Lizard bot shows how to scamper over the sand

17 July 2012 by **Michael Slezak**
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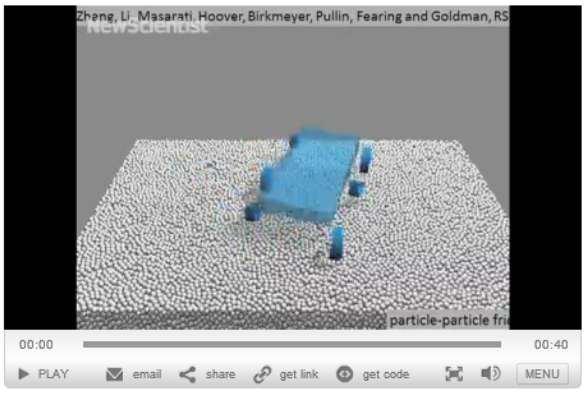

Video: Lizard-like legs help robot walk on sand

IF YOU'VE ever tried jogging on the beach, you'll know how hard it can be to run on soft sand. Now a robot that can scamper across the desert has helped to explain how lizards pull off the trick so effortlessly - and could provide insights that will allow better Martian rovers to be built.

Just 10 centimetres long and weighing 25 grams, the six-legged DynaRoach is certainly speedy. On sand, it can cover a distance equivalent to five of its own body lengths every second, reaching a top speed of 1.8 kilometres per hour. That's nearly as fast as some desert lizards that are "quite spectacular" movers, says Daniel Goldman, head of the Complex Rheology and Biomechanics (CRAB) Lab at Georgia Tech, Atlanta, where DynaRoach was developed.

An earlier, bigger version of the robot, inspired by the cockroach and built at the University of California, Berkeley, could crawl across sand, but when it tried to run, it got bogged down and ended up "swimming".

Now the CRAB Lab team has discovered that size is key to allowing the robot to dart at speed without sinking into the sand. Using slow-motion video to study the smaller DynaRoach's movement, the researchers found that because the sand's surface behaves much like a fluid, the robot's legs simply pushed off the sand on contact - much as a Jesus Christ lizard scampers on water.

To understand the mechanics of the robot's motion, the team created a computer model of the robot's legs interacting with millions of grains of sand. They found that the sand simply stayed in place, stopping the robot's legs sinking in and letting it skim the surface. The results were presented at a robotics conference in Sydney, Australia, last week.

Modelling the robot's movement has also improved our understanding of how desert lizards move. In work to appear in *The Journal of Experimental Biology*, the team shows that the zebra-tailed lizard exploits the fluid-like properties of sand in much the same way.

Christofer Clemente, who studies propulsion physiology at Harvard University, says the research represents "an important step forward to unlocking the

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Fluid mover *(Image: Gerald & Buff Corsi/Visuals Unlimited/Corbis)*

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secrets of desert locomotion". And with Mars rovers no strangers to getting bogged down, it could be that small, nimble robots like DynaRoach will become instrumental in exploring the sandy Martian terrain.

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