

April 2018



MONTANA GEOLOGICAL SOCIETY NEWSLETTER

Vol. 62 No. 6



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Our President discusses
“fake news” -- how far
and fast does it really
travel?



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bad science.



P5 / RALLY FOR SCIENCE

In need of weekend
plans? Look no farther!
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P8 / AAPG ACE

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President's Letter

Membership,

First I want to thank those who attended the recent luncheon. It was well-attended and included a great Q&A session.

Lately in the news and general consciousness of society is the idea of “fake news.” As scientists, we’ve been trained to be skeptical and evidence-minded but I imagine most of us have still been taken in by a false story or report at one time or another. This month I would like to highlight a paper in the journal Science dealing with this topic as well as pass along some tips for spotting bad science.

The team lead by Sinan Aral of MIT concluded “Falsehood diffused significantly farther, faster, deeper, and more broadly than the truth in all categories of information, and the effects were more pronounced for false political news than for false news about terrorism, natural disasters, science, urban legends, or financial information” (The spread of true and false news online; Science 359, March 9, 2018, p. 1146-1151). Their data comprised over 126,000 stories tweeted by over 3 million people more than 4.5 million times from 2006-2017.

To determine which claims were true or false, they used six sites devoted to fact-checking: factcheck.org, hoax-slayer.com, politifact.com, snopes.org, truthorfiction.com, and urbanlegends.about.com. The six sites agreed on which reports were true 95%-98% of the time, they said. The authors said they made no claims about the intent of the purveyors of the information in their analyses but instead focused their attention on veracity.

They found that false news stories were 70% more likely to be retweeted than true stories. “False news is more novel, and people are more likely to share novel information,” Aral said. Plus, people like to repeat information that seems to affirm their beliefs. When asked why someone would retweet a post before knowing if it’s actually true, Aral’s answer was status. “People who share novel information are seen as being in the know,” he said.

Falsehood also reached far more people than the truth, the study found. Whereas the truth rarely diffused to more than 1000 people, the top 1% of false-news cascades routinely diffused to between 1000 and 100,000 people. Falsehood reached more people at every depth of a cascade of tweets than the truth, meaning that many more people retweeted falsehood than they did the truth. It also took the truth about 6 times longer to reach 1500 people than a falsehood.

According to the authors false stories inspired fear, disgust, and surprise in replies, whereas true stories inspired anticipation, sadness, joy, and trust.

If you are interested in more details on the study and would like to read the full paper, please contact me. I also recommend www.allsides.com. It’s a site that helps sort through bias in the news by providing multiple articles on the same story written from different sides of the political spectrum. It also has an extensive list of news sources and gives them a bias rating ranging from far-left to far-right.

Thanks for reading,

Felipe Pimentel
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A Rough Guide to SPOTTING BAD SCIENCE

Being able to evaluate the evidence behind a scientific claim is important. Being able to recognise bad science reporting, or faults in scientific studies, is equally important. These 12 points will help you separate the science from the pseudoscience.

1. SENSATIONALISED HEADLINES

Aa

Article headlines are commonly designed to entice viewers into clicking on and reading the article. At times, they can over-simplify the findings of scientific research. At worst, they sensationalise and misrepresent them.

7. UNREPRESENTATIVE SAMPLES USED



In human trials, subjects are selected that are representative of a larger population. If the sample is different from the population as a whole, then the conclusions from the trial may be biased towards a particular outcome.

2. MISINTERPRETED RESULTS



News articles can distort or misinterpret the findings of research for the sake of a good story, whether intentionally or otherwise. If possible, try to read the original research, rather than relying on the article based on it for information.

8. NO CONTROL GROUP USED



In clinical trials, results from test subjects should be compared to a 'control group' not given the substance being tested. Groups should also be allocated randomly. In general experiments, a control test should be used where all variables are controlled.

3. CONFLICTS OF INTEREST



Many companies will employ scientists to carry out and publish research - whilst this doesn't necessarily invalidate the research, it should be analysed with this in mind. Research can also be misrepresented for personal or financial gain.

9. NO BLIND TESTING USED



To try and prevent bias, subjects should not know if they are in the test or the control group. In 'double blind' testing, even researchers don't know which group subjects are in until after testing. Note, blind testing isn't always feasible, or ethical.

4. CORRELATION & CAUSATION



Be wary of any confusion of correlation and causation. A correlation between variables doesn't always mean one causes the other. Global warming increased since the 1800s, and pirate numbers decreased, but lack of pirates doesn't cause global warming.

10. SELECTIVE REPORTING OF DATA



Also known as 'cherry picking', this involves selecting data from results which supports the conclusion of the research, whilst ignoring those that do not. If a research paper draws conclusions from a selection of its results, not all, it may be guilty of this.

5. UNSUPPORTED CONCLUSIONS



Speculation can often help to drive science forward. However, studies should be clear on the facts their study proves, and which conclusions are as yet unsupported ones. A statement framed by speculative language may require further evidence to confirm.

11. UNREPLICABLE RESULTS



Results should be replicable by independent research, and tested over a wide range of conditions (where possible) to ensure they are consistent. Extraordinary claims require extraordinary evidence - that is, much more than one independent study!

6. PROBLEMS WITH SAMPLE SIZE



In trials, the smaller a sample size, the lower the confidence in the results from that sample. Conclusions drawn can still be valid, and in some cases small samples are unavoidable, but larger samples often give more representative results.

12. NON-PEER REVIEWED MATERIAL



Peer review is an important part of the scientific process. Other scientists appraise and critique studies, before publication in a journal. Research that has not gone through this process is not as reputable, and may be flawed.



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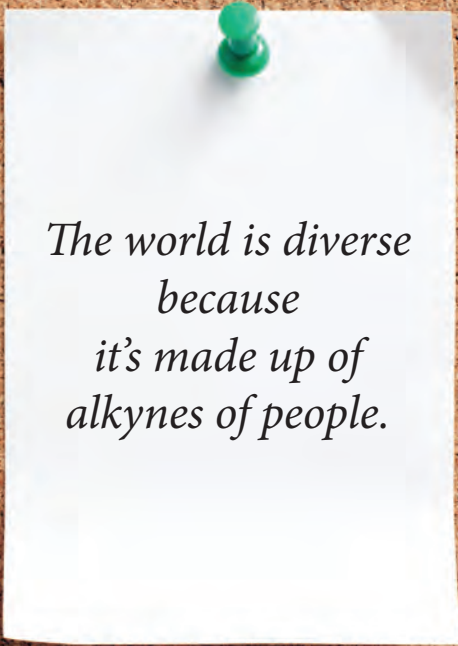
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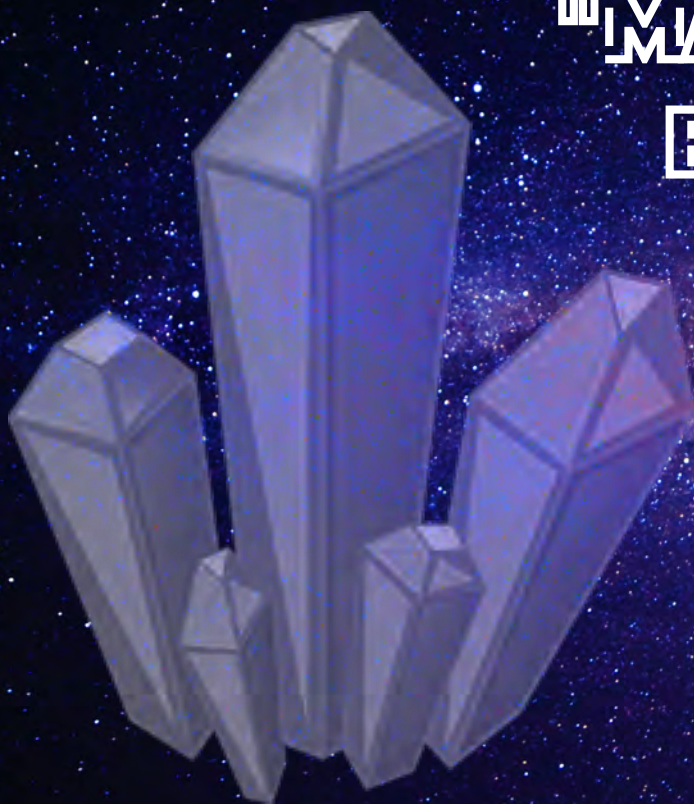


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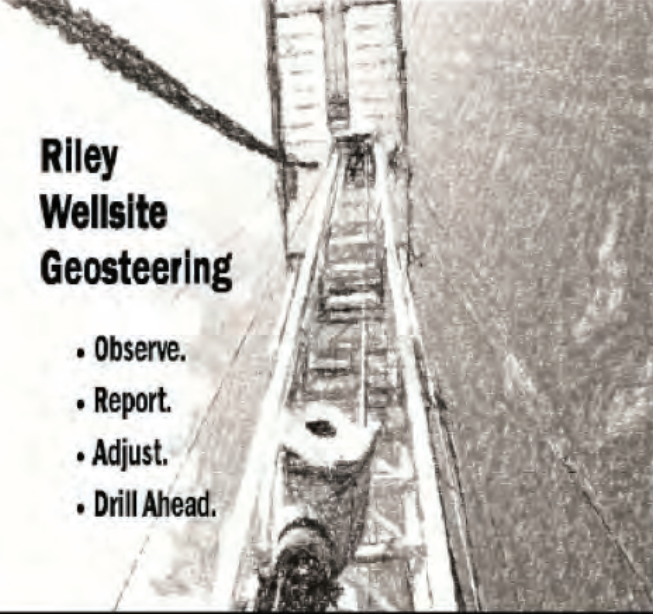
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