

# Two-Legged Robot Sets Speed Record

A two-legged robot that walks at record-breaking speed has been developed by researchers from Germany and Scotland. "RunBot" is the fastest robot on two legs - for its size. At 30 centimeters high, it can walk at a speedy

a simple neuronal controller could walk in a natural manner - and fast," says Florentine Worgotter, from the University of Göttingen in Germany, who developed RunBot.

RunBot's walking motion is initiated by a simple



RunBot's program mimics the way neurons control reflexes in humans and other animals.

3.5 leg-lengths per second. This beats the previous record holder - MIT's Spring Flamingo.

According to popsci.com, the robot is controlled by a simple program that mimics the way neurons control reflexes in humans and other animals. Unlike most other two-legged robots, RunBot has few sensors and can detect just two things - when a foot touches the ground, and when a leg swings forward.

"We wanted to show that a very simple system with

set of controls. When one of the robot's feet touches the ground, the opposite leg swings forward, throwing it off balance. The knee of the swinging leg bends automatically until a sensor in the hip causes it to straighten out, ready to hit the ground. When this leg touches the ground, the cycle starts again.

Software that mimics neuronal control allows RunBot to learn to walk more quickly. It tries different things. If a change doesn't help its speed, RunBot tries something else.

# Fast Language Learners Boast More White Matter

Fast language learners have more white matter and less symmetrical brains, a new scanning study has revealed.

The results are among the first to link brain differences to language learning aptitude in healthy people, says Narly Golestani at University College London, UK. "The bigger picture is that we're starting to understand that brain shape and structure can be informative about people's abilities," she told newscientist.com.

Those in the study who were quickest to hear subtle differences in sounds from a foreign language were found to have the greatest amount of white, fatty tissue in a brain region responsible for sound processing.

The study involved 65 French adolescents aged between 11 and 18, none of whom had any substantial foreign language skills. These youngsters were asked to distinguish the French 'da' sound, similar to that in the word 'dad', from the Hindi 'da' sound, which resembles that in the word 'ardent'. The tongue is positioned near the upper teeth to make the French sound and at the roof of the mouth to make the Hindi sound.

Golestani notes that the difference between the sounds is subtle, existing only in the first 40 milliseconds. The fastest learned to spot the difference within 8 minutes, while the slowest were still guessing randomly after 20 minutes.

Then, the 11 fastest and 10 slowest

learners were given brain scans using magnetic resonance imaging (MRI). The researchers focused their analysis on a region of the brain called Heschl's gyrus, which helps to process sound.

The brain scans revealed that the fastest learners had, on average, 70 percent more white matter in the left Heschl's gyrus than the slowest learners. They also showed a 3.2-fold difference between the fast learner with the most amount of white matter and the slow learner with the least amount of white matter.

Golestani stresses the results only deal with a person's ability to understand foreign language sounds and do not relate to other aspects of language, such as grammar.

# Finance Impacts Mate Preferences

In the past, surveys have overwhelmingly shown that women want a rich man, and men want a good-looking woman. While not much has changed for men, as women's financial independence has increased, it seems that their preferences have changed.

Phiouna Moore and colleagues at the University of St Andrews, UK, analyzed questionnaires from 1,851 women between the ages of 18 and 35. They found that as a woman's

level of "resource control" increases - in other words as they become more financially independent - so does their preference for physical attractiveness in potential partners.

According to newscientist.com, women who had low levels of control over their cash rated the financial status of a man over his looks. Those with a decent source of income rated physical attractiveness more highly. Economic constraints on women

are not as strong as they were 50 years ago, Moore says. "It is this change in comparison to historical constraints that I believe influences mate preferences."

Questionnaires are one thing, but what do women do in real life? Moore says that a study she is working on suggests that the same relationship exists between a woman's resource control and the characteristics that attracted her to her current partner.

# Hope for Brain-Injured Children

The number of sites in children's brains involved in language recognition decreases as the children age, according to a University of Cincinnati (UC)

study. The finding, says Jerzy Szaflarski, an assistant professor of neurology at the UC Academic Health Center, suggests that as a child grows more language proficient, recalling words may involve less effort. It also supports earlier explanations as to why young children who injure a large part of one side of the brain often recover completely, or almost completely.

"The decrease in activity sites may mean that language areas in the brain are more flexible when children are younger and become more specialized as they mature," Dr. Szaflarski told sciencedaily.com.

"This raises hope for rehabilitation of brain function in children after stroke or traumatic brain injuries," he says.

Dr. Szaflarski and senior coauthor Scott Holland, a UC professor who also heads pediatric brain-imaging research at Cincinnati Children's Hospital Medical Center, led a study of 30 children, starting when they were aged 5, 6 and 7. For five years they monitored the children's responses using functional magnetic resonance (fMRI) brain imaging, a technique that shows what part of the brain "lights up" with activity during a specific exercise.

They concluded that more brain areas are involved during a language exercise in a 5-year-old than in an 11-year-old.

# Second Sight for Blind Mice

When visual neurons degenerate in the eye, there is no therapy available to repair them. But a new study provides a ray of hope. Mice injected with a light receptor protein from algae appear to regain some ability to process visual information, reports science.com.

Photoreceptors convert light into electrical impulses that are sent to the brain via retinal neurons. If these photoreceptors are damaged or destroyed, the retinal neurons have no signal to relay, and vision is lost. Zhuo-Hua Pan, a vision neuroscientist at Wayne State University in Detroit, Michigan, wondered if

there were a way to get the retinal neurons to act more like photoreceptors.

A recently cloned photo-pigment gene from algae seemed like a good place to start. The photo-pigment allows algae to detect light, and because it is encoded by a single gene, the DNA is easy to incorporate into a virus. Pan and colleagues injected the modified virus into the eyes of mice lacking photoreceptors.

Three to four weeks after injection, the fluorescent marker attached to the gene lit up the retinal neurons, indicating that they were expressing the photo-pigment.

Normally, retinal neurons do not transmit signals to the visual cortex in response to light, but these neurons did. And the effect was long-lasting: At least 12 months after the injection, the retinal neurons continued to fire in response to light.

Can these signals compensate for lost vision? "We can't say yet," says Pan, whose team still has to perform behavioral studies that would test the mice's visual acuity. Another complicating issue is that the viral vector is not specific, so it delivers the gene to all retinal cells. Ideally, the virus would just target bipolar cells, which are important in processing light signals.

# Battery Electrodes Self-Assembled by Viruses

Genetically modified viruses that assemble into electrodes could one day revolutionize battery manufacturing, says newscientist.com.

Researchers in the US have created viruses that automatically coat themselves in metals and line up head to tail to form an efficient battery anode - the negatively charged component that channels electrons to generate current. These nanowires could be used to make revolutionary new forms of lithium-ion batteries.

"Now it's simply a matter of designing the other components, and we'll be able to form batteries by simply pouring all the ingredients together and letting them self-assemble," says Angela Belcher, a biological engineer at MIT who led the research. "Plus we can make them at room temperature in very safe conditions, instead of the high temperatures and dangers usually associated with battery production."

Belcher's team genetically modified tube-shaped viruses

that normally infect bacteria to create the electrodes. They introduced snippets of single-stranded DNA that caused the viruses to manufacture specific molecules on their outer coating that attach to cobalt ions and gold particles. This combination turns the virus into an efficient anode as they provide an ideal conduit for electrons.

To find the right genetic code to produce the gold-clinging molecules, or complexes, Belcher's team exposed billions of viruses with slightly different DNA to gold and then extracted genetic material from the ones that most strongly interacted with the metal. To create the cobalt-clinging complexes, the team created genetic code from scratch by mimicking the code which enables animal cells to harvest calcium.

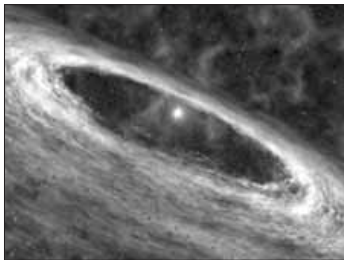
The genetic material added to the viruses can easily be interchanged, so it should be relatively simple to create other electronic components, including a positively charged battery electrode (cathode) using the technique.

# Planets Everywhere

The more astronomers look for planets outside the solar system, the more they seem to find them - and in the unlikelyst of places, says an article in science.com.

The latest evidence came at a NASA news conference, where a team of astronomers announced that the Spitzer Space Telescope has identified what appears to be a disk of planet-forming rubble surrounding a spinning neutron star known as a pulsar.

Pulsars are like the giant radioactive ball bearings of the universe - hard, dense, almost perfectly round, and



A protoplanetary disk surrounds pulsar 4U 0142+61 in this artist's rendering.

spewing out massive amounts of x-rays. The supercompact remnants of giant stars that went supernova, they are made mostly of neutrons, with the mass of the sun pressed into a sphere no more than 16 kilometers wide. Just a teaspoon's worth of a pulsar would weigh over 2 billion tons. They also generate tremendous magnetic fields, trillions of times more powerful than Earth's.

The Spitzer data, collected in infrared light, show a flat disk of dust orbiting the pulsar, named 4U 0142+61 and located about 13,000 light-years away in the constellation Cassiopeia. Once a star with a mass between 10 and 20 times the sun's, 4U 0142+61 probably survived no more than 10 million years before collapsing some 100,000 years ago. Its crushing mass created the tiny neutron core and then recoiled explosively into space.

Some of the fallback from that explosion eventually settled into a protoplanetary disk closely circling the pulsar. That disk orbits 4U 0142+61 about 1 million miles out and probably contains about 10 Earth-masses of material.

# Half of Cancers Linked to Lifestyle

A report by the American Cancer Society says that half the cancer deaths could be prevented by lifestyle changes, like quitting smoking.

According to sciencenews.com, the report predicted 564,850 cancer deaths in 2006, with 170,000 from smoking-related cancer. About one-third of the total are likely to be related to a combination of bad diet, lack of exercise and overweight.

Another lifestyle factor is overexposure to sunlight, which can cause skin cancers, especially the deadly melanoma. Many people also fail to get regular screenings for cancers like breast and colon, which are usually curable if caught early.

# Liquid Puzzle Solved

Dutch researchers believe they have cracked the physics behind a mysterious bouncing behavior of liquids, first seen more than 40 years ago.

British engineer Arthur Kaye first noticed this weird phenomenon in 1963, while experimenting with a mixture of obscure organic liquids. When he poured his viscous mixture on to a surface, the down-going stream would suddenly throw up a jet that merged with the incoming stream.

"The effect is used in textbooks to illustrate the strange properties of complex fluids," says Michel Versluis of the University of Twente in the Netherlands. Now he and his colleagues say this odd phenomenon may actually be very common, occurring regularly in the bathroom and the kitchen. It could happen with everything from tomato ketchup to yoghurt, paints, shampoo and liquid soap, Versluis told nature.com.

The reason you have probably never noticed this so-called Kaye effect is that it is generally over in an instant. The whole process, from the emergence of the jet to its merging with the incoming stream, typically takes about 300 milliseconds, says Versluis. "It's usually so short that you don't see it with the naked eye."

He and his colleagues have studied the Kaye effect using a high-speed video camera, which has allowed them to figure out what is really going on. Versluis says the effect should happen in any liquid that displays shear-thinning behavior. This means that as the liquid flows, its viscosity decreases; that is, it gets thinner. "Liquid soaps and shampoos are designed to have this property," says Versluis - they'll sit in your hand but will flow as you rub them into your hair. Non-drip paints have the same behavior.

# Drug Caused Clinical-Trial Disaster

The drug-trial disaster that put six British patients in intensive care does not seem to have been due to contamination or a failure to follow protocol, says the agency investigating the incident. If the preliminary finding is confirmed, it would indicate that the drug itself caused the negative effects.

The interim report by the UK Medicines and Healthcare Products

Regulatory Agency (MHRA), which approves clinical trials, says they found no evidence to suggest that procedure was not followed correctly, reveals nature.com.

The finding raises the possibility that antibody therapies such as the one being tested, called TGN1412, may not be safe for humans and that preliminary animal tests may not spot potential dangers.

"We believe there was a powerful pharmacological action of this drug in man that was not detected or detectable in animals," MHRA chief executive Kent Woods says. The men were given a dose 500 times smaller than those used in animal trials, leading to questions over whether animal tests are sufficient precaution when testing drugs of this type.

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