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APPEAL Workshop

Gather yourselves in groups of 3-4 participants. Every group should select one topic to work on (20'). Most of them show a selection of recent press articles showing how science goes from article to press release and to headline news. Comment and discuss them in groups. Think on some tips for students to help them differentiate the true news. (nb. You could create an acronym like the RAD CAB one for online sources, see bottom for link). After that, each group should summarize it to the rest (10'). For the tips, we will work out all together with the 'top 5 (or 10)' tips for students.

Billion Suns:

Aim: differentiate the different language between article, press release and original paper. Analyse the loss of information and possible misunderstandings when scientific information changes from one channel to other.

Press release:

https://www.eurekalert.org/pub_releases/2017-06/uon-obs062317.php

Independent:

<http://www.independent.co.uk/news/science/billion-suns-brightest-light-ever-earth-scientists-x-ray-nebraska-a7808331.html>

Daily Mail:

[Laser produces light a BILLION times brighter than the sun in breakthrough that could lead to safe and highly-sensitive 3D X-ray scans](#)

Original research paper:

<https://www.nature.com/nphoton/journal/vaop/ncurrent/full/nphoton.2017.100.html>

The 'Big Chill' theory:

Aim: differentiate the different language between article, press release and original paper. Analyse the loss of information and possible misunderstandings when scientific information changes from one channel to other.

Article:

<http://www.abc.net.au/science/articles/2012/08/21/3572476.htm>

Press Release

<http://newsroom.melbourne.edu/news/n-885>

Original paper:

James Quach, Chun-Hsu Su, Andrew Martin, Andrew Greentree. **Domain structures in quantum graphity**. *Physical Review D*, 2012; 86 (4) DOI: [10.1103/PhysRevD.86.044001](https://doi.org/10.1103/PhysRevD.86.044001)

'Einstein was wrong' (quantum entanglement)

Aim: think on the different meanings of words in different contexts. For example, 'wrong' and 'action at distance'.

(speed of light and entanglement: action at distance)

<http://www.dailymail.co.uk/sciencetech/article-3283317/Einstein-wrong-Ground-breaking-test-reveals-spooky-quantum-entanglement-phenomenon-real.html>

quantum teleportation

<https://futurism.com/a-quantum-teleportation-breakthrough-physicists-just-smashed-previous-records/>

Debunked studies :

Aim: understand bias in the experiment, and how a physical phenomenon may be misinterpreted by the writer.

"N-Rays"

https://en.wikipedia.org/wiki/N_ray

<https://www.aps.org/publications/apsnews/200708/history.cfm>

human magnetism

<http://www.cbsnews.com/news/magnet-boy-attracts-metal-to-chest/>

Fake news impacting society

Nutella and cancer

<http://www.acsh.org/news/2017/01/12/nutella-cancer-story-gives-fake-news-bad-name-10723>

aspartame and cancer

https://en.wikipedia.org/wiki/Aspartame_controversy

Does science communication need to be fun?

Aim: think

Electron band in Ge

<http://pages.cs.wisc.edu/~kovar/hall.html>

The goatman

<http://www.bbc.co.uk/news/science-environment-37443204>

ABOUT 5-SIGMA DISCOVERIES AND STATISTICAL SIGNIFICANCE:

Aim: explain the different meanings of '5-sigma'. Consider the different standards in different sciences. Is it well communicated?

In the social sciences, a p-value of $p < 0.05$ is considered sufficient to claim an effect. The equivalent in particle physics is $p < 0.0000003$

Research hypothesis/ null hypothesis

<http://rpsychologist.com/the-higgs-boson-sigma-5-and-the-concept-of-p-values>

<https://blogs.scientificamerican.com/observations/five-sigmawhats-that/>

<http://blogs.oii.ox.ac.uk/policy/many-of-us-scientists-dont-understand-p-values-and-thats-a-problem/>

(and related paper: <http://journal.frontiersin.org/article/10.3389/fphy.2016.00006/full>)

Additional resources:

PAPERS (SCIENCE):

'Adventures in Experimental Physics' Journal:

<http://trove.nla.gov.au/work/11280963?selectedversion=NBD918944>

ARTICLES/MEDIA:

Where journalists go to get press releases:

<https://www.eurekaalert.org>

This is a guide for journalists reporting on science, but is useful for everyone!

<http://www.scidev.net/global/communication/practical-guide/how-to-report-scientific-findings.html>

HOW SCIENCE WORKS ARTICLES:

Symmetry Magazine - blind analysis in astronomical surveys:

<http://www.symmetrymagazine.org/article/the-facts-and-nothing-but-the-facts>

Wired - Scientists are wrong all the time and that's fantastic (vaccines and autism)

<https://www.wired.com/2015/02/scientists-wrong-time-thats-fantastic/>

BOOKS:

Gary Taubes, Nobel Dreams: Power, Deceit, and the Ultimate Experiment

<http://www.goodreads.com/book/show/3071857-nobel-dreams>

"Brilliant Blunders" (Simon & Schuster, May 14, 2013)

PODCASTS:

'SCIENCE' FOR LAUGHS:

<http://pages.cs.wisc.edu/~kovar/hall.html>

<http://blogs.discovermagazine.com/discoblog/2010/12/17/each-cell-phone-tower-creates-18-babies-the-difference-between-causation-correlation/#.WVIRcTOZNmM>

OTHER INTERESTING SITES:

PLOS 'missing pieces' journal of null and negative results

<http://collections.plos.org/missing-pieces>

EDUCATIONAL TOOLS:

For teaching general online source evaluation, schools use this:

<http://www.radcab.com>