

Driving research into journalism — handbook for scientists

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LOOKOUT
STATION

Connecting
Journalism and
Science

**DRIVING SCIENTIFIC
RESEARCH INTO
JOURNALISTIC REPORTING
ON FORESTS, ENVIRONMENT
AND CLIMATE CHANGE**

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HANDBOOK FOR SCIENTISTS ►

Scientists are the key in helping us understand the challenges and opportunities that lie in front of us as well as which are the steps we have to take, as a society.

1 Scientists in the public sphere

Scientific work is hard, tough, complex and requires a lot of focus, attention and dedication – and as little distraction as possible. Scientists have enough on their plate, with high competition for funding, publications, academic recognition and career advancements. In some countries, scientists and young researchers are also affected by the instability of their contracts and career perspectives, by the uncertainty of their future, by the lack of resources and of appropriate funding and so on.

So, there is enough to deal with already without having to embark in public discussion and having to face general audiences and larger publics. Is there?

The history of science shows us that choosing to dwell exclusively within the academic environment is not functional or even strategic in the long run. Science has modelled our contemporary society and has been a key pillar in the development of humanity through the centuries. And scientists have been key players in the process, often explicitly so. Think of Charles Darwin who published his “On the Origin of Species” in 1859 with the general audience in mind and not restricting his work to scientists. The reactions to his work were partly harsh and he was even ridiculed but it did not stop his work. Or think of Michael Faraday who launched and often presented the Christmas lectures for children and Friday evening discourses at the Royal Institution he was leading in the mid-1900s. These events were so crowded that they originated the first traffic jams in London.

There are many more recent examples of scientists involved and engaged in the public sphere in. Scientists who have played a very public role often using the media to the advantage of their scientific work, shaping public knowledge, informing policies and eliciting economic advancements. Science has become more and more of a public adventure and a very competitive enterprise. In some cases, scientists have to fight hard get their field recognised, to gain public acceptance, to prove it relevant to get more funding, more opportunities, and more enthusiastic students enrolled in their programmes.

Next, we go from iconic characters of the twentieth century, such as Rachel Carson and Margaret Mead, to more contemporary ones, Stephen Hawking, Guido Tonelli and Fabiola Gianotti.

Rachel Carson and the birth of EPA, the US Environmental Protection Agency

Rachel Carson has been credited for the birth of the American Environmental Protection Agency (EPA). Carson was the first scientist who collected, organised and put together data and case studies which were already known to the scientific community about the effects of pesticides, and particularly of DDT on the entire biosphere. Carson deliberately decided to communicate her scientific findings not only to her peers but also to the general public. She wrote articles on The New Yorker, then collected them in her most famous best seller, selling over 2 million copies. She even agreed to be on a 1-hour long news program, CBS report, that reached over 5 million people. Carson is recognised as one of the main actors behind the mounting public concern about the deterioration and the decline in the human environment that led to the first National Environmental Policy Act in 1970 and ultimately to the establishment of the US Environmental Protection Agency.

Charles Darwin published his “On the Origin of Species” in 1859 with the general audience in mind and not restricting his work to scientists.



Rachel Carson
Marine biologist, author, and conservationist

“Of all that I shall miss in closing these columns, I shall feel most keenly the loss of fellowship and interaction with readers. Have we not shared 300 episodes of mutual learning?”

Stephen Jay Gould, 2000

A large yellow triangle pointing to the right, containing the number 2.

2

Why scientists should communicate

Everybody communicates and scientists are more than aware of the various expected communication activities: there is the peer-to-peer communication related to articles, conference presentations, workshops etc. Securing the funding for your research work adds another layer; grant writing and reporting often requires making the work more accessible to the funding bodies, foundations, EU evaluators and other stakeholders. But while communicating their work to different audience every day, one audience is often left out: the general public. But having already made the effort to simplify research work without trivialising it and yet making it understandable to many non-experts, scientists are only one step away to communicating to a much wider audience.

John Snow and the cholera map

In the first half of the 1800s many diseases were still associated only with environmental conditions and thought to be transmitted by miasma in the air. There was little knowledge about the microbiology of infectious diseases. London had over 2.5 million people living in the biggest metropolitan area of the time. But the organisation of the city in terms of sanitation was still very poor. There were no sewers, and animals like cows and horses were living in the houses with people. The city reeked, and the smell was thought to be the cause for the frequent disease outbreaks. Cholera was one of the worst killers, with cycle of epidemics of 4-5 years and thousands of deaths at each outbreak.

A local Soho doctor, John Snow, had become convinced that cholera was not transmitted by miasma and air but by water contamination and during the next outbreak, in August 1854, he saw an opportunity to prove his theory. Convinced that the outbreak was associated with one unique point of infection, a local water pump, John Snow undertook dozens of interviews to residents in the area to see where the victims were living and whether they had taken water from that pump.

Instead of writing about it, John Snow drew each case, visually, in a map. It became immediately obvious that there was a dramatic concentration of infections around the pump. He numbered each case with a black square and built bars that were proportionate to the number of people dead at each house. Again, there is no need to be able to read the data or to be familiar with statistics to see that the pump is likely to be the cause of infection.

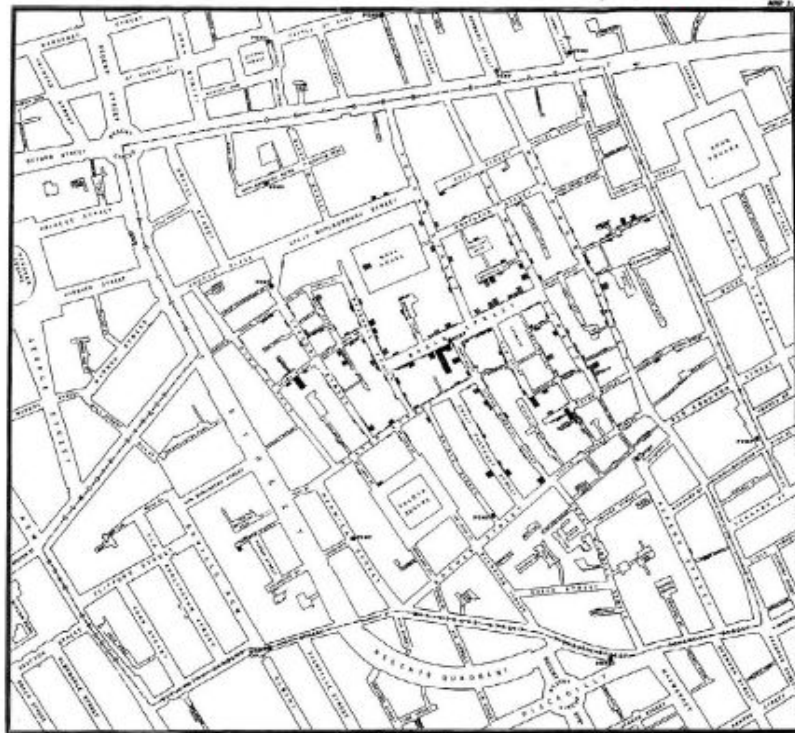
Eventually, by the mid-1860s, when the next cholera epidemics burst in London, the authorities had been convinced by Snow that contaminated water sources were the problem. Sewers were started being constructed and as soon as the disease appeared people were instructed to boil the water. 1866 marked the last cholera outbreak in London.



John Snow
English physician

“That in a way is the ultimate legacy of this map”, said Steven Johnson, an American science writer in a TED conference on the subject, “It’s a map of deaths that ended up creating a whole new way of life, the life that we’re enjoying here today.”

John Snow
Cholera map



Europe is greener now than 100 years - University of Wageningen and The Washington Post

In 2014, Rick Noack, at that time a contributor to The Washington Post and currently their Foreign Affairs correspondent from Berlin, published a very nice article showing the extent of reforestation in Europe in the last century. [Watch: How Europe is greener now than 100 years ago.](#)

Reforestation is due to a number of causes which are clearly outlined in the article. From the technological improvement which has reduced the amount of cropland needed to produce food to the urbanisation and to the development of a common agricultural policy and many more. The article is complemented by a dynamic map which was produced by Richard Eade from the University of Wageningen.

The map works very effectively in an informative context since it allows the reader to see the dramatic changes in forest coverage in different European

which would be much less if simply described



Rick Noack
Foreign affairs reporter
who covers Europe and
international security issues
from The Washington Post's
Berlin bureau

Mann - and the Hockey stick graph

In 1999, Michael Mann, a climatologist then at University of Massachusetts published together with his colleagues Raymond Bradley and Malcolm Hughes from the University of Arizona, a scientific paper analysing paleoclimatic data sets from tree rings, ice cores, corals and joining historical data with more recent ones on temperature and CO₂ emissions.

His reconstruction of the Northern Hemisphere temperature was going back by about 1000 years. The paper was published on the American Geophysical Union magazine. It contained a series of graphs and a conclusion. One of the graphs in particular was striking, showing the dramatic increase in temperatures from the early 20th century on. The graph was examined by another climatologist, Jerry Mahlman, as the 'hockey stick' and has become the iconic representation of global warming.

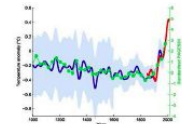
So iconic that the graph itself has been the object of a very highly heated controversy between the supporters of the idea of human induced climate change and the negationists. The hockey stick graph became particularly notorious in 2001, when it was used by the IPCC Third Assessment report in the summary for policymakers. Then the sceptics made an extra effort to undermine Mann's work and conclusions. Mann ended up defending himself in front a congressional committee led by senator James Inhofe of Oklahoma, who was among those calling global warming a hoax. In 2006, the hockey stick was used by Al Gore in his documentary The Inconvenient Truth, which was seen worldwide, in traditional media and at cinemas and has been since one of the most popular films on climate change ever.

Again, why is this graph so powerful? Well, it needs very little further explanation. We see quite a visual appeal, and this chart is immediately readable and comprehensible and summarises the scientific conclusion in a very defined way.

However, the attacks on Mann convinced him that it is not enough to play in the scientific arena and that more effort is needed to actually explain the global warming data and facts to the general public.

He has founded a blog called realclimate.org where, together with fellow scientists, he explains scientific facts to non-experts. As we will see in Chapter 4, he is not alone in this effort.

More and more climate scientists are striving to use appropriate language and images to talk to different publics.



Over: <https://www.realclimate.org/index.php?p=10>
<https://www.realclimate.org/index.php?p=10>



Ed Hawkins
Climate scientist

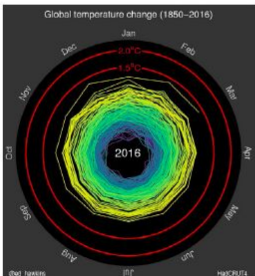
An animated GIF on temperature rising going from science to media

Ed Hawkins, a climate scientist in the National Centre for Atmospheric Science (NCAS) at the University of Reading and contributing author to the IPCC AR5, created an animated GIF to display the monthly temperature throughout the year from 1850 to 2016.

The animated spiral, says the Climate Lab, a blog kept by Hawkins and his fellow scientists, presents global temperature change in a visually appealing and straightforward way. The pace of change is immediately obvious, especially since the past few decades. The relationship between current global temperatures and the internationally discussed target limits are also clear without much complex interpretation needed.

Ed Hawkins shared his animation through his twitter account in May 2016, and got retweeted over 10 000 times while tagging a conversation with over 15 000 people. But his spirals got seen by millions thanks to the fact that such an effective way of representing temperatures and the 1.5 and 2.0 °C scenarios really worked for the general media as well. It went viral, being seen millions of times on Facebook and Twitter but it was also picked and shared by a range of media, from the Washington Post to Vox, from Public Radio International to many more.

And, to the astonishment of its creator, it was used during the opening ceremony of the Rio Olympics, getting covered once more by every media in the world.



https://www.pfsc.org/sites/default/files/2016-05-10_global_temperature_gif_shares_have_been_millions.pdf

Daniel Crawford - the music of rising temperature

Daniel Crawford, an undergraduate student at the University of Minnesota, [institute on the Environment](#), decided to use his cello to communicate the latest climate science through music.

Instead of using a chart, and visualise the data of the rising temperatures, Crawford translated on data visualization to convert the global temperature records in a series of musical notes. Simplification in the auditory equivalent of data visualization. It is not a new technique, and in recent years it has been applied to a number of scientific disciplines, from biomedical ones to astronomy, from governance to genetics. Crawford's final product is called ["A Song of Our Warming Planet"](#).

The reason why it works so well is that it not only gives people something to look at but actually more directly it gives them something they can feel.

A very effective way to connect not only to objective thinking, but to evoke emotional responses.



Daniel Crawford
Undergraduate student at
the University of Minnesota,
institute on the Environment



Climate Change Debate: Last Week Tonight with John Oliver (HBO)

7,932,242 views

👍 72K 💬 2.6K ➦ SHARE ≡ ⋮

4 Scientists who already work on communicating climate change

Far from being an exhaustive list, the following are examples of science initiatives and scientists who have decided to try and communicate their work to a broader audience, either directly or through the media. All selected experiences are related to climate change communication.

Many of these examples are drawn from American experiences. This is mainly due to language issues but also to the fact that the US have elected, in this century, two out of three presidents with strong negationist views on climate change. George W. Bush, who was president until 2009, was hardly committed to fight climate change. And Donald Trump, who just began his mandate as of January 2017, has basically done everything in his power to reduce the US commitment against climate change and in favour of the environment. The decision to exit the Paris agreement, to cut funding and change all executive staff at the EPA speak volumes. But American scientists are determined to fight back. The huge March for Science, which involved rallies and demonstrations in over 600 American cities, saw over 1 million participants on April 22nd 2017. It was called by over 100 scientific organisations and it has been defined an event of unprecedented scale. The March is taking place also in 2018.

In Europe things are more complicated. There is not a unique government policy on the environment, although there are a series of EU policies and directives which go in the direction of having a common strategy to fight climate change and to build a sustainable future for the European people.

But a joint effort by the scientific community towards the building of a stronger European approach to environmental science is at the present less prominent, although there are many regional and national initiatives.

Jonathan Foley

Executive director of the [California Academy of Science](#), is a scientist whose highly renowned scientific work has been focusing on understanding worldwide changes in ecosystems, land use and climate, global food security and sustainability. His commitment to environmental communication goes back years, both when he was the director of the Institute on the Environment (IIE) at the University of Minnesota and even before, at the University of Wisconsin, where he founded the Climate, People and Environment Program (CPEP) and the Center for Sustainability and the Global Environment (SAGE). His scientific work is of high impact, with over 130 articles many of which published in *Science*, *Nature*, and the *Proceedings of the National Academy of Sciences*.

5 Know your travel mates, journalists and communicators

Science is not a one-man show. It has not been such for a long time. Any of the major science enterprises from the mid twentieth century on, be it the Manhattan Project, which led to the construction of the atomic bomb, the Human genome project or the Higgs boson quest have been undertaken by thousands of scientists worldwide and required a huge collaboration, coordination and, obviously, communication effort. The same is true for climate science, where physicists have to work with geologists, statisticians, oceanographers, mathematicians, social scientists and more and more. Complex science requires complex research teams.

Now, think of science reporting. Yes, you still have written articles, simple interviews, short TV programmes with a scientist hosted by an anchor man or woman or brief radio interviews. But journalism is evolving fast and media is now producing data journalism, multimedia and very articulate projects. Data journalism has brought reporters to deal with data, numbers, databases, maps and charts, and to learn how to use them as sources for their stories, complemented by more traditional reporting such as interviewing or going on the field and collecting people impressions. Filming, and more experimental formats such as the VR/360 images or the augmented reality have allowed reporters to produce immersive pieces which bring their audiences right within a story and allow them to have a full view of an environment and not only the angle previously chosen by the video maker. Newsrooms around the world are changing and transforming, and the journalistic product is rarely the result of a one person's work. It is the outcome of a strong and proactive collaboration with graphic designers, developers, science and data analysts, photographers and filmmakers.

So, here we have a great opportunity to foster a better and stronger communication that brings scientists and journalists to work together more and better in the development of a reporting idea, in the production and in the revision and fact check of the final product. This does not mean transforming scientists into journalists. Not, on the other hand, having journalists acting as spokesmen for science.

On the contrary, this dialogue aims at involving journalists in understanding what the work of a

scientist is, how it is done, where, when, how to collect and interpret scientific data. And maybe even become able to challenge, ask more complex questions, to go deeper in the implications.

It aims at empowering scientists to find suitable ways to tell their stories, to bring their outcomes to a wider public. It aims at bringing much more completeness and substance to the reporting, ultimately making a better service to the public.

There are already great examples of very successful and constructive processes that yielded high quality communication products. Usually, this kind of work means that the scientists agree to see the journalist more than once, maybe giving them the time not only of a 10-minute interview but actually a day in a lab or bringing them along on a field trial or data collection campaign. It is time consuming and not easy to organise, but the results are really rewarding and the scientists who took part in these adventures usually enjoyed them a lot. Firstly, because it is very interesting to see your work through the eyes of a non-expert and also because, in many cases, these journalistic products turn out to be beautiful, not aggravated by misinterpretation or striking assumptions and are something scientists can be proud to share with other people.

Here there is a showcase of some of these works:

1. [From Miami to Shanghai: 3 °C of warming will leave world cities a below sea level](#) - *The Guardian*

Data and scientific visualizations produced by the scientists of the Climate Central team (see

Download the Handbook here:

<https://thelookoutstation.com/projects/handbook-scientists-driving-scientific-research-journalistic-reporting-forests-environment>

https://www.efi.int/sites/default/files/files/publication-bank/2018/lookout_station_2018_tola_handbook.pdf

Enjoy and Thanks!

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