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We picked a few of the most exciting research areas and asked leading scientists: Where is your field heading in 2007?

by [Edit Staff](#) • Posted January 3, 2007 06:20 PM

High Energy Physics

The coming year will see a number of interesting developments as the Large Hadron Collider (LHC) goes online. The enormous amount of data generated by the LHC will force us to refine our methods—and explore new ones—for extracting and interpreting information from high energy collisions. This work should lead to new insights into the masses of elementary particles and the consequences of various models for particle physics and cosmology.

Also of interest is the recent application of string theory to the physics being done at the Relativistic Heavy Ion Collider (RHIC), where string theory permits some calculations that would otherwise be intractable. The idea at RHIC is to better understand the strong force that binds together the elements of a nucleon, and 2007 may see the theoretical advances of string theory inform the experimental results from RHIC.

—*Lisa Randall, Harvard University*

Astrobiology

On February 28, 2007, for the first time, human technology will be operating on five planets (including Earth). The New Horizons spacecraft will cruise past Jupiter at a distance of 2.5 million km and use the behemoth's gravitational pull to redirect the craft toward Pluto (which it will reach in 2015) as it inspects Jupiter and its moons. Cassini will still be circling Saturn, and a growing armada of spacecraft will continue to patrol Mars, including the Mars Exploration Rovers (fingers crossed). Meanwhile, the European Space Agency's Venus Express will be building up an unprecedented trove of data on the climate and atmosphere of Earth's parched, burnt, acidic sister world. In billions of years, Earth is destined to wind up like Venus as the sun ages and warms. Perspective from this era of interplanetary prospecting will help reveal our planet's complexities.

—*David Grinspoon, Southwest Research Institute*

Infectious Disease

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The majority of human diseases have animal origins—influenza, HIV, malaria, measles, SARS coronavirus, and BSE prion, among others. These agents have jumped from animals to humans, yet despite ongoing transmission of novel agents from animals to humans, there are currently no systems in place to monitor and control these "emergence events" before they go on to cause pandemics. 2007 will see the development of "disease forecasting" science: focused monitoring of the movement of novel agents into humans from animals; systematic study to identify the factors that permit a "jumped" agent to establish itself among humans; and systematic efforts to discover the full range of human viruses and other possible disease agents. If successful, the efforts will both identify unrecognized human disease threats and help predict and prevent the next major human pandemic.

—*Nathan Wolfe, UCLA*

Developmental Psychology

For a long time, developmental psychologists have had little to say about questions such as when children start to believe in God, what they think about the relationship between body and soul, and how they judge people in terms of good or evil. But this is changing, in large part because of theoretical developments in fields such as evolutionary theory and cross-cultural psychology. We can now make substantive claims about why religious belief and moral thought exist in the first place, and derive some interesting predictions about what should and should not be innate. And we can test these predictions using the same sorts of methods that have been so successful in exploring the origins of physical and social understanding. The big news in 2007 is that we should see the first published studies that explore moral and religious thought in very young children, perhaps in babies.

—*Paul Bloom, Yale University*

Paleoclimatology

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