

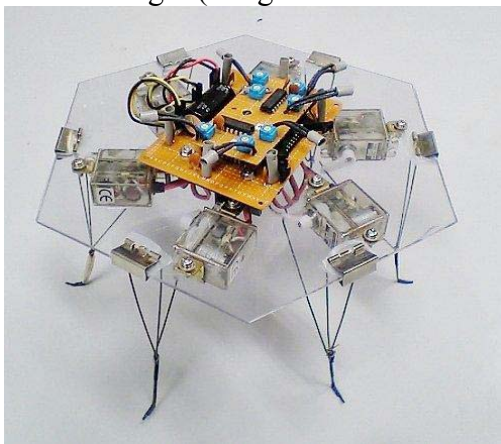
## Robot moved by a slime mould's fears

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- NewScientist.com news service
- Will Knight



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The slime mould - pictured on the screen in the experimental set-up - causes a robot to naturally avoid the light (Image: Klaus-Peter Zauner)



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The six-legged hexapod robot is remotely-controlled by slime (Image: Klaus-Peter Zauner)

A bright yellow slime mould that can grow to several metres in diameter has been put in charge of a scrabbling, six-legged robot.

The *Physarum polycephalum* slime, which naturally shies away from light, controls the robot's movement so that it too keeps out of light and seeks out dark places in which to hide itself.

Klaus-Peter Zauner at the University of Southampton, UK, who developed the slime-controlled bot with colleagues from Kobe University in south-central Japan, says the idea is to find simpler ways to control a robot's behaviour.

"The computers we have today are very good for what we built them for," he told **New Scientist**. "But, in a complex or paradoxical environment, things tend not to work out."

*Physarum polycephalum* is a large single-celled organism that responds to food sources, such as bacteria and fungi, by moving towards and engulfing it. It also moves away from light and favours humid, moist places to inhabit. The mould uses a network of tiny tubes filled with cytoplasm to both sense its environment and decide how to respond to it. Zauner's team decided to harness this simple control mechanism to direct a small six-legged (hexapod) walking bot.

#### **Mechanical embodiment**

They grew slime in a six-pointed star shape on top of a circuit and connected it remotely, via a computer, to the hexapod bot. Any light shone on sensors mounted on top of the robot were used to control light shone onto one of the six points of the circuit-mounted mould – each corresponding to a leg of the bot.

As the slime tried to get away from the light its movement was sensed by the circuit and used to control one of the robot's six legs. The robot then scrabbled away from bright lights as a mechanical embodiment of the mould. Eventually, this type of control could be incorporated into the bot itself rather than used remotely.

Zauner believes engineers will need to look towards this type of simple control mechanism, especially as components are scaled down. "On the nanoscale, we have to learn how to work with autonomous components," he says. "We have to let molecules do what they naturally do."

#### **Available energy**

Biology is already influencing the evolution of robots in other ways. For example, researchers led by Chris Melhuish at the University of the West of England in Bristol, UK, have developed robots that generate power by [consuming flies](#).

"Computational autonomy has been studied for some time," says Ioannis Ieropoulos of the University of Western England team. "For a truly autonomous robot, the level of computational complexity will depend on the available energy."

Details of the slime-bot project were presented at the Second International Workshop on Biologically Inspired Approaches to Advanced Information Technology, held in Osaka, Japan, on 26 and 27 January.

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