The 25 Most Influential People in Space

By David Bjerklie and the Editors of TIME

As the frontiers of space expand, so do the opportunities for its explorers: to pilot spacecraft, spot planets, search for aliens—and share their passion. Here's an array of the most brilliant

Steve Squyres

MARS ROVER PACK LEADER

Earth's invasion of Mars (sci-fi writers had it backwards) began with planetary flybys in the 1960s; then came the Viking 1 and 2 landers in 1976 and the Pathfinder mission, with the first Mars rover, Sojourner, in 1997. Today, Cornell University astronomer Steven Squyres is spearheading a new scientific offensive as principal scientist of NASA's Mars Exploration Rover mission. Rover's robot geologists Spirit and Opportunity landed in January 2004 and have sent back more than 100,000 full-color images of Martian terrain as well as microscopic images and detailed analyses of rocks and soil surfaces. Squyres has also been an aquanaut at NASA's underwater lab in Florida, helping to plan for manned space missions in extreme environments.

Jacqueline Hewitt

DARK AGE ASTRONOMER

Science runs on curiosity and funding, and Jackie Hewitt, as director of MIT's Kavli Institute for Astrophysics and Space Science, has plenty of the former to attract the latter. Hewitt is a radio astronomer whose focus is on the cosmic Dark Age, the period between the Big Bang and the birth of the first stars and galaxies. The gestation of the early universe has so far been hidden from view, but radio astronomy aims to change that. Among the ambitious proposals Hewitt has championed is an immense farm of radio antennas to be deployed on the far side of the moon, well out of reach of any interfering static from Earth. While far out, such projects would be invaluable training grounds for the next generation of space scientists.

Jerry Nelson

TELESCOPE INNOVATOR

"New telescopes and their instrumentation are at the heart of progress in astronomy," said the Kavli Foundation when it awarded its 2010 astrophysics prize to Jerry Nelson and two colleagues, Roger Angel and Ray Wilson. The great challenge in building large optical telescopes is to create a precise reflecting surface able to withstand distortion due to gravity, heat or cold. For decades, that meant a maximum mirror diameter of 6 m (19.7 ft.). Nelson, as technical leader for the twin 10 m (33 ft.) Keck telescopes on Mauna Kea, Hawaii, broke that barrier using segmented mirrors; Nelson is leading again in the design of the unprecedented Thirty-Meter Telescope, which will be the most advanced and powerful optical telescope on Earth.

R. Jay GaBany

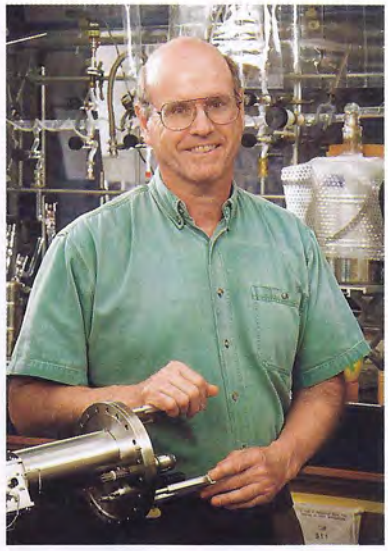
STELLAR SHUTTERBUG

Gigantic observatories and orbiting space telescopes don't own astronomy. Not entirely. Smaller can sometimes be better, as astrophotographer R. Jay GaBany has proven. The galactic mergers that produce spiral galaxies like the Milky Way leave behind faint relics called stellar tidal streams. But because these cosmic fossils are so large, viewing them requires wider views and longer exposure times than are possible at major observatories. With a half-meter telescope located under the dark skies in the mountains of New Mexico, GaBany patiently produces unmatched images of stellar streams. Though officially an amateur, GaBany collaborates with the pros as a peer, earning scientific respect and accolades in the process.

Chryssa Kouveliotou

GAMMA-RAY ARGONAUT

As a child growing up in Greece, Chryssa Kouveliotou spent summer nights lying on the beach searching the sky for falling stars and the tracings of satellites. Her determination to explore the heavens graduated to more exotic phenomena. "My first love was always gamma-ray bursts," recalls Kouveliotou, of NASA's Marshall Space Flight Center, "tremendous explosions that rock the universe like nothing else." One source of gamma rays is magnetars, the tiny, superdense remains of supernovas that generate the most powerful magnetic fields in the universe; imagine a magnet strong enough to pull the keys out of your pocket from a distance halfway to the moon.



Louis Allamandola

COSMIC CHEMIST

The building blocks of carbon-based life are found virtually everywhere in the universe. "Molecules from space helped to make the Earth the pleasant place that it is today," according to Louis Allamandola, founder of NASA's Ames Astrochemistry Laboratory. The puzzle of how these compounds form and how they combine with hydrogen, oxygen and nitrogen in the frigid, radiation-filled vacuum of space was solved by Allamandola and his colleagues by approximating those harsh conditions in the lab. Produced by dying, giant red stars, these carbon compounds have rained down on Earth since the origin of the solar system. As Allamandola has observed, "Even in death, the seeds of life are sewn."

Andrea Ghez

BLACK-HOLE DETECTOR

Astronomers have long considered the Milky Way a mild-mannered galaxy. But when Andrea Ghez of the University of California, Los Angeles, mapped the galactic center with unprecedented resolution, she found stars moving at extraordinarily high speed, which meant they were orbiting something extraordinarily massive. (The key to the discovery was adaptive optics techniques, which compensate for the blurring effects of the atmosphere.) Her conclusion? Our milquetoast Milky Way has a monstrous black hole at its center, some 26,000 light-years from Earth. If a galaxy as sedate as our own harbors a massive black hole, such cosmic beasts may well lurk at the center of most galaxies.

John Mather

OBSERVATIONAL COSMOLOGIST

The Big Bang left behind a telltale glow—still detectable today, nearly 14 billion years later—called the cosmic microwave background (CMB) radiation or, as cosmologist John Mather refers to it, "the accumulated trace of everything." Precise measurements of CMB are critical because any proposed model of the universe must be able to explain variations in it. Using data from the Cosmic Background Explorer satellite, Mather and colleague George Smoot made a map of the early universe, a work of cosmic cartography that won them Nobel Prizes in 2006.

Geoff Marcy

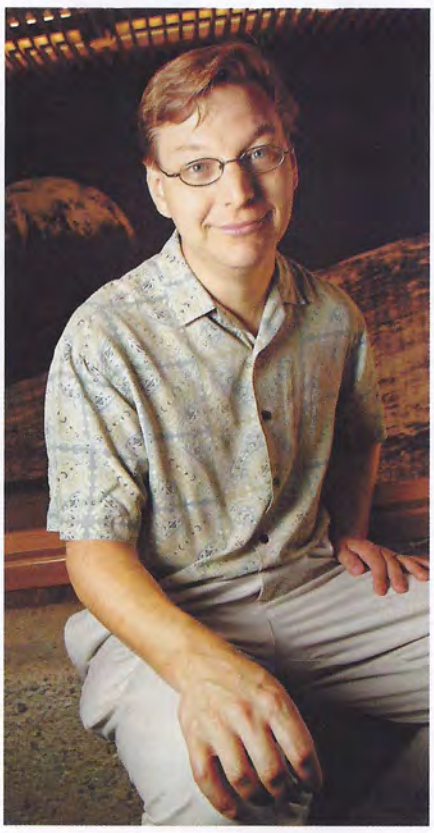
PLANET HUNTER

When astronomer Geoff Marcy decided to shift gears to look for planets in other star systems, it didn't seem like a brilliant career move at first. He teamed up with graduate student Paul Butler and, as Marcy remembers it, "when we told other astronomers about our search for extrasolar planets, they would often smile politely, look down at their shoes and change the subject." The duo's search took eleven years, but in 1995 they hit pay dirt. They quickly became the most prolific planet hunters and in 1999 were the first astronomers to find a multiple-planet system outside our own, with "three lovely planets" orbiting a common star.

Liu Yang

CHINA'S FIRST WOMAN IN SPACE

Flight has a way of stirring ambitions. A school assembly inspired Liu Yang, who had wanted to be a bus conductor, to become a pilot. She joined her country's air force, racked up 1,680 hours as a fighter pilot and was recruited as a prospective astronaut (or taikonaut, as they are called in China). Yang's historic mission into space in June 2012 was also China's most ambitious and complex; it included a manned space docking, a technically demanding procedure for both spacecraft and taikonauts but essential to the space station China wants to launch by 2020.



Jill Tarter

SEARCHER FOR EXTRATERRESTIAL INTELLIGENCE

For three decades, Jill Tarter has been waiting for E.T. to call. She began her intergalactic watch in graduate school, and in 1984 she helped found the SETI Institute in Mountain View, Calif. Tarter also worked on developing a catalog of nearby stars that might have habitable planets. The main criteria? Stability for billions of years, enough time for intelligent life to evolve. In 2012 Tarter retired as director of SETI research to focus on fundraising for SETI's Allen Telescope Array. "The good news is that the tools we have now are getting better, faster and bigger," she told *New Scientist*. "We are finally acquiring a set of tools that is perhaps adequate for the task."

Michael Brown

PLUTO SLAYER

The summer of 2005 marked Pluto's last gasp. Caltech planetary astronomer Mike Brown and some colleagues were tracking objects on the fringes of the solar system, out where the comets roam, and they found one (later named Eris) that was larger than the ninth planet. In the 1990s, when such faraway objects first began to be spotted, the status of plutoids (initially called trans-Neptunian objects or dwarf planets) seemed to divide the world into Pluto huggers and haters. Brown's findings, however, finally tipped the balance toward Pluto's demotion. We may have lost a planet, but we've gained a more fascinating solar neighborhood.

Elon Musk

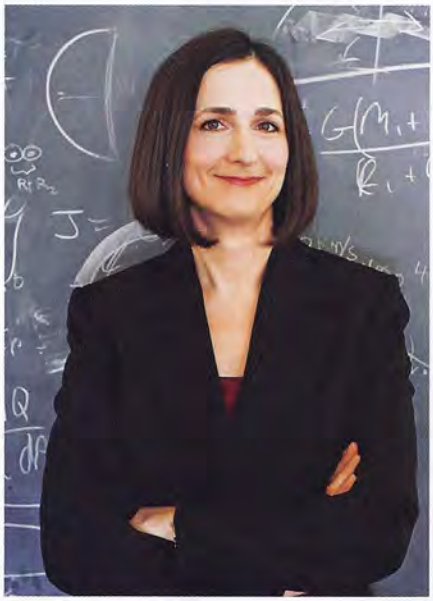
ROCKET MAN

First he made a fortune with the Internet start-up PayPal greasing the wheels of e-commerce. Then he co-founded Tesla Motors, maker of the first electric sports car, and helped launch the alternative-energy provider SolarCity. But entrepreneur extraordinaire Elon Musk was just getting warmed up. Musk's company SpaceX made history in May 2012 as the first private company to deliver a payload to the International Space Station. SpaceX has a multiyear, dozen-mission contract with NASA, a growing list of international clients and plans to fly to the moon. Maybe Musk's ambition to send humans to explore Mars within the next two decades, a goal that struck skeptics as pie in the sky, isn't so crazy after all.

Avi Loeb

COSMICDAWN EXPLORER

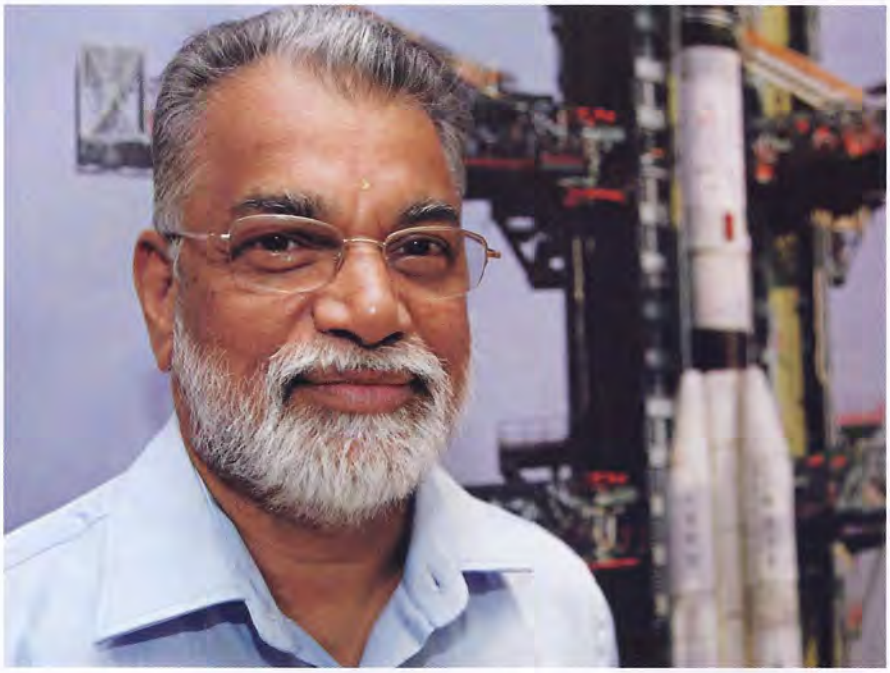
It's when theory meets evidence that the rubber meets the road, in the view of Harvard astrophysicst Avi Loeb. Until now, our understanding has been mostly theoretical about how the Dark Age of the early universe gave way to the cosmic dawn of the first stars and galaxies. Loeb, in fact, was among the first theorists to explore this frontier. But a new generation of telescopes promises to produce a flood of data for theorists to consider. Of course, some work will remain speculative. The Milky Way is on a collision course with Andromeda galaxy, and Loeb has run computer simulations of the outcome. In 5 billion years, we'll know if he's right.



Sara Seager

EARTH-TWIN SEEKER

It has been a dramatic learning curve for planet hunters. First came the jaw-dropping experience of being able to detect such cosmically tiny objects so far away, then the excitement of finding hundreds of them. Today, astronomers like MIT's Sara Seager are sorting through these riches to find Earth twins. Seager's goal is to be able to recognize atmospheric gases, or biosignatures, that would signal life on a distant planet. And that, says Seager, would bring the Copernican Revolution full circle: Not only is Earth not the center of the universe; there are lots of other living planets out there as well.



K. Radhakrishnan

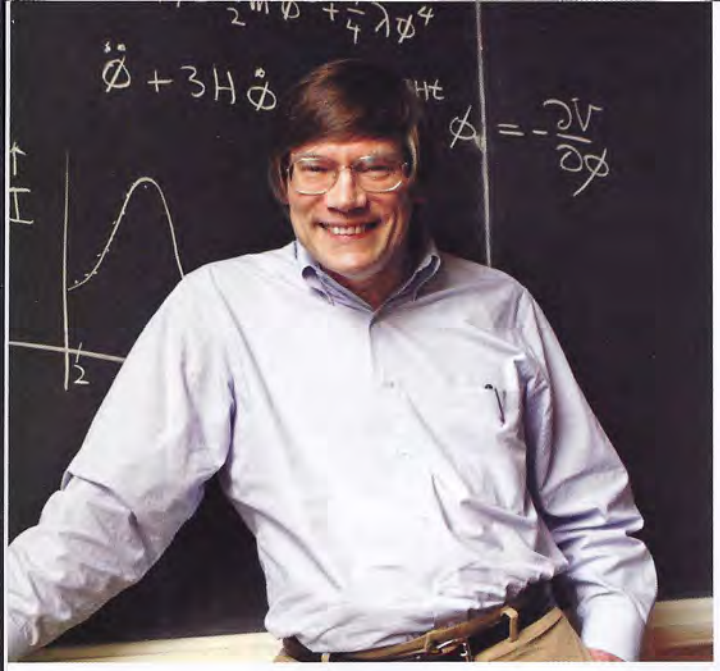
INDIAN SPACE ORGANIZATION CHAIRMAN

Most people are surprised to learn that India launched a space program in 1962, the year John Glenn orbited the Earth. At the time, as even the father of the Indian space program, Vikram Sarabhai, acknowledged, there were critics who questioned "the relevance of space activities in a developing nation." Any remaining qualms were put to rest on Nov. 14, 2008, when India became the fourth nation to plant its flag on the moon with an unmanned lunar probe. A key person behind the Chandrayaan 1 mission was K. Radhakrishnan, now chairman of the Indian Space Research Organization. In 2013, India plans to send a rover to the moon as part of the Chandrayaan 2 mission.

Rashid Alievich Sunyaev

THEORY SURVIVOR

As a teenager growing up in the Soviet Union, Rashid Sunyaev loved to study history. But his father advised him not to pursue it as a profession. "He told me that he had several friends who were historians, and they were all shot or sent to prison," Sunyaev told an audience of students after he won the 2011 Kyoto Prize. So instead, he delved into the perturbations of the cosmos. Sunyaev, who divides his time between the Max Planck Institute for Astrophysics in Germany and the Space Research Institute in Moscow, has theorized about what variations in the cosmic microwave background radiation reveal about the structure of the universe and how matter behaves when spiraling into a black hole.



Alan Guth

INFLATION CHAMPION

The Big Bang was born as an idea more than 50 years ago, but the theory had holes. For one, the universe couldn't have gotten so big so quickly. In 1980, Alan Guth devised a theory called inflation to fill the gap. Guth hypothesized an exponential expansion of space-time in nearly the first instant of the universe, during which it ballooned in size at least a trillion trillion times in less than a trillionth of a trillionth of a second. Talk about blowing up. If that isn't mind-boggling enough, such is the rarefied nature of the theory, notes Guth, that "it becomes very tempting to ask whether, in principle, it's possible to create a universe in the laboratory."

Carolyn Porco

SATURN FAMILY PHOTOGRAPHER

Black holes are not the only exotic game in town. As Carolyn Porco reminds us, mysteries abound in our own solar backyard. Porco is director of imaging for the Cassini-Huygens mission to Saturn. Since 2004, Cassini has discovered seven new moons as well as new rings. Hydrocarbon lakes have been spotted in the polar regions of the moon Titan and geyser-like plumes erupting from Enceladus. The combination of heat, liquid water and organic materials, says Porco, might just mean an environment hospitable to life. If life has arisen twice in our solar system, the odds suggest it has occurred a staggering number of times throughout the universe.

Adam Riess

COSMIC SPEED CLOCKER

Since the 1920s, astronomers have known the universe is expanding. But will the expansion go on steadily forever? Or will it eventually slow, stop, or even begin to contract? The answer is apparently none of the above. Johns Hopkins astronomer Adam Riess and others, using data from the Hubble telescope, have shown that the expansion is actually accelerating, a finding the Nobel Prize committee called "astounding." What's more, it appears that what is pressing the cosmic gas pedal is the mysterious entity "dark energy." Riess hopes Hubble's successor, the Webb Space Telescope, will help us understand why.

Brian Greene

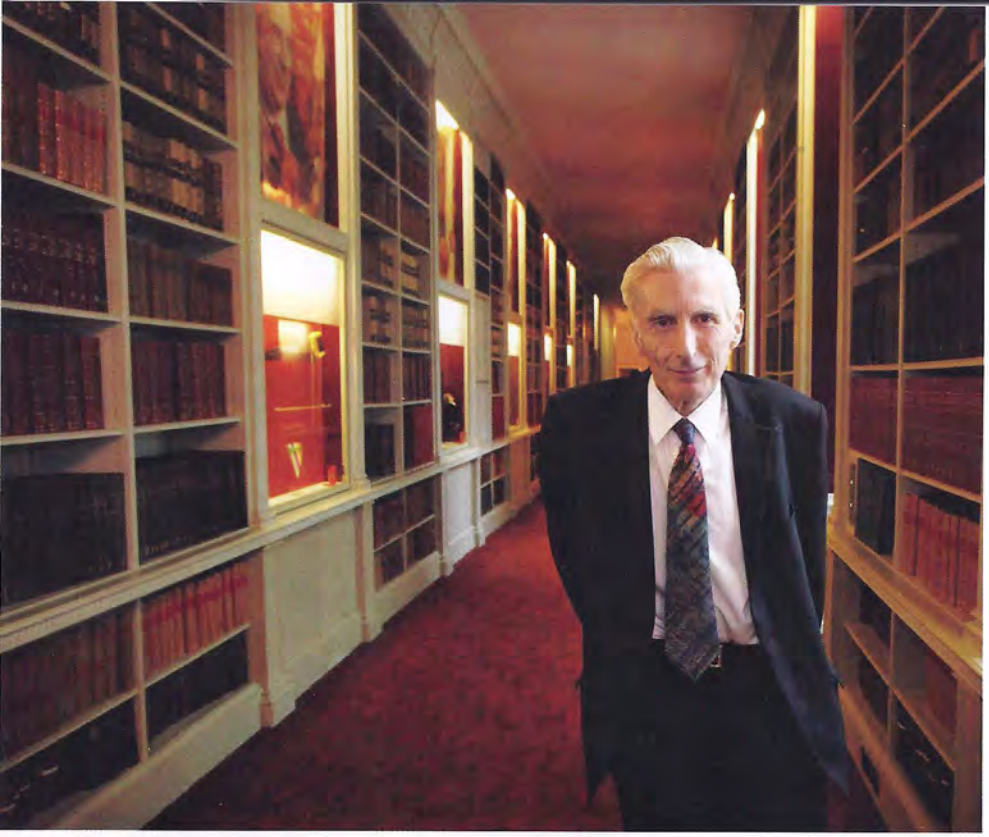
SUPERSTAR STRING PLAYER

Science fans have never had it so good. As worthy heir to the cool-geek throne of Carl Sagan, Brian Greene packs a huge amount of smarts and enthusiasm into his passion for science. In addition to being director of Columbia's Institute for Strings, Cosmology, and Astroparticle Physics, Greene is also co-founder of the World Science Festival and author of *New York Times* bestsellers *The Elegant Universe* and *The Fabric of the Cosmos* (both made into *NOVA* series on PBS), as well as other books. Greene doesn't just explain astrophysics; in his day job he ponders string theory, which aims to unify gravity and quantum physics.

Neil DeGrasse Tyson

HAYDEN PLANETARIUM DIRECTOR

When the American Museum of Natural History remodeled its Hayden Planetarium in the late 1990s, director Neil deGrasse Tyson quietly recast the solar system, and Pluto got the boot as a planet. A great fuss ensued, although astronomers would not officially demote Pluto until 2006. For Tyson, it was a perfect teaching moment—and as the host of several PBS *NOVA* series, including an upcoming remake of Carl Sagan's landmark series *Cosmos,* he knows teaching moments when he sees them. Tyson is also the author of 10 books, including a memoir, *The Sky is Not the Limit: Adventures of an Urban Astrophysicist*



Martin Rees

ASTRONOMER ROYAL OF BRITAIN

In his post since 1995, Rees follows such celebrated predecessors as Edmund Halley, best known for predicting the return of the comet that came to bear his name. "Astronomers might seem the most helpless of all scientists," wrote Rees recently. "They can't do experiments on stars and galaxies, and human lives are far too short for us to watch most cosmic objects evolve." But fortunately, what the universe lacks in convenience, it makes up for in quantity. As a theoretical astrophysicist, Rees has pondered quasars, gamma-ray bursts, galactic nuclei and gravitational waves, as well as the possibility that our universe is merely one part of a vast multiverse.

David Spergel

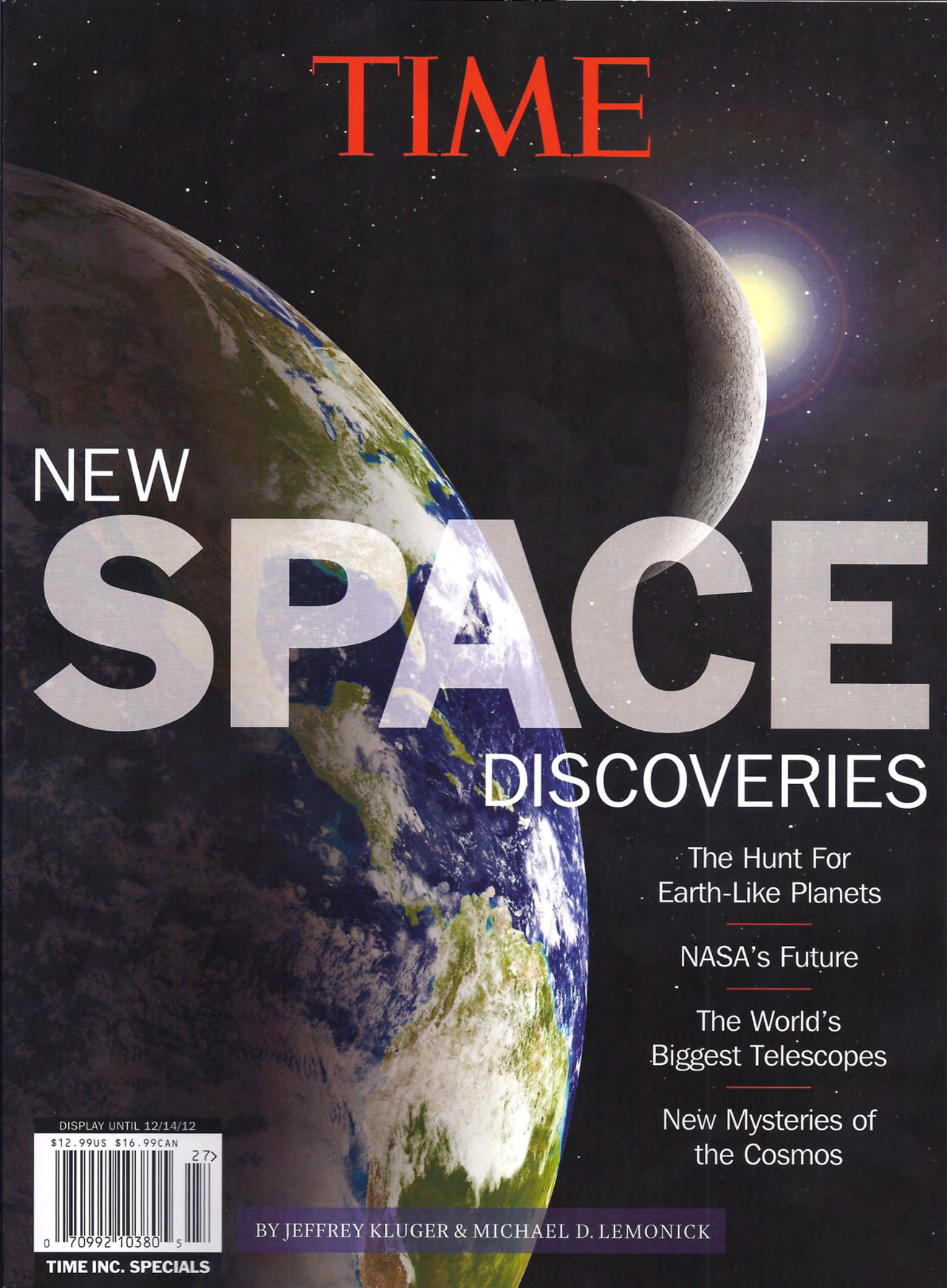
DARKSIDE MAPPER

The satellite's name is a tongue twister—the Wilkinson Microwave Anisotropy Probe (WMAP)—but for astrophysicists like Princeton University's David Spergel, the data it has collected is pure gold. By revealing minute variations in the cosmic background radiation, WMAP has allowed researchers to fix the age of the universe at 13.75 billion years and conclude that the visible matter we take for reality makes up only a fraction (4.6%) of the universe; the rest comprises two little-known entities, dark matter and dark energy, providing a new frontier of epic mystery.

David Charbonneau

EXOPLANETOLOGIST

Imagine a character in a play stepping out of the shadows and into a spotlight at center stage. That's basically how Harvard University astronomer David Charbonneau finds planets orbiting other stars. When a faraway exoplanet passes in front of its star, it becomes visible, explains Charbonneau, and offers astronomers "unparalleled opportunities to determine the properties of the planet and its atmosphere." Charbonneau, who leads an exoplanet survey called the MEarth Project, began his search as a graduate student using a 4-in. telescope; today he uses the Kepler, Spitzer and Hubble space telescopes, as well as an eight-telescope array on Mount Hopkins in Arizona.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