

# Robot scientist becomes first machine to discover new scientific knowledge

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Scientists have created a Robot Scientist which the researchers believe is the first machine to have independently discovered new scientific knowledge. The robot, called Adam, is a computer system that fully automates the scientific process. The work will be published tomorrow (03 April 2009) in the journal *Science*.

Prof Ross King, who led the research at Aberystwyth University, said: "Ultimately we hope to have teams of human and [robot](#) scientists working together in laboratories".

The scientists at Aberystwyth University and the University of Cambridge designed Adam to carry out each stage of the scientific process automatically without the need for further human intervention. The robot has discovered simple but new [scientific knowledge](#) about the genomics of the baker's yeast *Saccharomyces cerevisiae*, an organism that scientists use to model more complex life systems. The researchers have used separate manual experiments to confirm that Adam's [hypotheses](#) were both novel and correct.

"Because biological organisms are so complex it is important that the details of biological experiments are recorded in great detail. This is difficult and irksome for human scientists, but easy for Robot Scientists."

Using artificial intelligence, Adam hypothesised that certain genes in baker's yeast code for specific enzymes which catalyse biochemical

reactions in yeast. The robot then devised experiments to test these predictions, ran the experiments using laboratory robotics, interpreted the results and repeated the cycle.

Adam is still a prototype, but Prof King's team believe that their next robot, Eve, holds great promise for scientists searching for new drugs to combat diseases such as malaria and schistosomiasis, an infection caused by a type of parasitic worm in the tropics.

Prof King continued: "If science was more efficient it would be better placed to help solve society's problems. One way to make science more efficient is through automation. Automation was the driving force behind much of the 19th and 20th century progress, and this is likely to continue."

Prof Douglas Kell, BBSRC Chief Executive, said: "Computers play a fundamental role in the scientific process, which is becoming increasingly automated, for instance in drug design and DNA sequencing. This has led to more scientific data, increasingly available on the web, which in turn requires an increased use of computers to analyse these data. Robot scientists could provide a useful tool for managing such data and knowledge, making scientific procedures easier and more efficient. This kind of learning will become even more important as we move further towards integrative and predictive biology in the era of Web 2.0 and the Semantic Web."

Source: Biotechnology and Biological Sciences Research Council

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