Spreading scientific knowledge today

How to compete with Facebook and cat videos

Janet Holmén
Freelance editor
janet.holmen@gmail.com
The science news cycle

From Jorge Cham’s TEDxUCLA talk “The Science Gap” https://youtu.be/AzcMEwAxSP8
Communication barriers

The public often lacks basic scientific knowledge

News media tend to exaggerate and oversimplify

Over 80% of Americans supported putting this proposed label on food:

**WARNING:** This product contains deoxyribonucleic acid (DNA). The Surgeon General has determined that DNA is linked to a variety of diseases in both animals and humans. In some configurations, it is a risk factor for cancer and heart disease. Pregnant women are at very high risk of passing DNA to their children.

Survey by Oklahoma State University Department of Agricultural Economics
Sir Paul Nurse, President of the Royal Society:

“Scientists have forgotten that we don’t operate in an isolated bubble. We cannot take the public for granted. We have to talk to them. We have to communicate the issues. We have to earn their trust if science really is going to benefit society.”

“Earning trust requires more than just focusing on the science. We have to communicate it effectively too.”
Effective communication

Steer clear of scientific style

Start strong – grab the reader’s attention and hold it!
Starting strong

**Avian Migration: The Ultimate Red-Eye Flight**

By Ashli Moore and Paul Bartell. Published in *American Scientist* January-February 2013
Imagine yourself on board a red-eye flight from Los Angeles to New York City, an eight-hour journey that begins at bedtime and ends at breakfast. Your plan to sleep during the flight is thwarted by sporadic turbulence and an uncomfortable seat. When you arrive at John F Kennedy Airport, you feel dehydrated and grumpy, but you head straight to work for an important meeting. Fast food, caffeine and deadlines fuel your day’s full schedule. That night, you order Chinese takeout and eat it mindlessly in front of your laptop. You want nothing more than a warm shower and a long rest. Unfortunately, it’s time to head back to the airport for another red-eye flight.
Effective communication

Steer clear of scientific style

Start strong – grab the reader’s attention and hold it!

Use *ordinary* language

Keep paragraphs short and logically connected
No one foresaw, back in December of 2013, that the little boy who fell ill in a village called Méliandou, in Guinea, West Africa, would be the starting point of a gruesome epidemic, one that would devastate three countries and provoke concern, fear, and argument around the planet.

No one imagined that this child’s death, after just a few days’ suffering, would be only the first of many thousands. His name was Emile Ouamouno. His symptoms were stark—intense fever, black stool, vomiting—but those could have been signs of other diseases, including malaria. Sad to say, children die of unidentified fevers and diarrheal ailments all too frequently in African villages. But soon the boy’s sister was dead too, and then his mother, his grandmother, a village midwife, and a nurse. The contagion spread through Méliandou to other villages of southern Guinea. This was almost three months before the word “Ebola” began to flicker luridly in email traffic between Guinea and the wider world.
The first clues in this long mystery—clues that seemed to point toward bats—arose from disease outbreaks caused by Marburg virus, Ebola’s slightly less notorious relative within the group known as filoviruses. The story of Ebola is closely connected with that of Marburg, according to a seasoned South African virologist named Robert Swanepoel, who has long studied them both.

“The two are interlinked,” he said, as we sat before a computer screen in his Pretoria home, looking at photographs from his archive. Swanepoel, who hides a genial heart within a bearish exterior, is retired from the National Institute for Communicable Diseases (NICD), in Johannesburg, where he ran the Special Pathogens Unit for 24 years, but is still busy with research and bristling with ideas and memories.
Earn the reader’s trust

Focus on individuals

Be human –
Choose the right level for your readers
Eight glacial cycles from an Antarctic ice core

A great grand-daddy of ice cores

Frozen time

One research project – three presentations
Eight glacial cycles from an Antarctic ice core

EPICA community members*

* A full list of authors appears at the end of the paper.

The Antarctic Vostok ice core provided compelling evidence of the nature of climate, and of climate feedbacks, over the past 420,000 years. Marine records suggest that the amplitude of climate variability was smaller before that time, but such records are often poorly resolved. Moreover, it is not possible to infer the abundance of greenhouse gases in the atmosphere from marine records. Here we report the recovery of a deep ice core from Dome C, Antarctica, that provides a climate record for the past 740,000 years. For the four most recent glacial cycles, the data agree well with the record from Vostok. The earlier period, between 740,000 and 430,000 years ago, was characterized by less pronounced warmth in interglacial periods in Antarctica, but a higher proportion of each cycle was spent in the warm mode. The transition from glacial to interglacial conditions about 430,000 years ago (Termination V) resembles the transition into the present interglacial period in terms of the magnitude of change in temperatures and greenhouse gases, but there are significant differences in the patterns of change. The interglacial stage following Termination V was exceptionally long—28,000 years compared to, for example, the 12,000 years recorded so far in the present interglacial period. Given the similarities between this ear for warm period and today, our results may imply that without human intervention, a climate similar to the present one would extend well into the future.

The climate of the last 500,000 years (500 kyr) was characterized by extremely strong 100-kyr cyclicity, as seen particularly in ice-core and marine-sediment records. During the earlier part of the Quaternary (before 1 million years ago; 1 Myr BP), cycles of 41 kyr dominated. The period in between shows intermediate behaviour, with marine records showing both frequencies and a lower amplitude of the climate signal. The observed frequencies arise from parameters of the Earth's orbit that control the amount, and the seasonal and latitudinal distribution, of solar radiation. However, the reasons for the dominance of the 100-kyr (eccentricity) over the 41-kyr (obliquity) band in the later part of the record, and the amplifiers that allow small changes in radiation to cause large changes in global climate, are not well understood. New records of the earlier periods, looking at parameters unavailable in marine records, are needed.

Ice cores provide the most direct and highly resolved records of (especially) atmospheric parameters over these timescales. They record climate signals, as well as forcing factors of global significance, such as the altitude 3,233 m above sea level, discussed here, is aimed at producing a record of the longest time period possible. The site has an ice thickness of 3,309 ± 22 m; the current drilling depth is 3,190 m, of which 3,139 m has been analysed for a wide range of constituents. The current mean annual surface temperature is −54.5°C, and the snow accumulation rate is 25 kg m⁻² yr⁻¹ (2.5 cm water equivalent per year). The drill site is 56 km from the site of a previous Dome C core that provided records extending into the last glacial period, and 550 km from the site of the Vostok cores. The completion of the Dome C core was delayed when the first drilling became stuck at 788 m in 1999, and this shorter EDC06 core has already yielded many important results from the last 45 kyr (see, for example, refs 10–14).

Here we present the EDC records of δD and other parameters, analysed at low resolution, for the available core. We show that the core represents 740 kyr, including all of marine isotope stage (MIS) 11, which was not completed in the Vostok record, and running through a further three complete 100-kyr cycles, to MIS 18.4. We
A great grand-daddy of ice cores

Jerry F. McManus

A record of Earth’s climate over the past eight ice ages and their associated interglacial periods has been uncovered from a new ice core in Antarctica, almost doubling the age of previous ice-core records.

Millennium after millennium, the snow falling on Greenland and Antarctica has built up deep ice sheets that are invaluable archives of past conditions on Earth. Antarctica has now yielded the longest ice-core record yet, one that covers a staggering 740,000 years, with more to come. This accomplishment is the result of an effort by the EPICA consortium (European Project for Ice Coring in Antarctica). The group’s report, by lead author Eric Wolov and colleagues, appears on page 623, with further comment on page 596.

A decade ago, ice cores from Greenland provided compelling evidence for the persistent climatic instability of the last glacial cycle, which reached back more than 100,000 years through the last ice age and into the previous interglacial. In the polar desert of Antarctica, however, slower snow accumulation means the ice archives can span longer intervals, and what is arguably the simplest climate record in existence comes from Vostok, East Antarctica. This goes back approximately 400,000 years, taking in four glacial cycles. Yet even this grand-daddy of ice cores falls frustratingly short of reaching several climatic milestones — for instance, the interval when the dominant behaviour of the ice ages shifted: the time of the largest deglacial transition and the early portion of an interglacial interval that began shortly after the last ice age. This gap is now filled.

For interested non-specialist academics

Catchy title
More flowery language
Simple data graph
11 references
Researchers have pulled the oldest-yet core of ice from the Antarctic — giving us a 740,000-year record of the planet’s climate. Gabrielle Walker braves the cold to find out how they did it, and what they hope to learn.

"Are you ready to go into the freezer?" It’s a warm summer’s day in Le Fontanil, southeastern France, but glaciologist Jerome Chappellaz is pulling on a hefty parka and snow boots. He punches a button and a door slides open into a vast commercial cold store, where whirring fans add a bitter wind-chill to the temperature of -25°C. Although we have come to look at ice, we’re first confronted with three floors of wooden pallets stacked up to the ceiling, bearing sides of beef, rings of yellow goat’s cheese and boxes of frozen raspberries.

“We work with a raw material that is very close to melting, so we’re always close to losing our samples,” says Chappellaz, from France’s leading glaciology laboratory — the Laboratoire de Glaciologie et Géophysique de l’Environnement (LGGE) in Grenoble, 15 kilometres from Le Fontanil. “But they have millions of euros of food in here, so there’s no way they will let it thaw.”

That’s just as well, because the samples Chappellaz is talking about are far more precious than cheese. Tucked away in the attic, in scores of cardboard cartons cross-wrapped with black straps like slightly battered Christmas presents, is one of the world’s most extraordinary archives — a record of ancient climate written into 15 kilometres of ice cores, taken from mountain glaciers and the frozen caps of Greenland and Antarctica’s slopes. There are heated tents for sleeping, a crane, and unrestricted but exact step with temperature for hundreds of thousands of years.
Science has a public relations problem

Laypeople think scientists are:

- Intelligent
- Competent
- Unemotional
- Hard to understand

and always talk about

Bummer!

Here kitty, kitty, kitty...
To get through to ordinary folks:

Tell a story

Start strong – hook your readers

Simplify – both content and language

Respect your audience

Populate your article with people
Useful resources:

Excellent tips on writing for the general public, by Katie L. Burke, editor at *American Scientist*

[https://www.americanscientist.org/blog/from-the-staff/12-tips-for-scientists-writing-for-the-general-public](https://www.americanscientist.org/blog/from-the-staff/12-tips-for-scientists-writing-for-the-general-public)

In 2013-2014, the *Guardian* ran an entire series on science writing

[https://www.theguardian.com/science/series/secrets-science-writing](https://www.theguardian.com/science/series/secrets-science-writing)

Article by Chris Mooney about ideological communication barriers, from the *Washington Post*


Plain old advice:

Read everything you can find about popular science writing. Some tips will work for you, and others won’t. The more you read, the more likely you will find your own best strategy.

Always try to let your texts “sit” for a while. When they are still fresh in your mind, you can’t be objective. You remember all the pain they cost you to write, so you won’t want to change a single word! If you reread them after some time has gone by, your errors will be obvious and you will be happy (or at least *more willing*) to fix them.