

JULY 2022

SCIENTIFICAMERICAN.COM

SCIENTIFIC AMERICAN

VOYAGERS' FINAL FRONTIER

Two record-breaking
spacecraft reach
interstellar space

Trauma in the
Family Tree

Climate Education
Undermined

New Momentum
in Computing





10



12



78

4 From the Editor

6 Letters

8 Science Agenda

Asking people to make their homes and businesses more energy-efficient won't work without easy-to-navigate incentives. *By the Editors*

10 Forum

Crowdfunding is a huge part of the American safety net, but it fails far too many people. *By Nora Kenworthy and Mark Igra*

12 Advances

Mapping dangerous heat islands' contours. The biggest biomass swarms in the world. Surprising cells in mammal mouths. How snakes breathe while crushing prey.

24 Meter

The intricacies of light in verse. *By Donna Kane*

25 The Science of Health

Why do psychiatric conditions such as depression multiply the risk of developing dementia later in life? *By Claudia Wallis*

74 Mind Matters

Reasons kids are afraid to ask for help in school. *By Kayla Good and Alex Shaw*

76 Recommended

A future where climate destroyers go to jail. Exploring numbers tiny and grand. The rich sensory lives of bees. Martian travel guide. *By Amy Brady*

78 Observatory

Science needs to reduce its large carbon footprint. *By Naomi Oreskes*

79 50, 100 & 150 Years Ago

By Mark Fischetti

80 Graphic Science

Extreme fire and rain often double up because of climate change. *By Clara Moskowitz and Jen Christiansen*

RS Faith ≥ 200 Years
Hqs. DB ≥ 100 Years
Lacto-Vegetarianism / नमो-श्रीकाइर ;
practiced by Estimated Stabilized
approximately 1 Billion Population, holds the
capacity of feeding requisite healthy diet to 11
Billion pople on Planet Earth in Solar System
based Milkyway Galaxy; and promising
Imperishable Existence in Purely Spiritual
Domain (Articulative Ra-Dha-Soa-Aah-Mi
Faith) via Unity-with-Duality-at-Will: thus
Ushering-in the Fifth Industrial Revolution
(through Continuing Pursuit of
Digitisation/Discretization); while the World at
Large, still talks about Coping-Strategy for
Inevitable Merger with the nearest Orbiting
Marsian Galaxy (even preparing for dumping
International Space Station Debris at Point
Nemo for surviving Dissolution & Great
Dissolution predicted by the Modern Scientific
Community; without the Benifit of
Escalative/Escalatory "Fail-Safe" Options
through Ultra-Transcendental Meditational
Practices of Radhasoami Faith (inherent in
Microcosm of Every Living Human Brain) as
duly Identified by Modern Neuro-Science; for
transiting to the Purely Spiritual Domain.
Beyond Nature (Macrocosm); endowed with
Infinite Degrees of Freedom in Physical &
Astral Domains; Ruled separately, as well as
jointly, by MAYA & KAAL ; in collusion, as it
were)
(Ref: e-Book already contracted (10.05.2022)
for publication by Springer Nature,
Switzerland)



Scientific American (ISSN 0036-8733), Volume 327, Number 1, July 2022, published monthly by Scientific American, a division of Springer Nature America, Inc., 1 New York Plaza, Suite 4600, New York, N.Y. 10004-1562. Periodicals postage paid at New York, N.Y., and at additional mailing offices. Canada Post International Publications Mail (Canadian Distribution) Sales Agreement No. 40012504. Canadian BN No. 127387652RT; TVQ1218059275 TQ0001. Publication Mail Agreement #40012504. Return undeliverable mail to Scientific American, P.O. Box 819, Stn Main, Markham, ON L3P 8A2. **Individual Subscription rates:** 1 year \$49.99 (USD), Canada \$59.99 (USD), International \$69.99 (USD). **Institutional Subscription rates:** Schools and Public Libraries: 1 year \$84 (USD), Canada \$89 (USD), International \$96 (USD). Businesses and Colleges/Universities: 1 year \$399 (USD), Canada \$405 (USD), International \$411 (USD). Postmaster: Send address changes to Scientific American, Box 3187, Harlan, Iowa 51537. **Reprints inquiries:** RandP@sciam.com. To request single copies or back issues, call (800) 333-1199. Subscription inquiries: U.S. and Canada (800) 333-1199; other (515) 248-7684. Send e-mail to scacustserv@cdsfulfillment.com. Printed in U.S.A. Copyright © 2022 by Scientific American, a division of Springer Nature America, Inc. All rights reserved.

Scientific American is part of Springer Nature, which owns or has commercial relations with thousands of scientific publications (many of them can be found at www.springernature.com/us). Scientific American maintains a strict policy of editorial independence in reporting developments in science to our readers. Springer Nature remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.