

Hot Topic Discussion

Science Outreach in the Post-Truth Age

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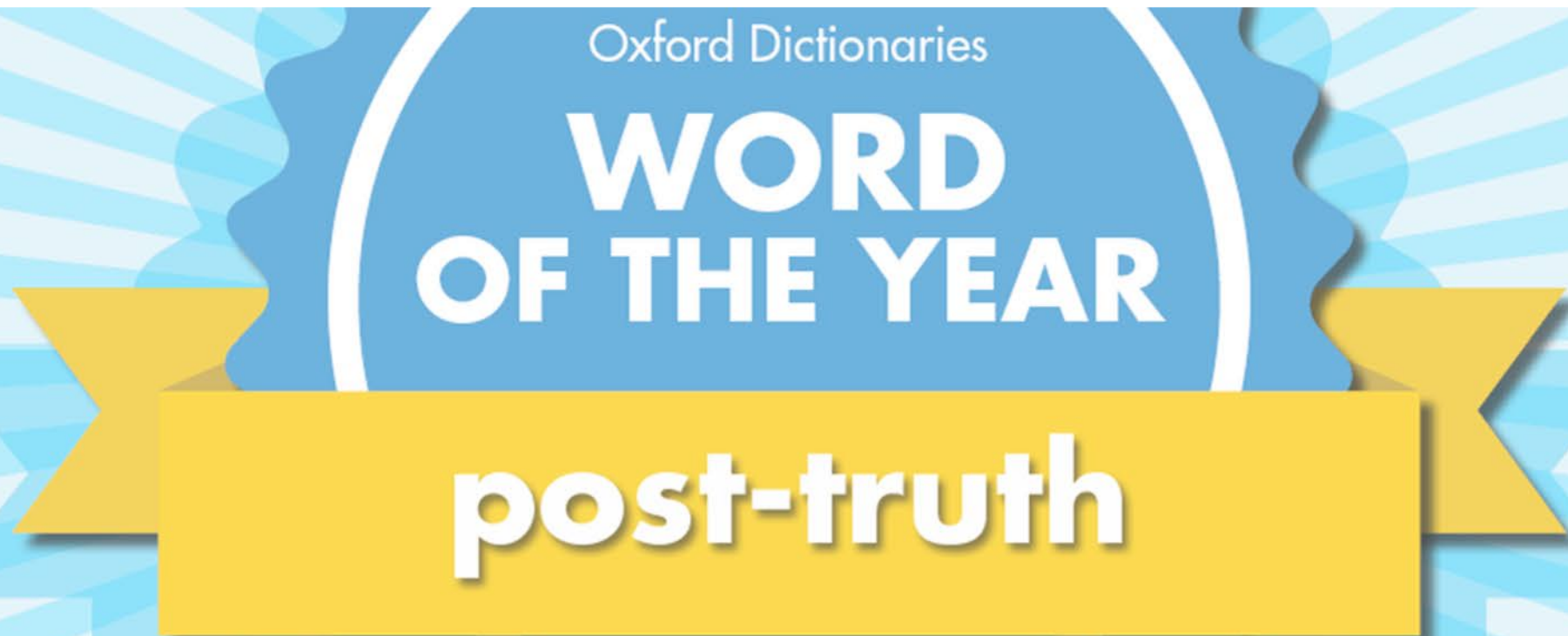
Illustration: adapted from Elastico SRL

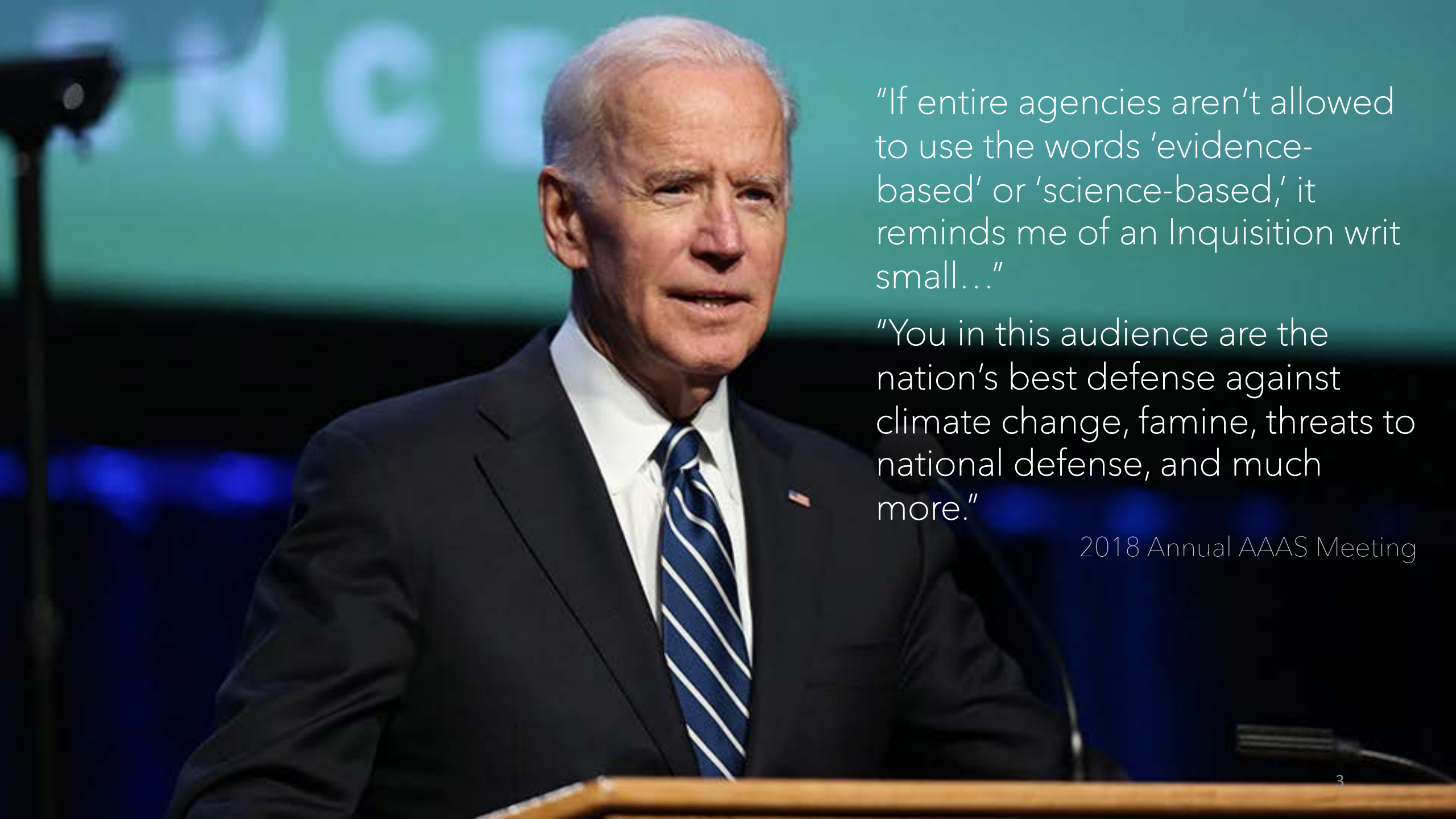


What is the post-truth?

“denoting circumstances in which objective facts are less influential in shaping public opinion than appeals to emotion and personal belief”

Source: <https://en.oxforddictionaries.com/word-of-the-year/word-of-the-year-2016>





"If entire agencies aren't allowed to use the words 'evidence-based' or 'science-based,' it reminds me of an Inquisition writ small..."

"You in this audience are the nation's best defense against climate change, famine, threats to national defense, and much more."

2018 Annual AAAS Meeting

Case study: climate change

Consensus on consensus: a synthesis of consensus estimates on human-caused global warming

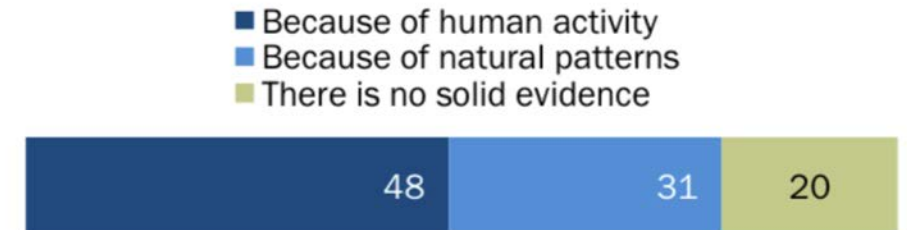
John Cook^{1,2,3,16}, Naomi Oreskes⁴, Peter T Doran⁵, William R L Anderegg^{6,7}, Bart Verheggen⁸, Ed W Maibach⁹, J Stuart Carlton¹⁰, Stephan Lewandowsky^{11,2}, Andrew G Skuce^{12,3}, Sarah A Green¹³, Dana Nuccitelli³, Peter Jacobs⁹, Mark Richardson¹⁴, Bärbel Winkler³, Rob Painting³ and Ken Rice¹⁵

Abstract

The consensus that humans are causing recent global warming is shared by 90%–100% of publishing climate scientists according to six independent studies by co-authors of this paper. Those results are consistent with the 97% consensus reported by Cook *et al* (*Environ. Res. Lett.* **8** 024024) based on 11 944 abstracts of research papers, of which 4014 took a position on the cause of recent global warming. A survey of authors of those papers ($N = 2412$ papers) also supported a 97% consensus. Tol (2016 *Environ. Res. Lett.* **11** 048001) comes to a different conclusion using results from surveys of non-

About half of Americans say Earth is warming due to human activity

% of U.S. adults saying climate change is mostly due to human activity/mostly due to natural patterns/there is no solid evidence that Earth is getting warmer

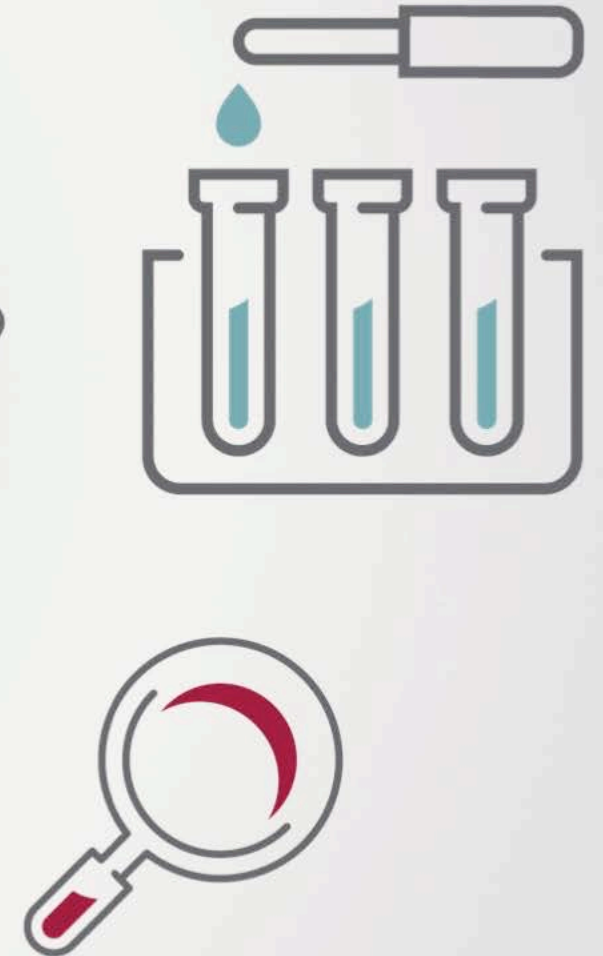
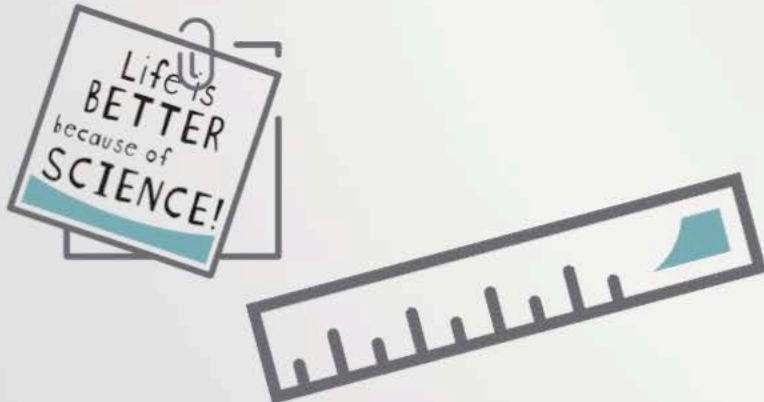


Note: Beliefs about climate change include those who “lean” toward each response. Those who did not give an answer are not shown. Source: Survey conducted May 10-June 6, 2016. “The Politics of Climate”

PEW RESEARCH CENTER

Evidence vs. Emotion

Skepticism, not Denialism



Scientists can bolster credibility by engaging with communities.

editorial

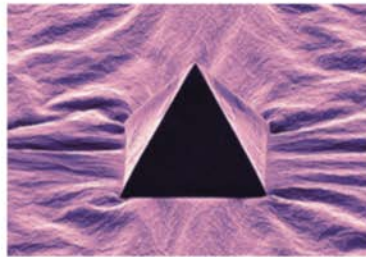
Science outreach in the post-truth age

Outreach activities, like those related to National Nanotechnology Day, contribute to building a science culture, narrowing the gap between science and the public.

The definition of 'post-truth' given by Oxford Dictionaries is: "Relating to or denoting circumstances in which objective facts are less influential in shaping public opinion than appeals to emotion and personal belief." There is no better expression to describe the current political climate, and in fact its usage spiked during the months leading up to the Brexit referendum in the UK and to the presidential election in the USA, earning the status of 'word of the year 2016'. The increasingly common attitude of scepticism towards science can also be considered as an example of post-truism, a point made by Sue Desmond-Hellmann, CEO of the Bill & Melinda Gates Foundation, in a lecture delivered at Cambridge University (available at <http://go.nature.com/2flKlfFf>). Often in discussions about climate change, vaccination, evolution and homeopathy, to name a few, scientific evidence is belittled in the name of other types of belief.

Denial of scientific theories, without the support of experimental evidence

known to the National Nanotechnology Coordination Office (NNCO), the White House-led office that coordinates and supports, through federal funding, the National Nanotechnology Initiative (NNI), an R&D venture that groups 20 different departments and agencies in the field of nanotechnology. Among the NNI's goals, education and outreach are high on the list. For this reason, last year they launched the first National Nanotechnology Day on 9 October (following the American date notation, 10/9, for 10⁹). Several colleges and universities across the country, as well as science foundations and societies, participated in the event with outreach activities, seminars, talks, photography exhibitions and lab visits aimed at filling the gap between the science carried out in the lab and the lay audience's experience of it. Scientists and experts in the field also recorded short 'Nano Nuggets' videos, talking about their vision for nanotechnology. The whole event list is hosted on the NNI website (<http://go.nature.com/2wjYmU>)



The image above represents a pyramidal tip from an array used for soft lithography. The pyramid is made of a polymeric elastomer coated in glass; cooling the material during the manufacturing process shrinks the polymer, rippling the surface around the tip. The image was recorded at the Northwestern University Atomic and Nanoscale Characterization Center (NUANCE) and exposed with the title 'Lone Glass Pyramid' at the NUANCE Center Fall 2016 Gallery. The gallery's reception was held in occasion of National Nanotechnology Day 2016.

- We also bear some responsibility in failing to effectively communicate our discoveries.
- Take the example of nano!
- Need to promote science education at all levels

Resources and Opportunities



Source: <https://www.socialsciencespace.com/2016/12/research-communicating-science-post-truth-era/>

- Event: "Science Communication in a Post-Truth World" 3/1/18 (location: 2-105; RSVP: <https://goo.gl/6sp1Lx>)
- National Nano Day
- Cambridge Science Festival (4/19)
- KI is looking for volunteers for outreach program with local high schools (contact: ereinfel@mit.edu)
 - 3/30 (drug delivery demo)
 - Other field trips March-June



**US Science Festival
Nifty Fifty Tour, All
Girls High School in MD**



Women in Science Week, High School Students



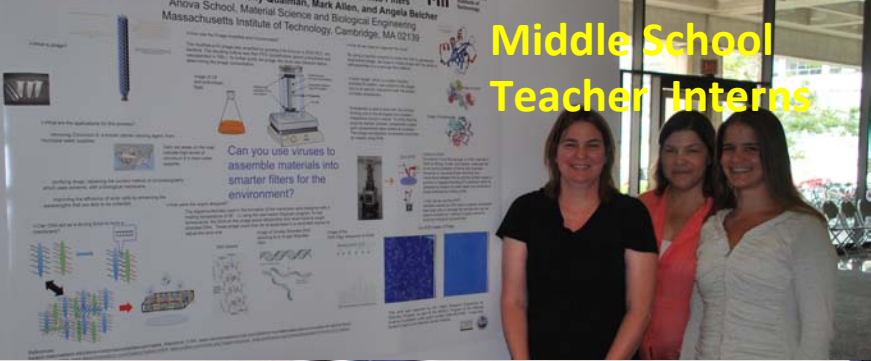
THE WALKER PRIZE



**Belcher Museum of Science
Exhibit, Bosotm**



**2nd grade
optics**



**Middle School
Teacher Interns**



**AAAS Family
Day- KeynoteS**



**Middle
School
DNA Labs**



Biochem for Kids

STEM Education is our Future



ScienceAroundtheWorld.com
Teaching and Learning Science Around the World



Discussion Questions

- Question 1: Why do we deny scientific evidence?

Discussion Questions

- Question 2: What constitutes effective scientific communication?

Discussion Questions

- Question 2: What constitutes effective scientific communication?
 1. Listen
 2. Step back and identify uncertainties/questions
 3. Communicate using simple facts (% , etc.)
 4. Listen and discuss (test the messaging not the audience)

Discussion Questions

- Question 3: Besides nanoscience, what other emerging techs do you anticipate would benefit from better communication efforts with the public?

Take home

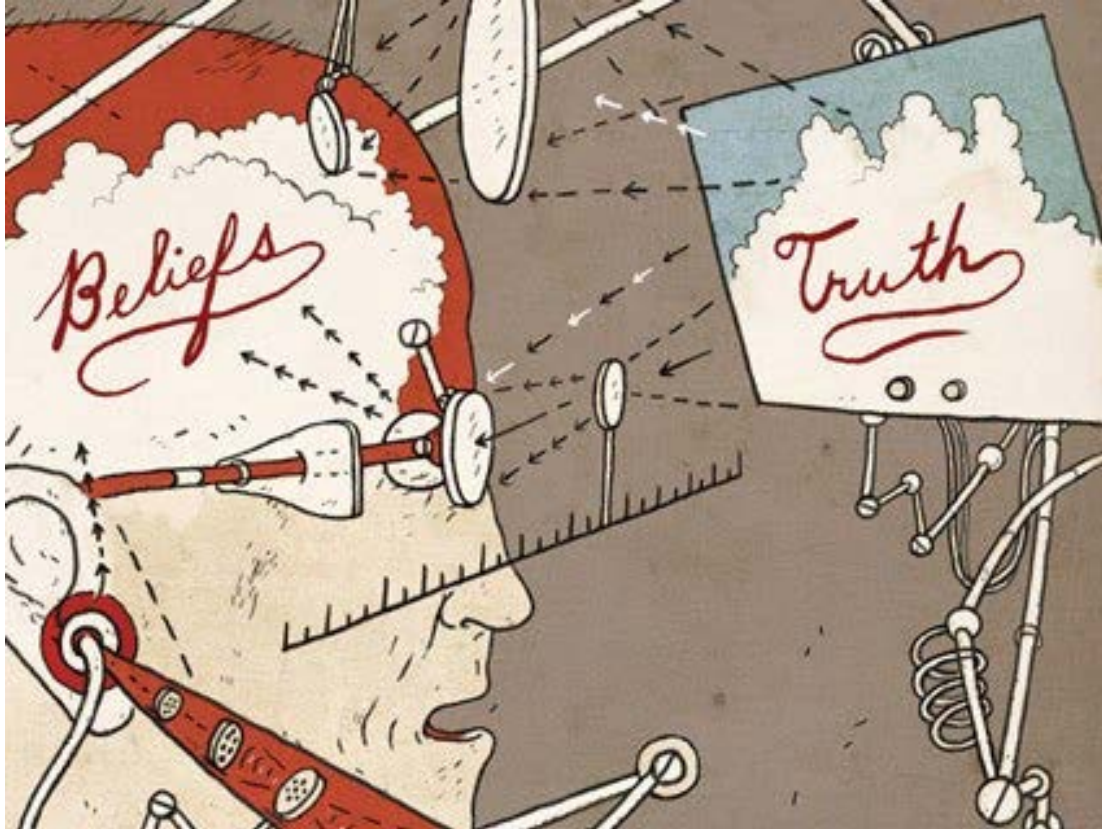


Illustration: Jonathon Rosen

- We also bear some responsibility for public mistrust when we fail to broadly communicate our own discoveries.
- Engage with the public through community-led activities and learn how to communicate science more informally.