Adar said. If you just want to browse the past versions of a given site, you drag a slider backwards to see older and older versions. Alternatively, you can draw a box around just one part of the site, if you're interested in, say, the lead story on CNN.com but don't care about the rest of the page. These boxes can be filtered by keyword searches or date, so you could look only for lead stories featuring Hollywood actors or stories that ran on Fridays.

Users can view historical data by moving the slider, but more sophisticated analyses are available as well. If you're looking at something numerical, such as gas prices over time, the program can draw graphs for you. Or you can pull out images from specific times, such as traffic pictures, and compare them all side by side. These kinds of visualizations can be further organized in a timeline or by clustering -- Zoetrope can make an image comparing traffic patterns on sunny days versus cloudy days, for example.

Right now, Zoetrope saves a new version of approximately 1,000 different sites every hour, Adar said. It's been running for four months, so records go no further than that, but Adar hopes to eventually incorporate information from the Internet Archive's nearly 14 years of records into the program.

He wants to figure out how to scale the program up from 1,000 Web pages to all pages in existence, and has run studies to figure how often each page would need to be captured. For example, a traffic site or stock-watching page would need versions saved much more often than every hour, but there are many unchanging pages that could be archived less frequently. Eventually, Zoetrope could automatically figure out how often to capture a page based on how frequently it changes, Adar said.

"This is really a new way to think about storing information on the Web," he said.

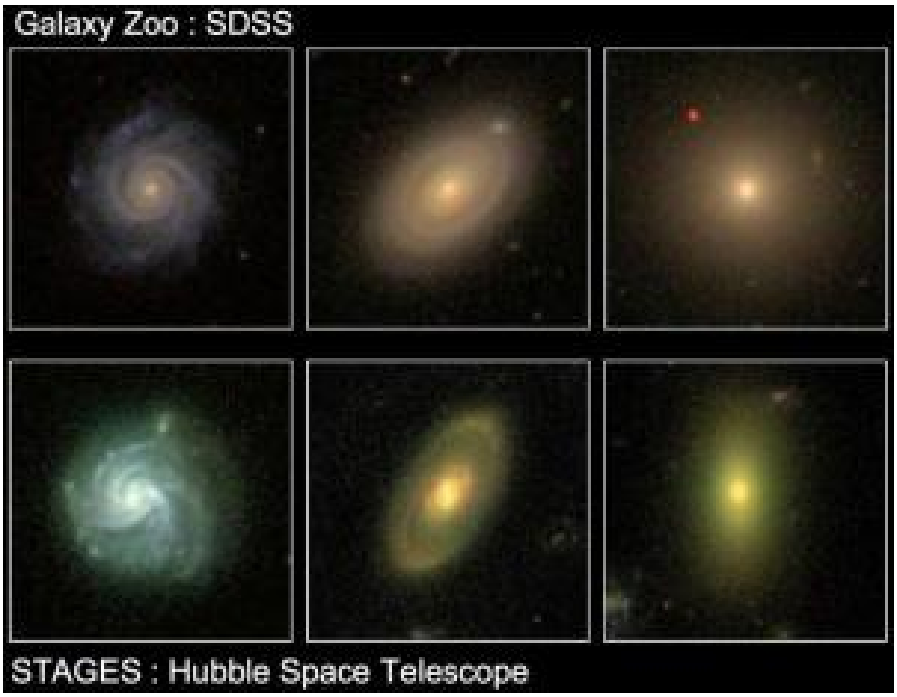
The researchers hope to release Zoetrope free, and say it may be available as early as next summer.

The National Science Foundation, the Achievement Rewards for College Scientists Foundation and the Washington Research Foundation provided funding for Zoetrope. James Fogarty, UW computer science and engineering assistant professor, also worked on the application.

Adapted from materials provided by University of Washington.

http://www.sciencedaily.com/releases/2008/11/081117153236.htm

Strangulation Of Spiral Galaxies: 'Missing Link' Discovered



These images of three galaxies from the Galaxy Zoo (top) and STAGES surveys (bottom) show examples of how the newly discovered population of red spiral galaxies on the outskirts of crowded regions in the Universe may be a missing link in our understanding of galaxy evolution. At left, both surveys find examples of normal spiral galaxies displaying all the hallmarks of youth: blue in colour, they are disk-like in structure. The obvious spiral arms host knotty structures where large numbers of hot young stars are being born. On the right are examples of typical rounded balls of stars known as elliptical galaxies. The reddish colour indicates that their stars are mostly old. With no gas left to use as fuel to form any more, they are old, dead and red In the centre are examples of the new "red spiral" galaxy found in large numbers by both the STAGES and Galaxy Zoo collaborations. While still disk-like and recognizably spiral in shape, their spiral arms are smoother. Furthermore, their colour is as red as the ellipticals. Astronomers from both teams believe these red spirals are objects in transition, where star formation has been shut off by interactions with the environment. (Credit: STAGES image credit: Marco Barden, Christian Wolf, Meghan Gray, the STAGES survey; STAGES image from Hubble Space Telescope, colour from COMBO-17 survey; Galaxy Zoo image credit: Sloan Digital Sky Survey)

ScienceDaily (Nov. 25, 2008) — Astronomers in two UK-led international collaborations have separately uncovered a type of galaxy that represents a missing link in our understanding of galaxy evolution.

Galaxy Zoo, which uses volunteers from the general public to classify galaxies, and the Space Telescope A901/902 Galaxy Evolution Survey (STAGES) projects have used their vast datasets to disentangle the roles of "nature" and "nurture" in changing galaxies from one variety to another.

Both studies have identified a population of unusual red spiral galaxies that are setting out on the road to retirement after a lifetime of forming stars. Crucially, nature and nurture appear to play a role in this transformation: both the mass of a galaxy as well as its local environment are important in determining when and how quickly its star formation is shut down. The scientists' work appears together in a forthcoming edition of Monthly Notices of the Royal Astronomical Society.

Astronomers place most normal galaxies into two camps according to their visual appearance: either disk-like systems like our own Milky Way, or round, rugby-ball shaped collections of stars known as

ellipticals. In most cases, a galaxy's shape matches its colour: spiral galaxies appear blue because they are still vigorously forming hot young stars. Elliptical galaxies, on the other hand, are mostly old, dead, and red, and tend to cluster together in crowded regions of space.

The Galaxy Zoo team examined the connection between the shapes and colours of over one million galaxies using images from the largest ever survey of the local Universe, the Sloan Digital Sky Survey and the help of hundreds of thousands of volunteers from the general public. A key ingredient to their success was reliably classifying the appearance of galaxies by actually looking at them, rather than relying on error-prone computer measurements.

Surprisingly, they find that many of the red galaxies in crowded regions are actually spiral galaxies, bucking the trend for red galaxies to be elliptical in shape. These red spiral galaxies may be just the smoking gun astronomers have been looking for.

Dr. Steven Bamford, an STFC postdoctoral researcher at the University of Nottingham, led the Galaxy Zoo study. "In order to have spiral arms, they must have been normal, blue, spiral galaxies up until fairly recently. But for some reason their star formation has been stopped, and they have turned red. Whatever caused them to stop forming stars can't have been particularly violent, or it would have destroyed the delicate spiral pattern." The Galaxy Zoo team concludes that a more subtle process must be at work, one that kills off star formation but does not disrupt the overall shape of the galaxy.

While Galaxy Zoo looked at the gross properties of millions of galaxies across a large chunk of sky, the STAGES project took a complementary approach by examining in detail just the sort of neighbourhoods where these transformations are expected to occur. Dr. Christian Wolf, an STFC Advanced Research Fellow at the University of Oxford, trained the Hubble Space Telescope on a region of space crowded with galaxies known as the A901/902 supercluster. Like the Galaxy Zoo team, Dr. Wolf also uncovered a surprisingly large population of spiral galaxies in the supercluster that are red in colour.

So has the star formation in these red spiral galaxies been completely killed off? The answer is no: despite their colour, the red spirals are actually hiding star formation behind a shroud of dust. Invisible to our (or Hubble's) eye, this star formation is only detectable in the infrared part of the spectrum i.e. radiation emitted from the galaxies at wavelengths longer than visible light.

Dr. Wolf remarks, "For the STAGES galaxies, the Spitzer Space Telescope provided us with additional images at infrared wavelengths. With them, we were able to go further and peer through the dust to find the missing piece of the puzzle". Within the supercluster, Dr. Wolf discovered that the red spirals were hiding low levels of hidden star formation, despite their otherwise lifeless appearance in visible light.

Putting the observations from both projects together, the picture that emerges is a gentle one: the star formation in blue spiral galaxies is gradually shut off and hidden behind dust, before petering out to form smooth "lenticular" (lens-shaped) red galaxies with no trace of spiral arms. To go further and transform the galaxy into an elliptical would require more violent mechanisms, such as the wholesale collision of galaxies.

Location is key: the red spirals are found primarily on the outskirts of crowded regions of space where galaxies cluster together. As a blue galaxy is drawn in by gravity from the rural regions to the suburbs, an interaction with its environment causes a slow-down in star formation. The closer in a galaxy is, the more it is affected.

But if environment decides where the process occurs, the mass of the galaxy decides how quickly it takes place. Because both STAGES and Galaxy Zoo looked at such large numbers of galaxies, they were able to further subdivide them according to how much they weighed. Sure enough, both groups find that galaxy mass is also important. Professor Bob Nichol of Portsmouth University, a Galaxy Zoo team

member, explains: "Just as a heavyweight fighter can withstand a blow that would bring a normal person to his knees; a big galaxy is more resistant to being messed around by its local environment. Therefore, the red spirals that we see tend to be the larger galaxies - presumably because the smaller ones are transformed more quickly."

Chris Lintott, Galaxy Zoo team leader at the University of Oxford, pays tribute to the role of the general public in the Galaxy Zoo research. "These results are possible thanks to a major scientific contribution from our many volunteer armchair astronomers. No group of professionals could have classified this many galaxies alone."

Meghan Gray, STFC Advanced Fellow at the University of Nottingham and leader of the STAGES survey, comments on the agreement of the two projects on the role of environment and mass: "Our two projects have approached the problem from very different directions, and it is gratifying to see that we each provide independent pieces of the puzzle pointing to the same conclusion."

The next step for both teams is to find out exactly what shuts off the star formation, by looking inside the galaxies themselves. One suspect behind the slow demise of galaxies is a process known as strangulation, in which a galaxy's fuel supply is stripped away as it encounters the crowd. Starved of the raw material needed to form new stars, it will slowly change colour from blue to red as its existing stars age.

Adapted from materials provided by Royal Astronomical Society (RAS).

http://www.sciencedaily.com/releases/2008/11/081124194936.htm

Global Warming Predictions Are Overestimated, Suggests Study On Black Carbon

Savanna fires occur almost every year in northern Australia, leaving behind black carbon that remains in soil for thousands of years. (Credit: Grant Stone, QCCCE)

ScienceDaily (Nov. 25, 2008) — A detailed analysis of black carbon -- the residue of burned organic matter -- in computer climate models suggests that those models may be overestimating global warming predictions.

A new Cornell study, published online in Nature Geosciences, quantified the amount of black carbon in Australian soils and found that there was far more than expected, said Johannes Lehmann, the paper's lead author and a Cornell professor of biogeochemistry. The survey was the largest of black carbon ever published.

As a result of global warming, soils are expected to release more carbon dioxide, the major greenhouse gas, into the atmosphere, which, in turn, creates more warming. Climate models try to incorporate these increases of carbon dioxide from soils as the planet warms, but results vary greatly when realistic estimates of black carbon in soils are included in the predictions, the study found.

Soils include many forms of carbon, including organic carbon from leaf litter and vegetation and black carbon from the burning of organic matter. It takes a few years for organic carbon to decompose, as microbes eat it and convert it to carbon dioxide. But black carbon can take 1,000-2,000 years, on average, to convert to carbon dioxide.

By entering realistic estimates of stocks of black carbon in soil from two Australian savannas into a computer model that calculates carbon dioxide release from soil, the researchers found that carbon dioxide emissions from soils were reduced by about 20 percent over 100 years, as compared with simulations that did not take black carbon's long shelf life into account.

The findings are significant because soils are by far the world's largest source of carbon dioxide, producing 10 times more carbon dioxide each year than all the carbon dioxide emissions from human activities combined. Small changes in how carbon emissions from soils are estimated, therefore, can have a large impact.

"We know from measurements that climate change today is worse than people have predicted," said Lehmann. "But this particular aspect, black carbon's stability in soil, if incorporated in climate models, would actually decrease climate predictions."

The study quantified the amount of black carbon in 452 Australian soils across two savannas. Black carbon content varied widely, between zero and more than 80 percent, in soils across Australia.

"It's a mistake to look at soil as one blob of carbon," said Lehmann. "Rather, it has different chemical components with different characteristics. In this way, soil will interact differently to warming based on what's in it."

Adapted from materials provided by Cornell University.

http://www.sciencedaily.com/releases/2008/11/081119120155.htm

Forests May Play Overlooked Role In Regulating Climate

Forests may influence the Earth's climate in important ways that have not previously been recognized. (Credit: Copyright Michele Hogan)

ScienceDaily (Nov. 25, 2008) — Scientists led by a team at the University of New Hampshire show that forests may influence the Earth's climate in important ways that have not previously been recognized.

When sunlight reaches the Earth's surface it can either be absorbed and converted to heat or reflected back to outer space, where it doesn't influence the Earth's temperature. Scott Ollinger, a professor at the UNH Institute for the Study of Earth, Oceans, and Space and the department of Natural Resources and the Environment, and colleagues have discovered that, of the total amount of sunlight that falls on forests, the fraction that gets reflected back to space is directly related to levels of nitrogen in their foliage.

While scientists have long known that nitrogen-rich foliage is more efficient at pulling carbon dioxide out of the atmosphere, this new discovery suggests that nitrogen plays an important additional role in the Earth's climate system that has never before been considered. Specifically, trees with high levels of foliar nitrogen have a two-fold effect on climate by simultaneously absorbing more CO2 and reflecting more solar radiation than their low-nitrogen counterparts.

Ollinger and UNH colleagues Andrew Richardson, Mary Martin, Dave Hollinger, Steve Frolking, and others, stumbled upon the discovery while poring over six years worth of data they collected from research sites across North America. The study involved a novel combination of NASA satellite- and aircraft-based instruments, along with meteorological towers from the AmeriFlux network and leaf-level measurements to analyze various aspects of forest canopies. When Ollinger noticed that the overall reflectivity of forest canopies (also known as albedo) rose and fell in conjunction with leaf nitrogen, he had a eureka moment.

"Bits and pieces of evidence for this have been around for years but nobody put them together before because it's a question we hadn't even thought to ask," Ollinger says. "Scientists have long been aware of the importance of albedo, but no one suspected that the albedo of forests might be influenced by nitrogen. And because most of the effect is in the infra-red region of the sun's spectrum, beyond that which human eyes can detect, the pattern isn't immediately obvious."

The newly discovered link between foliar nitrogen and canopy albedo adds an interesting new twist to the understanding of the climate system and raises intriguing questions about the underlying nature of ecosystem–climate interactions.

Changes in climate, air pollution, land use, and species composition can all influence nitrogen levels in foliage, and all of these may be part of a climate feedback mechanism that climate models have not yet examined. Future research planned by the team will involve examining the underlying causes for why the relationship exists and working with climate modelers to determine how the nitrogen-albedo mechanism will influence predictions of climate change.

This research was published the week of November 17 in the Proceedings of the National Academy of Sciences.

Adapted from materials provided by University of New Hampshire, via EurekAlert!, a service of AAAS.

http://www.sciencedaily.com/releases/2008/11/081117192811.htm

Transporting Broiler Chickens Could Spread Antibiotic-resistant Organisms

ScienceDaily (Nov. 25, 2008) — Researchers at the Johns Hopkins Bloomberg School of Public Health have found evidence of a novel pathway for potential human exposure to antibiotic-resistant bacteria from intensively raised poultry — driving behind the trucks transporting broiler chickens from farm to slaughterhouse.

A study by the Hopkins researchers found increased levels of pathogenic bacteria, both susceptible and drug-resistant, on surfaces and in the air inside cars traveling behind trucks that carry broiler chickens. The study is the first to look at exposure to antibiotic-resistant bacteria from the transportation of poultry. The findings are published in the first issue of the Journal of Infection and Public Health.

Typically, broiler chickens are transported in open crates on the back of flatbed trucks with no effective barrier to prevent release of pathogens into the environment. Previous studies have reported that these crates become contaminated with feces and bacteria.

The new study was conducted on the Delmarva Peninsula—a coastal region shared by Maryland, Delaware and Virginia, which has one of the highest densities of broiler chickens per acre in the United States. Ana M. Rule, PhD, a research associate in the Bloomberg School's Department of Environmental Health Sciences, along with professor Ellen K. Silbergeld, PhD, and Sean L. Evans collected air and surface samples from cars driving two to three car lengths behind the poultry trucks for a distance of 17 miles.

The cars were driven with both air conditioners and fans turned off and with the windows fully opened. Air samples collected inside the cars, showed increased concentrations of bacteria (including antibiotic-resistant strains) that could be inhaled. The same bacteria were also found deposited on a soda can inside the car and on the outside door handle, where they could potentially be touched."We were expecting to find some antibiotic-resistant organisms since it's pretty clear that the transportation conditions for these chickens are not closed or contained," Rule said. "Our study shows that there is a real exposure potential, especially during the summer months, when people are driving with the windows down; the summer is also a time of very heavy traffic in Delmarva by vacationers driving to the shore resorts."

The strains of bacteria collected were found to be resistant to three antimicrobial drugs widely used to treat bacterial infections in people. These drugs are approved by the U.S. Food and Drug Administration for use as feed additives for broiler poultry. The study findings were also consistent with other studies on antibiotic resistance in poultry flocks and poultry products.According to the authors, the findings support the need for further exposure characterization, and attention to improving methods of biosecurity in poultry production, especially for regions of high density farming such as the Delmarva Peninsula.

Support for the study came via the Johns Hopkins Center for a Livable Future's Innovation Grant Program.

Journal reference:

1. Ana M. Rule, Sean L. Evans, Ellen K. Silbergeld. **Food animal transport: A potential source of community exposures to health hazards from industrial farming (CAFOs)**. *Journal of Infection and Public Health*, 2008; 1 (1): 33 DOI: 10.1016/j.jiph.2008.08.001

Adapted from materials provided by Johns Hopkins University Bloomberg School of Public Health.

http://www.sciencedaily.com/releases/2008/11/081124130946.htm

Robots Created That Develop And Display Emotions And Become Attached To Certain People

Dr Lola Cañamero is giving one of several new robots some playtime. (Credit: Image courtesy of University of Hertfordshire)

ScienceDaily (Nov. 25, 2008) — Robots that develop and display emotions as they interact with humans, and become attached to them, will be exhibited at the ICT'08 event organized by the European Commission in Lyon next week.

Dr Lola Cañamero, of the University of Hertfordshire's School of Computer Science, is co-ordinating a European project which is developing robots that are capable of growing emotionally, responding to humans and of expressing their own emotional states as they interact with people.

Prototypes of some of these robots showing mid-term project results will be exhibited at ICT 2008, Europe's leading information and communication technologies event, which will take place in Lyon from 25-27 November 2008.

The project, FEELIX GROWING (FEEL, Interact, eXpress: a Global approach to development With Interdisciplinary Grounding; funded by the Sixth Framework Programme of the European Commission, aims to develop autonomous robots which will be capable of interacting with humans in everyday environments, and will learn and develop emotionally, socially and cognitively in accordance with the needs and personalities of the individuals with which they associate.

"The aim is to develop robots that grow up and adapt to humans in everyday environments," said Dr Cañamero. "If robots are to be truly integrated in humans' everyday lives as companions or carers, they cannot be just taken off the shelf and put into a real-life setting, they need to live and grow interacting with humans, to adapt to their environment."

At ICT 2008, Dr Cañamero and the project's international team of researchers will explain and demonstrate this approach using live interactive demonstrations and videos. Live demonstrations will include a baby pet robot learning to control its stress as it explores a new environment helped by a human caregiver, several robotic heads that show facial emotional responses to humans' faces and voices, humanoid robots that learn to execute simple tasks by observing and imitating humans, and an interactive

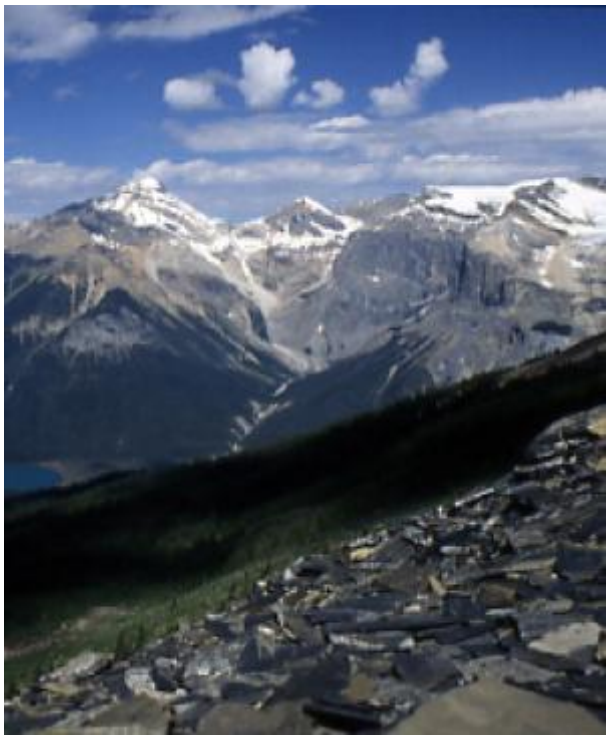
floor that responds to human touch and movement with different light and sound patterns. Videos and demonstrations will also show how non-human primates (chimpanzees) react to some of these robots.

The other players in the FEELIX GROWING project are: Centre National de la Recherche Scientifique, France; Université de Cergy Pontoise, France; Ecole Polytechnique Fédérale de Lausanne, Switzerland; University of Portsmouth, UK; Institute of Communication and Computer Systems, Greece; Entertainment Robotics, Denmark; and SAS Aldebaran Robotics, France.

Adapted from materials provided by University of Hertfordshire, via AlphaGalileo

http://www.sciencedaily.com/releases/2008/11/081120111622.htm

Deep Heat Solution To 500-million Year Fossil Mystery



The view from Walcott's quarry, the main fossil collecting site for the Burgess Shale. In the forground are discarded Burgess slabs split by a team of palaeontologts looking for fossils. (Credit: Sarah Gabbott)

ScienceDaily (Nov. 25, 2008) — Scientists from the universities of Leicester and Cambridge and from the British Geological Survey have published new research in the journal Geology this month (November) shedding new light on a 500-million year old mystery.

The 500 million year-old fossils of the Burgess Shale in Canada, discovered over a century ago, still provide one of the most remarkable insights into the dawn of animal life. The beautiful silvery fossils show the true nature of the life of that time, just after the "Cambrian explosion" of animal life.

Yet, their existence is a paradox: the fossils have been buried deep in the Earth's crust and heated to over 300°C (~600 °F), before being thrust up by tectonic forces to form a mountainous ridge in the Rockies. Usually such extreme conditions are thought to destroy fossils. But, in the Burgess Shale the most exquisite detail of soft tissues has been preserved.

Now, by careful restudy of its fossils (published in the November issue of the journal Geology) Alex Page and his colleagues Phil Wilby, Sarah Gabbott and Jan Zalasiewicz, of the universities of Cambridge and Leicester and the British Geological Survey, have solved this riddle.

They have shown that as the delicate organic tissues of these fossils were heated deep within the Earth, they became the site for mineral formation. The new minerals, forged at these tremendous depths, picked out intricate details such as gills, guts and even eyes.

Alex Page said: "This provides a whole new theory for how fossils form. The deep heating may not have cremated them, but it certainly left them stone baked."

Once an ancient sea bed, the Burgess shale were formed shortly after life suddenly became more complex and diverse – the so-called Cambrian explosion – and are of immense scientific interest.

Normally, only hard parts of ancient animals became fossilised; the bones, teeth or shells. Soft parts were rarely preserved: many plants and invertebrate animals evolved, lived for millions of years and became extinct, but left no trace in the fossil record. The Burgess Shales preserved soft tissue in exquisite detail, and the question of how this came to happen has troubled scientists since the discovery of the fossils in 1909.

Adapted from materials provided by University of Leicester.

http://www.sciencedaily.com/releases/2008/11/081112074906.htm

Plate Tectonics Started Over 4 Billion Years Ago, Geochemists Report

"We're revealing a new picture of what the early Earth might have looked like," said lead author Michelle Hopkins. "In high school, we are taught to see the Earth as a red, hellish, molten-lava Earth. Now we're seeing a new picture, more like today, with continents, water, blue sky, blue ocean, much earlier than we thought." (Credit: Image courtesy of UCLA)

ScienceDaily (Nov. 27, 2008) — A new picture of the early Earth is emerging, including the surprising finding that plate tectonics may have started more than 4 billion years ago — much earlier than scientists had believed, according to new research by UCLA geochemists reported Nov. 27 in the journal Nature.

"We are proposing that there was plate-tectonic activity in the first 500 million years of Earth's history," said geochemistry professor Mark Harrison, director of UCLA's Institute of Geophysics and Planetary Physics and co-author of the Nature paper. "We are reporting the first evidence of this phenomenon."

"Unlike the longstanding myth of a hellish, dry, desolate early Earth with no continents, it looks like as soon as the Earth formed, it fell into the same dynamic regime that continues today," Harrison said. "Plate tectonics was inevitable, life was inevitable. In the early Earth, there appear to have been oceans; there could have been life — completely contradictory to the cartoonish story we had been telling ourselves."

"We're revealing a new picture of what the early Earth might have looked like," said lead author Michelle Hopkins, a UCLA graduate student in Earth and space sciences. "In high school, we are taught to see the Earth as a red, hellish, molten-lava Earth. Now we're seeing a new picture, more like today, with continents, water, blue sky, blue ocean, much earlier than we thought."

The Earth is 4.5 billion years old. Some scientists think plate tectonics — the geological phenomenon involving the movement of huge crustal plates that make up the Earth's surface over the planet's molten interior — started 3.5 billion years ago, others that it began even more recently than that.

The research by Harrison, Hopkins and Craig Manning, a UCLA professor of geology and geochemistry, is based on their analysis of ancient mineral grains known as zircons found inside molten rocks, or magmas, from Western Australia that are about 3 billion years old. Zircons are heavy, durable minerals related to the synthetic cubic zirconium used for imitation diamonds and costume jewelry. The zircons studied in the Australian rocks are about twice the thickness of a human hair.

Hopkins analyzed the zircons with UCLA's high-resolution ion microprobe, an instrument that enables scientists to date and learn the exact composition of samples with enormous precision. The microprobe shoots a beam of ions, or charged atoms, at a sample, releasing from the sample its own ions, which are

then analyzed in a mass spectrometer. Scientists can aim the beam of ions at specific microscopic areas of a sample and conduct a high-resolution isotope analysis of them without destroying the object.

"The microprobe is the perfect tool for determining the age of the zircons," Harrison said.

The analysis determined that some of the zircons found in the magmas were more than 4 billion years old. They were also found to have been formed in a region with heat flow far lower than the global average at that time.

"The global average heat flow in the Earth's first 500 million years was thought to be about 200 to 300 milliwatts per meter squared," Hopkins said. "Our zircons are indicating a heat flow of just 75 milliwatts per meter squared — the figure one would expect to find in subduction zones, where two plates converge, with one moving underneath the other."

"The data we are reporting are from zircons from between 4 billion and 4.2 billion years ago," Harrison said. "The evidence is indirect, but strong. We have assessed dozens of scenarios trying to imagine how to create magmas in a heat flow as low as we have found without plate tectonics, and nothing works; none of them explain the chemistry of the inclusions or the low melting temperature of the granites."

Evidence for water on Earth during the planet's first 500 million years is now overwhelming, according to Harrison."You don't have plate tectonics on a dry planet," he said.

Strong evidence for liquid water at or near the Earth's surface 4.3 billion years ago was presented by Harrison and colleagues in a Jan. 11, 2001, cover story in Nature."Five different lines of evidence now support that once radical hypothesis," Harrison said. "The inclusions we found tell us the zircons grew in water-saturated magmas. We now observe a surprisingly low geothermal gradient, a low rate at which temperature increases in the Earth. The only mechanism that we recognize that is consistent with everything we see is that the formation of these zircons was at a plate-tectonic boundary. In addition, the chemistry of the inclusions in the zircons is characteristic of the two kinds of magmas today that we see at place-tectonic boundaries."

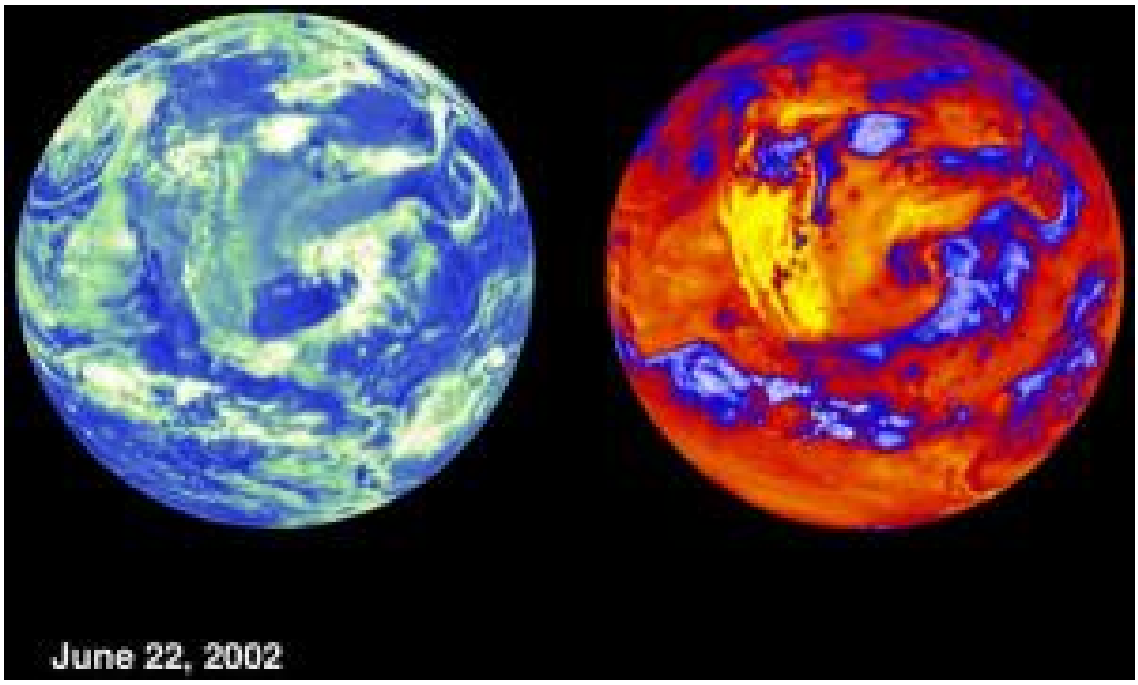
"We developed the view that plate tectonics was impossible in the early Earth," Harrison added. "We have now made observations from the Hadean (the Earth's earliest geological eon) — these little grains contain a record about the conditions under which they formed — and the zircons are telling us that they formed in a region with anomalously low heat flow. Where in the modern Earth do you have heat flow that is one-third of the global average, which is what we found in the zircons? There is only one place where you have heat flow that low in which magmas are forming: convergent plate-tectonic boundaries."

Three years ago, Harrison and his colleagues applied a technique to determine the temperature of ancient zircons."We discovered the temperature at which these zircons formed was constant and very low," Harrison said. "You can't make a magma at any lower temperature than what we're seeing in these zircons. You look at artists' conceptions of the early Earth, with flying objects from outer space making large craters; that should make zircons hundreds of degrees centigrade hotter than the ones we see. The only way you can make zircons at the low temperature we see is if the melt is water-saturated. There had to be abundant water. That's a big surprise because our longstanding conception of the early Earth is that it was dry."

Adapted from materials provided by University of California - Los Angeles.

http://www.sciencedaily.com/releases/2008/11/081126133357.htm

Clouds And Climate Change: CERES Flight Model Moves Toward Launch



An example of CERES data from CERES Aqua show measurements over the United States from June 22, 2002. CERES detects the amount of outgoing heat and reflected sunlight leaving the planet. (Credit: NASA)

ScienceDaily (Nov. 27, 2008) — NASA's Langley Research Center's Clouds and the Earth's Radiant Energy System (CERES) instruments have been observing clouds and the radiation budget for nearly a decade now. Key questions remain about how a warming climate will affect clouds, which play an important role in what scientists call the planet's "radiation budget."

Since its inception, CERES, which measures all wavelength radiation, has gathered that important data, building on the prior observations of NASA's Earth's Radiation Budget Experiment (ERBE) data to create a 30-year record of radiative flux at the top of Earth's atmosphere.

A new sensor, the CERES Flight Model (FM) 5, that will continue the 30-year climate data record of the Earth's radiant energy, has been delivered ahead of schedule and on budget, by Northrop Grumman Space Technologies. The CERES FM 5 instrument will fly as part of the National Polar-orbiting Operational Environmental Satellite System (NPOESS) Preparatory Project (NPP) in 2010. Four CERES sensors currently operate on NASA's Terra and Aqua Earth Observing System spacecraft.

"We were given authority to proceed in January '08, and we delivered in Nov. '08," said CERES co-Principal Investigator Norman Loeb. "That, to me, is a really spectacular success story."

The "radiation budget" is an ever-changing exchange of incoming solar radiation and outgoing radiation that is either emitted by Earth or reflected by the Earth's surface, clouds and aerosols. The amount of energy fluctuates, but the "budget" is always in near-balance, meaning incoming and outgoing radiative fluxes are approximately equal. Changes in this budget largely determine the Earth's temperature and climate.

Clouds play a significant, but still not completely understood, role in the Earth's radiation budget. Low, thick clouds can reflect the sun's energy back into space before solar radiation reaches the surface, while

high clouds trap the radiation emitted by the Earth from escaping into space. The total effect of high and low clouds determines the amount of greenhouse warming.

When scientists build computer models that predict how Earth's climate will change over time, figuring out what role clouds play in the radiation budget and how cloud behavior might change due to a warming planet is an important task toward accuracy.

"The Earth's radiation balance is in many ways the most critical part of the climate system and is directly influenced by changes in atmospheric composition, such as greenhouse gases and aerosols, cloud properties, and surface and atmospheric temperature," said Loeb. CERES co-Principal Investigator Bruce Wielicki noted "The long climate record from CERES will ultimately answer a longstanding question in science concerning the role of clouds in amplifying or damping the sensitivity of the Earth's climate system."

Data indicate that clouds have an overall cooling effect on the planet. But many other questions remain about what a changing climate will do to cloud behavior, and how exactly clouds affect climate and seasonal weather. The role of clouds remains the largest source of discrepancy among climate models, underscoring the importance of both continuing to observe clouds and their relationship to the radiation budget, and using CERES data to refine the role of clouds in climate models.

Adapted from materials provided by NASA's Langley Research Center. Original article written by Patrick Lynch.

http://www.sciencedaily.com/releases/2008/11/081124163607.htm

Source Of Geysers On Saturn's Moon Enceladus May Be Underground Water

Saturn's moon Enceladus may indeed hide an underground reservoir of water. Ice particles mixed with liquid water are being expelled from at least one part of this moon's surface out to distances of 300 km (200 miles). (Credit: NASA)

ScienceDaily (Nov. 27, 2008) — Saturn's moon Enceladus may indeed hide an underground reservoir of water.

Scientists at Jet Propulsion Lab in California, the University of Colorado and the University of Central Florida in Orlando teamed up to analyze the plumes of water vapor and ice particles spewing from the moon. They used data collected by the Cassini spacecraft's Ultraviolet Imaging Spectrograph (UVIS). Cassini was launched from the Kennedy Space Center in 1997 and has been orbiting Saturn since July 2004.

The team, including UCF Assistant Professor Joshua Colwell, found that the source of plumes may be vents on the moon that channel water vapor from a warm, probably liquid source to the surface at supersonic speeds.

The team's findings are reported in the Nov. 27 issue of the journal Nature.

"There are only three places in the solar system we know or suspect to have liquid water near the surface," Colwell said. "Earth, Jupiter's moon Europa and now Saturn's Enceladus. Water is a basic ingredient for life, and there are certainly implications there. If we find that the tidal heating that we believe causes these geysers is a common planetary systems phenomenon, then it gets really interesting."

The team's findings support a theory that the plumes observed are caused by a water source deep inside Enceladus. This is not a foreign concept. On earth, liquid water exists beneath ice at Lake Vostok, Antarctica.

Scientists suggest that in Enceladus's case, the ice grains would condense from the vapor escaping from the water source and stream through the cracks in the ice crust before heading into space. That's likely what Cassini's instruments detected in 2005 and 2007, the basis for the team's investigation.

The team's work also suggests that another hypothesis is unlikely. That theory predicts that the plumes of gas and dust observed are caused by evaporation of volatile ice freshly exposed to space when Saturn's tidal forces open vents in the south pole. But the team found more water vapor coming from the vents in 2007 at a time when the theory predicted there should have been less.

"Our observations do not agree with the predicted timing of the faults opening and closing due to tidal tension and compression," said Candice Hansen, the lead author on the project. "We don't rule it out entirely . . . but we also definitely do not substantiate this hypothesis."

Instead, their results suggest that the behavior of the geysers supports a mathematical model that treats the vents as nozzles that channel water vapor from a liquid reservoir to the surface of the moon. By observing the flickering light of a star as the geysers blocked it out, the team found that the water vapor forms narrow jets. The authors theorize that only high temperatures close to the melting point of water ice could account for the high speed of the water vapor jets.

Although there is no solid conclusion yet, there may be one soon. Enceladus is a prime target of Cassini during its extended Equinox Mission, underway now through September 2010.

The team of researchers also includes Brad Wallis, and Amanda Hendrix from Jet Propulsion Laboratory; Larry Esposito (principal investigator of the UVIS investigation), Bonnie Meinke and Kris Larsen from the University of Colorado; Wayne Pryor from Central Arizona College; and Feng Tian, from NASA's postdoctoral program.

"We still have a lot to discover and learn about how this all works on Enceladus," Colwell said. "But this is a good step in figuring it all out."

Adapted from materials provided by University of Central Florida.

http://www.sciencedaily.com/releases/2008/11/081126133405.htm

Dawn Spacecraft Glides Into New Year

Artist concept of Dawn in space. (Credit: NASA/JPL)

ScienceDaily (Nov. 27, 2008) — NASA's Dawn spacecraft shut down its ion propulsion system this week as scheduled. The spacecraft is now gliding toward a Mars flyby in February of next year.

"Dawn has completed the thrusting it needs to use Mars for a gravity assist to help get us to Vesta," said Marc Rayman, Dawn's chief engineer, of NASA's Jet Propulsion Laboratory, Pasadena, Calif. "Dawn will now coast in its orbit around the sun for the next half a year before we again fire up the ion propulsion system to continue our journey to the asteroid belt."

Dawn's ion engines may get a short workout next January to provide any final orbital adjustments prior to its encounter with the Red Planet. Ions are also scheduled to fly out of the propulsion system during some systems testing in spring. But mostly, Dawn's three ion engines will remain silent until June, when they will again speed Dawn toward its first appointment, with asteroid Vesta.

Dawn's ion engines are vital to the success of the misson's 8-year, 4.9-billion-kilometer (3-billion-mile) journey to asteroid Vesta and dwarf planet Ceres. One of these extremely frugal powerhouses can generate more than 24 hours of thrusting while consuming about .26 kilograms (about 9 ounces) of the spacecraft's xenon fuel supply -- less than the contents of a can of soda. Over their lifetime, Dawn's three ion propulsion engines will fire cumulatively for about 50,000 hours (over five years) -- a record for spacecraft.

Dawn will begin its exploration of asteroid Vesta in 2011 and the dwarf planet Ceres in 2015. These two icons of the asteroid belt have been witness to so much of our solar system's history. By utilizing the same set of instruments at two separate destinations, scientists can more accurately formulate comparisons and contrasts. Dawn's science instrument suite will measure shape, surface topography, tectonic history, elemental and mineral composition, and will seek out water-bearing minerals. In addition, the Dawn spacecraft itself and how it orbits both Vesta and Ceres will be used to measure the celestial bodies' masses and gravity fields.

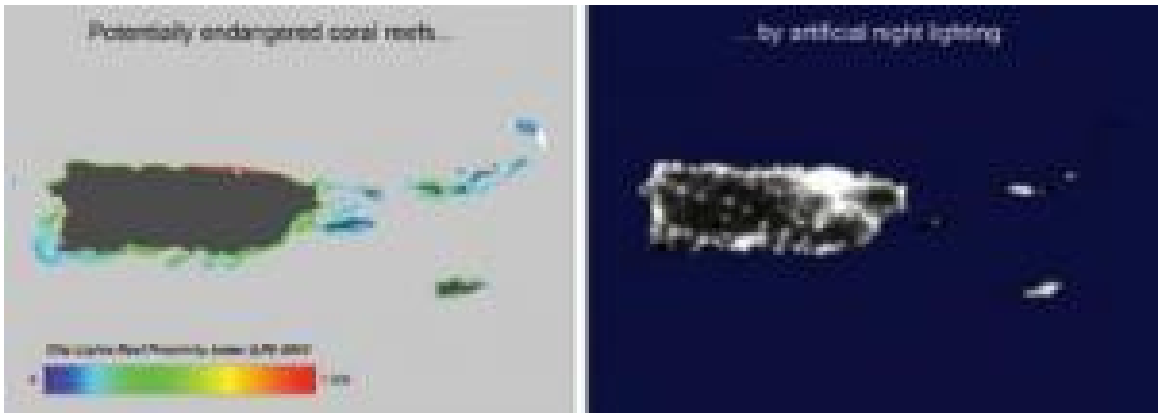
The Dawn mission to asteroid Vesta and dwarf planet Ceres is managed and operated by JPL for NASA's Science Mission Directorate, Washington, D.C. The University of California, Los Angeles, is responsible for overall Dawn mission science. Other scientific partners include: Max Planck Institute for Solar System Research, Katlenburg, Germany; DLR Institute for Planetary Research, Berlin, Germany; Italian National Institute for Astrophysics, Rome; and the Italian Space Agency. Orbital Sciences Corporation of Dulles, Virginia, designed and built the Dawn spacecraft.

Additional information about Dawn is online at http://www.nasa.gov/dawn and http://dawn.jpl.nasa.gov.

Adapted from materials provided by NASA/Jet Propulsion Laboratory.

http://www.sciencedaily.com/releases/2008/11/081124164156.htm

Light Pollution Offers New Global Measure Of Coral Reef Health



The lights proximity index (LPI) values surrounding Puerto Rico (left) and the undifferentiated night light from the island (right). (Credit: Christoph Albrecht et al. in Geocarto International)

ScienceDaily (Nov. 26, 2008) — We've all seen the satellite images of Earth at night--the bright blobs and shining webs that tell the story of humanity's endless sprawl.

These pictures are no longer just symbols of human impact, however, but can be used to objectively measure it, according to a study in the December 2008 issue of Geocarto International, a peer-reviewed journal on geoscience and remote sensing.

Travis Longcore, a USC geographer and expert in light pollution, collaborated with an international team, led by Christoph Aubrecht of the Austrian Research Centers, to develop the index.

"Coral reefs are incredibly important—but unfortunately they're also incredibly fragile," Longcore said. "Using night light proximity, we were able to identify the most threatened and most pristine spots in an objective and easily repeatable way."

The researchers did this by first classifying the light into three separate sources: urban areas, gas flares and fishing boat activity.

Each of these sources puts stress on reefs: urban areas cause sewage and polluted runoff, oil platforms cause leakages and spills, and commercial fishing boats deplete marine life and impair the ecological balance.

The closer a reef is to one or more of these sources, the higher the index number and the greater the stress on the reefs.

While previous assessments of coral reef health, like the 1998 Reefs at Risk survey, considered more variables, the LPI yields similar results, Longcore added.

"As a first-pass global assessment, light pretty much correlates with human impact on the oceans," he explained.

Light's direct impact on coral reefs

In this way the index uses light as an indirect measure of coral reef health, which could help inform conservation policy.

But the LPI is also a direct measurement of coral reef stress, since light itself also affects marine life, according to the study.

"The lights themselves are a stress in terms of changing the ecology in the environments around them," Longcore explained.

In 2002, Longcore and his colleague Catherine Rich of The Urban Wildlands Group organized a conference for scientists studying light. In 2006, Rich and Longcore co-edited a book on the subject called "Ecological Consequences of Artificial Night Lighting."

Since then, Longcore has been at the forefront of widening interest in light pollution and its effects on human and environmental health. (For example, National Geographic's cover story this month is on light pollution.)

"It used to be you couldn't find light pollution and wildlife together, except in a few white papers," Longcore said.

Increasingly, concerns about artificial lighting extend beyond star enthusiasts to environmental and human health issues, he added.

In terms of coral reefs, more research is needed on light's direct effects, but lab studies show that light can disrupt coral reproduction, which is timed to moonlight.

"Light at levels that would seem insignificant to humans can be incredibly significant to marine organisms and even terrestrial organisms," Longcore said.

As a rule of thumb, artificial light tends to benefit predators, which is why many organisms rely on darkness to maximize their odds of survival.

Light can also disrupt migration patterns of birds. In fact, Shell and Philips recently teamed up to change the lighting schemes on North Sea oilrigs for this reason.

In addition, communications towers, mainly because of their flashing lights, attract and kill about 4-5 million birds a year in North America, Longcore noted.

Yet despite its significance, light pollution is only one of many stresses facing coral reefs, which act synergistically to threaten their survival.

More on the study

The researchers used data from the Defense Meteorological Satellite Program (DMSP), which was initially designed to detect moonlit clouds.

The model found that in terms of proximity to urban light, coral reefs in Singapore, the Red Sea, Barbados, Puerto Rico, and Bahrain have the highest index values.

In terms of fishing boat activity, coral reefs in the Gulf of Thailand, off the west coast of Thailand, and in China have the highest LPI values. And in terms of gas flares, Bahrain and the Persian Gulf show the highest values.

Coral reefs in Indonesia, Malaysia and the Philippines rate high in terms of a coincidence of all three light sources.

Places with very low LPI values were the Great Barrier Reef, the Marshall Islands, Madagascar, and the Cargados Carajos Shoals near Mauritius.

The study's other authors were: C. Elvidge, K. Baugh, B. Tuttle, A. Howard and E. Erwin of the National Oceanic & Atmospheric Administration's National Geophysical Data Center; Catherine Rich of The Urban Wildlands Group; J. Safran of ESRI; and A. Strong and C. Eakin of NOAA's Coral Reef Watch.

The study was funded in part by NOAA, including its Coral Reef Watch and the Coral Reef Conservation Program.

Adapted from materials provided by University of Southern California, via EurekAlert!, a service of AAAS.

http://www.sciencedaily.com/releases/2008/11/081124174955.htm

Synthetic Sea Worm Glue May Mend Shattered Knee, Face Bones

The small, sea-dwelling sandcastle worm normally makes its tube-shaped home by using its tentacles to grab pieces of sand and shell from the water and attaching them with its own natural glue. But in the laboratory, the worm will make its tube out of just about anything it is given -- in the case of this photo, beads of zirconium oxide. A synthetic version of this seaworthy glue has been developed at the University of Utah for possible use in repairing small fragments of bone in people with fractured knee, wrist and other joint bones, and also facial bones. (Credit: Fred Hayes for the University of Utah)

ScienceDaily (Nov. 26, 2008) — Sandcastle worms live in intertidal surf, building sturdy tube-shaped homes from bits of sand and shell and their own natural glue. University of Utah bioengineers have made a synthetic version of this seaworthy superglue, and hope it will be used within several years to repair shattered bones in knees, other joints and the face.

"You would glue some of the small pieces together," says Russell Stewart, associate professor of bioengineering and senior author of the study to be published online within a week in the journal Macromolecular Biosciences.

"When you break the top of a bone in a joint, those fractures are difficult to repair because if they are not aligned precisely, you end up with arthritis and the joint won't work anyway. So it's very important to get those pieces aligned as well as possible."

In lab tests using cow bone pieces from groceries, the synthetic sea-worm glue – a first-generation prototype – performed 37 percent as well as commercial superglue.

Stewart expects the synthetic worm glue will be tested on animals within a year or two, and will be tested and used on humans in five to 10 years.

The synthetic sandcastle worm glue would not be used to repair large fractures such as major leg and arm bones, for which rods, pins and screws now are used. But Stewart envisions that it might be used for gluing together small bone fragments in fractured knees, wrists, elbows, ankles and other joints, and also the face and skull.

"If a doctor rebuilds a joint with pins and screws, generally weight is kept off that joint until it's healed," Stewart says. "So our goal isn't to rebuild a weight-bearing joint with glue. It is to hold the pieces together in proper alignment until they heal. … We see gluing the small fragments back into the joint."

In their study, Stewart and colleagues wrote: "It is especially difficult to maintain alignment of small bone fragments by drilling them with screws and wires. An adjunctive adhesive could reduce the number or volume of metal fixators while helping maintain accurate alignment of small bone fragments to improve clinical outcomes."

Bioengineer Patrick Tresco, associate dean for research at the University of Utah's College of Engineering, says: "Most current adhesives do not work when surfaces are wet so they are no good for holding together bone, which is wet and bloody. There is nothing like it [the synthetic worm glue] on the market today."

The synthetic glue also can carry drugs, so it could be used to deliver pain killers, growth factors, antibiotics, anti-inflammatory medicines or even stem cells to sites where bone fragments are glued, "simultaneously fixing the bone and delivering potent drugs or even genes to the spots where they are needed," Stewart says.

And where pieces of bone now are cut out due to cancer, the adhesive might be used to firmly attach "tissue scaffolds" used to encourage regrowth of the missing bone.

Stewart is seeking to patent the synthetic sea worm glue so it can be licensed to an outside company that would develop it as a product. He hopes to make better versions that have more bonding power, are biocompatible in the human body and biodegradable.

"Ultimately, we intend to make it so it is replaced by natural bone over time," Stewart says. "We don't want to have the glue permanently in the fracture." Stewart says some synthetic superglues or "instant glues" are used instead of sutures for superficial skin wounds. But because of toxicity or toxic byproducts, "they are not suitable for deep tissue use," including bone repair, he adds.

Building a Sandcastle Colony 'One Grain of Sand at a Time'

Stewart conducted the study with Hui Shao, a doctoral student in bioengineering; and Kent Bachus, a research associate professor of orthopaedics.

The study involved Phragmatopoma californica, the sandcastle worm, which lives in vaguely sandcastle-like colonies of tube-shaped homes on the California coast.

The adult worm is an inch or so long, and an eighth-inch in diameter. But they build tubes several inches long, using sand grains and shell fragments.

"They will not leave their tube. They live in their tube and have dozens of tentacles they stick out one end of the tube, which is how they gather food and particles to build their shells with."

Tiny, hair-like cilia brush the sand grains and shell pieces down the tentacles so they can be grabbed by the worm's fleshy, pincer-like "building organ" and glued onto the under-construction tube piece by piece.

The worm "secretes two little dabs of glue onto the particle," says Stewart. "And the building organ puts it onto the end of the tube and holds it there for about 25 seconds, wiggling it a little to see if the glue is set, and then it lets go. The glue is designed to set up and harden within 30 seconds after the worm secretes it."

Worms build their tube-like shells next to each other, like stacks of pipes, to form a large colony. "One grain of sand at a time it builds big, reef-like colonies the size of Volkswagens," Stewart says. "A colony looks like a mound."

In the lab, Stewart previously showed the worms will use any handy building material, using their natural adhesive to build tubes by gluing together tiny pieces of egg shell, glass beads, red sand, bone, zirconium oxide, and even pieces of a silicon chip.

The Chemistry of Glue

Scientists already knew sandcastle worm glue contained proteins and a substance named dopa, which also is present in glue mussels used to glom onto rocks and boats.

"But we took the compositional characterization a lot further," hypothesized how the worm glue works, and used that to create the synthetic glue, says Stewart.

The sea worm's glue is made from two proteins – one acidic or negatively charged, the other basic or positively charged – that are natural polymers, or compounds with a repeating, chain-like structure. The glue also contains positively charged ions of calcium and magnesium.

In the natural worm glue, each protein polymer's "backbone" is made of polyamide, which has "side chains" of other chemicals attached to the backbone.

Stewart didn't use polyamide in the synthetic glue because it is impractical to synthesize. Instead, for the "backbone" of polymers in the synthetic glue, he used water-soluble polyacrylates, synthetic polymers that are related to commercial superglues and are used in floor wax, nail polish, pressure-sensitive adhesives and Plexiglas.

The "side chains" attached to the synthetic glue's polymer backbones copied the natural worm glue's side chains chemically and in other ways, Stewart says. Some side chains are dopa, which makes the glue function as glue.

"We made polymers with side chains that mimicked the positive and negative charges in the worm glue," Stewart says.

When the polymers are mixed, they form an unusual substance known as a "coacervate," which condenses out of the polymer solution and sinks to the bottom of a test tube as a dense solution that is the foundation of the synthetic glue.

The two polymers in the coacervate "cross link" – their side chains attach to each other – forming chemical bonds that make synthetic worm glue harden.

Because the solution-within-a-solution doesn't disperse, it can be sucked up with a syringe. "In some cases we may be able to repair bones with a [glue-filled] syringe rather than screws and power tools," says Stewart.

To test the strength of the synthetic glue, Stewart cut cow leg bones from grocery stores in cubes measuring 0.4 inches on a side, sanded the pieces, got them wet and bonded pieces together either with synthetic worm glue or with Loctite 401 superglue. The bonded pieces of bone were kept warm and wet for 24 hours. He tested the strength of the glues by using dull blades to push each of the glued cubes in opposite directions until the bond failed.

Adapted from materials provided by University of Utah.

http://www.sciencedaily.com/releases/2008/11/081125085620.htm

High Blood Pressure In The Doctor's Office May Not Predict Heart Risks

ScienceDaily (Nov. 26, 2008) — Continuously measuring blood pressure may help predict heart disease and related deaths among individuals with treatment-resistant hypertension, while blood pressure readings taken in a medical office do not appear to predict future heart risks, according to a report in November 24 issue of Archives of Internal Medicine, one of the JAMA/Archives journals.About 10 percent to 30 percent of individuals with high blood pressure have a condition known as resistant hypertension, according to background information in the article. For these patients, blood pressure remains high despite treatment with at least three antihypertensive drugs, always including a diuretic (medication that increases urine output). Ambulatory blood pressure monitoring, or measuring blood pressure at regular intervals throughout the day, is increasingly important in managing patients with this condition because of the possibility of a white-coat effect (when an individual only has high blood pressure at the physician's office).

Gil F. Salles, M.D., Ph.D., studied 556 patients with resistant hypertension who attended an outpatient clinic between 1999 and 2004. Participants underwent a clinical examination and had their blood pressure monitored continuously during a 24-hour period (every 15 minutes throughout the day and every 30 minutes at night). They were followed up at least three to four times a year until December 2007.After a median (midpoint) follow-up period of 4.8 years, 109 (19.6 percent) of participants had a cardiovascular event or died of cardiovascular disease. This included 44 strokes, 21 heart attacks, 10 new cases of heart failure and five sudden deaths. Seventy patients (12.6 percent) died, including 46 (8.3 percent) of cardiovascular causes.

Blood pressure measured in the office did not predict any of these events, whereas higher average ambulatory blood pressures (both systolic or top-number and diastolic or bottom-number) were associated with the occurrence of fatal and non-fatal heart events. This association remained after controlling for office blood pressure and other risk factors for heart disease. When considered separately, nighttime blood pressure was superior to daytime blood pressure in predicting heart events. If nighttime systolic blood pressure increased by 22 millimeters of mercury, risk for future heart events increased by 38 percent, whereas an increase of 14 millimeters of mercury in diastolic blood pressure increased heart risks by 36 percent."This study has important clinical implications," the authors write. "First, it reinforces the importance of ambulatory blood pressure monitoring performance in resistant hypertensive patients. Furthermore, ambulatory blood pressure monitoring should be performed during the whole 24 hours, with separate analyses of the daytime and nighttime periods, because it seems that nighttime blood pressures are better cardiovascular risk factors than are daytime blood pressures."

"Second, it raises the question of whether therapeutic interventions directed specifically at controlling nighttime hypertension will be able to improve cardiovascular prognosis compared with the traditional approach of controlling daytime blood pressure levels," they conclude. "This important clinical question should be addressed in future prospective interventional studies."This study was supported in part by a grant from PETROBRAS-FINEP and by research grants from the Brazilian National Research Council.

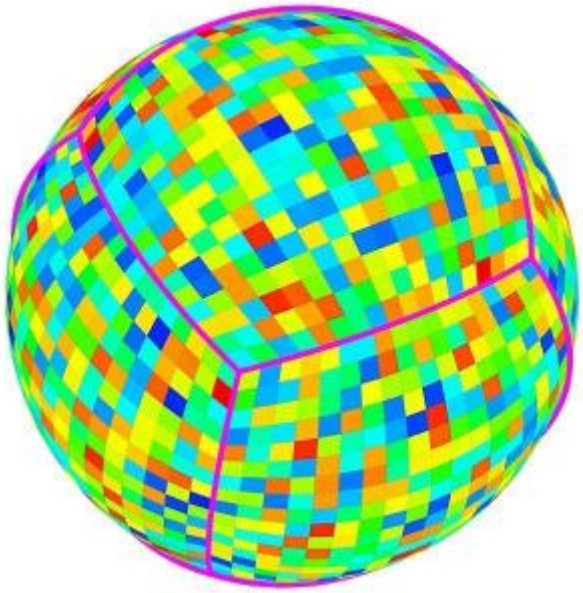
Journal reference:

1. Gil F. Salles; Claudia R. L. Cardoso; Elizabeth S. Muxfeldt. **Prognostic Influence of Office and Ambulatory Blood Pressures in Resistant Hypertension**. *Archives of Internal Medicine*, 2008; 168 (21): 2340 DOI: 10.1001/archinte.168.21.2340

Adapted from materials provided by JAMA and Archives Journals.

http://www.sciencedaily.com/releases/2008/11/081124165119.htm

Record Set Simulating Seismic Wave Propagation Across The Earth



To learn more about the inner sanctum of the earth's core, seismologists take advantage of one of nature's most destructive forces: earthquakes. Somewhat like the way a CAT scan images the brain, seismologists track seismic wave patterns from earthquakes to model the structure of the earth's core. One of the great challenges is to capture the propagation of high-frequency waves, with periods of 1 to 2 seconds, as they travel across the globe. To simulate this activity, seismologists employ a spectral-element application called SPECFEM3D_GLOBE that uses a fine mesh of hexahedral finite elements, pictured here, and high-performance computers. (Credit: D. Komatitsch, Université de Pau; L. Carrington, San Diego Supercomputer Center at UC San Diego.)

ScienceDaily (Nov. 26, 2008) — A team led by researchers at the San Diego Supercomputer Center at UC San Diego has successfully completed record-setting, petascale-level simulations of the earth's inner structure, paving the way for seismologists to model seismic wave propagations at frequencies of just over one second – the same frequencies that occur in nature.

Results of these latest seismic wave simulations were announced at SC08, the international conference for high-performance computing, where the research by the SDSC-led team was a finalist for Gordon Bell prize, awarded annually for outstanding achievement in high-performance computing applications. The SDSC team includes researchers from the California Institute of Technology; Université de Pau and INRIA, France; and the Institut Universitaire de France, France.

The record runs were completed on the 'Jaguar' system at Oak Ridge National Laboratory (ORNL). The record run broke the two-second barrier by achieving a shortest period of 1.15 seconds and 161 teraflops, using 149,784 cores.

That is the shortest wave period ever obtained in seismic wave propagation, as well as the highest level of parallelism and the first sustained performance of seismic wave propagation exceeding 160 TFlops. (One teraflop equals one trillion calculations per second. To put that in perspective, it would take a person operating a hand-held calculator more than 30,000 years to complete one trillion calculations.)

The latest supercomputer simulations, led by SDSC researcher Laura Carrington, focused on overcoming a key challenge in global seismology: modeling the propagation of seismic waves with frequencies as small as one second. The team broke the previous record set in 2003, which achieved frequencies of 3.5 seconds.

"In breaking the two-second barrier, we were able to model wave propagation clear through the Earth to more accurately predict its structure," said Carrington, who is with SDSC's Performance Modeling and Characterization (PMaC) laboratory. "More significantly, by achieving a frequency just above one second, we were able to duplicate the same frequencies that occur in nature, providing an unprecedented level of resolution that will greatly enhance our understanding of the physics and chemistry of the Earth's interior."

Researchers used a spectral finite-element application called SPECFEM3D_GLOBE for the latest and largest simulations ever done in this area of research. Waves at frequencies of between one and two seconds, generated when major earthquakes with magnitudes measuring 6.5 or more occur, help reveal new information about the 3D structure of the Earth because they are the highest frequency signals that can propagate, or travel, all the way through the Earth, particularly near the core-mantle boundary (CMB), the inner core boundary (ICB), and the enigmatic inner core, which is comprised of solid iron.

There is no need to simulate wave periods of less than one second for seismographic comparisons, because such frequencies signals do not propagate across the entire globe, according to the researchers.

Moreover, the team's research is crucial in helping seismologists better understand the dramatic differences in the complex structure of the Earth's inner core, which appears to be anisotropic, or having unequal physical properties along different axes, with dramatic differences between its eastern and western hemispheres.

Earlier, the research team conducted simulations using a wide range of resources provided by the TeraGrid, the nation's largest open scientific discovery infrastructure linking compute resources among 11 partner sites across the U.S. Runs were conducted using approximately 32,000 cores on the 'Ranger' supercomputer at the Texas Advanced Computing Center (TACC) at The University of Texas in Austin. That run achieved a seismic period length of 1.84 seconds and at a sustained 28.7 TFlops.

Prior to that, the team successfully completed several simulations using TeraGrid supercomputer resources, including 29,000 cores on the 'Jaguar' system at ORNL's National Center for Computational Sciences, achieving 1.94 seconds at 35.7 TFlops. Runs were also conducted on the Cray XT4 'Franklin' system at the National Energy Research Scientific Computing Center (NERSC) at the Lawrence Berkeley National Laboratory in Berkeley, Calif.; (12,150 cores with a shortest seismic wave of 3 seconds at 24 TFlops), and on the Cray XT4 'Kraken' system at the University of Tennessee-Knoxville (17,496 cores at 2.52 seconds at 22.4T Flops. The TFlops number in these and subsequent runs were measures using PSiNSlight, a performance measurement and tracing tool developed by SDSC's PMaC Lab.

The researchers also made a number of radical structure and memory management changes to the SPECFEM3D_GLOBAL application to enable what researchers call "peta-scale-ability", or using processors numbering in the hundreds of thousands. Efforts focused on the application to overlapping communications using non blocking MPI calls, optimizations to reduce cache misses, optimization to reduce I/O, large restructurings to reducing memory consumption, and work to reduce memory fragmentation.

In addition to Carrington, SDSC researchers on the team include Allan Snavely, director of the PMaC Lab; and researchers Michael Laurenzano and Mustafa Tikir. Additional team members include Dimitri Komatitsch, David Michéa, and Nicolas Le Goff of the Université de Pau, CNRS and INRIA Magique-3D, Laboratoire de Modélisation et d'Imagerie en Géosciences, Pau, France; and Jeroen Tromp, formerly a professor of geophysics with the California Institute of Technology's Seismological Laboratory. Tromp recently joined Princeton University's geosciences and mathematics departments. Komatitsch is also affiliated with the Institut Universitaire de France, in Paris.

Komatitsch and Tromp developed SPECFEM3D_GLOBE over 10 years ago, in order to do 3D whole Earth models that account for geological variations in and under the Earth's crust. These variations have a

dramatic effect on how earthquakes propagate. Komatitsch's work on the application was vital in the collaboration that accomplished this record breaking run.

About the run, Tromp and Komatitsch had this to say: "One of the long-term goals of seismology is to be able to routinely simulate 3D seismic wave propagation in the whole Earth following earthquakes at frequencies of about 1 Hz, the highest frequency signal that can be seen clear across the planet. Very large numerical simulations performed on the new Cray XT5 system at Oak Ridge will enable us to get increasingly closer to this lofty goal."

Research for the SPECFEM3D_GLOBE applications was supported in part by the National Science Foundation (NSF); the Performance Engineering Research Institute (PERI); and the U.S. Department of Energy (DoE); in addition to resources from the NSF-funded TeraGrid program.

The SC08 conference was held in Austin, Texas, November 15-21.

Adapted from materials provided by University of California - San Diego.

http://www.sciencedaily.com/releases/2008/11/081125113106.htm

Archeology Of Homelessness

ScienceDaily (Nov. 26, 2008) — No matter what you see in the movies, archaeology isn't really about finding ancient temples or golden idols. It's about the day-to-day "stuff"— the material culture—of people's lives. It doesn't even have to be ancient, as a study of homeless peoples' stuff in Indianapolis is showing. Instead of being an exotic field, archaeology may even help the homeless to live better lives.

Larry J. Zimmerman, Ph.D., an Indiana University–Purdue University Indianapolis professor of anthropology and museum studies at the School of Liberal Arts and Jessica Welch, an IUPUI student and a formerly homeless woman, have completed a unique study of the material culture of the homeless. The researchers discovered that the problem of homelessness is broader and much more complex than previously thought.

They presented their findings this summer at the World Archeological Congress in Dublin, Ireland. Results of the study are to be published early next year in the peer-reviewed journal Historical Archeology.

Archeological perspectives on the production, use and disposition of material culture – clothing, utensils and other "stuff" that helps people to survive can provide insight into lives. Homeless people, often invisible to those around them, have, use and dispose of material culture as they move across the landscape, But because people are homeless, many Americans think they lack material culture.

"Archeology can help in the way a story is told, can raise issues of social justice and can inform the public and policy makers," said Zimmerman. "This study of the material culture of the homeless is preliminary in every way, but we believe that it shows the utility of applying archeological methods to help understand a contemporary social problem. Archeology can be a tool for making decisions, not just for understanding the past."

Past anthropological studies of the homeless have been mostly ethnographic – focusing on everything from HIV/AIDS to drug use or job training– and primarily have been done in the controlled settings of shelters. Yet, according to Zimmerman, most homeless individuals, especially men, live most of their lives outside of shelters, and we know almost nothing about it. This is the first study to use the tools and techniques of archeology to understand the broader environment and activities of the homeless. "We tend to see the homeless as a small extension of our lives but they are not; this is almost a different culture," said Zimmerman.

It's different because priorities change when finding food and having a place to sleep are your top concerns. Many people in the mainstream culture are closer to slipping into homelessness than they realize," said study co-author Jessica Welch, an IUPUI student who was herself homeless, living under trees and squatting in abandoned houses in Long Beach, Calif., in the early 1990s. Welch recently completed a bachelor's degree in psychology and anthropology this and plans to go into public service working with the homeless.

"You develop coping mechanisms – a fight or flight response - when you are homeless that are probably not appropriate in mainstream culture. You get increasingly defensive and desperate. This is just one of the many things that make it difficult for homeless people to re-enter 'normal society. We have to understand that a goal of simply creating more affordable housing units is not enough; we need a complete social safety net, including better treatment and counseling options, and plenty of compassion and understanding on the part of the community," she said.

For this study, Zimmerman and Welch focused on sites near downtown Indianapolis where homeless sought outdoor shelter. They avoided direct interaction with the homeless so as not to interfere with the lives of this vulnerable population. They did not open homeless "caches," often sealed black trash bags

partly hidden in out of the way places, in which homeless individuals store items they wish to keep or have access to in the future.

They located camps – many of them in use for long periods of time – where the homeless found or created shelter. They photographed these sites and conducted inventories of what the homeless threw away or left behind when they were away from the camp. They looked for patterns or clusters of certain types of materials such as clothing, shoes, food, cardboard laid out as furniture, or tarps providing shelter.

"We always kept in mind that these sites were peoples' homes and we respected them. They already have difficult lives and we did not want to make them more difficult," said Welch.

Some of their findings and even what they did not find surprised them. "We found a large number of food cans. Most had been opened, often not very successfully, with knives or by banging them against rocks or even by heating them until the contents exploded. We rarely found cans that had been opened by a can opener. That made us realize that they didn't have can openers, which must have been very frustrating to them," said Zimmerman.

"We also found a lot of hotel-size bottles of shampoo and conditioner, deodorant and toothpaste. Only the toothpaste was used. This tells us that giving things like shampoo and conditioner to individuals without access to water doesn't make sense. It would be better to send these kinds of things to shelters and not distribute then to people living on the streets. When we try to deliver aid to the homeless we tend to give them what we think they need. A much better way to deliver aid is to target what they actually need, and our work on the material culture of the homeless may help us find out what that really is," said Zimmerman.

According to Zimmerman and Welch, their study provides evidence that some homeless survive well, occasionally living in organized camps. "This work is an odd reaffirmation of how adaptable our species is. As an anthropologist I know this, but it's good to have it reaffirmed," said Zimmerman.

Adapted from materials provided by Indiana University–Purdue University Indianapolis.

http://www.sciencedaily.com/releases/2008/11/081124130956.htm

New Tool Trains Athlete Brains To React 53 Percent Faster

Boxing champion Antonin Décarie in automatic virtual environment cave developed at Universite de Montreal. (Credit: Image courtesy of University of Montreal)

ScienceDaily (Nov. 26, 2008) — All great athletes know that in order to perform well, they can't just depend on their physical capabilities. Speed and efficiency in decision-making are just as essential. Two researchers from the School of Optometry of the Université de Montréal have discovered how to train the brain of athletes to improve their overall athletic performance.

Professor Jocelyn Faubert and postdoctoral student David Tinjust, put a dozen soccer, tennis and hockey players through multiple object-tracking exercises. The athletes' capacity to absorb a lot of information simultaneously and manage it efficiently increased on average by 53 percent.

In one of these exercises, subjects in the automatic virtual environment cave were asked to follow the increasingly rapid movements of a series of balls and identify those that quickly changed colour. After each training session, which lasted about an hour, results were recorded and athletes could note their progress. "It's like physical training, but for the brain," says Faubert.The approach has already gained great popularity among athletes, from star goalie Kim St-Pierre to North American boxing champion Anthonin Décarie."In their normal workouts, athletes regularly evaluate their physical performance, but until now there has been no tool that could rate their cognitive performance," says Faubert. "If an athlete feels both physically and mentally ready, that can only have a positive influence on his or her performance."

Originally, the tool was used to see how elderly people or those with vision problems would behave in a virtual environment. For example, how could subjects work their way through a crowd, traffic or get on an escalator? The researchers then decided to adapt the process to top athletes and transfer the scientific knowledge to virtual training tools.Athletes could wear a virtual helmet that would allow them to train anywhere. They could also wear cybernetic gloves and glasses and, while viewing superimposed images, they could practise complex movements with a fictitious opponent. Every movement of the hand, foot and head would be recorded with sensors.

Adapted from materials provided by University of Montreal.

http://www.sciencedaily.com/releases/2008/11/081118122107.htm

100 Notable Books of 2008

The Book Review has selected this list from books reviewed since Dec. 2, 2007, when we published our previous Notables list.

Fiction & Poetry

AMERICAN WIFE. By Curtis Sittenfeld. (Random House, $26.) The life of this novel's heroine — a first lady who comes to realize, at the height of the Iraq war, that she has compromised her youthful ideals — is conspicuously modeled on that of Laura Bush.

ATMOSPHERIC DISTURBANCES. By Rivka Galchen. (Farrar, Straus & Giroux, $24.) The psychiatrist-narrator of this brainy, whimsical first novel believes that his beautiful, much-younger Argentine wife has been replaced by an exact double.

BASS CATHEDRAL. By Nathaniel Mackey. (New Directions, paper, $16.95.) Mackey's fictive world is an insular one of musicians composing, playing and talking jazz in the private language of their art.

BEAUTIFUL CHILDREN. By Charles Bock. (Random House, $25.) This bravura first novel, set against a corruptly compelling Las Vegas landscape, revolves around the disappearance of a surly 12-year-old boy.

BEIJING COMA. By Ma Jian. Translated by Flora Drew. (Farrar, Straus & Giroux, $27.50.) Ma's novel, an important political statement, looks at China through the life of a dissident paralyzed at Tiananmen Square.

A BETTER ANGEL: Stories. By Chris Adrian. (Farrar, Straus & Giroux, $23.) For Adrian — who is both a pediatrician and a divinity student — illness and a heightened spiritual state are closely related conditions.

BLACK FLIES. By Shannon Burke. (Soft Skull, paper, $14.95.) A rookie paramedic in New York City is overwhelmed by the horrors of his job in this arresting, confrontational novel, informed by Burke's five years of experience on city ambulances.

THE BLUE STAR. By Tony Earley. (Little, Brown, $23.99.) The caring, thoughtful hero of Earley's engrossing first novel, "Jim the Boy," is now 17 and confronting not only the eternal turmoil of love, but also venality and the frightening calls of duty and war.

THE BOAT. By Nam Le. (Knopf, $22.95.) In the opening story of Le's first collection, a blocked writer succumbs to the easy temptations of "ethnic lit."

BREATH. By Tim Winton. (Farrar, Straus & Giroux, $23.) Surfing offers this darkly exhilarating novel's protagonist an escape from a drab Australian town.

DANGEROUS LAUGHTER: Thirteen Stories. By Steven Millhauser. (Knopf, $24.) In his latest collection, Millhauser advances his chosen themes — the slippery self, the power of hysterical young people — with even more confidence and power than before.

DEAR AMERICAN AIRLINES. By Jonathan Miles. (Houghton Mifflin, $22.) Miles's fine first novel takes the form of a letter from a stranded traveler, his life a compilation of regrets, who uses the time to digress on an impressive array of cultural issues, large and small.

DIARY OF A BAD YEAR. By J. M. Coetzee. (Viking, $24.95.) Coetzee follows the late career of one Señor C, who, like Coetzee himself, is a South African writer transplanted to Australia and the author of a novel titled "Waiting for the Barbarians."

DICTATION: A Quartet. By Cynthia Ozick. (Houghton Mifflin, $24.) In the title story of this expertly turned collection, Henry James and Joseph Conrad embody Ozick's polarity of art and ardor.

ELEGY: Poems. By Mary Jo Bang. (Graywolf, $20.) Grief is converted into art in this bleak, forthright collection, centered on the death of the poet's son.

THE ENGLISH MAJOR. By Jim Harrison. (Grove, $24.) A 60-year-old cherry farmer and former English teacher — an inversion of the classic Harrison hero — sets out on a trip west after being dumped by his wife.

FANON. By John Edgar Wideman. (Houghton Mifflin, $24.) Wideman's novel — raw and astringent, yet with a high literary polish — explores the life of the psychiatrist and revolutionary Frantz Fanon.

THE FINDER. By Colin Harrison. (Sarah Crichton/Farrar, Straus & Giroux, $25.) A New York thriller, played out against the nasty world of global capitalism.

FINE JUST THE WAY IT IS: Wyoming Stories 3 . By Annie Proulx. (Scribner, $25.) These rich, bleak stories offer an American West in which the natural elements are murderous and folks aren't much better.

THE GOOD THIEF . By Hannah Tinti. (Dial, $25.) In Tinti's first novel, set in mid-19th-century New England, a con man teaches an orphan the art of the lie.

HALF OF THE WORLD IN LIGHT: New and Selected Poems. By Juan Felipe Herrera. (University of Arizona, paper, $24.95.) Herrera, known for portrayals of Chicano life, is unpredictable and wildly inventive.

HIS ILLEGAL SELF. By Peter Carey. (Knopf, $25.) In this enthralling novel, a boy goes underground with a defiant hippie indulging her maternal urge.

HOME. By Marilynne Robinson. (Farrar, Straus & Giroux, $25.) Revisiting the events of her novel "Gilead" from another perspective, Robinson has written an anguished pastoral, at once bitter and joyful.

INDIGNATION. By Philip Roth. (Houghton Mifflin, $26.) Marcus Messner is a sophomore at a small, conservative Ohio college at the time of the Korean War. The novel he narrates, like Roth's last two, is ruthlessly economical and relentlessly deathbound.

THE LAZARUS PROJECT. By Aleksandar Hemon. (Riverhead, $24.95.) This novel's despairing immigrant protagonist becomes intrigued with the real-life killing of a presumed anarchist in Chicago in 1908.

LEGEND OF A SUICIDE. By David Vann. (University of Massachusetts, $24.95.) In his first story collection, Vann leads the reader to vital places while exorcizing demons born from the suicide of his father.

LIFE CLASS. By Pat Barker. (Doubleday, $23.95.) Barker's new novel, about a group of British artists overtaken by World War I, concentrates more on the turmoil of love than on the trauma of war.

LUSH LIFE. By Richard Price. (Farrar, Straus & Giroux, $26.) Chandler — and Bellow, too — peeps out from Price's novel, in which an aspiring writer cum restaurant manager, mugged in the gentrifying Lower East Side of Manhattan, himself becomes a suspect.

A MERCY. By Toni Morrison. (Knopf, $23.95.) Summoning voices from the 17th century, Morrison performs her deepest excavation yet into America's history and exhumes the country's twin original sins: the importation of African slaves and the near extermination of Native Americans.

MODERN LIFE: Poems . By Matthea Harvey. (Graywolf, paper, $14.) Harvey is willing to take risks, and her reward is that richest, rarest thing, genuine poetry.

A MOST WANTED MAN . By John le Carré. (Scribner, $28.) This powerful novel, centered on a half-Russian, half-Chechen, half-crazy fugitive in Germany, swims with operatives whose desperation to avert another 9/11 provokes a slow-burning fire in every line.

MY REVOLUTIONS. By Hari Kunzru. (Dutton, $25.95.) Kunzru's third novel is an extraordinary autumnal depiction of a failed '60s radical.

NETHERLAND. By Joseph O'Neill. (Pantheon, $23.95.) In the wittiest, angriest, most exacting and most desolate work of fiction yet about post-9/11 New York and London, the game of cricket provides solace to a man whose family disintegrates after the attacks.

OPAL SUNSET: Selected Poems, 1958-2008. By Clive James. (Norton, $25.95.) James, a staunch formalist, is firmly situated in the sociable, plain-spoken tradition that runs from Auden through Larkin.

THE OTHER. By David Guterson. (Knopf, $24.95.) In this novel from the author of "Snow Falling on Cedars," a schoolteacher nourishes a friendship with a privileged recluse.

OUR STORY BEGINS: New and Selected Stories. By Tobias Wolff. (Knopf, $26.95.) Some of Wolff's best work is concentrated here, revealing his gift for evoking the breadth of American experience.

THE ROAD HOME. By Rose Tremain. (Little, Brown, $24.99.) A widowed Russian emigrant, fearfully navigating the strange city of London, learns that his home village is about to be inundated.

THE SACRED BOOK OF THE WEREWOLF. By Victor Pelevin. Translated by Andrew Bromfield. (Viking, $25.95.) A supernatural call girl narrates Pelevin's satirical allegory of post-Soviet, post-9/11 Russia.

THE SCHOOL ON HEART'S CONTENT ROAD. By Carolyn Chute. (Atlantic Monthly, $24.) In Chute's first novel in nearly 10 years, disparate characters cluster around an off-the-grid communal settlement.

SIR GAWAIN AND THE GREEN KNIGHT: A New Verse Translation. By Simon Armitage. (Norton, $25.95.) One of the eerie, exuberant joys of Middle English poetry, in an alliterative rendering that captures the original's drive, dialect and landscape.

SLEEPING IT OFF IN RAPID CITY: Poems, New and Selected. By August Kleinzahler. (Farrar, Straus & Giroux, $26.) Kleinzahler seeks the true heart of places, whether repellent, beautiful or both at once.

TELEX FROM CUBA. By Rachel Kushner. (Scribner, $25.) In this multilayered first novel, international drifters try to bury pasts that include murder, adultery and neurotic meltdown, even as the Castro brothers gather revolutionaries in the hills.

2666. By Roberto Bolaño. Translated by Natasha Wimmer. (Farrar, Straus & Giroux, cloth and paper, $30.) The five autonomous sections of this posthumously published novel interlock to form an astonishing whole, a supreme capstone to Bolaño's vaulting ambition.

UNACCUSTOMED EARTH. By Jhumpa Lahiri. (Knopf, $25.) In eight sensitive stories, Lahiri evokes the anxiety, excitement and transformations felt by Bengali immigrants and their American children.

THE UNFORTUNATES. By B. S. Johnson. (New Directions, $24.95.) This novel, first published in 1969, dovetails theme (the accidents of memory) with eccentric form (unbound chapters to be read in any order).

WHEN WILL THERE BE GOOD NEWS? By Kate Atkinson. (Little, Brown, $24.99.) Jackson Brodie, the hero of Atkinson's previous literary thrillers, takes the case of a mother and baby who suddenly disappear.

THE WIDOWS OF EASTWICK. By John Updike. (Knopf, $24.95.) In this ingenious sequel to "The Witches of Eastwick," the three title characters, old ladies now, renew their sisterhood, return to their old hometown and contrive to atone for past crimes.

YESTERDAY'S WEATHER. By Anne Enright. (Grove, $24.) Working-class Irish characters grapple with love, marriage, confusion and yearning in Enright's varied, if somewhat disenchanted, stories.

Nonfiction

AMERICAN LION: Andrew Jackson in the White House . By Jon Meacham. (Random House, $30.) Meacham, the editor of Newsweek, discerns a democratic dignity in the seventh president's populism.

ANGLER: The Cheney Vice Presidency. By Barton Gellman. (Penguin Press, $27.95.) An engrossing portrait of Dick Cheney as a master political manipulator.

BACARDI AND THE LONG FIGHT FOR CUBA: The Biography of a Cause. By Tom Gjelten. (Viking, $27.95.) An NPR correspondent paints a vivid portrait of the anti-Castro clan behind the liquor empire.

THE BIG SORT: Why the Clustering of Like-Minded America Is Tearing Us Apart. By Bill Bishop with Robert G. Cushing. (Houghton Mifflin, $25.) A journalist and a statistician see political dangers in the country's increasing tendency to separate into solipsistic blocs.

BLOOD MATTERS: From Inherited Illness to Designer Babies, How the World and I Found Ourselves in the Future of the Gene. By Masha Gessen. (Harcourt, $25.) Hard choices followed Gessen's discovery that she carries a dangerous genetic mutation.

CAPITOL MEN: The Epic Story of Reconstruction Through the Lives of the First Black Congressmen. By Philip Dray. (Houghton Mifflin, $30.) A collective biography of the pioneers of black political involvement.

THE CHALLENGE: Hamdan v. Rumsfeld and the Fight Over Presidential Power. By Jonathan Mahler. (Farrar, Straus & Giroux, $26.) An objective, thorough study of a landmark case for Guantánamo detainees.

CHAMPLAIN'S DREAM. By David Hackett Fischer. (Simon & Schuster, $40.) Fischer argues that France's North American colonial success was attributable largely to one remarkable man, Samuel de Champlain.

CHASING THE FLAME: Sergio Vieira de Mello and the Fight to Save the World. By Samantha Power. (Penguin Press, $32.95.) Vieira de Mello, who was killed in Iraq in 2003, embodied both the idealism and the limitations of the United Nations, which he served long and loyally.

CONDOLEEZZA RICE. An American Life: A Biography. By Elisabeth Bumiller. (Random House, $27.95.) A New York Times reporter casts a keen eye on Rice's tenure as a policy maker, her close ties to George Bush, and her personal and professional past.

THE DARK SIDE: The Inside Story of How the War on Terror Turned Into a War on American Ideals. By Jane Mayer. (Doubleday, $27.50.) A New Yorker writer recounts the emergence of the widespread use of torture as a central tool in the fight against terrorism.

DELTA BLUES: The Life and Times of the Mississippi Masters Who Revolutionized American Music. By Ted Gioia. (Norton, $27.95.) Gioia's survey balances the story of the music with that of its reception.

DESCARTES' BONES: A Skeletal History of the Conflict Between Faith and Reason. By Russell Shorto. (Doubleday, $26.) Shorto's smart, elegant study turns the early separation of Descartes's skull from the rest of his remains into an irresistible metaphor.

DREAMS AND SHADOWS: The Future of the Middle East. By Robin Wright. (Penguin Press, $26.95.) This fluent and intelligent book describes the struggles of people from Morocco to Iran to reform or replace long-entrenched national regimes.

THE DRUNKARD'S WALK: How Randomness Rules Our Lives. By Leonard Mlodinow. (Pantheon, $24.95.) This breezy crash course intersperses probabilistic mind-benders with profiles of theorists.

AN EXACT REPLICA OF A FIGMENT OF MY IMAGINATION: A Memoir. By Elizabeth McCracken. (Little, Brown, $19.99.) An unstinting account of the novelist's emotions after the stillbirth of her first child.

FACTORY GIRLS: From Village to City in a Changing China. By Leslie T. Chang. (Spiegel & Grau, $26.) Chang's engrossing account delves deeply into the lives of young migrant workers in southern China.

THE FOREVER WAR. By Dexter Filkins. (Knopf, $25.) Filkins, a New York Times reporter who was embedded with American troops during the attack on Falluja, has written an account of the Iraq war in the tradition of Michael Herr's "Dispatches."

FREEDOM'S BATTLE: The Origins of Humanitarian Intervention. By Gary J. Bass. (Knopf, $35.) Bass's book is both a history and an argument for military interventions as a tool of international justice today.

A GREAT IDEA AT THE TIME: The Rise, Fall, and Curious Afterlife of the Great Books. By Alex Beam. (PublicAffairs, $24.95.) The minds behind a curious project that continues to exert a hold in some quarters.

HALLELUJAH JUNCTION: Composing an American Life. By John Adams. (Farrar, Straus & Giroux, $26.) Adams's wry, smart memoir stands with books by Hector Berlioz and Louis Armstrong among the most readably incisive autobiographies of major musical figures.

THE HEMINGSES OF MONTICELLO: An American Family. By Annette Gordon-Reed. (Norton, $35.) Gordon-Reed continues her study of the relationship between Sally Hemings and Thomas Jefferson.

HOT, FLAT, AND CROWDED: Why We Need a Green Revolution — and How It Can Renew America. By Thomas L. Friedman. (Farrar, Straus & Giroux, $27.95.) The Times columnist turns his attention to possible business-friendly solutions to global warming.

THE HOUSE AT SUGAR BEACH: In Search of a Lost African Childhood. By Helene Cooper. (Simon & Schuster, $25.) Cooper, a New York Times reporter who fled a warring Liberia as a child, returned to confront the ghosts of her past — and to look for a lost sister.

HOW FICTION WORKS. By James Wood. (Farrar, Straus & Giroux, $24.) Concentrating on the art of the novel, the New Yorker critic presents a compact, erudite vade mecum with acute observations on individual passages and authors.

MORAL CLARITY: A Guide for Grown-Up Idealists. By Susan Neiman. (Harcourt, $27.) Neiman champions Enlightenment values with no hint of oversimplification, dogmatism or misplaced piety.

THE NIGHT OF THE GUN: A Reporter Investigates the Darkest Story of His Life. His Own. By David Carr. (Simon & Schuster, $26.) Carr, a New York Times culture reporter, sifts through his drug- and alcohol-addicted past.

NIXONLAND: The Rise of a President and the Fracturing of America. By Rick Perlstein. (Scribner, $37.50.) Perlstein's compulsively readable study holds that Nixon's divisive and enduring legacy is the "notion that there are two kinds of Americans."

NOTHING TO BE FRIGHTENED OF. By Julian Barnes. (Knopf, $24.95.) With no faith in an afterlife, why should an agnostic fear death? On this simple question, Barnes hangs an elegant memoir and meditation, full of a novelist's affection for the characters who wander in and out.

NUREYEV: The Life. By Julie Kavanagh. (Pantheon, $37.50.) The son of Soviet Tatars could never get enough of anything — space, applause, money, sex — but he attracted an audience of millions to the art form he mastered.

PICTURES AT A REVOLUTION: Five Movies and the Birth of the New Hollywood. By Mark Harris. (Penguin Press, $27.95.) The best-picture nominees of 1967 were a collage of America's psyche, and more.

THE POST-AMERICAN WORLD. By Fareed Zakaria. (Norton, $25.95.) This relentlessly intelligent examination of power focuses less on American decline than on the rise of China, trailed by India.

PREDICTABLY IRRATIONAL: The Hidden Forces That Shape Our Decisions. By Dan Ariely. (Harper/HarperCollins, $25.95.) Moving comfortably from the lab to broad social questions to his own life, an M.I.T. economist pokes holes in conventional market theory.

THE RACE CARD: How Bluffing About Bias Makes Race Relations Worse. By Richard Thompson Ford. (Farrar, Straus & Giroux, $26.) Ford vivisects every sacred cow in "post-racist" America.

RETRIBUTION: The Battle for Japan, 1944-45. By Max Hastings. (Knopf, $35.) In this masterly account, Hastings describes Japanese madness eliciting American ruthlessness in the Pacific Theater.

A SECULAR AGE. By Charles Taylor. (Belknap/Harvard University, $39.95.) A philosophy professor thinks our era has been too quick to dismiss religious faith.

SHAKESPEARE'S WIFE. By Germaine Greer. (Harper/HarperCollins, $26.95.) With a polemicist's vision and a scholar's patience, Greer sets out to rescue Ann Hathaway from layers of biographical fantasy.

THE SUPERORGANISM: The Beauty, Elegance, and Strangeness of Insect Societies. By Bert Hölldobler and Edward O. Wilson. (Norton, $55.) The central conceit of this astonishing study is that an insect colony is a single animal raised to a higher level.

TELL ME HOW THIS ENDS: General David Petraeus and the Search for a Way Out of Iraq. By Linda Robinson. (PublicAffairs, $27.95.) A probing, conscientious account of strategy and tactics in post-surge Iraq.

THE TEN-CENT PLAGUE: The Great Comic-Book Scare and How It Changed America. By David Hajdu. (Farrar, Straus & Giroux, $26.) A worthy history of the midcentury crusade against the comics industry.

THEY KNEW THEY WERE RIGHT: The Rise of the Neocons. By Jacob Heilbrunn. (Doubleday, $26.) A journalist traces the neoconservative movement from its origins at the City College of New York in the 1940s.

THIS REPUBLIC OF SUFFERING: Death and the American Civil War. By Drew Gilpin Faust. (Knopf, $27.95.) The lasting impact of the war's immense loss of life is the subject of this extraordinary account by Harvard's president.

THE THREE OF US: A Family Story. By Julia Blackburn. (Pantheon, $26.) Searingly and unflinchingly, Blackburn describes an appalling upbringing at the hands of her catastrophically unfit parents.

THRUMPTON HALL: A Memoir of Life in My Father's House. By Miranda Seymour. (Harper/HarperCollins, $24.95.) Seymour's odd and oddly affecting book instantly catapults her father into the front rank of impossible and eccentric English parents.

TRAFFIC: Why We Drive the Way We Do (And What It Says About Us). By Tom Vanderbilt. (Knopf, $24.95.) A surprising, enlightening look at the psychology of the human beings behind the steering wheels.

THE TRILLION DOLLAR MELTDOWN: Easy Money, High Rollers, and the Great Credit Crash. By Charles R. Morris. (PublicAffairs, $22.95.) How we got into the mess we're in, explained briefly and brilliantly.

A VOYAGE LONG AND STRANGE: Rediscovering the New World. By Tony Horwitz. (Holt, $27.50.) An accessible popular history of early America, with plenty of self-tutoring and colorful reporting.

WAKING GIANT: America in the Age of Jackson. By David S. Reynolds. (Harper/HarperCollins, $29.95.) Reynolds excels at depicting the cultural, social and intellectual currents that buffeted the nation.

WHILE THEY SLEPT: An Inquiry Into the Murder of a Family. By Kathryn Harrison. (Random House, $25.) Harrison's account brings moral clarity to the dark fate of the family of Jody Gilley, who was 16 when she survived a rampage by her brother in 1984.

WHITE HEAT: The Friendship of Emily Dickinson and Thomas Wentworth Higginson. By Brenda Wineapple. (Knopf, $27.95.) The hitherto elusive Higginson was the poet's chosen reader, admirer and advocate.

THE WILD PLACES. By Robert Macfarlane. (Penguin, paper, $15.) Macfarlane's unorthodox British landscapes are furrowed with human histories and haunted by literary prophets.

THE WORLD IS WHAT IT IS: The Authorized Biography of V. S. Naipaul. By Patrick French. (Knopf, $30.) French has created a monument fully worthy of its subject, elucidating the enduring but painfully asymmetrical love triangle at the core of Naipaul's life and work.

http://www.nytimes.com/2008/12/07/books/review/100Notable-t.html?8bu&emc=bub1

You're Leaving a Digital Trail. What About Privacy?

By JOHN MARKOFF

Cambridge, Mass.

HARRISON BROWN, an 18-year-old freshman majoring in mathematics at M.I.T., didn't need to do complex calculations to figure out he liked this deal: in exchange for letting researchers track his every move, he receives a free smartphone.

Now, when he dials another student, researchers know. When he sends an e-mail or text message, they also know. When he listens to music, they know the song. Every moment he has his Windows Mobile smartphone with him, they know where he is, and who's nearby.

Mr. Brown and about 100 other students living in Random Hall at M.I.T. have agreed to swap their privacy for smartphones that generate digital trails to be beamed to a central computer. Beyond individual actions, the devices capture a moving picture of the dorm's social network.

The students' data is but a bubble in a vast sea of digital information being recorded by an ever thicker web of sensors, from phones to GPS units to the tags in office ID badges, that capture our movements and interactions. Coupled with information already gathered from sources like Web surfing and credit cards, the data is the basis for an emerging field called collective intelligence.

Propelled by new technologies and the Internet's steady incursion into every nook and cranny of life, collective intelligence offers powerful capabilities, from improving the efficiency of advertising to giving community groups new ways to organize.

But even its practitioners acknowledge that, if misused, collective intelligence tools could create an Orwellian future on a level Big Brother could only dream of.

Collective intelligence could make it possible for insurance companies, for example, to use behavioral data to covertly identify people suffering from a particular disease and deny them insurance coverage.

Similarly, the government or law enforcement agencies could identify members of a protest group by tracking social networks revealed by the new technology. “There are so many uses for this technology — from marketing to war fighting — that I can’t imagine it not pervading our lives in just the next few years,” says Steve Steinberg, a computer scientist who works for an investment firm in New York.

In a widely read Web posting, he argued that there were significant chances that it would be misused, “This is one of the most significant technology trends I have seen in years; it may also be one of the most pernicious.”

For the last 50 years, Americans have worried about the privacy of the individual in the computer age. But new technologies have become so powerful that protecting individual privacy may no longer be the only issue. Now, with the Internet, wireless sensors, and the capability to analyze an avalanche of data, a person’s profile can be drawn without monitoring him or her directly.

“Some have argued that with new technology there is a diminished expectation of privacy,” said Marc Rotenberg, executive director of the Electronic Privacy Information Center, a privacy rights group in Washington. “But the opposite may also be true. New techniques may require us to expand our understanding of privacy and to address the impact that data collection has on groups of individuals and not simply a single person.”

Mr. Brown, for one, isn’t concerned about losing his privacy. The M.I.T researchers have convinced him that they have gone to great lengths to protect any information generated by the experiment that would reveal his identity.

Besides, he says, “the way I see it, we all have Facebook pages, we all have e-mail and Web sites and blogs.”

“This is a drop in the bucket in terms of privacy,” he adds.

GOOGLE and its vast farm of more than a million search engine servers spread around the globe remain the best example of the power and wealth-building potential of collective intelligence. Google’s fabled PageRank algorithm, which was originally responsible for the quality of Google’s search results, drew its precision from the inherent wisdom in the billions of individual Web links that people create.

The company introduced a speech-recognition service in early November, initially for the Apple iPhone, that gains its accuracy in large part from a statistical model built from several trillion search terms that its users have entered in the last decade. In the future, Google will take advantage of spoken queries to predict even more accurately the questions its users will ask.

And, a few weeks ago, Google deployed an early-warning service for spotting flu trends, based on search queries for flu-related symptoms.

The success of Google, along with the rapid spread of the wireless Internet and sensors — like location trackers in cellphones and GPS units in cars — has touched off a race to cash in on collective intelligence technologies.

In 2006, Sense Networks, based in New York, proved that there was a wealth of useful information hidden in a digital archive of GPS data generated by tens of thousands of taxi rides in San Francisco. It could see, for example, that people who worked in the city’s financial district would tend to go to work early when the market was booming, but later when it was down.

It also noticed that middle-income people — as determined by ZIP code data — tended to order cabs more often just before market downturns.

Sense has developed two applications, one for consumers to use on smartphones like the BlackBerry and the iPhone, and the other for companies interested in forecasting social trends and financial behavior. The consumer application, Citysense, identifies entertainment hot spots in a city. It connects information from Yelp and Google about nightclubs and music clubs with data generated by tracking locations of anonymous cellphone users.

The second application, Macrosense, is intended to give businesses insight into human activities. It uses a vast database that merges GPS, Wi-Fi positioning, cell-tower triangulation, radio frequency identification chips and other sensors.

"There is a whole new set of metrics that no one has ever measured," said Greg Skibiski, chief executive of Sense. "We were able to look at people moving around stores" and other locations. Such travel patterns, coupled with data on incomes, can give retailers early insights into sales levels and who is shopping at competitors' stores.

Alex Pentland, a professor at the Media Lab at the Massachusetts Institute of Technology who is leading the dormitory research project, was a co-founder of Sense Networks. He is part of a new generation of researchers who have relatively effortless access to data that in the past was either painstakingly assembled by hand or acquired from questionnaires or interviews that relied on the memories and honesty of the subjects.

The Media Lab researchers have worked with Hitachi Data Systems, the Japanese technology company, to use some of the lab's technologies to improve businesses' efficiency. For example, by equipping employees with sensor badges that generate the same kinds of data provided by the students' smartphones, the researchers determined that face-to-face communication was far more important to an organization's work than was generally believed.

Productivity improved 30 percent with an incremental increase in face-to-face communication, Dr. Pentland said. The results were so promising that Hitachi has established a consulting business that overhauls organizations via the researchers' techniques.

Dr. Pentland calls his research "reality mining" to differentiate it from an earlier generation of data mining conducted through more traditional methods.

Dr. Pentland "is the emperor of networked sensor research," said Michael Macy, a sociologist at Cornell who studies communications networks and their role as social networks. People and organizations, he said, are increasingly choosing to interact with one another through digital means that record traces of those interactions. "This allows scientists to study those interactions in ways that five years ago we never would have thought we could do," he said.

ONCE based on networked personal computers, collective intelligence systems are increasingly being created to leverage wireless networks of digital sensors and smartphones. In one application, groups of scientists and political and environmental activists are developing "participatory sensing" networks.

At the Center for Embedded Networked Sensing at the University of California, Los Angeles, for example, researchers are developing a Web service they call a Personal Environmental Impact Report to build a community map of air quality in Los Angeles. It is intended to let people assess how their activities affect the environment and to make decisions about their health. Users may decide to change their jogging route, or run at a different time of day, depending on air quality at the time.

"Our mantra is to make it possible to observe what was previously unobservable," said Deborah Estrin, director of the center and a computer scientist at U.C.L.A.

But Dr. Estrin said the project still faced a host of challenges, both with the accuracy of tiny sensors and with the researchers' ability to be certain that personal information remains private. She is skeptical about technical efforts to obscure the identity of individual contributors to databases of information collected by network sensors.

Attempts to blur the identity of individuals have only a limited capability, she said. The researchers encrypt the data to protect against identifying particular people, but that has limits.

"Even though we are protecting the information, it is still subject to subpoena and subject to bullying bosses or spouses," she said.

She says that there may still be ways to protect privacy. "I can imagine a system where the data will disappear," she said.

Already, activist groups have seized on the technology to improve the effectiveness of their organizing. A service called MobileActive helps nonprofit organizations around the world use mobile phones to harness the expertise and the energy of their participants, by sending out action alerts, for instance.

Pachube (pronounced "PATCH-bay") is a Web service that lets people share real-time sensor data from anywhere in the world. With Pachube, one can combine and display sensor data, from the cost of energy in one location, to temperature and pollution monitoring, to data flowing from a buoy off the coast of Charleston, S.C., all creating an information-laden snapshot of the world.

Such a complete and constantly updated picture will undoubtedly redefine traditional notions of privacy.

DR. PENTLAND says there are ways to avoid surveillance-society pitfalls that lurk in the technology. For the commercial use of such information, he has proposed a set of principles derived from English common law to guarantee that people have ownership rights to data about their behavior. The idea revolves around three principles: that you have a right to possess your own data, that you control the data that is collected about you, and that you can destroy, remove or redeploy your data as you wish.

At the same time, he argued that individual privacy rights must also be weighed against the public good.

Citing the epidemic involving severe acute respiratory syndrome, or SARS, in recent years, he said technology would have helped health officials watch the movement of infected people as it happened, providing an opportunity to limit the spread of the disease.

"If I could have looked at the cellphone records, it could have been stopped that morning rather than a couple of weeks later," he said. "I'm sorry, that trumps minute concerns about privacy."

Indeed, some collective-intelligence researchers argue that strong concerns about privacy rights are a relatively recent phenomenon in human history.

"The new information tools symbolized by the Internet are radically changing the possibility of how we can organize large-scale human efforts," said Thomas W. Malone, director of the M.I.T. Center for Collective Intelligence.

"For most of human history, people have lived in small tribes where everything they did was known by everyone they knew," Dr. Malone said. "In some sense we're becoming a global village. Privacy may turn out to have become an anomaly."

http://www.nytimes.com/2008/11/30/business/30privacy.html?_r=1&th&emc=th

Amazon deforestation accelerates

The destruction of the Amazon rainforest in Brazil has accelerated for the first time in four years, Brazilian officials say.

Satellite images show 11,968 sq km of land was cleared in the year to July, nearly 4% higher than the year before.

The government said the figure was unsatisfactory but could have been a lot worse if it had not taken action against illegal logging.

High commodity prices had allegedly tempted farmers to clear more land.

In recent years the Brazilian government has been able to celebrate three successive falls in deforestation.

But the latest estimate from the National Institute for Space Research, known as INPE, shows that this trend has come to a halt.

'Could be worse'

Gilberto Camara of the Space Research Institute, said they would have liked better news.

"We believe it is a setback, but we believe it is also positive in the sense that the expected levels were much higher," Mr Camara said.

"There was a lot of burning on the ground in the second half of 2007, which could have led to a much greater increase in deforestation."

In late 2007 and early 2008 there were signs that deforestation was on the rise again - with land said to be in demand for cattle and soya at a time when commodity prices were high, says the BBC's Garry Duffy in Sao Paulo.

In response the government announced a series of measures to clamp down on illegal logging, including a major operation involving police and environmental inspectors known as the "Arc of Fire".

Brazil's Environment Minister, Carlos Minc, said that without actions like this, the figures could have been much higher.

"Many had expected an increase of 30-40% and we managed to stabilise it," Mr Minc told a news conference.

But he said that the government was still not satisfied.

"We want to lower numbers even more. We want zero deforestation."

Environmental groups will be watching the situation carefully to see if the resolve and the resources they say are needed to protect the Amazon region are in place, our correspondent says.

Story from BBC NEWS:
http://news.bbc.co.uk/go/pr/fr/-/2/hi/americas/7756241.stm

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Protection boost for rare gorilla

By Richard Black
Environment correspondent, BBC News website

The government of Cameroon has created a new national park aimed at protecting the critically endangered Cross River gorilla, the world's rarest.

Takamanda National Park, on the border with Nigeria, is home to an estimated 115 Cross River gorillas.

The total population of the subspecies is thought to be less than 300.

The news comes as governments of 10 gorilla range states gather in Rome for the first meeting of a new partnership aimed at protecting the primates.

The Gorilla Agreement was finalised in June, and brings together all the countries where the various species and subspecies are found.

The Wildlife Conservation Society (WCS) helped establish the Takamanda park, and believes it will help curb the hunting and forest destruction that have brought Cross River numbers to such a minuscule level.

"The government of Cameroon is to be commended for taking this step in saving the Cross River gorilla for future generations," said Steven Sanderson, president and CEO of WCS.

"By forming this national park, Cameroon sends a powerful message about the importance of conservation."

Gorillas should be able to move freely between the Takamanda reserve and Nigeria's Cross River National Park just across the border, helping to repair the fragmentation of habitat which can isolate tiny wildlife populations.

Communal benefits

Two years ago, with most gorilla populations falling, environment groups and concerned governments initiated a process designed to bring all the countries where the animals live into a new conservation deal.

The Gorilla Agreement, formulated under the UN Convention on Migratory Species (CMS), is the result.

Among other things, member governments have pledged to ensure suitable habitat is protected, co-operate with each other, restrain the spread of the Ebola virus, raise awareness of gorilla conservation and minimise conflict between the animals and human populations.

On Saturday, the 10 member countries hold their inaugural meeting in Rome.

"Getting the agreement signed was a great conservation achievement," said David Greer, co-ordinator of the African Great Apes Programme with conservation group WWF.

"It is now time for action. Together, we will look specifically at what steps each government will take to ensure gorillas have a secure future in the wild - through direct conservation action in a way that also benefits local communities."

This is a crucial aspect of the agreement. An estimated 15,000 people, for example, make a living from the flora and fauna of the Takamanda forest; without involving them in conservation initiatives, it is unlikely that the downward slide of Cross River gorillas could be stopped.

Other threats such as conflict would ideally be addressed under the agreement. Unrest in Democratic Republic of Congo (DRC) has brought armed conflict to Virunga National Park, rendering conservation impossible and raising the chances of primates being shot for food.

A coalition of groups, including the UN Environment Programme and the World Association of Zoos and Aquariums, has declared 2009 the Year of the Gorilla in an attempt to raise awareness about the animals still further.

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Story from BBC NEWS:
http://news.bbc.co.uk/go/pr/fr/-/2/hi/science/nature/7754544.stm

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