

MAKING WAVES



2017 ANNUAL REPORT



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Science News | NOVEMBER 25, 2017

GOING APE

Orangutans living in the forested foothills of Sumatra became their own species in 2017: *Pongo tapanuliensis*, or the Tapanuli orangutan. Skeletal and genetic evidence puts these apes on an evolutionary trajectory separate from other orangutans in Sumatra and Borneo. Numbering no more than 800, the Tapanuli orangutan lives on the brink of extinction due in part to habitat degradation and hunting.

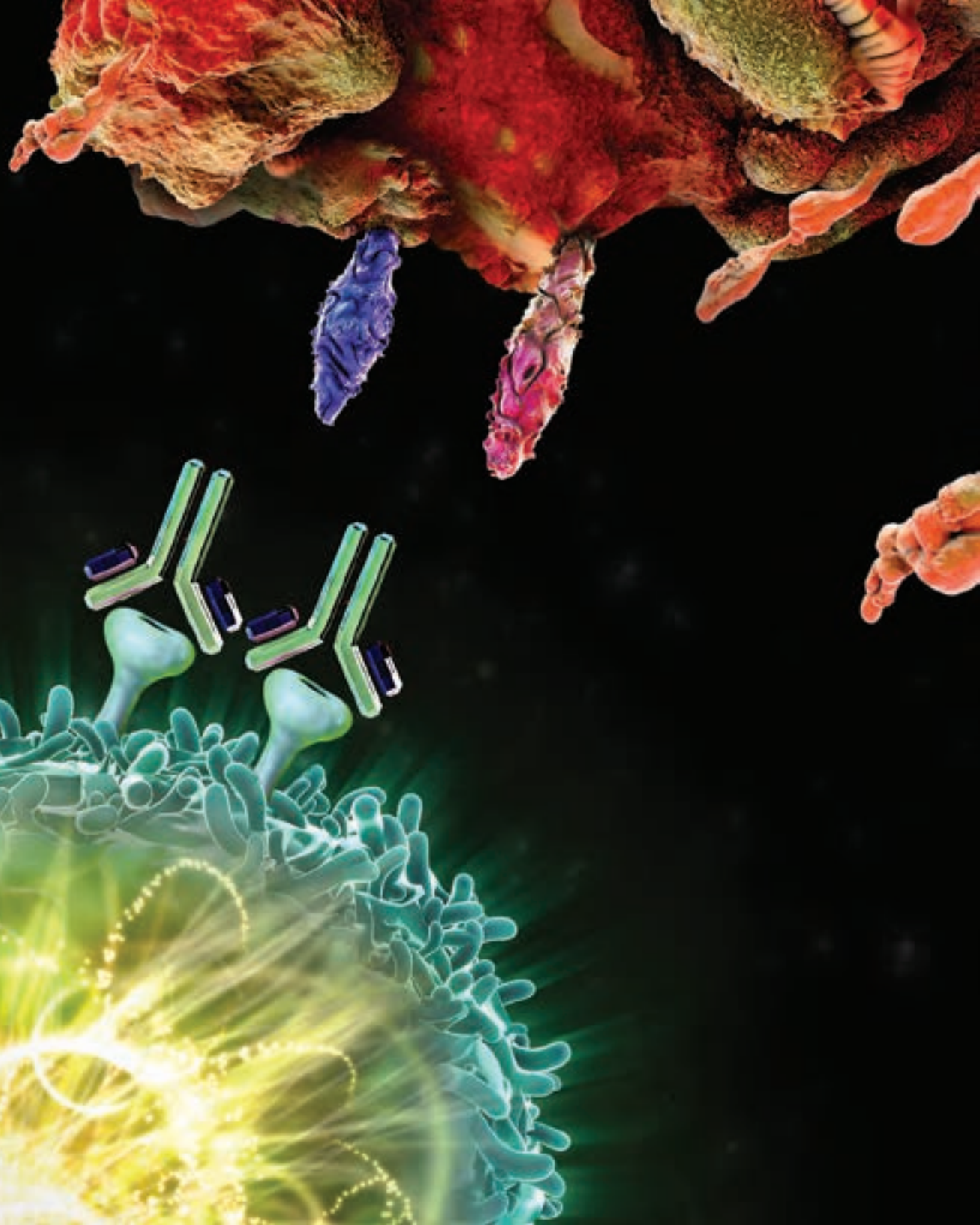
TIM LAMAN

Science News | JULY 8, 2017

CANCER COMBAT

An antibody sold as Keytruda can rev the body's immune system to combat cancer. By locking onto T cell receptors, the antibody blocks a tumor (top) from shutting down the T cell (bottom). The T cell is thus free to attack. In a study reported in 2017, the therapy was effective against 12 different types of solid tumors and controlled cancer in 77 percent of patients studied.

COURTESY OF MERCK & CO.



2017 YEAR IN REVIEW



I am delighted to introduce the Society for Science & the Public's 2017 Annual Report, *Making Waves*, which celebrates another outstanding year of our impact in championing science.

The award-winning Science News Media Group lived up to its legacy in 2017 by winning the Imagination Award from the Association of Magazine Media in the content category for our Gravitational Waves special report and the Eddie Award from Folio: in the full issue category for our Dino Doodson special report.

In 2017, the Science Talent Search (STS) was sponsored by Regeneron for the first time. We continue to honor the country's best and brightest young scientists through the nation's oldest and most prestigious science and mathematics competition for high school seniors. Through the extraordinary commitment of STS alumni Leonard S. Schleifer (1970 STS), Regeneron Founder, President & CEO, and George D. Yancopoulos (1976 STS), Regeneron President & Chief Scientific Officer, and the entire Regeneron team, we celebrated these young scientists with more than \$3 million in awards, including a top award of \$250,000.

The vision of the Society's President & CEO and Publisher of *Science News*, Maya Ajmera, resulted in significant increased visibility of the Society's brand in 2017, with news stories about the Society's programs achieving national coverage such as *The New York Times*, The Weather Channel and CBS This Morning and international coverage by the BBC and *The Times of India*. We are truly making waves.

I personally thank the Board of Trustees, whose commitment and guidance ensure the continued success of the Society. In particular, I want to thank Frank Wilczek, who retired as a Trustee in 2017. As a Society alumnus (1967 STS), Nobel Prize winner (Physics 2005) and

world-famous author, he has been a valuable voice on the Board of Trustees for almost a decade.

The Society welcomed three new members to our Board of Trustees in 2017: Christy Burton, Martin Chalfie and Feng Zhang. These three education and scientific leaders add expertise to the Board and will increase our ability to enable the Society to make waves into the future.

Christy Burton is the Co-Founder & Chair of The Burton Family Foundation. Martin Chalfie is a University Professor of Developmental Biology, Neurobiology, and Genetics & Genomics at Columbia University and received the Nobel Prize in chemistry in 2008. Feng Zhang, an alumnus of the 2000 STS and the 1998 and 1999 International Science and Engineering Fairs, is the Poitras Professor of Neuroscience at MIT and a core member of the Broad Institute.

Most importantly, we could not do our work without the generous support of you, the Society's subscribing members, donors, alumni and readers. I thank you for helping us to make waves as we champion science.

Sincerely yours,

H. Robert Horvitz, Ph.D.
Chair, Board of Trustees
Nobel Prize in Medicine or Physiology, 2002
Professor of Biology, Massachusetts Institute
of Technology
Investigator, Howard Hughes Medical Institute
Investigator, McGovern Institute



Science News | JULY 8, 2017

BIT VARIETY

Companies including IBM and Google are focused on building quantum computers from superconducting qubits. But there are other strategies. In this device from the University of Maryland, five ions sit in the gap at the center of the gold-colored blades, each about 2 centimeters long. Here, the ions are the qubits — and a computer built from 32 ions is currently in the works.

EMILY EDWARDS/JOINT QUANTUM INSTITUTE/UNIV. OF MARYLAND



I am pleased to present our 2017 Annual Report — *Making Waves*. This year has certainly been about making waves for the Society, from bringing on a new sponsor for our historic Science Talent Search (STS) to bringing *Science News* to profitability.

Thanks to the visionary leadership of STS alumni Leonard Schleifer (1970 STS), Founder, President & CEO, and George D. Yancopoulos (1976 STS), President & Chief Scientific Officer, Regeneron is supporting young scientists who are generating ideas and solutions to address the world's most intractable problems. As part of its sponsorship of the Science Talent Search, Regeneron committed \$100 million over 10 years, doubling the annual STS awards to more than \$3 million to better reward the Science Talent Search finalists, scholars and their schools. It was an honor to award our largest prize ever of \$250,000 — a life-changing award — to Indrani Das for her research into neurological damage.

The company's powerful investment of \$30 million into the Society's outreach and equity programs has opened the door for the Society to better help educators across the country engage young people in scientific research, with a specific emphasis on underserved communities.

Regeneron's support for *Science News* in High Schools, along with support from other corporations, foundations and philanthropists, ensures we can bring our award-winning journalism to student scientists across the country. In 2017, we brought *Science News* in High Schools to more than 4,300 schools in all 50 states; Washington, D.C.; Puerto Rico; American Samoa and the UK, reaching more than 4.1 million students and 13,000 teachers.

Science News in High Schools, along with a restructured *Science News* newsroom using a digital-first

strategy, helped bring our news organization to profitability — for the first time in a decade. The Society's renewed focus on communications, marketing and fundraising also contributed to *Science News*' positive bottom line.

The pages of this Annual Report highlight some of the impressive and exciting stories from our best-in-class reporters, including the news event that inspired our *Making Waves* theme: scientists' detection of gravitational waves coming from a collision between two neutron stars. We were also thrilled to see Kip Thorne, a 1958 alumnus of the Science Talent Search, win the Nobel Prize in physics for his work around gravitational waves. This brings the number of Science Talent Search alumni who have won Nobel Prizes to 13.

The Society's high-caliber reporting and education programming can only take place thanks to the Society's exceptional team. I am also grateful for the expansive network of thousands of judges and volunteers who ensure the success of our world-class science competitions. Additionally, I appreciate the steadfast stewardship of the Society by our Board of Trustees and am pleased to welcome Christy Burton, Martin Chalfie and Feng Zhang. None of this would be possible without your generous commitment to our work. Thank you for all that you do to ensure the Society's success and impact.

With best wishes,

Maya Ajmera
President & CEO
Publisher, *Science News*
1985 Science Talent Search



Science News | SEPTEMBER 2, 2017

LAST HURRAH

After a marathon performance, the Cassini spacecraft (illustrated) used its final burst of fuel to plunge into Saturn in 2017. Cassini spent 20 years in space, circled Saturn more than 200 times and took hundreds of thousands of images of the giant planet and its many moons. Data from the final dive should help solve some basic mysteries, including when the planet got its iconic rings.

JPL-CALTECH/NASA



MAKING WAVES

Science News | DECEMBER 23, 2017

OUT WITH A BANG

The collision of two neutron stars was *Science News*' top story of 2017. Almost overnight, the discovery vanquished some theories and vindicated others. It has implications, for example, for the origins of the universe's heaviest elements, the mysterious dark energy that makes up most of the cosmos and the source of long-mysterious, brilliant flashes of high-energy light.

CI LAB/NASA GODDARD SPACE FLIGHT CENTER

The Society for Science & the Public is a champion for science, dedicated to expanding scientific literacy, effective STEM education and scientific research. Founded in 1921 by Edward W. Scripps, a renowned journalist, and William Emerson Ritter, a zoologist, the Society is a nonprofit 501(c)(3) membership organization focused on promoting the understanding and appreciation of science and the vital role it plays in human advancement: to inform, educate and inspire.

For nearly 100 years, the Society has published the award-winning

Science News (SN), an in-depth and trustworthy source of science journalism. The Science News Media Group offers readers concise and comprehensive editorial content, informative imagery, educational products and access to archives going back to 1924. This includes *Science News for Students*, an award-winning, free digital resource serving students, parents and teachers. *SN* has nearly 120,000 subscribers, more than 10 million unique website visitors annually, 2.7 million Facebook fans and 2.7 million Twitter followers.

In 1942, the Society launched the first of its science competitions, the Science Talent Search, the nation's oldest and most prestigious science and math competition. In 2017, Regeneron took over as the competition's third sponsor, following Westinghouse and Intel. The Society also founded and produces the Intel International Science and Engineering Fair and the Broadcom MASTERS (Math, Applied Science, Technology and Engineering for Rising Stars). The Society's Affiliated Fair Network encompasses 425 U.S. and international fairs

and is a gateway to higher education and STEM careers for millions of students each year. The 60,000 alumni of our competitions form a community of thought leaders and innovators of all ages and from all industries.

The Society is thrilled to present its 2017 Annual Report. We are looking back on a year of exciting announcements that most certainly had us making waves.

2017 SOCIETY TOP TEN

2017 marked the first year in Regeneron's 10-year, \$100 million sponsorship of the Science Talent Search (STS). Indrani Das, of Oradell, N.J., won the top award for her study of a possible approach to treating the death of neurons due to brain injury or neurodegenerative disease.



The Society named 45 Advocates who worked to expand STEM opportunities for underserved students. The program seeks to open the door to scientific research for underserved students, many of whom are unaware of or unable to take advantage of science fair competitions.



Nearly 1,800 young scientists selected from 425 affiliated fairs in 78 countries, regions and territories competed at the 2017 Intel International Science and Engineering Fair (ISEF) in Los Angeles, Calif. The Society was proud to welcome Zimbabwe and Ghana to ISEF for the first time. Ivo Zell, of Hessen, Germany, won the first-place award of \$75,000.



The Society was proud to award \$120,000 in grants to science research teachers to purchase much-needed equipment and \$55,000 to 13 innovative organizations supporting community-based STEM projects through its STEM Action & Research Grants program.



Science News' coverage of the 2017 eclipse included a series examining what we can learn from a total solar eclipse, featuring an interactive high-lighting the paths of future solar eclipses.



In October, 200 STEM research teachers from across the country came together to share best practices at the 2017 Research Teachers Conference, sponsored by Regeneron.



Science News for Students continued its series on the need for greater diversity in STEM. This year's focus was on the need for more people of color in STEM and the role of people with disabilities in STEM. The series was made possible thanks to Arconic Foundation.



One of our own, alumnus Ben Hylak, spoke to the 30 finalists who competed in October in the Broadcom MASTERS. Faris Irwin Wald of Santa Fe, N.M., won the top award, the \$25,000 Samueli Foundation Prize, for his achievements in STEM, critical thinking and collaboration.



The Society added three new members to the Board of Trustees: Feng Zhang, noted scientist and alumnus of the 1998 and 1999 ISEF as well as the 2000 STS, Nobel Prize-winning scientist Martin Chalfie and distinguished philanthropist and investor Christy Burton. Their experience will be invaluable to the Society.



The Society named Nancy Shute Editor in Chief of *Science News*. She will lead the *Science News* newsroom and digital transformation. Previously, Shute was cohost of NPR's health blog, *Shots*, and contributed news coverage and features to NPR's *All Things Considered* and *Morning Edition*.

Science News | AUGUST 19, 2017

IN MOTION

New evidence for a particle that is its own antiparticle, called a Majorana fermion, turned up in a quantum layer cake this year. To observe the signature of the particle, proposed in 1937, researchers coupled a topological insulator (gray bar in this illustration), which conducts electricity only on its edges, with a superconductor layer. Blue, orange and purple lines show the paths of Majorana fermions; green lines are traveling electrons.

BEIJING SONDII TECHNOLOGY CO. LTD.

SOCIETY COMPETITIONS

TOMORROW'S LEADERS

Left to right: Third-place winner Arjun Ramani, First-place winner Indrani Das and Second-place winner Aaron Yeiser.



REGENERON'S FIRST SCIENCE TALENT SEARCH



The Regeneron Science Talent Search (STS), a program of the Society for Science & the Public, is the nation's oldest and most prestigious science and mathematics competition for high school seniors. In 2017, Regeneron became only the third sponsor of the Science Talent Search, following previous sponsors Westinghouse and Intel, with a 10-year, \$100 million commitment that significantly increased the awards offered to students and schools. From nearly 1,800 applicants, 300 students were named scholars, with each scholar and their school receiving \$2,000 apiece. Forty finalists were selected to each receive \$25,000 and a trip to Washington, D.C., to compete for \$1.8 million in awards.

During the Science Talent Institute in March, George Yancopoulos (1976 STS), President & Chief Scientific Officer at Regeneron, served as the alumni speaker, challenging the finalists to do good in the world. The finalists shared their research

at the Public Exhibition of Projects at the National Geographic Society, in addition to visiting the National Institutes of Health and the Janelia Research Campus of Howard Hughes Medical Institute. The finalists also met with their members of Congress on Capitol Hill after attending a special breakfast hosted by Regeneron Founder, President & CEO Leonard Schleifer (1970 STS).

Indrani Das, of Oradell, New Jersey, won the \$250,000 top prize for her study of a possible approach to treating the death of neurons due to brain injury. Second place and \$175,000 went to Aaron Yeiser, of Schwenksville, Pennsylvania, who developed a mathematical method for solving partial differential equations on complicated geometries. The third-place \$150,000 winner was Arjun Ramani, of West Lafayette, Indiana, for blending the mathematical field of graph theory with computer programming to answer questions about networks at faster rates.



Left to right: Frank Sandy, 1954 Science Talent Search alumnus with his grandson Aaron Yeiser, 2017 STS second place winner.



Left to right: Nathaniel Lee, Emily Peterson and Archana Verma are visited by Rep. Thomas Suozzi (NY) at the 2017 Regeneron Science Talent Search Awards Gala.



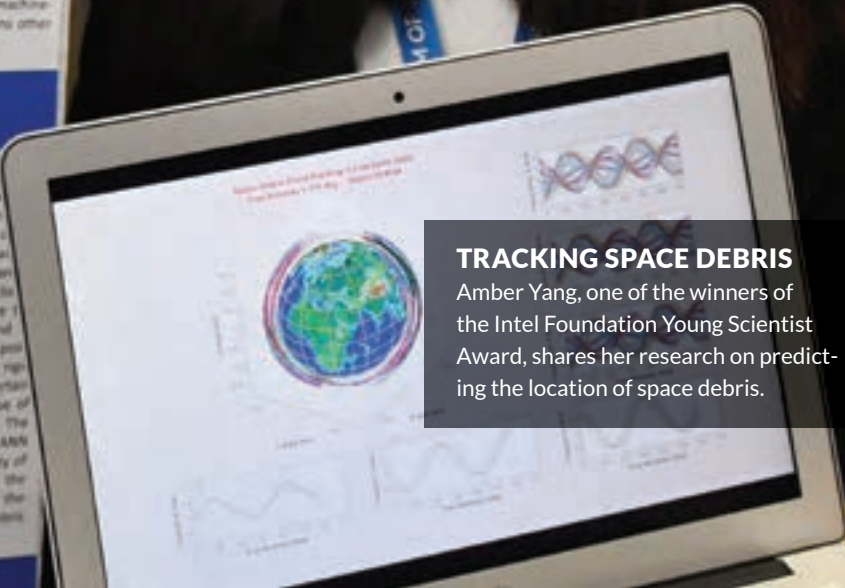


REGENERON'S INAUGURAL PROGRAM

Opposite page, clockwise from top: Archana Verma, 2017 Science Talent Search finalist, displays her project at the Public Exhibition of Projects; 2017 STS finalists Indrani Das and Nathaniel Lee on the U.S. Capitol steps, looking to the future; 2017 STS finalist Steven Elliott shares his project, "A Quadcopter Nonlinear Motor Controller Using Force Sensor Feedback" with interested visitors. This page, clockwise from top: 2017 Regeneron STS first place award is accepted by Indrani Das; Jazz Tobaccowalla from Regeneron, speaks on a panel; Angela Duckworth, author of *Grit: The Power of Passion and Perseverance*, gives the keynote address at the 2017 Awards Gala; Arjun Ramani, 2017 STS second place winner, with 1999 STS alum Erika Ebbel Angle (right) and Suzanne Hammer (left); 2017 STS finalists visit HHMI's Janelia Research Campus.

TRACKING SPACE DEBRIS

The space debris cloud tracking problem was analyzed using an Iterative Cloud (ICP) method to register and align space debris clouds to extract the kinematic patterns from successive ICP transformations. Then, an Artificial Neural Network (ANN) backpropagation method was applied to recognize the dynamic changes of kinematic patterns from the ICP alignment for accurate space debris cloud trajectory predictions. Instead of tracking a single space debris in an orbit, the machine learns ICP registration system was developed to track a group of space debris at point cloud in multiple orbits simultaneously. The ICP method was demonstrated to have abilities to decide shape equivalence between two space debris clouds and estimate the motion between them even though the correspondences of two point clouds are not known to the cloud tracking system beforehand. The rigid transformation between two point clouds in the ICP alignment allows for the shape of level of shape deformation or flexibility in point clouds, especially for the shape of space debris clouds that gradually deform when orbiting around the Earth. The point clouds of the ICP-registered point clouds were extracted through the similarity of point clouds registered in the space debris cloud tracking. Similarity of point clouds was used to manage the ICP alignment accuracy. The ANN trajectory prediction reduced the tracking errors. Simulations of the ANN trajectory prediction using real data of space debris effectiveness of the space debris cloud tracking system using real data of space debris



Estimation Layer	Output Layer	Training Rate	Sampling Measurement	RMSE	Final Samples
6	0.4	0.1	1.0E-6	0.8	

INTEL

2 / 15 6 3.4

g the geometric patterns utilizing the delta differences for the IC-
 ated manner to estimate the new delta-differences in the IC-
 the displacement of T_{new} to reconstruct multiple orbits of wave
 the kinematic patterns into the inputs $(X_{\text{in}}, X_{\text{in}})$ of an ANN-based
 ble weights (W) trained by a backpropagated method, and an
 the IC-kinematic patterns for the next prediction. Therefore, the new IC-

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YOUNG INNOVATORS

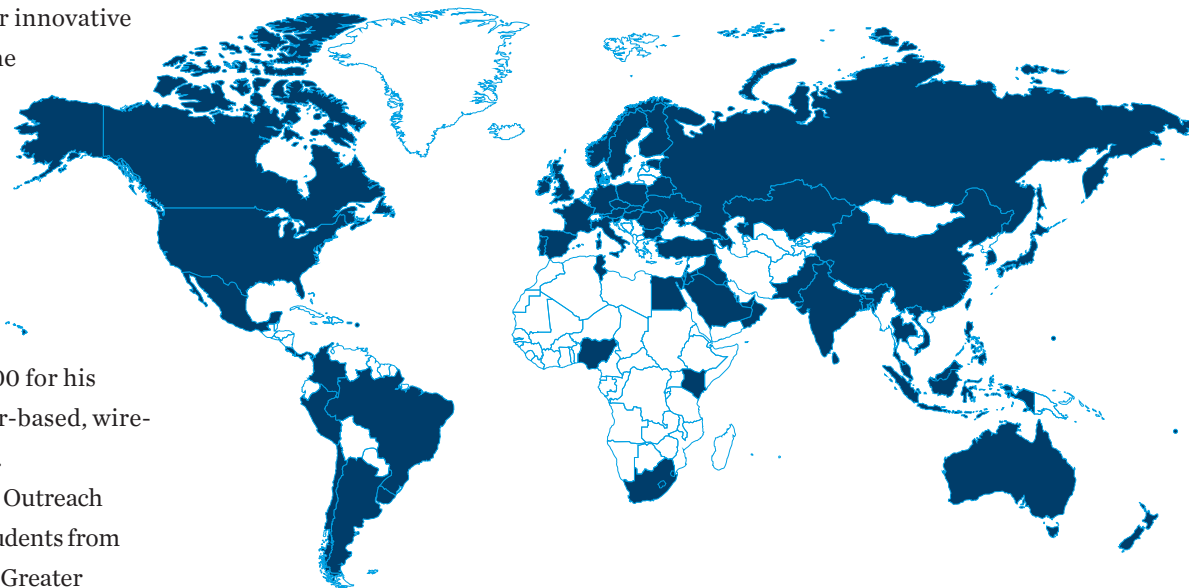
FROM AROUND THE GLOBE

The Intel International Science and Engineering Fair (Intel ISEF), a program of the Society for Science & the Public, is the world's largest international pre-college science competition. The 2017 Intel ISEF, held in Los Angeles, California, proved to be a showcase of the best scientific minds by featuring nearly 1,800 young scientists selected from 425 affiliated fairs in 78 countries, regions and territories. The Society hosted the first annual Innovation and Entrepreneurship Panel, enabling the 2017 finalists to learn from notable alumni about their experiences and the impact of the Fair on their lives. The discussions sparked a new passion for entrepreneurship in the finalists and allowed them to see how far science could take them.

Ivo Zell, of Hessen, Germany, was awarded first place, receiving the Gordon E. Moore Award of \$75,000 for designing and constructing a remote controlled prototype of a new

“flying wing” aircraft. Amber Yang, of Windermere, Florida, received one of two Intel Foundation Young Scientist Awards of \$50,000 for her innovative approach to predicting the locations of clouds of space debris that move in low Earth orbit. Valerio Pagliarino, of Castelnuovo Calcea, Italy, received the other Intel Foundation Young Scientist Award of \$50,000 for his prototype of a novel, laser-based, wireless, high-speed network.

The Society's Education Outreach Day brought over 3,400 students from 53 schools throughout the Greater Los Angeles area to participate in the LA STEM Experience, an event that welcomed over 30 hands-on science exhibitors for students to interact with in addition to meeting finalists.



COUNTRIES WITH ISEF AFFILIATED FAIRS AND FINALISTS

Tens of millions of students compete in science fairs around the world every year, with hundreds of thousands rising to compete in the Society's affiliated fairs.





MIDDLE SCHOOL STEM LEADERS DREAM BIG

Broadcom MASTERS, the premier science and engineering competition for middle school students, is open to the top 10 percent of middle school participants in Society-affiliated science fairs around the country. In 2017, 2,499 students from 49 states, four territories and one Department of Defense school abroad competed. The Top 300 MASTERS were honored, representing middle schools from 37 states, Puerto Rico and the Department of Defense overseas. In late October, the 30 finalists came to Washington, D.C., to present their research and compete in hands-on team challenges to demonstrate their skills in critical thinking, collaboration, communication and creativity.

The finalists competed at the Smithsonian Environmental Research Center, at the Georgetown University School of Medicine and with partners from the Computer History Museum. They presented their research to the

public at Union Station and visited Capitol Hill to meet with their members of Congress.

Faris Wald was named the winner of the Samueli Foundation Prize, receiving \$25,000 for his exceptional performance throughout the week and his research on the relationship between coronal holes and cyclones. Emily Tianshi received the \$20,000 Robert Wood Johnson Foundation Award for Health Advancement, Meghna Behari was named the winner of the \$10,000 Marconi/Samueli Award for Innovation and Helen Lyons received the \$7,500 Lemelson Award for Invention.



MIDDLE SCHOOL STARS

Opposite page: 2017 Broadcom MASTERS finalists on the U.S. Capitol steps. Above: Nora Navid shares her project, “Polling Pollinators: Do Pollinators Prefer Native Plants, Cultivars, or Nativars? A Two-Year Study” with a visitor.

INNOVATION AND ENTREPRENEURSHIP PANEL

Presented by Society for Science & the Public



KAI KLOEPFER

@KaiKloepfer

MEREDITH LEE

@mmlee

ANN MAKOSINSKI

@annmakosinski

SHEEL TYLE

@sheeltyle

TAYLOR WILSON

@Sciradioactive

GEOFFREY WOO

@geoffreywoo

PANEL MODERATOR:

MAYA AJMERA

@MayaAjmera



ALUMNI INNOVATE

The 2017 Intel ISEF held its first ever Innovation and Entrepreneurship Panel. Alumni panelists in industries ranging from nuclear physics to venture capital impressed upon the finalists the significant potential young people have to change the world.

THE ALUMNI EXPERIENCE

THROUGH COMPELLING PROGRAMMING

2017 was a banner year for alumni engagement. From hosting events to volunteering, alumni connected with one another and shared their time, not only lifting each other up but also readying the way for the next generation of science leaders.

This year we were able to offer alumni new and engaging opportunities, including:

- Raising awareness about the Society and how to give back
- Promoting alumni talents beyond the traditional STEM sphere
- Hosting regional and local events

This global alumni network of more than 60,000 innovators, educators, academics and enthusiasts is tackling some of society's greatest challenges. We are excited to broaden our programming and provide a space for alumni to connect and, together, build a better world.



New York Signature Alumni Event

In 2017, the Society hosted its third Signature Alumni event at Jazz at Lincoln Center in New York. The evening began with welcome remarks from Society President & CEO Maya Ajmera (1985 STS). Over 120 alumni and friends of the Society attended the event, which featured a one-on-one conversation with George Yancopoulos (1976 STS), President & Chief Scientific Officer at Regeneron, a flute performance by Sara Kornfeld Simpson (2014 STS; 2011–2012 ISEF) and a panel conversation on the value of science research in solving society's most critical challenges. Panelists included Michael Colsher (1997 STS), Eden Full Goh (2007–2008 ISEF), Kristin Kovner (2000 STS) and Michael Li (2003 STS; 2003 ISEF).



2017 NOBEL PRIZE IN PHYSICS

Kip Thorne (1958 STS) won the Nobel Prize in physics for his work with the Laser Interferometer Gravitational-Wave Observatory (LIGO) and his observations of gravitational waves.



SOCIETY ALUMNI

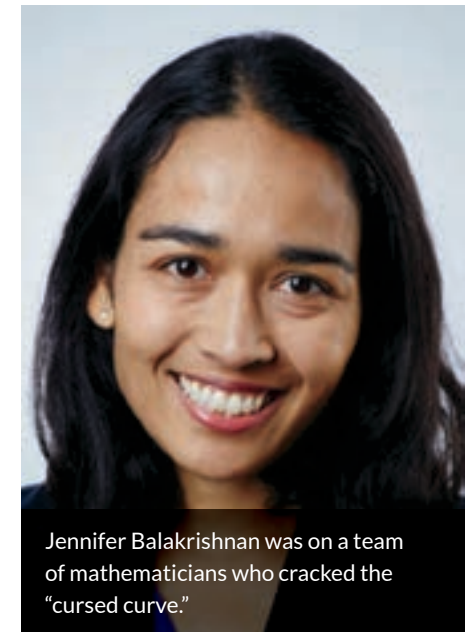
STORIES & SUCCESSES

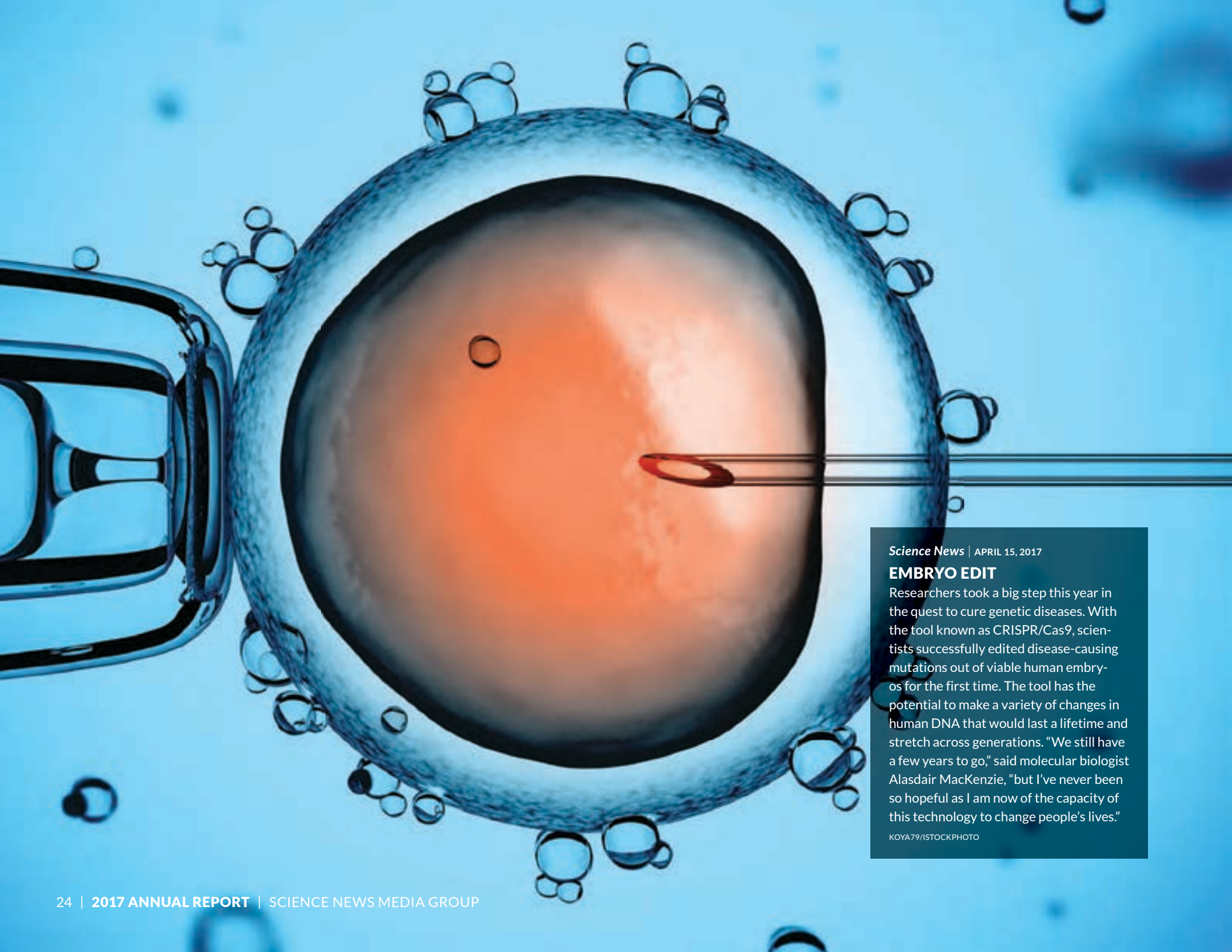
Society alumni are recognized leaders in their fields. In 2017, alumni received national and international recognition for their contributions to science, engineering, technology, innovation and entrepreneurship. Alumni received accolades such as the Breakthrough

Prize in Fundamental Physics; the Nobel Prize in physics; Forbes 30 Under 30; the Blavatnik National Awards for Scientists in Chemistry, Physical Sciences and Engineering, and Life Sciences and the Thiel Fellowship.

“The Society alumni community is an opportunity to establish or maintain a rapport with people who shared a similar experience and who have expanded into many different areas.”

LEON TATEVOSSIAN
1973 STS





Science News | APRIL 15, 2017

EMBRYO EDIT

Researchers took a big step this year in the quest to cure genetic diseases. With the tool known as CRISPR/Cas9, scientists successfully edited disease-causing mutations out of viable human embryos for the first time. The tool has the potential to make a variety of changes in human DNA that would last a lifetime and stretch across generations. "We still have a few years to go," said molecular biologist Alasdair MacKenzie, "but I've never been so hopeful as I am now of the capacity of this technology to change people's lives."

KOYA79/ISTOCKPHOTO

SCIENCE NEWS MEDIA GROUP



Science News | AUGUST 21, 2017

SPECTACULAR SCIENCE

August's Great American Eclipse was much more than a spectacle. As the moon passed in front of the sun, scientists asked some serious questions. Many had to do with the solar corona, the outermost region of the sun's atmosphere. Best observed during a total eclipse, the corona is where the solar wind originates, where loopy magnetic structures are anchored and where space weather gets its start.

ANTHONY QUINTANO/FICKR (CC BY 2.0)

EYES TO THE SKIES

WITH THE ECLIPSE & BEYOND

The greatest science event of the year? Hands down, the Great American Eclipse. As millions of people turned their attention to the skies, *Science News* was ready, reporting live with the help of contributors stationed across the country. True to our mission, we explained the science behind the spectacle to loyal readers and to new audiences with a 10-part online series in the days leading up to the event. Astronomy writer Lisa Grossman reported live from Wyoming on eclipse day, and an accompanying interactive globe put the paths of the next 15 total solar eclipses at the fingertips of online readers.

We were truly in our element, geeking out over how the corona heats, solar mass ejections and general relativity. For nearly a century, *Science News* has covered advances in science, medicine and technology for the general public, and this year was no exception. We were at mission control at NASA's Jet Propulsion

Lab when the Cassini spacecraft crashed into Saturn, and we were quick to jump on news that a giant iceberg had broken from the Larsen C ice shelf. We tracked the latest advances in the CRISPR/Cas9 gene-editing technology, including the first editing of viable human embryos, and the latest finds about human origins. Other top stories of the year included the colliding of neutron stars, the discovery of a family of planets that might harbor life around a star some 39 light-years away, and the approval of gene therapies for treating some types of leukemia and lymphoma. "It is critical in this time of questioning of science that we are able to put sources in front of students that are based on peer-reviewed research," said teacher Coleen Weiss-Magasic, of West Milford Township High School in West Milford, New Jersey. And so we continue our legacy of covering the latest advances, empowering people to evaluate the news and the world around them.



LISTEN UP

The Science News Media Group offered two audiobooks as enticements for new members this year: *Head Space: How our brains rule our lives* and *Life Hacks: Surprising adaptations help plants and animals thrive*. Both books are packed with *Science News for Students* stories appropriate for audiences of all ages. The best part: new members who received an audiobook also supported our journalistic mission.



AUDIENCE FAVORITES OF 2017

Millions of people visited the *Science News* website in 2017, endorsing our coverage with their clicks. Here are the most popular online stories of the year, plus the most-read stories from each of our blogs.

Top stories from the magazine

- 1 **The blue wings of this dragonfly may be surprisingly alive**
Tiny tubes between veins in the shimmering blue wings of morpho dragonflies (one shown) may be respiratory networks that help create nanostructures responsible for the dazzling display (*SN Online*: 6/30/17).
- 2 **Here are the paths of the next 15 solar eclipses**
Did you miss the Great American Eclipse? Find another opportunity using this map of all 15 total solar eclipses worldwide from 2017 to 2040 (*SN Online*: 8/18/17).
- 3 **Mystery void is discovered in the Great Pyramid of Giza**
High-energy particles from space called cosmic rays helped scientists uncover a previously unknown cavity inside one of the world's oldest and largest monuments (*SN Online*: 11/2/17).
- 4 **Ancient DNA offers clues to the Canaanites' fate**
An analysis of five Canaanites' genetic instruction manuals not only revealed the ancient group's roots but also identified descendants — modern Lebanese people (*SN Online*: 7/27/17).
- 5 **How gut bacteria may affect anxiety**
The inventory of tiny molecules called microRNAs in the brain may offer clues to how gut bacteria hijack people's emotions. The recent findings, in mice, could help scientists develop new treatments for mental health problems (*SN Online*: 8/29/17).

Top blog posts

CONTEXT | TOM SIEGFRIED

Quantum mysteries dissolve if possibilities are realities

Incorporating "potential" elements of reality in a complete picture of nature might resolve quantum mysteries (*SN Online*: 10/1/17).

SCIENCE TICKER | SCIENCE NEWS STAFF

Antarctica's Larsen C ice shelf is within days of completely cracking

The crack in Antarctica's Larsen C ice shelf grew 17 kilometers at the end of May (*SN Online*: 6/1/17).

GROWTH CURVE | LAURA SANDERS

Drugs for reflux disease in infants may come with unintended consequences

Infants prescribed proton-pump inhibitors may be at higher risk for broken bones later on (*SN Online*: 5/24/17).

WILD THINGS | SARAH ZIELINSKI

How a dolphin eats an octopus without dying

Dolphins in Australia prep some meals by tossing live octopuses until the creatures are safe to eat (*SN Online*: 4/25/17).

SCICURIOUS | BETHANY BROOKSHIRE

On social media, privacy is no longer a personal choice

Data from a defunct social platform suggest Internet users may need to rethink how they control their personal information (*SN Online*: 8/24/17).

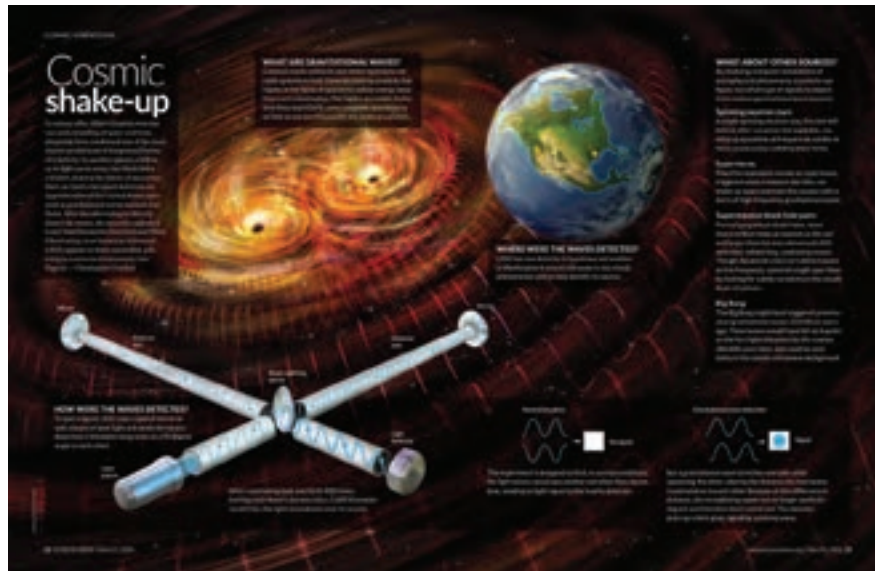
SCIENCE & THE PUBLIC | SCIENCE NEWS STAFF

March for Science will take scientists' activism to a new level

Historians called it an "unprecedented" event; more than 1 million people marched in support of science on April 22 (*SN Online*: 4/19/17).

APPLAUSE AND OUTREACH FOR 2017

We've done it again. *Science News* received several major journalism awards in 2017 in recognition of our outstanding coverage. Our staff also traveled far and wide to spread the word about the value of science and science journalism.



Special Report

Science News received an Imagination Award from the Association of Magazine Media for our Gravitational Waves Special Report (SN: 3/5/16, p. 24). The award recognizes work that is innovative in creating and distributing content across multiple platforms. Among the highlights of the coverage:

- News reporting the announcement of the detection of gravitational waves, by Andrew Grant
- An essay about the history of the search for gravitational waves, by author Marcia Bartusiak
- A print infographic explaining the discovery, by Christopher Crockett
- A video titled "What are gravitational waves?" by Helen Thompson
- An online educator guide for teachers and students related to the discovery



Dino Doomsday

We also won an Eddie award from FOLIO for our special report: Dino Doomsday (SN: 2/4/17, p. 16), which explored the fiery end of the dinosaurs and the new world that followed. The special report included:

- A feature story that revisited the evidence for the dinosaurs' final days, by Thomas Sumner
- A look at the crowd of animals that thrived once dinosaurs were out of the way, by Meghan Rosen
- An online slideshow highlighting the lucky birds that somehow survived the extinction events, by Susan Milius

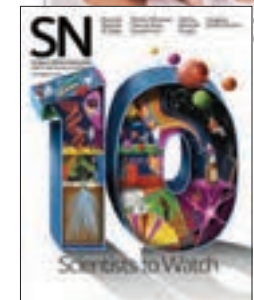
Making News

Growth Curve

In the summer of 2017, *Science News* launched a brand-new Growth Curve blog, where neuroscience writer Laura Sanders, who is a neuroscientist and mother, tackles the inexact science of parenting – revealing what new research can and can't say about pregnancy and raising kids. Sanders has since appeared on Seattle's KIRO Radio talking about kids and screen time and has been interviewed by the website Parentifact.

SN 10

Close on the heels of the Growth Curve launch, in October *Science News* recognized 10 outstanding early- and mid-career scientists with the SN 10: Scientists to Watch list. Academic centers around the country, including MIT, UCLA and the Carnegie Institution, helped us get the word out about these future superstars and their noteworthy work.



Science News for Students | JULY 5, 2017

FLAVORED WATER

From cats to rats to humans, mammals know when they're drinking water. Research reported in 2017 suggests that acid-sensing taste bud cells, the same ones that help people identify a lemon as sour, also help us detect water. Though water may taste like nothing, our tongues definitely sense it as something — a good thing, since water is so essential to survival.

ORANIT6666/ISTOCKPHOTO

EXPLAINING TOPICAL SCIENCE TO STUDENTS

Science News for Students (SNS) brings the latest developments in STEM to students 12 years and older. Engaging stories and imagery nearly doubled the online site's traffic, compared to 2016. By year-end, *SNS* had logged 11.7 million unique visitors, representing readers in more than 120 nations.

Major stories in 2017 included two on the value of diversity in STEM fields: one focused on people of color, the other on researchers with disabilities. This uplifting series profiled how people beat the odds to make major contributions, with tips for the next generation on how to do it. Generous support from Arconic Foundation made the series possible as well as two *SNS* videos that brought the faces and voices of such researchers to young people.

A pair of videos by *SNS* education writer Bethany Brookshire showed students how to test two popular questions: how far will a sneeze spread germs, and will

food retrieved from the floor almost immediately (the “5-second rule”) be safe to eat? Accompanying Eureka! Lab blogs show classrooms how to repeat the experimentation, data acquisition and analysis. *Analyze This!* — a new *SNS* blog series that debuted in 2017 — also helps students learn how to “read” data from tables, charts and graphs.

Teachers have asked *SNS* to give their students a scientific take on topical issues. In 2017, the magazine did just that. Consider “fake news.” *SNS* responded with a series on why people are vulnerable to believing false claims — and how students can seek to identify fact-based assertions in what they read. Major events in 2017 included hurricanes Harvey, Irma and Maria, which devastated the Caribbean and communities in the U.S. Gulf Coast. By the end of September, *SNS* had published six feature-length stories on the storms, focusing on the science behind their impacts.



ALL THE NEWS THAT'S FIT TO PRINT

This special compilation of a *Science News for Students* series on technology and innovation was made possible with generous support from The Lemelson Foundation.

Science News | JUNE 24, 2017

WEBB OF LIFE

NASA's James Webb Space Telescope, scheduled to launch in 2020, will investigate hundreds of transiting exoplanets, including many that orbit stars known as M dwarfs. These stars, the most common type in the galaxy, are smaller, cooler and often harsher than our sun. Still, recent discoveries suggest that the ruddy stars and their planets might be tantalizing targets in the search for extraterrestrial life.

DESIREE STOVER/NASA



OUTREACH & EQUITY



NEWS IN THE CLASSROOM
Through the *Science News* in High Schools program, high schools across the nation receive *Science News*. High school teachers gain a network to discuss best practices for teaching science and getting their students into scientific research.

INSPIRING CURRICULA THROUGH OUR SCIENCE REPORTING

The *Science News* in High Schools program ensures that teachers can help students link what they are learning in their textbooks and labs to the latest discoveries, making topics more current, relevant and understandable to inspire more young people to pursue an interest in science.

More than four million high school students had access to the 2017–2018 *Science News* in High Schools program. In its third year, the program engaged more than 13,000 educators from over 4,350 schools in all 50 states, the District of Columbia, Puerto Rico, American Samoa and the United Kingdom.

Each high school in the program receives 10 copies of each issue of *Science News* magazine throughout the school year, and every participating educator has a digital account to access all program content and the article archives going back to 1924. In addition to award-winning scientific journalism,

high schools receive an interdisciplinary educator guide with each issue, aligned with Common Core and Next Generation Science Standards. A weekly e-newsletter engages educators with the current issue, offering ways to incorporate the content into their classrooms. Teachers also gain access to an online educator community, where they are able to share ideas and best practices.

The program is positively impacting participating schools, many of which are reaching underserved rural and Title I students. Science textbooks are almost immediately out-of-date, whereas *Science News* in High Schools provides award-winning, real-time scientific information.

The Society appreciates the support of Regeneron, Arconic Foundation and The Burton Family Foundation, along with the generosity of individuals and the Society's staff Annual Giving Fund, which have all sponsored schools in the program.

4,350
SCHOOLS

in 50 states as well as Washington, D.C., Puerto Rico, American Samoa and the United Kingdom participated in *Science News* in High Schools during the 2017–2018 school year

4.1
MILLION STUDENTS

gained access to *Science News* in High Schools program content during the 2017–2018 school year

13,100
TEACHERS

directly received the program's content during the 2017–2018 school year

HANDS-ON LEARNING
Gbaweah Sandy conducts scientific research with the help of Advocate Jamie Ludwig.

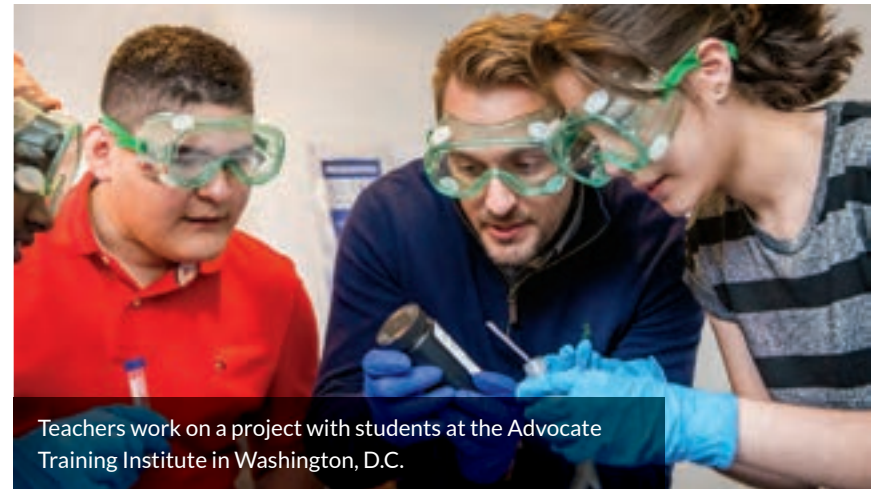
EXPANDING OPPORTUNITIES FOR UNDERSERVED STUDENTS

Continuing the Society's commitment to expanding opportunities for underserved students, the Advocate Grant Program experienced strong growth and success in 2017. Advocates serve as mentors for a group of underserved middle or high school students, helping them transition from doing science projects and research to entering their work in science research competitions. In addition to a stipend, Advocates receive an all-expenses-paid trip to Washington, D.C., for the Advocate Training Institute, an event where they are given additional training and support from Society staff and Lead Advocates. Lead Advocates are returning Advocates who provide an extra layer of support for new Advocates throughout the program via monthly conference calls as well as through an online community.

Following a successful pilot program of nine Advocates in 2015, the Advocate Grant Program expanded to serve 31 participants in 2016. That cohort closed

out their grant cycle in the spring of 2017, having mentored over 500 underserved students, with more than 400 of them entering science research competitions, including local and regional fairs, Intel ISEF and the Regeneron Science Talent Search. In the spring of 2017, the Society welcomed a new cohort of 45 Advocates, including six Lead Advocates. Following the Advocate Training Institute in June 2017, those 45 participants recruited over 700 underserved students, many of whom subsequently entered or will enter science research competitions.

The Society Advocate Grant Program is made possible through the support of Arconic Foundation, Jack Kent Cooke Foundation and Regeneron. Through their support, the number of Advocates continues to grow, enabling the Society to reach and engage underserved students and help them enter STEM competitions.



Teachers work on a project with students at the Advocate Training Institute in Washington, D.C.



Ameka Yawson works on scientific research with Jamie Ludwig, an Advocate for the 2017–2018 school year.



TEACHERS COLLABORATING
At our annual Research Teachers Conference, science research teachers network and gain skills to help their students enter science competitions.

BRINGING TOGETHER STEM RESEARCH TEACHERS

In its third year, the Research Teachers Conference once again brought together 200 teachers from across the country — from veteran research teachers hoping to share their knowledge and seeking reinvigoration to novice teachers aspiring to help students see science in its truest form — authentic science research. A total of 500 teachers from close to 500 high schools have now attended the conference, and many have returned home to inspire change in their school districts. Teachers indicated that their experience at the conference will improve their research classes or programs, lead them to start mentoring students with projects, or connect them with other teachers who can help to sustain their programs throughout the year.

This year's conference highlighted the use of big data in student research projects, and keynote speaker Ruth Krumhansl, of the Oceans of Data Institute, shared how her organization

is working to develop curricula and improve educator access to data sets. Narasim Banavara of Mercy College hosted a session showing how he uses TSA and NYPD data for his students' research projects. Veteran Research Teachers presented on topics such as "Supporting Science Research in Rural Areas" and "Inspiring Student Research with *Science News*."



High school teachers share best practices for supporting students in independent science research.



Teachers gather in Washington, D.C., to connect with a network of their peers.

POWER TOOLS & PROGRAMMING

Electric Girls, a New Orleans-based nonprofit, teaches leadership, electronics and computer programming.

SUPPORTING STUDENTS THROUGH EDUCATORS & NONPROFITS

The Society for Science & the Public recently launched a series of grant programs aimed at supporting teachers, students and innovative nonprofits engaging in STEM activities. Through the STEM Action Grant program, the Society is supporting organizations that advocate for the general public's increased understanding of STEM fields, spark a lifelong interest in and appreciation for STEM fields through unique programming and increase underrepresented populations' participation in STEM fields. In 2017, small grants of up to \$5,000 were awarded to 13 deserving organizations to support their work, totaling \$55,000.

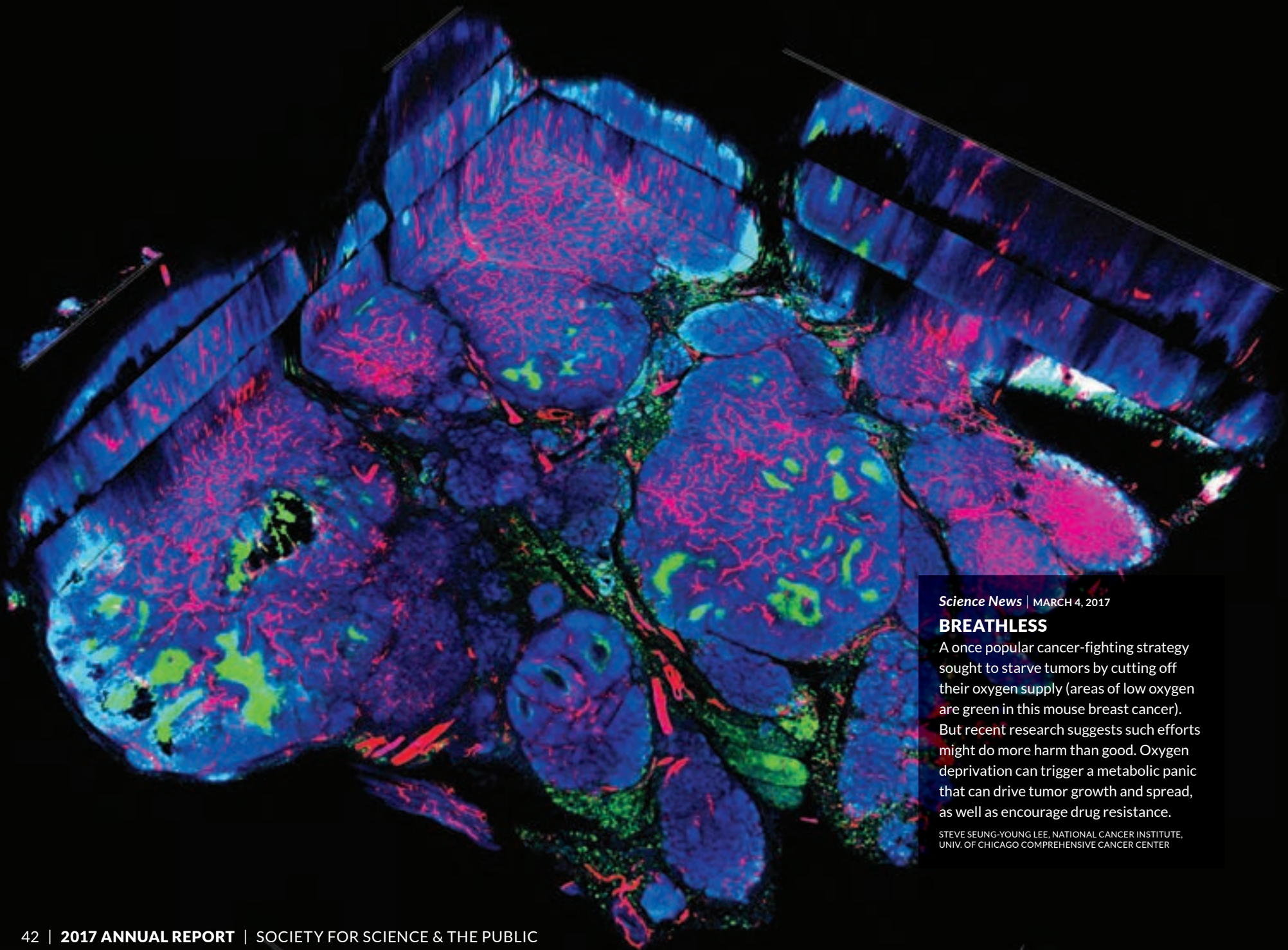
Through the STEM Research Grant program, the Society supports educators who are leading students in authentic STEM research projects, enriching multiple students and supporting low-income or underrepresented students. In total, the Society provided \$120,000 in grants to 29 STEM teachers to fund

materials needed to complete research projects or travel necessary to bring students to locations where they could complete their research.

The Society for Science & the Public Award for Community Innovation was established in 2017 as part of the STEM Action Grant program. Twenty Society-affiliated science fairs were each invited to award \$500 to the project at the fair that provided the best solution to a problem in the local community. The recipients of this award were featured on the Society's blog, and their stories demonstrate how they are making a difference in their hometowns.

2017 STEM ACTION GRANT RECIPIENTS





Science News | MARCH 4, 2017

BREATHLESS

A once popular cancer-fighting strategy sought to starve tumors by cutting off their oxygen supply (areas of low oxygen are green in this mouse breast cancer). But recent research suggests such efforts might do more harm than good. Oxygen deprivation can trigger a metabolic panic that can drive tumor growth and spread, as well as encourage drug resistance.

STEVE SEUNG-YOUNG LEE, NATIONAL CANCER INSTITUTE,
UNIV. OF CHICAGO COMPREHENSIVE CANCER CENTER

SOCIETY FOR SCIENCE & THE PUBLIC



Science News | SEPTEMBER 16, 2017

FROM THE DEEP

About 3,000 meters underwater off the southeast coast of South America, a stream of deep water from the Atlantic Ocean spills into the Southern Ocean. Recent research tracked the path of that water, called the North Atlantic Deep Water, as it spirals southeastward and up toward the surface around Antarctica. This warmer, saltier water has been linked to the melting of ice shelves, including off the western Antarctic Peninsula (shown).

JO CREBBIN/SHUTTERSTOCK

FINANCIALS

The Society for Science & the Public operates two broad areas of program work: science journalism and world-class science competitions for high school and middle school students. Ninety-one cents of every dollar spent by the Society goes to support program work. General and administrative costs are four cents of every expense dollar and fundraising costs are five cents of every expense dollar.

Science competitions remain a vibrant and important segment of program work, accounting for 69 percent of all program spending. The audience for science journalism continued to expand in 2017. The *Science News* website garnered more than 10 million unique visitors during 2017. Twitter followers increased to 2.7 million

and remained steady with 2.7 million Facebook fans.

The *Science News* in High Schools program continues to play a significant role in the Society's outreach efforts. The program is funded through individual and corporate grants that sponsor over 4,350 high schools with 43,450 print magazines and unlimited digital access for each sponsored school. The program serves over 4.1 million students.

The Society's balance sheet is very healthy, with unrestricted current assets exceeding current liabilities by \$27.2 million, yielding a ratio of 4.8 (ratio of current assets to current liabilities). The Society carries no long-term debt and owns its primary office real estate.

The Society's investment portfolio makes up 79 percent of current assets. The investment portfolio is conservatively invested to preserve capital and minimize any downside risk.

Restricted assets (grants receivable) make up the largest asset class, which represent future funding commitments from Regeneron, Intel, Broadcom Foundation and additional funders for science competitions and other program work.

Current Year Operating Revenue and Expense

	2017	2016
Revenue		
Science News magazine	\$ 6,801,368	\$ 5,648,941
Science education programs	20,489,478	17,762,816
In-kind and other revenue	953,822	1,181,930
Total operating revenue	28,244,668	24,593,687
Expense		
Program services	26,545,539	22,558,091
General and management	1,254,891	1,471,265
Fundraising	1,525,701	814,721
Total operating expense	29,326,131	24,844,077

Non Operating Activities and Pledges

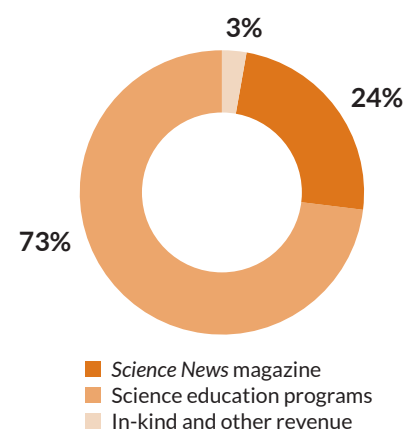
	2017	2016
Non Operating Activity		
Investment income	2,488,549	1,627,399
Change in post retirement benefit liability	(82,671)	(104,149)
Pledges and Contributions Designated for Future Years		
Pledges and contributions received in 2017	14,113,341	52,742,378
Prior years' pledges used in current year	(22,797,249)	(18,923,015)
Change in permanently restricted net assets	335,578	25,480
Non Operating Activity	(5,942,452)	35,368,093
Change in Net Assets	(7,023,915)	35,117,703
Net assets at the beginning of the year	100,122,071	65,004,368
Net assets at the end of the year	\$ 93,098,156	\$ 100,122,071

Balance Sheet

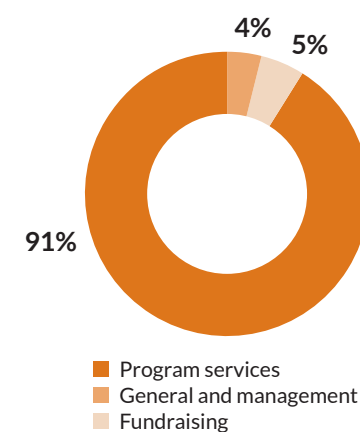
	2017	2016
Assets		
Cash and short term receivables	\$ 7,299,173	\$ 3,016,104
Investments	27,130,890	26,543,262
Grants receivable	67,694,362	78,442,518
Property and equipment	152,731	286,247
Total Assets	102,277,156	108,288,131
Liabilities		
Accounts payable	1,044,609	515,015
Awards payable	2,880,760	2,594,490
Deferred subscription revenue	3,285,630	3,267,555
Post retirement benefit liability	1,968,000	1,789,000
Total Liabilities	9,178,998	8,166,060

Net Assets \$ 93,098,157 \$ 100,122,071

FY 2017 Operating Revenue



FY 2017 Operating Expense





WHY I GIVE

"I'm very pleased with the opportunity to support the Society for Science & the Public. I am inspired by the Society's work in engaging young people — especially those in underserved communities — in science, technology, engineering and math. The Society's *Science News* in High Schools program, in particular, has a powerful impact on young people at an important juncture in their lives. I'm delighted to help reach more individuals through all the Society's programs, making an impact through STEM education and science journalism."

Christy Burton co-founded The Burton Family Foundation and chairs the Foundation's board. The Foundation is a leading sponsor of the Society's *Science News* in High Schools program, providing funding for 100 Arizona schools.

CHRISTY BURTON

Trustee, Society for Science & the Public
Co-Founder and Chair, The Burton Family Foundation

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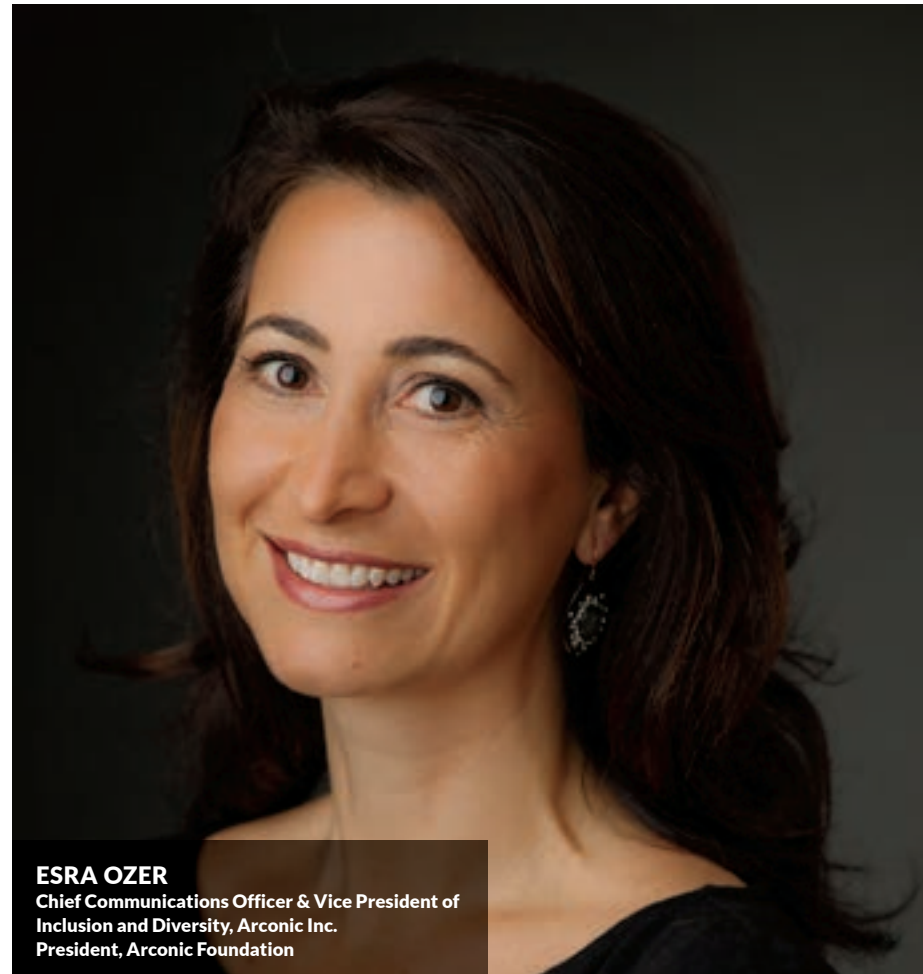
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ESRA OZER

Chief Communications Officer & Vice President of
Inclusion and Diversity, Arconic Inc.
President, Arconic Foundation

WHY WE GIVE

“Finding the brightest minds and empowering tomorrow’s workforce helps create strong and vibrant communities. The Society is a catalyst for creating the breakthroughs that will solve our toughest challenges.”

Since 2015, Arconic Foundation has been a generous lead funder of the Society’s *Science News* in High Schools program, Advocate Grant Program and *Science News for Students*. The Foundation also provided Special Awards for accomplished finalists and funded Education Outreach Day at Intel ISEF 2017.

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WHY I GIVE

"In high school, I was wildly curious about science. I played hooky many days to go down to the Library of Congress to read about physics and chemistry, to read about atomic energy and Van de Graaff generators. I competed in science fairs. When I won a place as one of 40 Westinghouse Science Talent Search finalists in 1949, I found a world of people who were my equals, my intellectual kin. That year, a whole group of us went to Harvard together and stimulated each other in courses to outperform. I am delighted to support the organization that continues to make this opportunity available to young people, especially seeking out students from underrepresented backgrounds. We must identify and nurture the next generation of innovators."

Walter Gilbert is a founding member of the Catalyst Circle, a group of leading supporters for Society for Science & the Public.

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WHY I GIVE MY TIME

"Intel ISEF constructs a worthwhile, meaningful volunteer opportunity for me because it supports the notion that we need to champion the inquisitive moments that fuel innovation in young people and support the development of their identity within the science, technology, engineering and math fields. I have been proud to serve as a volunteer, Spanish-language interpreter and chair of the Los Angeles Local Arrangements Committee for the past eight years because Intel ISEF allows me to witness the limitless potential of young researchers who have taken charge of their curiosity. I am proud to donate my time to Intel ISEF, which delivers on its mission of being a champion for science."

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WHY WE GIVE

“By challenging and inspiring students to pursue STEM learning, the Society supports students that work hard and may have financial need. Through the mentorship of an Advocate, underrepresented students are able to access scientific competitions, college and beyond.”

Since 2015, Jack Kent Cooke Foundation has been a lead supporter of the Society's Advocate Grant Program.



Science News | APRIL 29, 2017

THE PROTON PUZZLE

The subatomic particles make up much of the visible matter in the universe, but scientists still have a lot to learn about protons. The PHENIX experiment at Brookhaven National Laboratory in New York helped discover the source of protons' spin, a quantum property analogous to the spinning of a top. Data from PHENIX helped demonstrate that gluons — particles that hold the proton together — contributed to the spin.

BROOKHAVEN NATIONAL LAB (CC BY-NC-ND 2.0)

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Science News | NOVEMBER 11, 2017

BRIGHT BURST

Two ultradense cores of dead stars produced a long-awaited collision observed directly for the first time this year. The smashup of neutron stars 130 million light-years away, shown in this artist's conception, showered scientists with riches. Some 70 observatories gathered data in the form of gravitational waves, gamma rays, X-rays, radio waves and in visible, ultraviolet and infrared light. "Already it is transforming our understanding of the universe, with a fresh narrative of the physics of stars in their death throes," said France Córdova, director of the National Science Foundation.

NSF, LIGO, A. SIMONNET/SONOMA STATE UNIV.



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