



## Planetary Blitz

Scientists and engineers outdid themselves in 2005 in mounting exploratory expeditions beyond Earth. They had spacecraft at or on the way to the moon, Mercury, Venus, Mars, a

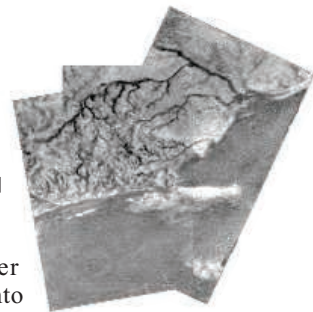
comet, an asteroid, Saturn, and the very edge of the solar system. At the Red Planet, three orbiters and two rovers beamed back terabytes of data. The high point of a banner year, however, came on Saturn's haze-shrouded moon Titan. In January, the European spacecraft Huygens drifted down to a familiar-looking but fundamentally weird world.

The first landing on another planet's moon revealed a world where infrequent but drenching rains of liquid methane wash low hills, cutting networks of steep-sided valleys and flushing icy debris and dark organic crud out into shallow lakes. The lakes then evaporate away,

**Drenched.** Huygens found a familiar-looking world washed by methane rains.

although the lander apparently settled into ground still soaked with methane. The discovery of a sort of hydrologic cycle shaping another world is a first.

A fleet of other explorers joined Huygens this year. The aging Voyager 1 reported approaching the "edge" of the solar system, where the solar wind slows abruptly. The



## Scorecard 2004

Slam-dunks and near-fizzles gave our editors a mixed record for prophecy this year.

**Recycling pays.** New results confirmed that autophagy is much more than just a way for nutrient-starved cells to recycle membrane components and cytoplasmic molecules. Studies indicated that autophagy helps the immune response to bacteria and viruses and that some microbes have developed ways to counter or even exploit the cellular process. Researchers also began to detail how autophagy is connected to both neurodegeneration and cancer.



**Obesity drugs.** No new drugs for obesity were approved in 2005, but rimonabant continues to show promise in clinical trials, and Sanofi-Aventis may receive U.S. Food and Drug Administration approval for it in 2006.

**HapMapping along.** The International HapMap Project delivered on schedule, publishing its first version this past October. (A finer resolution copy will come out in 2006.) A California company, Perlegen Sciences, published its own map last February. The \$138 million map also helped lead scientists to a macular degeneration gene and a gene for skin color; how much it will help next year, and how widely it will be used, remain open questions.



**Cassini-Huygens at Saturn.** So far the joint U.S., European, and Italian mission to the ringed planet has been a blazing success. Amid the smallest of glitches, the Huygens lander drifted down to Titan's surface, revealing an icy landscape carved by rains of liquid methane. Elsewhere in the system, Enceladus proved energetic for such a little moon, spewing ice and water from its south pole to form the nebulous E ring. The bizarre F ring sported a spiral-necklace companion ring. And another 55 orbits of Saturn are still on Cassini's agenda.

**Paper tigers.** North Korea says it will give up its nuclear weapons program, but the devil is in the details, none of which have been worked out. Meanwhile, Iran's new hard-line government insists that uranium enrichment is an inalienable right, leaving little hope that negotiations will prevent Iran from acquiring the means and know-how to develop a nuclear arsenal.



**European Research Council.** The ERC, an agency that would fund top basic research across Europe, has morphed in just a few years from a scrappy grassroots movement to the darling of politicians. In April, the European Commission made the ERC the centerpiece of its bid to double the E.U.'s research funding. And in July the commission appointed 22 high-profile scientists to the ERC's scientific council, which will divvy up the first grants. But political wrangling over the E.U.'s overall budget has left the ERC in limbo. By December, the proposed doubling for research was off the table, and scientists feared that the ERC could be left with only token funding—and disappointed applicants.

**Regulating nano.** Governments worldwide are working hard to develop standards for nanomaterials, come up with programs to test their safety, and regulate their use.

