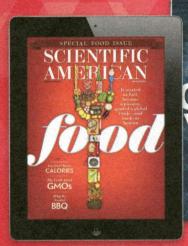
EXCLUSIVE OFFER FOR SUBSCRIBERS ONLY





UPGRADE TO PRINT+DIGITAL!

Upgrade your print subscription to include digital access and read Scientific American anytime, anywhere with any computer, tablet or smartphone. Upgrade online now with one of these special offers!

1014760 P-325 P52414 10

0151/ET2331

********FIKW. *CAK-KT LOT**C-008

PRINT+DIGITAL

www.scientificamerican.com/upgrade1 ENTER CODE: UPGRADE 1

ALL-ACCESS

www.scientificamerican.com/upgrade2 ENTER CODE: UPGRADE 2

Limited-time offer available to current subscribers only. See back for details.

INTRODUCTION

32 Einstein

A hundred years ago Albert Einstein published his general theory of relativity and rewrote the rules of our physical world. By the Editors

ESSAY

34 Why He Matters

Einstein's mind had an astonishing influence on our civilization.

By Brian Greene

HISTORY

38 How Einstein Reinvented Reality

Amid personal troubles, political tension and fierce competition, a grand theory was born.

By Walter Isaacson

Also: Relativity Primer

THOUGHT EXPERIMENTS

46 Head Trip

Einstein's thought experiments forged new frontiers in physics. *By Sabine Hossenfelder*

COSMOLOGY

50 What Einstein Got Wrong

The visionary scientist repeatedly misjudged the value of his ideas. By Lawrence M. Krauss

A LEGACY IN NUMBERS

56 Relativity's Reach

A map of Einstein's influence.

FUNDAMENTAL PHYSICS

60 Cleaning Up after Einstein
His quest for a theory of everything
failed, so today's physicists are
trying new strategies.
By Corey S. Powell

THEORY

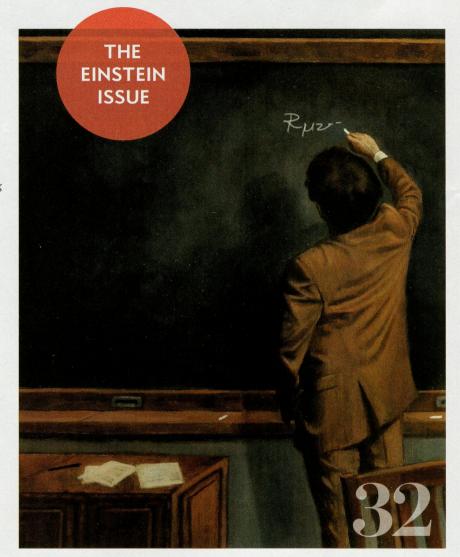
68 A Brief History of Time Travel

Moving forward is easy. Backward poses a challenge. *By Tim Folger*

ASTRONOMY

74 The Black Hole Test

Does general relativity work in extreme gravity? By Dimitrios Psaltis and Sheperd S. Doeleman



A STUDY IN CONTRASTS

80 Who Was Einstein, Really?

The great scientist's life and personality.

NEUROSCIENCE

82 Genius in a Jar

Decades of picking over Einstein's brain have brought us no closer to understanding what made him so smart. *By Brian D. Burrell*

QUANTUM PHYSICS

88 Is the Cosmos Random?

Einstein's claim that God does not play dice with the universe has been seriously misinterpreted.

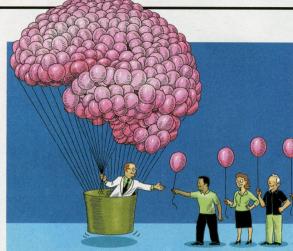
By George Musser



ON THE COVER

Albert Einstein's enigmatic face has captivated the world nearly as long as his theories have. The scientist's hallmark hair and soulful eyes have become an icon of genius. This special issue investigates the great man's life, legacy and the future of his ideas on the 100th anniversary of his greatest success, his general theory of relativity. Illustration by Daniel Adel.

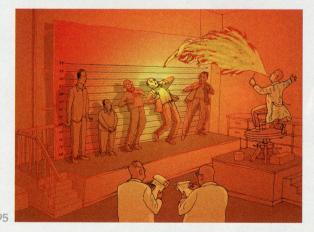
SCIENTIFIC AMERICAN



14



21



6 From the Editor

8 Letters

12 Science Agenda

Budget meddling by Congress could cripple crucial Earth science programs. *By the Editors*

14 Forum

Brain researchers are overwhelmed with data. Hackers can help. By Daniel Goodwin

16 Advances

Why Lyme disease may linger. Underwater greenhouses. The SAT revamped. A toy car powered by evaporation.

29 The Science of Health

A Mediterranean-style diet in later stages of life may slow memory loss. *By Dina Fine Maron*

31 TechnoFiles

The new breed of virtual assistant is scary smart. By David Pogue

94 Recommended

Recent takes on Einstein. By Clara Moskowitz

95 Skeptic

How trustworthy are DNA and other crime scene tests? By Michael Shermer

96 Anti Gravity

Birds show math skills; dogs showcase loyalty. Bu Steve Mirsku

98 50, 100 & 150 Years Ago

100 Graphic Science

Populous cities are supposed to emit less carbon per capita, but they don't always. *By Amber Williams*

ON THE WEB

General Relativity at 100

Take a quiz about Einstein, read about the real story of $E = mc^2$, explore an interactive relativity infographic, watch a video about the theory, and more. Go to www.ScientificAmerican.com/relativity

Scientific American (ISSN 0036-8733), Volume 313, Number 3, September 2015, published monthly by Scientific American, a division of Nature America, Inc., 1 New York Plaza, Suite 4500, New York, N.Y. 10004-1562, Periodicals postage paid at New York, NY., and at additional mailing offices. Canada Post International Publication Mail (Canadian Distribution) Sales Agreement No. 40012504. Canadian BN No. 127387652RT; TVQ1718059275 TQ0001 Publication Mail Agreement #40012504. Return undeliverable mail to Scientific American, P.O. Box 819, 5tm Main, Markham, ON L3P 8A2. Individual Subscription rates: 1 year \$39.97 (USD), Canada \$49.97 (USD), International \$40 (USD). Institutional Subscription rates: 1 year \$39.97 (USD), Canada \$77 (USD), International \$84 (USD). Businesses and Colleges/Universities: 1 year \$330 (USD), Canada \$333 (USD), Canada \$333 (USD), Canada \$333 (USD), Canada \$333 (USD), International \$34 (USD). Postmaster: Send address changes to Scientific American, Box 3187, Harlan, Iowa 51537. Reprints available: write Reprint Department, Scientific American, 1 New York Plaza, Suite 4500, New York, N.Y. Copyright © 2015 by Scientific American, a division of Nature America, Inc., All rights reserved.