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From Snidely Whiplash to Joads: Foreclosures as seen in the arts

Julia Keller

Dip a battered tin cup into the choppy, overwrought waters of "The Grapes of Wrath" and you'll pull up a mess of stuff: anger, sadness, dirt, drowned dreams, rusty screws, rocks, thwarted passions and gravel.

When times get tough, as John Steinbeck chronicles in his 1939 novel, the American dream gets turned inside out. Everything that was wonderful turns to ash. The sweet goes sour. And homeownership -- the four-square foundation of the nation's self-image -- becomes a source of frustrated rage. It's not just that people are losing their homes; that can happen in the wake of floods or fires or hurricanes. Steinbeck's point -- one that has acute relevance to the contemporary subprime mortgage crisis -- is that the loss is intensified when the home is yanked away by a bank, by an institution with a hunk of polished marble in lieu of a heart:

"The Bank -- or the Company -- needs -- wants -- insists -- must have -- as though the Bank or the Company were a monster, with thought and feeling, which had ensnared them," Steinbeck wrote of the men who repossess workers' homes. "The Bank is something more than men, I tell you. It's the monster. Men made it, but they can't control it."

The United States has faced a variety of economic catastrophes. But what makes the current subprime mortgage situation especially calamitous is a concept that authors and filmmakers have recognized for a long time: It's not just the loss of a home that hurts. It's the loss of a home at the hands of high-powered financial institutions. The victims aren't relinquishing simply a garage, a family room and maybe some nice drapes; they're saying goodbye to an ideal of trust and belief.

Foreclosures are the dark side of the American dream. And, just as many works of art depict the joys of homeownership after long striving, such as Lorraine Hansberry's powerful 1959 play "A Raisin in the Sun" or John Grisham's heartfelt novel "A Painted House" (2001), others have depicted with equal vigor the pain of losing those homes -- and losing them because of fast-talking salesmen who peddled not snake oil, but adjustable-rate mortgages.

Even when played for laughs, home foreclosures are a staple of American popular culture. The ebony-cloaked, mustachioed villain known as Snidely Whiplash, who relished kicking widows and orphans out of their cottages in the cartoon series "Dudley Do-Right" beginning in 1963, remains a stock figure: the evil, cackling bad guy who does the bank's odious bidding.

The serious portraits, though, still resonate. In "Cloudsplitter" (1998), Russell Banks' jumbo novel about John Brown, a watershed moment for the extremist abolitionist occurs when he borrows against the family home -- and loses everything. "To his [Brown's] further horror, the original lien against the place had been called in by the bank and sold at auction," recalls Brown's son, who narrates the tale. "Blinded by his anger, Father was unable to accept the reality of the situation ... and as a consequence, one warm day the county sheriff and his deputies came out to the farm to put us off it." John Brown is out of control, his son remembers: "The prospect of losing the place had put him in a mindless frenzy."

Banks intimates that such an ego-shattering experience may have planted the seeds for Brown's later fury and violence. Seeing his family forcibly sent away from home by men with money and power was enough to push Brown over the edge, enough to turn a righteous wrath against slavery into a blaze of domestic terrorism.

The 1984 film "Country," in which a farm couple played by Jessica Lange and Sam Shepard get behind in their mortgage payments, features a wrenching scene. An auctioneer shows up to dispose of their house and property, but before he can get the sale going, neighbors arrive and begin chanting, "No sale! No sale!" It is a potent reminder of the emotional trauma of losing one's home -- the place for which one has struggled and sacrificed for long years -- to a cold, soulless bureaucracy.

Yet it is "The Grapes of Wrath," that great dark symphony of Americana, that turns foreclosure into a stubborn bass note, ponderous and snarling, as it drowns out hope and reason.

"And all of them were caught in something larger than themselves," Steinbeck writes of the hired gangs who come to throw people out of their homes. "Some of them hated the mathematics that drove them, and some were afraid, and some worshipped the mathematics because it provided a refuge from thought and from feeling. ... The bank -- the monster has to have profits all the time. It can't wait. It'll die."

Steinbeck's words are melodramatic and over the top, as great novels sometimes are, and it wildly oversimplifies a highly complex situation, as great novels sometimes do. But it gets at a theme that the present subprime crisis has revived: A home is more than walls and a floor. It's a piece of the American dream that, when it is dragged forcibly away from the people who believed in it, leaves a mark on the soul as well as the sidewalk.

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http://www.chicagotribune.com/entertainment/chi-0203_litlifemain_coverfeb03,1,2716083.column?ctrack=3&cset=true

Where the Capitalism Is (Always on Display)
By EDWARD ROTHSTEIN

A few years ago, when irrational exuberance reigned, opening a handsome museum devoted to the history and celebration of money just a block from the New York Stock Exchange might have seemed somewhat vulgar. In times of enthusiasm and plenty, celebration is superfluous. Why devote reverential attention to something when its powers are so omnipresent that they provide daily fodder for gossip?

Now, of course, it's a different story. At a time of uncertainty — as the market quavers, the dollar sinks, sub-prime lenders go belly up, and the Federal Reserve Bank rapidly twists its dials — money becomes more puzzling and more unpredictable, demanding closer scrutiny.

So while opening the Museum of American Finance on Wall Street last month might at first have seemed like bad timing — like buying a stock at its top, or selling at its bottom — there was actually no better moment to mount this tribute to the "forces that have made New York City the financial capital of the world" (as one of the museum's displays puts it). And if our city's status and the currency that backs it are more contested than they once were, that only makes the enterprise more urgently intriguing.

In fact, the museum was founded just after the 1987 market crash, because John Herzog, chairman of a trading firm that has since become part of Merrill Lynch, said he felt that there was no "institutional memory" on Wall Street. Moments of crisis require that expanded perspective, and, as the museum's founding shows, they also inspire it.

Once housed in a much smaller space at the United States Customs House (where it also had the more ponderous title of Museum of American Financial History), the institution has now come into its own, leasing 30,000 square feet of the former Bank of New York building. And since the nearby New York Stock Exchange has been closed to the public since Sept. 11, this museum may also become a de facto visitors' center.

After $9 million in costs (and with a $3 million annual budget), the museum, an affiliate of the Smithsonian Institution, now has a library and an auditorium, along with 10,000 square feet of exhibition space on what was once the imposing "private banking" mezzanine. It is a magisterial space, its grand murals celebrating American industrial achievements — powered, presumably, by the investments of many who once banked here.

Unfortunately, the bank was completed just before the 1929 market crash, which must have left many clients in straitened circumstances. But this museum is not shy about such vagaries in financial fortune. It sees its mission as both celebratory — paying tribute to the "American democratic open market system" — and educational, depicting just how that system evolved and the ways it works and sometimes falters.

So little is taught about this subject in the public schools, and so much still needs to be learned by those who have not quite figured out the nature of derivatives and other financial instruments, that the museum is both welcome in what it attempts and disappointing in how it falls short. In some cases it is too obvious (a wall display of the objects lying behind the trade of pork belly and grain futures doesn't add much); in other cases too compressed (being taught about the nature of bonds is one thing, understanding junk bonds is something else).

There are other problems as well. We wait to see how all of this will congeal into a clear understanding of the ways American markets differ from others, or why capitalism, in this particular form, has become so immensely successful. There might also have been more exploration of the debates that have raged over the last 150 years. Winston Churchill's quotation is left to speak for itself without commentary: "The inherent vice of capitalism is the unequal sharing of blessings; the inherent virtue of socialism is the equal sharing of miseries."

What is needed is a better strategy for teaching something about the economic system — perhaps interactive displays outlining the way a market actually works. Instead too much space is devoted to freestanding touch-screen monitors offering extensive interviews with 16 entrepreneurs, including Robin Chase (Zipcar) and David G. Neeleman (JetBlue); many of these figures are far less interesting than what they accomplished. And there is such a thing as too much tribute: Citigroup gets an unnecessary, promotional display of objects and video, while a more detailed case history, demonstrating a single corporation's successes and failures, risks and ventures, would be far more revealing.

So I hoped for more. The frustration is that this is not just a good story; it is a great story, an epic, and here it can be glimpsed only piecemeal. But there are so many fragments here, and so many compelling ones, that the individual parts actually end up greater than their sum. Unusual items from the museum's 10,000-object collection range from early adding machines to the ticker tape detailing the plummeting prices of the 1929 crash; from a 1720 South Sea Company stock certificate signed by Isaac Newton, who lost his investment in a speculative "bubble" of the 18th century, to a check signed by John D. Rockefeller.

Some of the displays, designed by C&G Partners (which created the deft exhibits at the redesigned Griffith Observatory in Los Angeles), tell their story with humor, using touch screens to give the history of bank robbery, or showing a clip from "It's a Wonderful Life," so that Jimmy Stewart can explain the virtues of a "savings and loan." A small room devoted to the history of American money could have been twice as large and was easily the most coherent in the museum, aided by nearly $6 million in rare coins and bills and a 60-pound ingot from the California Gold Rush, found in a shipwreck. The armed guard outside that room served as a reminder of what this exhibition space once was.

Such sensations make the museum far less staid than it appears. What is shown again and again, in the charts and anecdotes, is how difficult a partner fortune can be (though Fortune — the magazine — exhibited in a display of some classic issues from the 1930s and '40s, was clearly both lovely and powerful). The wheel of fortune is an ancient concept, and it can be seen revolving here, not just in the history of the room itself, but in tumultuous stories condensed into labels and objects. The distinctively American twist is the idea that the wheel can be manually turned — and that anybody can spin it, even though some results may be unexpected.

A board game from 1886 is like a do-it-yourself Horatio Alger story. "Game of the District Messenger Boy," reads the faded box, "or Merit Rewarded." Figures looking like racing Wall Street messengers move around the board as instructed by a spinning wheel: "Advance to District Manager," reads one square; "Drowsiness, go back to Reprimand," reads another.

Elsewhere we read of the "oracle of Omaha," Warren E. Buffett — the only pupil of the renowned Columbia University economist Benjamin Graham to have ever earned an A+ in his graduate work — but also of "Enron's (Mis)Managers" and of figures like William C. Durant, the founder of General Motors, who went from being a billionaire to (in the wake of the 1929 crash) becoming a dishwasher, running a bowling alley and selling a dandruff cure. Some wealth is created out of risk and labor; but so, too, is some poverty. Freedom has come from capital; so, too, has slavery. A scrap of paper becomes a fortune, and a fortune becomes worthless paper.

One display reminds us that Willie Sutton famously explained that he robbed banks "because that's where the money is." But we come to this former bank to see exactly what money is — and what America has made of it. That doesn't really happen. But enough is seen so that money starts to seem less like a material object than like something more ethereal, affected by sea winds and psychology, faith and risk. And at this uncertain moment its mysterious powers seem all the more uncanny: it's a perfect time to see it in action. This museum is not a bad place to start.

The Museum of American Finance is open Tuesdays through Saturdays at 48 Wall Street, Lower Manhattan; (212) 908-4110 or financialhistory.org.

http://www.nytimes.com/2008/02/02/arts/design/02muse.html?_r=2&ref=arts&oref=slogin&oref=slogin

'THE MADDENING TRUTH'

Travels With Hemingway: That's Not All She Wrote
By WILBORN HAMPTON

It is one of the myths of the profession that inside every journalist there is a great novel struggling to get out. For Ernest Hemingway, the myth became a reality. For Martha Gellhorn, Hemingway's third wife, the struggle was her life story. In "The Maddening Truth," a new play being staged by the Keen Company at the Clurman Theater, David Hay makes a case that Gellhorn ultimately won the battle.

Gellhorn, who died in 1998, is one of those writers one has often heard about but rarely reads. She was a pioneer among women as a foreign correspondent, working first in the Paris bureau of United Press and then as a reporter for Collier's magazine during the Spanish Civil War. She covered every theater of World War II, including the Allied landings on D-Day. She was at Dachau, the Nazi death camp, after it was liberated, and her account is a textbook example of reporting. For all the bravura of her journalism, however, she longed to be accepted as a novelist, and Mr. Hay's play concerns her inner turmoil in pursuing that goal. Told in a series of scenes that move backward and forward in time, the play opens in 1972 as Gellhorn is trying to return to Vietnam. For the sake of narrative expediency, some episodes from her far-flung life and several characters are collapsed; a string of lovers, for example, is represented by one, Laurance Rockefeller.

Mr. Hay captures the complexity of Gellhorn's character. She could be sharp-tongued or sweet-talking and was not above using her sexual allure to get her way. Highly opinionated, she had a keen eye for detail but little time for objectivity in her journalism. Her defense against bad reviews for her novels and other books was disdain for all other writers. While "The Maddening Truth," which has been smoothly directed by Carl Forsman, is fascinating as a character study, its weakness as a play is the paucity of dramatic conflict. Except for a shouting match or two with a reporter and one excellent scene in which Gellhorn, trying to write a novel in Kenya, confronts Hemingway's ghost, the 100-minute show is mainly a chronicle of her life.

Lisa Emery, nervously tapping her foot, pouring a glass of whiskey, puffing a cigarette or flirting, brings Gellhorn to life in a portrayal that lays bare her frustration and anger. William Connell, Terry Layman, Richard Bekins and Peter Benson all give fine performances in support.

Early in the play an editor at a London newspaper rebuffs a reporter wanting to do an interview with Gellhorn by saying: "Why on earth should anyone have the slightest interest in her now? Other than the fact she was married to Hemingway." Mr. Hay offers his audience several reasons.

"The Maddening Truth" continues through Feb. 17 at the Clurman Theater, 410 West 42nd Street, Clinton, (212) 279-4200, ticketcentral.com.

http://theater2.nytimes.com/2008/02/01/theater/reviews/01trut.html?ref=books

Without Metaphor
By KATIE ROIPHE

SWIMMING IN A SEA OF DEATH

A Son's Memoir.

By David Rieff.

180 pp. Simon & Schuster. $21.

One can't say Susan Sontag died a particularly private death. She once declared she wouldn't tell her readers "what it is really like to emigrate to the kingdom of the ill and live there," but it seems other people were determined to do it for her. The latest glimpse we have of her sickbed is "Swimming in a Sea of Death," David Rieff's intelligent, disordered account of his mother's final illness.

It is perhaps surprising that Rieff objects violently to the frank and controversial photographs that Annie Leibovitz took of his mother as she was dying. He writes that Sontag was "humiliated posthumously" by Leibovitz's "carnival images of celebrity death."

Rieff himself seems to have made a compromise with the business of intimate revelation; in his indirection one feels the tastefulness, the reserve of the reluctant or ambivalent memoirist. His images of his mother are vague, a figure weeping in another room; if they were sketches, they would be rendered in a charcoal smudge. We see her underlining a pamphlet put out by the Leukemia and Lymphoma Society, but we do not see her illness itself in any detail. Rieff tells us he is not taking notes during her final months (which echoes Leibovitz's assertion that she stopped taking pictures during that same time). He tells us, in one elliptical passage, that "she might be covered in sores, incontinent and half delirious," but he does not want to write straightforwardly that she is.

What is shocking about the memoir is how ordinary Sontag seems. The reactions of this strong, singular woman to her illness, as Rieff reports them, are oddly generic. In a car returning from receiving the terrible diagnosis, he writes, she looks out the window, and "'Wow' she said, 'Wow.'" It tells us

something important, surely, that one of the most articulate women of the last century should say, in the face of her cancer, “Wow.”

In fact, Sontag’s confrontation with her own ordinariness is the most intriguing element of Rieff’s story. For a woman who had always believed in her own exceptionality, who had defined herself by her will to be different, to rise above, the terrifying democracy of illness is one of its most painful aspects. Throughout her final illness, she tells Rieff, “This time, for the first time in my life, I don’t feel special.” In the most profound and affecting passages of the book, Rieff questions whether, on some level, his mother thought that she was too special to die. He investigates the line between hubris and bravery, grandiosity and vitality. Do we ever truly accept that we will die? Is there a part of the mind, especially for someone as ambitious, as avid, as Sontag, that refuses to believe in its own extinction? Rieff enumerates the qualities that enabled her to transcend her unhappy girlhood in Arizona and her early unhappy marriage to become one of the country’s most formidable intellectuals. “Her sense that whatever she could will in life she could probably accomplish ... had served her so well for so long that, empirically, it would have been madness on her part not to have made it her organizing principle, her true north,” he writes. That same belief in the power of her own desire, that spectacular ambition, that intellectual bravado, made it impossible to accept that fatal illness was not another circumstance she could master.

Of course, Sontag’s belief in her exceptionality had a history. In her first bout with breast cancer in her early 40s, she survived. In early interviews after her recovery, she seemed intoxicated by her brush with death. She claimed she had acquired a “fierce intensity” that she would bring to her work; and she incorporated the idea of radical illness into the drama of her intellect, the dark glamour of her writer’s pose. Sontag had written in her diary during her treatment that she needed to learn “how to turn it into a liberation.” And it was that determination, that stubbornness, that constant act of self-transcendence that she thought she could reproduce at 71, when cancer was diagnosed for a third time. But this time it didn’t work. “She had the death that somewhere she must have come to believe that other people had from cancer,” Rieff writes, “the death where knowledge meant nothing, the will to fight meant nothing, the skill of the doctors meant nothing.”

For a writer who voluntarily embarks on a memoir about his mother, Rieff is curiously silent on the subject of their relationship, but the contrast in styles speaks for itself. If Sontag was incomparable in her confidence, grand-scale in her ambition, constitutionally incapable of self-irony, her son is the opposite. He is disarming in his tentativeness, his modesty, his self-doubt. “I am not even remotely smart enough to resolve any of this, even in my own mind,” he writes.

The book is haunted by Rieff’s anxiety that Sontag may have undergone an arduous treatment that was almost certain to fail, and in doing so put herself through an unnecessary ordeal. One of the doctors Rieff consults suggests a “folie à deux” between some cancer patients and their doctors, where physicians offer elaborate treatments, holding out hope when there is essentially none, in order to honor their patients’ last wishes to battle their disease. Did Sontag undergo a painful and doomed bone marrow transplant because she refused to accept the basic medical facts of her case? Rieff suggests that she might have. She struggled past the moment it was rational to struggle. Rieff seems to wish she had died a more peaceful death.

One of the fascinations of this memoir is watching Sontag’s thoughts play themselves out in the medium of life. In her elegant polemic, “Illness as Metaphor,” she argues against the various fantasies that surround disease. Instead of poetry and emotionally charged beliefs, she argues, patients need to see clearly, think rationally, arm themselves with medical information to prepare themselves for the hard work of the cure. When Sontag was sick, she wrote in her journals that “I have become afraid of my own imagination.” It was this fear she so brilliantly investigated and rejected in “Illness as Metaphor.” The imagination, the romantic overlay we give disease, becomes the patient’s worst enemy.

The purity and charisma of the ideas Sontag laid out in “Illness as Metaphor” are irresistible, and yet this time around, for Sontag, seeing clearly and absorbing information would lead only to the certain knowledge that she would die. In her final confrontation with cancer, she needed consolation; she needed fantasy; she needed not to think clearly. This was the dilemma for Rieff: Should he act according to what

he felt his mother wanted as she lay in her hospital bed, nurturing false hopes and offering comforting lies? Or should he follow the dictates of her rigorous, uncompromising work, and tell her the truth? Rieff returns again and again to his guilt over whether he should have been more honest. The book's very structure mimics the restlessness of a family member in a hospital room: pacing, circling, hovering. In the end, Sontag couldn't live her illness without metaphor; she needed the idea of a fight even after the fight was lost.

Ultimately, Sontag's strength is hard to disconnect from her folly. Her way of dying seems impossible, arrogant, heroic. Her conclusions, so hard won, so beautifully wrought, in "Illness as Metaphor" seem a luxury here. In the introduction to that book, Sontag wrote about the kingdom of the ill, but in the real kingdom of the ill, as Rieff reminds us, there is no place to ruminate on metaphors: there is only death. From her bed at Memorial Sloan-Kettering, when she was recovering from breast cancer, Sontag wrote in her journal, "In the valley of sorrow, spread your wings." Rieff, his mother's son, unwilling to mystify, to romanticize, adds that "this was not the way she died." But it is, of course, the way she lived.

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http://www.nytimes.com/2008/02/03/books/review/Roiphe-t.html?ref=books

Log On. Tune Out.
By JOHN LANCHESTER

AGAINST THE MACHINE:

Being Human in the Age of the Electronic Mob

By Lee Siegel.

182 pp. Spiegel & Grau. $22.95.

One of the oldest and soundest rules in intellectual life is "never get in a parsing contest with a skunk." It is a principle that the lively, intelligent, combative cultural critic Lee Siegel forgot in autumn 2006, when he gave in to the temptation to respond to comments about him posted on his blog at The New Republic's Web site. Some of the comments were anonymous and abusive — featuring allegations of chromosomal deficiencies and pedophilia — and Siegel replied under the pseudonym "sprezzatura," praising his own work and denouncing his critics ("You couldn't tie Siegel's shoelaces"). When it emerged that Siegel was sprezzatura, he was pilloried in the blogosphere, suspended by The New Republic and, "in good American fashion," he writes, rewarded with the opportunity "to write the book on Web culture that I'd long wanted to write."

Under the circumstances, no one would expect that new book, "Against the Machine," to be a valentine to the Internet. The book describes itself, in its first sentence, as being "about the way the Internet is reshaping our thoughts about ourselves, other people and the world around us." The view it takes of that reshaping is an angry, dark one. Siegel sees the Internet as "the first social environment to serve the needs of the isolated, elevated, asocial individual." "Against the Machine" sets out to explore the consequences of that fact.

There is a variety of Luddite cultural pessimist who sees the Internet as inherently trivial, a gigantic nonevent in the history of man. Most Net naysayers are in that camp, but Siegel isn't one of them. In that sense, he agrees with the Net's boosters and hucksters. He thinks that "the Internet is possibly the most radical transformation of private and public life in the history of humankind." The trouble is that "from the way it is publicly discussed, you would think that this gigantic jolt to the status quo had all the consequences of buying a new car." Siegel's mission is to make his readers think about the negative effects of the Internet — its destructive impact on our culture, on our polity and, perhaps most important, on our sense of ourselves.

The indictment comes with a number of counts. Siegel argues that the Internet invites people to "carefully craft their privacy into a marketable, public style." In doing so it creates an environment in which everything is on display all the time, whether on YouTube, on Internet dating sites or in the blogosphere. This turns the culture into a giant popularity contest, an expanded and never-ending version of high school. "You must sound more like everyone else than anyone else is able to sound like everyone else," Siegel writes. Thanks to the Internet, and to shows like "American Idol," we are encouraged to believe in a phony idea of interactivity, as "all popular culture aspires to full viewer participation." "Popular culture," he argues, "used to draw people to what they liked. Internet culture draws people to what

everyone else likes." Siegel makes the strong point that "what the Internet hypes as 'connectivity' is, in fact, its exact opposite." People sitting on their own in front of computer screens — this once would have been called disconnectedness or atomization. Siegel is blistering on the "surreal world of Web 2.0, where the rhetoric of democracy, freedom and access is often a fig leaf for antidemocratic and coercive rhetoric; where commercial ambitions dress up in the sheep's clothing of humanistic values; and where, ironically, technology has turned back the clock from disinterested enjoyment of high and popular art to a primitive culture of crude, grasping self-interest."

Most good cultural critics are instinctive moralists, and Siegel is a fine example of the type. But criticism of this type often leaves the reader wondering, as James Joyce wondered apropos Wyndham Lewis's attacks on "Ulysses": Even if all of this argument is granted as true, how much of the truth is it? How much does it leave out, and how much could be said on the other side of the story? Pretty much everyone not madly in love with the Web will agree with some of what Siegel says about Internet culture. Anonymity may be a desirable quality for a corporate whistle-blower or a Chinese political blogger, but it is an almost entirely destructive force in the online discourse of the West, and Siegel is right to say so. But there are counterpoints to be made and counterexamples to be offered at more or less every stage of Siegel's argument. For example, although Siegel notes that there are "about 70 million blogs in existence, with between 40,000 and 50,000 being created every day," he doesn't point out that most of those blogs aren't in English — doesn't, in fact, acknowledge the impact of the Internet anywhere outside America. That, in the context of this discussion, is a little provincial. If the Internet changes everything, the rest of the planet has to be part of the story.

It also doesn't help Siegel's case that he is so angry all the time. "Against the Machine" is an intemperate book. Siegel is too quick to attribute mercantile or otherwise venal motives to people with whom he disagrees, and the range of interesting thinkers at whom he takes potshots is pretty wide: Kevin Kelly, Stewart Brand, David Brooks, Malcolm Gladwell, Lawrence Lessig and many others. He is hasty, and at times careless, as in this paragraph on the Lonelygirl15 affair, a YouTube stunt from 2006 featuring a young actress who turned out to be represented by the Creative Artists Agency:

"By the time the Lonelygirl hoax was revealed, the country had long been reeling from a series of public betrayals. Enron officials had lied to their shareholders. A New York Times reporter named Jayson Blair had lied to his editors. James Frey had fabricated events in his best-selling, Oprah-endorsed memoir. Most consequentially, and outrageously, of all, President Bush had clearly lied to America and to the world about the existence of weapons of mass destruction in Iraq, and also about a connection between Saddam Hussein and Al Qaeda. You might have expected an exasperated American public, or at least the American media and blogosphere, to be equally angered by the revelation that YouTube and MySpace had been infiltrated by dishonest and powerful vested interests."

The fact that a man as smart as Siegel came to put Lonelygirl15 and Iraq into the same train of argument is a sign of the Internet's power to make people lose all sense of perspective. The ramped-up affect of "Against the Machine," its air of haste and its ad hominem quality are uncomfortably reminiscent of the blogs Siegel so dislikes. There are moments when it seems that Siegel is baring psychic wounds in public, and the reader comes to suspect that he was much more troubled by his bruising experience with the blogosphere than he is willing to let on. Why is so much to do with the Internet — so much of what's said on it, and so much of what's said about it, by its advocates and its detractors — so angry? "Against the Machine" doesn't solve that mystery. But at least Siegel signs his arguments with his own name.

John Lanchester's most recent book is a memoir, "Family Romance."

http://www.nytimes.com/2008/02/03/books/review/Lanchester-t.html?ref=books&pagewanted=print

Trisha Brown debuts three dances at Joyce Theater

BY APOLLINAIRE SCHERR

February 3, 2008

Sixteen years ago, when Trisha Brown won a MacArthur "genius" award - the first the philanthropic foundation granted a woman choreographer - she bought a small, shingled house in Hampton Bays. It stands inside a lattice of light woven by a wide circle of pines, spruces and maples.

"It was like heaven," she says of her first night on the 1 1/2-acre plot, which she shares with her husband, video artist Burt Barr. "I went out and stood in those trees all night, just looking. I wanted to see what everyone was doing! I looked at my feet and the bark, the simplest things in the world. I had been so deprived."

For three decades, the internationally known postmodern choreographer and opera director had lived in converted industrial lofts in lower Manhattan. But she grew up in Aberdeen, Wash., with a huge forest on one side and the wild Pacific Ocean on another.

"Even rhythmically," she says, "I'm still linked to what it's like to run down the side of a hill inside the forest with maybe a few creeks intercepting, and decide what's sand, what's solid ground and what's rotten wood and unstable. You're always adjusting. You don't run straight down the hill, or you'll land in the creek."

Cultivated by her early and long familiarity with nature, this luscious yet precise sensibility graces nearly five decades of dances, including the three pieces that the Trisha Brown Dance Company will perform this week at the Joyce Theater.

The premiere "I love my robots" and the revivals "If you couldn't see me"and "Foray Forêt" may span 17 years and several phases in Brown's fruitful career, but they all generate surprising drama out of simple distinctions. Inside and outside, edge and center, front and back, person and robot exchange places or seep into one another.

Before she blurs boundaries, though, Brown firmly establishes them. "I love limitations," she says softly. (Even when she's emphatic, Brown maintains a shy person's quiet.) "Postmodern dance is so

capable of giving you 10,000 ideas and no traffic signs. And how do you limit it, how do you choose? The choreographer has to make up how they make up a dance - that's big."

For the 1994 solo "If you couldn't see me," she let her friend Robert Rauschenberg do the honors. When the artist got a Yamaha keyboard for Christmas, he fantasized about playing a weepy country ballad with a title like "If you never saw me again" while Brown danced with her back to him.

So she did (though without the serenade). "I learned so much about how to convey expression when the methods for doing that are all on the front of your body, your smile and hands," she says. "But at first I wanted to cry all the time, because I couldn't tell what the audience was thinking."

The audience has been affected as well. "The dance [has] had a narrative for people, like I was dancing into the void. It had a life."

Last year's "I love my robots" - receiving its New York premiere this week - highlights Brown's playful side. (She is always playing, in fact, though the rigor and subtlety of her experiments often camouflage the goofy premise.)

Designed by architect Kenjiro Okazaki, the robots in question are absurdly plain. "They don't have arms or legs or faces," Brown says. "They only have a tube to represent them." Still, bobbling on their thin stems and skimming across the stage as if by whim (actually by remote control), they become more human than the humans methodically tracing circles inside of squares inside of circles across every inch of the space.

Beyond the forest

The 1990 "Foray Forêt" borrows most directly from Brown's childhood. The dance turns the stage into a forest clearing, spacious to its inhabitants and yet secluded - however tenuously - from the outside world. "Foray Forêt" plunges us into sudden pockets of inwardness.

Brown achieves this mysterious effect by working every aspect of the theater subtly and seamlessly. There is no set or plot to the dance. Instead, Rauschenberg's shimmery costumes and shafts of light dapple the stage. Trios turn into duets and then solos in an easy, incidental way. Dancers' hands and feet creep into view at the wings like forest creatures in the underbrush. And a live marching band parades just out of sight along the theater's perimeter, the peppy tunes rising and fading as the musicians tromp closer and farther.

About those toes and fingers peeking in from the wings, Brown says, "I called that 'trouble at the border.' I told the dancers, there has to be some kind of fuss when you get onto or off the stage, like when you're getting in or out of a swimming pool."

As for the marching band, "If you grew up in Aberdeen, it was always a big deal when you heard Sousa, a marching band. It either meant Roosevelt was coming to town or the circus or something really ravishing for a kid. And I thought, I wonder if everyone goes somewhere back in their heads when they hear Sousa."

It's OK with Brown if they don't. And if the audience never imagines that she does, that's fine, too. After all, she moved to New York - in 1961 - to leave her country ways behind. " Deborah Hay came to me around then and said, 'We've got a farm in Maine. Come on up,' and I thought, I came to New York to dance, not to go back to Aberdeen."

Influential landscapes

SoHo was a light industrial district when, in the '70s, Brown bought the loft where she still lives. So many trucks were backed up to loading docks that walking down the street became its own dance. "I'd duck seven times on my block," she says.

She embraced the urban landscape. The building in the now-legendary 1970 dance-with-rigging, "Man

Walking Down the Side of a Building," was a stolid brick number from the neighborhood. Another piece stretched across rooftops from Spring Street to White Street, with the water towers as the serendipitous sets. A loft's dead wires and holes in the plaster served as movement cues for structured improvisation - for example, "Collapse to the floor at the dead wire. Swerve to the right at the hole."

But once a wild girl, always a wild girl. For Brown, "landscape" - with or without "urban" - is the operative word. Whether the stage is the side of a building, a pillared SoHo gallery, a crowded sidewalk or, later in her career, a regular old proscenium theater, Brown has treated it with a wide-eyed attentiveness usually reserved for observations of nature.

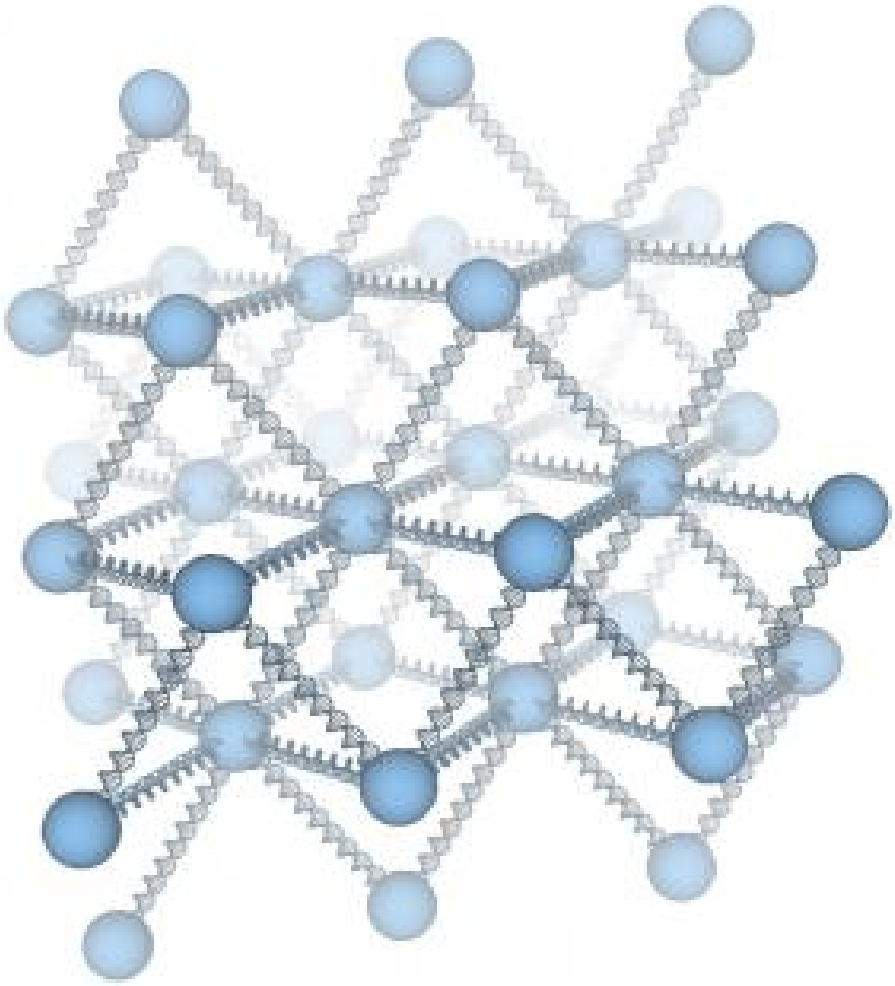
One of the pleasures of Hampton Bays, she says, is "there's water on all sides" - the Great Peconic Bay, the Tiana Bay, the Shinnecock Bay and then the Atlantic Ocean "all the way to Europe." She likes to collect bricks whose edges the tide has worn away, but she doesn't need to go down to the water all the time. "I'm not avaricious," she says. It's enough to know "there's liquid everywhere."

That's how nature is in Brown's dances. Even when we can't see it, we know it's there.

WHEN&WHERE: The Trisha Brown Dance Company performs Tuesday through Sunday at the Joyce Theater, 175 Eighth Ave. at 18th Street, Manhattan. Tickets $35. Call 212-242-0800 or visit joyce.org.

http://www.newsday.com/entertainment/arts/ny-ffdnc5557817feb03,0,4473803.story

DNA Is Blueprint, Contractor And Construction Worker For New Structures



Computer rendition of a structure created by using DNA to assemble nanoparticles into well-defined crystal lattices. (Credit: Northwestern University)

ScienceDaily (Feb. 4, 2008) — DNA is the blueprint of all life, giving instruction and function to organisms ranging from simple one-celled bacteria to complex human beings. Now Northwestern University researchers report they have used DNA as the blueprint, contractor and construction worker to build a three-dimensional structure out of gold, a lifeless material.

Using just one kind of nanoparticle (gold) the researchers built two common but very different crystalline structures by merely changing one thing -- the strands of synthesized DNA attached to the tiny gold spheres. A different DNA sequence in the strand resulted in the formation of a different crystal.

The technique, to be published in the journal Nature, and reflecting more than a decade of work, is a major and fundamental step toward building functional "designer" materials using programmable self-assembly. This "bottom-up" approach will allow scientists to take inorganic materials and build structures with specific properties for a given application, such as therapeutics, biodiagnostics, optics, electronics or catalysis.

Most gems, such as diamonds, rubies and sapphires, are crystalline inorganic materials. Within each crystal structure, the atoms have precise locations, which give each material its unique properties. Diamond's renowned hardness and refractive properties are due to its structure -- the precise location of its carbon atoms.

In the Northwestern study, gold nanoparticles take the place of atoms. The novel part of the work is that the researchers use DNA to drive the assembly of the crystal. Changing the DNA strand's sequence of As, Ts, Gs and Cs changes the blueprint, and thus the shape, of the crystalline structure. The two crystals reported in Nature, both made of gold, have different properties because the particles are arranged differently.

"We are now closer to the dream of learning, as nanoscientists, how to break everything down into fundamental building blocks, which for us are nanoparticles, and reassembling them into whatever structure we want that gives us the properties needed for certain applications," said Chad A. Mirkin, one of the paper's senior authors and George B. Rathmann Professor of Chemistry in the Weinberg College of Arts and Sciences, professor of medicine and professor of materials science and engineering. In addition to Mirkin, George C. Schatz, Morrison Professor of Chemistry, directed the work.

By changing the type of DNA on the surface of the particles, the Northwestern team can get the particles to arrange differently in space. The structures that finally form are the ones that maximize DNA hybridization. DNA is the stabilizing force, the glue that holds the structure together. "These structures are a new form of matter," said Mirkin, "that would be difficult, if not impossible, to make any other way."

He likens the process to building a house. Starting with basic materials such as bricks, wood, siding, stone and shingles, a construction team can build many different types of houses out of the same building blocks. In the Northwestern work, the DNA controls where the building blocks (the gold nanoparticles) are positioned in the final crystal structure, arranging the particles in a functional way. The DNA does all the heavy lifting so the researchers don't have to.

Mirkin, Schatz and their team just used one building block, gold spheres, but as the method is further developed, a multitude of building blocks of different sizes can be used -- with different composition (gold, silver and fluorescent particles, for example) and different shapes (spheres, rods, cubes and triangles). Controlling the distance between the nanoparticles is also key to the structure's function.

"Once you get good at this you can build anything you want," said Mirkin, director of Northwestern's International Institute for Nanotechnology.

"The rules that govern self-assembly are not known, however," said Schatz, "and determining how to combine nanoparticles into interesting structures is one of the big challenges of the field."

The Northwestern researchers started with gold nanoparticles (15 nanometers in diameter) and attached double-stranded DNA to each particle with one of the strands significantly longer than the other. The single-stranded portion of this DNA serves as the "linker DNA," which seeks out a complementary single strand of DNA attached to another gold nanoparticle. The binding of the two single strands of linker DNA to each other completes the double helix, tightly binding the particles to each other.

Each gold nanoparticle has multiple strands of DNA attached to its surface so the nanoparticle is binding in many directions, resulting in a three-dimensional structure -- a crystal. One sequence of linker DNA, programmed by the researchers, results in one type of crystal structure while a different sequence of linker DNA results in a different structure.

"We even found a case where the same linker could give different structures, depending on the temperatures at which the particles were mixed," said Schatz.

Using the extremely brilliant X-rays produced by the Advanced Photon Source synchrotron at Argonne National Laboratory in combination with computational simulations, the research team imaged the crystals to determine the exact location of the particles throughout the structure. The final crystals have approximately 1 million nanoparticles.

"It took scientists decades of work to learn how to synthesize DNA," said Mirkin. "Now we've learned how to use the synthesized form outside the body to arrange lifeless matter into things that are useful, which is really quite spectacular."

The Nature paper, entitled "DNA-programmable nanoparticle crystallization" is to be published January 31, 2008. In addition to Mirkin and Schatz, other authors are Sung Yong Park, a former postdoctoral fellow in Schatz's lab and now at the University of Rochester (lead author); graduate student Abigail K. R. Lytton-Jean, Northwestern University; Byeongdu Lee, Advanced Photon Source, Argonne National Laboratory; and Steven Weigand, Northwestern's DND-CAT Synchrotron Research Center at Argonne's Advanced Photon Source.

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

http://www.sciencedaily.com:80/releases/2008/01/080130130652.htm

Link Between Smoking In Pregnancy And Sudden Infant Death Syndrome Explained

Josef Buttigieg, a PhD student in the Department of Biology, and his academic advisor, Colin Nurse, professor in the Department of Biology. (Credit: Photo by Susan Bubak)

ScienceDaily (Feb. 4, 2008) — A new study sheds light on the relationship between women who smoke while pregnant--or are exposed to second-hand smoke--and an increased risk of SIDS to their babies.

Researchers at McMaster University have found a mechanism that explains why an infant's ability to respond to oxygen deprivation after birth--or a hypoxic episode--is dramatically compromised by exposure to nicotine in the womb, even light to moderate amounts.

"While cigarette smoke contains many different compounds, we found there is a direct impact of one component, nicotine, on the ability of certain cells to detect and respond to oxygen deprivation," says Josef Buttigieg, lead author and a PhD graduate student in the department of Biology. "When a baby is lying face down in bed, for example, it should sense a reduction in oxygen and move its head. But this arousal mechanism doesn't work as it should in babies exposed to nicotine during pregnancy."

The research, which was conducted on laboratory rats in collaboration with Dr. Alison Holloway, explains the critical role that catecholamines--a group of hormones released by the adrenal glands--play in a baby's transition to the outside world.

During birth, the baby is exposed to low oxygen, which signals the adrenal glands to release the catecholamines, which contain adrenaline, or the 'fight or flight' hormone, explains Buttigieg.

It is these catecholamines that signal the baby's lungs to reabsorb fluid, to take its first breath, and help the heart to beat more efficiently. And for some months after birth, the adrenal gland still acts as an oxygen sensor, aiding in the baby's arousal and breathing responses during periods of apnea or asphyxia. But the ability to release catecholamines during these moments--a critical event in the adaptation of life outside the womb--is impaired due to nicotine exposure.

"At birth, the nervous control of the adrenal gland is not active and so a baby relies on these direct oxygen sensing mechanisms to release catecholamines," says Colin Nurse, academic advisor on the study and a professor in the department of Biology. "But nicotine causes premature loss of these mechanisms, which would normally occur later in development after nervous control is established. Thus, the infant becomes much more vulnerable to SIDS."

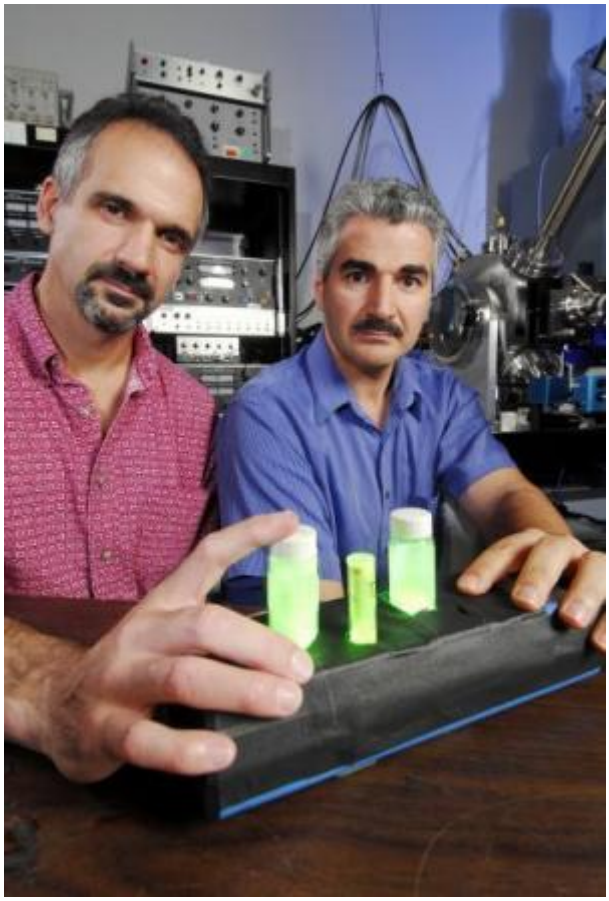
The findings are published online in the journal Federation of American Societies for Experimental Biology (FASEB) and will appear in the May 2008 print issue.

The study was funded in part by the Heart & Stroke Foundation of Ontario, Canadian Institutes of Health Research, and Focus on Stroke.

Adapted from materials provided by McMaster University.

http://www.sciencedaily.com:80/releases/2008/01/080129125422.htm

New Decontamination System Kills Anthrax Rapidly Without Lingering Effects



In addition to decontaminating bioterrorism hazards, GTRI research scientists Brent Wagner and Hisham Menkara are also investigating the potential use of UV-C phosphors for sterilizing medical equipment and purification applications. (Credit: Georgia Tech Photo: Gary Meek)

ScienceDaily (Feb. 4, 2008) — In October 2001, letters containing anthrax spores were mailed to several news media offices and two U.S. senators, killing five people and infecting 17 others. Clearing the Senate office building of the spores with chlorine dioxide gas cost $27 million, according to the Government Accountability Office. Cleaning the Brentwood postal facility outside Washington cost $130 million and took 26 months.

Researchers at the Georgia Tech Research Institute (GTRI) in collaboration with Austin-based Stellar Micro Devices, Inc. (SMD) have developed prototypes of a rapid, non-disruptive and less expensive method that could be used to decontaminate bioterrorism hazards in the future.

Using flat panel modules that produce X-rays and ultraviolet-C (UV-C) light simultaneously, the researchers can kill anthrax spores in two to three hours without any lingering effects. The system also has the ability to kill anthrax spores hidden in places like computer keyboards without causing damage.

"This is certainly an improvement over previous techniques," said Brent Wagner, GTRI principal research scientist and director of its Phosphor Technology Center of Excellence (PTCOE). "The UV-C attacks spores on surfaces and the X-rays penetrate through materials and kill spores in cracks and crevices."

X-ray irradiation is used commercially to sterilize medical products and food by disrupting the ability of a microorganism to reproduce. UV-C also prevents replication, but both types of radiation can penetrate the outer structure of an anthrax spore to destroy the bacteria inside.

The current decontamination standard -- chlorine dioxide gas -- kills microorganisms by disrupting transport of nutrients across the cell wall, but cannot reach hidden spores. Hard surfaces must be cleaned independently with harsh liquid chlorine dioxide. In addition, people cannot re-enter a room fumigated with chlorine dioxide until the gas is neutralized with sodium bisulfite vapor and vented from the building.

The new decontamination system resembles a coat rack with radiation modules arranged on rings at various heights that face outward to broadcast radiation throughout a room. Since the X-rays and UV-C are lethal at the flux densities used, the system operates unattended and is turned on outside the affected space.

UV-C light in the modules is produced using the optical and electrical phenomenon of cathodoluminescence. Numerous electron beams are generated by arrays of cold cathodes, each acting like the electron gun in a cathode ray tube.

"When an electron beam hits a powder phosphor, it luminesces and emits visible and/or non-visible light," explained Hisham Menkara, a senior research scientist in GTRI's Electro-Optical Systems Laboratory.

GTRI became involved in SMD's project, which was funded by the Air Force Research Laboratory's Small Business Innovation Research program, because the PTCOE housed UV-C phosphors created and patented by Sarnoff Corporation in the mid-1970s.

"We knew that Georgia Tech had experts in powder phosphors with regard to flat panel displays and we approached them to develop new phosphors for our decontamination purpose," said Mark Eaton, president and CEO of SMD. "We were fortunate that they had UV-C phosphors available from decades earlier."

With the Sarnoff phosphors in hand, Wagner and Menkara set off to determine the best UV-C emitting phosphor and optimize its properties for use with X-rays in SMD's small flat panel display.

To find the best phosphor that emitted light in the UV-C region of the spectrum -- wavelengths below 280 nanometers -- the emission spectra of each phosphor was measured against the DNA absorption curve. This curve shows the optimal wavelengths to destroy an organism's DNA.

After investigating many different phosphors, the researchers chose lanthanum phosphate:praseodymium (LaPO4:Pr or LAP:Pr) as the most efficient phosphor, with a power efficiency near 10 percent. Since the UV emission didn't fall completely under the DNA absorption curve, the relative "killing efficiency" was approximately 50 percent.

In the laboratory, Menkara created the phosphor by mixing precursors lanthanum oxide, hydrogen phosphate and praseodymium fluoride (La2O3, H3PO4 and PrF3, respectively) in a glass beaker with methanol (CH3OH) and ammonium chloride (NH4Cl). Air drying the mixture in a fume hood caused the methanol to completely evaporate.

The resultant cake was crushed into a fine powder, heated in a furnace to a temperature as high as 1250 degrees Celsius for two hours and crushed again.

"To determine the best conditions for producing the highest efficiency phosphor, we tried different precursors and completed the firing under different atmospheric conditions and temperatures," explained Menkara.

Test results showed that higher temperatures were more efficient and a capped quartz tube was the best container to hold the powder inside the furnace. Wagner and Menkara also found that adding lithium fluoride (LiF) and reducing the praseodymium concentration increased the cathodoluminescent properties of the LAP:Pr phosphor.

With the improved phosphor, laboratory tests conducted by SMD showed that the combined X-ray and UV-C decontamination system could kill anthrax spores.

GTRI researchers hope to develop new UV-C phosphors that can achieve cathodoluminescent efficiency higher than 10 percent with an emission spectrum that provides increased coverage of the DNA absorption curve.

With increased efficiency, UV-C panels could be used for sterilizing medical equipment or purification applications.

"We may be able to use UV-C panels to clean wastewater, which would be better than the lamps currently used. In the environment where the lamps must operate, they are very difficult to clean, whereas flat panels could be cleaned with a squeegee," noted Eaton.

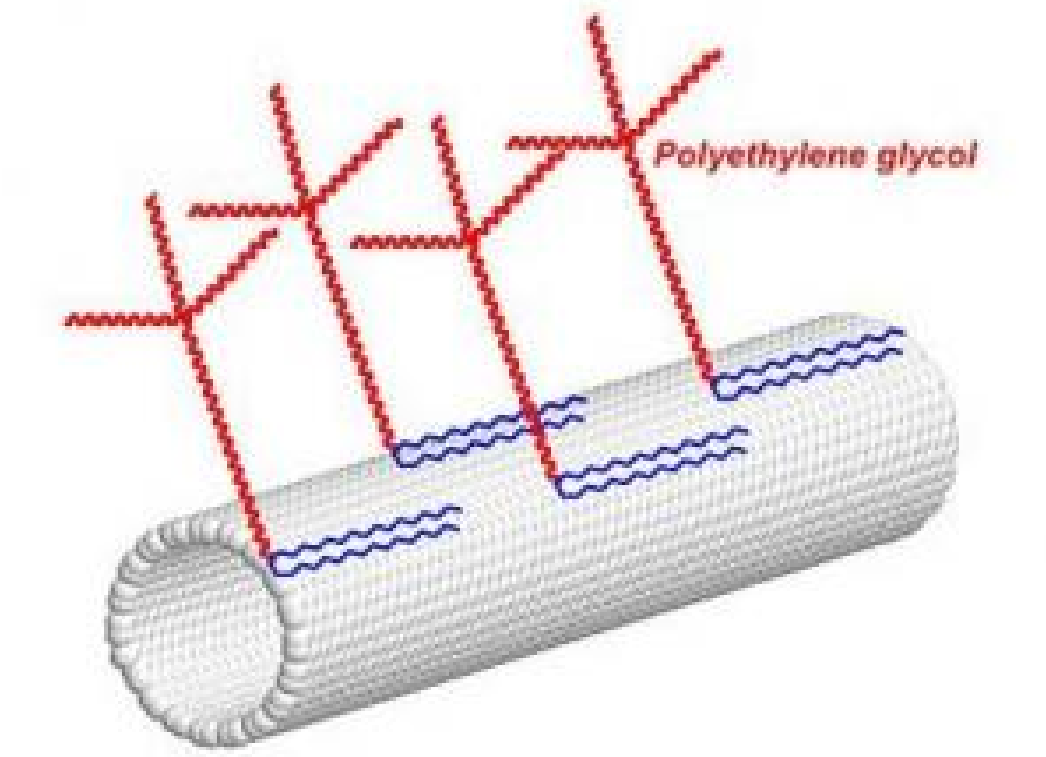
Another potential application is to kill viruses in buildings used to house chickens. Current methods involve removing the chickens and raising the temperature in the chicken houses for several days to deactivate the virus.

"With the combined UV-C/X-ray system, you could turn the system on for a few hours, kill the viruses and as soon as you turn it off, the chickens could come right back in," said Wagner.

Adapted from materials provided by Georgia Institute of Technology, via EurekAlert!, a service of AAAS.

http://www.sciencedaily.com:80/releases/2008/01/080129125415.htm

New Nanotube Findings Give Boost To Potential Biomedical Applications



A representation of a carbon nanotube accessorized with a coating of branched PEG. (Credit: Courtesy of Hongjie Dai)

ScienceDaily (Feb. 4, 2008) — Carbon nanotubes-cylinders so tiny that it takes 50,000 lying side by side to equal the width of a human hair-are packed with the potential to be highly accurate vehicles for administering medicines and other therapeutic agents to patients. But a dearth of data about what happens to the tubes after they discharge their medical payloads has been a major stumbling block to progress.

Now, Stanford researchers, who spent months tracking the tiny tubes inside mice, have found some answers.

Studies in mice already had shown that most nanomaterials tend to accumulate in organs such as the liver and spleen, which was a concern because no one knew how long they could linger. But fears that the tiny tubes might be piling up in vital organs, like discarded refrigerators at the bottom of a rural ravine, can now be put to rest, said Hongjie Dai, the J. G. Jackson and C. J. Wood Professor of Chemistry at Stanford, whose research team has demonstrated that the nanotubes exit the organs.

Dai and his group found that the carbon nanotubes leave the body primarily through the feces, with some by way of the urine. "That's nice to know," Dai said. "This now proves that they do get out of the system."

The full extent of the news, which is scheduled to be published the week of Jan. 28 in Proceedings of the National Academy of Sciences Online Early Edition (PNAS), is even better than that: The three-month-long study also allays worries that the nanotubes, by simply remaining in the organs for a long time, would prove toxic to the mouse.

"None of the mice died or showed any anomaly in the blood chemistry or in the main organs," said Dai, senior author on the PNAS paper. "They appear very healthy, and they are gaining weight, just like normal mice. There's no obvious toxicity observed." The lack of toxicity of nanotubes in mice is consistent with a previous pilot study done by Sanjiv Gambhir, a professor of radiology at Stanford, and his research group in collaboration with Dai's group.

"This is the first time anyone has done a systematic circulation and excretion study like this for nanotubes, and data on other nano particles is also scarce," Dai said. "The excretion pathway may apply to other nano materials and may need to be looked at closely like this also."

Previous research published by Dai's group has demonstrated the potential for using nanotubes in treating cancerous cells and targeting tumors in mice.

His group used Raman spectroscopy, a method of applying light from a laser beam that effectively "illuminates" the presence of the target molecules in the organs of the mice.

Being hit with light from the beam causes a detectable change in the state of a molecule's energy. Carbon nanotubes, composed entirely of carbon atoms that are mostly arranged in linked hexagonal rings, give off a strong signal in response to the beam. This allowed the researchers to pinpoint the position of the chosen molecules, as well as ascertain their abundance in the blood or organs.

Previous detection methods that relied on attaching fluorescent labels or spectroscopic tags to the nanotubes had yielded unreliable results. The attachments tended to either come loose from the tubes or decay over time spans ranging from a few days to only a few hours-far too short to reveal the ultimate fate of the nanotubes.

While knowing the carbon nanotubes will move through the digestive system at a healthy pace is critical to future practical applications, it is also crucial that the nanotubes not enter the digestive system too soon after being injected; they need to spend enough time in the circulatory system to find their way to their target location.

The key to fine-tuning the carbon nanotubes' speed of circulation turns on how the basic, bare-bones floor model is chemically accessorized.

"You can make the nanotubes circulate a very long time in the blood, if the chemistry is done right," Dai said. The researchers found that coating their carbon nanotubes with polyethylene glycol (PEG), a common ingredient in cosmetics, worked best.

They used a form of PEG with three little limbs sprouting off a central trunk. "Those provide better shielding to the nanotube than just a single branch. Therefore, they interact less with the biological molecules around them," Dai said.

The team stuffed the PEG liberally into the linked hexagonal rings that compose the nanotubes, prompting Dai to describe the end result as resembling rolled-up chicken wire with feathers sticking out all over.

Though they may sound less than gorgeous visually, the feathery nanotubes turned in a beautiful performance in practical terms, Dai said. The coating of PEG made the nanotubes highly water soluble, which helped them to stay in the blood instead of being absorbed.

"They circulate in the blood for about 10 hours or so in mice, which seems to be a good length of time," Dai said.

The right chemical coating on nanotubes also can help ease them out of the mouse in a timely fashion, and the three-branched PEG was effective there, too.

Dai's earlier research demonstrated that nanotubes have promise for treating cancer with two different approaches. Once they have zeroed in on the target cells, shining light on the nanotubes causes them to generate heat, which can kill cancer cells. The other method is to rig the nanotubes to accumulate at targeted sites, where they can deliver medication from within the tubes.

"[Carbon nanotubes] seem to be promising for biomedical applications and for potentially treating cancer, either using drugs or using the physical properties," Dai said. "This is the reason we carried out the study of the fate of nanotubes in mice. I think this is really a very fundamental issue."

The research was funded by the Cancer Center for Nanotechnology Excellence, which is funded by the National Institutes of Health and the National Cancer Institute. The first author of the PNAS paper is Zhuang Liu, graduate student in chemistry. The paper's other authors, all affiliated with Stanford University, are Xiaoyuan "Shawn" Chen, assistant professor in radiology; Dr. Corrine Davis of the Veterinary Service Center in the Department of Comparative Medicine; Weibo Cai, postdoctoral scholar in radiology; and Lina He, formerly a technician in Chen's research group.

Adapted from materials provided by Stanford University.

http://www.sciencedaily.com:80/releases/2008/01/080129125511.htm

Archaeologist 'Strikes Gold' With Finds Of Ancient Nasca Iron Ore Mine In Peru

Kevin J. Vaughn, a Purdue assistant professor of anthropology, holds a pottery fragment he discovered at an excavation site in Nasca, Peru. The piece of pottery is from about the 5th century A.D., which is the same time period as other artifacts he uncovered at Mina Primavera. Vaughn hypothesizes the mine was the source of some of the iron ore pigments used to produce the vibrant colors as seen on this pottery. (Credit: Purdue News Service photo/David Umberger)

ScienceDaily (Feb. 3, 2008) — A Purdue University archaeologist discovered an intact ancient iron ore mine in South America that shows how civilizations before the Inca Empire were mining this valuable ore.

"Archaeologists know people in the Old and New worlds have mined minerals for thousands and thousands of years," said Kevin J. Vaughn, an assistant professor of anthropology who studies the Nasca civilization, which existed from A.D. 1 to A.D. 750. "Iron mining in the Old World, specifically in Africa, goes back 40,000 years. And we know the ancient people in Mexico, Central America and North America were mining for various materials. There isn't much evidence for these types of mines.

"What we found is the only hematite mine, a type of iron also known as ochre, recorded in South America prior to the Spanish conquest. This discovery demonstrates that iron ores were important to ancient Andean civilizations."

In 2004 and 2005, Vaughn and his team excavated Mina Primavera, which is located in the Ingenio Valley of the Andes Mountains in southern Peru. The research team performed field checks and collected some samples in 2006 and 2007.

The researchers determined that the mine is a human-made cave that was first created around 2,000 years ago. An estimated 3,710 metric tons was extracted from the mine during more than 1,400 years of use. The mine, which is nearly 700 cubic meters, is in a cliffside facing a modern ochre mine.

Vaughn hypothesizes that the Nasca people used the red-pigmented mineral primarily for ceramic paints, but they also could have used it as body paint, to paint textiles and even to paint adobe walls.

The Nasca civilization is known for hundreds of drawings in the Nasca Desert, which are known as the Nasca-Lines and can only be seen from the air, and for an aqueduct system that is still used today.

Vaughn and his team discovered a number of artifacts in the mine, including corncobs, stone tools, and pieces of textiles and pottery. The age of the items was determined by radiocarbon dating, a process that determines age based on the decay of naturally occurring elements.

"Archaeologists have a very good sequence of pottery from this region, so I can look at most pots from this region and determine a date within a century that is based on stylistic changes of the pottery," Vaughn said. "Even before the dating, we knew this was an ancient mine because of the ceramic pieces. These very small fragments, about the size of a penny, had distinct designs on them that are characteristic of the early Nasca civilization."

The artifacts from the excavation are being curated by the Instituto Nacional de Cultura of Peru at its museum in Ica, Peru.

Now that there is archaeological evidence that ancient cultures in the Andes were mining iron ore, it is important to give credit to New World civilizations, Vaughn said.

"Even though ancient Andean people smelted some metals, such as copper, they never smelted iron like they did in the Old World," he said. "Metals were used for a variety of tools in the Old World, such as weapons, while in the Americas, metals were used as prestige goods for the wealthy elite."

This excavation was part of Vaughn's Early Nasca Craft Economy Project, a multiyear National Science Foundation-funded study of Nasca ceramic production and distribution. The project's goal is to better understand the origins of inequality and political economy in this ancient culture.

Vaughn says material scientists and engineers, as well as mineralogists, will be interested in this discovery.

"This study of mining is a great example of how archaeology bridges the social and physical sciences," he said.

The National Science Foundation and the Heinz Foundation funded the Mina Primavera excavation. Next, Vaughn will be excavating a habitation site that has a 4,000-year occupation in hopes of understanding the long-term settlement history of the region.

"I hope to continue surveying for mines and mining-related sites in the region, and hopefully undertake additional excavations at the mine," he said.

The findings of the excavation are published in December's Journal of the Minerals, Metals & Materials Society.

Adapted from materials provided by Purdue University.

http://www.sciencedaily.com:80/releases/2008/01/080129125405.htm

Explaining Chemotherapy-associated Nausea

ScienceDaily (Feb. 3, 2008) — A new study from the Monell Center increases understanding of the biological mechanisms responsible for the nausea and vomiting that often afflict patients undergoing chemotherapy. The findings could lead to the development of new approaches to combat these debilitating side effects.

"By increasing knowledge of what causes the nausea and vomiting that accompany chemotherapy treatment, we move closer to providing patients with less traumatic and hopefully more effective drug treatment regimens," said lead author Bart De Jonghe, PhD, a Monell physiologist. Anorexia (loss of appetite) and cachexia (a syndrome of physical wasting and weight loss) often accompany chemotherapy-induced symptoms of nausea and vomiting. These side effects can compromise the patient's nutritional status and impede recovery.

The research, published online in the American Journal of Physiology, uses a rat model to identify a nerve that transmits signals of chemotherapy-associated illness from the small intestine to the brain. To explore whether sensory nerves traveling from the intestinal system to the brain contribute to nausea and illness associated with chemotherapy, the Monell researchers examined the incidence of pica in rats that received the potent chemotherapy drug cisplatin. Cisplatin treatment, widely used for a variety of cancers, is highly associated with nausea and vomiting.

Pica is the term used to describe the eating of non-food substances, such as clay or dirt. Because rats -- which do not vomit -- eat clay when made sick by toxins, researchers measure pica behavior as an indicator of nausea and malaise in these animals. In the Monell study, rats given cisplatin began to eat clay, decreased their food intake, and lost body weight.

The researchers found that cisplatin-associated pica was reduced by 60 percent when they cut a nerve that transmits sensory signals from the small intestine to the brain. Cutting the same nerve, known as the common hepatic branch of the vagus nerve, also lessened the reduction of food intake and loss of body weight. These results suggest that the upper intestine is an important site for generation of the nausea and appetite loss associated with chemotherapy drugs.

The findings also help to define the neural systems involved in nausea and malaise, which can significantly impact the nutritional status of patients receiving potent drug treatments for diseases such as cancer or AIDS.

"This nerve may be part of a natural detection system that we use to detect toxins in food, and it is possible that we are activating it with these strong medications," comments senior author Charles Horn, PhD, a behavioral neuroscientist at Monell.

Increased understanding of this system will enable development of specific blockers to reduce nausea and improve quality of life during chemotherapy and related therapeutic regimens.

Future studies also will evaluate whether the vagus nerve contributes to other side effects associated with chemotherapy, such as altered taste perception, fatigue, and stress.

The research was supported by the National Institute on Deafness and Other Communication Disorders and the National Institute of Diabetes and Digestive and Kidney Diseases.

Adapted from materials provided by Monell Chemical Senses Center.

http://www.sciencedaily.com:80/releases/2008/01/080130092111.htm

Daytime Nap Can Benefit A Person's Memory Performance

ScienceDaily (Feb. 3, 2008) — A brief bout of non-REM sleep (45 minutes) obtained during a daytime nap clearly benefits a person's declarative memory performance, according to a new study.

The study, authored by Matthew A. Tucker, PhD, of the Center for Sleep and Cognition and the department of psychiatry at Harvard Medical School, focused on 33 subjects (11 males, 22 females) with an average age of 23.3 years. The participants arrived at the sleep lab at 11:30 a.m., were trained on each of the declarative memory tasks at 12:15 p.m., and at 1 p.m., 16 subjects took a nap while 17 remained awake in the lab. After the nap period, all subjects remained in the lab until the retest at 4 p.m.

It was discovered that, across three very different declarative memory tasks, a nap benefited performance compared to comparable periods of wakefulness, but only for those subjects that strongly acquired the tasks during the training session.

"These results suggest that there is a threshold acquisition level that has to be obtained for sleep to optimally process the memory," said Dr. Tucker. "The importance of this finding is that sleep may not indiscriminately process all information we acquire during wakefulness, only the information we learn well."

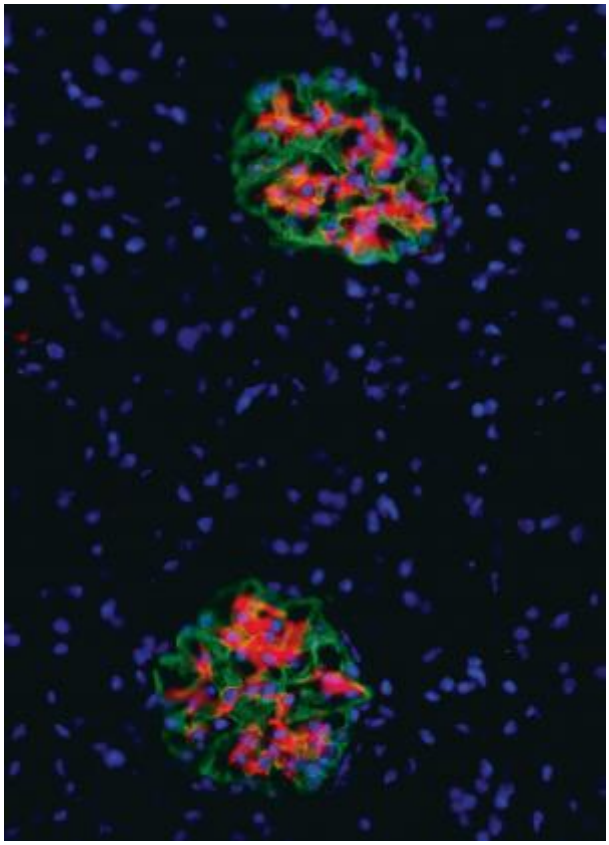
It is recommended that adults get between seven and eight hours of nightly sleep.

The article "Enhancement of Declarative Memory Performance Following a Daytime Nap is Contingent on Strength of Initial Task Acquisition" was published in the February 1 issue of the journal Sleep.

Adapted from materials provided by American Academy of Sleep Medicine.

http://www.sciencedaily.com:80/releases/2008/02/080201085728.htm

Breakdown Of Kidney's Ability To Clean Its Own Filters Likely Causes Disease



With a key protein disabled, a pair of kidney filtering units can't keep antibodies, which are red in this image, from building up in the filter. Scientists now think inability to keep these filters clear may be an important contributor to kidney damage. (Credit: Image courtesy of Washington University School of Medicine)

ScienceDaily (Feb. 3, 2008) — The kidney actively cleans its most selective filter to keep it from clogging with blood proteins, scientists from Washington University School of Medicine in St. Louis reveal in a new study.

Researchers showed that breakdown of this self-cleaning feature can make kidneys more vulnerable to dysfunction and disease.

"We speculate that defects of this clearance mechanism can leave things on the filter that can damage it," says senior author Andrey Shaw, M.D., Emil R. Unanue Professor of Immunobiology in Pathology and Immunology. "This could include autoimmune antibodies that mistakenly target the body's own tissues like those that occur in the disease lupus."

Despite extensive knowledge of the structure of the kidney, several scientific controversies linger over how the organ does its complicated and essential job of filtering wastes from the blood for disposal without simultaneously discarding too much water or key blood proteins in the urine. Understanding how these tricky tasks are accomplished is essential to developing new treatments for kidney disease and renal failure, which are among the top ten causes of death in the United States.

Like many mechanical filtering systems, the kidney passes the blood through a series of progressively finer screens. After passing through a structure known as the glomerular basement membrane (GBM), fluid and serum proteins must finally pass through the most selective filter of the kidney, which is comprised of specialized epithelial cells called podocytes. These cells form a web-like barrier to the passage of large serum proteins into the urine.

"The kidney screens 150 to 200 liters of blood daily, and we were curious as to how the kidney keeps the filter from clogging up," says first author Shreeram Akilesh, an M.D./Ph.D. student. "The two most common blood serum and plasma proteins are albumin, which helps regulate blood volume and convey a number of different substances around the body, and immunoglobin G (IgG), a type of immune system antibody. Because they're so common, we figured they would be among the most likely to get stuck on the filter, and set out to look for proteins that help clear them."

Researchers looked for proteins made in podocytes that could bind to albumin and IgG, reasoning that such proteins likely provide the "handles" the podocytes need to grab proteins and clear them from the filter.

A protein known as FcRn was high on the list of likely suspects. Akilesh had studied FcRn previously in the laboratory of coauthor Derry C. Roopenian, Ph.D., professor at the Jackson Laboratory in Bar Harbor, Maine. Prior research there and in other laboratories had revealed that FcRn binds to both IgG and albumin and is present in human podocytes.

After confirming that the FcRn protein also is made in mouse podocytes, scientists then asked if FcRn was responsible for clearing IgG antibody from the filter. To do this, they measured the retention of a radioactive tracer in the kidneys of normal mice and in mice where the gene for FcRn had been disabled. Mice lacking FcRn had difficulty clearing antibody from the kidney.

When researchers studied the mice lacking FcRn for longer periods of time, they saw evidence that antibodies were accumulating in the kidney.

In another experiment, researchers gave the mice injections of large quantities of protein to saturate the clearance system. They followed those injections with what would normally have been a harmlessly small dose of an antibody potentially toxic to the kidney. The mice developed kidney damage as a result. Researchers believe this was because they couldn't clear the toxic antibody from the GBM quickly enough.

"This is the first clear demonstration that the filter system in the kidney isn't just a passive mechanical filter, it's actually involved in its own maintenance," says Akilesh. "It also provides us with a nice mechanism for explaining how the normal function of this filter may be breaking down in ways that leads to kidney disease and damage."

To follow up, Shaw plans to look for other podocyte proteins involved in filter clearance.

Journal reference: Akilesh S, Huber TB, Wu H, Wang G, Hartleben B, Kopp JB, Miner JH, Roopenian DC, Unanue ER, Shaw AS. Podocytes use FcRn to clear IgG from the glomerular basement membrane. Proceedings of the National Academy of the Sciences, January 22, 2008.

Adapted from materials provided by Washington University School of Medicine.

http://www.sciencedaily.com:80/releases/2008/01/080129125401.htm

Baffin Island Ice Caps Shrink By 50 Percent Since 1950s, Expected To Disappear by Middle of Century

Ice caps on the northern plateau of Baffin Island in the Canadian Arctic have shrunk by 50 percent in recent decades as a result of warming temperatures. (Credit: Gifford Miller, University of Colorado at Boulder)

ScienceDaily (Feb. 2, 2008) — A new University of Colorado at Boulder study has shown that ice caps on the northern plateau of Baffin Island in the Canadian Arctic have shrunk by more than 50 percent in the last half century as a result of warming, and are expected to disappear by the middle of the century.

Radiocarbon dating of dead plant material emerging from beneath the receding ice margins show the Baffin Island ice caps are now smaller in area than at any time in at least the last 1,600 years, said geological sciences Professor Gifford Miller of CU-Boulder's Institute of Arctic and Alpine Research. "Even with no additional warming, our study indicates these ice caps will be gone in 50 years or less," he said.

The study also showed two distinct bursts of Baffin Island ice-cap growth commencing about 1280 A.D. and 1450 A.D., each coinciding with ice-core records of increases in stratospheric aerosols tied to major tropical volcanic eruptions, Miller said. The unexpected findings "provide tantalizing evidence that the eruptions were the trigger for the Little Ice Age," a period of Northern Hemisphere cooling that lasted from roughly 1250 to 1850, he said.

A paper on the subject was published online in Geophysical Research Letters and featured in the Jan. 28 edition of the American Geophysical Union journal highlights. Authors on the study included Miller, graduate students Rebecca Anderson and Stephen DeVogel of INSTAAR, Jason Briner of the State University of New York at Buffalo and Nathaniel Lifton of the University of Arizona.

Located just east of Greenland, the 196,000 square-mile Baffin Island is the fifth largest island in the world. Most of it lies above the Arctic Circle.

The researchers also used satellite data and aerial photos beginning in 1949 to document the shrinkage of more than 20 ice caps on the northern plateau of Baffin Island, which are up to 4 miles long, generally less than 100 yards thick and frozen to their beds. "The ice is so cold and thin that it doesn't flow, so the ancient landscape on which they formed is preserved pretty much intact," said Miller.

In addition to carbon-dating plant material from the ice edges, the researchers extracted and analyzed carbon 14 that formed inside the Baffin Island rocks as a result of ongoing cosmic radiation bombardment, revealing the amount of time the rocks have been exposed, he said. The analysis of carbon 14 in quartz crystals indicated that for several thousand years prior to the last century, there had been more ice cover on Baffin Island, Miller said.

The increase of ice extent across the Arctic in recent millennia is thought to be due in large part to decreasing summer solar radiation there as a result of a long-term, cyclic wobble in Earth's axis, said Miller. "This makes the recent ice-cap reduction on Baffin Island even more striking," he said.

Funded primarily by the National Science Foundation, the study is among the first to use radiocarbon samples from rocks for dating purposes, Miller said. The radiocarbon portion of the study was conducted at INSTAAR and the University of Arizona.

Temperatures across the Arctic have been rising substantially in recent decades as a result of the build up of greenhouse gases in Earth's atmosphere. Studies by CU-Boulder researchers in Greenland indicate temperatures on the ice sheet have climbed 7 degrees Fahrenheit since 1991.

Adapted from materials provided by University of Colorado at Boulder.

http://www.sciencedaily.com:80/releases/2008/01/080128113831.htm

Building Safety Into Robots, Cars, Planes And Medical Equipment

TTE Systems: Left to right: Devaraj Ayavoo, John Gordon, Anjali Das at the driving simulator and Michael Pont. (Credit: Image courtesy of University of Leicester)

ScienceDaily (Feb. 2, 2008) — A revolutionary new technology developed by engineers at the University of Leicester after over 12 years research promises to make safety a sure thing in equipment as diverse as cars, aircraft and medical equipment.

The new patented technology invented by the researchers has led to the development of a new product family called "RapidiTTy". A company -- TTE Systems Ltd - has been spun out from the University of Leicester to develop and market this product.

TTE Systems Ltd aims to transform the way engineers develop systems which contain "embedded processors". Aircraft, cars, medical equipment and industrial robots are all examples of modern systems which contain such processors. Many of these embedded systems are safety related.

The company believes its new technology can make all the difference between life and death in some scenarios.

Dr. Devaraj Ayavoo, Technical Manager, TTE Systems Ltd, said: "If you are surfing the Web and it takes a few seconds longer than normal to access a particular page, this won't usually matter at all. However, if you put your foot on the brakes in your car, you can't afford to wait -- you need to be sure that the brakes will work immediately. At TTE Systems, our job is to ensure that complex embedded systems always work correctly."

Dr. Michael Pont, CEO of TTE Systems Ltd and Head of the Embedded Systems Laboratory at the University of Leicester, added: "Clearly there are many systems currently in use that are perfectly safe.

"However what is not easy at present is making systems safe and proving that they are safe. Our technology makes it easier to develop systems with predictable behaviour - a key requirement for safe systems.

"In an industry that is geared at developing new systems very quickly, the development of predicable systems has often been ignored and it is in this area that we have specialised.

"Our work involves what are known as "time triggered" -- or TT - designs. The goal with this technology can be stated very simply: In a TT design, we know in advance exactly what the embedded system will be doing at every moment of time during its execution.

"This is a highly innovative approach to system development.

"Our techniques can be applied in a very wide range of systems - even where safety is not a key requirement. For example, in many consumer appliances -- like washing machines, dishwashers, even DVD players -- customers would welcome improved reliability."

TTE Systems Ltd, created with support from the Lachesis Fund (the University Challenge Fund for the East Midlands), has launched the first products in the RapidiTTy family. The RapidiTTy family provides a complete, cost-effective, suite of software tools which support the rapid development and testing of a wide range of reliable embedded systems. The RapidiTTy tools build on a solid technical foundation ("time-triggered architectures"). These were developed in the Embedded Systems Laboratory at the University of Leicester over a period of more than 12 years. Staff in the Laboratory have an international reputation for their work in this area. To date, seven patent applications have been filed in connection with this new technology.

Dr Pont said there was real potential for the systems developed at Leicester to make an international impact: "Our tools make it very easy to incorporate our technology in "standard" development processes.

"Using time-triggered technology allows us to create low-cost tools which facilitate the rapid development of reliable embedded systems. Our goal is to make reliability a cornerstone of mainstream development tools."

Dr. Ayavoo added: "The design of embedded systems is often an extremely complicated process. Our users have been amazed how easy RapidiTTy is to use."

The ESDL is a newly-created lab which is funded by EMDA and hosted by the University of Leicester in New Walk, Leicester.

Adapted from materials provided by University of Leicester.

http://www.sciencedaily.com:80/releases/2008/01/080129080659.htm

Anemia Treatment May Improve or Worsen Disease, Based on Timing

ScienceDaily (Feb. 2, 2008) — Erythropoietin has so far been known to doctors as a hormone that boosts red-blood-cell production. Now, a mouse study led by Lois Smith, MD, PhD, an ophthalmologist at Children's Hospital Boston, shows it also keeps blood vessels alive and growing in the eye. The findings not only add a new function to the hormone, but also give doctors a reason to pause before prescribing it to patients with diseases affected by abnormal blood-vessel growth, such as retinopathy and cancer.

The study also found that whether the hormone is a risk or benefit depends on the timing of administration.

Smith and first author of the study* Jing Chen, PhD, worked in mice with retinopathy, an eye disease that begins when healthy blood vessels nourishing the retina die. Numerous vessels then grow in, but they are deformed. Ultimately, the deformed vessels may pull the retina off the back of the eye, causing blindness.

The researchers measured erythropoietin produced in the retina as the disease progressed. Production was 3 to 10 times below normal during early-stage retinopathy, when healthy blood vessels died, and 12 to 33 times above normal during late-stage retinopathy, when deformed blood vessels grew into the retina. The researchers concluded that erythropoietin helps blood vessels survive and grow in the retina, with effects that may be healthy or harmful.

Next, the team examined whether giving erythropoietin could treat retinopathy. They injected erythropoietin into the bloodstream either early, as the mice lost healthy blood vessels, or later, when deformed blood vessels began to invade--then compared them with untreated mice.

Boosting erythropoietin early slowed the disease. The mice lost half as many healthy blood vessels, causing about 30 percent fewer deformed vessels to grow in. Raising erythropoietin levels later, when deformed blood vessels were present, appeared to accelerate the disease--slightly more deformed blood vessels grew in.

If similar effects are found in humans, and its use is properly timed, then giving erythropoietin early could slow loss of healthy blood vessels in retinopathy, says Smith. "Right now, there is very little out there to treat blood vessel loss in patients with retinopathy. However, further studies on the restoration of normal levels of erythropoietin are needed to translate these results to patients."

In other diseases, like cancer, in which doctors need to slow blood vessel growth, the hormone could be blocked, although clinical trials would need to confirm this idea, she adds.

But given at the wrong time, erythropoietin may make blood vessels grow in an unhealthy way, says Smith. For example, because it boosts red blood cells, erythropoietin is often prescribed to premature babies and diabetic adults for anemia. Some of these patients also have retinopathy. Giving the hormone at the wrong time might help anemia, but worsen the eye disease.

"We're not saying, 'don't do it.' We're saying, 'think about it,'" says Smith. "Physicians should look at the state of the eye before giving erythropoietin to patients with retinopathy. They should consider not giving it to patients with full-blown retinopathy, in which abnormal vessels are present, because our work suggests it may accelerate the disease. However, if a patient is early on in the disease, then our work suggests erythropoietin may be beneficial."

Cancer patients, who often take erythropoietin for anemia, face a similar potential risk, says Smith. "Since erythropoietin has the potential to make blood vessels in tumors grow, it could make tumors worse, although a clinical trial is required to know if this is true in humans."

Overall, Smith says her mouse studies are a reason for doctors to think and researchers to investigate, not for patients to panic.

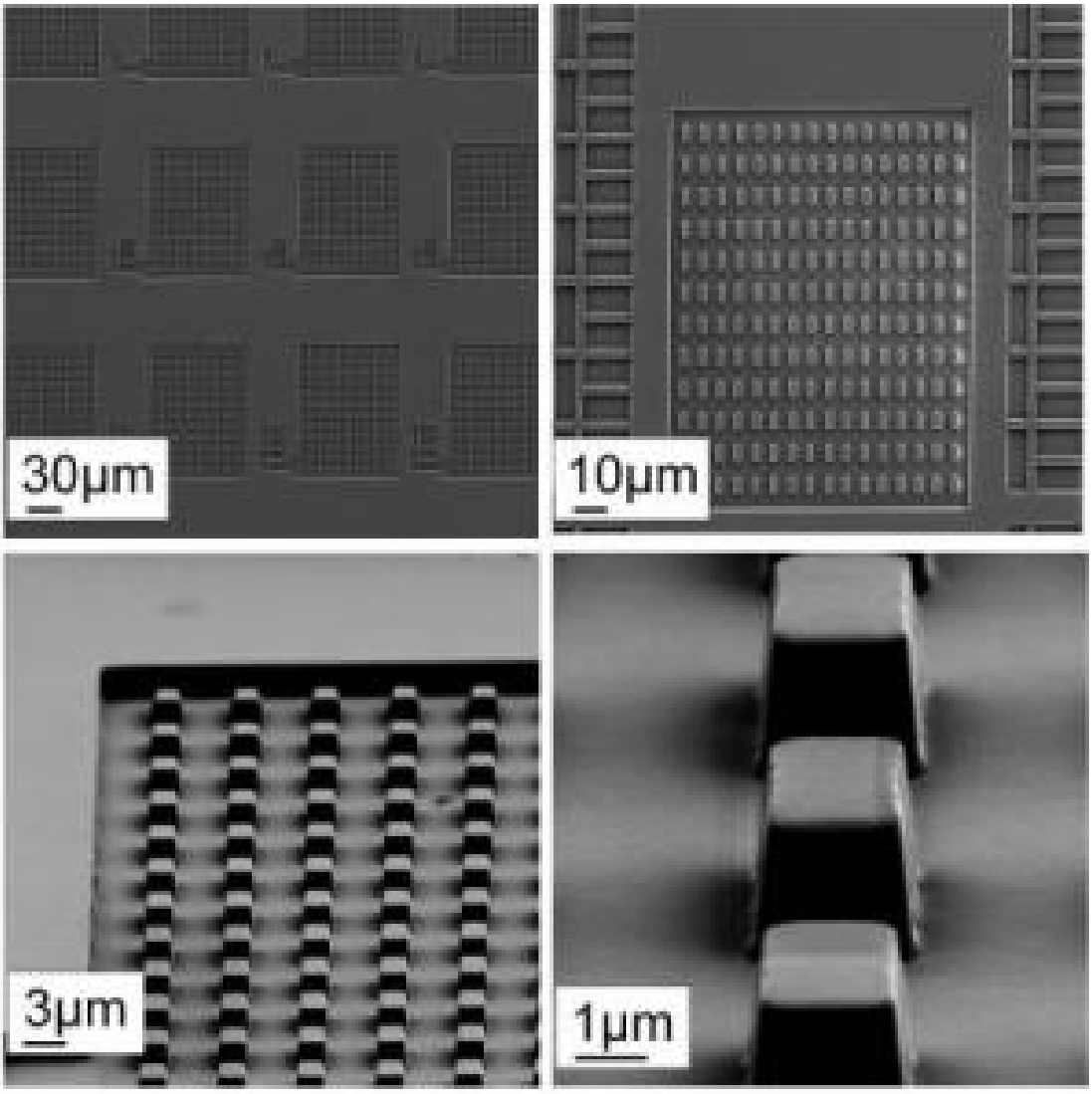
*This research was published in the February issue of the Journal of Clinical Investigation (online January 24).

The research was funded by the V. Kann Rasmussen Foundation, the NIH, Children's Hospital Boston, the Juvenile Diabetes Foundation, and the Research to Prevent Blindness organization.

Adapted from materials provided by Children's Hospital Boston, via EurekAlert!, a service of AAAS.

http://www.sciencedaily.com:80/releases/2008/01/080130111629.htm

New Polymer Could Improve Semiconductor Manufacturing



Researchers from Rensselaer Polytechnic Institute's Department of Physics and Center for Integrated Electronics have developed a new inexpensive, quick-drying polymer that could lead to dramatic cost savings and efficiency gains in semiconductor manufacturing and computer chip packaging. In this series of scanning electron microscope images of the new PES polymer in a UV-imprint lithography application, the well-defined pattern indicates the material's potential for use in next-generation chip making techniques. (Credit: Rensselaer Polytechnic Institute)

ScienceDaily (Feb. 1, 2008) — Researchers at Rensselaer Polytechnic Institute and Polyset Company have developed a new inexpensive, quick-drying polymer that could lead to dramatic cost savings and efficiency gains in semiconductor manufacturing and computer chip packaging.

Along with allowing enhanced performance and cost savings for conventional photolithography processes, the new material, called polyset epoxy siloxane (PES), should also enable a new generation of lower-cost, on-chip nanoimprinting lithography technology, according to the researchers.

"With this new material, chip manufacturers will be able to trim several steps from their production and packaging processes, and in turn realize a cost savings," said Toh-Ming Lu, the R.P. Baker Distinguished Professor of Physics at Rensselaer, who oversaw the study. "PES is cheaper and more reliable."

The widely adopted technique of photolithography involves using a mix of light and chemicals to generate intricate micro- and nano-scale patterns on tiny areas of silicon. As part of the process, a thin polymer film -- called a redistribution layer, and crucial to the effectiveness of device -- is deposited onto the silicon wafer, in order to ease the signal propagation delay and to protect the chip from different environmental and mechanical factors.

The new PES material developed by Lu's group and Polyset Company is one such thin polymer film, and it offers several advantages over the incumbent materials typically used in the semiconductor manufacturing industry. In addition, their new PES material can also be used as a thin polymer film for ultraviolet (UV) on-chip nanoimprinting lithography technology, which is still in the early phases of development. The consistency of using PES in conventional technology, and then continuing to use PES while academia and industry test and gradually migrate to the next generation of devices, should help ease the transition, Lu said.

"Having the ability to use one material -- our new PES -- for both photolithography and imprint will be very attractive to manufacturers," Lu said. "At its core, our project is basic research, but it also has important industry implications. It's very exciting."

Manufacturers today typically use benzocyclobutene and polyimide as polymers for redistribution layers, because of their low water absorption, thermal stability, low curing temperature, low thermal expansion, low dielectric constant, and low leakage current. Lu said PES offers significant advantages to these materials, particularly in the areas of cure temperature and water uptake.

PES cures, or dries and hardens, at 165 degrees Celsius, about 35 percent cooler than the other two materials. The need for less heat should translate directly into lower overhead costs for manufacturers, Lu said. Another advantage of PES is its low water uptake rate of less than 0.2 percent, less than the other materials. Additionally, PES adheres well to copper and can easily be made less brittle if needed. All of these attributes make PES a promising candidate for redistribution layer application and UV imprint lithography.

"The results demonstrate that PES is feasible to be used as UV-curable resist for both the redistribution application for electronic packaging and micro/nano imprint lithography," said Rensselaer Research Associate Pei-I Wang, co-author of the new paper, published recently in the Journal of Vacuum Science and Technology B.

Along with photolithography and on-chip nanoimprinting lithography, PES holds the potential for applications in other optical devices, flat-panel display, biotechnology devices, and microelectromechanical systems, Wang said.

In addition to Lu and Wang, co-authors on the paper include Rensselaer materials science and engineering professor Omkaram Nalamasu, who is also chief technical officer of Applied Materials Inc. in Santa Clara, Calif.; Rajat Ghoshal and Ram Ghoshal of Polyset Co. Inc. in Mechanicville, N.Y.; Charles Schaper of Transfer Devices Inc. in Santa Clara, Calif.; and Andrew Li of Applied Materials.

The project was funded through the New York State Foundation for Science, Technology and Innovation.

Adapted from materials provided by Rensselaer Polytechnic Institute.

http://www.sciencedaily.com:80/releases/2008/01/080128152315.htm

Sniffling mice raise therapy hope
Scientists have created a mouse that can catch a cold - raising hopes of new ways to treat serious respiratory conditions and asthma.

It had been thought rhinoviruses, which cause most human colds and can trigger asthma attacks, could only affect higher primates.

The researchers hope their genetically modified mice will provide a valuable test-bed for potential new medications.

The study, led by London's Imperial College, appears in Nature Medicine.

> **It will open up new paths to finding treatments which have been delayed for many years**
> Sir Leszek Borysiewicz
> Medical Research Council

Rhinoviruses are the major cause of acute attacks of chronic obstructive pulmonary disorder (COPD) - another name for chronic bronchitis and emphysema - which can be fatal.

Although they were discovered 50 years ago, the failure to find a way to infect small animals has proved to be a major stumbling block to developing new treatments.

As a result, there are curently no effective treatments.

Lead researcher Professor Sebastian Johnston said: "These mouse models should provide a major boost to research efforts to develop new treatments for the common cold, as well as for more potentially fatal illnesses such as acute attacks of asthma and of COPD."

Of the 100 known strains of the rhinovirus, 90% attack by latching on to a particular receptor molecule found on the surface of human cells.

The viruses cannot bind to the mouse version of the same receptor.

The latest research has succeeded in modifying the mouse receptor so it is more like the human version.

This meant the modified mice could be infected with the virus.

The researchers were also able to trigger asthma-like symptoms in the infected animals by exposing them to a protein found in egg white, which is known to provoke an allergic reaction in the lungs.

Important discovery

Sir Leszek Borysiewicz, chief executive of the Medical Research Council which funded the study, said: "This important and fundamental discovery will enable us to understand the effects rhinoviruses and common colds have on our health.

"It will open up new paths to finding treatments which have been delayed for many years and provides us with the opportunities for further breakthroughs in the future."

Leanne Male, of the charity Asthma UK, said: "Ninety per cent of people with asthma tell us that colds and flu trigger their asthma symptoms but as yet there is no specific treatment for virally induced asthma attacks and steroid treatments are only partially effective against them.

"We welcome this latest advancement as it will lead to a greater understanding of viral infections and their link with asthma and may help the development of a suitable treatment for virus-induced asthma attacks, thus greatly improving the lives of the 5.2 million people with the condition in the UK."

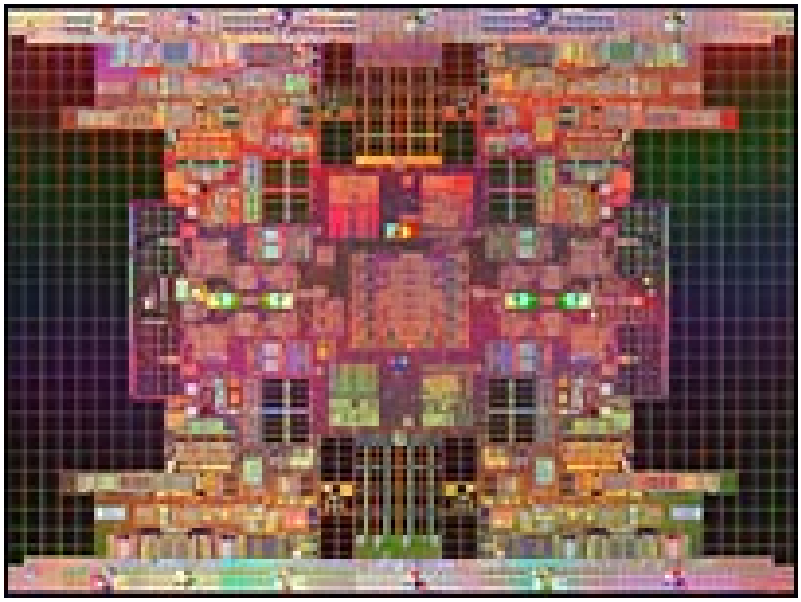
Story from BBC NEWS:
http://news.bbc.co.uk/go/pr/fr/-/2/hi/health/7225742.stm

Published: 2008/02/04 09:31:46 GMT

Chips pass two billion milestone

By Jonathan Fildes
Science and technology reporter, BBC News

The first chip to pack more than two billion transistors has been launched by silicon giant Intel.



The quad-core chip, known as Tukwila, is designed for high-end servers rather than personal computers.

It operates at speeds of up to 2GHz, the equivalent of a standard PC chip.

It marks the latest milestone in chip technology; Intel released the first processor to contain more than one billion transistors in 2006.

"It's not revolutionary, it's another evolutionary step," said Malcolm Penn, an analyst at Future Horizons, of Tukwila.

Memory machine

The chip industry is driven by Moore's Law, originally articulated by Intel co-founder Gordon Moore in 1965.

The industry axiom states that the number of transistors it is possible to squeeze in to a chip for a fixed cost doubles every two years.

TRANSISTORS
Transistors are basic electronic switches found in silicon chips
Each transistor can be switched on or off, representing a "1" or "0", known as binary code
All computation is done using different combinations of these two outputs to do calculations
Modern chips contain millions of transistors allowing them to execute millions of calculations per second
The tiny devices consist of a source, drain and gate
A voltage applied to the gate and drain turns the device on

Removing the gate voltage switches it off again

In 2004, the equivalent processor to Tukwila contained 592 million of the tiny switches.

Although the new chip packs more than 2 billion transistors it operates at a relatively modest speed of 2GHz, the equivalent of many PC chips.

Last year IBM released what was described as the "world's fastest commercial chip" that operates at 4.7GHz.

The dual-core Power6 processor contains just 790 million transistors.

A large number of the transistors on the new Intel chip are used for memory.

"[It] contains lots of onboard memory and registers which are just a very efficient computer architecture to process data faster," said Mr Penn. ache memory holds data to be processed by the chip. The closer it is to the processor, the quicker the data can be crunched.

"It's like the difference between getting food from the fridge, rather than from the corner shop," said Mr Penn.

"The very early microprocessors had no cache memory onboard - it was all off chip - and now they have as much as they can fit on within the chip size limitation," he said. Mr Penn. "That's an ongoing trend."

Tiny technology

The chip also bucks the trend seen in many modern processors of aiming for lower power consumption.

"That's very much a reflection of the market place demands," said Justin Ratner, chief technology officer of the firm.

He said that firms that used the chips demanded more performance and were willing to trade power to get it.

"These chips go into a quite a unique market place," he said.

The firm will also show off a chip designed for ultra-mobile devices, known as Silverthorne.

The processor is based on the firms latest transistor technology which contains features just 45 nanometres (billionth of a metre) wide.

Tukwila is based on 65 nanometre technology.

"[Using 65nm technology] reflects the design time involved in that processor," Mr Ratner told BBC News.

Both chips will be shown off at the International Solid State Circuits Conference (ISSCC) in San Francisco.

Story from BBC NEWS:
http://news.bbc.co.uk/go/pr/fr/-/2/hi/technology/7223145.stm

Published: 2008/02/04 08:43:58 GMT

MMR 'does not trigger reaction'
Children with autism do not react differently to other youngsters to the MMR jab, a study shows.

London's Guy's and St Thomas's Hospital found no difference in the immune response to the jab in a study of 240 children aged between 10 and 12.

Fears about a link between the two were first raised in 1998, prompting a drop in uptake of the vaccine, but that research has now been discredited.

Studies since have shown there is no link and that has been confirmed again.

The research, partly funded by the Department of Health and published in the Archives of Disease in Childhood, is the largest of its kind.

> **I hope that this study will reassure them that there is no evidence linking the MMR vaccine to autism**
> Professor David Salisbury, of the Department of Health

Previous studies have mainly looked for a possible link by examining autism trends in large groups of populations.

But the Guy's and St Thomas's team analysed blood samples of 240 children aged 10 to 12 to see if the MMR jab had caused an abnormal immune response that could have triggered autism.

This would have been indicated by increased antibody levels, but the researchers found no difference in the three groups they studied - children with autism, those without and those with special educational needs.

While all the children had had the first MMR jab, not all of them went on to have the second needed for maximum immunity.

The children who developed autism or special educational needs were the most likely not to have had the follow up jab - an indication of the public suspicion surrounding the safety of MMR.

Researcher Dr David Brown said: "The study found no evidence linking MMR to autistic spectrum disorder and the paper adds to the overwhelming body of evidence from around the world supporting the use of MMR."

The Lancet medical journal published research by Dr Andrew Wakefield which led to the possibility being raised of a link between the jab and the condition in 1998.

Claims

The journal subsequently distanced itself from the study of 12 children after it emerged Dr Wakefield had received funding to support legal action by a group of parents who claimed their children were damaged by the vaccine.

Dr Andrew Wakefield is currently appearing before the General Medical Council on charges relating to the claims.

But all this was after the publication had had an impact. The up-take of the triple-jab slumped in the immediate aftermath and is still under the 95% needed for herd immunity in some places, particularly London.

The number of confirmed measles cases has risen from 56 in 1998 in England and Wales to just under 1,000 in 2007, according to provisional data.

However, the impact of MMR on these figures is not clear.

Professor David Salisbury, director of immunisation at the Department of Health, said: "It's natural for parents to worry about the health and well-being of their children and I hope that this study will reassure them that there is no evidence linking the MMR vaccine to autism."

But Jackie Fletcher, from Jabs campaign group, said the conclusions were misleading.

"It is making a leap from having the actual data on the antibodies and saying MMR does not cause autism."

Story from BBC NEWS:
http://news.bbc.co.uk/go/pr/fr/-/2/hi/health/7226763.stm

Published: 2008/02/05 00:01:12 GMT

Dutch Architects Plan for a Floating Future

by Joe Palca

Why Climate Change Brings Flooding

A warming atmosphere also means a warming ocean. As water heats up, it expands and triggers a sea level rise around the world. By 2080, a U.N. panel predicts this will have devastating consequences for millions of people around the world — rich and poor alike.

The Maasbommel houses are a new innovation, built within the past decade. *Dura Vermeer*

All Things Considered, January 28, 2008 · Architects in Holland are showing the rest of the world a way of turning adversity into opportunity.

The inevitable rise in sea level that comes with climate change is going to make it increasingly difficult to control flooding in low-lying Holland. But instead of cursing their fate, architects are designing a new Holland that will float on water, and the Dutch government seems willing to try out the scheme. Holland has made other countries begin to question, too. Who says you have to live on dry land?

With the exception of the major highways, it feels like you can't drive more than a mile or so in the Netherlands without running into water. It could be the sea; it could be a river; it could be a canal.

Floating Foundations

On a grey day in November, we head to a town called Maasbommel on the Maas River. We're going to see a lady who owns a floating house. Well, it's not really a floating house. It's a house that can float because it has a unique foundation.

We eventually find the driveway that takes us down to a cluster of cool-looking houses along the river. They have a nautical feel, with curved lines and colored wooden planking.

We're supposed to be visiting the house of Anne van der Molen, but we can't seem to find hers. So we start knocking on doors. We want to see the inside of one of these houses.

Finally, we find someone who is home: Mariana Smits. She is a delightful, energetic woman. If I had to pick one adjective, I'd pick perky. She invites us in for a tour.

It has the look of a typical split-level house. A living room faces the river; stairs lead to a bedroom in back and to a master bedroom above the living room. "We are two of us, me and my husband," Smits says. "So it's big enough for us."

But then I make an odd tour request. I ask her if I can see her home's foundation. Luckily, she's happy to oblige. She leads us downstairs.

"This is underwater," she says when we get there. We are in an enclosed basement with a low ceiling, and the Maas River is all around us. I mean, you poke a hole, and you're going to have water come in.

You see, Smits' foundation actually sits on the river bottom. If the river level rises to flood stage, the house and the foundation float up with the water level. Flexible pipes keep the house connected to electrical and sewer lines.

The house hasn't floated yet, but the prediction is that with global warming, the river will flood about once every 12 years. This ability to cope with floodwater rather than be devastated is why Smits moved here.

"In the other village we have lived, there was always the water. I was very scared," Smits says. "Two times, we have evacuated to leave our old house. This was very scary for us. And we got the opportunity to buy this house. It's a safe place."

In fact, global warming, with the increased risk of flooding it brings, is causing some architects in Holland to change their philosophy.

Chris Zevenbergen is with Dura Vermeer, the company that designed and built Smits' house.

"The whole idea is, in our designs, we should always take into account what will happen when there's an extreme event," Zevenbergen says. In the past, the Dutch only built homes in places where dikes made flooding unlikely.

"The concept that in fact you build in an area where a flood may occur is completely new," Zevenbergen says.

New, and attracting attention. Go ahead and build houses in areas that might flood — just build them on floating foundations.

At his office in the Hague, Koen Olthuis drums his fingers on his desk while he is fielding calls from people all over the world interested in water architecture. Olthuis is bursting with energy. He's the co-founder of a firm called Waterstudio, a small office with a dozen or so youngish employees.

Olthuis' projects go beyond the idea of simply keeping the house and its contents dry.

"The next step: we not only make the house floating, but we make the complete garden floating," Olthuis says. hy not? Why lose all those pretty Dutch tulips just because it floods? After all, Olthuis says, building floating foundations is a snap. Just fill a concrete box with some kind of plastic foam, flip it over, and you've got a stable platform that's ready to float. And the more of these platforms you join together, the more stable they are. So Olthuis doesn't plan to stop at single family homes.

"You see a floating foundation, with a garden on top of it, a swimming pool on top of it, and a house on top of it. And you can fix those floating gardens to each other, and make a floating village of it," he says.

A Return to a Nomadic Lifestyle

All of the projects that Olthuis is describing are still on the drawing board. But the Dutch government has set aside some money and space to try building some of these floating architectural concepts. And Olthuis is confident that people are ready for a new way of living.

"The momentum is just right. Because of the climate change, because of the Al Gore story, because of New Orleans, because of the financials of this moment, everybody is waiting for new innovations," Olthuis says. nd those innovations are coming. Zevenbergen's company has already built floating greenhouses and has designs for floating roads. It even has plans for houses that not only float, but also move.

"You can move them along the river, and go to a city which is close to the river, and park your home there in a special harbor which is constructed for this type of boat," Zevenbergen says. "That we call a nomadic way of living, that you can change the area where you live depending on the season or whatever."

If this sounds like turning the lowly houseboat of yesterday into tomorrow's design for living, well, basically it is.

But the point is, suddenly, climate change is no longer a dire threat, but an opportunity for innovation.

"There are infinite possibilities. That's the idea," Zevenbergen says. "Everything is in fact possible. Nothing is impossible. Sounds crazy, eh?"

Or not.

Produced by Rebecca Davis.

http://www.npr.org:80/templates/story/story.php?storyId=18480769

Languages evolve in sudden leaps, not creeps

- 18:31 01 February 2008
- NewScientist.com news service
- Phil McKenna

Language evolves in sudden leaps, according to a statistical study of three major language groups. The finding challenges the slow-and-steady model held by many linguists and matches evidence that genetic evolution follows a similar path.

Mark Pagel from the University of Reading in the UK and colleagues applied statistical tools commonly used in biology to the analysis of three of the world's major language groups: Indo-European, Austronesian, and Bantu.

By comparing commonly used words within each language group, they were able to identify the extent to which languages within a group diverged from the others. This enabled them to build a family tree, charting the divergence of one "mother tongue" into hundreds of daughter languages.

If languages change at a constant rate, the length of any branch back to the root of the language "tree" should be of the same length. But the researchers found that languages that are very different from the common root had longer paths. This suggests that, each time they split, an abrupt spurt of evolution occurs.

They found that up to a third of all vocabulary changes result from "punctuational bursts of change" when one language splits from another.

In 2005, Pagel performed a similar analysis of genetic variation in species of trees. He found that 22% of evolutionary change came during similar periods of rapid development in some species. "In one case its words, in the other case its genes," Pagel says.

Pagel says languages may diverge suddenly when a subgroup separates from a larger population, to create a unique social identity. Similarly, genetic change may occur suddenly as genes try to adapt quickly to a new environment.

Pagel's colleague Quentin Atkinson adds that, when a small group is isolated from a larger population, any idiosyncrasies in the way they speak may become amplified. "The same thing happens in biology where smaller founder populations are able to change more quickly," he says.

Salikoko Mufwene a linguist at the University of Chicago, however, says it may be misleading to characterise language evolution as "abrupt". "You don't go to bed speaking one way and wake up speaking another way," he says. "Languages may change over centuries, but that is not abrupt, that is gradual."

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http://www.newscientist.com/channel/being-human/dn13267-languages-evolve-in-sudden-leaps-not-creeps.html?feedId=online-news_rss20

Sylvie Guillem stretches herself for Push

The brilliant renegade Sylvie Guillem has made a career of doing things her way. First she turned her back on Nureyev, then the Royal Ballet. Now the world's most exciting dancer is stretching herself with extraordinary modern pieces. She gives a rare interview

Nadine Meisner

Sylvie Guillem has a way of talking – direct, drily witty, French-accented – that is immensely likeable. She sits, an elongated woman warrior, her famously limber legs crossed like precision weapons and an amused gleam in her eyes. The long stick with which she practises her newest martial-arts discipline, aiki-jo, lies nearby, propped across her Brompton folding bicycle. "Oh, I had to insist," she is saying, sending up her image as She Who Must Be Obeyed, the ballerina formerly known as Mademoiselle Non, whose every demand would send the Royal Ballet obediently scurrying.

What did she have to insist? That the choreographer Russell Maliphant should banish all thoughts of stopping as a dancer. He had already created a piece, Broken Fall, for Guillem and the Ballet Boyz, Michael Nunn and William Trevitt. Now she wanted him not only to choreograph, but to dance with her – so he did. Maybe that is why their programme is called Push. Created in 2005, it comes to the Coliseum for its fourth London run this spring.

It's a rare occurrence when contemporary dance performed by just two people sells out houses. But the seamless, mesmerising quality of Maliphant's choreography, combined with the world's most exciting ballerina, is an astonishing experience. Guillem becomes a lanky boy-girl, enclosed in sculpted light and punctuating her liquid moves with sudden sharpness, like exclamation marks. Or she is half woman, half dragonfly, arms windmilling in a strobo-scopic crescendo. This is dance of unique achievement, fusing bold radicalism with total accessibility and leaving you wanting more.

Push, like Sacred Monsters, Guillem's collaboration with the Kathak dancer Akram Khan, has toured widely here and abroad. Is it the glittery ballerina name that brings the crowds? Maybe. But they are not disappointed, staying to offer an ovation at the end. Only once during Sacred Monsters, in a 4,000-seat theatre in Greece, did a spectator interrupt. "It was at a point when I do some talking," Guillem

recalls. “He said, ‘Why don’t you dance?’ And I said, ‘Well, I thought that’s what I’d been doing for 20 minutes already.’ Maybe he was waiting for the Sylvie Guillem with the diadem and tutu, and he was disappointed. And I said, ‘If you don’t like it, I’m sorry. I could sing if you want.’ So the audience started to laugh and applaud.”

She could have carried on with the diadem-and-tutu roles she does so well. But she has always broken away for fresh challenges. Contemporary dance might not be entirely new to her – she has been performing various forms of it for years – but it does require a determined commitment to rethinking the body’s mechanics. “Russell links together simple gestures to make beautiful poetic phrases,” she says. “We are not used to simplicity in the ballet world. But here, suddenly, a simple gesture takes on an importance, so that it’s not just a nice picture, but something that talks.” The focus in ballet is the other way round: more on external shape, less on inner impulse. “Someone will teach you a movement, and you, as a classical dancer, will imitate, perfectly, but it will be an empty image. And, for me, imitation – whether in ballet or in contemporary dance – has never been enough. A movement has to have life, a personality.”

Guillem is notorious for her strong-willed, maverick independence of mind. Right from her early days at the Paris Opéra Ballet, she felt a certain distance from received ideas. She was the most talented pupil ever to emerge from the company’s school, a freak, a preternaturally gifted phenomenon who in 1984, aged just 19, was promoted to the highest company rank, *étoile*. But she would question certain assumptions. “Teachers don’t want to change. They would say, ‘It was set like this, you should do it like this.’ Classical ballet depends too much on people without vision, who just copy. It was only a few people who would say to me, ‘Yes, that’s not a bad idea. I didn’t do it like this myself, but maybe you should try.’” It wasn’t about being a rebel, but about resisting mindless conformity. When, in 1998, she coached the Finnish National Ballet in her new version of Giselle, she introduced a freer approach, allowing dancers to make adjustments for their own bodies. “They were a bit surprised. And I was surprised that they were surprised.”

She laughs. The practical, combative manner is all of a piece with her functional, casual clothes, trainers and spectacles, hung around her neck for convenience. No fuss, no pretentiousness, no glamour, no vanity. For her, celebrity is just a means to power, allowing her to work the way she wants. She and the Royal Ballet divorced last year, ending an 18-year relationship. “I know they said I left the company because I didn’t want to do the big classical roles any more, but that’s not true.” After all, there were plenty of other possible roles. Instead, it was her dislike of the present directorate, she says, that spelt the end. “I did cope with it for a while, but what was the point? I don’t want to ruin my life by feeling angry, so I left.”

In 1989, at 24, Guillem had made an even more dramatic break, leaving, amid great furore, the Paris Opéra Ballet and her boss, Rudolf Nureyev. She arrived at the Royal Ballet as a renegade guest star. Her extraordinary technique thrilled and angered British audiences in equal measure. Some thought her extreme flexibility a sensational vision of the ballet of the future; others, the traditionalists, accused her of unclassical distortion. Now even her detractors have been won over, eulogising her expressiveness and range.

Her schedule is full until the end of next year. As well as touring Push and Sacred Monsters, she has been in Japan performing a programme that includes a Swan Lake extract. (The classical roles have not been completely discarded.) She is also preparing another documentary film and a second book of photographs, as well as working on a new piece with Maliphant and the Canadian actor-director Robert Lepage. “I saw one of Robert’s shows in Sydney and went backstage and said, ‘If, one day, you need a dancer, I’m here.’” Sadler’s Wells is the co-producer, and the piece is pencilled in for next year.

It is appropriate that Guillem should be an associate artist of Sadler’s Wells: London has been her base since she first arrived. “I have friends here, and I like this town,” she says, “apart from too much traffic and not enough cycle lanes.” If she doesn’t get stopped for speeding through a red traffic light, it takes her 25 minutes to cycle to Sadler’s Wells from Notting Hill, where she shares her flat and garden with her long-term boyfriend, the photographer Gilles Tapie.

Guillem stands up and prepares to leave. Her long, rangy body has the look of a Masai. “People say I’m too skinny, and I try to gain weight, but I can’t. I love to eat – it is my great passion – but I think it’s my metabolism. My grandfather was like that, tall and very thin.” She is pulling a cap down over her head, twisting a scarf round her neck. On her bike, she also wears a pollution mask and sunglasses. No wonder the police stopped her in St James’s Park during President Bush’s visit to Buckingham Palace: “I had to half undress so they could see I was not a terrorist.”

Far from it: she is festooned with honours from the French state, among them the Légion d’Honneur, which she received from President Mitterrand at the Elysée Palace. “Already, at that time, he was ill. He arrived a bit late, and we were all in line, 10 men and women, from different fields.” It was rather impressive, the way she tells it. “He stopped at each person to pin the medal and made a small speech, from memory, for each of us, a resumé of what each had done.”

Her honorary CBE was more low-key, delivered by the then culture secretary Tessa Jowell. Guillem didn’t know she had been awarded it until the Royal Ballet’s assistant director congratulated her. “I said, ‘For what?’ And she said, ‘You’ve got the CBE. Didn’t you know?’ She explained that usually they write to people, but I received nothing.” I tell her it’s exceptional for a foreigner to be awarded a British honour. “Well, I am very pleased. It’s just that it looked like a mistake, as if they got the wrong person.” She laughs. “Maybe it really *was* a mistake.”

http://entertainment.timesonline.co.uk/tol/arts_and_entertainment/stage/dance/article3277258.ece

Great Art for the Greatest Numbers
Dana Gioia's Leadership
Of the National Endowment for the Arts
By JULIA M. KLEIN
February 5, 2008; Page D5

LOS ANGELES -- As we sit down to afternoon tea, Dana Gioia launches into an explanation of why the Millennium Biltmore Hotel's Rendezvous Court resembles an ornate Renaissance chamber. The hotel's grand public spaces, Mr. Gioia says, were modeled after rooms in Queen Isabella and King Ferdinand's Spanish palace.


Terry Shoffner

Before the evening is over, still at the Biltmore, we will have seen the world premiere of "Tony Caruso's Final Broadcast," a one-act opera with music by Paul Salerni and libretto by Mr. Gioia. The winner of the National Opera Association's Chamber Opera Competition, the work "begins in a very realistic satiric situation," the death throes of a classical music station, "and moves -- I like to think cleverly and inevitably -- towards a kind of mythic statement," Mr. Gioia says.

Prior to the opera's well-received unveiling, Mr. Gioia enjoys a scone and clotted cream and explains just how he has propelled the National Endowment for the Arts to its biggest budget boost in nearly three decades, a $20.3 million increase to $144.7 million for fiscal 2008, which ends Sept. 30.

"I never knew it," says Mr. Gioia, 57, "but all my life I had been preparing to be chairman of the National Endowment for the Arts. This is a job in which I use virtually everything I know every week." That is no small statement. Mr. Gioia, a graduate of the Stanford Business School, is a former vice president of marketing for General Foods Corp., where he was credited with the revival of such brands as Jell-O and Kool-Aid. But he also holds a master's degree in comparative literature from Harvard and is a poet, critic, translator and anthologist of some renown. His 1991 essay, "Can Poetry Matter?" -- published in The Atlantic Monthly and later expanded into a book -- sparked a cultural furor, and his most recent poetry collection, "Interrogations at Noon" (2001), received the American Book Award.

BusinessWeek has dubbed Mr. Gioia, who took over as chairman in February 2003, "The Man Who Saved the NEA." A less effusive article in last month's Commentary by Michael J. Lewis, professor of art at Williams College, calls the NEA "a cautious dispenser of largesse" and says that Mr. Gioia's chairmanship "has been notable for its calm."

"My objective has been to insist that there are things in our society that are neither right nor left," Mr. Gioia says. "What I sought to do was to take arts and arts education out of the divisive and destructive rhetoric of the culture wars."

The NEA was, for a while, a prime battleground. In late 1980s and '90s, after a handful of grants to controversial avant-garde artists such as Andres Serrano and Robert Mapplethorpe, the endowment found itself under assault from conservatives seeking its abolition. With its budget peaking at $176 million in 1992, it remains smaller than in its heyday.

But Mr. Gioia's NEA is distinguished by its ambition. Using both public and private partnerships to bolster its impact, it now reaches schoolchildren, military families, and cultural organizations in every U.S. congressional district.

"The Big Read," which sponsors community-wide festivals around a select group of classics and contemporary works, is the largest NEA program ever, says Mr. Gioia. An attempt to address declines in reading, it expands to 400 U.S. cities this year. "Shakespeare in American Communities" has sent 66 theater companies to some 3,000 schools in all 50 states. "Operation Homecoming," a writing program for soldiers and their spouses, has spawned two films and a Random House anthology.

"American Masterpieces: Three Centuries of Artistic Genius" supports the performance of American works. The "NEA Jazz Masters" program takes fellowship recipients on the road. The popularization of poetry that Mr. Gioia has long advocated gets a boost from "Poetry Out Loud," a national recitation contest for high-school students that is co-sponsored by the Chicago-based Poetry Foundation. And who else but Mr. Gioia would have imported opera to military bases?

"We set a simple goal at the NEA," he says, "which is to serve all Americans." That necessitated an activist stance, he says, because "if you only wait for the applications to come in to you, they come overwhelmingly from established arts organizations."

"See, I'm an artist," he says, "and so my primary goal is really bringing the transformative power of great art to the broadest audience possible. And I'm a business person, and I had a day job for two decades, and it taught me that there are ways to take a good idea and make it more effective and more affordable."

But his strongest influence, he says, is his childhood in Hawthorne, Calif., "a working-class neighborhood populated mostly by immigrant families." There he saw lives -- including his own -- changed by art, but also how elusive access to the arts could be.

Mr. Gioia says he wanted to tackle the problem in a systemic way. "We're thinking in terms of the whole society," he says. "Most artists in the United States are underemployed. They can't get work all year round. Most arts organizations run a deficit. Most presenting arts organizations in the United States don't own their own facility. That's the supply side.

"On the demand side, most smaller and midsize communities have very limited cultural offerings. And most students have never been to the symphony, a play, an opera. The idea is to help make it possible for people to present good works to communities and groups which would never have access to them. It's not simply to help the supply of art, but it's to match the supply and the demand."

Mr. Gioia's first initiative was "Shakespeare in American Communities," which teamed theater companies, school districts, and NEA-developed educational materials. He describes reaction to the program as "ecstatic."

Mr. Gioia says he was "shocked" to learn that the NEA, founded in 1965, had never served the military. "I felt that that was a failure of democratic vision," he says. Partnering with the Defense Department, he brought Shakespeare to military bases and schools. "We even performed in the hangar where the Stealth bombers were located," he says, "in which there were armed guards who told the actors that if they stepped beyond the line, they'd unfortunately have to be shot." No casualties were reported.

Building on that success, Mr. Gioia launched "Operation Homecoming" with the financial backing of Boeing. He secured the military's promise not to censor soldiers' writings (save on national-security grounds) and enlisted as teachers such literary eminences as the poet Richard Wilbur and the novelist Bobbie Ann Mason. "Most important," he says, "we told people who are serving in this war that their voices are important enough to be heard."

When Boeing offered to sponsor another program, Mr. Gioia "did something that everybody thought . . . was crazy": He invited opera companies to military bases. The tours drew "huge audiences," and the buoyant reception persuaded some opera companies to return on their own steam, he says.

"The Big Read," with the sponsorship of the State Department, has become part of a cultural exchange program. Russians have read Harper Lee's "To Kill a Mockingbird," while Egyptians get a chance this

year to read three books, including Ray Bradbury's "Fahrenheit 451," all in translation. In Los Angeles, Mr. Gioia met with Mr. Bradbury to discuss his new introduction for the Arabic edition. He also talked to the mayor's office about cultural exchanges with Mexico, another "Big Read" partner.

"I think it is a mistake to think that we can communicate with the rest of the world only through politics and money," Mr. Gioia says, suggesting that we need to add culture "as one of our foreign-policy tools."

One of Mr. Gioia's own political tools is the NEA's comprehensive database. "The way I begin a meeting with a congressman now," he says, "is that I ask the congressman to name any high school in the district. I then take my readout and I'll say, 'Do you know [this English teacher]?' So I can demonstrate down to a classroom level how far we reach in their district. At that point, there hasn't been a single member of either house of Congress who hasn't grabbed the printout from me."

Mr. Gioia likes to relate an anecdote about William Faulkner resigning his position as postmaster in Oxford, Miss.: "Somebody asked, 'Bill, why did you quit as postmaster?' And he said, 'I'm sick and tired of being at the beck and call of every son of a bitch who could afford a two-cent stamp.' But the fact is, if you are a public servant, you *are* at the beck and call of every citizen, and that simply comes with the territory."

The decline of arts education in the U.S. and the paucity of international cultural exchanges "will take decades to repair," Mr. Gioia says. "What we're doing now is simply to craft an estimable beginning, and to do this in a way which has the highest possible quality.

"See, I don't believe that artistic quality and democracy are irreconcilable," he says -- as always, anticipating the next question. "I don't believe you either have to have mediocre art or elitist art. . . . And so I'm trying to reach the broadest number of people possible with the best art possible."

But has Mr. Gioia really quieted all the NEA's critics? On the contrary, he says. "Anything you do someone will complain about," he says. "But that's liberating. Because then you know you should do the right thing."

Ms. Klein is a cultural reporter and critic in Philadelphia.

http://online.wsj.com:80/article/SB120216732200642525.html?mod=weekend_leisure_banner_left

Madness in his Method - Stanislavski revisited

Stanislavski's acting methods have been distorted and misunderstood but a new edition of his books should put that right

Benedict Nightingale

It was possibly the most ominous moment in American theatre history. The actress Stella Adler, who felt she was being destroyed by what would become known as the Method, went to Paris in 1934 and met the man who had inspired it, the great Russian director and theoretician Konstantin Stanislavski. And what was his reply to her complaints, especially those about the technique known as “affective memory”, which means drawing on one's own emotional experiences so as to give life to a character? He told her that it was relatively unimportant and need never be used unless all else had failed.

But when Adler reported his words to the Method fanatic Lee Strasberg, who was to go on to found the Actors Studio and put affective memory at its very core, he shrieked: “Stanislavksi doesn't know. I know.”

Well, Adler went her own way, successfully creating the role of Bessie Berger, the matriarch at the centre of Odets's Awake and Sing. But so many American actors fell in behind the cult leader Strasberg that the Method became the dominant force in American theatre. You can still see its influence in those screen and stage performers who aspire to turn characters into their own selves - and sometimes their own mumbling, fidgeting, scratching selves - rather than turn their selves into characters. As Peter Ustinov said when he was directing a maddeningly fussy, restless, self-absorbed Method actor: “Don't just do something; stand there.”

Strasberg's revisionism is one way to spurn Stanislavski. Another has sometimes been the British way, which is to ignore him altogether and, like the late John Gielgud in his more precious moments, rely too much on voice and melody.

In both cases it's worth going back to the gospel itself, Stanislavski's book An Actor's Work, which has just been republished in a lively new translation by Jean Benedetti. In it the author, disguised as one Tortsov, instructs a student group led by Kostia, who is Stanislavski's own younger self - and how incisive and stimulating the result often is, how vital it still seems today.

Near the start Kostia presents his tutor with an Othello in which he reproduces the stealthy, dangerous, supposedly “African” tiger imitations that he has practised in the mirror. Near the end he appears disguised as a theatre critic who squeals, giggles and amazes himself and others with “my insolence, the hostility of my tone, my point-blank stare, my cynicism and rudeness”. Tortsov is withering about the first, which exemplifies the superficial, tricksy acting that he loathes, but is so convinced by the second that he pushes Kostia away in disgust, screaming “Vermin, parasite!”.

An Actor's Work shows us how and why Kostia's evolution occurred. It's actually two books trimmed and edited into one: An Actor Prepares, which Stanislavski began in 1929 and kept obsessively

revising, and Building a Character, unfinished at his death in 1938. And the obvious problem - that there can be no totally authoritative text - is worsened by the fact the two volumes were published many years apart. The result was that Stanislavski's disciples, especially in America, absorbed the first, which is largely about actors' need to explore and exploit their inner selves, and neglected the second, which talks in detail of technique and the discipline required onstage.

Either way, Stanislavski looks for actors who utterly reject the hack acting he found in the Russian theatre - “tearing one's hair to suggest despair, stridency for hatred, a false sob for grief” - and end up able to perform the great dramatist he put on the map. Yes, Chekhov would probably have renounced the theatre in despair if the director hadn't taken The Seagull- a crudely performed flop at its premiere - and given it the sensitive, psychologically probing production it needed. And it's mainly from his experience with Chekhov that Stanislavksi worked out methods, as opposed to a Method, that can still transform a decent actor into a major one.

These include rigorous exercises with the voice, athletic work with the body and ruses for excising stress and tension, but also the subtler stuff often associated with a “system” that he never wanted to become rigid. Since actors can't rely on inspiration, which comes from deep within, Stanislavski aimed to stimulate it by helping them to “make the unconscious conscious”. That means drawing on one's own experiences and imagination to think and feel oneself into a character's past history, present predicament and changing motives. It means reacting truthfully and freshly “as if” one was really there. It means much else, maybe including that contentious “emotional memory”, as Stanislavksi called it.

Michael Caine once told me that for moments of grief he recalled the death of the beloved father who never saw him rise from Cockney obscurity to international success.

So emotional memory can have its successes. I don't know what went through Dustin Hoffman's mind when his Willy Loman cradled John Malkovich's Biff in a Broadway revival of Arthur Miller's Death of a Salesman, but I do know it was one of the two or three most moving moments I've had in a theatre. And yet there are tales of the technique not only producing narcissistic, selfish performances, but of making actors neurotic, hysterical and ill.

Indeed, the same Hoffman could take Method techniques to extremes. He appeared on the set of Marathon Man looking drawn and dishevelled, having not slept for two days in order to play the victim of Laurence Olivier's fugitive Nazi. “Dear boy, you look awful,” Olivier said. “Why don't you try acting?” For the same film Hoffman notoriously forced Olivier to rush ad-libbing around Central Park in preparation for a scene in which he'd chase him with a gun, seemingly not caring when the sickly peer's ankles began to swell dangerously.

Yet I'll never forget that great Irish player, Ray McAnally, telling me that Olivier wasn't an actor but a brilliant, bravura “performer”. Perhaps he could have done with a bit of Stanislavski. Yet again the Russian has always had his critics, among them Chekhov himself, who felt he stimulated his actors with such overelaborate stage effects that he yearned to write a play beginning with total silence: “No birds, no dogs, no cuckoos, not one single cricket.” Then, as today, Stanislavksi was provocative, controversial - and, as An Actor's Work confirms, a genius.

An Actor's Work is published on February 11 by Routledge.

WHAT HAS STANISLAVSKI EVER DONE FOR US?

Chiwetel Ejiofor, starring in Othello at the Donmar Warehouse

He was just a very thorough theatre practitioner. I've read some of his books and also his notes on various plays - including, a while ago, his notes on Othello. I found it detailed and fascinating. There's been a misinterpretation of what he's intending to say about acting, that it's all about disappearing into something irretrievably. It's not about that completely. He had a real perspective on the feelings of the

audience watching the show. He knew how a show should move. A lot of his stuff is enlightening and engaging but, like anything else, you formulate your own way through. You take what's useful.

Janet McTeer, starring in God of Carnage at the Gielgud from March 7

My bible when I was at college was actually Uta Hagen's book, Respect for Acting, but I always thought Stanislavski was great. The imagination is a wild and woolly thing that tends to go off on its own - it's the greatest tool an actor has. And all these methods are just tools to bring some focus, some discipline to the imagination. I've always drawn from all of them.

If you get stuck in a scene, it's great to use Stanislavski - you just remind yourself: “What do I want? How am I going to get there?” It can be very, very simple. But like any method, if you stick to it to the exclusion of all else you'll go wrong.

Samuel West, directing Dealer's Choice at Trafalgar Studios

It's not about navel-gazing. And, actually, it's not about feelings. That's a problem I have with the Method. I've seen Method actors come off stage and say: “Yeah, I'm really feeling it tonight.” And I say: “That's interesting, but did it work?”

Character is not about how you feel about your grandfather or what you had for breakfast; it's how you behave. But people behave differently because of what they have for breakfast. It does embody something, that argument between Olivier and Hoffman on the set of Marathon Man (see feature). Olivier thought that acting was representation - that it was all about show. And that won't do for us any more. I do as much homework as I can - only 10 per cent may be of any use, but the more you do, the bigger the 10 per cent. But it's not a black art. You just feel a little bit more in control. You don't need to know who gave you that ashtray on the coffee table. But it might mean that you feel a bit less of a wanker when you sit down next to it.

And we know the difference, []don't we? When you switch on the radio, within a second and a half you know if you're listening to drama. I'm not sure it should be quite so easy.

Olivia Williams, starring in Happy Now at the National Theatre

Stanislavski's way of working and the influence of his system is not something you adopt or reject, it is in the very fibre of the modern acting style. I am working in a play that meanders in and out of realism, comedy and some heightened dream sequences, and they all need to be routed by a philosophy, or you find yourself chasing laughs, or speaking faster so you can get offstage and text the nanny.

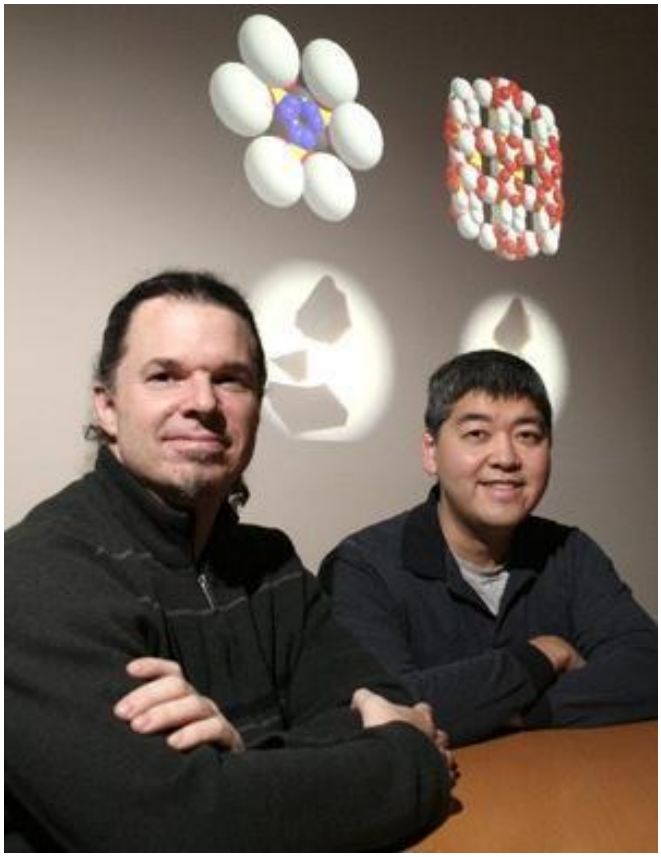
My own philosophy is to adopt the working methods of the director of each production. I worked with an astonishing Polish theatre company, Garzienice, and vowed to abandon my life and live in a forest with them performing folk tales by candlelight. I guess I am a technical tourist.

It is pure coincidence that in my present employment, Happy Now, I am living the life of my character, and her reactions are largely my own. It is Stanislavski in reverse. I keep trying to shake her off, then there she is, unable to persuade her own child to put a coat on, or stepping in dog shit in her flip flops.

When you reach a dead end with a scene, or even in life, Stanislavski's nine questions will get you out of almost any fix, be it a tragedy or a comedy or a gravy advert.

http://entertainment.timesonline.co.uk/tol/arts_and_entertainment/stage/theatre/article3290697.ece

Nanotechnology: Entirely New Way Of Storing Gas Created



David Cramb (left) and George Shimizu have discovered an entirely new way of storing gas. (Credit: Ken Bendiktsen)

ScienceDaily (Feb. 5, 2008) — A new process for catching gas from the environment and holding it indefinitely in molecular-sized containers has been developed by a team of University of Calgary researchers, who say it represents a novel method of gas storage that could yield benefits for capturing, storing and transporting gases more safely and efficiently.

"This is a proof of concept that represents an entirely new way of storing gas, not just improving on a method that already exists," said U of C chemistry professor George Shimizu. "We have come up with a material that mechanically traps gas at high densities without having to use high pressures, which require special storage tanks and generate safety concerns."

In a new article in Nature-Materials,* Shimizu, fellow U of C professor David Cramb, chemistry graduate student Brett Chandler and colleagues from the National Research Council describe their invention of "molecular nanovalves." Using the orderly crystal structure of a barium organotrisulfonate, the researchers developed a unique solid structure that is able to convert from a series of open channels to a collection of air-tight chambers.

The transition happens quickly and is controlled simply by heating the material to close the nanovalves, then adding water to the substance to re-open them and release the trapped gas. The paper includes video footage of the process taking place under a microscope, showing gas bubbles escaping from the crystals with the introduction of water.

"The process is highly controllable and because we're not breaking any strong chemical bonds, the material is completely recyclable and can be used indefinitely," Shimizu said.

The team intends to continue developing the nanovalve concept by trying to create similar structures using lighter chemicals such as sodium and lithium and structures that are capable of capturing the lightest and smallest of all gases -- hydrogen and helium.

"These materials could help push forward the development of hydrogen fuel cells and the creation of filters to catch and store gases like CO_2 or hydrogen sulfide from industrial operations in Alberta," Cramb said.

*The paper "Mechanical gas capture and release in a network solid via multiple single-crystalline transformations" is available in the Advanced Online Publication of the journal Nature-Materials.

Adapted from materials provided by University of Calgary.

http://www.sciencedaily.com:80/releases/2008/02/080201111012.htm

Anna's Hummingbird Chirps With Its Tail During Display Dives

A male Anna's hummingbird caught during a display dive, compiled from high speed video. At the bottom of the dive, the bird flares its tail for 60 milliseconds. The inner vanes of the bird's two outer tail feathers vibrate in the 50 mph airstream to produce a brief chirp. (Credit: Christopher J. Clark and Teresa Feo/UC Berkeley)

ScienceDaily (Feb. 5, 2008) — The beeps, chirps and whistles made by some hummingbirds and thought to be vocal are actually created by the birds' tail feathers, according to a study by two students at the University of California, Berkeley.

The students used a high-speed camera to record the dive-bomber display of the Anna's hummingbird (Calypte anna), the West Coast's most common hummer now in the heat of mating season. The video established that the chirp a male makes at the nadir of his dive coincides with a 60 millisecond spreading of his tail feathers - faster than the blink of an eye.

Wind tunnel tests confirmed that the outer tail feathers vibrate like a reed in a clarinet. The bird's split-second tail spread at dive speed thus produces a loud, brief burst that sounds like a chirp or beep.

"This is a new mechanism for sound production in birds," said lead author Christopher J. Clark, a UC Berkeley graduate student in the Department of Integrative Biology. "The Anna's hummingbird is the only hummingbird for which we know all the details, but there are a number of other species with similarly shaped tail feathers that may use their tail morphology in producing sounds."

The most likely birds to make tail-feather chirps are the Anna's relatives, the "bee" hummingbirds, which are the tiniest hummers in the world. They include the ruby-throated and black-chinned hummingbirds that migrate between the eastern United States and Central America, the Allen's and Costa's hummingbirds that, like the Anna's, reside year-round in the western U.S., the widespread

Rufous hummingbird that migrates between the United States and Central America, the tropical woodstar hummingbirds and the bee-sized bee hummingbird of Cuba, the world's smallest.

"Most have funny tail feathers with tapered or narrow tips, all have mating dives, and all make a different sound," Clark said. "It's possible that sexual preference by females has caused the shape of the tail feathers, and thus the sound, to diverge, thereby driving the evolution of new species."

"This phenomenon nicely illustrates the strength of the evolutionary process, and sexual selection, in particular, to derive novel functions from pre-existing structures," noted Robert Dudley, Clark's advisor and a UC Berkeley professor of integrative biology.

Clark and recent UC Berkeley graduate Teresa J. Feo, both with UC Berkeley's Museum of Vertebrate Zoology, report their findings in this week's online version of the journal Proceedings of the Royal Society B.

The tail-feather beep of the Anna's hummingbird is similar to the whistling feathers of ducks and other birds, including the mourning dove, the whistling swan and nighthawks. Those sounds, however, seem to be incidental to wing flapping, the researchers said.

The tail-feather beep of the Anna's hummingbird, on the other hand, is an important part of the dive display that seduces females and also serves to drive away rivals or other threatening animals.

Nevertheless, Clark said, the reed-like mode of sound production may explain other bird feather "sonations." For example, while researchers have found tail feathers to be the source of winnowing sounds made by snipe, an elusive member of the sandpiper family, the mechanism is unknown.

Clark emphasized that the tail-feather sonation is not a whistle, as some have described the chirp. A whistling sound is produced as air moves through a constriction, as in a tea kettle, or over a rigid edge - a classic pennywhistle. The dive chirp is produced by the vibrating vane of a feather.

The display of the male Anna's hummingbird, a green-backed hummingbird with green head and red throat and weighing less than a nickel, is one of the most dramatic of the hummingbirds. During the breeding season, which lasts from November through May, males ascend rapidly to a height of 100 feet or more, then execute a looping dive at speeds of over 23 meters per second (50 miles per hour), Clark and Feo calculated from their video. When they reach the bottom of their dive and round upward near a perching female or intruder, the birds produce a loud chirp.

Ornithologists have debated whether this sound is produced vocally or by the tail, and in fact, one of the earliest reports suggested a tail-feather source. The most recent paper on the subject, a 1979 article by the late songbird expert Luis Baptista of the California Academy of Sciences, argued that the frequency of the chirp is similar to the hummingbird's vocalization frequency, and thus the chirp is probably vocal.

To determine the origin once and for all, Clark and Feo observed for two springs the mating flights of male Anna's hummingbirds at a San Francisco Bay shoreline park called the Albany Bulb. With a borrowed high-speed camera taking 500 shots per second, Clark and Feo recorded male display dives performed for the benefit of a stuffed female hummingbird attached to a low bush or of a caged female. The video revealed a very brief flaring of the tail feathers at the bottom of the dive, just prior to the bird's ascent for another dive. The flaring coincided with the chirps.

To confirm, the students captured males and plucked or trimmed their tail feathers, knowing that birds can fly without tail feathers and that they typically grow back in five weeks. Those males missing the outer pair of five pairs of tail feathers, or those with the trailing (inner) vanes of the outer feathers trimmed, were unable to make dive sounds.

The researchers then took the tail feathers to a wind tunnel at Stanford University's Hopkins Marine Station in Pacific Grove, Calif., and demonstrated that a wind blowing at the same speed as a diving hummingbird made the tail feathers flutter at a frequency of 3.3-4.7 kilohertz, equivalent to the highest note on a piano, four octaves above middle C. High-speed video showed the sound was produced by the fluttering of the trailing edge of the outer tail feathers; outer tail feathers missing the inner vane produced no sound. Apparently, barbules linking the barbs of the feather vane make the vane stiff enough to vibrate like a reed in a wind instrument.

"Just blowing outward on the tail feather makes the same frequency as in the dive," said Feo, who plays clarinet in the Cal Band.

Interestingly, the tail chirp of the Anna's hummingbird is louder that its vocalizations, leading the researchers to note in their paper, "This suggests that switching to feather sonations has allowed (small birds) to escape the intrinsic constraints on vocal sound volume" imposed by their small song box, or syrinx.

Clark and Feo hope to test related hummingbirds to see whether their tail feathers also vibrate and are responsible for chirps made during display dives

The research was supported by UC Berkeley's Museum of Vertebrate Zoology.

Adapted from materials provided by University of California - Berkeley, via EurekAlert!, a service of AAAS.

http://www.sciencedaily.com:80/releases/2008/01/080129191358.htm

Efforts To Eliminate Tuberculosis In US By 2010 Fall Far Short Of Benchmarks

ScienceDaily (Feb. 5, 2008) — The U.S. is likely to fall far short of its benchmark goals toward eliminating tuberculosis as a public health problem, according to data from a nationwide survey.Latent TB infection (LTBI) prevalence in the 1999-2000 U.S. population (excluding homeless and incarcerated individuals) was found to be 4.2 percent, according to the survey. The current infection rate would have to be 1 percent and decreasing if the U.S. were on course to reach its goal of TB incidence of less than one per million by 2010. These are the first survey-based national LBTI estimates since 1971-1972.

"Persons with LTBI are not infectious and cannot transmit TB to others, and only 5-10 percent of individuals with LTBI will go on to develop active TB, which is infectious. But because the risk of progression to TB can be substantially reduced by preventive treatment, it is crucial that LTBI by detected and treated," said lead author Diane Bennett, M.D., M.P.H., of the Centers for Disease Control and Prevention.The National Health and Nutritional Examination Survey (NHANES), a cross-sectional series of nationally representative health examination surveys, suggests that of the 11,213,000 with LTBI in the overall U.S. population, only one in four had been diagnosed, and only 13 percent had been prescribed treatment.

"The LTBI rates among non-Hispanic whites, 1.9 percent, is close to that required for TB elimination, but the far higher rates among all other groups make U.S. TB elimination by 2010 unlikely," wrote Dr. Bennett and senior author Kenneth Castro, M.D., M.P.H.In this study, researchers used data from 1999-2000 on 7,386 participants with TB skin test results. They intentionally over-sampled people with low income, adolescents, people over age 60, African-Americans, and Mexican-Americans so as to allow for separate analyses of these groups. The survey estimated that approximately 11 million individuals had LTBI in 1999-2000. While that represents a marked decline from the early 1970s, it also masks the shifting demographics of those who have LTBI.

Latent TB infections among individuals living below the poverty level, at 6.1 percent, were significantly higher than the 3.3 percent among individuals living above the poverty level. Because the data excludes homeless and incarcerated individuals, who make up much of the U.S. population living below the poverty line, the association may be even stronger than suggested.Race and ethnicity were also associated with LTBI, even after accounting for socioeconomic status. "Among individuals born in the United States, higher LTBI rates were seen among non-Hispanic blacks and Mexican Americans compared with non-Hispanic whites," wrote Dr. Bennett.

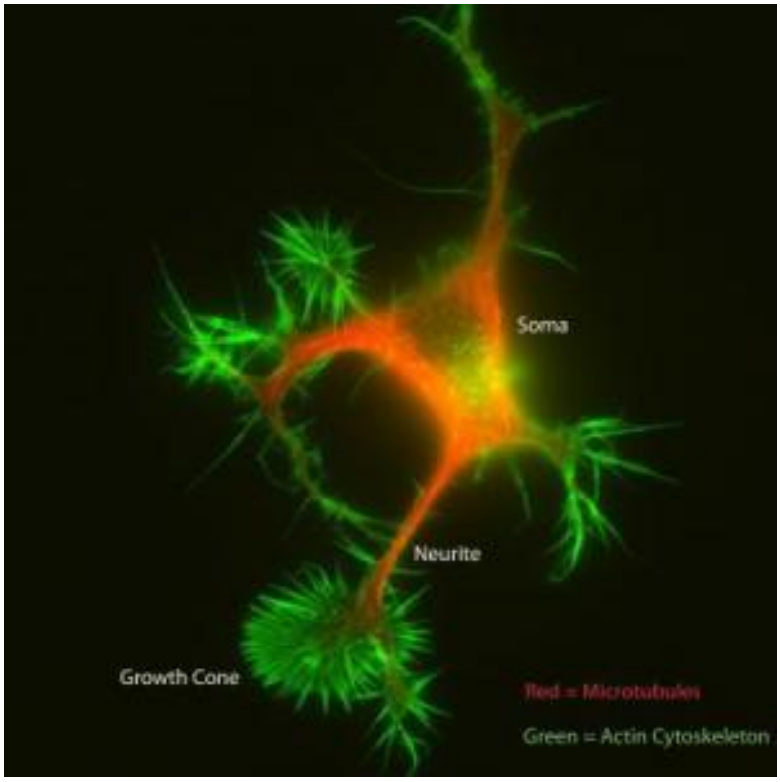
Most striking, however, was the rate of infection among foreign-born individuals. In this survey, 18.7 percent of foreign-born individuals were infected with TB, compared to 1.8 percent of those born in the U.S. In 1999-2000, 6.9 million of the individuals with LTBI were foreign-born, as compared with 4.1 million U.S.-born; only 12 percent of the foreign-born and 16 percent of the U.S.-born had received treatment.

"The higher LTBI rates among some subgroups suggest that specific public health actions should be taken for and with immigrant communities, racial minorities and individuals living in poverty," Dr. Bennett said. "While LTBI is not infectious and latently infected individuals are not a threat to others, increased outreach for education, diagnosis and provision of appropriate preventive treatment could prevent many future cases of active TB."

The findings were published in the first issue for February of the American Journal of Respiratory and Critical Care Medicine, published by the American Thoracic Society.*Adapted from materials provided by American Thoracic Society, via EurekAlert!, a service of AAAS.*

http://www.sciencedaily.com:80/releases/2008/02/080201085740.htm

Scientists Map Signaling Networks That Control Neuron Function



Mouse neuron showing multiple neurites with fan-shaped growth cones. (Credit: UCSD School of Medicine)

ScienceDaily (Feb. 4, 2008) — In the first large-scale proteomics study of its kind, researchers at the University of California, San Diego (UCSD) School of Medicine have mapped thousands of neuronal proteins to discover how they connect into complex signaling networks that guide neuron function. Their research -- using quantitative mass spectrometry, computational software and bioinformatics to match the proteins to their cellular functions -- may lead to a better understanding of brain development, neurodegenerative diseases, and spinal cord regeneration.

Led by Richard Klemke, Ph.D., professor of pathology at UCSD School of Medicine and the Moores UCSD Cancer Center, the research team designed a new technology enabling them to, for the first time, isolate and purify neurites -- long membrane extensions from the neuron that give rise to axons or dendrites. This technological breakthrough opens the door to understanding how neurites form and differentiate to regenerate neuronal connections and give rise to a functioning network. It also led to the discovery of how two key signaling molecules are regulated by a complex protein network that controls neurite outgrowth.

The formation of neurites, a process called neuritogenesis, is the first step in the differentiation of neurons, the basic information cells of the central nervous system.

"Understanding how neurites form is crucial, as these structures give rise to the specialized axons and dendrites which relay sensory input and enable us to see, hear, taste, reason and dream," said Klemke.

Neurons regenerate by sending out one or several long, thin neurites that will ultimately differentiate into axons, which primarily receive signals, or dendrites, primarily involved in sending out signals. These long, branch-like protrusions have a specialized sensory structure called a growth cone that probes the extracellular environment to find its way and determine which direction the neurite should move in order to hook up with other neurites that will also differentiate into axons and dendrites.

The neural signaling network of dendrites and axons forms a huge information grid, which the UCSD team is studying in order to discover how neurons connect properly and regenerate to maintain proper wiring of the brain. Understanding the role that neuritogenesis plays in the regeneration of nerve connections damaged by diseases such as Alzheimer's, Parkinson's or other neurogenerative diseases is an important component of mapping the signaling network.

"Our primary goal is to identify unique proteins that cause the neurite to sprout and differentiate," said Klemke. "We also want to understand the underlying signals that guide neurite formation and migration in response to directional cues."

Klemke's postdoctoral associates Olivier Pertz and Yingchun Wang identified a complex network of enriched proteins called GEFs and GAPs that control neuritogenesis by modulating signaling.

"This signaling provides external guidance cues to mechanical mechanisms inside the cell that make the neurite go forward, turn, or reverse direction," Klemke said. "Understanding how the thousands of neurite proteins work in concert may someday help us guide neurites to the right place in the body to regenerate and reverse the impact of neural degenerative diseases or help facilitate spinal cord healing after injury."

The researchers developed a unique microporous filter technology to separate the neurite from the cell body of the neuron, called the soma. The ability to slice millions of neurons into their soma and neurite components opened the door to using mass spectrometry, a tool able to identify the thousands of proteins that uniquely compose the two structures. Using information gleaned from published work, the researchers were then able to predict the function of most of the neurite proteins. This allowed them to construct a blueprint of how the thousands of proteins work together to facilitate neurite formation.

This study will be published the week of January 28 to February 1 in the on-line, early edition of the journal Proceedings of the National Academy of Science.

Contributors to the study include Richard D. Smith, Feng Yang, and David G. Camp II, Biological Sciences Division, Environmental Molecular Sciences Laboratory, Pacific Northwest National Laboratory, Richland, WA; and Olivier C. Pertz, Yingchun Wang, Wei Wang, Laurie J. Gay, UCSD Department of Pathology and Moores UCSD Cancer Center.

The work was funded by grants from the National Institutes of Health, the Susan G. Komen Foundation, and a Cell Migration Consortium Grant. The Environmental Molecular Sciences Laboratory is a U.S. Department of Energy national scientific user facility.

Adapted from materials provided by University of California - San Diego, via EurekAlert!, a service of AAAS.

http://www.sciencedaily.com:80/releases/2008/01/080129125529.htm

New Thoughts On Language Acquisition: Toddlers As Data Miners

Toddlers' brains can effortlessly do what the most powerful computers with the most sophisticated software cannot, learn language simply by hearing it used. (Credit: Indiana University)

ScienceDaily (Feb. 4, 2008) — Indiana University researchers are studying a ground-breaking theory that young children are able to learn large groups of words rapidly by data-mining.

Their theory, which they have explored with 12- and 14-month-olds, takes a radically different approach to the accepted view that young children learn words one at a time -- something they do remarkably well by the age of 2 but not so well before that.

Data mining, usually computer-assisted, involves analyzing and sorting through massive amounts of raw data to find relationships, correlations and ultimately useful information. It often is used and thought of in a business context or used by financial analysts, and more recently, a wide range of research fields, such as biology and chemistry. IU cognitive science experts Linda Smith and Chen Yu are investigating whether the human brain accumulates large amounts of data minute by minute, day by day, and handles this data processing automatically. They are studying whether this phenomenon contributes to a "system" approach to language learning that helps explain the ease by which 2- and 3-year-olds can learn one word at a time.

"This new discovery changes completely how we understand children's word learning," Smith said. "It's very exciting."

Smith, chair of the Department of Psychological and Brain Sciences at IU Bloomington, and Yu, assistant professor in the department, recently received a $1 million grant from the National Institutes of Health to fund this research for five years. Here are some recent findings:

*In one of their studies, published in the journal Cognition, Yu and Smith attempted to teach 28 12- to 14-month-olds six words by showing them two objects at a time on a computer monitor while two pre-recorded words were read to them. No information was given regarding which word went with which image. After viewing various combinations of words and images, however, the children were surprisingly successful at figuring out which word went with which picture.

*In the adult version of the study, which used the same eye-tracking technology used in the Cognition study, adults were taught 18 words in just six minutes. Instead of viewing two images at a time, they simultaneously were shown anywhere from three to four, while hearing the same number of words. The adults, like the children, learned significantly more than would be expected by chance. Many of the adult subjects indicated they were certain they had learned nothing and were "amazed" by their success. Yu and Smith wrote in the journal Psychological Science, "This suggests that cross-situational learning may go forward non-strategically and automatically, steadily building a reliable lexicon."

Yu and Smith say it's possible that the more words tots hear, and the more information available for any individual word, the better their brains can begin simultaneously ruling out and putting together word-object pairings, thus learning what's what.

Yu, who has a doctorate in computer science and writes much of the software programming for their studies, said that if they can identify key factors involved in this form of learning and how it can be manipulated, they might be able to make learning languages easier, through training DVDs and other means, for children and adults. The learning mechanisms used by the children to learn words also could be used to further machine learning.

Adapted from materials provided by Indiana University, via Newswise.

http://www.sciencedaily.com:80/releases/2008/01/080129215316.htm

Bio-crude Turns Cheap Waste Into Valuable Fuel

Forest waste can be converted into bio-crude oil. (Credit: Image courtesy of CSIRO Australia)

ScienceDaily (Feb. 4, 2008) — CSIRO and Monash University have developed a chemical process that turns green waste into a stable bio-crude oil. The bio-crude oil can be used to produce high value chemicals and biofuels, including both petrol and diesel replacement fuels.

"By making changes to the chemical process, we've been able to create a concentrated bio-crude which is much more stable than that achieved elsewhere in the world," says Dr Steven Loffler of CSIRO Forest Biosciences.

"This makes it practical and economical to produce bio-crude in local areas for transport to a central refinery, overcoming the high costs and greenhouse gas emissions otherwise involved in transporting bulky green wastes over long distances."

The process uses low value waste such as forest thinnings, crop residues, waste paper and garden waste, significant amounts of which are currently dumped in landfill or burned.

"By using waste, our Furafuel technology overcomes the food versus fuel debate which surrounds biofuels generated from grains, corn and sugar," says Dr Loffler.

"The project forms part of CSIRO's commitment to delivering cleaner energy and reducing greenhouse gas emissions by improving technologies for converting waste biomass to transport fuels."

The plant wastes being targeted for conversion into biofuels contain chemicals known as lignocellulose, which is increasingly favoured around the world as a raw material for the next generation of bio-ethanol.

Lignocellulose is both renewable and potentially greenhouse gas neutral. It is predominantly found in trees and is made up of cellulose; lignin, a natural plastic; and hemicellulose.

CSIRO and Monash University will apply to patent the chemical processes underpinning the conversion of green wastes to bio-crude oil once final laboratory trials are completed.

The research to date is supported by funding from CSIRO's Energy Transformed Flagship program, Monash University, Circa Group and Forest Wood Products Australia.

National Research Flagships CSIRO initiated the National Research Flagships to provide science-based solutions in response to Australia's major research challenges and opportunities. The nine Flagships form multidisciplinary teams with industry and the research community to deliver impact and benefits for Australia.

Adapted from materials provided by CSIRO Australia.

http://www.sciencedaily.com:80/releases/2008/02/080204094459.htm

Talking with Mildred D. Taylor

by Nancy J. Johnson and Cyndi Giorgis

Born in Mississippi in 1943 and raised in Ohio, Mildred D. Taylor grew up immersed in family stories. As a child, Taylor visited her great-grandfather's house built at the turn of the past century, a house that didn't have running water or electricity. Memories of those visits found their way into a series of stories about the Logan family, most notably *Roll of Thunder, Hear My Cry,* the 1977 Newbery Medal winner. Taylor's stories reveal struggles, racial tension, and tragedy, as well as triumph, pride, and family honor.

NJJ & CG: How did you begin writing for children?

Taylor: I had been trying to write stories for years that were based on narratives told by my family, and everything was always rejected. A friend of mine told me about a contest that was sponsored by the Council on Interracial Books for Children. The story I submitted was one I had previously written from several points of view [eventually published as *Song of the Trees*]. I tried writing it from a boy's point of view because the story was based on my father's life, but that didn't work. So I decided to retell it from the girl's point of view. It won that honor and got my foot in the door.

NJJ & CG: Was your father a storyteller?

Taylor: He was a great storyteller. The whole family used to tell stories. Whenever we went south to visit relatives, I heard stories. All of my books are based on something that happened to a family member or a story told by a family member, or they are based on something that happened to me when I was growing up.

NJJ & CG: Do you hear your father's voice when you write? Does that propel your own writing?

Taylor: It really does, because I was never an outspoken child. I was always quiet. But when I'm writing a story, I hear the voices—maybe not my father's voice—but I always hear the characters, they way they talk and how they express themselves.

NJJ & CG: What do you remember about writing* Roll of Thunder, Hear My Cry*?

Taylor: I was married and living in Los Angeles while writing that book. My mother had to have surgery so I went home. I was writing the last chapters at that time. The intensity of those chapters made writing them very difficult. I was worrying about the book when a song came to me, which was "Roll of Thunder." I had prayed over the book because it was too hard. When the song came I ran upstairs and told my father, "You've got to hear this." I sang the song for him—everything came through in that song. I told him that day, this book is going to win the Newbery. Unfortunately he did not live to see it published. I knew it was going to be a breakthrough book. It will always be the most special book I have written.

NJJ & CG: What compels you to continue writing family stories?

Taylor: In addition to family, I write about history because I was very affected by it as a child. When I was in school, many people did not know about the true history of black people in America. Both my mother's and father's families owned land. They'd had land since the 1800s. I wanted to tell the truth about what life was like before the civil rights movement.

NJJ & CG: Which of your books stands out when you think of today's readers?

Taylor: I get letters from teenagers who love *The Road to Memphis* and *Let the Circle Be Unbroken*. What readers are drawn to is the family and the fact that the characters grew up during hard times. Also, they like the romances in those books. I think they are learning many positive things about black people, in addition to what life was like and what people had to endure.

NJJ & CG: How about responses from readers? Is there one that lingers?

Taylor: A boy once wrote to me but did not reveal whether he was white or black. What was moving was that he said my work could be noted as a contribution to the civil rights movement. He said if it were not for my books, he wouldn't know what the civil rights movement was about. My books gave a face to it and now he understands why there is a Martin Luther King Day. Another letter arrived just a couple of weeks ago. It's handwritten and says: "I am 87 years old and can hardly see. I have just finished listening to *Roll of Thunder, Hear My Cry*. It is the best thing I have ever heard. I sat up late each night to hear the tape from our library. Thank you so very much for the great story. I live in Mississippi and remember well the era of your book. Thank you so much for writing it." It brought tears to my eyes to know what I have written affects people of so many different generations.

Nancy J. Johnson is a professor of English education at Western Washington University. *Cyndi Giorgis* is an associate professor of children's and young adult literature at the University of Nevada–Las Vegas.

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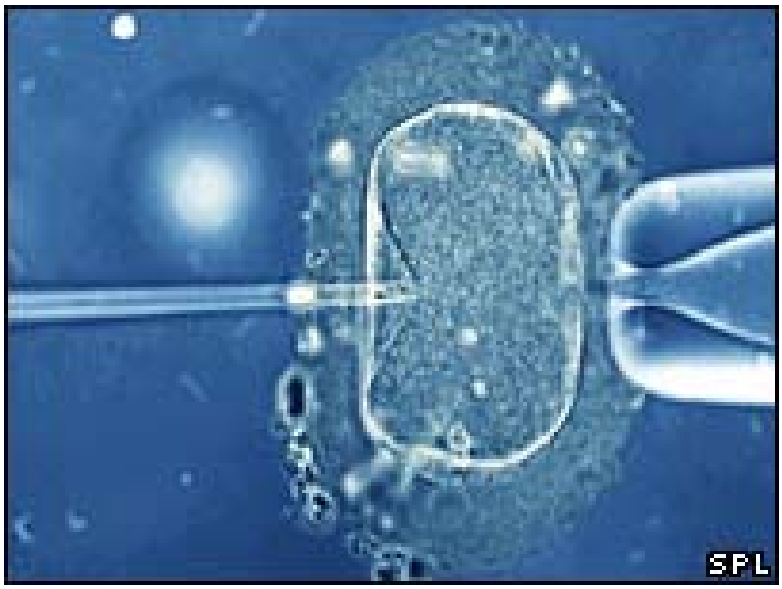
Three-parent embryo formed in lab
Scientists believe they have made a potential breakthrough in the treatment of serious disease by creating a human embryo with three separate parents.



The Newcastle University team believe the technique could help to eradicate a whole class of hereditary diseases, including some forms of epilepsy.

The embryos have been created using DNA from a man and two women in lab tests.

It could ensure women with genetic defects do not pass the diseases on to their children.

It is human beings they are experimenting with
Josephine Quintavalle
Comment on Reproductive Ethics

The technique is intended to help women with diseases of the mitochondria - mini organelles that are found within individual cells.

They are sometimes described as "cellular power plants" because they generate most of the cell's energy.

Faults in the mitochondrial DNA can cause around 50 known diseases, some of which lead to disability and death.

About one in every 6,500 people is affected by such conditions, which include fatal liver failure, stroke-like episodes, blindness, muscular dystrophy, diabetes and deafness.

At present, no treatment for mitochondrial diseases exists.

Genetic transplant

The Newcastle team have effectively given the embryos a mitochondria transplant.

We believe we could develop this technique and offer treatment in the forseeable future that will give families some hope of avoiding passing these diseases to their children
Professor Patrick Chinnery
University of Newcastle

They experimented on 10 severely abnormal embryos left over from traditional fertility treatment.

Within hours of their creation, the nucleus, containing DNA from the mother and father, was removed from the embryo, and implanted into a donor egg whose DNA had been largely removed.

The only genetic information remaining from the donor egg was the tiny bit that controls production of mitochondria - around 16,000 of the 3billion component parts that make up the human genome.

The embryos then began to develop normally, but were destroyed within six days.

Appearance

Experiments using mice have shown that the offspring with the new mitochondria carry no information that defines any human attributes.

So while any baby born through this method would have genetic elements from three people, the nuclear DNA that influences appearance and other characteristics would not come from the woman providing the donor egg.

However, the team only have permission to carry out the lab experiments and as yet this would not be allowed to be offered as a treatment.

Professor Patrick Chinnery, a member of the Newcastle team, said: "We believe that from this work, and work we have done on other animals that in principle we could develop this technique and offer treatment in the forseeable future that will give families some hope of avoiding passing these diseases to their children."

Dr Marita Pohlschmidt, of the Muscular Dystrophy Campaign, which has funded the Newcastle research, was confident it would lead to a badly needed breakthrough in treatment.

"Mitochondrial myopathies are a group of complex and severe diseases," she said.

"This can make it very difficult for clinicians to provide genetic counselling and give patients an accurate prognosis."

However, but the Newcastle work has attracted opposition.

Josephine Quintavalle, of the pro-life group Comment on Reproductive Ethics, said it was "risky, dangerous" and a step towards "designer babies".

"It is human beings they are experimenting with," she said.

"We should not be messing around with the building blocks of life."

Mrs Quintavalle said embryo research in the US using DNA from one man and two women was discontinued because of the "huge abnormalities" in some cases.

Dr David King, of Human Genetics Alert, expressed concern about a "drift towards GM babies".

Story from BBC NEWS:
http://news.bbc.co.uk/go/pr/fr/-/1/hi/health/7227861.stm

Published: 2008/02/05 11:13:29 GMT

Lifting weights 'good as running'
Weight training could be as effective as endurance exercises like running when it comes to burning fat and warding off diabetes, a study suggests.

American scientists created mice which carried a gene that, when switched on, gave them muscles similar to those produced by weight training.

When the gene was off, the mice - which were fed a fast food diet - became obese and developed liver problems.

But when on, the same mice burned up fat, the Cell Metabolism study said.

In addition, the fatty liver disease it had developed while the gene was off disappeared, and it stopped being resistant to insulin, a condition which can lead to type II diabetes.

This was despite the fact that the mouse was still eating a diet high in fat and sugar and did not increase its physical activity.

The team from the Boston University School of Medicine (BUSM) genetically engineered the mouse to grow a certain type of muscle - known as Type II - which develops as a result of resistance training.

This is different to the muscle which forms as a result of endurance training such as running, known as Type I.

Speeding up

"We've shown that Type II muscle does more than allow you to pick up heavy objects," said Kenneth Walsh of BUSM. "It's also important in controlling whole-body metabolism."

If you have these muscles, even when you are not doing much, you are still burning up energy
Professor Ken Fox
Bristol University

The researchers suggested it may be because an increase in this type of muscle sparks changes in the rest of the body.

Professor Ken Fox, an exercise specialist at the University of Bristol, said that attention was increasingly turning to resistance exercise as a means to improve metabolism.

"If you have these muscles, even when you are not doing much, you are still burning up energy.

"It's a hot topic at the moment. It's something that could be particularly useful for older people who may have trouble with endurance exercise, and it can be very satisfying because the effects of resistance training appear very quickly."

Story from BBC NEWS:
http://news.bbc.co.uk/go/pr/fr/-/1/hi/health/7228896.stm

Published: 2008/02/06 02:35:48 GMT

Woof! Computer Speaks Dog

Tracy Staedter, Discovery News

Feb. 4, 2008 -- Dog owners may think they can recognize their pet's bark. But a new study shows that a computer is far better at identifying a canine's woofs, arfs, and ruffs than a human.

The computer, which relies on artificial intelligence and machine learning methods, could provide a new tool for automatically analyzing large amounts of data typically recorded during behavioral studies.

"Animals communicate very different emotional states by very different vocal sequences," said Csaba Molnár, an ethologist from Eötvös Loránd University in Budapest, Hungary.

"You could use this method to analyze other vocal signals, such as bird songs, or categorize video recordings. You could even use it to categorize human speech and dialogues."

The software, which was developed by collaborators at the Sony Computer Science Laboratory in Paris, France, analyzed more than 6,000 barks from 14 Hungarian sheepdogs known as Mudis.

The researchers recorded barks in six different behavioral categories: "stranger" (where an unknown person appeared at the house in the absence of the owner); "fight" (where a trainer encourages the dog to bark aggressively); "walk" (where the owner prepares for a walk outside); "alone" (where the owner tied the dog to a tree and walked out of sight); "ball" (where the owner held a favorite toy); and "play" (where the owner played a familiar game with the dog).

After the barks were collected, they were transferred to a computer and digitized. Artificial intelligence software is then used in a two-stage process to first learn the more than 100 acoustic features of the different kinds of barks and then use that knowledge to code, classify and evaluate them.

In one experiment, the software correctly classified the barks in 43 percent of cases. "Fight" and "stranger" barks were the easiest to recognize, while "play" barks were more difficult. When matched against a human's ability to do the same, the computer's success was about the same.

In a second experiment, the software correctly recognized the barks of 52 percent of individual dogs. A human's ability to do this was much lower, which suggests that there are acoustic differences to dog woofs that humans cannot discern.

According to veterinarian and applied animal behaviorist, Sophia Yin, animal vocalizations that sound similar on a cursory listening are very different upon closer analysis. In 2004, Yin and colleague Brenda McCowan published a similar study in the *Journal of Applied Animal Behavior*.

However, the computer they used employed statistical methods and not artificial intelligence to crunch the data.

"It might be that the method they're using is a faster way to analyze. Because we did statistical analysis, it took a long time. We had to keep running the machines overnight to get all of those barks analyzed," said Yin.

However the information is gleaned, discerning dog barks can give owners better information for dealing with the animal's behavior.

"People might just think, 'Oh he's barking again, we have to use an electronic collar on him,'" said Yin.

But if they can understand the context for the bark, they can find a better solution.

For future work, Molnár and his team plan to use the artificial intelligence software to compare the barks of various working dogs, such as sheep dogs and hunting dogs. A difference could provide some insight into the effect of artificial selection on the vocal communication of the dogs, he said.

http://dsc.discovery.com/news/2008/02/04/computer-dog-bark.html

Public Intellectuals, Inc.

By Jeffrey R. Di Leo

Public intellectuals in America have good reason to be discouraged. And so do those who look to them for intellectual leadership. Currently, it almost seems that the more public the intellectual, the less seriously he or she is taken by other intellectuals. Nevertheless, public intellectuals today have more media outlets and markets available to them than ever before. Due primarily to the rise of new technologies, the circulation and recirculation of their ideas are reaching wider and wider audiences. Consequently, as the intellectual influence of public intellectuals over other intellectuals (viz., non-public intellectuals) wanes, the market for their ideas and their entertainment value skyrockets.

An additional cause for discouragement for public intellectuals and those who look to them for intellectual leadership is that society at large just doesn't seem to afford its iconic or star public intellectuals much respect anymore. Public intellectuals in America are merely "one side of an argument," so to speak. From the general public's point of view, they are either Republican or Democrat; liberal or conservative; left-wing or right-wing; pro-choice or pro-life; and so on. Public intellectuals signify or are reduced by the general public to nothing more than a position — and usually an extreme one — on a topic of contemporary social and political concern.

The reduction of the discourse of public intellectuals to mere polarized positions is the most observable sign of a lack of respect. It serves to short-circuit and obviate subtleties of argument and render superfluous the need for evidence. Respect is afforded public intellectuals not by the mere "declaration" or "assertion" of a position (anyone can merely declare or assert a position). Rather, respect is granted to them through the opportunity to articulate and defend their positions in some detail or depth to a wide audience. It is further confirmed when their defense is thoughtfully received by an attentive audience. Public intellectuals are respected for the depth of their knowledge, and efforts to suppress it, such as the reduction of their knowledge to a mere position, is ultimately a sign of disrespect for them as intellectuals.

The lack of respect afforded our public intellectuals today is a major cause for concern. The current situation can be put into better context when one recalls that the history of public intellectualism in America includes figures such as Ralph Waldo Emerson, William James, Max Weber, and John Dewey — figures who still have a powerful presence in the world of ideas. At present, public intellectualism in America is preoccupied more with the idea-in-itself that is being promoted than with the person who is promoting it. For much of the last century, Dewey, for example, was regarded as not just another expert commenting on the public school system in America. Rather, he was treated as one of America's finest philosophers who just happened to be sharing his ideas on education to a respectful and attentive national audience. At the opening of the 21st century, however, the situation is much different.

The final cause for discouragement regarding public intellectuals is the tug of war between academe and the public-private sector in which public intellectuals currently find themselves. Public intellectuals play a crucial role in the circulation, production and identity of knowledge though the two worlds they inhabit — academe and the public-private sector — both compete for their allegiance and affiliation. The interests of these two worlds are very different, with the most obvious difference being that academe privileges highly specialized modes of discourse, whereas the public-private world favors generalized ones.

I believe that the fundamental terms of the relationship of public intellectuals to the academic and public-private sectors must be changed. I will even go so far as to offer that we might consider replacing the phrase "public intellectual" with the arguably more apt (albeit controversial) one, "corporate intellectual." The motivation for my case, however, will come from a most unlikely and unconventional source — Emerson. Even though Emerson was writing well before the rise of academe and the university in America, his thoughts on academics and public intellectuals are extremely insightful and provide a unique point of entry regarding the issues at hand.

Critical reflection on the role of public intellectuals in America is important at this particular time in our history. Recent social and political events such as the war in Iraq, the mistreatment of prisoners at Guantanamo Bay and Abu Graib, and our responses to natural disasters, such as increasing global

warming and Hurricane Katrina, reveal that our society seems to have lost its ability to question authority, to separate knowledge from opinion, and to discern what is valuable from what is worthless. Public intellectuals can potentially play a central role in directing — or even redirecting — the social and political agenda of the nation as well as provide the public with reliable insight. However, the academy's move toward increasingly specialized knowledge and discourse and the public-private sector's movement toward increasingly generalized (and polarizing) discourse and knowledge places public intellectuals in a difficult position to accomplish these ends. If public intellectuals are to become relevant and respected again, viz., be able to (re)direct social and political beliefs and aims, the terms of their relationship with the public-private and academic spheres must be changed.

Affiliations and Academic Values

Academe is frequently characterized as an oasis from the market-driven forces of the public-private sector. Within the academy, ideas are said to be pursued without regard to their market value by individuals dedicated to the life of the mind. Students and teachers enjoy in academe a reprieve from the pressure to conform their practices to the requirements of "cash value" or "public sentiment." Academe is a site where knowledge is disseminated, discovered, and debated, and academic values are directly linked to these knowledge-driven practices.

The public-private sector, however, is associated with a different set of activities and values. Moreover, arguably, this set of activities and values is defined as the opposite of those of academe. For example, if academe is dedicated to the life of the mind, then the public-private sector is not; if academe disseminates, discovers, and debates knowledge and ideas, then the public-private sector does not; if academe is not motivated by market values, then the public-private sector is. In sum, the public-private sector is a site where ends are pursued relative to their potential either to appease public and private sentiment or produce "cash value," whereas the academy is not.

Affiliation with the public-private sector is often akin in the academy to "selling out," namely, abandoning the pursuit of knowledge for the pursuit of market share. This perception is part of the reason that terms such as "public intellectual" and "academic" are at times used in a mutually exclusive manner: either one is a public intellectual or one is an academic. One cannot be both.

Public intellectuals promote or sell ideas whereas academics pursue or discover ideas; public intellectuals speak to and for the masses, whereas academics speak to and for academics. Moreover, public intellectuals are often distinguished by considerations of quantity, whereas academics are differentiated by considerations of quality. For public intellectuals, the more attention that their ideas or they themselves receive, the more valued they are as public intellectuals. In other words, one cannot be a valuable public intellectual without a public, and the greater the public, the greater the value that is ascribed to the public intellectual. Academics, however, are valued differently.

The key factor in judging the value of academics is quality: quality research in their discipline, quality teaching of their students, and quality service to their institution and community. While quantity can sometimes positively influence determinations of academic value, quantitative value is always tempered by considerations of quality. Standards of academic quality are determined within the academic community and may vary from discipline to discipline. In large part, quality in academia is a relative and subjective affair, as much depends on the standards established by the community. This notion of academic quality is particularly true within the humanities, but arguably holds as well in the sciences. Quality, the relative and subjective factor at the center of determinations of academic value, is much different than the key factor used to determine the value of public intellectuals. Issues of quantity are largely objective and empirical. As we shall see, for some, one only needs a tally-sheet and a calculator to determine the value of a public intellectual, whereas one needs very discipline-specific information to determine the value of an academic. This lack of reliance on discipline-specific information in quality judgments of public intellectuals is troubling.

The Decline of Public Intellectuals

We are living in a time when both the meaning and function of public intellectuals are being radically reshaped. The rise of new media and the growth of the entertainment industry have resulted in an unprecedented need for individuals to participate in it. Increasing numbers of academics are entering this

growing marketplace for ideas, while at the same time the number of institutionally unaffiliated persons is decreasing. And while the "decline" of the public intellectual in America has been presented in numerous ways by numerous commentators, the most notorious and noteworthy example is the recent study from the legal commentator Richard Posner.

In his widely debated book *Public Intellectuals* (2002), Posner argues that American public intellectualism is in "decline" and presents a range of empirical evidence to support this conclusion. By a variety of methodologically questionable means, including statistics on media mentions, Internet traffic, and scholarly mentions, Posner presents a list of 546 major public intellectuals. He also offers a list of the top 100 public intellectuals most frequently mentioned in the media, with Henry Kissenger, Pat Moynihan, George Will, Larry Summers, William Bennett, Robert Reich, and Sidney Blumenthal at the top. Posner's taxonomy of public intellectuals is as worthless in some respects as E.D. Hirsch's list of "What Every Literate American Knows" in *Cultural Literacy* (1987) or Robert Maynard Hutchins' selection of the *Great Books of the Western World* (1952). Nevertheless, it is as symptomatic of our times as *People* magazine's annual personality taxonomies or David Letterman's nightly Top Ten Lists.

While Posner's study of public intellectuals is interesting and well intentioned, the fact that his quest for the biggest figures in the intellectual world literally is solely based on quantitative factors, and never on qualitative ones, is disappointing. Posner's method furthers the notion that public intellectualism is merely a matter of "getting noticed" and never a matter of the quality of contribution one is making, let alone its epistemological, social and political value. Work like Posner's continues to promote the unfortunate notion that public intellectuals are identifiable and worthy of merit based solely on the size of the market for their ideas, with no methodological allowances made for the quality of their contributions to public discourse. In addition, Posner treats public intellectualism in America as though it were merely part of the entertainment industry — which it very well may be — and, as such, judged by standards more akin to the Nielson ratings than the tribunal of reason.

Work on public intellectuals by cultural theorists like David Shumway, Jeffrey J. Williams, Sharon O'Dair and Cary Nelson is vastly superior to work like Posner's. Their work seldom gets bogged down in the quantitative and who's-who aspects of public intellectualism, but rather focuses on the cultural and disciplinary logic of what they call "the star system." Effectively, their work on the star system is a commentary on the transition of some individuals from (private) academics to public intellectuals: a transition noteworthy for its shift between differing criterions of value, among other things.

One aspect of the star system is that a small coterie of academics make the transformation from being merely the most recognizable face of the life of the mind (academic stars) to being quite literally part of the entertainment industry (super-stars). As super-stars, their entertainment qualities and market value exceed those of mere academic stars. They operate in a value system more like that of movie stars than that of academic stars. If one can raise a stir, then one achieves a higher value in this system.

The nature of public intellectualism in America is in crisis partly because a wedge has been driven between the interests of academe and the interests of public-private sectors. One is either a mere academic or one is a mere public figure. As an academic, one's audience is at best the members of one's profession, and at worst, the members of one sub-area of one's profession. In either case, the audience is strictly delimited. As a public intellectual, while one finds one's audience expanded beyond the limits of one's profession, one also finds it increasingly difficult in America to carry on a high and relevant level of discourse.

Given the unfortunate situation of academic and public intellectuals in America today, it might be instructive to look back to a time in America when the promise of a strong relationship between intellectuals and both academe and the public-private spheres existed and then ask how this relationship might be re-established. In looking back, I would like to comment on Emerson, in whose work there is the promise of a compromise between mere academics and mere public intellectuals; in looking forward I would like to suggest that we consider abandoning the academic-public intellectual dichotomy and establish a new category that might be called the "corporate intellectual" — a term more consonant with the values of the new academy as well as with the public-private sector.

Transcendental Scholars

In his 1837 address to the Phi Beta Kappa society, "The American Scholar," Emerson envisioned the American scholar as a person who would do whatever possible to communicate ideas to the world, not just to fellow intellectuals. Emerson regarded the American scholar to be a whole person while thinking. As a whole person, the American scholar would speak and think from the position of the "One Man," which "is not a farmer, or a professor, or an engineer, but he is all. Man is priest, and scholar, and statesman, and producer, and soldier."

In the act of thinking, the intellectual becomes this whole person. Emerson writes: "In this distribution of functions the scholar is the delegated intellect. In the right state he is Man Thinking. In the degenerate state, when the victim of society, he tends to become a mere thinker, or still worse, the parrot of other men's thinking. "

Isn't this still true today? Doesn't public intellectualism suffer from the exact form of degeneracy noted by Emerson? Are there not too many public intellectuals who are parrots in the public arena, speaking merely from the parameters laid out for them by others? Is regurgitating established discourses and strictly defined conceptual frameworks a sign of public intellectualism or public propaganda? Emerson is right in asserting that such things both discredit the ideas of individuals and render suspect the quality of their thoughts.

In all fairness though, perhaps "parroting" is more of a practical necessity today than it was in Emerson's time. The need to affiliate one's ideas with a group, school or individual is perhaps a function of the sound-bite age, where metonymic or telegraphic communication abounds. We demand labels for and from our public intellectuals, and when we don't have them, we become nervous. And the labels we put on and demand from our public intellectuals are perhaps more important than what they actually think. "He's a Republican" or "She's a feminist" go a long way in the public arena in terms of persuading people of the value of our "thinking"; phrases like she sides with "moral values" and he is "against big government" serve as short-hand for more complete explanations and serve to cut off public debate and thought. This labeling process presents the conditions for an unending repetition and circulation of crystallized, unchanging doctrines within the public sphere.

As a public intellectual, Emerson's whole person thinking wears a number of different hats. "The office of the scholar," writes Emerson, "is to cheer, to raise, and to guide men by showing them facts amidst appearances. He plies the slow, unhonored, and unpaid task of observation." "He is one who raises himself from private considerations and breathes and lives on public and illustrious thoughts. He is the world's eye. He is the world's heart." Emerson closes his address with a beautiful vision of public intellectuals as a group: "We will walk on our own feet; we will work with our own hands; we will speak our own minds. The study of letters shall be no longer a name for pity, for doubt, and for sensual indulgence."

Emerson provides us with a very clear response to the relationship of intellectuals to the public-private and academic spheres. For him, intellectuals live among these spheres, but do not affiliate with either one exclusively. For him intellectuals are always already involved in the public and private spheres as well as in the academic spheres and others. The concept of an "intellectual" for him implies a relationship with public, private and academic interests. Emerson himself, as perhaps the premier public intellectual of his day, if not in American history in general, both promoted or sold his ideas as well as worked hard to pursue or discover ideas; he both spoke to and for the masses as well as to and for the scholar.

From Public Intellectuals to Corporate Intellectuals

Public intellectualism today seems remote from the ideals of the Emersonian intellectual. In contrast to Emerson's notion of the intellectual, our own appears overly narrow. The notion of the intellectual as "trapped" between affiliating with academe and the public-private sector is foreign to Emerson's all-embracing intellectual. The rise of the corporate university allegedly pulls intellectuals away from the realm of academic values and into the realm of corporate and market (or neo-liberal) values. The general conclusion of most commentary of this type is that the intellectual's values and identity are compromised in some way — a conclusion that is reached by assuming that corporate and academic values are fundamentally incompatible.

But why do we need to continue to regard corporate and academic values as incompatible? Can there not be some common ground between them that allows not only for the continuing integrity of academic values in themselves but also of corporate values in themselves? Furthermore, what would happen if we postulate the intellectual from the position of the compatibility of academic and corporate values? Would the resultant intellectual be admirable or despicable? Progressive or reactionary? A monster or an angel?

One might reasonably call the type of intellectual that is the result of the rise of the new corporate university a "corporate intellectual." This designation would not only be appropriate, but also ultimately a fair one. While some might look upon the designation "corporate intellectual" with fear and disdain, I will offer that it is no less disdainful than the shopworn and outmoded designation "public intellectual." More often than not, public intellectuals function in America today as part of the entertainment industry — as part of a space set apart from academe. Most American academics are not public intellectuals, even if many of America's public intellectuals are academics.

The recent rise of the corporate university leads one to the conclusion that academe is no longer nor will it ever be again an oasis divorced from private and public interests. Therefore, if intellectuals believe that the recent demand to straddle academe and the public-private sector is the continuing condition of the academy, they will be obligated to develop a sense of intellectual self-identity that does not view itself as "trapped" or "compromised." As the nature of academic identity changes, so too will, of necessity, the identity of intellectuals.

These changes in the configuration of the university call for academics to consider the markets for their ideas. In other words, instead of merely pursuing ideas in themselves or ideas as such, academics would weigh the market value of their ideas along with more purely knowledge-based considerations. This would simply be an extension of market-based practices already well established in academia. For example, most doctoral candidates balance the knowledge-based virtues of possible dissertation topics against the potential of these topics being appealing to prospective employers. Moreover, this market-based decision making is not limited to graduate students alone.

Professors of all levels working on manuscripts with an eye toward publication are remiss if they do not consider the market for their manuscript in the early stages of its development. Academic presses are increasingly behaving more like trade presses in that they are with more frequency refusing to publish otherwise academically sound manuscripts that do not have much potential for sales. On the down-side, this trend puts more pressure on academics to publish books with appeal beyond a small coterie of specialists; on the up-side, it compels academics to think in terms of a wider-audience for their ideas and to pursue projects that engage a broader set of interests and knowledge.

Furthermore, while it would be easy to be disdainful of the type of intellectual that results from this process, one should avoid this judgment and maintain an open mind as to the potential of these intellectuals for producing progressive change in both their particular professions and society at large. Corporate intellectuals would be persons who would always take into account at some level the market for their ideas and who would never merely pursue ideas as such. Market considerations of one's ideas of necessity bring them into the public sphere — and ultimately to a wider audience. Consequently, corporate intellectualism would in effect be a new type of public intellectualism. Moreover, given the current state of public intellectualism in America, this transition might not be a bad thing, particularly if it brings into the public sphere more of the progressive kinds of knowledge and questions pursued by academics.

The necessary condition for proper academic values and identity should not be gauged by one's disassociation of interest with the market. As "corporate intellectuals," members of academe would configure their identity as allied to both the "insular" world of the academy and to the public sphere. Not only is this a potentially more positive, socially responsible identity for intellectuals, it is more in tune with the current and continuing material conditions of the academy. So, for example, in considering writing a book or offering a course, intellectuals would weigh market considerations with academic concerns, asking both whether the project would have a market and whether it would further academic discourse. This reconfigured identity will resonate with academics seeking ways to have more public influence.

Rather than feeling trapped between academe and the public-private sector, academics should take advantage of the opportunity to align their identity with the public-private sphere. One of our goals as intellectuals might be to find ways to bring the two spheres to work together more organically, exercising public accountability without compromising our intellectual freedoms. In the process, increasing numbers of academic intellectuals might come to be regarded as public intellectuals. While the phrase "corporate intellectual" might grate against those ideologically opposed in toto to the corporatization of the university, it will be much more difficult for them to reject prima facia the notion that academics should weigh market considerations along with purely knowledge-based ones. If nothing else, the phrase "corporate intellectual" will spark much needed conversation about the positive role for academics in the emerging corporate university, particularly with regard to their relation to the public sphere. This will be one of the more encouraging consequences of the corporatization of the university, a material condition that does not appear to be passing away very soon. In the end, these newly minted corporate intellectuals have the potential not only to alter the meaning and nature of the American intellectual, but also to capture, as Emerson says, the world's eye and the world's heart. Hopefully, this is something that they will be able to do without seriously jeopardizing the pursuit of knowledge.

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http://insidehighered.com:80/views/2008/02/04/dileo

How Fiction Works, By James Wood

An Olympian critic points out where major-league talents are getting it wrong

Reviewed by DJ Taylor
Sunday, 3 February 2008

The mark of Wood's dexterity, as chapters on Detail, Character, Language and Dialogue rapidly succeed one another, all broken up into a series of daintily numbered paragraphs, is his ability to extract useful lessons from the sight of a major-league talent getting it wrong. A closely inspected passage from Henry James's What Maisie Knew, in which he demonstrates how the authorial gaze oscillates between Maisie, the wider community in which Maisie operates and the writer himself, is made easier by James's mastery of the point of view. Even better, consequently, is Wood's dissection of an extract from John Updike's Terrorist, in which he convicts Updike of stuffing in so much character-forming detail that he ends up playing his creation false.

Supposedly intended for "writers, readers and anyone interested in what happens on the page", How Fiction Works belongs to the upper shelf of what is turning into a very considerable critical sub-genre: the literary user's manual. Professor John Sutherland got in first with his The Novel: A user's guide (2006), closely followed by Professor John Mullan's How Novels Work. Verse, meanwhile, was covered by Ruth Padel's Fifty-Two Ways to Read a Poem.

Naturally, the levels vary. Sutherland was chatty, informal and commercially attuned; Mullan more interested in the nuts and bolts side of literary composition. Wood, on the other hand, is positively Olympian, taking Flaubert, Nabokov, Joyce and other heroes of the modernist canon out into the book-lined study of his mind and hob-nobbing with them in the most companionable manner.

Style-wise, all this realises a quaint academicism not seen in English letters for the best part of a century. No one minds enthusiasm, of course, but when Wood admires a particular sentence he crows over it: "What a piece of writing this is!" (What Maisie Knew); "What an amazing opening!" (a Chekhov story); "How fine this is!" (Marilynne Robinson).

There are the intent prolepses ("I return to the question of artifice and lifelikeness in 'Truth, Convention, Realism', paragraphs 111-122"), the habit of pronouncing taxonomic judgment on absolutely everyone mentioned (poor old A C Benson, dragged into a foot-note, can't just be "the writer A C Benson", he has to be "the minor English writer A C Benson"), above all that de haut en bas Cambridge combination room use of the adjective "little". Wood apparently got his inspiration from Ruskin's "little book" The Elements of Drawing. His hero Henry Green once gave a "little talk" at the BBC. Why, Wood – modesty breaking out all over the place – admits to writing a "little book" himself.

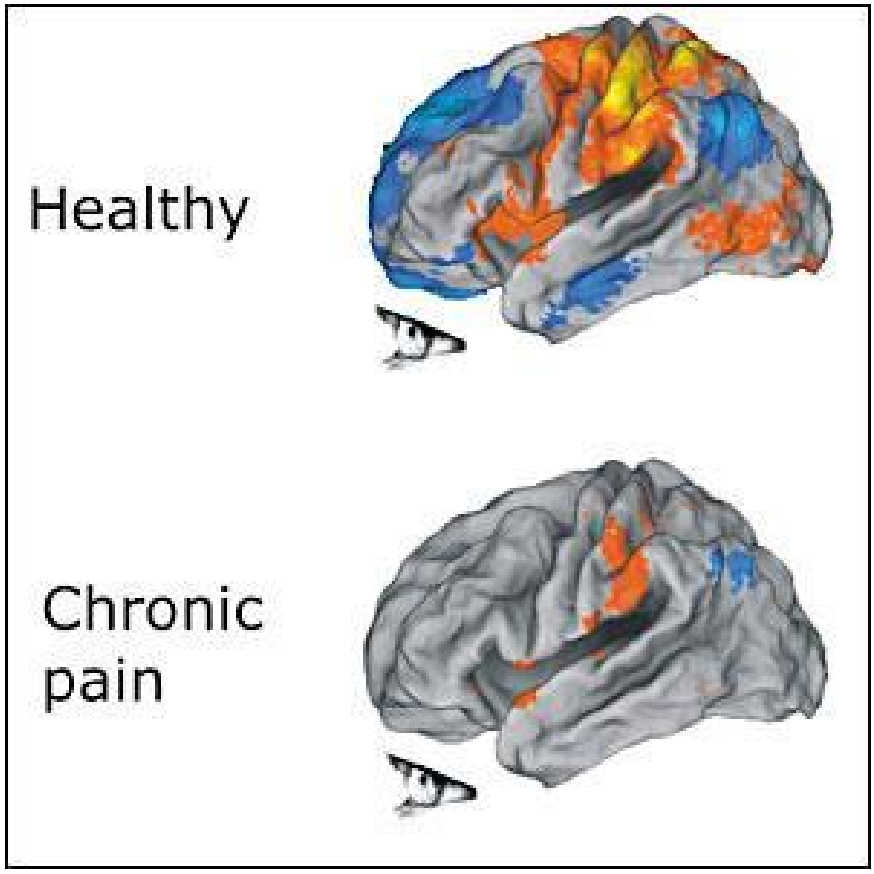
The foregoing is merely a bad case of literary manners, of course, which one can take or leave while continuing to relish the verve of Wood's insights. Where Wood sometimes falters is in his progress from practical criticism to the mighty conclusion. Rather like Adam Thirlwell in Miss Herbert, he has a trick of coining grand aphoristic obiter dicta in a way that suggests no one had ever thought of the idea before. "Metaphor is analogous to fiction because it floats a rival reality." "The novel is the great virtuoso of exceptionalism: it always wriggles out of the rules thrown around it."

It's a pity, too, that the rigour brought to Updike can't be applied to some of the other titans of contemporary OK-ness. When Saul Bellow, for example, describes a river as "crimped, green, blackish, glassy", he is not so much describing a river as drawing attention to how good he is, contributing, in fact, to one of the great deceptions of modern literature, which is to offer to the reader not a plausible narrative but the less allowable spectacle of the writer writing.

The result is a mixed bag: full of top-notch observations from the coal-face, but weighed down by its self-consciousness. The publishers are marketing this book as a 21st-century update of Forster's Aspects of the Novel (1927). No harm in that, but the fustiness of some of the critical language ("marvelous alchemical translation" etc) occasionally makes it seem closer in spirit to some of the productions of late-Victorian belles lettres – Henley's Views and Reviews, say.

http://www.independent.co.uk/arts-entertainment/books/reviews/how-fiction-works-by-james-wood-776499.html

Chronic Pain Harms The Brain



Comparison of brains. These images show the brain from the left side, demonstrating striking differences between chronic pain patients and healthy subjects. They illustrate with colors how much activation (red-yellow) or deactivation (dark/light blue) was found at each location. (Credit: Image courtesy of Northwestern University)

ScienceDaily (Feb. 6, 2008) — People with unrelenting pain don't only suffer from the non-stop sensation of throbbing pain. They also have trouble sleeping, are often depressed, anxious and even have difficulty making simple decisions.

In a new study, investigators at Northwestern University's Feinberg School of Medicine have identified a clue that may explain how suffering long-term pain could trigger these other pain-related symptoms.

Researchers found that in a healthy brain all the regions exist in a state of equilibrium. When one region is active, the others quiet down. But in people with chronic pain, a front region of the cortex mostly associated with emotion "never shuts up," said Dante Chialvo, lead author and associate research professor of physiology at the Feinberg School. "The areas that are affected fail to deactivate when they should."

They are stuck on full throttle, wearing out neurons and altering their connections to each other.

This is the first demonstration of brain disturbances in chronic pain patients not directly related to the sensation of pain.

Chialvo and colleagues used functional magnetic resonance imaging (fMRI) to scan the brains of people with chronic low back pain and a group of pain-free volunteers while both groups were tracking

a moving bar on a computer screen. The study showed the pain sufferers performed the task well but "at the expense of using their brain differently than the pain-free group," Chialvo said.

When certain parts of the cortex were activated in the pain-free group, some others were deactivated, maintaining a cooperative equilibrium between the regions. This equilibrium also is known as the resting state network of the brain. In the chronic pain group, however, one of the nodes of this network did not quiet down as it did in the pain-free subjects.

This constant firing of neurons in these regions of the brain could cause permanent damage, Chialvo said. "We know when neurons fire too much they may change their connections with other neurons and or even die because they can't sustain high activity for so long," he explained.

'If you are a chronic pain patient, you have pain 24 hours a day, seven days a week, every minute of your life," Chialvo said. "That permanent perception of pain in your brain makes these areas in your brain continuously active. This continuous dysfunction in the equilibrium of the brain can change the wiring forever and could hurt the brain."

Chialvo hypothesized the subsequent changes in wiring "may make it harder for you to make a decision or be in a good mood to get up in the morning. It could be that pain produces depression and the other reported abnormalities because it disturbs the balance of the brain as a whole."

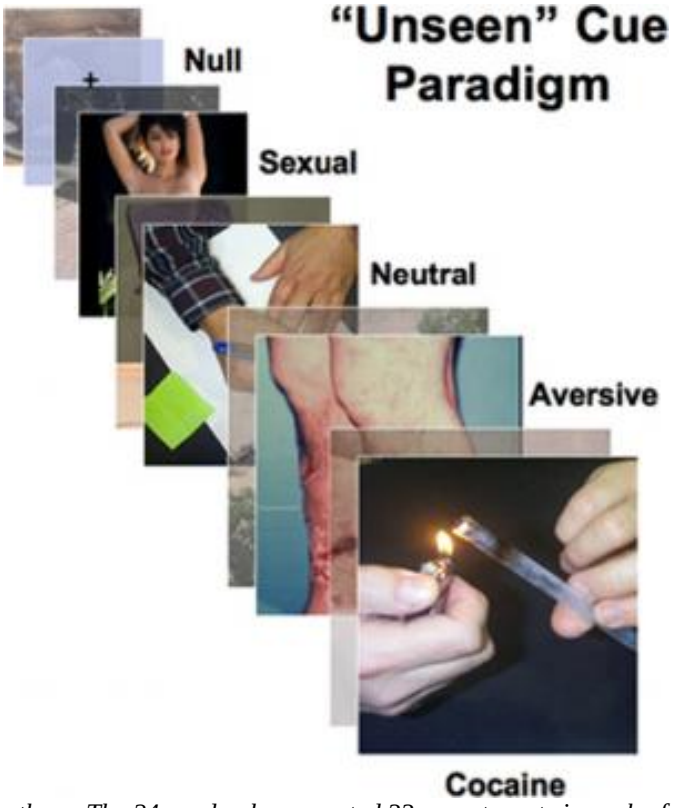
He said his findings show it is essential to study new approaches to treat patients not just to control their pain but also to evaluate and prevent the dysfunction that may be generated in the brain by the chronic pain.

The study will be published Feb. 6 in The Journal of Neuroscience. Chialvo's collaborators in this project are Marwan Baliki, a graduate student; Paul Geha, a post-doctoral fellow, and Vania Apkarian, professor of physiology and of anesthesiology, all at the Feinberg School.

Adapted from materials provided by Northwestern University.

http://www.sciencedaily.com:80/releases/2008/02/080205171755.htm

Subconscious Signals Can Trigger Drug Craving



Cocaine patients were shown photos such as these. The 24 randomly-presented 33 msec targets in each of four categories (cocaine, sexual, aversive and neutral, interspersed with grey-screen nulls) were immediately followed by a 467 msec neutral "masking" stimulus". Under these conditions, the 33 msec stimuli can escape conscious detection. (Credit: Childress AR, Ehrman RN, Wang Z, Li Y, Sciortino N, et al.)

ScienceDaily (Feb. 6, 2008) — Using a brain imaging technology called functional magnetic resonance imaging (fMRI), scientists have discovered that cocaine-related images trigger the emotional centers of the brains of patients addicted to drugs -- even when the subjects are unaware they've seen anything.

A team of researchers at the University of Pennsylvania, led by Dr. Anna Rose Childress and Dr. Charles O'Brien, showed cocaine patients photos of drug-related cues like crack pipes and chunks of cocaine. The images flashed by in just 33 milliseconds -- so quickly that the patients were not consciously aware of seeing them. Nonetheless, the unseen images stimulated activity in the limbic system, a brain network involved in emotion and reward, which has been implicated in drug-seeking and craving.

"This is the first evidence that cues outside one's awareness can trigger rapid activation of the circuits driving drug-seeking behavior," said NIDA director Dr. Nora Volkow. "Patients often can't pinpoint when or why they start craving drugs. Understanding how the brain initiates that overwhelming desire for drugs is essential to treating addiction."

To verify that the patterns of brain activity triggered by the subconscious cues reflected the patients' feelings about drugs, Childress and her colleagues gave the patients a different test two days later, allowing them to look longer at the drug images. The patients who demonstrated the strongest brain response to unseen cues in the fMRI experiment also felt the strongest positive association with visible

drug cues. Childress notes, "It's striking that the way people feel about these drug-related images is accurately predicted by how strongly their brains respond within just 33 milliseconds."

Childress and her colleagues also found that the regions of the brain activated by drug images overlapped substantially with those activated by sexual images. This finding supports the scientific consensus that addictive drugs usurp brain regions that recognize natural rewards needed for survival, like food and sex.

According to Childress, these results could improve drug treatment strategies. "We have a brain hard-wired to appreciate rewards, and cocaine and other drugs of abuse latch onto this system. We are looking at the potential for new medications that reduce the brain's sensitivity to these conditioned drug cues and would give patients a fighting chance to manage their urges."

Citation: Childress AR, Ehrman RN, Wang Z, Li Y, Sciortino N, et al (2008) Prelude to Passion: Limbic Activation by "Unseen" Drug and Sexual Cues. PLoS One 3(1): e1506. doi:10.1371/journal.pone.0001506 http://www.plosone.org/doi/pone.0001506

The study was funded by the National Institute on Drug Abuse (NIDA), part of the National Institutes of Health (NIH).

Adapted from materials provided by Public Library of Science, via EurekAlert!, a service of AAAS.

http://www.sciencedaily.com:80/releases/2008/01/080130092113.htm

Ancient Climate Secrets Raised From Ocean Depths

Fossil corals collected at the Sisters Seamount, Huon Marine Reserve, at a depth of 1450 m. The large coral in the centre is a fossil of Desmophyllum dianthus, a solitary species. It is growing on a fossil specimen of the reef building coral Solenosmilia variabilis. (Credit: Image courtesy of CSIRO Australia)

ScienceDaily (Feb. 5, 2008) — Scientists aboard the research vessel, Southern Surveyor, return to Hobart today with a collection of coral samples and photographs taken in the Southern Ocean at greater depths than ever before.

Using a remotely operated submersible vehicle the international research team captured images of life found on deep-sea pinnacles and valleys up to three kilometres beneath the Ocean's surface.

During a three-week voyage, scientists from CSIRO's Wealth from Oceans National Research Flagship and the US, collaborated to retrieve examples of live and fossilised deep-ocean corals from a depth of 1 650 metres near the Tasman Fracture Zone, south-east of Tasmania.

"These corals are evidence of an extinct coral reef," says the voyage's Chief Scientist, CSIRO Marine and Atmospheric Research's Dr Ron Thresher.

"Our sampling came up with some very old fossil corals of the type we are now seeing live and forming extensive reefs at depths of 800-1300 metres. This suggests that the reef extended much deeper in the past, but how long ago or why it died out, we don't know yet," he says.

The composition of deep-sea corals is used to determine past ocean conditions, such as temperature, salinity and the mixing of surface and deep-water layers, over tens to hundreds of thousands of years.

Dr Thresher says over the coming year the samples will be examined to determine when these newly discovered reefs existed and if their extinction can be related to long-term climate patterns.

The findings will provide ancient climate data that contribute to models of regional and global climate change, based on historical circulation patterns in the Southern Ocean.

He says that at times the submersible vehicle – or Autonomous Benthic Explorer (ABE), on loan from the Woods Hole Oceanographic Institution (WHOI) – was pushed off course while exploring the extreme depths and, in two cases, had its forward progress stopped altogether. Such movements enabled researchers to identify previously unknown and unexpectedly strong, deep currents.

"The voyage was a success despite some of the roughest conditions ever experienced by the team, particularly in deploying the ABE," Dr Thresher says.

The voyage is part of a collaboration between CSIRO's Wealth from Oceans Flagship, WHOI in the US, the National Science Foundation in the US, the marine division of the Australian Department of Environment, Water, Heritage and the Arts and, the Marine National Facility.

Media are invited to discuss the results with Ron Thresher, Jess Adkins (California Institute of Technology) and Dana Yoerger (WHOI) when the Southern Surveyor arrives in Hobart at 10.30 am today at CSIRO Marine and Atmospheric Research – Castray Esplanade.

CSIRO initiated the National Research Flagships to provide science-based solutions in response to Australia's major research challenges and opportunities. The nine Flagships form multidisciplinary teams with industry and the research community to deliver impact and benefits for Australia.

Adapted from materials provided by CSIRO Australia.

http://www.sciencedaily.com:80/releases/2008/02/080201090826.htm

Art And Medicine Meet To Make The World's First 'Operation' Gown

Durham University second year medical student Melissa Gilbert wears the surgical garment showing where incisions should be made on the body. (Credit: Durham University/North News)

ScienceDaily (Feb. 5, 2008) — Medical students will be helped to understand what it is like to go under the knife thanks to a world-first project that brings together art and science.

A unique surgical gown, which goes on international display at the Museum of Science in Boston January 30, should significantly improve understanding of where operation incisions are made, and what they mean to the patient, say its developers at Durham and Ulster Universities in the United Kingdom.

It is hoped the gown, which would be worn by medical students in the classroom, will supplement the traditional plastic models of the human body that are currently in global use as teaching aids. It will also help in explaining procedures to patients, according to the scientists.

The gown has nine zips showing where surgeons make cuts in the body for various operations such as removal of the appendix and open heart surgery and its silk material is more like human tissue than the plastic of the traditional models. Medical students will wear the gown in the classroom whilst fellow students learn about surgical incisions using the zips. It will lead to a greater understanding of what it means to be the patient, say the developers.

Researchers say it will contribute to an improvement in teaching aids currently available. They say that, although the traditional plastic models can be used to show areas of the body and where incisions will roughly be made, they are not able to give medical students a sense of the feeling if they were the patient or show them the type of texture they will find once they have made an incision.

Leading medical developer Professor John McLachlan, Associate Dean in Durham University's School for Health, explains: "Current anatomical teaching aids describe but they don't evoke. They take no account of emotional involvement or the feel of the body. The way medical students distance themselves emotionally from the patient's body has long been seen as a desirable outcome of current modes of medical training.

"But this 'desensitation' also brings with it the risk of objectifying the body. The patient becomes 'the liver in bed four' rather than Mrs Smith. We think we can use art to bring meaning back into medical teaching and we want to help students understand the significance of the body as well as its structure."

The garment, named 'Incisions', was funded by the Wellcome Trust as part of a wider project to explore teaching, learning and thinking about the body through a series of art works and artefacts. 'Incisions' has been selected for inclusion in two major international exhibitions with the first one at the Museum of Science in Boston, USA opening today (30 January).

Artistic lead, Karen Fleming, Reader at Ulster University, said: "The body and garments are common objects in art and design but collaboration with medical knowledge brings a new dimension. The challenge for us has been finding material metaphors for living matter that were aesthetically inviting rather than repulsive. We have combined some of the familiar features from hospital gowns with fashion detailing to make it appealing"

The research team aims to feed the use of the gown into medical schools around the UK and beyond. It could form an integral part of the Personal and Professional Development strand of medical training in which students develop the ability to communicate effectively and sensitively with their patients.

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

http://www.sciencedaily.com:80/releases/2008/01/080129191401.htm

Dietary Evidence For Prevention And Treatment Of Cardiovascular Disease

ScienceDaily (Feb. 5, 2008) — The Journal of the American Dietetic Association has published a comprehensive review of dietary factors for treating and preventing cardiovascular disease. The review of more than 150 recent research studies and other articles "provide scientific rationale for food and nutrition professionals and other health professionals for counseling patients," according to the nationwide expert panel led by registered dietitian Linda Van Horn, professor and acting chair of the department of preventive medicine at Northwestern University and editor-in-chief of the Journal.

The panel examined the state of current research on the effectiveness of foods, nutrients and food components in reducing cardiovascular disease risk factors while also meeting a person's nutrient needs, and identified areas where further research is needed.

"Numerous dietary factors/nutrients have been identified that affect (cardiovascular disease) risk factors," the researchers write. "An individualized dietary pattern is recommended to optimize CVD risk factor reduction while meeting nutrient needs."

The review identifies effective "dietary considerations" including a diet that:

- Is low is saturated fatty acids, trans fatty acids and dietary cholesterol;
- Is "ample" in total dietary fiber with emphasis on soluble fiber;
- Includes fat-free/low-fat dairy foods and/or other calcium/vitamin D-rich sources;
- Is rich in vitamins, minerals, phytochemicals and antioxidants from multiple servings of fruits and vegetables and low in sodium;
- May include plant sterols and stanols in high-risk individuals; and
- Achieves a healthful body weight and calorie balance with the recommended dietary intervention by increasing physical activity and maintaining adequate calorie intake.

Adapted from materials provided by American Dietetic Association.

http://www.sciencedaily.com:80/releases/2008/02/080201085625.htm

Communing With Nature Less And Less

ScienceDaily (Feb. 5, 2008) — From backyard gardening to mountain climbing, outdoor activities are on the wane as people around the world spend more leisure time online or in front of the tube, according to findings published recently in the Proceedings of the National Academy of Sciences.

"There's a real and fundamental shift away from nature -- certainly here [in the United States] and possibly in other countries," said Oliver Pergams, visiting research assistant professor of biological sciences at the University of Illinois at Chicago.

Pergams and Patricia Zaradic, a fellow with the Environmental Leadership Program, Delaware Valley in Bryn Mawr, Pa., had previously reported a steady decline in per capita visits to U.S. national parks since the late 1980s -- which correlated very strongly with a rise in playing video games, surfing the Internet and watching movies. The researchers call this recent shift to sedentary, electronic diversions "videophilia." And they don't see it as healthy progress.

"The replacement of vigorous outdoor activities by sedentary, indoor videophilia has far-reaching consequences for physical and mental health, especially in children," Pergams said. "Videophilia has been shown to be a cause of obesity, lack of socialization, attention disorders and poor academic performance."

In the new study, Pergams and Zaradic sought to gather and analyze longitudinal survey data on various nature activities from the past 70 years -- including the 20 years since U.S. national park visits began their ongoing decline.

"We felt that national park visits in the U.S. were a pretty good proxy for how much people were involved in nature," said Pergams. "But we wanted to see if people were going less to other nature-related venues or participating less in nature recreation activities, both here and in other countries."

The biologists examined figures on backpacking, fishing, hiking, hunting, visits to national and state parks and forests. They found comparable reliable statistics from Japan and, to a lesser extent, Spain.

They found that during the decade from 1981 to 1991, per-capita nature recreation declined at rates from 1 percent to 1.3 percent per year, depending on the activity studied. The typical drop in nature use since then has been 18-25 percent.

As biologists, the researchers are also concerned about the ecological implications.

"We don't see how this can be good for conservation," Pergams said. "We don't see how future generations, with less exploration of nature, will be as interested in conservation as past generations."

Funding for the study was provided by the Nature Conservancy.

Adapted from materials provided by University of Illinois at Chicago, via EurekAlert!, a service of AAAS.

http://www.sciencedaily.com:80/releases/2008/02/080204172316.htm

New Clue In The Mystery Of Glassy Water

Rain drops falling on still water. (Credit: iStockphoto/Magdalena Duczkowska)

ScienceDaily (Feb. 5, 2008) — Water has some amazing properties. It is the only natural substance found in all three states -- solid, liquid and gas -- within the range of natural Earth temperatures. Its solid form is less dense than its liquid form, which is why ice floats. It can absorb a great deal of heat without getting hot, has very high surface tension (helping it move through roots and capillaries -- vital to maintaining life on Earth) and is virtually incompressible.

A less commonly known distinction of water, but one of great interest to physical chemists, is its odd behavior at its transition to the glassy phase. The "glassy state" is a sub-state of matter -- glassy water and ice, for example, are chemically identical and have the same state (solid), but have a different structure. Put another way, ice is crystalline, whereas glass is, well, chunky. As water makes the transition to its glassy state, it behaves very oddly, a fact that has baffled scientists.

Arizona State University Regents Professor C. Austen Angell has found a vital clue that helps explain water's bizarre behavior at the glass transition and, along the way, gained important insights into phases of liquid water as well. His research is published in the Feb. 1, 2008 issue of the journal Science.

"We know a lot about glasses that form from ordinary silicates, sugars and metals," Angell says. "They're making golf clubs out of glassy metals these days. But how important is the glassy state of water" And what can it tell us about ordinary water, which is such an anomalous liquid?"

Most glassy forms of matter experience a gradual increase in heat capacity -- the amount of energy it takes to heat a sample by one degree Kelvin -- until a key transition point is reached. At that point (called the "glass temperature"), these materials suddenly up-jump to a new, 100 percent higher, heat capacity zone and change from a solid to very viscous liquid phase -- as if a solid brick of cold honey were heated and suddenly became a sticky liquid again. This occurs even in solutions in which water is the chief component.

In pure water, however, something quite different happens. As cold, glassy water is heated, its heat capacity barely changes until about 136 K (-215 F), where it begins to increase slightly. Then, abruptly at 150 K (-190 F), it crystallizes and stops being glassy. Approached from the other direction, supercooling water produces a similarly odd effect: Heat capacity remains constant as the water cools until around 250 K (-10 F), when it begins to increase very rapidly with decreasing temperature.

Angell wanted to know what was transpiring in the "no man's land" between 150 and 250 K (-190 and -10 F). Where, he wondered, was the "real" glass transition for glassy water?

He solved the problem by looking at the behavior of both supercooled water and "nanoconfined" glassy ice. Nanoconfined water is water that has been squeezed into pores with a diameter of about 20 angstroms, or 20 hundred-millionths of a meter (roughly five times the scale of atoms and chemical bonds). Using the behavior of water in these states and combining it with a hypothetical behavior of bulk water deduced using the laws of thermodynamics, he was able to bracket the possible heat capacity of water in the "no man's land" and come up with a novel cooperative transition to explain the substance's odd behavior.

"Water's heat capacity suddenly goes crazy near this transition and, before we can see what is happening, it crystallizes," Angell says. "One trick for finding out what is going on in there is to put the water in a confinement -- to make it nanoscopic so that it forgets how to crystallize. We see the same behavior but with no data gap."

According to Angell, water does not behave like the usual glass formers and therefore lacks the characteristic heat-capacity jump (glass transition) to the glassy phase; instead, because of its unusual hydrogen bond network, it behaves as if it is in a crystalline phase, making what is known as an "order-disorder transition." This sucks out all of the heat capacity at temperatures around 220 K and explains why the glass transition in water (near 136 K) is so undramatic compared to other substances.

It also gave Angell an idea for a new scenario to explain the odd behavior of supercooled water, one that is compatible with observed behavior but does not require a critical point.

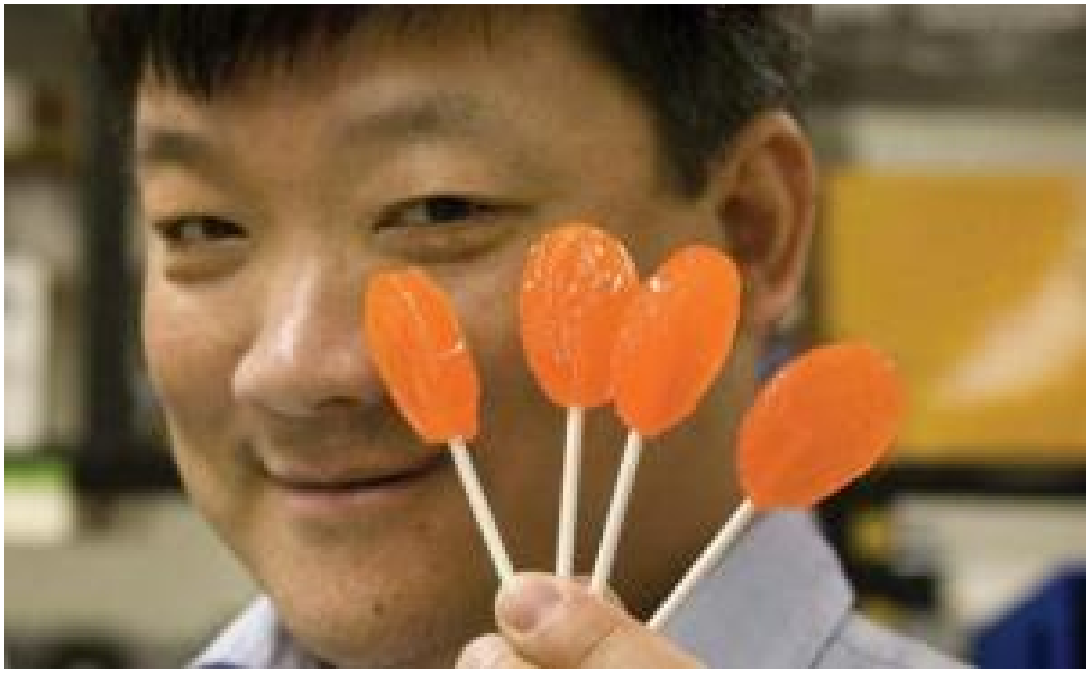
"I wanted to find the answer to the puzzle of what was happening in 'no man's land,'" Angell says. "And so I worked up from the glassy state and nanoconfinement."

"In the end, we say, 'Well that that's not what bulk water would do -- that's been thrust upon it by making it so tiny,'" he explains. "But nevertheless it's an important part of the picture and it supports the conclusion that we've got a different sort of thermodynamics in water than we have in any of these other molecular glass-forming liquids."

Adapted from materials provided by Arizona State University.

http://www.sciencedaily.com:80/releases/2008/01/080131151901.htmg

Enjoy Candy Without The Cavities: Good Lollipop Kills Bacteria That Causes Tooth Decay



What Willy Wonka did for chocolate, UCLA microbiologist Wenyuan Shi is doing for lollipops. (Credit: UCLA)

ScienceDaily (Feb. 5, 2008) — What Willy Wonka did for chocolate, UCLA microbiologist Wenyuan Shi is doing for lollipops.

Because of Shi, thousands of orange-flavored lollipops are rolling out of a factory in Grand Rapids, Mich., into the hands of people eager to lick them for one reason only. Shi and his lab team at the School of Dentistry have managed to make candy that's actually good for your teeth. The orange-flavored, sugar-free lollipop they devised is infused with a natural ingredient found in licorice that kills the primary bacterium causing tooth decay, Streptococcus mutans.

Marketed as Dr. John's Herbal Candy, the lollipop, now available for purchase through a candy manufacturer that licenses the technology from UCLA, is the first therapeutic developed by Shi. But he has many more in the works to target bacteria wreaking havoc in the nose, ear and gut, to name just a few.

It all emerges from a vision the microbiologist had eight years ago to apply a medical approach to dentistry - to identify the decay-causing pathogens among the 700 kinds of bacteria living in the human mouth, track their presence and then target them with antimicrobial "smart bombs" that he and his lab would engineer to kill the bad bacteria without harming the good.

And he's also working on kits to test for these devilish pathogens. "Part of my wild dream is that one day you will walk into the dentist's office and give a saliva sample to be tested, just as you would give urine and blood samples to doctors," said Shi, a professor with joint appointments in UCLA's dental and medical schools.

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

http://www.sciencedaily.com:80/releases/2008/02/080204144715.htm

Hidden Art Could Be Revealed By New Terahertz Device

Like X-rays let doctors see the bones beneath our skin, "T-rays" could let art historians see murals hidden beneath coats of plaster or paint in centuries-old buildings. (Credit: Image courtesy of University of Michigan)

ScienceDaily (Feb. 5, 2008) — Like X-rays let doctors see the bones beneath our skin, "T-rays" could let art historians see murals hidden beneath coats of plaster or paint in centuries-old buildings, University of Michigan engineering researchers say.

T-rays, pulses of terahertz radiation, could also illuminate penciled sketches under paintings on canvas without harming the artwork, the researchers say. Current methods of imaging underdrawings can't detect certain art materials such as graphite or sanguine, a red chalk that some of the masters are believed to have used.

The team of researchers, which includes scientists at the Louvre Museum, Picometrix, LLC and U-M, used terahertz imaging to detect colored paints and a graphite drawing of a butterfly through 4 mm of plaster. They believe their technique is capable of seeing even deeper.

In March, the scientists will take their equipment to France to help archaeologists examine a mural they discovered recently behind five layers of plaster in a 12th century church.

"It's ideal that the method of evaluation for historical artifacts such as frescoes and mural paintings, which are typically an inherent part of a building's infrastructure, be non-destructive, non-invasive, precise and applicable on site. Current technologies may satisfy one or more of these requirements, but we believe our new technique can satisfy all of them," said John Whitaker, an author of the paper who is a research scientist and adjunct professor in the Department of Electrical Engineering and Computer Science at U-M.

Terahertz imaging can reveal depth and detail that other techniques cannot, Whitaker said. And it's not potentially harmful like X-ray imaging because terahertz radiation is non-ionizing. Its rays don't have

enough energy to knock electrons off atoms, forming charged particles and causing damage, like X-rays do.

While terahertz radiation is all around us in nature, it has been difficult to produce in a lab because it falls between the capabilities of electronic devices and lasers.

"Terahertz is a strange range in the electromagnetic spectrum because it's quasi-optical. It is light, but it isn't," said Bianca Jackson, first author of the paper who is a doctoral student in applied physics.

The device used for this research is a hybrid between electronics and lasers. It was developed by the Ann-Arbor based company Picometrix. It's called the T-Ray™ system, and it uses pulses from an ultra-fast laser to excite a semiconductor antenna, which in turn emits pulses of terahertz radiation.

The rays permeate the plaster, and some reflect back when there is a change in the material. When they bounce back and how much energy they retain depends on the material they hit. Different colors of paint, or the presence of graphite, for example, cause tell-tale differences in the amount of energy in the returning waves. A receiver measures this energy, and the scientists can use the data to produce an image of what lies beneath, Jackson explained.

A similar device made by Picometrix is used routinely to examine the foam on the space shuttle's fuel tanks for underlying damage, said Irl Duling, director of terahertz business development at Picometrix and an author of the paper. This paper discusses a new application, rather than a new device.

Gèrard Mourou, a U-M electrical engineering professor emeritus, said he believes this technique will be especially useful in Europe, where historic regime changes often resulted in artworks being plastered or painted over. This was common in places of worship, some of which switched from churches to mosques and vice versa over the centuries.

"In France alone, you have 100,000 churches," Mourou said. "In many of these places, we know there is something hidden. It has already been written about. This is a quick way to find it."

And Leonardo DaVinci's "The Battle of Anghiari," for example, is believed to lurk beneath other frescos at the Palazzo Vecchio in Florence, Italy, Mourou said.

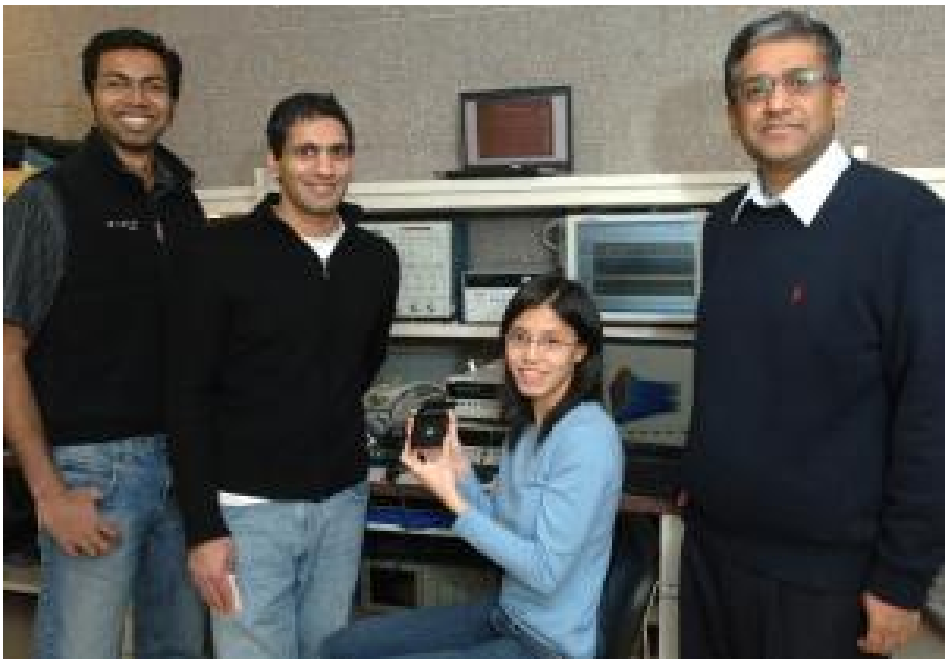
The paper"Terahertz imaging for non-destructive evaluation of mural paintings," is published in the February edition of Optics Communications.

Mourou is the A. D. Moore Distinguished University Professor Emeritus of Electrical Engineering and Computer Science. He currently holds a position at the Laboratoire d'Optique Appliquèe. Other authors are: Steven Williamson of Picometrix; Marie Mourou, a U-M undergraduate student; and Michel Menu, of the Center for Research and Restoration at The Louvre Museum.

Adapted from materials provided by University of Michigan.

http://www.sciencedaily.com:80/releases/2008/02/080204111732.htm

Energy-efficient Microchip Could Result In Cell Phones Staying Charged 10 Times As Long, Self-charging Electronics



Three electrical engineering graduate students (from left) Yogesh Ramadass, Naveen Verma, and Joyce Kwong, seated, are members of Professor Anantha Chandrasakan's team that has developed a microchip that is 10 times more energy efficient than others. (Credit: MIT photo by Donna Coveney)

ScienceDaily (Feb. 5, 2008) — Researchers at MIT and Texas Instruments have unveiled a new chip design for portable electronics that can be up to 10 times more energy-efficient than present technology. The design could lead to cell phones, implantable medical devices and sensors that last far longer when running from a battery.

The innovative design will be presented Feb. 5 at the International Solid-State Circuits Conference in San Francisco by Joyce Kwong, a graduate student in MIT's Department of Electrical Engineering and Computer Science (EECS).*

The key to the improvement in energy efficiency was to find ways of making the circuits on the chip work at a voltage level much lower than usual, Anantha Chandrakasan of MIT explains. While most current chips operate at around one volt, the new design works at just 0.3 volts.

Reducing the operating voltage, however, is not as simple as it might sound, because existing microchips have been optimized for many years to operate at the higher standard-voltage level. "Memory and logic circuits have to be redesigned to operate at very low power supply voltages," Chandrakasan says.

One key to the new design, he says, was to build a high-efficiency DC-to-DC converter-which reduces the voltage to the lower level-right on the same chip, reducing the number of separate components. The redesigned memory and logic, along with the DC-to-DC converter, are all integrated to realize a complete system-on-a-chip solution.

One of the biggest problems the team had to overcome was the variability that occurs in typical chip manufacturing. At lower voltage levels, variations and imperfections in the silicon chip become more problematic. "Designing the chip to minimize its vulnerability to such variations is a big part of our strategy," Chandrakasan says.

So far the new chip is a proof of concept. Commercial applications could become available "in five years, maybe even sooner, in a number of exciting areas," Chandrakasan says. For example, portable and implantable medical devices, portable communications devices and networking devices could be based on such chips, and thus have greatly increased operating times. There may also be a variety of military applications in the production of tiny, self-contained sensor networks that could be dispersed in a battlefield.

In some applications, such as implantable medical devices, the goal is to make the power requirements so low that they could be powered by "ambient energy," Chandrakasan says-using the body's own heat or movement to provide all the needed power. In addition, the technology could be suitable for body area networks or wirelessly enabled body sensor networks.

"Together, TI and MIT have pioneered many advances that lower power in electronic devices, and we are proud to be part of this revolutionary, world-class university research," said Dr. Dennis Buss, chief scientist at Texas Instruments. "These design techniques show great potential for TI future low-power integrated circuit products and applications including wireless terminals, battery-operated instrumentation, sensor networks and medical electronics."

*Kwong carried out the project with MIT colleagues Anantha Chandrakasan, the Joseph F. and Nancy P. Keithley Professor of Electrical Engineering, and EECS graduate students Yogesh Ramadass and Naveen Verma. Their Texas Instruments (TI) collaborators are Markus Koesler, Korbinian Huber and Hans Moormann. The team demonstrated the ultra-low-power design techniques on TI's MSP430, a widely used microcontroller. The work was conducted at the MIT Microsystems Technology Laboratories, which Chandrakasan directs.

The research was funded in part by a grant from the U.S. Defense Advanced Research Projects Agency.

Adapted from materials provided by Massachusetts Institute of Technology, via EurekAlert!, a service of AAAS.

http://www.sciencedaily.com:80/releases/2008/02/080204102750.htm

Generation Gap? 'Online Gap' Widens Divide Between Parents and Children

ScienceDaily (Feb. 5, 2008) — Instant messaging, blogs, Facebook, MySpace -- there are limitless ways your child communicates online with the offline world. And the risks and opportunities are only increasing.

A new Tel Aviv University research study has found that, despite what parents might believe, there is an enormous gap between what they think their children are doing online and what is really happening.

In her study, Prof. Dafna Lemish from the Department of Communication at Tel Aviv University surveyed parents and their children about the children's activities on the Internet. "The data tell us that parents don't know what their kids are doing," says Prof. Lemish. Her study was unique in that parents and children from the same family were surveyed.

Strange Encounters

In one part of the study, Prof. Lemish surveyed over 500 Jewish and Arab children from a variety of ages and socio-economic backgrounds, asking them if they gave out personal information online. Seventy-three percent said that they do. The parents of the same children believed that only 4 percent of their children did so.

The same children were also asked if they had been exposed to pornography while surfing, or if they had made face-to-face contact with strangers that they had met online. Thirty-six percent from the high school group admitted to meeting with a stranger they had met online. Nearly 40% of these children admitted to speaking with strangers regularly (within the past week).

Fewer than 9 percent of the parents knew that their children had been meeting with strangers, engaging in what could be viewed as very risky behavior. Prof. Lemish suspects that this gap is wider in the U.S., where children from middle-class backgrounds have more opportunity to surf online privately.

Erasing their Tracks

In another part of the study, Prof. Lemish found that 30 percent of children between the ages of 9 and 18 delete the search history from their browsers in an attempt to protect their privacy from their parents. She suggests that common filtering software may not be effective, since children will access what they are looking for elsewhere -- at a friend's house, an Internet café, or school. And if the child accesses dangerous material outside of the home, they will be unprepared and uninformed when it happens, she says.

Prof. Lemish believes that one problem is that parents are not as media-literate as they could be. They don't have a handle on using popular online software and chat programs, and tend to have no clue about what is really happening online.

But she cautions, "This lack of knowledge on the parents' part may be no different than the situation before the advent of the Web. Parents don't know what their children are doing on the Net, in the same manner that they don't know what goes on at class, parties, or clubs."

Avoiding Dangers

Prof. Lemish advises that parents should give their children the tools to be literate Internet users, and to navigate around any potential dangers. Most importantly, parents need to talk to their children. "The child needs similar tools that teach them to be weary of dangers in the park, the mall or wherever. The same rules in the real world apply online as well.

"For example, under no circumstances, should a child ever give strangers their private information over the Internet, or meet unsupervised with strangers. Children should be encouraged to tell their parents about Internet encounters that make them uncomfortable. It's just common sense and parents need to teach them that. Talking with your children regularly is important."

At the same time, she stresses, parents should not disregard the advantages of the Internet: "We tend to forget that it offers our children a source of independence, a way to explore the world, and helps them meet friends whom they could not meet in their real world. As parents, we need to help them explore the positive opportunities the Internet offers them, and to reduce the risks."

Adapted from materials provided by Tel Aviv University.

http://www.sciencedaily.com:80/releases/2008/02/080204143203.htm

Fat People Cheaper to Treat, Study Says

By MARIA CHENG
AP Medical Writer

LONDON (AP) -- Preventing obesity and smoking can save lives, but it doesn't save money, researchers reported Monday. It costs more to care for healthy people who live years longer, according to a Dutch study that counters the common perception that preventing obesity would save governments millions of dollars.

"It was a small surprise," said Pieter van Baal, an economist at the Netherlands' National Institute for Public Health and the Environment, who led the study. "But it also makes sense. If you live longer, then you cost the health system more."

In a paper published online Monday in the Public Library of Science Medicine journal, Dutch researchers found that the health costs of thin and healthy people in adulthood are more expensive than those of either fat people or smokers.

Van Baal and colleagues created a model to simulate lifetime health costs for three groups of 1,000 people: the "healthy-living" group (thin and non-smoking), obese people, and smokers. The model relied on "cost of illness" data and disease prevalence in the Netherlands in 2003.

The researchers found that from age 20 to 56, obese people racked up the most expensive health costs. But because both the smokers and the obese people died sooner than the healthy group, it cost less to treat them in the long run.

On average, healthy people lived 84 years. Smokers lived about 77 years, and obese people lived about 80 years. Smokers and obese people tended to have more heart disease than the healthy people.

Cancer incidence, except for lung cancer, was the same in all three groups. Obese people had the most diabetes, and healthy people had the most strokes. Ultimately, the thin and healthy group cost the most, about $417,000, from age 20 on.

The cost of care for obese people was $371,000, and for smokers, about $326,000.

The results counter the common perception that preventing obesity will save health systems worldwide millions of dollars.

"This throws a bucket of cold water onto the idea that obesity is going to cost trillions of dollars," said Patrick Basham, a professor of health politics at Johns Hopkins University who was unconnected to the study. He said that government projections about obesity costs are frequently based on guesswork, political agendas, and changing science.

"If we're going to worry about the future of obesity, we should stop worrying about its financial impact," he said.

Obesity experts said that fighting the epidemic is about more than just saving money.

"The benefits of obesity prevention may not be seen immediately in terms of cost savings in tomorrow's budget, but there are long-term gains," said Neville Rigby, spokesman for the International Association for the Study of Obesity. "These are often immeasurable when it comes to people living longer and healthier lives."

Van Baal described the paper as "a book-keeping exercise," and said that governments should recognize that successful smoking and obesity prevention programs mean that people will have a higher chance of dying of something more expensive later in life.

"Lung cancer is a cheap disease to treat because people don't survive very long," van Baal said. "But if they are old enough to get Alzheimer's one day, they may survive longer and cost more."

The study, paid for by the Dutch Ministry of Health, Welfare and Sports, did not take into account other potential costs of obesity and smoking, such as lost economic productivity or social costs.

"We are not recommending that governments stop trying to prevent obesity," van Baal said. "But they should do it for the right reasons."

http://news.wired.com:80/dynamic/stories/O/OBESITY_COST?SITE=WIRE&SECTION=HOME&TEMPLATE=DEFAULT&CTIME=2008-02-05-02-58-08

A man of few words

Ed Ruscha, one of the creators of pop art, talks to Emma Forrest about earthquakes, inspirations - and the artists he rates today

Emma Forrest
Wednesday February 6, 2008

Guardian

At 70 years of age, clean-shaven, with thick white hair and a fine physique, the artist Ed Ruscha is disarmingly handsome. He looks something like his close friend Dennis Hopper, but even more like a tidied-up Harry Dean Stanton. He has on a grey sweatshirt, blue jeans, normal-looking sneakers and spectacles that might be expensive. His voice sounds luxurious, too. Not posh, but lush and comforting, a slight Jack Nicholson drawl. As I enter his studio, Woody, his dog and mascot, comes running at me with a combination of kisses and growls. "Woody senses you're a writer," Ruscha says, deadpan.

Interviews are hard with Ed Ruscha, one of the creators of pop art, his work appearing alongside that of Roy Lichtenstein and Andy Warhol in the groundbreaking 1962 LA show New Painting of Common Objects. Not because he's difficult - but because he's so agreeable. (Incidentally, a note on the correct pronunciation of that name: it's "roo-SHAY".)

Posit a take on his work - which straddles painting, drawing and photography, and challenges our ideas about what life is like in the modern, media-saturated city - and he'll smile and answer: "I think you're right." Or he'll blink and say: "That makes a lot of sense ... Would you like some more water?" You don't really get the feeling he's being evasive. He's just midwestern, from Nebraska, the absolute centre of the country. Perhaps that's why he seems somehow centred. Far from having an artist's temperament, he is like a farmer who just happened to wander into that cavernous studio of his in Venice, California, and start, well, working. Asked how it felt to represent America at the 2005 Venice Biennale, after decades of slow-simmering acclaim, he concedes: "That was very ... good. It was quite a surprise, and a good one." Still, he wanted to get back to LA. "The more I travel," he says, "the more I want to be home."

Home has been California since he left Nebraska to study at Cal-Arts, thinking he would like to be a sign painter, but soon gravitating to visual art. Back then, California was a wasteland for an artist.

Ruscha never cared. "I equate the eastern side of the country with the industrial side of America," he says, "and the west with open spaces." California has been the undercurrent of so much of his work, from his 1966 book of photographs, Every Building On the Sunset Strip (true to its title), to that 1962 group show, which inaugurated the concept of pop art, then seen as so shocking.

"I hate to see change here," he says. "I'm very stodgy. I'm always looking at old photos of California and Los Angeles, knowing that what I'm looking at is now full of houses. There used to be vacant lots in Los Angeles, now all taken up by three-storey boxes - it's all getting infilled."

According to the dictionary, "infilled" isn't a word, but then this is the man who sealed his reputation with "word paintings", visual interpretations of words and phrases: Lisp (powdered graphite and pencil on paper, 1966); Ding (gunpowder and pastel on paper, 1971); Amusing Alloys (acrylic on paper, 1991). LA may be "infilled", but isn't it also pretty wild, with roaming coyotes and raccoons? "Possums are all over Venice," he nods. "They're nasty. Don't you challenge one." I won't. "Well ... good."

It becomes hard not to make word paintings in your head when talking to Ruscha. I look over at Woody, panting by the desk: Well ... Good (dog saliva, 2008). But it's not just possums here. There are earthquakes, landslides. All your art could just crumble overnight. "That thought is always there. It's sort of exciting."

Born in Omaha in 1937, Ruscha says his first visual memory is of seeing an owl in a tree when he was two. "That's my connection to that place in my life," he says. "The owl was hooting. I think that I saw that owl. But you know how stories ... " Change over time? I read out a press release for his current show at the Gagosian Gallery in London. Describing the hanging of old paintings side by side with new renderings of the same image, it talks about "the lie at the core of the work". He sits up straight. "The lie at the core?" He turns the phrase over on his tongue. "The lie at the core. Huh. That's a different way to look at it. That's not something I'm intending people to see."

What are you intending people to see? He shrugs. "I have no social agenda with my work. I'm deadpan about it." The traditional midwestern qualities again. "Uh-huh. Could be." It seems that what has always been labelled "California art" is actually California seen through the lens of midwestern values. "I was raised with the Bible belt mentality, and by coming to California, I came out of this dark place and unlearned a lot of things I'd been taught."

What must his family have thought when he decided to become an artist? "My father didn't like it so much, because it was not practical. He was sceptical until he read an article about Walt Disney that said he was a benefactor of my school. Then my father said, 'Keep going there!'" Ruscha's dad died before seeing his son's success. His mother continued to suggest he would make a good weatherman. "I said, 'It sounds interesting, but I'll get to that tomorrow.'"

Inspired by Jasper Johns' interpretation of numbers, letters, targets and other "things we have looked at but not examined", Ruscha stuck with art school, never dreaming he would ever sell a painting. The first 10 shows he had, he didn't. "The real drive was to impress my friends and colleagues, people I respected. What's greater than that? I basically got down on my hands and knees and wanted their approval."

Thinking back to the 1962 show, he says: "There was a common thread, not necessarily visual. We felt very sympathetic towards one another, but the work was nothing alike." And looking back on his work, he is pleased by his restraint. "I didn't have to fill up a picture frame." You're restrained as a person, too? "Maybe." That seems unusual for a famous artist. "Could be."

I am stunned when he tells me that the painting that has most inspired him is Millais' Ophelia, showing her drowning in a stream, having been driven mad. "It's a prominent work in my life as an artist. I saw it when I was 21, 22, and I've made many pilgrimages to it." But you're so, not, mad. "I saw other things beyond the romance of the tragedy. There's this figure and you're looking down on it and there's

a woodsy beauty to it, the greens and water that really had a message to me. I was thinking about it when I painted The Los Angeles County Museum On Fire."

He admires Tracey Emin and Bill Woodrow; are there artists working in other mediums with whom he feels on the same wavelength? "The Coen brothers are really great. No Country for Old Men was particularly good. All of their movies are. David Lynch, I have to say, has really got some good things going. Mulholland Drive - that was good! And Inland Empire ... " His voice is excited. "I didn't like that one. Long and drawn out."

Because life in LA necessitates being in cars, the radio here is nothing if not lively. Many hours of drive-time, filled with words - ideal for a word painter. "Yeah, yeah!" he says. "There's two stations you can get on to at the same time. Most radios will pick up the neighbouring station for some reason. I like that! I like hearing weird music over the top of a stock report. The clashing of two unlike things: that is the key to all our problems. Introducing another unplanned thing into a fact of life, an antagonistic thing that somehow makes something new."

Ruscha has never gone in search of a word or phrase for a painting. "They happen, fairly fluidly. I've never said, 'I haven't had an idea in three days - I have to go look at a dictionary.'" Ever been haunted by a word? "I've had a lot bounce around that never get addressed." But not in a bothersome way? He points to the back of the studio, where a new painting bears the legend: "HOT RIP STOP". "They come out of mystery, the mystery of the brain." He smiles. "To try to explain is a fruitless effort."

In 1969, when he didn't want to paint any more because he felt it was just putting a skin on a surface, he began to take a canvas and stain it - tobacco juice, blood - so the substance went down into the fabric. "Then I went back to painting," he says. It all sounds so simple and easy, and utterly without ego. "Part of ego," he says, petting Woody's ears, "is displaying the ego. I've got ego and I think I'm really good. But maybe I fall down in trying to sell it to people."

When he walks me out, he signs two copies of Busted Glass, the catalogue from his last show of drawings at the Gagosian. In my friend's copy, he writes: "Happy trails." The urge to analyse the real meaning of those two words is overwhelming, such was his quiet and reserve. It makes what he wrote in my copy seem sort of genius: "Rage on! Ed Ruscha".

· **Ed Ruscha: Paintings** is at the Gagosian, Britannia St, London, until March 15. Details: 020-7841 9960

http://arts.guardian.co.uk/art/visualart/story/0,,2253156,00.html

Book bribery?

Spanish town proposes giving students $1.50 for every hour they spend reading in their local or school library

IAIN SULLIVAN

Associated Press

February 6, 2008 at 5:34 AM EST

NOBLEJAS, SPAIN — The mayor of a small town in Spain figures he knows how to keep children in school: Pay them.

Agustin Jimenez, socialist mayor of the agricultural town of Noblejas in central Spain, is recommending the town's children be given a euro - the equivalent of about $1.50 - for every hour they spend reading in their local or school library.

The sweetener is part of a string of measures to be voted on by the Noblejas council in March. Others include funds for apartments in university towns for students from Noblejas, teachers to give private lessons to struggling students and expert advice to parents on the virtues of keeping their children at school.

Not everyone agrees with the idea. Some critics see it as a bribe that is bound to fail.

Others figure if the payments can get children hooked on reading, it may lead to greater interest in learning over all.

Mr. Jimenez said he knows of no similar program elsewhere in Spain. "We asked ourselves the question, 'Can we and should we keep our arms crossed while we can see that the students failing at school is ever more evident?' " Mr. Jimenez said.

A recent European Commission study showed 31 per cent of Spain's students were leaving school early.

Spanish students were also some of the worst at reading in Europe, with 21 per cent of 15-year-olds having difficulties, compared with the European Union average of 19.8 per cent.

Mr. Jimenez said that in Noblejas, an economically strong town of some 4,000 inhabitants, the dropout rate is 80 per cent if you consider children who simply end their schooling after the obligatory period concludes at 15 or 16.

"We are clearly losing the discipline of studying; and to stop this we need to reward or pay for the habit of studying," he said. "We must educate this habit into the youngsters."

The proposal has been met with mixed reaction from students and parents.

"Instead of giving money to people who are going to go just for the euro instead of studying, they could spend the money on a park or things for children," student Maria Canada Campos said.

Ana Lopez Riga also sees drawbacks. She thinks her two children will just go for the euros.

"My children - I have one who is 13 years old and the other is 9 - have told me that they are going to go to the library and spend all the hours they can just for the euros."

Another woman, Carmen Baeza, was more optimistic.

"It could be that they get hooked on reading because of the euro and they pick up the habit of reading," she said.

When students go to the library to earn their euro, they will be supervised and will be expected to read or study. It is not clear if the children will receive the money, cash in hand, as they leave.

"Before I didn't go much but now I think I'll go more now," said student Sergio Lopez Lio.

http://www.theglobeandmail.com:80/servlet/story/RTGAM.20080206.wreading06/BNStory/International/?page=rss&id=RTGAM.20080206.wreading06

Tipping Elements In Earth's Climate System

Sea ice in the Beaufort Sea, Arctic. (Credit: USFWS)

ScienceDaily (Feb. 7, 2008) — A number of key components of the earth's climate system could pass their 'tipping point' this century, according to new research.

The term ‘tipping point’ is used to describe a critical threshold at which a small change in human activity can have large, long-term consequences for the Earth’s climate system.

"Society may be lulled into a false sense of security by smooth projections of global change," the researchers around Timothy Lenton from the British University of East Anglia in Norwich and Hans Joachim Schellnhuber from the Potsdam Institute for Climate Impact Research report. Global change may appear to be a slow and gradual process on human scales. However, in some regions anthropogenic forcing on the climate system could kick start abrupt and potentially irreversible changes. For these sub-systems of the Earth system the researchers introduce the term "tipping element".

In this new research, lead author Prof Tim Lenton of the University of East Anglia (UEA) and colleagues at the Postdam Institute of Climate Impact Research (PIK), Carnegie Mellon University, Newcastle University and Oxford University have drawn up a shortlist of nine tipping elements relevant to current policy-making and calculated where their tipping points could lie. All of them could be tipped within the next 100 years. The nine tipping elements and a prediction of the time it would take them to undergo a major transition are:

- Melting of Arctic sea-ice (approx 10 years)
- Decay of the Greenland ice sheet (more than 300 years)
- Collapse of the West Antarctic ice sheet (more than 300 years)
- Collapse of the Atlantic thermohaline circulation (approx 100 years)
- Increase in the El Nino Southern Oscillation (approx 100 years)
- Collapse of the Indian summer monsoon (approx 1 year)
- Greening of the Sahara/Sahel and disruption of the West African monsoon (approx 10 years)

- Dieback of the Amazon rainforest (approx 50 years)
- Dieback of the Boreal Forest (approx 50 years)

Arctic sea-ice and the Greenland Ice Sheet are regarded as the most sensitive tipping elements with the smallest uncertainty. Scientists expect ice cover to dwindle due to global warming. The West Antarctic Ice Sheet is probably less sensitive as a tipping element, but projections of its future behavior have large uncertainty. This also applies to the Amazon rainforest and Boreal forests, the El Niño phenomenon, and the West African monsoon. "These tipping elements are candidates for surprising society by exhibiting a nearby tipping point," the authors state in the article that is published in PNAS Online Early Edition. The archetypal example of a tipping element, the Atlantic thermohaline circulation, could undergo a large abrupt transition with up to ten percent probability within this century, according to the UN climate report from 2007.

Given the scale of potentially dramatic impacts from tipping elements the researchers anticipate stronger mitigation. Concepts for adaptation that go beyond current incremental approaches are also necessary. In addition, "a rigorous study of potential tipping elements in human socio-economic systems would also be welcome," the researchers write. Some models suggest there are tipping points to be passed for the transition to a low carbon society.

Highly sensitive tipping elements, smallest uncertainty

Greenland Ice Sheet

Warming over the ice sheet accelerates ice loss from outlet glaciers and lowers ice altitude at the periphery, which further increases surface temperature and ablation. The exact tipping point for disintegration of the ice sheet is unknown, since current models cannot capture the observed dynamic deglaciation processes accurately. But in a worst case scenario local warming of more than three degrees Celsius could cause the ice sheet to disappear within 300 years. This would result in a rise of sea level of up to seven meters.

Arctic sea-ice

As sea-ice melts, it exposes a much darker ocean surface, which absorbs more radiation than white sea-ice so that the warming is amplified. This causes more rapid melting in summer and decreases ice formation in winter. Over the last 16 years ice cover during summer declined markedly. The critical threshold global mean warming may be between 0.5 to 2 degrees Celsius, but could already have been passed. One model shows a nonlinear transition to a potential new stable state with no arctic sea-ice during summer within a few decades.

Intermediately sensitive tipping elements, large uncertainty

West Antarctic Ice Sheet

Recent gravity measurements suggest that the ice sheet is losing mass. Since most of the ice sheet is grounded below sea level the intrusion of ocean water could destabilize it. The tipping point could be reached with a local warming of five to eight degrees Celsius in summer. A worst case scenario shows the ice sheet could collapse within 300 years, possibly raising sea level by as much as five meters.

Boreal forest

The northern forests exhibit a complex interplay between tree physiology, permafrost and fire. A global mean warming of three to five degrees Celsius could lead to large-scale dieback of the boreal forests within 50 years. Under climate change the trees would be exposed to increasing water stress and peak summer heat and would be more vulnerable to diseases. Temperate tree species will remain excluded due to frost damage in still very cold winters.

Amazon rainforest

Global warming and deforestation will probably reduce rainfall in the region by up to 30 percent. Lengthening of the dry season, and increases in summer temperatures would make it difficult for the forest to re-establish. Models project dieback of the Amazon rainforest to occur under three to four degrees Celsius global warming within fifty years. Even land-use change alone could potentially bring forest cover to a critical threshold.

El Niño Southern Oscillation (ENSO)

The variability of this ocean-atmosphere mode is controlled by the layering of water of different temperatures in the Pacific Ocean and the temperature gradient across the equator. During the globally three degrees Celsius warmer early Pliocene ENSO may have been suppressed in favor of persistent El Niño or La Niña conditions. In response to a warmer stabilized climate, the most realistic models simulate increased El Niño amplitude with no clear change in frequency.

Sahara/Sahel- and West African monsoon

The amount of rainfall is closely related to vegetation climate feedback and sea surface temperatures of the Atlantic Ocean. Greenhouse gas forcing is expected to increase Sahel rainfall. But a global mean warming of three to five degrees Celsius could cause a collapse of the West African monsoon. This could lead either to drying of the Sahel or to wetting due to increased inflow from the West. A third scenario shows a possible doubling of anomalously dry years by the end of the century.

Indian summer monsoon

The monsoon circulation is driven by a land-to-ocean pressure gradient. Greenhouse warming tends to strengthen the monsoon since warmer air can carry more water. Air pollution and land-use that increases the reflection of sunlight tend to weaken it. The Indian summer monsoon could become erratic and in the worst case start to chaotically change between an active and a weak phase within a few years.

Lowly sensitive tipping elements, intermediate uncertainty

Atlantic thermohaline circulation

The circulation of sea currents in the Atlantic Ocean is driven by seawater that flows to the North Atlantic, cools and sinks at high latitudes. If the inflow of freshwater increases, e.g. from rivers or melting glaciers, or the seawater is warmed, its density would decrease. A global mean warming of three to five degrees Celsius could push the element past the tipping point so that deep water formation stops. Under these conditions the North Atlantic current would be disrupted, sea level in the North Atlantic region would rise and the tropical rain belt would be shifted.

The paper also demonstrates how, in principle, early warning systems could be established using real-time monitoring and modelling to detect the proximity of certain tipping points.

Journal article: Lenton, T. M., Held, H., Kriegler, E., Hall, J. W., Lucht, W., Rahmstorf, S. and Schellnhuber, H. J. (2008). Tipping elements in the Earth's climate system. Proceedings of the National Academy of Sciences, Online Early Edition. February 4, 2008.

Adapted from materials provided by Potsdam Institute for Climate Impact Research, via EurekAlert!, a service of AAAS.

http://www.sciencedaily.com:80/releases/2008/02/080204172224.htm

Brain Region That Can Be Stimulated To Reduce The Cognitive Deficits Of Sleep Deprivation Identified

ScienceDaily (Feb. 7, 2008) — A Columbia University Medical Center research team has uncovered how stimulation of a particular brain region can help stave off the deficits in working memory, associated with an extended sleep deprivation.

Working memory is a specific form of short-term memory that relates to the ability to store task-specific information for a limited timeframe, e.g., where your car is parked in a huge mall lot or remembering a phone number for few seconds before writing it down. It has long been established that cognitive performance, such as working memory, declines with sleep deprivation.

"We are excited about the possibilities of using brain stimulation to improve cognitive function," said Bruce Luber, Ph.D., lead author of the paper and an instructor in clinical psychiatry at Columbia University College of Physicians & Surgeons and the New York State Psychiatric Institute. "We recently published a study in which we were able to improve the working memory performance of young adults for the first time and this new study extends our findings."

"In this research, we were able to non-invasively manipulate a brain network identified by imaging to partially remediate the effects of sleep deprivation using repetitive transcranial magnetic stimulation (rTMS), which has already shown promise in treating depression and other disorders," said Sarah H. Lisanby, M.D., senior author of the study and co-principal investigator of the DARPA grant funding this research. Dr. Lisanby is associate professor of clinical psychiatry and chief of the Brain Stimulation and Therapeutic Modulation Division, at the Columbia University College of Physicians & Surgeons and the New York State Psychiatric Institute.

"These findings have important implications for better understanding the neural bases of cognitive decline in the elderly. And the rTMS used in this study may potentially be useful in exploring and treating cognitive deficits due to aging and neuropathology in general," said Yaakov Stern, Ph.D., a professor of clinical neuropsychology in neurology and psychiatry at the Taub Institute for the Research on Alzheimer's Disease and the Aging Brain and the Gertrude H. Sergievsky Center at Columbia University Medical Center. Dr. Stern was principal investigator of the DARPA grant.

Findings were published online on Jan. 17, 2008 in Cerebral Cortex; the paper will be published in an upcoming print issue of the journal.

Study Designed to Test Sleep Deprivation Network, by Influencing the Expression of Key Brain Areas in the Network

In a previous study , the investigators identified a sleep deprivation network of brain areas that was active during the performance of a working memory task. Expression of this network was reduced following sleep deprivation. They also found a relationship between reduced expression of this network following sleep deprivation and poorer performance on the working memory task.

In the study, 15 young, healthy subjects underwent sleep deprivation for 48 hours. Working memory was tested using a letter recognition test, known as the delayed match to sample (DMS) task, in which subjects have to recall as quickly as possible whether a letter was included in a set of letters they had just seen. Participants performed this task during fMRI sessions both before sleep deprivation and at the conclusion of the sleep deprivation period.

The researchers used repetitive transcranial magnetic stimulation (rTMS) to test whether stimulation of three brain regions in the previously identified network following the sleep deprivation period, could improve performance on the working memory task. rTMS administers a rapid sequence of magnetic pulses to a specific brain area.

Results showed that stimulation at a site over left lateral occipital cortex, a prominent part of the brain network identified with fMRI, resulted in a reduction of sleep-induced slower reaction time without a corresponding decrease in accuracy. This improvement in performance was most marked in those individuals who showed the greatest reduction in the expression of the brain network following sleep deprivation.

"In addition to expanding our understanding of cognitive decline in the elderly, these findings may also have implications for new ways to treat sleep deprivation, a pervasive problem for soldiers, truck drivers and night-shift workers, which can result in impairment on the job and accidents," said Dr. Stern.

"Cognitive Reserve" Varies Among Individuals

Elderly persons show a broad range of individual differences in the degree to which they experience cognitive deficits as they age. One hypothesis to explain these differences was first formulated by Dr. Stern in 2002 and has since been adopted by neuroscientists worldwide, and is known as cognitive reserve. The theory of cognitive reserve suggests that some individuals are better able to cope with age-related or other neuropathology because they can call upon more neural resources.

These present findings are consisted with the concept of cognitive reserve because some participants suffered larger deficits in working memory performance due to sleep deprivation, while others were much less affected. These susceptibility differences were related to differential expression of a brain network.

This suggests that the activity of the sleep deprivation network exhibited properties of neural reserve, where a greater capacity or efficiency in the network allowed some individuals to maintain performance in the face of sleep deprivation. Moreover, these results suggest that rTMS was able to somehow enhance the network activity in those who were not able to maintain performance, artificially facilitating neural reserve.

This research was supported by a grant from the Defense Advanced Research Projects Agency (DARPA), the central research and development organization for the U.S. Department of Defense.

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

http://www.sciencedaily.com:80/releases/2008/02/080201155646.htm

Growing Hypoallergenic Rubber Plants In Texas

Guayule transplants grow in field plots at the Texas AgriLife Research Station at Halfway. This bushy perennial shrub is native to the Big Bend area but requires irrigation under cultivation. (Credit: Texas AgriLife Research photo)

ScienceDaily (Feb. 7, 2008) — Changing and growing markets have renewed interest and research on guayule and lesquerella, two native Big Bend plants that might be grown in other parts of Texas, a Texas AgriLife Research scientist said.

Dr. Mike Foster, a research scientist with the Texas AgriLife Research and Extension Center at Lubbock, said he is looking at the possibility of developing the two plants into alternative crops in the Trans-Pecos and High Plains. Foster, who is located at the Texas AgriLife Research Station in Pecos, spoke at the recent High Plains Vegetable Conference in Canyon. The reason guayule is back on the forefront now is medical products, Foster said. Many people are allergic to natural rubber products, but guayule rubber does not seem to cause the allergic reactions.

"There are about 300 medical devices that require natural rubber," he said. "Many occupations require people to wear gloves and the guayule natural rubber does not produce the allergic reactions because of fewer proteins. That's where we are headed with this." Guayule is a native shrub in the Big Bend area and produces natural rubber, Foster said. This plant was harvested in the early 1900s in Mexico and Texas and received attention in the U.S. during World War II.

The Emergency Rubber Project was created in 1942-1944, and that is when the first studies were performed on the reaction and limitation of guayule to low-temperature environments in Texas and New Mexico. The experiments looked at 23 locations in the two states, Foster said. Little injury was seen on dormant shrubs at temperatures as low as 0 degrees, he said. Even in Dalhart, the plants had a 31 percent survival at minus 10 degrees.

Following the war, interest decreased and the U.S. became primarily an importer of rubber that is derived from rubber trees, Foster said. The rubber from guayule is structurally the same. In the late

1970s, interest in domestic rubber production was revived because of the oil embargo, he said. That's when researchers started trying to increase the biomass of these plants. And now Foster is again looking at the plant with plots at the Texas AgriLife Research Station at Halfway, near Plainview. The Trans Pecos and Plainview areas have similar elevations and temperatures, but the Plainview area receives almost two times as much rain. The freeze dates are similar.

The plants were transplanted in May 25, 2006, and received a total of 23 inches of water (rain and irrigation) during the growing season. Foster said he has already determined the high biomass lines that have been recently developed will not work in the colder regions because they lost their cold tolerance during the breeding process. He has determined winter survival requires a dry period in the fall followed by a gradual temperature decline. Problems can arise if plant growth is induced by a winter warm period that is followed by frost. However, two breeding lines are showing potential.

The shrubs are harvested at two years of age when the whole plant can be dug up or it can be clipped and left to regrow, Foster said. It will need to be grown under irrigation, but the water requirements for the High Plains have not been determined. "One of the advantages here (in the High Plains) is you get some rainfall, so it can reduce the water inputs," he said. "The Trans Pecos, where it is native, has trouble with salinity in the water, so we're just trying to see how adaptive it is in this region.

"If this really happens, I think the High Plains would be in position to cash in on the market," Foster said. "One of the last reports I saw, natural rubber varied from $1.30 to $1.60 a pound. With the medical application, the demand is growing." Foster said the co-products may be as valuable as the rubber. To process guayule for rubber, the plant has to be ground up and the rubber comes from the bark. The resin can be used to treat wood, and the leftover pulp can be used for composite boards and as an energy source, i.e. fire logs, briquettes and fuel pellets.

Lesquerella, the other crop Foster is working with, has potential as an industrial oilseed crop, he said. It also is found in Mexico and the Trans Pecos, but can be found growing as far north as Kansas.

The cool season perennial produces oil similar to that of castor, he said. All U.S. castor oil is imported.

The plant produces yellow flowers that develop into capsules containing numerous small, flat seeds. One million seeds weigh only 20 ounces, Foster said.

The seeds can be crushed to produce oil that could be used as the base-stock to improve viscosity of 2-cycle engine oil, motor oil and hydraulic fluid, he said. It also can be used in biodegradable gear oil with off-shore drilling applications, and it has potential as a biodiesel/biofuel additive.

"We certainly see this can be a potential new crop for the Trans Pecos and High Plains regions," Foster said.

He said he is working with a research group at Pecos and Halfway research stations. The first planting at Halfway in 2006 had a weed problem and they were not able to harvest. A second crop was planted in 2007 and will be harvested this spring.

Foster said once the viability of the crops is determined, the acceptance of them as an alternative crop will depend on the ability to get them processed and to a market with a reasonable profit.

Adapted from materials provided by Texas A&M University.

http://www.sciencedaily.com:80/releases/2008/02/080201134903.htm

Lending A Robotic Hand To Your Carpentry Education

ScienceDaily (Feb. 7, 2008) — Up to now, most learning focused on abstract symbolic knowledge like writing, or passive receptive iconic knowledge through images. But there is a third kind, 'enactive' knowledge, or learning by doing. It is the information we acquire using our whole bodies, and it is a new paradigm in IT-assisted education.

Learning by doing, or by 'enaction', started at the dawn of humanity itself, from the time the first proto-human discovered that a bone could become a tool. But it is a practice that has become marginalised in developed societies, as convenience and, increasingly, technology lure people away from craftwork and physical labour.

Today, knowledge mediated by computers is transmitted symbolically, through writing, or iconically with pictures. But not, perhaps, for much longer.

Thanks to an EU-funded research network, called Enactive, there is now a large and thriving research community working on computer-assisted 'enactive' knowledge. Experts in robotics, virtual reality, experimental psychology and neuroscience share resources and information.

"Four years ago when we started, there was no research community for IT-assisted, enactive knowledge," says Enactive's coordinator Professor Massimo Bergamasco. "There were relatively isolated communities in experimental psychology and neuroscience, but there was nothing that linked those fields with specialists in computer science, or multimedia, or robotics." Now there is a society, a conference and one of the network's partners is setting up a lab dedicated to this research.

It is a tremendous achievement, but what will it all mean?

Virtual carpentry

It is easy to imagine various potential applications. How about using a screen, a glove and a handheld 'chisel' to become a carpenter? You could change the settings to reflect different types of wood, and you could mess up as many pieces as you like because they would be replaced virtually. But, at the end of it, you would be a fully skilled craftsman.

Does it sound a bit far-fetched? Well, in a separate EU-funded project, called Haptex, researchers have successfully created the 'feel' of a virtual fabric. Its texture, strength and elasticity are all transmitted via a glove. First time users are really surprised at how real this virtual fabric feels.

Professor Bergamasco highlights other potential applications. "We see concepts in different fields, like rehabilitation, surgery, industrial training, space exploration. The number of potential applications is virtually limitless."

Imagine a surgeon practicing a delicate procedure on a virtual patient, until he or she becomes expert. Or, one day perhaps, it will be possible to model an individual patient and practise a particularly tricky operation virtually, before trying the real thing.

It is all built on the idea that we learn better by doing something than by reading about it, or even watching a video.

But the real wonder of this research is that experts do not yet know what marvels enactive knowledge could yet unlock. Creating computer-assisted, enactive devices will provide tremendous tools to disciplines like experimental psychology and neuroscience.

Imagine a language interface that hears what you say and responds appropriately. Will you learn better, faster, or not? What does 'whole body' education tell us about human psychology, evolution and learning mechanisms? And what new potential enactive applications will those experimental discoveries enable?

Uncanny reality

We do know that, in the shorter term, it will be discoveries made through a combination of haptic devices, audio and video. Haptic devices are interfaces that provide a physical feedback to the user. Typically they appear, in a very primitive application, with video game control pads. The pad shakes each time an impact occurs on screen, for instance.

There are far more sophisticated devices, however, like the haptic glove created by Haptex. Combined with audio and vision, haptic devices can provide uncannily realistic impressions of reality.

"Most of the work within the next few years focuses on audio, vision and touch, there is no real work on taste or smell yet. Different groups are looking at different things, like audio with haptics, video with haptics or combinations... The network has really inspired a lot of activity," explains Bergamasco.

"In fact, the Network of Excellence was a superb platform to promote this field," he reveals. "We had 25 groups, research institutes, mostly in Europe but with some in the USA and Canada, and the degree of interaction between them now is amazing."

It means that the whole field of technology assisted, enactive knowledge is just at its very beginnings, but thanks to the work of the Enactive Network of Excellence, the field is set to expand rapidly.

Adapted from materials provided by ICT Results.

http://www.sciencedaily.com:80/releases/2008/02/080206161559.htm

Managing Chronic Pain: When Does Morphine Become Less Effective?

ScienceDaily (Feb. 7, 2008) — Opioids, such as morphine, are effective and widely used drugs for the control of pain.

However, tolerance to opioids can develop with repeated administration (that is, higher and higher doses of the drug are required to achieve the same level of pain relief).

Nonetheless, there is some evidence to suggest that tolerance to opiods does not develop when they are used to treat individuals with diseases that are accompanied by inflammation.

Support for this hypothesis has now been provided by Christian Zöllner and colleagues from Charité--Universitätsmedizin Berlin, Germany, who found that peripheral tolerance to morphine did not develop in the chronically inflamed paws of rats.

Furthermore, blocking the action of endogenous opioid compounds in the inflamed tissue enabled tolerance to morphine to develop.

These data indicated that under conditions of chronic pain, endogenous opioid compounds prevent morphine from causing tolerance, inferring that the use of peripherally acting opioids for the prolonged treatment of inflammatory diseases such as chronic arthritis, inflammatory neuropathy, and cancer is not necessarily accompanied by opioid tolerance.

The journal article "Chronic morphine use does not induce peripheral tolerance in a rat model of inflammatory pain" was published in the Journal of Clinical Investigation on February 1, 2008.

Adapted from materials provided by Journal of Clinical Investigation, via EurekAlert!, a service of AAAS.

http://www.sciencedaily.com:80/releases/2008/02/080203101431.htm

PET Outperforms CT In Characterization Of Lung Nodules, Study Shows

ScienceDaily (Feb. 7, 2008) — Researchers involved in a large, multi-institutional study comparing the accuracy of positron emission tomography (PET) and computed tomography (CT) in the characterization of lung nodules found that PET was far more reliable in detecting whether or not a nodule was malignant. "CT and PET have been widely used to characterize solitary pulmonary nodules (SPNs) as benign or malignant," said James W. Fletcher, professor of radiology at Indiana University School of Medicine in Indianapolis, Ind. "Almost all previous studies examining the accuracy of CT for characterizing lung nodules, however, were performed more than 15 years ago with outdated technology and methods, and previous PET studies were limited by small sample sizes," he noted.

"Detecting and characterizing SPNs is important because malignant nodules represent a potentially curable form of lung cancer. Identifying which SPNs are most likely to be malignant enables physicians to initiate the proper therapy before local or distant metastases develop," said Fletcher. In a head-to-head study addressing the limitations of previous studies, PET and CT images on 344 patients were independently interpreted by a panel of experts in each imaging modality, and their determination of benign and malignant nodules were compared to pathologic findings or changes in SPN size over the next two years. The researchers found that when PET and CT results were interpreted as "probably" or "definitely" benign, the results were "strongly associated with a benign final diagnosis"—in other words, the modalities were equally good at making this determination. PET's superior specificity (accuracy in characterizing a nodule as benign or malignant), however, resulted in correctly classifying 58 percent of the benign nodules that had been incorrectly classified as malignant on CT. Furthermore, when PET interpreted SPNs as definitely malignant, a malignant final diagnosis was 10 times more likely than a benign.

SPNs are commonly encountered in both primary and specialty settings, often showing up on chest X-rays obtained for some other purpose than cancer screening and are often the first manifestation of lung cancer. The question for these patients then becomes whether to undergo surgery, undergo a needle biopsy or "watch and wait" to find out if the nodule is benign or malignant but treatable. "In patients with an untreated and undiagnosed SPN between 7 and 30 millimeters, PET provides better identification of malignant nodules that require a more aggressive treatment approach," said Fletcher. "PET in combination with CT can also provide good identification of those nodules that are most likely to be benign, suggesting that a 'watch and wait' strategy can be adopted in lieu of unnecessary invasive—and expensive—procedures such as needle biopsy or surgery," he added.

According to the American Cancer Society, lung cancer is the leading cause of cancer deaths in both men and women in the United States, with approximately 155,000 deaths each year. Although the survival rate is 49 percent for cases detected when the disease is still localized, only 16 percent of lung cancer cases are diagnosed at this early stage. Recently, almost 7 percent of 1,000 healthy volunteers in New York who participated in the Early Lung Cancer Action Project were found to have between one and three nodules on baseline screening X-rays. Co-authors of "A Comparison of the Diagnostic Accuracy of F18-FDG PET and CT in the Characterization of Solitary Pulmonary Nodules" include Fletcher; Steven M. Kymes, department of ophthalmology and visual sciences, Washington University School of Medicine, St. Louis, Mo.; Michael Gould, department of Veterans Affairs, Palo Alto Health Care System and department of medicine; George Segall, department of Veterans Affairs, Palo Alto Health Care System and department of radiology, Stanford School of Medicine, Stanford, Calif.; Naomi Alazraki, department of radiology, Emory University School of Medicine, Atlanta, Ga.; R. Edward Coleman, department of radiology, Duke University School of Medicine, Durham, N.C.; Val. J. Lowe, department of radiology, Mayo Clinic, Rochester, Minn.; Charles Marn, department of radiology and Lyn A. Thet, department of medicine, University of Wisconsin School of Medicine, Madison, Wis.; Kelvin Lee, department of Veterans Affairs, Cooperative Studies Program Coordinating Center, Palo Alto, Calif.

Adapted from materials provided by Society of Nuclear Medicine.

http://www.sciencedaily.com:80/releases/2008/02/080206105434.htm

Helium-8 Study Gives Insight Into Nuclear Theory, Neutron Stars

The diagrams above illustrate the nuclear structure of three forms of helium. (Credit: Image courtesy of Argonne National Laboratory)

ScienceDaily (Feb. 6, 2008) — The most neutron-rich matter that can be made on Earth—the nucleus of the helium-8 atom—has been created, trapped and characterized by researchers at the U.S. Department of Energy's Argonne National Laboratory. This new measurement gives rise to several significant consequences in nuclear theory and the study of neutron stars.

"This result will help us test the best nuclear structure theories that are out there right now, including work from the Physics Division's own theory group," said Argonne physicist Peter Mueller, who, along with Ph.D. student Ibrahim Sulai and other Physics Division colleagues, used an innovative laser trap to confine individual helium-8 atoms long enough to precisely determine their nuclear charge distribution, a quantity that indicates how the atom's two protons and six neutrons arrange themselves to form the nucleus.

Unlike stable helium, which usually has two and occasionally one neutron that pack closely and symmetrically with two protons, the element's unstable isotopes—helium-6 and helium-8—have additional neutrons that form "halos" around the compact central core. In 2004, the Argonne team had determined that the two extra neutrons in helium-6 arrange themselves asymmetrically on one side of the nucleus, a few trillionths of a millimeter away from the core.

In their recent study, however, the researchers discovered that helium-8's four extra neutrons group themselves differently from helium-6's. The four helium-8 neutrons in the halo arrange themselves in a less lopsided way around the core, altering the dynamics of the nucleus.

Helium-6 and helium-8 are both radioactive and decay quickly, complicating efforts to measure their properties. Helium-8 has a half-life of only a tenth of a second, meaning that samples of the atom have to be measured "on-line," or immediately after they are produced, which is not easy in the first place. Scientists require high-power accelerators to create even a tiny quantity of these atoms.

In this experiment, the Argonne scientists teamed up with Antonio Villari and his colleagues from the GANIL cyclotron facility in northern France, one of a handful of facilities that could generate a sufficient quantity of helium-8. Still, helium-8 represents only a small fraction of all the atoms that the cyclotron produces, so scientists needed a way to separate the target atoms from the rest of the atom stream and to observe each helium-8 atom long enough for an accurate study.

In order to do so, the scientists created an "atom trap" using six laser beams to restrain the helium-8 atoms. While other particles in the beam would fly right past the trap, about once every two minutes one helium-8 atom would fall into it. The laser beams functioned as the bars of a small cage—if the atom moved too much to one side, then one of the beams would push it back towards the middle.

Once the atom was trapped, the scientists shined another pair of laser beams onto it. By tuning this laser's frequency, they matched the atom's resonant frequency, causing it to glow bright enough so that Mueller and his colleagues could tell they had collected it.

Because the atom's resonant frequency depends on its nuclear structure, each helium isotope glows at a slightly different frequency. With the help of precision atomic theory calculations provided by collaborator Gordon Drake from the University of Windsor, Ontario, the researchers were able to use the measured frequency data to reveal helium-8's nuclear structure.

While the team carried out the experiment at an accelerator in France, Argonne will soon submit a bid for a new facility that could produce far greater quantities of helium-8 and other rare isotopes, attracting students and scientists from all over the world to Illinois.

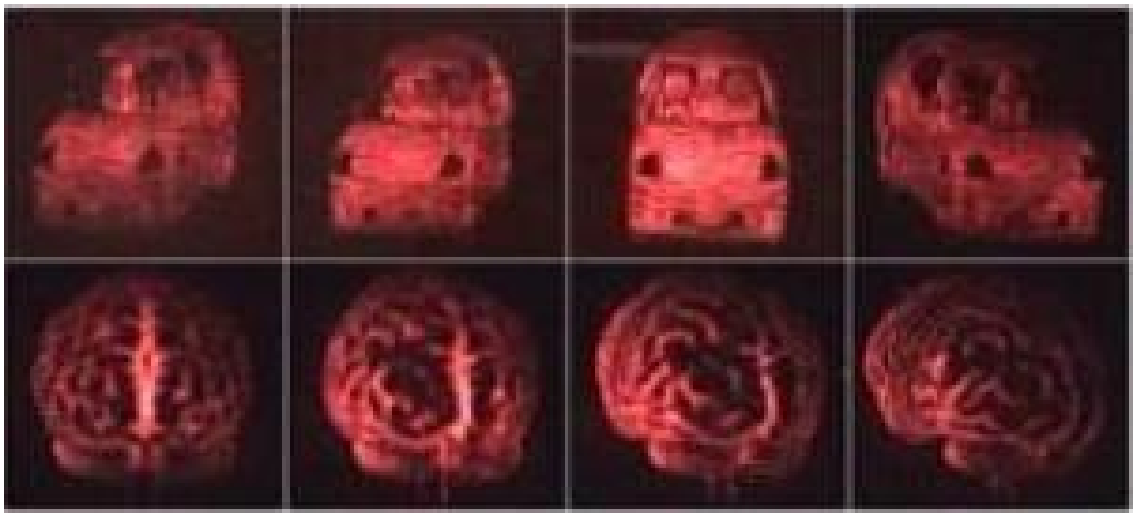
The proposed Facility for Rare Isotope Beams (FRIB), for which Argonne will submit a bid, could, for example, generate more than 1,000 times the number of unstable helium nuclei that researchers are now able to produce in the same time. "Having access to a facility like FRIB would open up many new possibilities for research into types of matter nearly impossible to examine otherwise," Mueller said. "This result shows that we have reached a scientific frontier, and FRIB would enable us to expand it even further."

A scientific paper on this work, "Nuclear Charge Radius of 8He," was published in the December 21 edition of Physical Review Letters.

Adapted from materials provided by Argonne National Laboratory.

http://www.sciencedaily.com:80/releases/2008/02/080205201555.htm

3-D Holography Breakthrough: Erase And Rewrite In Minutes



Views of an automobile (top) and of a human brain (bottom) from the updatable 3-D holographic display developed at The University of Arizona College of Optical Sciences in collaboration with Nitto Denko Technical Corp., Oceanside, Calif. The 3-D images were recorded on a 4-inch by 4-inch photorefractive polymer device. (Credit: University of Arizona College of Optical Sciences/Nitto Denko Technical Corp.)

ScienceDaily (Feb. 6, 2008) — University of Arizona optical scientists have broken a technological barrier by making three-dimensional holographic displays that can be erased and rewritten in a matter of minutes.

The holographic displays -- which are viewed without special eyewear -- are the first updatable three-dimensional displays with memory ever to be developed, making them ideal tools for medical, industrial and military applications that require "situational awareness."

"This is a new type of device, nothing like the tiny hologram of a dove on your credit card," UA optical sciences professor Nasser Peyghambarian said. "The hologram on your credit card is printed permanently. You cannot erase the image and replace it with an entirely new three-dimensional picture."

"Holography has been around for decades, but holographic displays are really one of the first practical applications of the technique," UA optical scientist Savas Tay said.

Dynamic hologram displays could be made into devices that help surgeons track progress during lengthy and complex brain surgeries, show airline or fighter pilots any hazards within their entire surrounding airspace, or give emergency response teams nearly real-time views of fast-changing flood or traffic problems, for example.

And no one yet knows where the advertising and entertainment industries will go with possible applications, Peyghambarian said. "Imagine that when you walk into the supermarket or department store, you could see a large, dynamic, three-dimensional product display," he said. It would be an attention-grabber.

Tay, Peyghambarian, their colleagues from the UA College of Optical Sciences and collaborators from Nitto Denko Technical Corp., which is an Oceanside, Calif., subsidiary of Nitto Denko, Japan, report on the research in the Feb. 7 issue of the journal Nature.

Their device basically consists of a special plastic film sandwiched between two pieces of glass, each coated with a transparent electrode. The images are "written" into the light-sensitive plastic, called a photorefractive polymer, using laser beams and an externally applied electric field. The scientists take

pictures of an object or scene from many two-dimensional perspectives as they scan their object, and the holographic display assembles the two-dimensional perspectives into a three-dimensional picture.

The Air Force Office of Scientific Research, which has funded Peyghambarian's team to develop updatable holographic displays, has used holographic displays in the past. But those displays have been static. They did not allow erasing and updating of the images. The new holographic display can show a new image every few minutes.

The four-inch by four-inch prototype display that Peyghambarian, Tay and their colleagues created now comes only in red, but the researchers see no problem with developing much larger displays in full color. They next will make one-foot by one-foot displays, then three-foot by three-foot displays.

"We use highly efficient, low-cost recording materials capable of very large sizes, which is very important for life-size, realistic 3D displays," Peyghambarian said. "We can record complete scenes or objects within three minutes and can store them for three hours."

The researchers also are working to write images even faster using pulsed lasers.

"If you can write faster with a pulsed laser, then you can write larger holograms in the same amount of time it now takes to write smaller ones," Tay said. "We envision this to be a life-size hologram. We could, for example, display an image of a whole human that would be the same size as the actual person."

Tay emphasized how important updatable holographic displays could be for medicine.

"Three-dimensional imaging techniques are already commonly used in medicine, for example, in MRI (Magnetic Resonance Imaging) or CAT scan (Computerized Axial Tomography) techniques," Tay said. "However, the huge amount of data that is created in three dimensions is still being displayed on two-dimensional devices, either on a computer screen or on a piece of paper. A great amount of data is lost by displaying it this way. So I think when we develop larger, full-color 3D holograms, every hospital in the world will want one."

Adapted from materials provided by University of Arizona.

http://www.sciencedaily.com:80/releases/2008/02/080206131640.htm

Swallowed Magnets Attract Trouble In Boy's Stomach, Surgeons Urge Vigilance

Four-year-old Braden Eberle of San Jose holds a pair of small, rare-earth magnets, similar to the ones he swallowed in 2007. The magnets snapped together in his intestinal tract, pinching the tissue. (Credit: Lucile Packard Children's Hospital)

ScienceDaily (Feb. 6, 2008) — Four-year-old Braden Eberle was worried. “Mom, I swallowed something,” said the San Jose boy. His mother, Jill, reassured him when she learned that it was just a tiny magnet that had slipped loose from a construction-type toy. But the next day, he swallowed another.

“I didn’t think anything of it at first,” said Jill Eberle, but she threw away the building set after the second incident. Braden had been holding the pieces in this mouth when the pencil eraser-sized magnets came loose and slipped down his throat. “They were so tiny, I thought they would just pass through.”

The next day, Friday, Braden began to complain of an intermittent stomachache severe enough to wake him from sleep. On Saturday morning, Eberle took her son to the emergency room—purely as a precautionary measure. “I thought it was probably the flu, but I couldn’t stop thinking about the magnets,” Eberle said.

“Braden didn’t really look that sick,” agreed Lucile Packard Children’s Hospital pediatric surgeon Sanjeev Dutta, MD, who evaluated Braden at Good Samaritan Hospital in San Jose the Saturday before Easter 2007. “But when I heard he’d swallowed two magnets at two different times, I became concerned.” X-rays revealed that the powerful rare-earth magnets had snapped together in Braden’s intestinal tract and were pinching the delicate tissue. Braden needed immediate surgery.

“Dr. Dutta was adamant,” said Eberle, who hadn’t expected such a drastic response. “He wasn’t messing around.” Within two hours, the surgery was over. Dutta used minimally invasive laparoscopic techniques to remove the magnets through just three small incisions, and Braden recovered quickly.

Dutta describes the case in a study published in the February issue of the Archives of Pediatric and Adolescent Medicine as a cautionary tale for other physicians. The report urges clinical vigilance and early surgical consultation when magnets are swallowed—even if the child exhibits few symptoms of distress.

Many of the magnets in today's toys contain neodymium, a metal with an unusually strong magnetic force.

"These rare-earth magnets are so much more powerful than the magnets we used to play with as kids," said Dutta, who is also an assistant professor of pediatric surgery at the Stanford School of Medicine. "Kids swallow things all the time. Even one magnet can cause a problem if the child has swallowed something else made of metal." Intestinal tissue pinned between the objects can disintegrate, causing an infection or digestive issues. In addition, the affected length of intestine can twist, cutting off the blood supply and killing that portion of the bowel.

"The fact that kids have died or gotten very sick from swallowing these magnets is a big concern to me, and a primary reason why I wanted to publish Braden's case," said Dutta.

"These magnet toys are ubiquitous. They're recommended for older children, but many of these kids have younger siblings." Braden had been playing with his older brother's set.

Older children may also be at risk. Less than two weeks after Braden's surgery, the Consumer Product Safety Commission issued an update to an earlier warning about toys containing magnets like those Braden swallowed. At that time, one death and 27 intestinal injuries like Braden's had been reported due to such magnets. At least 10 of those injuries involved children between the ages of 6 and 11.

Several magnet-based construction sets have been recalled by the commission. In many, the tiny, powerful magnets are affixed to plastic building pieces such as 1.5-inch squares, 1-inch triangles, cylinder rods, flexors, connectors, x-tenders and curves. The sets come in an assortment of colors. Other types of toys and games with the magnets have been subjected to similar recalls during the past year.

"I can't believe they use these magnets in children's toys," said Eberle, who has banned all such magnets from her house. That is, all but two—the two Dutta removed from Braden's intestine. Those she keeps as a reminder of what could have happened.

"The fact that Braden knew to tell me he had swallowed something may have saved his life," she said. "I never would have known. I would have assumed it was the flu. It's so scary how it happens so fast."

Adapted from materials provided by Stanford University School Of Medicine.

http://www.sciencedaily.com:80/releases/2008/02/080205200644.htm

Obesity May Be Wired In The Brain, Rat Study Suggests

A predisposition for obesity might be wired into the brain from the start, suggests a new study. (Credit: iStockphoto/Ekaterina Monakhova)

ScienceDaily (Feb. 6, 2008) — A predisposition for obesity might be wired into the brain from the start, suggests a new study of rats.

Rats selectively bred to be prone to obesity show abnormalities in a part of the brain critical for appetite control, the researchers found. Specifically, the researchers show that the obese rats harbor defects in neurons of the arcuate nucleus (ARH) of the hypothalamus, which leaves their brains less responsive to the hunger-suppressing hormone leptin.

"The neurodevelopmental differences in these animals can be seen as early as the first week," said Sebastien Bouret of the University of Southern California. "The results show that obesity can be wired into the brain from early life. The three-million-dollar question now is how to get around this problem."

It is increasingly accepted that obesity results from a combination of genetic and environmental factors, the researchers said. Rodent models of obesity can provide valuable insights into the biological processes underlying the development of obesity in humans. The "diet-induced obese" (DIO) rats used in the current study are particularly suited to the task, according to Bouret, because their tendency to become overweight shares several features with human obesity, including the contribution of many genes.

Previous studies had suggested that the brains of DIO rats are insensitive to leptin, the researchers added. Circulating leptin, produced by fat tissue, acts as a signal to the brain about the body's energy status. Leptin is also critical for the initial development of ARH neurons.

In the new study, the researchers examined the obesity-prone rats for signs of abnormal brain development. They found that the animals' brains had fewer neural projections from the ARH, a deficiency that persisted into adulthood. Those projections are needed to relay the leptin signal received by the ARH to other parts of the hypothalamus, Bouret said.

The researchers found further evidence that those changes in brain wiring stem from a reduced responsiveness of the brain to leptin's action during development.

"It seems [in the case of these rats] that appetite and obesity are built into the brain," Bouret said. While their condition might be ameliorated by exercising and eating right, he added, the findings suggest that the propensity to gain weight can't be reversed.

But there is hope yet. It's possible that treatments delivered during a critical early period of development might be capable of rewiring the brain, Bouret said.

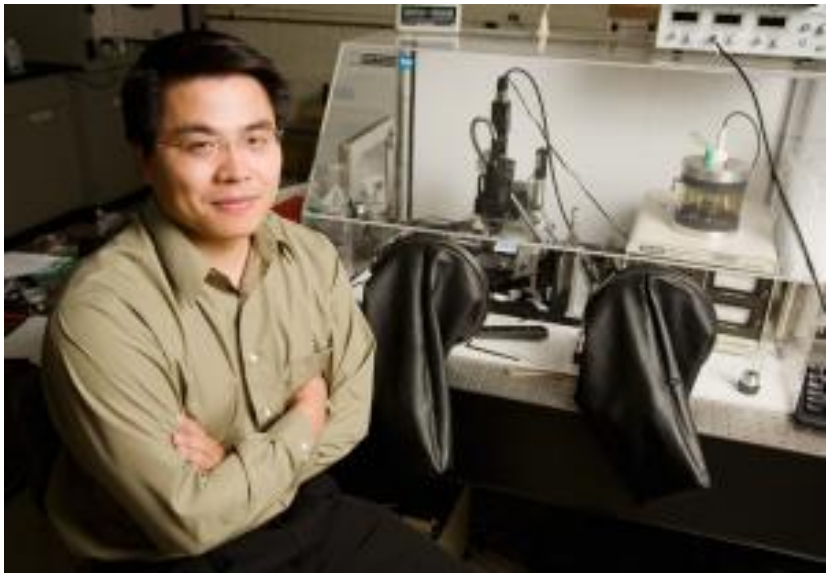
This researchwas published in the February issue of Cell Metabolism, a publication of Cell Press.

The researchers include Sebastien G. Bouret, Neuroscience Program, The Saban Research Institute, Childrens Hospital Los Angeles, University of Southern California, Los Angeles, CA, Inserm, U837, Jean-Pierre Aubert Research Center, Universite´ Lille, Lille, France; Judith N. Gorski, Neurology Service, Veterans Affairs Medical Center, East Orange, NJ, Department of Neurology and Neurosciences, New Jersey Medical School, Newark, NJ, Department of Pharmacology, Merck Research Laboratories, Rahway, NJ; Christa M. Patterson, Neurology Service, Veterans Affairs Medical Center, East Orange, NJ, Department of Neurology and Neurosciences, New Jersey Medical School, Newark, NJ; Stephen Chen, Neuroscience Program, The Saban Research Institute, Childrens Hospital Los Angeles, University of Southern California, Los Angeles, CA; Barry E. Levin, Neurology Service, Veterans Affairs Medical Center, East Orange, NJ, Department of Neurology and Neurosciences, New Jersey Medical School, Newark, NJ; and Richard B. Simerly, Neuroscience Program, The Saban Research Institute, Childrens Hospital Los Angeles, University of Southern California, Los Angeles, CA.

Adapted from materials provided by Cell Press, via EurekAlert!, a service of AAAS.

http://www.sciencedaily.com:80/releases/2008/02/080205121745.htm

New Process Makes Nanofibers In Complex Shapes And Unlimited Lengths



Min-Feng Yu, a professor of mechanical science and engineering, and an affiliate of the Beckman Institute, has developed a new process for creating complex, three-dimensional nanoscale structures. (Credit: Photo by L. Brian Stauffer)

ScienceDaily (Feb. 6, 2008) — The continuous fabrication of complex, three-dimensional nanoscale structures and the ability to grow individual nanowires of unlimited length are now possible with a process developed by researchers at the University of Illinois.

Based on the rapid evaporation of solvent from simple "inks," the process has been used to fabricate freestanding nanofibers, stacked arrays of nanofibers and continuously wound spools of nanowires. Potential applications include electronic interconnects, biocompatible scaffolds and nanofluidic networks.

"The process is like drawing with a fountain pen -- the ink comes out and quickly dries or 'solidifies,' " said Min-Feng Yu, a professor of mechanical science and engineering, and an affiliate of the Beckman Institute. "But, unlike drawing with a fountain pen, we can draw objects in three dimensions."

Yu and graduate students Abhijit Suryavanshi and Jie Hu describe the drawing process in a paper accepted for publication in the journal Advanced Materials, and posted on its Web site.

To use the new process, the researchers begin with a reservoir of ink connected to a glass micropipette that has an aperture as small as 100 nanometers. The micropipette is brought close to a substrate until a liquid meniscus forms between the two. As the micropipette is then smoothly pulled away, ink is drawn from the reservoir. Within the tiny meniscus, the solute nucleates and precipitates as the solvent quickly evaporates.

So far, the scientists have fabricated freestanding nanofibers approximately 25 nanometers in diameter and 20 microns long, and straight nanofibers approximately 100 nanometers in diameter and 16 millimeters long (limited only by the travel range of the device that moves the micropipette).

To draw longer nanowires, the researchers developed a precision spinning process that simultaneously draws and winds a nanofiber on a spool that is millimeters in diameter. Using this technique, Yu and his students wound a coil of microfiber. The microfiber was approximately 850 nanometers in diameter and 40 centimeters long.

To further demonstrate the versatility of the drawing process, for which the U. of I. has applied for a patent, the researchers drew nanofibers out of sugar, out of potassium hydroxide (a major industrial chemical) and out of densely packed quantum dots. While the nanofibers are currently fabricated from water-based inks, the process is readily extendable to inks made with volatile organic solvents, Yu said.

"Our procedure offers an economically viable alternative for the direct-write manufacture of nanofibers made from many materials," Yu said. "In addition, the process can be used to integrate nanoscale and microscale components."

The Grainger Foundation, the National Science Foundation and the Office of Naval Research provided funding. Part of the work was carried out in the university's Center for Microanalysis of Materials, which is partially supported by the U.S. Department of Energy.

Adapted from materials provided by University of Illinois at Urbana-Champaign.

http://www.sciencedaily.com:80/releases/2008/01/080130101732.htm

How Crystal Becomes A Conductor

ScienceDaily (Feb. 6, 2008) — Squeeze a crystal of manganese oxide hard enough, and it changes from an electrical insulator to a conductive metal. In a new report researchers use computational modeling to show why this happens.

The results represent an advance in computer modeling of these materials and could shed light on the behavior of similar minerals deep in the Earth, said Warren Pickett, professor of physics at UC Davis and an author on the study.

Manganese oxide is magnetic but does not conduct electricity under normal conditions because of strong interactions between the electrons surrounding atoms in the crystal, Pickett said. But under pressures of about a million atmospheres (one megabar), manganese oxide transitions to a metallic state.

Pickett and colleagues Richard Scalettar at UC Davis, Jan Kunes at the University of Augsburg, Germany, Alexey Lukoyanov at the Ural State Technical University, Russia, and Vladimir Anisimov at the Institute of Metal Physics in Yekaterinburg, Russia, built and ran computational models of manganese oxide.

Using the model, the researchers were able to test different explanations for the transition and identify the microscopic mechanism responsible. They found that when the atoms are forced together under high pressure, the magnetic properties of the manganese atoms become unstable and collapse, freeing the electrons to move through the crystal.

Manganese oxide has similar properties to iron oxide and silicates (silicon oxides), which make up a major part of the Earth's crust and mantle. Understanding how these materials behave under enormous pressures deep underground could help geologists understand the Earth's interior, Pickett said.

The paper was published Feb. 3 in the online edition of the journal Nature Materials.

Adapted from materials provided by University of California - Davis.

http://www.sciencedaily.com:80/releases/2008/02/080205170602.htm

First Documented Case Of Pest Resistance To Biotech Cotton

Bollworm, Helicoverpa zea, moths have a wingspan of 1. 5 to 2 inches. Their caterpillars, known as bollworms, are serious pests of cotton in the southeastern US and Texas. (Credit: USDA-Agricultural Research Service)

ScienceDaily (Feb. 8, 2008) — A pest insect known as bollworm is the first to evolve resistance in the field to plants modified to produce an insecticide called Bt, according to a new research report.

Bt-resistant populations of bollworm, Helicoverpa zea, were found in more than a dozen crop fields in Mississippi and Arkansas between 2003 and 2006.

"What we're seeing is evolution in action," said lead researcher Bruce Tabashnik. "This is the first documented case of field-evolved resistance to a Bt crop."

Bt crops are so named because they have been genetically altered to produce Bt toxins, which kill some insects. The toxins are produced in nature by the widespread bacterium Bacillus thuringiensis, hence the abbreviation Bt.

The bollworm resistance to Bt cotton was discovered when a team of University of Arizona entomologists analyzed published data from monitoring studies of six major caterpillar pests of Bt crops in Australia, China, Spain and the U.S. The data documenting bollworm resistance were first collected seven years after Bt cotton was introduced in 1996.

"Resistance is a decrease in pest susceptibility that can be measured over human experience," said Tabashnik, professor and head of UA's entomology department and an expert in insect resistance to insecticides. "When you use an insecticide to control a pest, some populations eventually evolves resistance."

The researchers write in their report that Bt cotton and Bt corn have been grown on more than 162 million hectares (400 million acres) worldwide since 1996, "generating one of the largest selections for insect resistance ever known."

Even so, the researchers found that most caterpillar pests of cotton and corn remained susceptible to Bt crops.

"The resistance occurred in one particular pest in one part of the U.S.," Tabashnik said. "The other major pests attacking Bt crops have not evolved resistance. And even most bollworm populations have not evolved resistance."

The field outcomes refute some experts' worst-case scenarios that predicted pests would become resistant to Bt crops in as few as three years, he said.

"The only other case of field-evolved resistance to Bt toxins involves resistance to Bt sprays," Tabashnik said. He added that such sprays have been used for decades, but now represent a small proportion of the Bt used against crop pests.

The bollworm is a major cotton pest in the southeastern U.S. and Texas, but not in Arizona. The major caterpillar pest of cotton in Arizona is a different species known as pink bollworm, Pectinophora gossypiella, which has remained susceptible to the Bt toxin in biotech cotton.

Tabashnik and his colleagues' article, "Insect resistance to Bt crops: evidence versus theory," will be published in the February issue of Nature Biotechnology. His co-authors are Aaron J. Gassmann, a former UA postdoctoral fellow now an assistant professor at Iowa State University; David W. Crowder, a UA doctoral student; and Yves Carrière, a UA professor of entomology. Tabashnik and Carrière are members of UA's BIO5 Institute.

"Our research shows that in Arizona, Bt cotton reduces use of broad-spectrum insecticides and increases yield," said Carrière. Such insecticides kill both pest insects and beneficial insects.

To delay resistance, non-Bt crops are planted near Bt crops to provide "refuges" for susceptible pests. Because resistant insects are rare, the only mates they are likely to encounter would be susceptible insects from the refuges. The hybrid offspring of such a mating generally would be susceptible to the toxin. In most pests, offspring are resistant to Bt toxins only if both parents are resistant.

In bollworm, however, hybrid offspring produced by matings between susceptible and resistant moths are resistant. Such a dominant inheritance of resistance was predicted to make resistance evolve faster.

The UA researchers found that bollworm resistance evolved fastest in the states with the lowest abundance of refuges.

The field outcomes documented by the global monitoring data fit the predictions of the theory underlying the refuge strategy, Tabashnik said.

Although first-generation biotech cotton contained only one Bt toxin called Cry1Ac, a new variety contains both Cry1Ac and a second Bt toxin, Cry2Ab. The combination overcomes pests that are resistant to just one toxin.

The next steps, Tabashnik said, include conducting research to understand inheritance of resistance to Cry2Ab and developing designer toxins to kill pests resistant to Cry1Ac.

Although preparation of this article was not supported by organizations that may gain or lose financially through its publication, the authors have received support for other research from Monsanto Company and Cotton, Inc. One of the authors (B. T.) is a co-author of a patent application filed with the World Intellectual Property Organization on engineering modified Bt toxins to counter pest resistance, which is related to research published in 2007 (Science 318: 1640-1642. 2007).

The U.S. Department of Agriculture funded the research.

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

http://www.sciencedaily.com:80/releases/2008/02/080207140803.htm

What Does And Doesn't Affect Immune System

ScienceDaily (Feb. 8, 2008) — Scientists know that a number of factors can affect the body's immune system: poor diet, certain steroids, chronic stress. Now researchers at Michigan State University have discovered that an appetite-controlling hormone also affects the immune system, while natural versions of certain steroids do not.

"These two studies,* while not directly related, show that the neuroendocrine system plays a big role in both the immune system and obesity," said Pamela Fraker, MSU professor of biochemistry and molecular biology and lead scientist for both projects. "MSU is one of the few places studying the relationship between metabolism, the immune system and the neuroendocrine system."

A new role for leptin

One MSU research team discovered that leptin, a hormone produced by fat cells, supports white blood cell production in the body, enhancing immune function. This is the first time leptin's effect on the immune system has been demonstrated.

Scientists have long known that leptin helps control how much a person eats as well as how quickly the body burns energy.

"Many investigators have been trying to unlock the key to obesity for years," said Fraker. "The more fat a person has, the more leptin there is in the bloodstream. In obese people, it seems that the body becomes leptin-resistant -- the signals get jammed. So giving obese people leptin doesn't help them lose weight."

The MSU scientists were examining ob/ob mice (genetically programmed to have non-functional leptin) and db/db mice (genetically programmed to have non-functional leptin receptors), giving them supplemental leptin to study its effects. While causing the mice to eat less, the big surprise was leptin's effect on the immune system. The mice that were given leptin had double the number of B cells, a type of white blood cell produced in bone marrow that fights infection by making antibodies.

"This is a brand new role for leptin," said Fraker. "It appears that most obese people may be somewhat immunosuppressed. This finding shows us that the body's resistance to leptin plays a role in that, too."

To further study leptin's effect on the immune system, Fraker and her colleagues are planning a study on morbidly obese people who will be having gastric bypass surgery. While the outcome of the surgery is highly successful for most people, mortality rates can range from 2 to 10 percent, which is significant.

"Infection from poor wound healing, which is the result of reduced immune function, is one reason people die from the surgery," Fraker said. "We're going to measure people's immune function before and after surgery to see how much it improves, as well as how fast it improves."

Other members of this research team are MSU scientists Louis King, research assistant professor of biochemistry and molecular biology, and Kate Claycombe, assistant professor of food science and human nutrition.

Naturally-produced steroids don't inhibit immune system

While corticosteroids, such as prednisone, reduce inflammation, they also inhibit the body's immune system -- a person taking prescription steroids is more susceptible to infection. Another MSU research team found that corticosteroids produced naturally in the body don't have this same immunosuppressive effect.

The human body secretes corticosteroids when it's under stress, both psychological and physical, and these steroids are responsible for the "fight-or-flight response" in humans and other animals. Cortisol (also called hydrocortisone) is the most abundant corticosteroid in the body. These steroids' anti-inflammatory effects are well-known and pharmaceutical companies have been making versions of them for about 20 years. But people taking steroids are warned that cuts and bruises may be slow to heal because of steroids' effects on the immune system.

Fraker and her team's discovery that the naturally-produced versions of the steroids don't affect the immune system like the pharmacological versions is the first time this has been observed.

"With the pharmacological versions of steroids, you lose some immune function," Fraker explained. "With the natural versions, you retain neutrophil [a type of white blood cell] function. It may be worthwhile for pharmaceutical companies to investigate synthesizing natural versions of the steroids."

*Both studies are reported in the online edition of the Proceedings of the National Academy of Sciences the week of February 4, 2008.

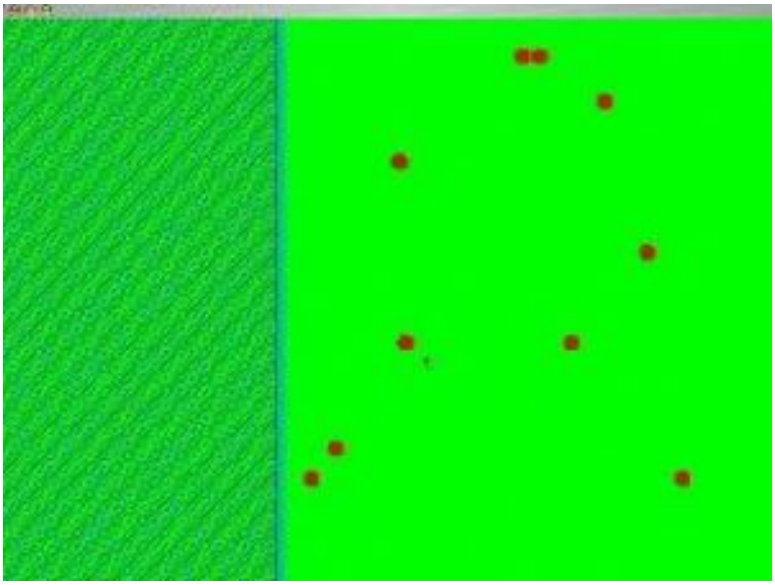
In addition to Fraker and King, other members of this research team are Mark Trottier, MSU research assistant professor of biochemistry and molecular biology, and Matthew Newsted, undergraduate research assistant.

Both of these researcher projects are supported by the National Institutes of Health. The work of Fraker and Claycombe is also supported by the Michigan Agricultural Experiment Station.

Adapted from materials provided by Michigan State University.

http://www.sciencedaily.com:80/releases/2008/02/080204172208.htm

Video Games Activate Reward Regions Of Brain In Men More Than Women



This image is from the game participants played in the study. If the balls are kept a certain distance from the wall, the wall moves to the right and the player gains territory, or space, on the screen. If a ball hits the wall, the line moves to the left and the player loses territory on the screen. (Credit: Image courtesy of Stanford University Medical Center)

ScienceDaily (Feb. 8, 2008) — Allan Reiss, MD, and his colleagues have a pretty good idea why your husband or boyfriend can't put down the Halo 3. In a first-of-its-kind imaging study, the Stanford University School of Medicine researchers have shown that the part of the brain that generates rewarding feelings is more activated in men than women during video-game play.

"These gender differences may help explain why males are more attracted to, and more likely to become 'hooked' on video games than females," the researchers wrote in their paper, which was recently published online in the Journal of Psychiatric Research.

More than 230 million video and computer games were sold in 2005, and polls show that 40 percent of Americans play games on a computer or a console. According to a 2007 Harris Interactive survey, young males are two to three times more likely than females to feel addicted to video games, such as the Halo series so popular in recent years.

Despite the popularity of video and computer games, little is known about the neural processes that occur as people play these games. And no research had been done on gender-specific differences in the brain's response to video games.

Reiss, senior author of the study and the Howard C. Robbins Professor of Psychiatry and Behavioral Sciences, has long been interested in studying gender differences; in 2005, he published a study showing that men and women process humor differently. He and his colleagues became interested in exploring the concept of territoriality, and they determined the best way to do so was with a simple computer game.

The researchers designed a game involving a vertical line (the "wall") in the middle of a computer screen. When the game begins, 10 balls appear to the right of the wall and travel left toward the wall. Each time a ball is clicked, it disappears from the screen. If the balls are kept a certain distance from the wall, the wall moves to the right and the player gains territory, or space, on the screen. If a ball hits the wall before it's clicked, the line moves to the left and the player loses territory on the screen.

During this study, 22 young adults (11 men and 11 women) played numerous 24-second intervals of the game while being hooked up to a functional magnetic resonance imaging, or fMRI, machine. fMRI is designed to produce a dynamic image showing which parts of the brain are working during a given activity.

Study participants were instructed to click as many balls as possible; they weren't told that they could gain or lose territory depending on what they did with the balls. Reiss said all participants quickly learned the point of the game, and the male and female participants wound up clicking on the same number of balls. The men, however, wound up gaining a significantly greater amount of space than the women. That's because the men identified which balls - the ones closest to the "wall" - would help them acquire the most space if clicked.

"The females 'got' the game, and they moved the wall in the direction you would expect," said Reiss, who is director of the Center for Interdisciplinary Brain Sciences Research. "They appeared motivated to succeed at the game. The males were just a lot more motivated to succeed."

After analyzing the imaging data for the entire group, the researchers found that the participants showed activation in the brain's mesocorticolimbic center, the region typically associated with reward and addiction. Male brains, however, showed much greater activation, and the amount of activation was correlated with how much territory they gained. (This wasn't the case with women.) Three structures within the reward circuit - the nucleus accumbens, amygdala and orbitofrontal cortex - were also shown to influence each other much more in men than in women. And the better connected this circuit was, the better males performed in the game.

The findings indicate, the researchers said, that successfully acquiring territory in a computer game format is more rewarding for men than for women. And Reiss, for one, isn't surprised. "I think it's fair to say that males tend to be more intrinsically territorial," he said. "It doesn't take a genius to figure out who historically are the conquerors and tyrants of our species-they're the males."

Reiss said this research also suggests that males have neural circuitry that makes them more liable than women to feel rewarded by a computer game with a territorial component and then more motivated to continue game-playing behavior. Based on this, he said, it makes sense that males are more prone to getting hooked on video games than females.

"Most of the computer games that are really popular with males are territory- and aggression-type games," he pointed out.

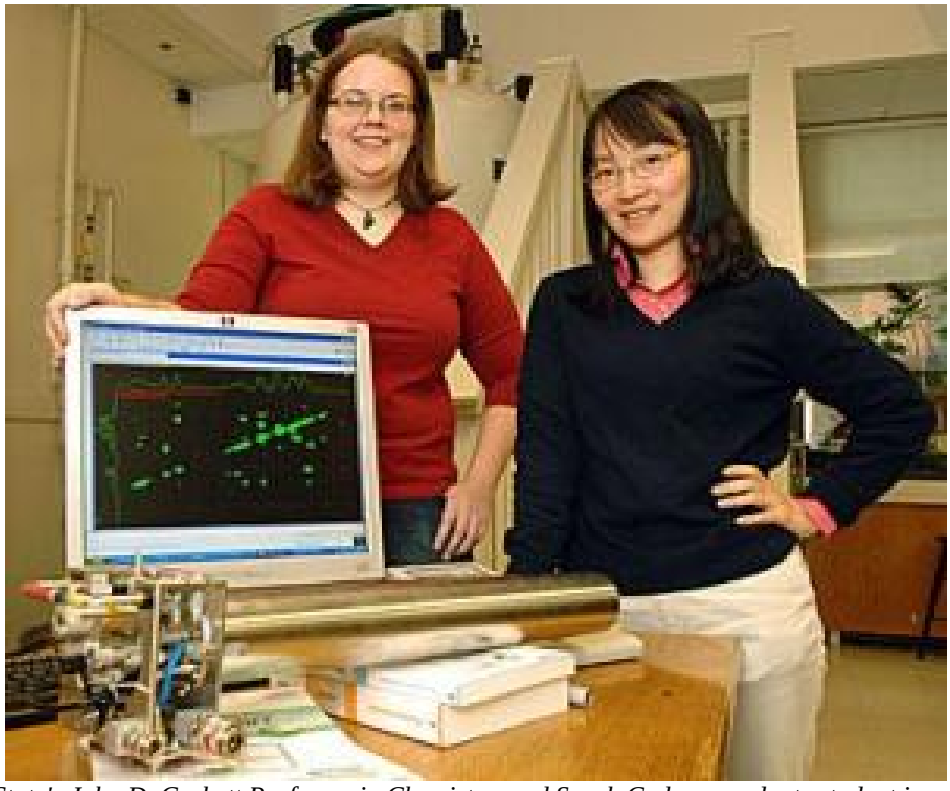
Reiss said the team's findings may apply to other types of video and computer games. "This is a fairly representative, generic computer game," he said, adding that he and his colleagues are planning further work in this area.

Fumiko Hoeft, MD, PhD, senior research scientist, was first author of the study. Co-authors include Christa Watson, social science research assistant; Shelli Kesler, PhD, assistant professor of psychiatry and behavioral sciences; and Keith Bettinger, software developer.

Adapted from materials provided by Stanford University Medical Center.

http://www.sciencedaily.com:80/releases/2008/02/080204140115.htm

Chemists Track How Drug Changes, Blocks Flu Virus



Mei Hong, Iowa State's John D. Corbett Professor in Chemistry, and Sarah Cady, a graduate student in chemistry, are using solid-state nuclear magnetic resonance spectroscopy to study how an anti-virus drug affects influenza A. The technique uses the equipment in front of and behind the researchers. It is similar to the magnetic resonance imaging technology that takes pictures of soft tissues in the body. (Credit: Photo by Bob Elbert.)

ScienceDaily (Feb. 7, 2008) — An anti-virus drug attacks influenza A by changing the motion and structure of a proton channel necessary for the virus to infect healthy cells, according to a recently published research paper by two Iowa State University chemists.

Mei Hong, Iowa State's John D. Corbett Professor in Chemistry, and Sarah Cady, a graduate student in chemistry, are studying the effects of the antiviral drug amantadine on influenza A. That's the type of flu bug that most commonly makes people sick and the one that has caused the most serious flu epidemics.

Hong said the findings are particularly important because mutations of the type A virus are resistant to amantadine treatment.

"In the last few years, amantadine resistance has skyrocketed among influenza A viruses in Asia and North America, making it imperative to develop alternative antiviral drugs," Hong and Cady wrote in their paper.*

To develop those drugs, Hong said researchers first need to understand exactly how amantadine stops the flu virus.

First, some background about how a flu virus infects a healthy cell: A virus begins the process by attaching itself to a healthy cell. The healthy cell surrounds the flu virus and takes it inside the cell through a process called endocytosis. Once in the cell, the virus uses a protein called M2 to open a channel to the healthy cell. Protons from the healthy cell flow through the channel into the virus and

raise its acidity. That triggers the release of the virus' genetic material into the healthy cell. The virus hijacks the healthy cell's resources and uses them to reproduce and spread the virus.

If the M2 proton channel is blocked, the process doesn't work and a virus can't infect a cell and spread.

Hong and Cady studied the proton channel with the help of solid-state nuclear magnetic resonance spectroscopy -- a technique similar to the magnetic resonance imaging technology that takes pictures of soft tissues in the body. The technology enabled them to discover and describe the motion and structure of the M2 proton channel in virus cells. They studied the channel when cells were treated with amantadine and when they were not.

Hong said the study made three findings:

- First, the M2 protein is in constant motion, changing among various conformations, and amantadine treatment changes the rate of motion and reduces the number of possible conformations the protein can adopt.
- Second, the structure of the protein changes most prominently at two places facing the channel interior when cells are treated with amantadine.
- And third, the tilt and orientation of the protein's helices are subtly changed by amantadine.

And all that blocks the ability of a virus to infect a healthy cell.

"We didn't know that before," Hong said. "And now that makes it very clear what we should study next."

Hong's next step is to examine how mutant versions of the virus are able to resist the flu-stopping changes caused by amantadine. Hong said that study will depend on winning research funding and recruiting graduate students interested in chemistry with biological applications.

Findings appear in the Feb. 5 edition of the Proceedings of the National Academy of Sciences.The National Science Foundation is supporting Hong's current study with a four-year, $680,000 grant.

Adapted from materials provided by Iowa State University.

http://www.sciencedaily.com:80/releases/2008/02/080201134859.htm

Treating Acne: Two Different Acid Peels Are Both Effective, Study Finds

ScienceDaily (Feb. 7, 2008) — Chemical peels using either alpha-hydroxy acid or beta-hydroxy acid are both highly effective in treating mild to moderately severe facial acne, researchers at the Saint Louis University School of Medicine have found - the first study to compare the two different types of acid peels as therapies for the skin disorder. Peels using beta-hydroxy acid (or BHA) had slightly fewer side effects and results that lasted a bit longer than did peels using alpha-hydroxy acid (or AHA), the study found. But overall, both types of treatments were similarly effective in reducing lesions caused by acne vulgaris, the medical term for common facial acne, which affects some 85 percent of all people 12 to 24 years old.

"This is good news for the millions of Americans who suffer from mild to moderately severe facial acne," said Dee Anna Glaser, M.D., vice chair and professor of dermatology at the Saint Louis University School of Medicine. "This provides more options for patients and doctors to chose from when it comes to tailoring a treatment program for each individual." AHA (which is also called glycolic acid) and BHA (also called salicylic acid) are frequently used by physicians to induce light skin peels, which help treat fine lines and wrinkles, acne and uneven texture and coloration. The peel removes a very thin layer of skin, which in turn promotes the growth of new, smoother skin.

Both types of acid are derived from organic compounds. AHA has the same active ingredient that's found in sugar cane juice, sour milk and tomato juice, while BHA is derived from salicin, which is closely related to the active ingredient in aspirin. The study involved 20 patients with moderate to severe facial acne. Their average age was 24 years; 13 were women. Each was treated with a chemical peel every other week for six weeks, with follow-up visits one month and two months after the last treatment.

Each treatment involved applying alpha-hydroxy acid to one side of the face and beta-hydroxy acid to the other side. Neither the patient nor the person who later evaluated them were aware which side of the face had been treated with which acid. The study found that both types of chemical peels significantly reduced acne lesions within two weeks of the first treatment, and patients continued to see a reduction in lesions through the first follow-up visit a month after the treatments had finished.

At the time of that first post-treatment visit, 94 percent of patients were judged to have had good or fair improvement in acne lesions on both sides of the face, as assessed by a blinded evaluator. A month later, at the second post-treatment visit, 81 percent of the sides of the face treated with beta-hydroxy acid still showed good or fair improvement in acne lesions, compared with 75 percent of the sides of the face treated with alpha-hydroxy acid. However, the sides of the face treated with alpha-hydroxy acid had developed a few new lesions - though this was judged not to be significant.

In general, both types of acid peels yielded the same side effects, which typically decreased over the course of the treatments. The most common of these included redness, peeling and scaling - though with alpha-hydroxy acid, the degree of the peeling and scaling was judged to be greater.

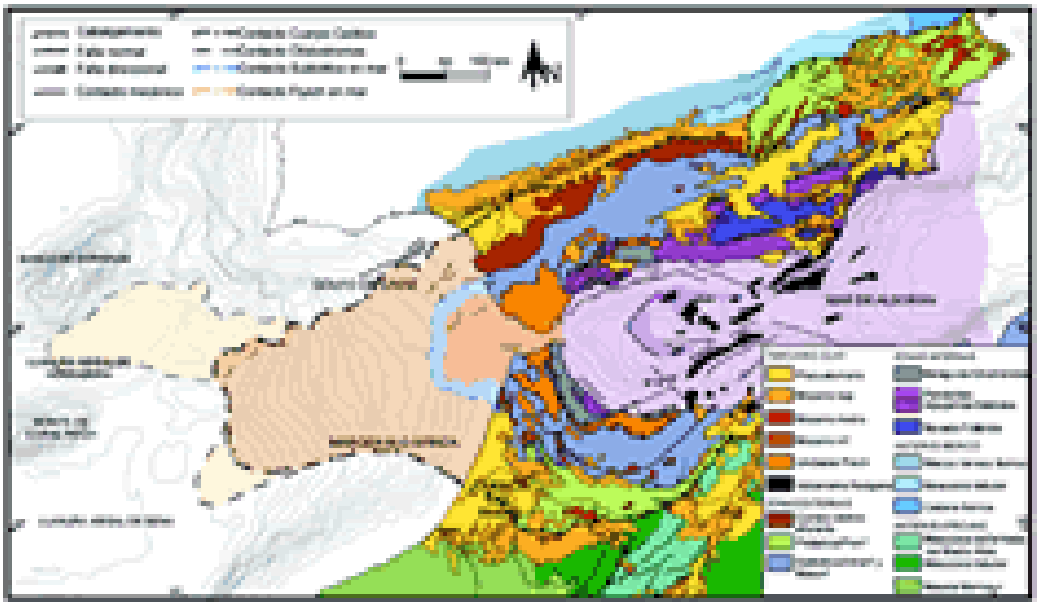
The research is published in a recent edition of Dermatologic Surgery.

In addition to Glaser, other researchers involved in the study included Katherine Flanagan, M.D., and Edward Kessler of the Saint Louis University of Medicine; Christina Chia, M.D., of the Yale University School of Medicine; and Cynthia Rogers, M.D., of Port Saint Lucie, Fla.

Adapted from materials provided by Saint Louis University.

http://www.sciencedaily.com:80/releases/2008/02/080206121508.htm

Mapping Active Faults In The Gibraltar Arc To Better Predict Earthquake-prone Regions



ScienceDaily (Feb. 7, 2008) — Africa and Europe get about 4 mm closer every year in a northeast convergence direction. The exact position and geometry of the boundary between the African and Eurasian plates is unknown, but it is located near the Gibraltar Arc — an area of intense seismic activity which was not studied deeply until now.

A group of researchers from the Andalusian Institute for Earth Sciences (CSIC) and the Department of Geodynamics of the University of Granada (UGR) described for the first time the physical and mechanical properties of the uppermost part of the Earth's crust — to a depth of 30 km which is where the highest magnitude earthquakes occur.

This study has made it possible to establish the exact position of the active faults of the Gibraltar Arc area which cause earthquakes, thus obtaining valuable geological information which could help determine the areas in which earthquakes are most likely to occur.

The author of this study is Fermín Fernández Ibáñez, whose doctoral thesis Sismicidad, reología y estructura térmica de la corteza del Arco de Gibraltar (Seismicity, reology and thermal structure of the Gibraltar Arc crust) was directed by researchers Juan Ignacio Soto Hermoso and José Molares Soto. This study, which was carried out within the CSIC project entitled The Gibraltar Arc System: Active Geodynamic Processes in the South-Iberian Margins (SAGAS), made the most comprehensive radiography so far in the faults of the Alboran Sea, the westernmost portion of the Mediterranean Sea.

The researchers characterised a region of intense deformation in which the relative movement of blocks is caused by left-lateral strike-slip faults known as "the Transalboran fault system," which expands from Murcia (Spain) to Alhucemas (Morocco). The other significant fault of the Gibraltar Arc area, which crosses the Transalboran fault perpendicularly, is called Nerja-Yusuf and goes from Málaga (Spain) to the Algerian coast.

Fernández and Soto assure that the south of the Iberian Peninsula and the north of Africa are very similar in geology. In order to characterise the way the Gibraltal Arc is being deformed due to pushing plates, the researchers studied oil wells, analysing the disfigurations caused by these forces.

This doctoral thesis could help to prevent natural disasters like the one that occurred in Indonesia in 2004, when a tsunami killed more than 300,000 people and flooded entire cities. In any case, researcher Fernández stated that although the Gibraltar Arc is an area of intense seismic activity and the movements of the faults could produce tsunamis, it is almost impossible that such a phenomenon would occur.

In addition, the study conducted at UGR related for the first time the temperature of the Earth's crust to its seismic activity, thus determining that the probability of earthquakes is significantly lower in areas of higher temperature. Therefore, the western area of Sierra Nevada and Alhucemas (which are located within the Gibraltar Arc) is the area in which most earthquakes occur due to low temperatures in the Earth's crust, while the area of Almería (Spain) and the eastern area of the Alboran Sea will probably experience fewer seismic movements.

Results from this study were published in the Journal of Geophysical Research or Tectonics.

Adapted from materials provided by University Of Granada.

http://www.sciencedaily.com:80/releases/2008/02/080205092746.htm

A Cosmic Fossil? Brilliant But Fuzzy Galaxy May Be Aftermath Of Multi-Galaxy Collision

The NASA/ESA Hubble Space Telescope has captured a new image of the galaxy NGC 1132 which is, most likely, a cosmic fossil -- the aftermath of an enormous multi-galactic pile-up, where the carnage of collision after collision has built up a brilliant but fuzzy giant elliptical galaxy far outshining typical galaxies. (Credit: NASA, ESA and the Hubble Heritage (STScI/AURA)-ESA/Hubble Collaboration. Acknowledgment: M. West (ESO, Chile))

ScienceDaily (Feb. 7, 2008) — The NASA/ESA Hubble Space Telescope has captured a new image of the galaxy NGC 1132 which is, most likely, a cosmic fossil – the aftermath of an enormous multi-galactic pile-up, where the carnage of collision after collision has built up a brilliant but fuzzy giant elliptical galaxy far outshining typical galaxies.

The elliptical galaxy NGC 1132, seen in this latest image from Hubble, belongs to a category of galaxies called giant ellipticals. NGC 1132, together with the small dwarf galaxies surrounding it, are dubbed a “fossil group” as they are most likely the remains of a group of galaxies that merged together in the recent past.

In visible light NGC 1132 appears as a single, isolated, giant elliptical galaxy, but this is only the tip of the iceberg. Scientists have found that NGC 1132 resides in an enormous halo of dark matter, comparable to the amount of dark matter usually found in an entire group of tens or hundreds of galaxies. It also has a strong X-ray glow from an abundant amount of hot gas – an amount normally only found in galaxy groups. Its X-ray glow extends over a region of space ten times larger than the 120,000 light-year radius it has in visible light. An X-ray glow that is equal in size to that of an entire group of galaxies.

The origin of fossil group systems remains a puzzle. The most likely explanation is that they are the end-products of a cosmic feeding frenzy in which a large cannibal galaxy devours all of its neighbours. A less likely explanation is that they may be very rare objects that formed in a region or period of time

where the growth of moderate-sized galaxies was somehow suppressed, and only one large galaxy formed.

Many galaxies reside in groups that are gravitationally bound together, including our own Milky Way, which is part of the Local Group. Sometimes gravity makes galaxies collide and eventually merge into one single galaxy. There is strong evidence that the Milky Way is one such cannibal that has snacked on numerous smaller galaxies during its lifetime, inheriting their stars in the process. Scientists are keenly studying the environment surrounding galaxies such as NGC 1132 using space telescopes like Hubble, and they try to trace the history of the formation these galaxies by analysing their properties.

In this Hubble image, NGC 1132 is seen surrounded by thousands of ancient globular clusters, swarming around the galaxy like bees around a hive. These globular clusters are likely to be the survivors of the disruption of their cannibalised parent galaxies that have been eaten by NGC 1132 and may reveal its merger history. In the background, there is a stunning tapestry of numerous galaxies that are much further away.

Elliptical galaxies are smooth and featureless. They contain hundreds of millions to trillions of stars, and their shapes range from nearly spherical to very elongated in shape. Their overall yellowish colour is a telltale sign of their great age. Because elliptical galaxies do not contain much cool gas they can no longer make new stars.

NGC 1132 is located approximately 320 million light-years away in the constellation of Eridanus, the River. This image of NGC 1132 was taken with Hubble's Advanced Camera for Surveys. Data obtained in 2005 and 2006 through green and near-infrared filters were used to produce a colour composite.

Adapted from materials provided by ESA/Hubble Information Centre.

http://www.sciencedaily.com/releases/2008/02/080205115813.htm

Discovery Could Lead To Urine Test To Detect Cancer Early, Better Prevention

ScienceDaily (Feb. 7, 2008) — Researchers at the University of Nebraska Medical Center (UNMC) in Omaha have assisted in a significant discovery – the understanding of a common mechanism of cancer initiation – that could result in better cancer assessment, prevention and detection.

"We have a novel approach to cancer. We know the initiating step," said Ercole Cavalieri, Ph.D., of the University of Nebraska Medical Center. "We think prevention of cancer can be solved by eliminating this initiating step."

Eleanor Rogan, Ph.D., a UNMC research collaborator, continued: "We have found the first step that starts a cell down the road to becoming a cancer cell. By preventing this first step from happening, we think we can stop the development of breast or prostate cancer. The combination of an early detection test for cancer risk with administration of preventing agents should enable us to significantly reduce the number of women and men that develop breast or prostate cancer."

The researchers have discovered that certain estrogen derivatives (metabolites) can react with deoxyribonucleic acid (DNA) to cause damage that may initiate a series of events leading to breast, prostate and other cancers. They found evidence in a simple urine test in humans. Estrogens can initiate cancer when natural mechanisms of protection do not work properly in the body, allowing estrogen metabolites to react with DNA.

"If these protections are insufficient, due to genetic, lifestyle or environmental influences, we think cancer can result," Dr. Cavalieri said. "Now that we have the basic knowledge about this unifying mechanism of cancer initiation, we have a greater sense of urgency to assess people at risk and, at the same time, begin studies of prevention by using specific natural compounds."

The findings are published in the December issue of the International Journal of Cancer. Findings were confirmed in a second, larger study and presented at a recent gathering of international scientists and physicians in San Antonio, Texas. The study involves researchers at the University of Nebraska Medical Center, Mayo Clinic and the Italian National Cancer Institute. A majority of the study was funded by the U.S. Army Breast Cancer Research Program Center of Excellence Award. Similar findings were reported and published about prostate cancer in the journal The Prostate in 2006.

The screening test developed by the researchers analyzes estrogen metabolite profiles in humans and can simultaneously associate the profile with risk of getting breast cancer. It involves testing a one-ounce sample of urine using a sophisticated method called tandem mass spectrometry, which analyzes about 40 estrogen-related compounds, including estrogen-DNA adducts formed by a chemical reaction of estrogen metabolites and DNA.

Researchers say the results are exciting because they show women at high risk of breast cancer can be identified by the level of adducts in a urine sample.

Researchers analyzed estrogen-DNA from 46 women with normal risk for breast cancer, 12 women at high risk of developing breast cancer, and 17 women diagnosed with breast cancer. They found women at high risk of breast cancer and the women with breast cancer had significantly higher levels of the estrogen-DNA adducts in their urine samples, while the women with normal risk for breast cancer had low levels.

"This is a very big step because we have a test in humans to determine the risk of getting breast or prostate cancer long before the tumor appears," Dr. Cavalieri said. "We can use these estrogen-DNA adducts as a measure of cancer risk. In addition, we have begun to establish how effective natural compounds may be at preventing cancer by determining their ability to reduce the levels of these adducts in urine."

He also said accumulating evidence suggests that specific metabolites of estrogens, if abundantly formed, can become cancer-initiating agents by reacting with DNA and generate mutations leading to cancer. DNA is composed of four bases, called adenine, guanine, cytosine and thymine, the alphabet of genetic information.

Estrogen metabolites react predominantly with the first two DNA bases, adenine and guanine, to form estrogen-DNA adducts, Cavalieri said. The resulting damage generated by the reaction can give rise to mutations that eventually initiate cancer. The important estrogen-DNA adducts spontaneously fall out of the DNA, leaving behind gaps that generate the cancer-initiating mutations.

The estrogen-DNA adducts eventually make their way out of cells and are excreted in urine.

“This finding identifies a new biomarker in the urine which appears to correlate with a women's risk of developing breast cancer,” according to Kenneth Cowan, M.D., Ph.D., director of the UNMC Eppley Cancer Center. “While these studies need to be confirmed in a prospective study in a larger group of patients, this could become an important screening assay for women and could lead to new therapies to prevent breast cancer.”

Dr. Cavalieri said one of the major obstacles in cancer research is related to the concept that cancer is a problem of 200 diseases, a viewpoint that has impeded researchers from looking at the origin of cancers because the search would be prohibitively complex. And for this reason, he said, the origin of breast, prostate and other human cancers has been virtually unknown.

While the expression of various cancers coincides with the concept of 200 diseases, some scientists believe a common origin is a factor for many prevalent types of cancer. There is widespread agreement in the scientific community that cancer is triggered by genetic mutations in critical genes, he said.

Jose Russo, M.D., senior member from the Fox Chase Cancer Center in Philadelphia, said: “The article is the best example of translational research. They have generated a unified concept of carcinogenesis and obtained a practical marker detectable in the urine of breast cancer patients. This article provides the adequate setting to explore this concept further by laying the basis to prepare a set of prospective clinical trials testing the preventive effects of the agents or mixtures of agents that can intercept the initiation event in breast or other cancers.”

David G. Longfellow, Ph.D., president and chief executive officer of the Toxicology Forum, an international, nonprofit organization devoted to conducting open dialogues among various segments of society concerned with problems in toxicology, said the work represents a paradigm shift in detection of cancer risk in humans and provides the earliest possible rational marker for prevention strategies and regimens.

“This work conveys a very exciting message that breast and prostate cancer risk can be identified years before the development of a tumor and suggests that natural preventive agents may be effectively used to prevent the initiation step in cancer,” Dr. Longfellow said. “Although this is a single manuscript, it is based on an extensive body of work in animal models and humans which consistently supports these findings and is complemented by collaboration with many international cancer scientists.”

Journal article abstract: http://www3.interscience.wiley.com/cgi-bin/abstract/117869053/ABSTRACT.

Adapted from materials provided by University of Nebraska, via Newswise.

http://www.sciencedaily.com/releases/2008/02/080206211504.htm

Transparent Adult Zebra Fish Will Make Human Biology Even Clearer

The transparent zebrafish. (Credit: Richard White, MD, PhD)

ScienceDaily (Feb. 7, 2008) — Zebrafish are genetically similar to humans and are good models for human biology and disease. Now, researchers at Children's Hospital Boston have created a zebrafish that is transparent throughout its life. The new fish allows scientists to directly view its internal organs, and observe processes like tumor metastasis and blood production after bone-marrow transplant in a living organism.

The fish, described in the February 7 issue of Cell Stem Cell, was created by Richard White, MD, PhD, a clinical fellow in the Stem Cell Program at Children's, with others in the laboratory of Leonard Zon, PhD.

The classic method for studying human diseases in animals is to allow the animal to get the disease, kill and dissect the animal, then ask, "what happened?" But in cancer and other fast-changing processes that traverse the body, this method is bound to miss something. "It's like taking a photograph when you need a video," says White, also an instructor of medicine at the Dana-Farber Cancer Institute.

Zebrafish embryos have enabled researchers to study disease in live organisms, since they are transparent. But zebrafish adults are opaque. "Everything after four weeks has been invisible to us," says White.

White's first experiment on the zebrafish examined how a cancer spreads. "The process by which a tumor goes from being localized to widespread and ultimately fatal is the most vexing problem that oncologists face," says White. "We don't know why cancer cells decide to move away from their primary site to other parts in the body."

White created a fluorescent melanoma tumor in the transparent fish's abdominal cavity. Viewing the fish under a microscope, White saw the cancer cells begin to spread within five days. He even saw individual cells metastasize, something that has not been observed, so readily and in real-time, in a living organism.

The spreading melanoma cells appeared to "home" to the skin after leaving the abdominal cavity. "This told us that when tumor cells spread to other parts in the body, they don't do it randomly," says White. "They know where to go."

White plans to study tumor cell homing, then look for ways to modify the tumor cells or cells of the host so that the spreading cells never find their new location.

The fish may also answer questions about stem cell transplants. While transplants of blood-forming stem cells help cancer patients rebuild healthy blood, some transplants don't "take," for reasons that are unknown. Scientists have lacked a full understanding what steps blood stem cells must take to do their job, says White.

White showed the process is observable in the fish. He first irradiated a transparent fish's bone marrow, then transplanted fluorescent blood-forming stem cells from another zebrafish. By four weeks, the fluorescent stem cells had visibly migrated and grown in the fish's bone marrow, which is in the kidney. Even individual stem cells were visible, something researchers haven't easily observed in a living organism, White says.

By studying how the stem cells embed and build blood in the fish, scientists can look for ways to help patients rebuild their blood faster. Drugs and genes could be tested in the living fish, with direct observation of results, White says.

White created the transparent fish simply by mating two existing zebrafish breeds. Zebrafish have three pigments in their skin--reflective, black, and yellow. White mated a breed that lacks reflective pigment, called "roy orbison," with one that lacks black pigment, called "nacre." The offspring had only yellow pigment in their skin, essentially looking clear. White named the new breed "casper."

The fish's brain, heart, and digestive tract are also visible, allowing researchers to study genetic defects of these organs from early embryonic development through adulthood. White hopes this tool will provide insight into how mutated genes cause diseases ranging from Alzheimer's disease to inflammatory bowel disease.

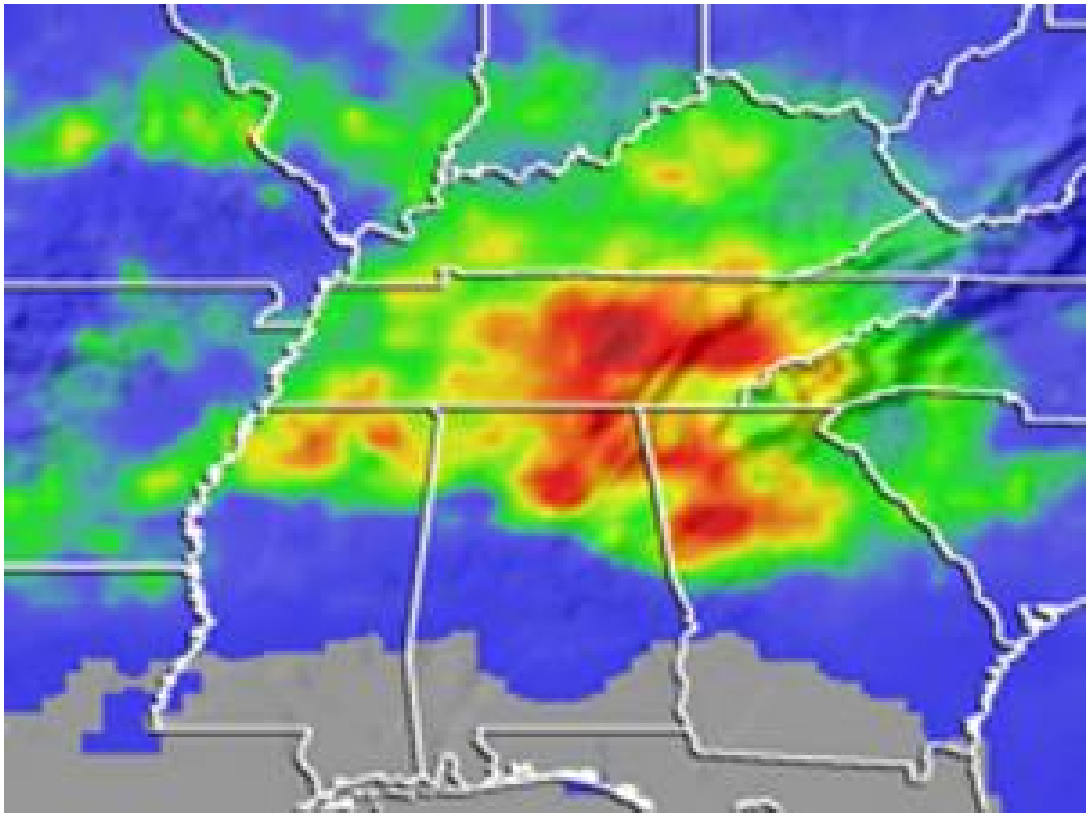
"What happens in a living organism is different than what happens in a dish," White says.

The study was funded by the American Society of Clinical Oncology, the Aid for Cancer Research organization, the Howard Hughes Medical Institution, and the National Institutes of Health.

Adapted from materials provided by Children's Hospital Boston, via EurekAlert!, a service of AAAS.

http://www.sciencedaily.com:80/releases/2008/02/080206121513.htm

Air Pollution May Be Causing More Rainy Summer Days In The Southeast US



Torrential rainfall from a 2003 storm in the Southeast resulted in massive accumulations of rain (red). Similar data from NASA's TRMM satellite has revealed that more rain falls midweek. (Credit: NASA)

ScienceDaily (Feb. 7, 2008) — Rainfall data from a NASA satellite show that summertime storms in the southeastern United States shed more rainfall midweek than on weekends. Scientists say air pollution from humans is likely driving that trend.

The link between rainfall and the day of the week is evident in data from NASA's Tropical Rainfall Measuring Mission satellite, known as TRMM. Midweek storms tend to be stronger, drop more rain and span a larger area across the Southeast compared to calmer and drier weekends. The findings are from a study led by Thomas Bell, an atmospheric scientist at NASA's Goddard Space Flight Center, Greenbelt, Md. Bell said the trend could be attributed to atmospheric pollution from humans, which also peaks midweek.

"It's eerie to think that we're affecting the weather," said Bell, lead author of the study published online this week in the American Geophysical Union's Journal of Geophysical Research. "It appears that we're making storms more violent."

Rainfall measurements collected from ground-based gauges can vary from one gauge site to the next because of fickle weather patterns. So, to identify any kind of significant weekly rainfall trend, Bell and colleagues looked at the big picture from Earth's orbit. The team collected data from instruments on the TRMM satellite, which they used to estimate daily summertime rainfall averages from 1998 to 2005 across the entire Southeast.

The team found that, on average, it rained more between Tuesday and Thursday than from Saturday through Monday. Newly analyzed satellite data show that summer 2007 echoed the midweek trend with peak rainfall occurring late on Thursdays. However, midweek increases in rainfall were more significant in the afternoon, when the conditions for summertime storms are in place. Based on satellite

data, afternoon rainfall peaked on Tuesdays, with 1.8 times more rainfall than on Saturdays, which experienced the least amount of afternoon rain.

The team used ground-based data from gauges, along with vertical wind speed and cloud height measurements, to help confirm the weekly trend in rainfall observed from space.

To find out if pollution from humans indeed could be responsible for the midweek boost in rainfall, the team analyzed particulate matter, the concentrations of airborne particles associated with pollution, across the U.S. from 1998 to 2005. The data, obtained from the Environmental Protection Agency, showed that pollution tended to peak midweek, mirroring the trend observed in the rainfall data.

"If two things happen at the same time, it doesn't mean one caused the other," Bell said. "But it's well known that particulate matter has the potential to affect how clouds behave, and this kind of evidence makes the argument stronger for a link between pollution and heavier rainfall."

Scientists long have questioned the effect of workweek pollution, such as emissions from traffic, businesses and factories, on weekly weather patterns. Researchers know clouds are "seeded" by particulate matter. Water and ice in clouds grab hold around the particles, forming additional water droplets. Some researchers think increased pollution thwarts rainfall by dispersing the same amount of water over more seeds, preventing them from growing large enough to fall as rain. Still, other studies suggest some factors can override this dispersion effect.

In the Southeast, summertime conditions for large, frequent storms are already in place, a factor that overrides the rain-thwarting dispersion effect. When conditions are poised to form big storms, updrafts carry the smaller, pollution-seeded raindrops high into the atmosphere where they condense and freeze.

"It's the freezing process that gives the storm an extra kick, causing it to grow larger and climb higher into the atmosphere," Bell said. He and his colleagues found that the radar on the TRMM satellite showed that storms climb to high altitudes more often during the middle of the week than on weekends. These invigorated midweek storms, fueled by workweek pollution, could drop measurably more rainfall.

The trend doesn't mean it will always rain on weekday afternoons during summertime in the Southeast. Rather, "it's a tendency," according to Bell. But with the help of satellites, new insights into pollution's effect on weather one day could help improve the accuracy of rainfall forecasts, which Bell said, "probably under-predict rain during the week and over-predict rain on weekends."

Adapted from materials provided by NASA/Goddard Space Flight Center.

http://www.sciencedaily.com:80/releases/2008/02/080201215416.htm

Particle Accelerator: Signals Sent Racing Ahead At Light Speed To Keep Particles Colliding

RHICs 2.4 mile ring has six intersection points where its two rings of accelerating magnets cross, allowing the particle beams to collide. The collisions produce the fleeting signals that, when captured by one of RHICs experimental detectors, provide physicists with information about the most fundamental workings of nature. (Credit: Image courtesy of DOE/Brookhaven National Laboratory) ScienceDaily (Feb. 7, 2008) — Imagine trying to catch up to something moving close to the speed of light - the fastest anything can move - and sending ahead information in time to make mid-path flight corrections. Impossible? Not quite. Physicists at the Relativistic Heavy Ion Collider (RHIC), a particle accelerator at the U.S. Department of Energy's Brookhaven National Laboratory, have achieved this tricky task - and the results may save the Lab money and time in their quest to understand the inner workings of the early universe.

The physicists have developed a way to measure subtle fluctuations in RHIC's particle beams as they speed around their 2.4-mile-circumference high-tech racetrack - and send that information ahead to specialized devices that smooth the fluctuations when the beam arrives. "These corrections help to keep the beams focused and colliding, recreating thousands of times a second the conditions that existed just after the Big Bang," said Steven Vigdor, Brookhaven Lab's Associate Laboratory Director for Nuclear and Particle Physics, who manages the RHIC program.

Already, RHIC scientists have learned that mere microseconds after the Big Bang, the universe was more interesting than imagined - a nearly "perfect" liquid with virtually no viscosity and strong interactions among its constituents. With the ability to race ahead of RHIC's beams and keep them focused, the scientists will be able to create many more "mini-Bangs" for study. The increase in data will help them investigate and measure the detailed properties of this "perfect" liquid, and test certain predictions stimulated by an unanticipated link between RHIC findings and "string theory," an appealing approach to incorporate gravity into a unified theory that describes all of Nature's forces. The beam-correcting technique, called stochastic cooling, has been implemented at accelerators where the beams are made of a continuous stream of particles - but never before at a facility where the

particles travel in discrete bunches, as is necessary for the beam-on-beam collisions that take place at RHIC. "Its successful demonstration at RHIC provides an alternative path to the goal of increased collision rates, which would be much more costly and take longer to achieve via other proposed means," Vigdor said.

How it works

RHIC circulates two beams of ions - electrically charged particles - moving in opposite directions in two separate rings at 99.995 percent the speed of light. Within each beam, the ions travel in discrete groups, or "bunches," each containing more than a billion ions. In the highest-energy experiments, the ions are the nuclei of gold atoms, composed of protons and neutrons that slam together where the two beams cross to produce a tiny speck of extremely hot, dense matter that mimics the conditions of the early universe.

But like all charged particle beams, RHIC's ions tend to spread out (heat up) as they circulate. As the ions spread, the number of protons and neutrons colliding - and the amount of useful data - declines.

So RHIC physicists are taking advantage of RHIC's circular shape and the ability to send signals as fast as the near-light-speed beam to cool the ions down - that is, keep them tightly bunched. The technique includes the term stochastic (derived from statistics, meaning random) because it relies on measuring the random fluctuations in the beam shape and size. The measurements are made at one point on the accelerator by devices that generate signals proportional to how far the particles are straying from their ideal positions. These devices then send the signals via fiberoptic or microwave links to a position ahead of the speeding beam, where electric fields are generated to "kick" the charged particles back toward their ideal positions. The result: more tightly squeezed, cooler ion bunches.

The signals stay ahead of the beam by taking one of two shortcuts - either traveling from one point to another across the circular accelerator, or by backtracking along the circle to meet the speeding beam about halfway around on its next pass. So far the RHIC physicists have tested stochastic cooling in the longitudinal direction - along the direction of the beam - in one of RHIC's two rings. Longitudinal cooling compensates for the ion bunches' tendency to lengthen as they circulate. This improvement has already increased RHIC's heavy-ion collision rate by 20 percent. Next, the physicists will test the same cooling system in RHIC's other ring.

With $7 million in additional funding, the physicists will design and build a similar system for correcting the tendency of RHIC's ion bunches also to become "fatter" as they circulate. Computer simulations, which have accurately predicted the achievements of the longitudinal cooling system, predict that combining this new transverse cooling system with longitudinal cooling in both rings and some additional equipment could increase collision rates overall by 500 percent. "This achievement would compare quite favorably with the goals of our original plan for upgrading collision rates based on a system known as electron cooling, which we estimate would have cost $95 million," said Vigdor. Plus, stochastic cooling can be implemented much more quickly than adding an electron-cooling accelerator because no new construction is required.

"Barring unforeseen budget or technical problems, we hope to implement the full stochastic cooling system by 2011," Vigdor said. Research at RHIC is funded primarily by the Office of Nuclear Physics within the U.S. Department of Energy's Office of Science and by various national and international collaborating institutions.

Adapted from materials provided by DOE/Brookhaven National Laboratory.

http://www.sciencedaily.com:80/releases/2008/02/080206101401.htm

Fully Robotic Observatory Set Up In Antarctica

A fully robotic observatory, dubbed PLATeau Observatory or PLATO, is predicted to result in new insights into the universe once possible only from space. (Credit: Image courtesy of PLATeau Observatory)

ScienceDaily (Feb. 7, 2008) — A team of scientists representing six international institutions, including Texas A&M University, has succeeded in reaching the summit of Antarctica -- also a monumental achievement for ground-based astronomy -- to establish a new astronomical observatory at Dome Argus on the highest point of the Antarctic Plateau.

Two weeks after arriving Jan. 11 at "Dome A" for only the second time in history, an expedition team led by the Polar Research Institute of China (PRIC) has completed installation work on a revolutionary fully robotic observatory, dubbed PLATeau Observatory or PLATO, that Texas A&M astrophysicist Dr. Lifan Wang predicts will result in new insights into the universe once possible only from space.

"Dome A is believed to be the best site for ground-based astronomy," explains Wang, one of the leaders of the scientific planning phase of the expedition, who holds the Mitchell-Heep-Munnerlyn Endowed Career Enhancement Professorship in Physics at Texas A&M and is head of the Chinese Center for Antarctic Astronomy. "Unlike the stormy Antarctic coast, the plateau is a very quiet place with very low wind speed. It is the coldest and driest place on Earth. These are critical conditions of a good site at which to build an observatory."

On Saturday the PRIC team featuring scientists from the National Astronomical Observatories of China carefully buttoned up their instruments and PLATO within the snug confines of the newly installed ground station. They then boarded their snow tractors for the 18-day, nearly non-stop return trip to the coast of Antarctica, leaving both PLATO and their telescopes behind for an 11-month period poised to make astronomical history.

"This permanent facility marks the culmination of centuries of effort to find the best location on the planet from which to observe the universe," Wang notes. "With a telescope at Dome A, it is possible to achieve near-space quality images at a much lower cost than launching a telescope into space."

Built by the University of New South Wales (UNSW) in Sydney, Australia, PLATO is designed to operate autonomously for up to 12 months at a time while sending back data via the Iridium satellite network. Powered by an array of solar panels during summer and small, high-efficiency diesel engines through the darkest winter months, it will be efficient as well as environmentally friendly, according to its developers. "By minimizing the need for human support, robotic facilities such as PLATO will play an important role in the future of Antarctic research," says the UNSW's Dr. Jon Lawrence, who led PLATO's development.

A global team of scientists will be contributing PLATO's instruments as part of the 2007-2008 International Polar Year that will see thousands of scientists -- including Wang and fellow Texas A&M astronomer Dr. Nicholas Suntzeff, both of the George P. and Cynthia Woods Mitchell Institute for Fundamental Physics and Astronomy -- from more than 60 nations conducting 200 projects examining a range of physical, biological and social research topics. PLATO's site-testing instruments include cameras that will measure the darkness of the sky, an acoustic radar to measure atmospheric turbulence and a monitor for very short microwave astronomy.

Seven telescopes -- four from China, two from Caltech and one from the University of Arizona and the University of Exeter that is partially funded by the National Science Foundation -- will take unique images of the heavens toward the South Pole.

One of the most important experiments is a set of four telescopes built at Purple Mountain Observatory, Nanjing, and the Nanjing Institute of Astronomical Optics Technology. Each of the 14.5-centimeter diameter telescopes is equipped with a different filter so that each can observe the sky in a different color or wavelength. The telescopes can view a large field of the sky toward the South Pole area. The system will generate continuous movies of the sky lasting for four months.

"This is a scientific study that can only be done in Antarctica," Wang explains. "We will be able to study the variability of the stars and search for planets around those far-away stars."

The 17-person PRIC team began its trek to Dome A in November, leaving Shanghai aboard the Xue Long icebreaker and sailing to Fremantle, where they were met by the 7-ton PLATO observatory, which had made the 4,000-kilometer journey across the Nullabor Plain from Sydney by road. After a further 18 days crossing the Southern Ocean, the Xue Long arrived at Zhongshan station, adjacent to Australia's Davis Station on the Antarctic coast, where PLATO was loaded onto a sled and filled with the 4,000 liters of jet fuel that will power it throughout the winter. The six-tractor caravan then covered the 1,300-kilometer overland traverse from Zhongshan to Dome A in just three weeks, arriving at the historic site on Jan. 11 for the first time since a PRIC team made the initial journey three years earlier to install an automatic weather station and evaluate the site's suitability for a permanent station.

Built to withstand some of the most extreme conditions on Earth, PLATO must endure temperatures that drop to -90 C in winter as well as air pressure barely half of that at sea level. The facility must operate completely unattended until the Chinese expeditioners return in January 2009, as there will be no human being within 600 kilometers of Dome A now that the traverse team has departed.

During the next few years, China will spend more than $25 million constructing a permanent station at Dome A. Already there are plans to build an array of large, wide-field telescopes there to generate additional movies of the sky.

Astronomers now are working on the construction of AST3 -- the Antarctic Schmidt Telescopes -- a system of three, half-meter telescopes expected to find planets around other stars about the size of Earth, hundreds of supernovas useful for cosmological studies and many other variable objects.

Adapted from materials provided by Texas A&M University.

http://www.sciencedaily.com:80/releases/2008/02/080201215412.htm

Broad Contemporary Art Museum

Mel Melcon / Los Angeles Times
The red scaffolding on the exterior of the Broad Contemporary Art Museum suggests architech Renzo Piano is looking back to early works like his Pompidou Center.
Renzo Piano's extension of the L.A. County Museum of Art reveals a clash of cultures between benefactor Eli Broad and Director Michael Govan.
By Christopher Hawthorne, Los Angeles Times Staff Writer
February 7, 2008
You know that well-worn architectural saying: A great building requires a great client.

In the case of Renzo Piano's extension of the Los Angeles County Museum of Art, which opens Feb. 16, the equation isn't quite so straightforward.

To begin with, LACMA has added substantially more than a single building. Though the 60,000-square-foot Broad Contemporary Art Museum, or BCAM, is getting most of the attention, Piano's changes to the sprawling museum campus also include a new entry pavilion and covered pedestrian walkway set back from Wilshire Boulevard, along with a reconfiguration of the ground floor of the 1965 Ahmanson Building to the east.

More to the point, it's a little hard to tell exactly who Piano's client is.

Is it Eli Broad, the billionaire LACMA trustee and donor who flew to Europe to recruit Piano personally after a bolder, more expensive expansion plan by Rem Koolhaas fell through?

Or is it Michael Govan, who took over as LACMA director two years ago, assuming responsibility for a design by an architect he likely would never have chosen himself?

The answer, of course, is both: Each man has a legitimate interest in even the most minor details of the expansion plan. Last month, after Broad made the surprise announcement that he wouldn't be donating his extensive collection to the museum, there was plenty of speculation about when and why his discussions with Govan over the fate of the artworks might have turned sour. But so far we've paid virtually no attention to the delicate back-and-forth between Govan and Broad over the details of Piano's design.

What a visit to the new LACMA makes clear is the extent to which the western half of its campus has

become contested space, straining to hold two very different ideas of how a museum in Los Angeles should look and operate. One view belongs to Broad, 74, and the other to Govan, who is three decades younger. Much of the fun of making sense of the expanded museum, in fact, lies in figuring out whose influence and sensibility can be glimpsed in which parts of the new construction.

Broad has operated here as a patron in the classic sense of the word, working with his handpicked architect to produce a handsome, well-made container for his extensive collection.

Govan, though he would never say so publicly, seems to see that vision as largely out of date, or least inappropriate for a place as young, dynamic and distrustful of institutional wisdom as Los Angeles. He clearly would prefer that the museum's new architecture represent a highly informal, ever-changing city where art is produced and redefined on a daily basis and not just bought, sold, duly cataloged and hung on walls.

Each one has found a separate sphere of influence in the first phase of the Piano extension. (A new free-standing gallery by Piano to the north of BCAM, along with a renovation of the old May Co. building by the Culver City firm SPF:a, will follow in the next few years.) BCAM itself, not surprisingly, is Broad's territory, a building for which he footed the entire $56-million bill and where Govan has held comparatively little sway. To hold Broad's art, Piano has produced a crisp travertine-clad box with galleries on three levels. Its dramatic, high-ceilinged top floor bathes works by Jeff Koons, Ed Ruscha, Cy Twombly and others in natural light that is very clear and nearly colorless, if a bit thin.

Piano's attempts to add color and a sense of energy to the exterior of the box with a scaffold of escalators and stairs, which he collectively calls "the spider," suggest that he is looking back to his professional youth, specifically to the Pompidou Center in Paris. Designed with Richard Rogers, that exuberant, deeply optimistic museum helped make Piano's name when it opened in 1977.

The spider succeeds in lending some playfulness to a building that is otherwise rather formally dressed. Framed in steel beams painted a bright shade of red, the spider's various cantilevered platforms offer broad views toward the Hollywood Hills. On the other side of BCAM, facing Wilshire, John Baldessari's twin, oversize banners -- each one measuring roughly 52 by 55 feet -- work to essentially the same effect. So does the building's saw-tooth roof line, created by a high-tech collection of fins and screens designed to keep harsh southern light from hitting the top-floor art.

But that exterior flair can't entirely disguise the fact that, at least inside, the building is well-behaved to a fault, with gallery spaces that are hushed and relentlessly rectilinear. In the rather banal ground-floor galleries, where two new pieces by Richard Serra hold court, the low ceiling is crisscrossed with lighting tracks that distract from the monolithic visual power of the massive works.

The art and architecture combine in BCAM to suggest that its name is a bit of false advertising: Piano's design is contemporary in the same way that the pieces inside by Koons, Ellsworth Kelly and Barbara Kruger are contemporary -- which is to say, not quite. Seen in the most cynical light, the whole enterprise seems stalled in the late 1980s, which is when Piano's museum work and many of the edgier artists in Broad's collection hit their stride.

Around the edges of BCAM, meanwhile, Govan has found plenty of opportunities to tweak Piano's scheme. His first move was to bring in the artist Robert Irwin, who so famously clashed with Richard Meier, another Broad favorite, over landscape design for the Getty Center. At LACMA, Irwin has added a necklace of palm trees on the perimeter of BCAM and in other outdoor spaces that were freed up when the museum demolished a parking garage and filled in a stretch of Ogden Drive north of Wilshire. Especially on the northern edge of BCAM, the thickly arranged palms take Piano's crisp pedestrian axis and transform it into something messier and more layered.

Govan saved his most dramatic interventions, though, for a pair of open spaces carved out by Piano: one in the new forecourt, which sits between Wilshire and the entry pavilion, and the other on the ground floor of the Ahmanson Building. Piano planned both as civic, European-style gathering spots. Govan, as if rejecting that notion as hopelessly nostalgic, responded by giving over most of each space to an artwork that grabs your attention away from the architecture and won't let go.

He added a huge Tony Smith sculpture, "Smoke," to the Ahmanson atrium, where it hovers dramatically over a new grand staircase leading up to LACMA's eastern courtyard. And in the forecourt, which Piano is fond of calling a "piazza," Govan decided to squeeze in a dense installation of 202 vintage lampposts by artist Chris Burden. Titled "Urban Light," the piece is a kind of pop temple, deftly straddling the lines between art and architecture and between seriousness and irony. It's also a joy to walk through. But there's no getting around the fact that it turns what might have been an actual public square along Wilshire -- a space defined from day to day by the people using it -- into an outdoor room for one sizable and very insistent piece of art.

In the latter stages of his career, the 70-year-old Piano has evolved into a kind of surgeon. Instead of architectural fireworks, what he offers his museum clients is coherence, largely unadorned: strong axes sliced confidently across a site; substantial materials; the accomplished manipulation of shadow and light.

Those skills are all in evidence in the LACMA expansion, particularly in BCAM's top-floor galleries and in the new pedestrian walkway, which offers a clear connection between the May Co. building, on the western edge of the museum campus, and the Ahmanson to the east. Thanks to Govan, they share space with -- and cede ground to -- some other, very different attitudes about what a museum in 21st century Los Angeles ought to be.

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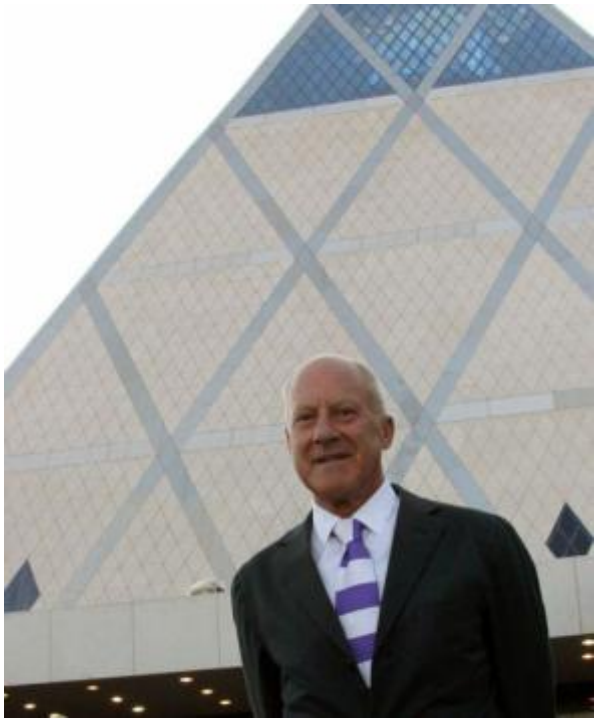
http://www.latimes.com:80/news/local/la-et-bcamarch7feb07,0,1360166.story

The king's new court: Norman Foster is taking on the home of America's national collection

By Ciar Byrne
Thursday, 7 February 2008



The result is quite a departure in a city as architecturally conservative as Washington DC. As a review of the Robert and Arlene Kogod Courtyard – named for it sponsors – in The New York Times noted; "this city has long been a backwater in terms of contemporary architecture".

But Lord Foster embraced the brief wholeheartedly, proclaiming it a privilege to work "a project with such cultural importance and historical sensitivity to Washington". The design for the courtyard was, he said, driven by a deep respect for the Old Patent Office Building, reinforcing the character of the existing building without competing with it.

Courtyards have become something of a Foster speciality. Most famously, he designed the Great Court at the British Museum, as well as the Treasury courtyard, and he and his team are currently working on a project for the Museum of Fine Art in Boston, where the courtyard is a glass box which sits quite separately from the external wall.

Spencer de Gray, senior partner at Foster + Partners, is keen to emphasise the difference between the new Smithsonian courtyard and the Great Court, while still using the British Museum as a point of reference.

Both were originally built to introduce natural light and fresh air into big buildings, but the Great Court is "all about being a focal point for circulation and facilities like shops, lavatories, cafés and information". At the Smithsonian, however, the loos and information desks are "cloaked within the main fabric of the building", leaving the courtyard as a place to meet friends for a coffee and also a venue for cocktail parties, concerts and speeches.

The most striking aspect of the new $63m (£32m) Kogod courtyard, however, is its canopy roof. Unlike the Great Court, the existing walls at the Smithsonian were not strong enough to bear the load of a ceiling so, instead, the vast, undulating glass roof is supported by eight columns, each clad in aluminium of the palest gold hue, and designed carefully to blend in with the original stonework.

The wave-like structure is an "acoustic" roof, the first of its kind in the world, constructed of deep, diamond shaped panes, into the sides of which is packed recycled cotton from denim jeans to act as sound-cladding, and protected by grilles.

It now acts as a huge acoustic absorber. It is extremely effective because it cuts the reverberation time down to just over three seconds, and that makes conversations very easy, but, more importantly, it's very good for amplified sound if someone is giving a speech, or if there are musical performances in the space.

The roof ripples in response to the central portion of the most historic part of the building, allowing it to skirt around a bay window and pediment, and the rippling idea is continued to encompass smaller bay-windows on either side. There are also good architectural reasons for the design. The more the roof undulates, the more efficient it is structurally; the more like an arch it is.

"It's always good to get one element in a building working really hard for you," says De Gray. At Stansted Airport, another Foster design, it was the bottom, rather than the top, of the building which was exploited, with a huge undercroft dug out to accommodate all the services and baggage-handling, liberating the roof to remain a simple structure that keeps water out and lets natural light in.

De Gray explains: "In the same way, the idea of making the roof here work really hard for its keep solved a lot of problems; the light, heat, the shading, the acoustics. We spent the money in a very wise way, but the structure was doing much more than just keeping the water out."

From the ground, clouds and aircraft can be seen with clarity through the canopy. But closer inspection reveals a milky surface covered in baked enamel-frit dots, which cut out about two thirds of the light, and help to keep the courtyard cool during the baking DC summers. For further cooling, Foster used Roman technology, putting pipes pumping cold water under the dark, stone, floor.

In winter, the water in the pipes is heated, providing a warm surface – it's an energy-efficient method of heating people without wasting energy by heating the whole space. And depending on whether the space is full in summer, or empty in winter, pylons around the edge of the space provide more cooling or heating.

Water is a vital element of the design. When no function is being held in the space, the thinnest skein of water, about a quarter of an inch deep, runs virtually the full length of the courtyard, flowing from left to right and disappearing down a tiny slot in the stone floor. Children delight in splashing around in this wafer-thin river, which can flow at different speeds, thereby altering the clarity of the reflection. But so shallow is the water that just a few steps out of it, feet are dry again.

The very last effect Foster wanted to create was that of a traditional palm-court. So the landscape architect Kathryn Gustafson was drafted in to create as natural a look as possible. In response, she has filled great planters, carved from the same white marble as used in the original building, with olive and fig trees which have been conditioned so that they will neither shed their leaves nor bear fruit.

For when the courtyard is turned over to performances, an acoustician has designed special loudspeakers housed in two of the air supply pylons, and based on speakers from Dutch churches and cathedrals where there is a lot of reverberation. These are very directional and maximise the clarity of the sound.

The lighting is also designed to bring a theatrical air to the space, ranging from simple white light to colours. At night, when the windows of the museum are lit up, the courtyard takes on the character of a town square.

Foster was eager to rekindle the history of the Smithsonian as a social-events building providing a large public living room for people in Washington. Lured in by a family craft-fair, 10,000 people attended the opening of the courtyard over the space of one day, although fire regulations mean it is only intended to hold 1,250 at any one time.

The idea of the urban living room, whether it's totally enclosed, partially enclosed, or completely open, is something that Foster has developed as a theme in our buildings over many years.

Other examples of Foster-designed "urban living rooms" include the Sainsbury Centre at the University of East Anglia, where visitors can view works of art in a relaxed setting, the Sage centre in Gateshead, where the main level is accessible all year round whether a concert is taking place or not, Stansted, and the Great Court.

De Gray says: "This theme of spaces that are not over-specific, not totally prescribed, that are free and accessible, spaces people can go to meet friends, to eat and drink, to relax, as we become increasingly urban in our ways of living, is extremely important in a city."

http://www.independent.co.uk:80/arts-entertainment/art-and-architecture/features/the-kings-new-court-norman-foster-is-taking-on-the-home-of-americas-national-collection-779044.html

Knee dynamo taps 'people power'

By Jonathan Fildes
Science and technology reporter, BBC News

A stroll around the park may soon be enough to charge the raft of batteries needed in today's power-hungry gadgets.

US and Canadian scientists have built a novel device that effortlessly harvests energy from human movements.

The adapted knee brace, outlined in the journal Science, can generate enough energy to power a mobile phone for 30 minutes from one minute of walking.

The first people to benefit could be amputees who are being fitted with increasingly sophisticated prosthetics.

"All of the new developments in prosthetics require large power budgets," Dr Douglas Weber of the University of Pittsburgh, and one of the authors of the paper, told BBC News.

"You need power to run your neural interface; you need it to run your powered joint, and so on.

"Getting that power is going to be really important."

Walk and talk

The new device generates power by a process known as "generative braking", analogous to the braking systems found in hybrid-electric cars such as the Toyota Prius.

"Walking is a lot like stop-and-go driving," explained Dr Max Donelan of Simon Fraser University in Burnaby, Canada, lead author of the paper.

"Within each stride muscles are continuously accelerating and decelerating the body.

Hybrid electric cars take advantage of stop-and-go driving using so-called "regenerative braking" where the energy normally dissipated as heat is used to drive a generator.

"We have essentially applied the same principle to walking."

Using a series of gears, the knee brace assists the hamstring in slowing the body just before the foot hits the ground, whilst simultaneously generating electricity.

Sensors on the device switch the generator off for the remainder of each step.

In this way, the device puts less strain on the wearer than if it was constantly producing energy.

Tests of the 1.6kg device produced an average of 5 watts of electricity from a slow walk.

"We also explored ways of generating more electricity and found that we can get as much as 13 watts from walking," said Dr Donelan.

"13 watts is enough to power about 30 minutes of talk time on a typical mobile phone from just one minute of walking."

However, to generate this amount of power the generator had to be constantly switched on, which required more effort from the wearer.

Battery pack

The knee brace is the latest development in a field known as "energy harvesting".

The field seeks to develop devices and mechanisms to recover otherwise-wasted energy and convert it into useful electrical energy.

"We're pretty effective batteries," Dr Donelan told BBC News. "In our fat we store the equivalent of about a 1,000kg battery."

Tapping this power source is not a new idea and has been exploited in everyday devices such as wind-up radios and self-winding watches.

The US defence research agency Darpa has a long-standing project to tap energy from "heel-strike" generators implanted in soldier's boots and powered through the pumping motion of a footstep.

And in 2005, US scientists showed off an energy-harvesting backpack which used a suspended load to convert movement into electrical energy.

However, heel-strike devices generate relatively little energy whilst people using the backpack have to bear the burden of carrying the bag.

"It requires a relatively heavy load - around 38kg - to get a substantial amount of power," said Dr Donelan.

Simulations showed that a soldier carrying the pack and walking at a relatively brisk pace could generate around 7.4 watts of power. "It's about the same amount of power as [the knee braces] produce," said Dr Donelan.

Kit list

The team believes the new device could have many uses.

"I think the early adopters will be people whose lives depend on portable power," he told BBC News.

"On the medical front, portable power is used by those who have amputated limbs to charge their powered prosthetic limbs," he said.

However, Dr Art Kuo at the University of Michigan does not believe it will be simply a case of strapping the device on to an existing prosthetic.

"It would probably involve building a new [prosthetic] knee that uses some existing ideas and then also tries to harvest energy using these principles," he said.

The team also hope the device could be useful for people who have suffered a stroke or spinal chord injury who wear an "exoskeleton" to help them move.

"The current and future emphasis is on powered exoskeletons," said Dr Donelan.

Soldiers may also benefit from wearing the knee brace to power the multitude of devices they now carry ,such as night vision goggles and GPS.

"They treat batteries like they treat food and water - they are so essential to what they do," he said.

Dr Donelan has now set up a spin-out company to exploit the technology and believes it will eventually be possible to develop a small device that can be fitted internally across different joints.

However, in the short term he has his sights set on a light weight, slim-line version of the knee brace.

"That's about 18 months away, so it's not science fiction far in the future stuff," he said.

Story from BBC NEWS:
http://news.bbc.co.uk/go/pr/fr/-/2/hi/technology/7226968.stm

Published: 2008/02/07 19:01:17 GMT

Mobiles narrow digital divisions
Mobile phones and net access are helping narrow the gulf between rich and poor nations, says a UN report.

The efficiencies these technologies bring has boosted development in poorer countries, said the UN Conference on Trade and Development (UNCTAD).

Mobile phone users in developing nations now make up 58% of handset subscribers worldwide, it said.

But it warned that the digital divide meant that developing nations still lagged far behind richer countries.

Big gap

The annual Information Economy report by the UN body looks at the way that science and technology can drive long-term economic growth.

It was now well-established, said the report, that greater use of technology in businesses, schools and at home could raise standards of living and help people prosper.

In many developing nations the mobile phone had become the standard bearer for these changes, it said.

"In Africa, where the increase in terms of the number of mobile phone subscribers and penetration has been greatest, this technology can improve the economic life of the population as a whole," it said.

In rural communities in Uganda, and the small vendors in South Africa, Senegal and Kenya mobile phones were helping traders get better prices, ensure less went to waste and sell goods faster.

The take up of mobiles was allowing developing nations to "leapfrog" some generations of technology such as fixed line telephones and reap more immediate rewards, said the report.

Greater use of computers in small businesses in countries such as Thailand made staff boost productive, it said. A study of Thai manufacturing firms showed that a 10% increase in computer literate staff produced a 3.5% productivity gain.

The developing world was also catching up in terms of net availability. In 2002, said UNCTAD, net availability was ten times higher in developing nations. In 2006, net availability was only six times higher.

But despite the improvements mobiles and greater computer use were bringing in their wake, the report warned that a big gulf remained between rich and poor.

Developed countries still had many more net users and since 2002 had the gap in terms of broadband users had widened.

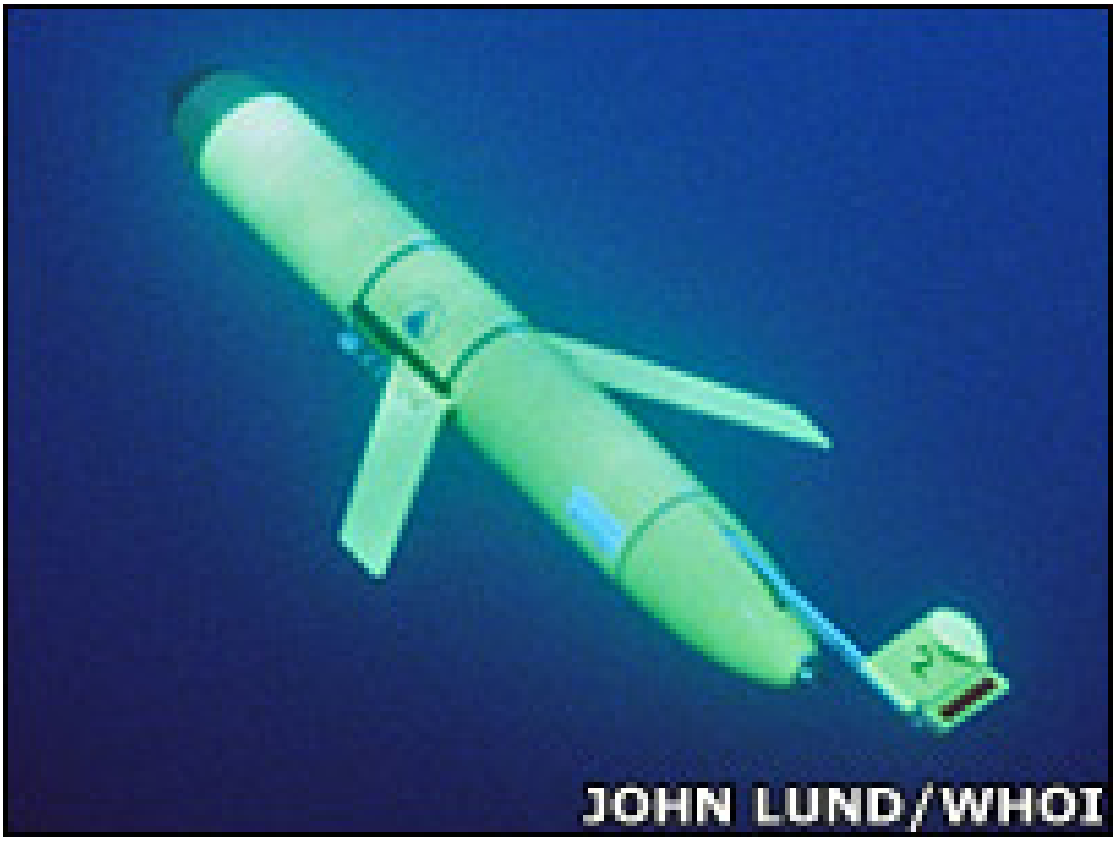
To make the most of the transformative potential of the net, mobiles and other technologies the UN report recommended that countries update cyber laws, intellectual property regulations, upgrade infrastructure and invest in training.

Story from BBC NEWS:
http://news.bbc.co.uk/go/pr/fr/-/2/hi/technology/7232264.stm

Published: 2008/02/07 12:15:51 GMT

Robot glider harvests ocean heat

By Jonathan Fildes
Science and technology reporter, BBC News



A sea-going robotic glider that harvests heat energy from the ocean has been tested by US scientists.

The yellow, torpedo-shaped machine has been combing the depths of seas around the Caribbean since December 2007.

The team which developed the autonomous vehicle say it has covered "thousands of kilometres" during the tests.

The team believe the glider - which needs no batteries - could undertake oceanographic surveys for up to six months at a time.

"We are tapping a virtually unlimited energy source for propulsion," said Dave Fratantoni of the Wood's Hole Oceanographic Institute (WHOi).

But Steve McPhail, an expert in autonomous underwater vehicles at the National Oceanography Centre (NOC), Southampton, said the machine would not totally do away with batteries.

"You still need to provide power for the sensors, for the data-logging system and for the satellite communications system to get the data back," he said.

As a result, the vehicle would have to intermittently return to a ship or shore to recharge its batteries.

"It's always a trade-off between the power used for the propulsion system and the power used for the sensors," said Mr McPhail.

Ocean network

Oceanographers are increasingly looking at ways to study the oceans over long periods and in real time.

This is important for understanding natural variations in circulation, for example, and for looking for any changes.

Already scientists have deployed large networks of sensors across the oceans.

For example, in 2004, NOC researchers strung sets of instruments across the Atlantic to measure circulation patterns.

The Rapid project, as it was known, painted the first detailed picture of Atlantic Ocean currents and showed how they vary throughout the year.

Its successor - Rapid Watch - has just received £16m from the Natural Environment Research Council and will monitor the Gulf Stream until 2014.

Scientists are also in the process of wiring the Pacific.

One project, the Argo network, will consist of an array of 3,000 floats strung out every 300km across the vast ocean.

Sensors on the floats will provide 100,000 temperature and salinity profiles every year.

Another network, the Monterey Accelerated Research System (Mars), will connect a research station in California with a sensor array deployed on the edge of Monterey Canyon, the deepest submarine canyon off the continental West Coast.

Lazy glide

The new vehicles could add to that knowledge by filling in the gaps between the sensors.

For example, it is proposed that Rapid Watch will use an armada of gliders alongside stationary sensors.

The machines are already used in oceanography and propel themselves through the ocean by changing their buoyancy to dive and surface. Wings generate lift and a vertical tail fin and rudder is used to steer.

The latest glider has been developed by Webb Research Corporation and WHOi.

It generates its energy for propulsion from the differences in temperature between warm surface waters and colder, deeper layers of the ocean.

Wax-filled tubes inside the craft expand when it is gliding through warmer water. This heat is used to push oil from a bladder inside the hull to one outside, changing its buoyancy.

Cooling of the wax at depth reverses the cycle.

Since December 2007, the prototype machine has been crisscrossing a 4,000m-deep basin in the Virgin Islands of the Caribbean.

The machine traces a saw-tooth profile through the water column as it lazily glides through the ocean, surfacing periodically to fix its positions via GPS and to relay data back to base.

According to WHOi researchers the vehicle crossed the basin between St Thomas and St Croix more than 20 times studying local currents.

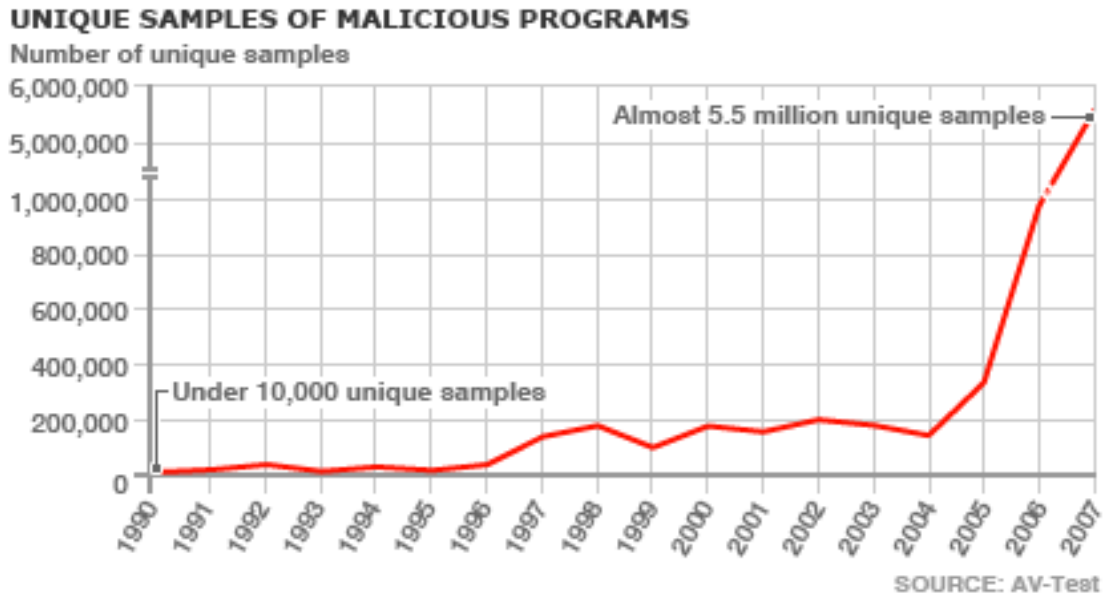
The eventual aim of the project is to deploy a fleet of vehicles to study much larger flows in the North Atlantic.

"Gliders can be put to work on tasks that humans wouldn't want to do or cannot do because of time and cost concerns," said Dr Fratantoni. "They can work around the clock in all weather conditions."

Story from BBC NEWS:
http://news.bbc.co.uk/go/pr/fr/-/2/hi/technology/7234544.stm

Published: 2008/02/08 13:04:02 GMT

Malicious programs hit new high
The number of malicious programs found online has reached an unprecedented high, say security firms.



Reports vary but some estimates suggest there were five times as many variants of malicious programs in circulation in 2007 compared to 2006.

Security company Panda Software said it was getting more than 3,000 novel samples of so called malware every day.

Criminals pump out variants to fool anti-virus programs that work, in part, by spotting common characteristics.

Threat landscape

Security software testing organisation AV Test reported that it saw 5.49 million unique samples of malicious software in 2007 - five times more than the 972,606 it saw in 2006.

AV Test reached its total by analysing malicious programs and generating a digital fingerprint for each unique sample.

The organisation said the different ways malware can be packaged will mean some duplication in its figures, but the broad trend showed a steep rise.

The organisation uses the samples to test security programs to see how many they can spot and stop.

Panda Software said the number of malicious samples it received in 2007 was up ten fold on 2006. In a statement it said the rise represented a "malware epidemic".

Finnish security firm F-Secure said it had seen a doubling in the number of pieces of malware it detected in 2007 compared to 2006.

Most of the malicious programs detected by these security organisations are aimed at the various versions of Microsoft's Windows operating system.

The vast majority of these unique malicious programs will be made up of elements from older viruses that have been scrambled to look fresh.

"It started about nine months ago, in early 2007, we saw massive surges of new variants," said Gerhard Eschelbeck, chief technology officer at anti-spyware firm Webroot.

"There are days when we see 1,000 or more new samples," he said.

"It's a low-effort high-frequency type threat," he said. "There's no completely ground-breaking new stuff out there."

He added that hi-tech criminals were adopting several tactics to avoid being spotted by anti-virus programs which try to spot the "signature" of each malicious program they know about.

"Anti-virus relies on customers to submit samples," said Mr Eschelbeck, "but with spyware you typically do not get samples because your customers do not know they are infected."

Increasingly, security firms have turned to new techniques to combat the rise in malware variants. Some use heuristics, or rules of thumb, to spot programs that are similar rather than identical to the ones they have seen before.

Others are using behaviour blockers that shut down any program that shows malicious intent.

Story from BBC NEWS:
http://news.bbc.co.uk/go/pr/fr/-/2/hi/technology/7232752.stm

Published: 2008/02/08 09:11:29 GMT

Password pain looks set to ease
Using your favourite websites and services could soon mean memorising far fewer passwords.

Tech giants Microsoft, IBM, Google and Yahoo have joined the board of the Open ID Foundation which aims to streamline login systems across the web.

The Foundation wants to bring about a system that could mean one ID acts as a guarantor of a person's identity across all the sites they have signed up for.

Already more than 10,000 websites have adopted the Open ID approach.

Password pain

At the moment, using a new web service typically means registering, laboriously entering personal details and thinking up another login name and password.

Open ID aims to remove some of the need to keep creating new login names and passwords by adopting the approach used by your computer when it looks up a site name you type into an browser address bar.

The Open ID approach revolves around an already established web identity that people nominate as their core identifier.

When this identity is used to sign on elsewhere, requests are sent back to the original place it was created to be verified.

While this could mean that people employ one login ID to for all the sites they use, it is more likely to let people significantly reduce the number of online identities they maintain.

Different identities could be maintained for different purposes.

"Open ID was always intended to be a decentralized sign-on system," said Brad Fitzpatrick, a Google software engineer who created OpenID while at blog software maker Six Apart. "It's fantastic to join a foundation committed to keeping it free and unencumbered by proprietary extensions."

The backing of Microsoft, Yahoo, Google, IBM and Verisign will give the project more momentum as between them these firms look after services that have hundreds of millions of users.

No information has been given about when the Open ID system will be used on the web services, such as Live Mail or GMail, that the companies run.

Prior to the companies joining the Open ID board Yahoo had pledged its support. It created a trial system that let people user a Yahoo login as their Open ID. In a similar move Google allows people to leave comments on Blogger postings by signing in with their Open ID.

Story from BBC NEWS:
http://news.bbc.co.uk/go/pr/fr/-/2/hi/technology/7234499.stm

Published: 2008/02/08 12:39:13 GMT

Oldest Horseshoe Crab Fossil Found, 445 Million Years Old

Lunataspis aurora - fossil paratype specimen (about 25 mm wide) beside the dried carapace of a young modern horseshoe crab. (Credit: Left image courtesy of G. Young, The Manitoba Museum; right, D. Rudkin, Royal Ontario Museum)

ScienceDaily (Feb. 8, 2008) — Few modern animals are as deserving of the title "living fossil" as the lowly horseshoe crab. Seemingly unchanged since before the Age of Dinosaurs, these venerable sea creatures can now claim a history that reaches back almost half-a billion years.

In a collaborative research article published recently in the British journal Palaeontology, a team of Canadian scientists revealed rare new horseshoe crab fossils from 445 million year-old Ordovician age rocks in central and northern Manitoba, which are about 100 million years older than any previously known forms.

Palaeontologist Dave Rudkin from the Royal Ontario Museum, with colleagues Dr. Graham Young of The Manitoba Museum (Winnipeg) and Dr. Godfrey Nowlan at the Geological Survey of Canada (Calgary), gave their remarkable new fossils the scientific name Lunataspis aurora, meaning literally "crescent moon shield of the dawn" in reference to their shape, geological age and northerly discovery sites. Although they are more "primitive" in several aspects than other known horseshoe crabs, their resemblance to living forms is unmistakable.

The fossil horseshoe crabs were recovered in the course of fieldwork studies on ancient tropical seashore deposits, providing yet another important link to their modern descendants that are today found along warmer seashores of the eastern United States and the Indian Ocean.

This is particularly significant, explains Rudkin. “Understanding how horseshoe crabs adapted to this ecological niche very early on, and then remained there through thick and thin, can give us insights into how ocean and shoreline ecosystems have developed through deep time.”

Today, marine shorelines worldwide are being threatened by human activity, and although some horseshoe crab populations are endangered, their enviably long record on Earth indicates that they have successfully weathered many previous crises, including the mass extinction that saw the demise of the dinosaurs and many other life forms 65 million years ago.

“We do need to be concerned about horseshoe crabs and many of the other unusual life forms found on marine shores,” said Dr. Young. “Nevertheless, we can also be mildly optimistic that some of these things have demonstrated a toughness that may allow them to survive our abuse of these environments.”

Living horseshoe crabs are extensively studied, especially in the fields of ecology and medical research. The exciting discovery of these unusual early fossil relatives adds a new introductory chapter to their remarkable story.

David Rudkin is Assistant Curator in the Department of Natural History (Palaeobiology) at the Royal Ontario Museum, and holds an appointment to the Department of Geology, University of Toronto, as a Lecturer in palaeontology. Rudkin joined the former Department of Invertebrate Palaeontology at the ROM in 1975 and began working on fossils from the Burgess Shale in British Columbia.

Adapted from materials provided by Royal Ontario Museum.

http://www.sciencedaily.com:80/releases/2008/02/080207135801.htm

Coral Reefs May Be Protected By Natural Ocean Thermostat

The Western Pacific Warm Pool, which lies northeast of Australia, contains some of the warmest ocean waters in the world. Water temperatures in the warm pool have risen less than elsewhere in the tropics, which may explain why reefs there have experienced less coral bleaching. (Credit: Illustration by Steve Deyo, Copyright UCAR)

ScienceDaily (Feb. 8, 2008) — Natural processes may prevent oceans from warming beyond a certain point, helping protect some coral reefs from the impacts of climate change, new research finds. The study, by scientists at the National Center for Atmospheric Research (NCAR) and Australian Institute of Marine Science (AIMS), finds evidence that an ocean "thermostat" appears to be helping to regulate sea-surface temperatures in a biologically diverse region of the western Pacific.

The research team, led by NCAR scientist Joan Kleypas, looked at the Western Pacific Warm Pool, a region northeast of Australia where naturally warm sea-surface temperatures have risen little in recent decades. As a result, the reefs in that region appear to have suffered relatively few episodes of coral bleaching, a phenomenon that has damaged reefs in other areas where temperature increases have been more pronounced.

The study* lends support to a much-debated theory that a natural ocean thermostat prevents sea-surface temperatures from exceeding about 88 degrees Fahrenheit (31 degrees Celsius) in open oceans. If so, this thermostat would protect reefs that have evolved in naturally warm waters that will not warm much further, as opposed to reefs that live in slightly cooler waters that face more significant warming.

"Global warming is damaging many corals, but it appears to be bypassing certain reefs that support some of the greatest diversity of life on the planet," Kleypas says. "In essence, reefs that are already in hot water may be more protected from warming than reefs that are not. This is some rare hopeful news for these important ecosystems."

Coral bleaching: The warm pool exception

Coral reefs face a multitude of threats, including overfishing, coastal development, pollution, and changes to ocean chemistry caused by rising levels of carbon dioxide in the atmosphere. But global warming presents a particularly grave threat because unusually warm ocean temperatures can lead to episodes of coral bleaching, in which corals turn white after expelling the colorful microscopic algae that provide them with nutrition. Unless cooler temperatures return in a few days or weeks, allowing algae to grow again, bleached corals often collapse and die.

Bleaching can occur naturally, but it has become increasingly widespread in recent decades. This is largely because sea-surface temperatures in tropical waters where corals live have increased about 0.5-0.7 degrees Fahrenheit (0.3-0.4 degrees Celsius) over the last two to three decades, with temperatures occasionally spiking higher.

However, between 1980 and 2005, only four episodes of bleaching have been reported for reefs in the Western Pacific Warm Pool. This is a lower rate than any other reef region, even though the western Pacific reefs appear to be especially sensitive to temperature changes. Sea-surface temperatures in the warm pool naturally average about 84 degrees Fahrenheit (29 degrees Celsius), which is close to the proposed thermostat limit. They have warmed up about half as much as in cooler areas of the oceans.

To study the correlation between temperatures and bleaching, the authors analyzed sea-surface temperatures from the period 1950-2006 in tropical waters that are home to corals, relying on measurements taken by ships, buoys, and satellites. They also used the NCAR-based Community Climate System Model to study computer simulations of past and future sea-surface temperatures. The team compared the actual and simulated temperatures to a database of coral bleaching reports, mostly taken from 1980 to 2005.

Will more warming raise the thermostat?

Researchers have speculated about several processes that could regulate ocean temperatures. As surface waters warm, more water evaporates, which can increase cloud cover and winds that cool the surface. In some areas, warming alters ocean currents in ways that bring in cooler waters. In addition, the very process of evaporation removes heat.

"This year, 2008, is the International Year of the Reef, and we need to go beyond the dire predictions for coral reefs and find ways to conserve them," Kleypas says. "Warming waters are just one part of the picture, but they are an important part. As we evaluate how and where to protect reefs, we need to determine whether the ocean thermostat offers some protection against coral bleaching."

Kleypas and her co-authors say more research needs to be conducted on the thermostat. In particular, scientists are uncertain whether global warming may alter it, raising the upper limit for sea-surface temperatures. Computer model simulations tend to capture the slow rate of warming in the western Pacific over the last few decades, but they show the warm pool heating rapidly in the future.

"Computer models of Earth's climate show that sea-surface temperatures will rise substantially this century," says NCAR scientist Gokhan Danabasoglu, a co-author of the study. "Unfortunately, these future simulations show the Western Pacific Warm Pool warming at a similar rate as the surrounding areas instead of being constrained by a thermostat. We don't know if the models are simply not capturing the processes that cause the thermostat, or if global warming is happening so rapidly that it will overwhelm the thermostat."

*The journal article "Potential role of the ocean thermostat in determining regional differences in coral reef bleaching events" authored by Joan A. Kleypas, Gokhan Danabasoglu, Janice M. Lough will be published in Geophysical Research Letters.

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