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June 2009
Issue 51

The *Plus* new writers award 2009

Read the winning entries in this issue of *Plus*

School winners

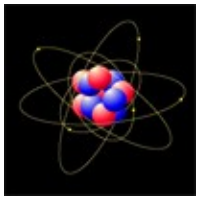
University winners

General public winners

And we journey to the frontiers of physics in a special issue...

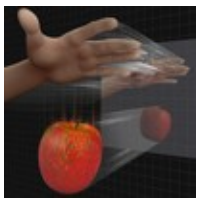
Hunting for life in alien worlds
Two of the most fundamental questions asked by people are how life emerged on the Earth, and whether we are alone in the cosmos. These deeply important questions form the core of a new kind of science, one that recently has been rapidly gathering momentum: astrobiology. **Lewis Dartnell** explains.

Hubble's top five scientific achievements
On May 19 2009 the Space Shuttle Atlantis released the Hubble Space Telescope back into orbit after a hugely successful servicing mission. To mark the occasion, **Mario Livio**, one of the scientists involved in the mission and intimately acquainted with Hubble, takes stock of its scientific legacy.



Particle hunting at the LHC

It's hard to avoid CERN these days. Last year's successful switch−on of CERN's Large Hadron Collider, followed by a blow−out which is currently being fixed, sparked wide−spread media coverage, and currently CERN stars in the Tom Hanks movie Angels and Demons. So what goes on at CERN and why the hubbub about the Large Hadron Collider, known as the LHC? **Ben Allanach** investigates.



The illusory Universe

With online socialising and alternative realities like *Second Life* it may seem as if reality has become a whole lot bigger over the last few years. In one branch of theoretical physics, though, things seem to be going the other way. String theorists have been developing the idea that the space and time we inhabit, including ourselves, might be nothing more than an illusion, a hologram conjured up by a reality which lacks a crucial feature of the world as we perceive it: the third dimension. *Plus* talks to **Juan Maldacena** to find out more.

Lambda marks the spot the biggest problem in theoretical physics

The mathematical maps in theoretical physics have been highly successful in guiding our understanding of the universe at the largest and smallest scales. Linking these two scales together is one of the golden goals of theoretical physics. But, at the very edges of our understanding of these fields, one of the most controversial areas of physics lies where these maps merge: the cosmological constant problem.

Career interview: Visual effects director

Alexis Wajsbrot is a visual effects specialist who has worked on a number of high−profile films including Harry Potter and the Half−blood Prince, Harry Potter and the Order of Phoenix, Tim Burton's Sweeney Todd, and also on some of those visually stunning commercials you see while waiting for your film to start. His speciality is anything that behaves like a fluid: water, smoke, fire, even fur or cloth. *Plus* went to see him to find out more.

Teacher package: On thin ice maths and climate change in the Arctic

In this issue's teacher package we look at some of the maths and science behind a recent expedition to the Arctic. The aim of the Catlin Arctic Survey was to gather data on ice thickness that will help to predict when the North Pole sea ice cover will melt, an event that will have dramatic consequence for the Arctic ecosystem and the Earth's climate as a whole. *Plus* was commissioned by Catlin Arctic Survey Education to produce mathematics and science enrichment material for ages 14 to 19 (key stages 4 and 5). The toolkits look at climate and sea ice models, GPS and cartography, how to predict future climate trends, and how to present statistical evidence.

Plus is part of the family of activities in the Millennium Mathematics Project, which also includes the NRICH and MOTIVATE sites.