Science Communication Workshop
November 24-25th 2016
CEITEC, Brno, Czech Republic

Prof Laura Bowater
The Norwich Medical School
University of East Anglia, Norwich, UK

Dr Richard Bowater
School of Biological Sciences
University of East Anglia , Norwich, UK

University of East Anglia
Norwich, Norfolk, UK

UEA & the Norwich Research Park

The NRP - a concentrated biosciences site for the 21st century

UEA

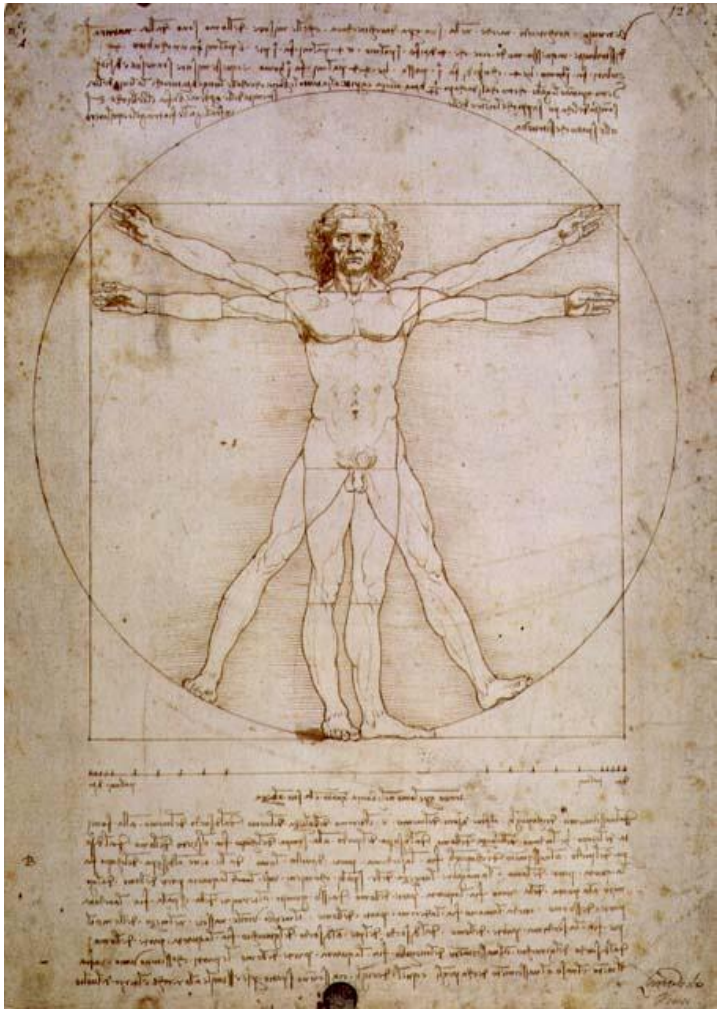
norwich research park

Introduction to Talk

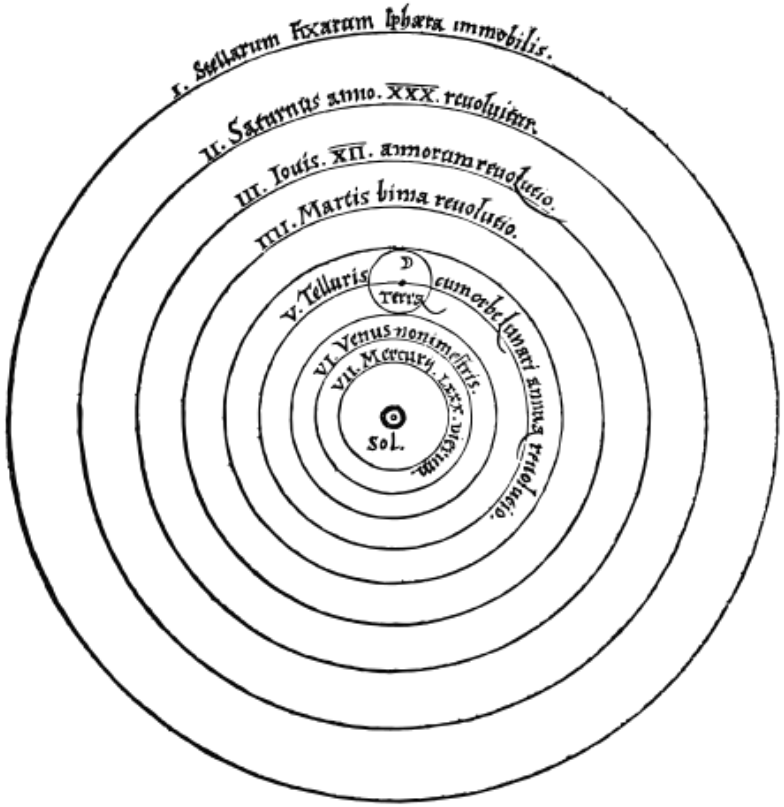
- Brief history about science
- Introduction to the science societies
- Science communication, who, why, when and what
- Science communication, past present and future

The Renaissance
The Age of 'Modern' Science

- A cultural movement, starting in Italy and spanning the 14th to the 17th Centuries, it was a rediscovery of ancient texts written in Greek or Latin
- Seen as a rebirth and marked the beginning of the modern age
- Its influence was felt in literature, arts, religion, philosophy, politics and science



The Science Revolution



Science Revolution

- *Copernicus's De revolutionibus orbium coelestium* (On the Revolutions of Heavenly Spheres) published in 1543, key text of the science revolution
- Same year Andreas Vesalius's *De human Corporis Fabrica* (on the fabric of the human body)

The idea of Francis Bacon - Inductive Reasoning

- Starts with many observations of nature followed by a theory of how things work
- The start of the concept of the scientific method
- This was science by experimentation, as we see it today

Science Societies and Institutions

Royal Society, established in 1660, included scientists such as Robert Boyle, Robert Hook and Christopher Wren; Royal Charter 1662. *The Philosophical Transactions.*

Other societies soon emerged.

- The Royal Institution (RI) 1779 (public education, philanthropic, idea of applied science)
- The Linnaean society 1778
- The Geological Society 1807
- The Zoological Society 1826
- The Royal Astronomy Society 1831
- The Chemical Society 1841

Science as an Amateur Pursuit

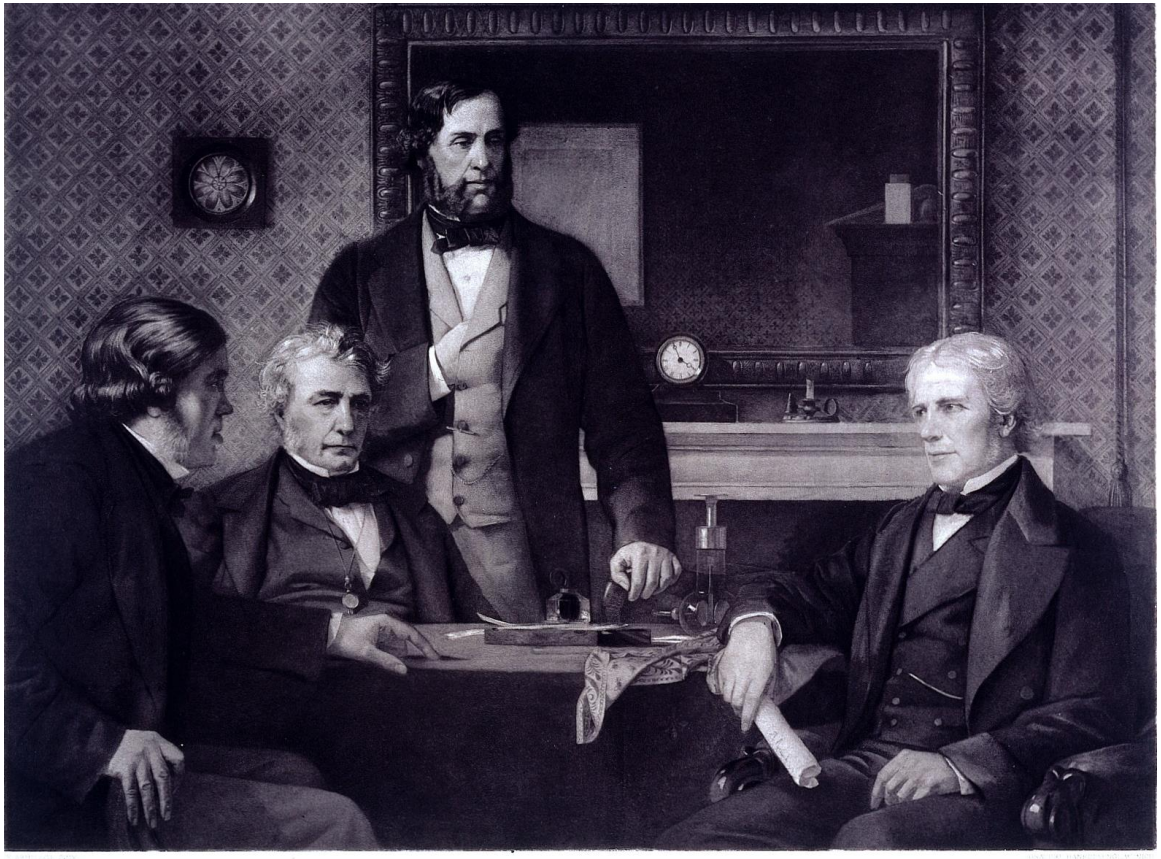
- Throughout the western world small towns and cities had their own science society
- Norwich we had the "Norwich Science Gossip Club 1870-1946

- Do you know any such clubs or societies in Brno or the Czech Republic?

The British Society of Newcastle

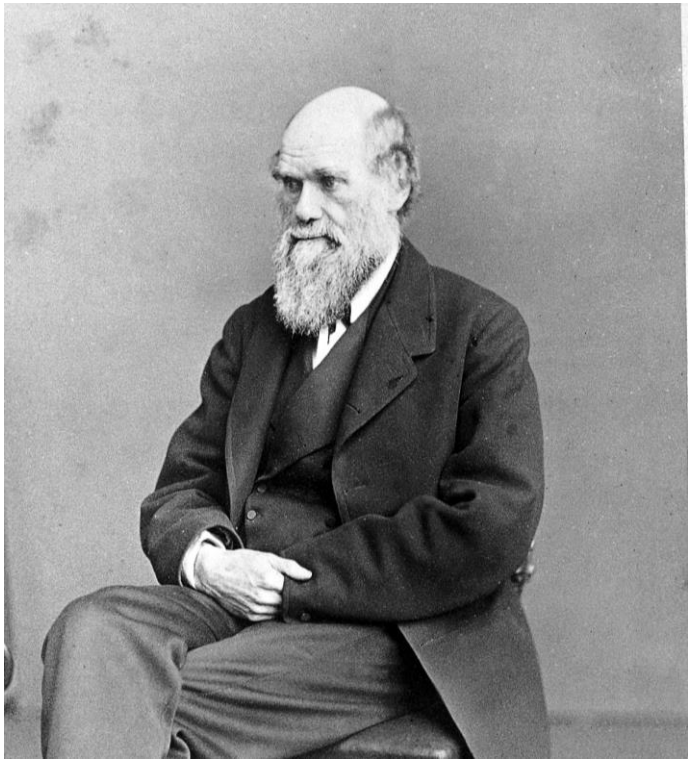
Thanks to the Geological Society for picture

The Birth of the Scientist……



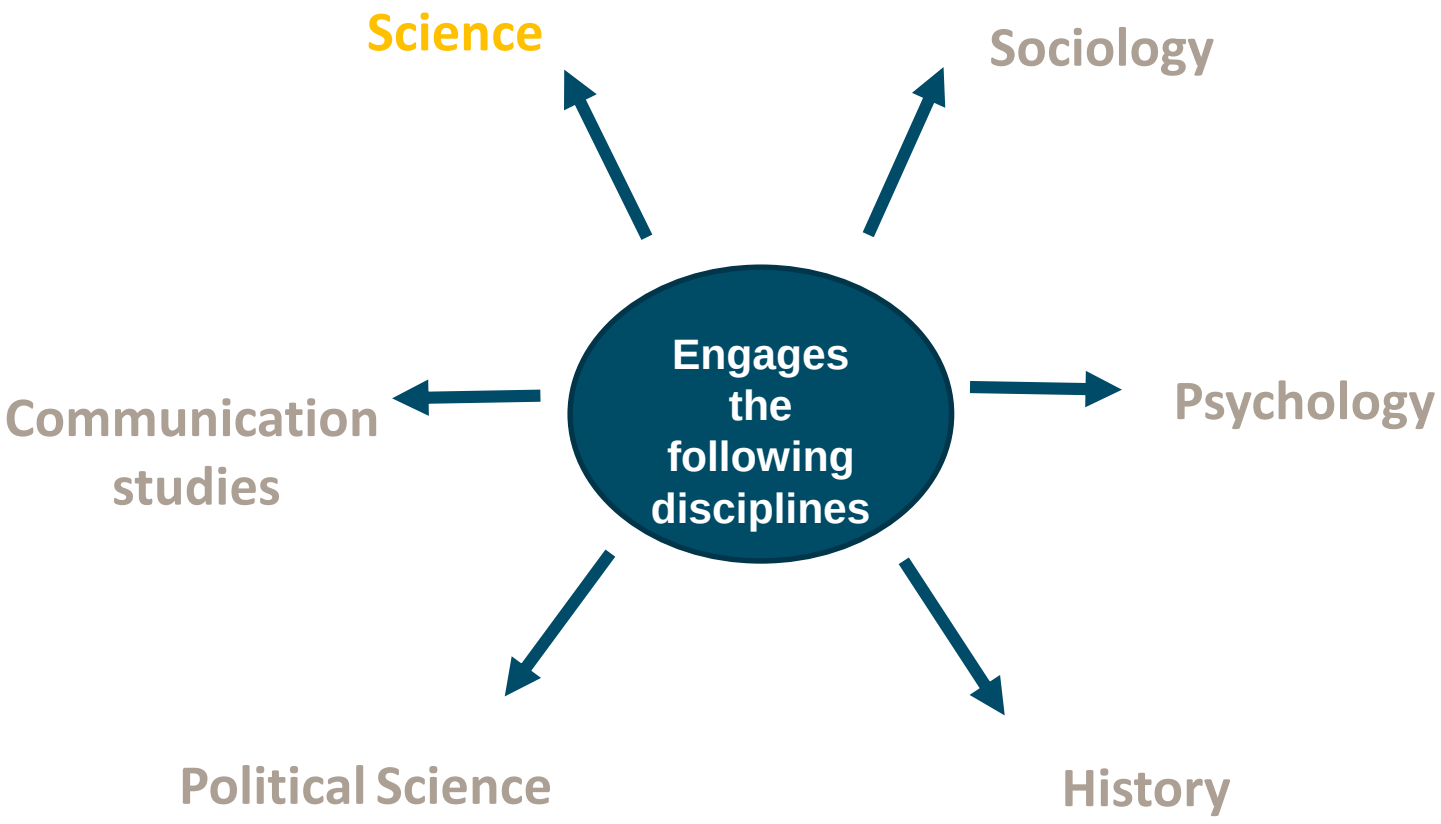
Scientist as a term, is rather recent. It was first ‘coined’ in 1834

Darwin had a lasting effect of modern science…



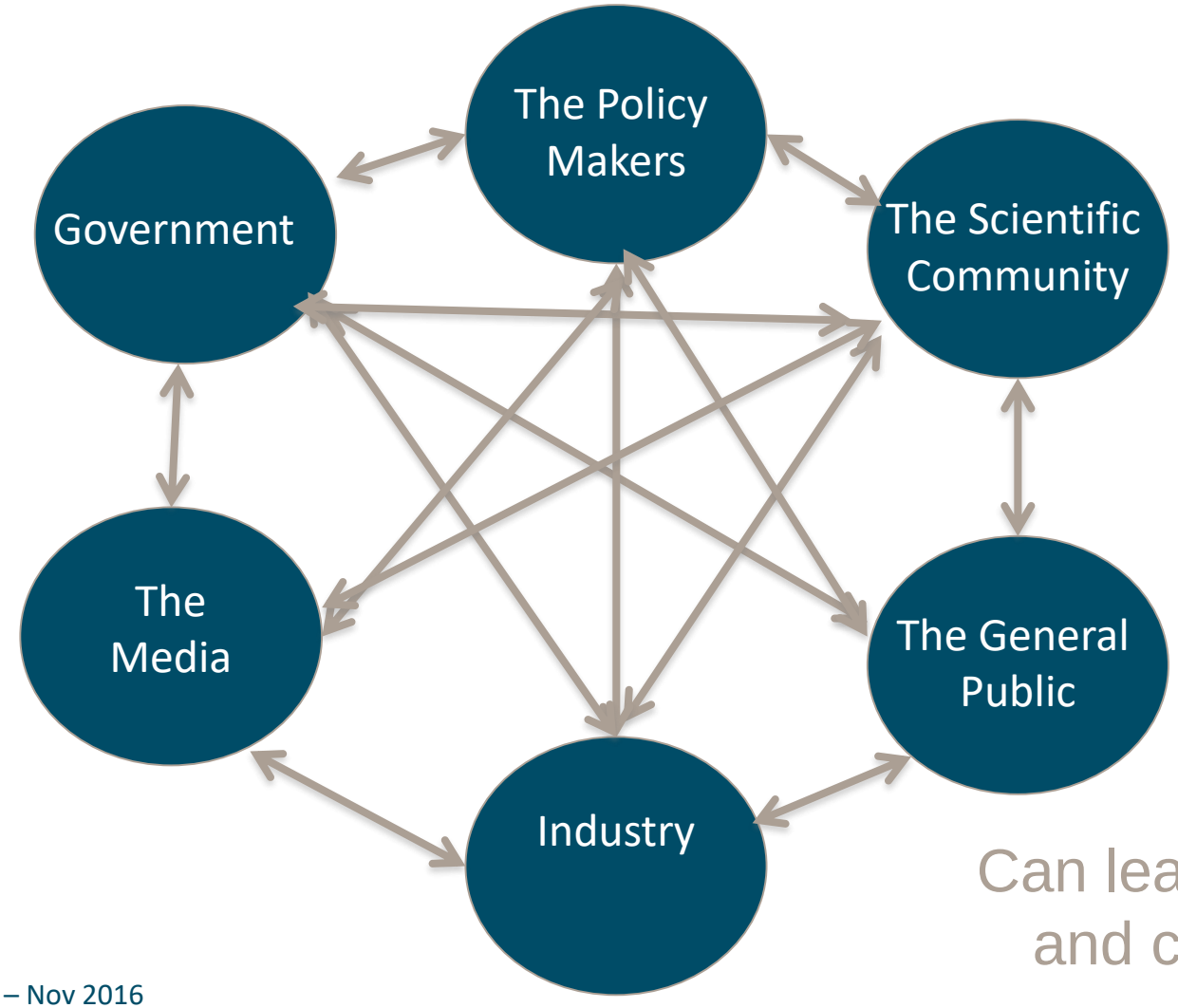
- Developed the concept of peer review
- Co-founder of the X-club in London
- X-club helped to established the journal *Nature*

Science Communication



It is a discipline in its own right

Science Communication with who?



Can lead to noise and confusion

Three Phases of Science Communication

Phase 1

Science Literacy 1960s to 1990s: Public don't know enough about science: as scientists we need to fill the deficit. The Deficit Model. We need a better informed public. One way/direction communication.

Three Phases of Science Communication

Phase 2

Public Understanding of Science (PUS). In the mid 1980s: If public knew more about science they would not distrust it so much. We need to give more science information and then the public 'will appreciate science and scientists'. Still a Deficit Model. Still one way/direction communication.

Three Phases of Science Communication

Phase 3

Public Engagement with Science and Technology (PEST). Science and society. Deficit is with scientists who do not communicate effectively with public. Push is to engage public in a two way dialogue process. Public helps inform decision making and direction of science research.

Who are the scientists who communicate

Towards a professional framework for scientists involved in public engagement. A Mcleod (2010)
Professional science communicators: may be employed by science centres or museums etc
Academic Science Communication Experts: may be social scientists studying science communication.
Science Popularisers: gain popularity with the public through writing, lecturing or broadcasting. Motivated to enthuse new audiences about science
Science Defenders: Work is either important or controversial seeking to explain or defend their research area
Scientists: involved with science communication in schools, science events with the public, enjoy science and want to pass enjoyment to an audience out with scientific community.

Levels of engagement of scientists with different science communication

Public Engagement Activity	None	Once	More than Once
Institutional Open Day	44%	36%	21%
Public Lecture	60%	21%	20%
Engaged with Policy Makers	67%	16%	17%
Teachers/Schools	70%	15%	15%
Newspaper/Media	77%	13%	11%
NGOs	77%	9%	14%
Written for public	75%	15%	10%
Public Dialogue Event	80%	13%	7%
Science Centres/museums	87%	6%	7%
Interviewed on Radio	88%	7%	6%
Judged Competitions	89%	8%	11%

Royal Society, RCUK and Wellcome Trust ('Science Communication' report , 2006)

Over to you: What do you think ?

1. Why do scientists choose to undertake science communication activities?

2. Why do scientists choose NOT to undertake science communication activities?

3. Why do universities choose to undertake science communication activities?

4. Why are research funders asking scientists to undertake science communication?

Over to you: What do you think ?

ANSWERS TO POINT 1

- Scientists want to create links to society
- Some scientists are keen to be `famous`
- To obtain more money
- To ensure that correct information is given to the public
- It is an obligation from funders

ANSWERS TO POINT 2

- No time to do it – there's too much other stuff to do
- Don't know how to do it
- Some scientists (and people generally) are introverted and don't like to speak to such audiences

ANSWERS TO POINT 3

- To justify how they spend money
- To trigger interest (attract) new students

ANSWERS TO POINT 4

- To justify how they spend money, show that it has been spent well
- To show practical impact of their research
- To bring in additional funding (from other sources)

Is Communicating Science to the Public Important?

Economic- this is the main driving force towards a public which has a better understanding. E.g. Human Genome Project
Utilitarian – the public should be more aware of the way that the community uses science. E.g use of DNA fingerprinting to identify criminals
Democratic- the public is often asked to make decisions about new technologies. E.g Three Parent In Vitro Fertilization (TPIVF)
Cultural – science can be done well or badly and Stephen J Gould remarked "*the best science is like high art, worth appreciating for its own sake and not necessarily because it brings immediate benefit*" E.g. Albatross and dynamic soaring.
Social- science penetrates all levels of human activity, an awareness of the basis of science and the issues surrounding it will enhance social cohesion. E.g. Crop yield and food security.

Some Reasons Scientists Do or Don't Communicate with Public

Pros	Cons
Political climate	No time
Reward and recognition	No skills
Increase chance of funding	No confidence, feel exposed/vulnerable
Addressing misperceptions of science and scientists	Lack of peer support or recognition
Benefits wider society	Fear of miscommunication
Personal satisfaction	Fear of misinterpretation

Public Attitude to Science 2014

https://www.ipsos-mori.com/researchpublications/researcharchive/3357/Public-Attitudes-to-Science-2014.aspx#gallery[m]/0/

Public's Attitude Towards the Communication of Science

Agreement with	% in 2014
Those who feel they are not clever enough to understand science	30
On the whole science will make life easier	81
Benefits of science outweigh the harm	55
Say TV is one of their sources of science information	59
Think they see and hear too little about science.	51
Scientists should listen to what ordinary people think	69

Looking Forward

Impact

Scientists must demonstrate that their science has a long-term impact on society. They must also demonstrate that they are engaging with the public.

Citizen Science

Public are already engaged in science: we have harnessed the public to work with us. They are counting, scoring, observing quantifying and identifying.

Garage Science

Public are already engaged in science: they are buying equipment, buying reagents, setting up experiments undertaking their own research without the input of scientists.

IDEAS TO GET STARTED WITH PUBLIC ENGAGEMENT

Become
involved
in a science festival.

Join
Sense about Science
(www.senseaboutscience.org/)

Set up a
BLOG
about your views of different aspects of science.

Apply for money
for an engagement event when you apply for research funding.

VOLUNTEER
to help with someone else's public engagement event.

Start
TWEETING
on scientific issues.

Find a
mentor
within your organisation to help get you started.

Respond
online to a scientific story in a newspaper.

Think about joining
Bright Club
for stand up science comedy.
(www.brightclub.org)

If you belong to a leisure group, club or other society, ask if you can
DO AN ACTIVITY
with them.

Take part
in a public lecture series.

Volunteer to
help out
at a public open day at your organisation.

Go and observe a
café scientifique
and then volunteer for a session.

If you belong to a book club,
pick a book to discuss
with a scientific theme.

Consider going on a
training course
either one run by your organisation or an external one.

WRITE A PIECE ABOUT SCIENCE
for your local newspaper or magazine published by your learned society.

If you have a webpage about you and your research,
ADD INFORMATION
about how your research could effect the public.