

March 14, 2012

Edward Aboufadel
6364 Scarborough Dr. SE
Ada, MI 49301

Dear Edward:

I am very pleased to hear that you successfully solved InnoCentive Challenge Number 9932752 – City of Boston: Eliminate Potholes – StreetBump for Boston! Enclosed please find the payment of your award. Thank you for your continuing participation.

Remember to keep checking the InnoCentive website (www.innocentive.com) as we continue to add interesting Challenges all the time. Again, my congratulations!

Please keep up the good work and thanks!

Best regards,

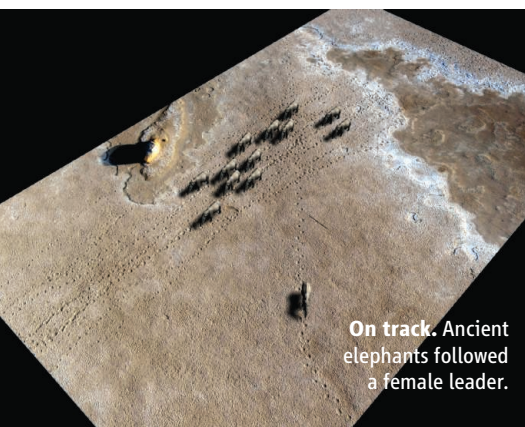
Dwayne H. Spradlin
President and Chief Executive Officer

rate, and helped launch the MIT Energy Initiative in 2006. It conducts research into alternative energy sources and better ways to use existing ones. She also focused on boosting diversity at MIT, from undergraduates to faculty.

FINDINGS

Elephant Footsteps Reveal Ancient Herd Behavior

When a herd of elephant ancestors walked through mud in the Arabian Desert about 7 million years ago, they unwittingly left their footprints—and clues about their behavior—behind. Those prints now expose how the herd behaved: Just like modern elephants, they followed a female leader.



On track. Ancient elephants followed a female leader.

The remarkable 260-meter-long trackway, made by at least 13 proboscideans of different sizes, is at the site of Mleisa 1 in the Al Gharbia region of Abu Dhabi Emirate. Using a kite-mounted camera to take aerial photographs of the footprints,

Random Sample

Road Scholars Solve Pothole Problem

The streets of Boston have met their match. This week, Massachusetts-based InnoCentive announced the winners of its latest Web-based challenge: to use smartphones to detect potholes. Building on a city of Boston app called Street Bump, which uses GPS and accelerometer data from a smartphone to record a car's location and sudden bounces, contestants vied to find ways to pool this data from many vehicles while distinguishing potholes from jolt-inducing features like railroad crossings.

Winning strategies varied widely. Undergraduates Nathan Marculis and Sarajane Parsons chose mathematical techniques called wavelets and Kruskal clustering. The challenge "involves detecting spikes or jumps in data," says their advisor, mathematician Ed Aboufadel of Grand Valley State University in Allendale, Michigan. "That's something wavelets are good at." Kruskal's algorithm helps identify related reports from different vehicles. Somerville, Massachusetts-based researchers headed by Massachusetts Institute of Technology grad Michael Nagle took a different approach. Using a tennis ball for scale, they measured the size of the potholes. They also used common-sense insights, such as realizing that a pothole jolt has a horizontal component to it (unlike that of a railroad crossing).

"We were impressed with the quality of the solutions," says Nigel Jacob, co-chief of the city's New Urban Mechanics Office, which co-sponsored the competition with InnoCentive and Liberty Mutual. "The challenge format allows us to focus on quality rather than the size of the vendor." The two teams and a third winner, Elizabeth Yip of Washington, will each receive a \$9000 prize. Before making the pothole-detecting apps available to the public, the city plans to merge the best features of the three algorithms into a single program.

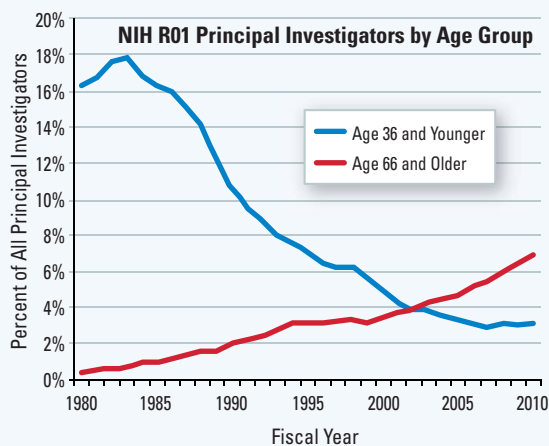


an international team of researchers, with the support of the Abu Dhabi Authority for Tourism and Culture, analyzed the prints' stride lengths and patterns. One solitary trackway was made by a large male traveling in a totally different direction from the other, smaller animals, according to a study in this week's *Biology Letters*. This "fossil-

ized behavior" suggests that 7 million years ago, females and young elephant ancestors followed a matriarchal female but males dispersed when they reached sexual maturity, just as modern elephants behave today, says primary author Faysal Bibi of the Museum für Naturkunde in Germany. <http://scm.ag/oldtracks>

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Downloaded from www.sciencemag.org on February 29, 2012



Older Scientists Still Get the Grants

A graph posted by the National Institutes of Health (NIH) this month highlights the growing imbalance between the youngest and oldest researchers. In 1980, almost 18% of principal investigators (PIs) holding NIH's basic research grant, called an R01 grant, were 36 and younger, and less than 1% were 66 and older. But by 2012, those 66 and older made up almost 7% of grantees and the youngsters were at only 3%. "These are big changes," wrote NIH extramural grants chief Sally Rockey on her Rock Talk blog.

The average age of a PI, now around 51, tracks the aging of medical school faculty, Rockey reports. Faculty over 65 may be staying on because of an end to mandatory retirement, a longer U.S. average life span, and slumping retirement portfolios, she suggests. The data offer a new slant on NIH's worry that the average investigator doesn't get his or her first grant until age 42 (*Science*, 7 November 2008, p. 834). NIH policies since 2007 that give an edge to proposals from young investigators have not yet lowered that number, Rockey reports.