Frontiers for Young Minds is a web-based scientific journal with an editorial board of young people.

**NUMBERS (April 2017)**

- **100** Science Mentors
- **100** Articles
- **50** Scientific Editors
- **500** Young Minds
- **2,000** Twitter followers
- **15,000** Facebook likes
- **100,000** Article views

**IN THE PRESS**

- Fast Company
- CBC News
- Smithsonian
- The Daily Californian

**COLLABORATORS**

- CellPress
- APS
- The Globe Program
- Frontiers

**SUPPORTED BY**

- Jacobs Foundation

*Named a GREAT WEBSITE FOR KIDS by the American Library Association*
Our Mission

We are on a mission to bring cutting-edge research to our youth and to foster scientific understanding in the world.

Science and research are the fabric of modern society and we should all understand what these discoveries mean and do for us. Translating cutting-edge research to the public has always been part of our mission. Connecting kids in a hands-on experience with researchers in the publishing process of these discoveries is not only an important step towards scientific understanding in young people, but also a very fun way to fulfill our mission.

Kamila Markram
Co-founder and CEO, Frontiers
About Frontiers for Young Minds

Frontiers for Young Minds is an open access scientific journal written for – and reviewed by – young people. We connect 8-15 year olds directly with scientists to provide critical feedback on articles about cutting-edge research. The end result is a journal of freely available scientific articles that are not only rigorous, but also shaped for younger audiences by the input of their own peers.

WHY CREATE A SCIENTIFIC JOURNAL FOR A YOUNGER AUDIENCE?

Since its inception, Frontiers has been committed to building bridges to better connect research communities: between disciplines, across continents, and with the general public.

Frontiers for Young Minds extends these bridges to younger audiences, not only providing them with access to cutting-edge research in a form they can understand, but also involving them in a critical step of the scientific process itself.

Dr. Robert Knight of the University of California Berkeley had a vision for a peer reviewed journal with an editorial board made up of 8-15 year olds. Working with Frontiers, this has since grown into a journal where young reviewers work with science mentors to publish articles that are not only scientifically accurate, but vetted for young people by their own peers.

THE BENEFITS

Empowering young minds to think like scientists

Frontiers for Young Minds enables young audiences to actively engage with the
scientific process, connecting them with leaders of the scientific community and challenging them to ask questions about ideas still at the cutting edge of science. By involving Young Minds in the process of scientific review, we help them develop their ability to think critically about science and communicate the latest research to their peers.

Fostering collaboration and creating connections in science

Few 8-15 year olds have the opportunity to interact with scientists, and even fewer are ever asked to provide feedback on the work of a recognized expert. The Frontiers for Young Minds platform enables students to find out first hand what it is to be a scientist, and how to work as part of a collaborative process towards a common goal.

Creating reliable resources for the public

Frontiers for Young Minds builds a bridge to more directly connect scientists with the public. All articles are written by the researchers themselves and are written in a form that can be understood and used by the broadest of audiences. This provides young minds, educators, and the general public with a reliable go-to source on the latest advances in science.

“It’s about analytical thinking and understanding the scientific method, which will help in their daily lives, not just in science”

Robert Knight, University of California, Berkeley
The people involved

YOUNG REVIEWERS

Kids and teens between the ages of 8-15 work with their classrooms or friends to provide feedback to the authors about how to make the best-possible articles for readers their own age, with the help of their Science Mentor.

SCIENCE MENTORS

Young (or young at heart) researchers with experience in the peer review process introduce their Young Reviewers to the idea of a life in science, the basics of science publishing, and encourage them to provide the authors with an honest and constructive review.

CHIEF EDITORS

Recognized experts who build teams of Associate Editors, provide an initial check on all new submissions, and make sure that each manuscript ends up in the right hands.

ASSOCIATE EDITORS

Experienced researchers who build teams of Science Mentors, oversee the review process to make sure all of the Young Reviewer feedback is put into place, and keep an eye out for new discoveries that would be interesting or important for young readers.
“Absolutely brilliant new forum for public communication”
The People’s Science

PARTICIPATING ORGANIZATIONS

Publishers, journals, and research societies who support the Frontiers for Young Minds mission and suggest recent articles from their publications to be turned into Young Minds versions.

EDUCATORS

Science Educators play a vital role in fostering a passion for the sciences. Educators provide a framework to help our Science Mentors align their message within the context of the curriculum.

SUBJECT AREAS COVERED

We cover a wide range of scientific fields

Working with enthusiastic researchers we publish articles in the following areas:

- Understanding Neuroscience
- Understanding the Earth and its Resources
- Understanding Astronomy and Space Science
- Understanding Health
- Understanding Biodiversity
- Understanding Mathematics

We will continue to include more fields, and are open to working with funders and sponsors on new and exciting areas.
How it works

1. Our editorial board identifies recent discoveries. These can be articles published by any publisher.

2. The scientists behind the original research write an article that translates the discovery into terms accessible to kids and teens. This new article is then submitted to Frontiers for Young Minds.

3. The Associate Editor assigns the manuscript to a Young Mind / Science Mentor pair, who produces a review report. The author must respond to this feedback point by point.

4. Once the review process is completed, the article is validated by the Associate Editor.

5. The finished article is published and made freely available on our website alongside the reviewers’ names.

We guarantee the protection of the younger reviewers’ identity and only publish their first names.
CORE CONCEPT

“Boiling Water Is Not Too Hot for Us!”—Preferred Living Spaces of Heat-Loving Microbes

Do you like to stay at the beach on a hot summer day? Sunbathing, chilling and playing beach games? If it is getting too hot, one can quickly refresh in the lakeside ocean. Can you believe that there are living organisms on our planet that would still thrive on the hottest day of the year? These tiny creatures are heat-loving microbes, which do not grow at temperatures around 50 degrees Celsius, but feel most comfortable in boiling water near volcanoes at the ground of the ocean or in terrestrial hot springs. Because of their strength and enduringness, they are of certain relevance for industrial and scientific applications. And can you imagine that most of these hot places are not located in deserts, but on volcanic islands in the Atlantic Ocean and near the North Pole?

AUTHORS

Sarah Scott

REVIEWED BY

School of the Madeleine

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NEW DISCOVERY

Bacteriophages: The Enemies of Bad Bacteria Are Our Friends!

Some bacteria can enter the human body and make people ill. Usually, these diseases are cured by antibiotics, but sometimes bacteria are resistant to them. In these cases, bacteria become very dangerous. Bacteriophages are viruses that infect bacteria but are harmless to humans. To reproduce, they get into a bacterium, where they multiply and finally, they break the bacterial cell to release the new viruses. Therefore, bacteriophages kill bacteria. Here, we explain how bacteriophages can be used to treat infectious diseases or to remove bacteria from other places where they are undesirable.

AUTHORS

Diana Guiñez / Lucia Fernandez / Beatriz Martinez / Ana Rodriguez / Pilu Garcia

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CORE CONCEPT

Can We Use Nanotechnology to Treat Cancer?

Could the next big change in cancer treatment actually be tiny? There are many reasons that cancer is such a difficult disease to treat. Scientists can try to come up either with new and better cancer medicines, or better ways for patients to receive their medicines. This paper describes a possible new way to deliver cancer medicines using nanoparticles — tiny, tiny sponge-like materials that have the cancer medicine inside — to try and improve the delivery of the cancer medicine into tumors. By putting the medicine inside the nanoparticle, we can protect the healthy cells in the body from these strong medicines, and we might be able to use a lower dose of the medicine to treat the patient. This exciting technology is still being researched and optimized, but could one day be used as an effective strategy to treat cancer patients.

AUTHORS

Courtney R. Thomas

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NEW DISCOVERY

Seeing the Shadow of Rings around a “Super Saturn”

Astronomers believe that they have seen the shadows of a giant ring system around an unseen planet move in front of their parent star. The fluctuations in the light coming from the star was found in data from May 2007, but not analysed until 2012. Unlike the rings of Jupiter that cause the star to dim by a few percent over a few hours, this star dimmed by an incredible 95% over the course of two months. The best explanation is that there is a planet, with rings about 200 times larger than the rings around Saturn, that moved in front of its star, causing the flickering that we saw. This unexpected discovery is leading us to look for more giant ring systems in other data, both online in astronomy digital archives and in older photographic plates.

AUTHORS

Matthew Kenworthy

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CORE CONCEPT

What Do Radio Waves Tell Us about the Universe?

Radio astronomy began in 1933 when an engineer named Karl Jansky accidentally discovered that radio waves come not just from inventions we create but also from natural stuff in space. Since then, astronomers have built better and better telescopes to find these cosmic radio waves and learn more about where they come from and what they can tell us about the universe. While scientists can learn a lot from the visible light, they detect with regular telescopes, they can detect different objects and events—like black holes, forming stars, planets in the process of being born, dying stars, and more—using radio telescopes. Together, telescopes that can see different kinds of waves—from radio waves to light waves to gamma rays—give a more complete picture of the universe than any one type can all on its own.

AUTHORS

Sarah Scott

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CORE CONCEPT

How Do We Understand Other People?

Imagine this: you walk into class, and see your friend sitting alone at a table. You notice your friend is looking downward, with a frown on her face. You probably think from these clues that your friend is sad. But how did you know that? One way that your brain could accomplish this is by simulating, or copying in your mind what you see the other person doing. This may help you understand that when you are doing these things you are usually sad, so it is probably the case that your friend is sad too. While there are other hypotheses for how our brain understands others, we are going to focus on simulation, and how special cells in the brain—called mirror neurons—may help to make simulation possible. We will first examine neuroimaging experiments, in monkeys and in humans, which help us understand this system better. Lastly, we discuss disorders such as autism, in which it may be more difficult to understand others’ actions, intentions and emotions.

AUTHORS

Jennifer Stain / Arn Perry

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CORE CONCEPT

Your Left-Handed Brain

While most people prefer to use their right hand to brush their teeth, throw a ball, or hold a tennis racket, left-handers prefer to use their left hand. This is the case for around 10% of all people. There was a time not so long ago when left-handers were stigmatized (see Glossary) in Western land (and other) communities. It was considered a bad sign if you were left-handed, and left-handed children were often forced to write with their right hand. This is nonsensical: there is nothing wrong with being left-handed, and trying to write with the non-preferred hand is frustrating for almost everybody. As a matter of fact, science can learn from left-handers, and in this paper, we discuss how this may be the case. We review why some people are left-handed and others are not, how left-handers’ brains differ from right-handers’, and why scientists study left-handedness in the first place.

AUTHORS

Roel M. Willems / Clyde Francis

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CORE CONCEPT

Does the Brain Read Chinese or Spanish the Same Way It Reads English?

There are at least 6,000 languages spoken in the world today (Comrie, 2009). The world’s languages are represented by a variety of writing systems called “orthographies.” All orthographies code spoken language using a system of symbols. However, orthographies differ in the size of the sound unit that is mapped onto each symbol. For example, in alphabetic orthographies, like English, Spanish, and Russian, each symbol maps onto an individual sound called a phoneme (e.g., the /b/ sound in “book”). In non-phonetic orthographies, like Chinese or Cherokee, the symbol maps onto a larger sound unit such as a syllable (e.g., the word “project”). Over 400 orthographies exist today. Here we will first learn about the characteristics of different orthographies.

AUTHORS

Sarah Scott

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NEW DISCOVERY

Itsy Bitsy Spider? It Depends...

You have probably heard it before, “the bug was huge!” baled your friend who is afraid of bugs, or “the needle was so big!” said another friend who is afraid of shots. Can such statements be more than just a figure of speech? We asked if fear could change the way we estimate size. To answer this question, we asked people who were afraid of spiders, and people who were not, to estimate the size of pictures of spiders and other animals. We also asked how unpleasant each picture was to look at. People who were afraid of spiders estimated spider size to be larger compared to people who were not afraid of spiders. This result shows that things like our emotions can affect the way we evaluate the size of things around us.

AUTHORS

Ryann

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CORE CONCEPT

Caring for Your Brain: What You Need to Know about Concussions

Concussions are an injury to the brain that can result in changes in the way you think (cognitive), the way your brain works (neurological) and the way you feel (physical and emotional). Concussions can be caused by accidents where you hit your head with the ground, tree, or another person. It is important to know the signs and symptoms of a concussion and what you need to do to allow your brain to heal properly. It is also important to know how
“The best sci-publishing launch in decades”
Noah Gray
Senior Editor, *Nature*
Get involved

Participating in Frontiers for Young Minds is a great way to build a bridge between young people and science at the cutting-edge. Our success depends on partnerships and collaborations from every side of the scientific world. We need:

• Authors willing to translate their recent publications for a new, broader audience
• Young people (ages 8-15) to serve as reviewers
• Schools and teachers to host Young Minds reviews in their classrooms
• Expert researchers to serve on our board and help Young Minds reach into new disciplines
• Young researchers committed to public outreach to serve as Science Mentors for our young reviewers

If you would like to join our international team, please contact us and let us know.

There is much left to be done, including opening new subject areas of science to Frontiers for Young Minds and bringing the program to kids who speak other languages.

Frontiers for Young Minds is committed to remain a fully not-for-profit program, free for both authors and readers.

Read more at our website, or send your question to

kids@frontiersin.org
Frontiers for Young Minds provides a collection of freely available scientific articles by distinguished scientists that are shaped for younger audiences by the input of their own young peers.

kids.frontiersin.org