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Home > [Science Magazine](#) > [16 January 2009](#) > Random

Samples

## Random Samples

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- ▼ [PTEROSAUR LIFTOFFS](#)
- ▼ [A FINGER FOR PROFIT](#)
- ▼ [COOL COSMOS](#)
- ▼ [POWER WALKING](#)

[View the PDF](#) for this page

### PTEROSAUR LIFTOFFS



*Quetzalcoatlus* was as big as a giraffe.

CREDIT: MARK WITTON

How did pterosaurs get off the ground? The giant flying reptiles had four legs, the front ones attached to sail-like wings, and could weigh 70 kilograms or more--far more than any bird.

"People have tried to fit pterosaur into a birdlike model," taking flight with two-legged leaps, says paleontologist David Unwin of the University of

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Leicester, U.K. But some scientists think pterosaurs must have pushed off with all four feet, as modern vampire bats do.

Now paleontologist Michael Habib of Johns Hopkins University in Baltimore, Maryland, has done the math to show that a "quadrupedal launch" is indeed plausible. Habib analyzed bone strength by comparing measurements from three pterosaur species with those from 20 bird species. In a paper in the journal *Zitteliana*, he reports that the leg bone (femur) becomes proportionately thicker than the wing bone (humerus) in heavier birds, which need more leg muscle to take off. In pterosaurs, however, the forelimbs were more robust, supporting the notion that they helped propel the animals--some as big as giraffes--into flight without the aid of winds or jump-off points.

James Cunningham, an engineer in Collierville, Tennessee, who studies vertebrate flight mechanics, says the quadrupedal takeoff (which he thought of years ago) makes sense because the animals didn't have enough shoulder muscle to take off by just running and flapping. Now, Unwin says, it's time to see whether fossil pterosaur footprints support the theory. "Birds dig in just before takeoff," he notes. "We can predict what a takeoff print would look like."

[\[Top of page\]](#)

## A FINGER FOR PROFIT

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Financial traders who make the biggest bucks got more testosterone in the womb, judging by their index-to-ring-finger ratio, according to a new study by a former Wall Street trader.

There is evidence that men with lower 2D:4D ratios--that is, relatively long ring fingers compared with index fingers--were exposed to more male hormones in the womb. So cognitive scientist John Coates and colleagues at the University of Cambridge in the United Kingdom decided to see if sex hormones had anything to do with success on the stock market floor. They measured finger ratios of 44 young male traders from a fast-paced "noisy" London trading floor and compared the data with 20 months of individual profit and loss sheets. Traders with the lowest ratios made the most money, even with years of experience controlled for, averaging £828,480 compared with £154,440 for the highest-ratio group.

The connection? High gestational androgen exposure has powerful organizational effects on the developing brain and affects traits such as increased risk-taking and quick reactions, as well as sensitivity to circulating testosterone, the researchers reported last week in *The Proceedings of the National Academy of Sciences*.

Psychologist Johannes Hönekopp of Northumbria University in Newcastle, U.K., says the notion that prenatal hormones contribute to noise traders' skill is "plausible but speculative." The fetal testosterone and finger-length relationship is weak, he says, so until they are replicated, the findings appear to be "too good to be true."

[\[Top of page\]](#)



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## COOL COSMOS

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CREDIT: UNIVERSITY OF TORONTO

It's the International Year of Astronomy, and astronomers in Toronto, Canada, are driving the fact home with eye-catching ads on buses and subways. "We're trying to make a point that it's really not that remote--in some sense, the universe is right around you; it's in you," says University of Toronto astronomer Ray Jayawardhana. Ads, in addition to the one below, point out that our bodies are made up of material from dead stars, that neutrinos from the sun are constantly zinging through us, and that Earth's slowing rotation makes each day a tiny bit longer. (*Science*, meanwhile, greets the year with a special News Focus section starting on page [326](#).)

[\[Top of page\]](#)

## POWER WALKING

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Soon, Tokyo's harried train commuters may not only have to buy their tickets but also generate the energy needed to punch them. East Japan Railway is testing a floor system that harvests energy from the footsteps of people walking through ticket gates.



CREDIT: DENNIS NORMILE/*SCIENCE*

The flooring is fitted with piezoelectric elements that convert the mechanical stress from pedestrians' weight into little blips of electricity. Twenty-five square meters of piezoelectric flooring are expected to generate 1400 kilowatt-seconds of power per day, enough to light a 40-watt LED bulb for 17 hours. "It's not much," admits railway spokesperson Makoto Yasuhara. But the company hopes more-efficient future equipment will power automated ticket gates and information boards. A 2-month pilot system is being tested at Tokyo Station, where 70,000 train riders surge through ticket gates daily.

[\[Top of page\]](#)

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