


 The logo for Scientific American, featuring the words "SCIENTIFIC AMERICAN" in a bold, serif font. The background of the logo is a green-tinted micrograph showing intricate biological or cellular structures.

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SCIENCE AND THE CITIZEN

ROBOTICS: REPLICATION

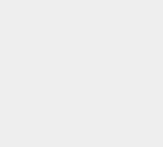
Dawn of a New Species?

When a future robotic race writes its Book of Genesis, it will surely give a place of honor to Hod Lipson and Jordan B. Pollack. In the August 31 [Nature](#), these Brandeis University researchers [report](#) that they have designed and built the first robot that can design and build other robots. (In earlier efforts, replicating machines had been simulated only on computers and on special integrated circuits.) The offspring are plastic trusses (like Tinker Toys) propelled by pistons and controlled by simple neural networks. The mother bot is a computer running a genetic algorithm, which draws up plans through trial and error, and a 3-D printer, which can create small plastic sculptures of any shape. The researchers could (almost) leave the system to work at night and come in the next morning to see artificial inchworms crawling around their lab. They still had to strap on motors and connect wires, but--in a reversal of roles--the robot told the humans what to do. The software is available for Windows-based computers (www.demo.cs.brandeis.edu/golem). So will humans soon share the world with cyborgs? If that sounds silly, consider that the researchers felt compelled to say in their paper that "robotic lifeforms" are not dangerous, yet.

--George Musser



Computer-designed robot named Arrow pushes itself along the carpet using the



piston at the center (for a movie, see golem03.cs-1.brandeis.edu/results.html).