

Did the universe evolve to make black holes?

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(Phys.org) —The maths underpinning Darwin's theory of natural selection could explain how the universe may be 'designed' to make black holes.

New Oxford University research builds on the 'cosmological natural selection hypothesis' – an idea first put forward in the 1990s to explain the apparent 'fine-tuning' of the universe's basic parameters to allow for the existence of atoms, galaxies, and life itself.

Cosmological natural selection proposes that, if new universes are born inside black holes, a '[multiverse](#)' of many possible universes could be shaped by a process similar to natural selection so that successive generations of universes evolve to become better at making black holes.

The Oxford team of evolutionary [theorist](#) Andy Gardner and [theoretical physicist](#) Joseph Conlon found that a basic equation from evolutionary genetics – called Price's theorem – can capture the process of cosmological natural selection and explain how the universe seems designed for the purpose of making [black holes](#) rather like a fish can seem 'designed' to swim underwater or a bird can appear 'designed' to fly.

A report of the research is published in the journal *Complexity* online.

'This idea of cosmological natural selection is controversial, and physicists have pointed out all sorts of problems with it. But we were interested in seeing if its basic evolutionary logic actually works,' said Dr Andy Gardner of Oxford University's Department of Zoology, lead author of the paper.

'We found that a general equation from [evolutionary genetics](#), Price's theorem, can help us to model how selection can work not only at the scale of genes and organisms but also at that of something as unimaginably vast as multiple universes,' said Dr Gardner. 'Our model uses maths similar to the [mathematical theory](#) underlying Darwinian adaptation in biology, which explains how the dynamics of natural selection leads to organisms appearing designed to maximize their fitness.'

The researchers point out that the evolution of universes is in many ways very different from the evolution of animals. For a start, in a multiverse of many possible universes there is no real concept of change over time. However, their models of evolving universes are quite similar to models of bacterial evolution – where generations evolve out of the asexual budding of cells.

More information: *Complexity* paper:

www.zoo.ox.ac.uk/group/gardner...rdnerConlon_2013.pdf

Provided by Oxford University

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