

# "Communicating Science in a Networked World"

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# UCDAVIS ANIMAL SCIENCE

Email: alvaneenennaam@ucdavis.edu Twitter: @BioBeef http://animalscience.ucdavis.edu/animalbiotech



http://blogs.egu.eu/network/palaeoblog/files/2012/10/science.jpg

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### Most Americans Can't Name a Living Scientist

Can you name a living scientist? (first volunteered responses)

		Stephen Hawking	15%
66%	34% –	James Watson	1%
		Jane Goodall	1%
		Bill Nye	1%
		Michio Kaku	1%
		Neil Degrasse Tyson	1%
		Other	14%
	Yes		
	No 🖉		

Source: Your Congress - Your Health Survey, March 2011 Charlton Research Company for Research!America

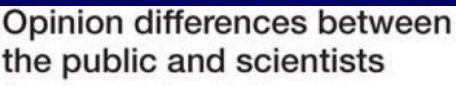


http://www.researchamerica.org/sites/default/files/uploads/MostAmericansCantNameaLivingScientist.pdf

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Percentage agreeing with statement



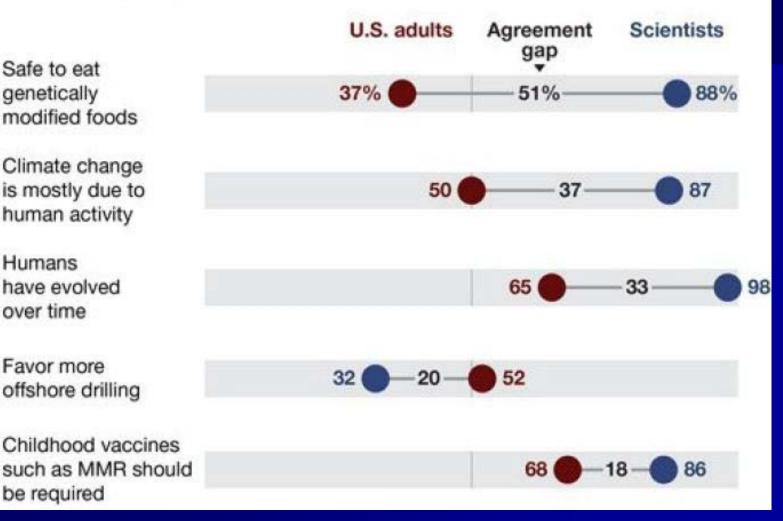


Image from http://news.nationalgeographic.com/news/2014/06/150129-public-opinion-aaas-health-education-science/ http://www.pewinternet.org/2015/01/29/public-and-scientists-views-on-science-and-society/pi\_2015-01-29\_science-and-society-00-01/



### 'Mommy PhD' Launches Scientists are People Campaign (March 9, 2015)



http://skepchick.org/2015/03/guest-post-mommy-phd-launches-scientists-are-people-campaign/

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### Mommy PhD then listed the ways in which she is a "regular person"

- I'm a mom. I'm a wife. I'm a sister.
- I grew up in the suburbs of New York City.
- I have 2 cats.
- I play tennis.
- I love to cook.
- I traveled in Australia and New Zealand after college and was in Sydney for the 2000 Olympics. I worked as a waitress at a coffee shop on Macquarie St during the Olympics.
- I like to scrapbook (yes, really).
- I play piano (I used to be very good).
- I can play the flute too (I used to be very terrible).
- I love doing arts and crafts with my kids.
- Buffy the Vampire Slayer is my favorite TV show of all time. Grr argh.
- I'm not as organized as I think I am.
- I think unloading the dishwasher is the worst chore ever.
- I love chocolate. I love cheesecake. There are few desserts that are not chocolate or cheesecake that I deem "worth it". Sticky toffee pudding is one of them.

http://skepchick.org/2015/03/guest-post-mommy-phd-launches-scientists-are-people-campaign/ Van Eenennaam 4/16/2015 Animal Genomics and Biotechnology Education





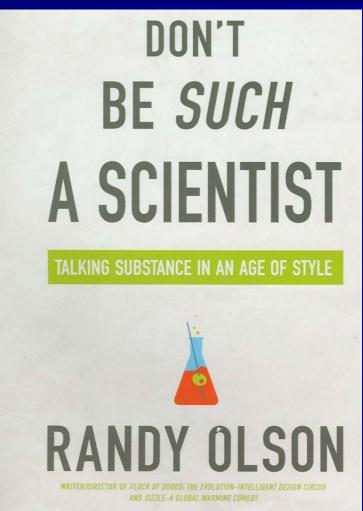
### Reminds me of the 1989-1990 TV series "Alien Nation"



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Part of the problem is that communication styles need to differ depending upon the audience



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### How Academic audiences respond to various aspects of communication

<b>Communication</b> aspect	Academic	
Main information channel	Audio and visual	
Structure	Information is fine	
Mode of response	Cerebral	
Need humor?	Not necessarily	
Like sincerity?	Suspicious of it	
Sex appeal?	Potential disaster	
Prearoused?	Yes	
Effective elements	Information	
Effective organs	Head	
Preferred voice	Robotic	

Olson, R. 2009. **Don't be such a scientist. Talking substance in an age of style**. Island Press. Van Eenennaam 4/16/2015



### How Academic versus "General Public" audiences respond to various aspects of communication

<b>Communication aspect</b>	Academic	General Public
Main information channel	Audio and visual	Visual
Structure	Information is fine	Need a story
Mode of response	Cerebral	Visceral
Need humor?	Not necessarily	Pretty much
Like sincerity?	Suspicious of it	Always
Sex appeal?	Potential disaster	The ultimate
Prearoused?	Yes	No
Effective elements	Information	Humor, sincerity, sex
Effective organs	Head	Heart, gut, gonads
Preferred voice	Robotic	Human

Olson, R. 2009. **Don't be such a scientist. Talking substance in an age of style**. Island Press. Van Eenennaam 4/16/2015



### For the record: I am a wife (25 years!), mother, friend, daughter, sister, aunt, cousin, colleague, and a person!





SACTOWN 10 MILE RUN Sacramento, CA April 12, 2015 UC DAVIS

MARATH

,0



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INIVERSU

### Have spent my career in animal agriculture



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### Work with producers using different production systems

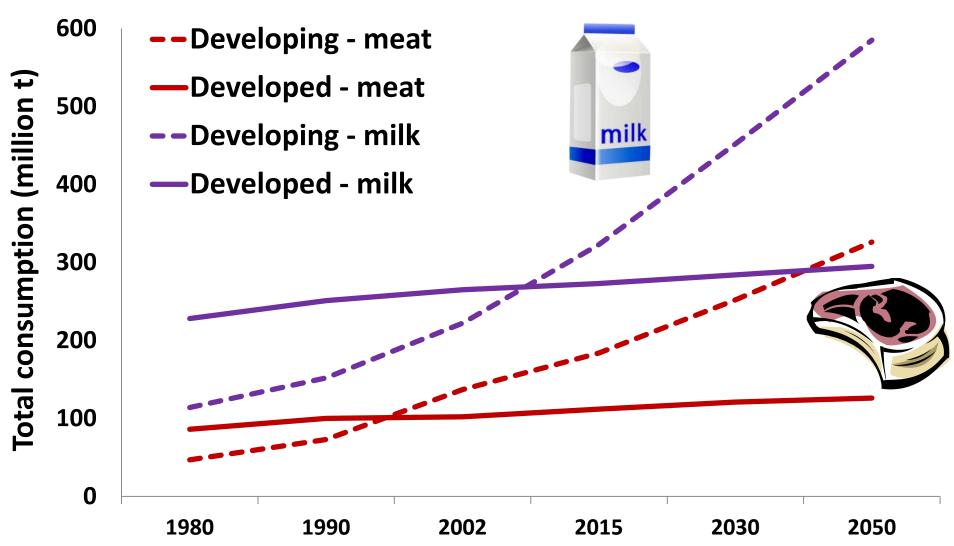


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# Past and projected trends in consumption of meat and milk in developing and developed countries

(Thornton, P.K. 2010 Livestock production: recent trends, future prospects. Philosophical Transactions of the Royal Society B: Biological Sciences 365:2853-2867).



### "Irony at the Apple Store" – Why can't AG use tech? @kevinfolta



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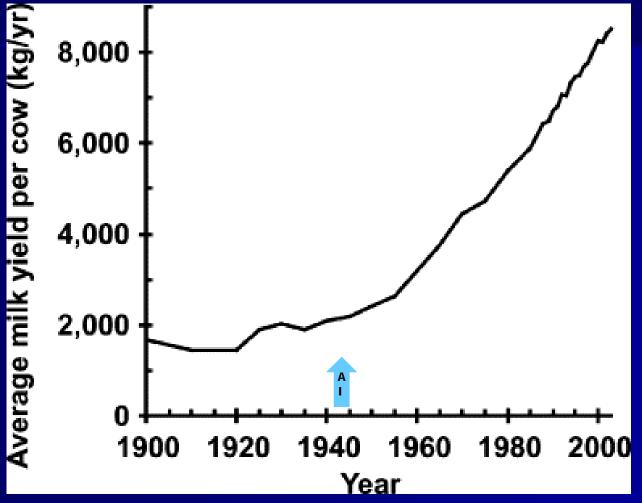






**1944: 25.6 million** animals; total annual milk production of 53.1 billion kg. **1997: 9.2 million** animals; total annual milk production of 84.2 billion kg.

### About half of this 369% increase in production efficiency is attributable to genetic improvement enabled by AI



VandeHaar, M.J. and St-Pierre, N. (2006). Major Advances in Nutrition: Relevance to the Sustainability of the Dairy Industry. *Journal of Dairy Science* 89, 1280-1291.



Round Oak Rag Apple Elevation (born 1965) >80,000 daughters, 2.3 million granddaughters, and 6.5 million great-granddaughters

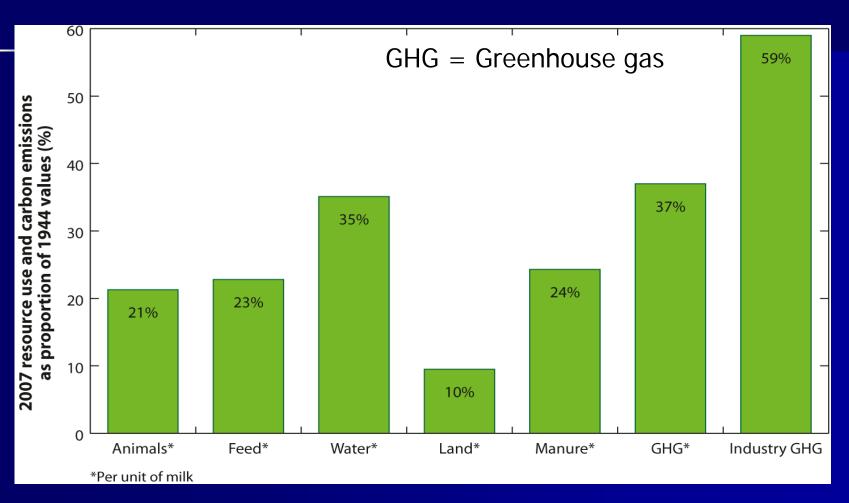


VanRaden, P.M. (2007). Improving Animals Each Generation by Selecting from the Best Gene Sources. Available: <u>http://aipl.arsusda.gov/publish/other/2007/Duke07\_pvr.pdf</u>.

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Resource use and waste outputs from modern US dairy production systems typical of the year 2007, compared with historical US dairying (characteristic of the year 1944).



Capper, JL and DE Bauman, 2013. The Role of Productivity in Improving the Environmental Sustainability of Ruminant Production Systems. Annual Review of Animal Biosciences. 1 pp. 9.1–9.21

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# Artificial insemination was initially a controversial technology

In the initial stages of attempting to develop AI there were several obstacles. The general public was against research that had anything to do with sex. Associated with this was the fear that AI would lead to abnormalities. Finally, it was difficult to secure funds to support research because influential cattle breeders opposed AI, believing that this would destroy their bull market.

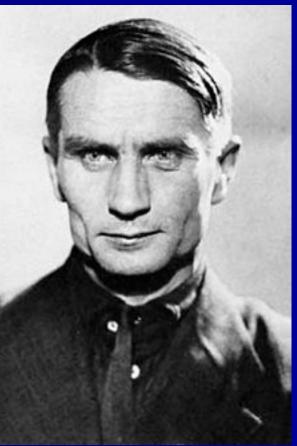
The careful field-tested research that accompanied AI soon proved to the agricultural community that the technology applied appropriately could identify superior production bulls free from lethal genes, would control venereal diseases, and did result in healthy calves. **Thus, fear was overcome with positive facts. The extension service played an important role in distributing these facts.** 

Foote, R.H. 2002. The history of artificial insemination: Selected notes and notables. J. Anim. Sci., 80 (E. Suppl.) (2002), pp. E22–E32



### Why is it important to ensure agricultural science and technology information is correct?

All of Lysenko's experiments were successful. The quality of Lysenko's research can be gauged by his credo that "in order to obtain a certain result, you must want to obtain precisely that result; if you want to obtain a certain result, you will obtain it....l only need such people as will obtain the results that I need."



Tromfin Lysenko 1898-1976 Animal Genomics and Biotechnology Education



Lysenko banished the evils of Mendelian inheritance as "the ravings of a monk" and turned against Darwinian evolution to invoke a theory of cooperation more in line with socialist thinking



"Even when Darwin's teaching first made its appearance, it became clear at once that its scientific, materialist core, its teaching concerning the evolution of living nature, was antagonistic to the idealism that reigned in biology."

### **Trofim Lysenko**

http://www.quotessays.com/trofim-lysenko.html

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## The Scientific Method is NOT a Democratic Process



CAST (Council for Agricultural Science and Technology) is a nonprofit organization composed of scientific societies and many individual, student, company, nonprofit, and associate society members. Together, we assemble, interpret, and communicate credible, science-based information.

- American Association of Avian Pathologists
   Ame
- American Association of Bovine Practitioners
- American Bar Association, Section of Environment, Energy, and Resources-Agricultural Management
- American Dairy Science Association
- American Meat Science Association
- American Meteorological Society, Committee on Agricultural and Forest Meteorology
- American Society for Nutrition
- American Society of Agricultural and Biological Engineers
- American Society of Animal Science
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- American Society of Plant Biologists
- American Veterinary Medical Association
- Aquatic Plant Management Society Council of Entomology Department Administrators
- Crop Science Society of America
- North Central Weed Science Society
- Northeastern Weed Science Society
- Poultry Science Association
- Society for In Vitro Biology
- Weed Science Society of America Western Society of Weed Science





# Agricultural Science and the Public.Dr. Norman E. BorlaugCAST Paper No. 1 (1973)1914 - 2009



'MOLINE, III., Jan. 15, 1973 Today, there is a near crisis in the international food grain market. The world food grain stocks have been depleted during the past six months to the lowest level in the past 25 years, and grain prices have soared. Winter killing last year in the winter wheat crop followed by a severe drought over much of the spring wheat growing area during the past summer in the U.S.S.R. is one of the prime reasons for a sudden major deficit in the world food market place. But there is also another, more subtle, but deep-rooted, scientific cause behind the scenes that undoubtedly contributed indirectly, but, nonetheless, greatly to this failure. I refer to the 30-year period (1935-1965) of the pseudo genetics and Lysenkoism and its disruptive effect on other aspects of agricultural and biological sciences"

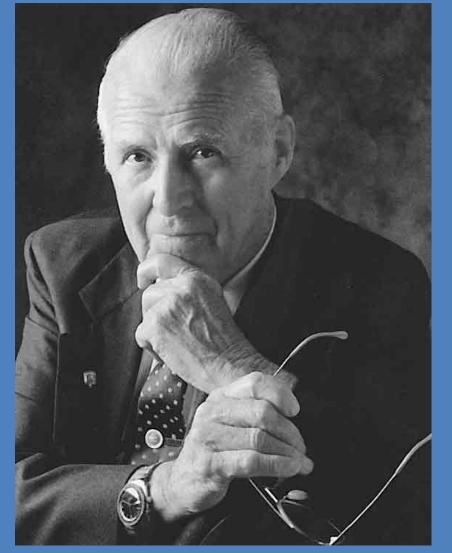
https://www.cast-science.org/media/cms/ Borlaug\_Paper\_06B3CC9AD64DF.pdf



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# Agricultural Science and the Public. Dr. Norman E. Borlaug CAST Paper No. 1 (1973) 1914 - 2009



#### **PSEUDO-GENETICS AND PSEUDO-ECOLOGY**

"Nevertheless, several extreme environmentalists posing as new messiahs founding a new religion would lead the world into an environmental utopia immediately. They advocate policy changes and legislation that may in the end be detrimental to agriculture, our food production potential and to society in general. These new messiahs have all too often only used the data which support their theories about ecological doom while ignoring much other experimental data that do not support their views. They often widely denounce all who disagree with them. I am fearful about the long-time effect of such a pseudo-scientific approach."

https://www.cast-science.org/media/cms/ Borlaug\_Paper\_06B3CC9AD64DF.pdf



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### UNIVERSITY OF

### Google image search for "Ideal Farm"



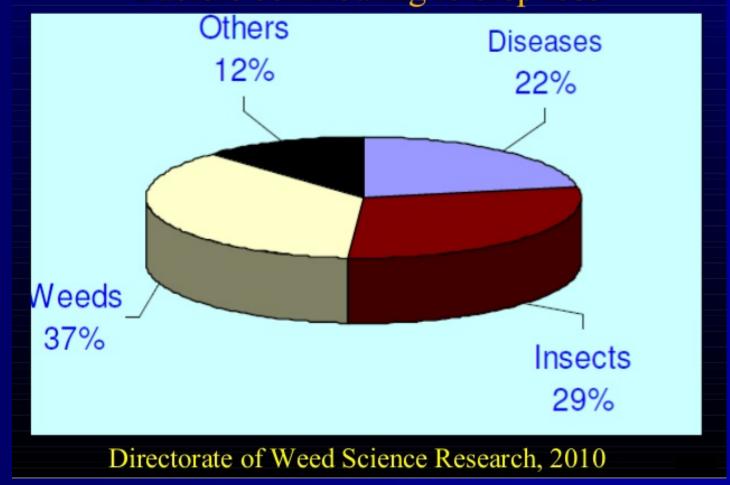
http://www.wallstickeroutlet.com/Images/oopsy-daisy-ideal-farm-wall-art-2.jpg Van Eenennaam 4/16/2015 Animal Genomics and Biotechnology Education





### Of the total annual pest losses in crops, weeds account for 37%, insects 29%, diseases 22% and other pests 12%.

Factors contributing to crop loss



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# Weeds use water, nutrients and decrease yield per acre



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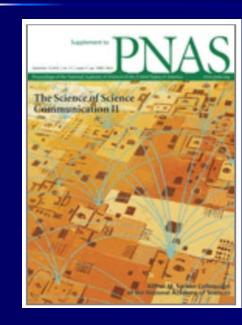


# Pinkeye is caused by bacteria carried by face flies





## The Science of Science Communication PNAS issue



"Some of the most polarizing topics in American politics are scientific ones. Even the existence of phenomena, such as global climate change and evolution, that are widely accepted in the scientific community is questioned by significant proportions of the US public."

Scheufele DA. Science communication as political communication. *Proceedings of the National Academy of Sciences* 2014;111:13585-13592.

"One of the biggest problems with the world today is that we have large groups of people who will accept whatever they hear on the grapevine, just because it suits their worldview—not because it is actually true or because they have evidence to support it. The really striking thing is that it would not take much effort to establish validity in most of these cases... but people prefer reassurance to research." Neil deGrasse Tyson

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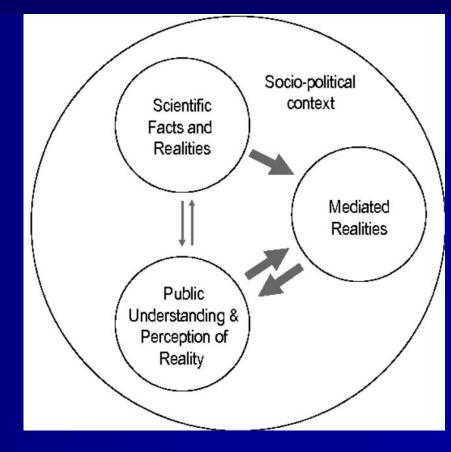


**Spiral-of-silence model** (Elizabeth Noelle-Neumann, 1974) Most people are to some degree fearful of isolating themselves in social settings and this "fear of isolation" makes them less likely to express unpopular opinions in public

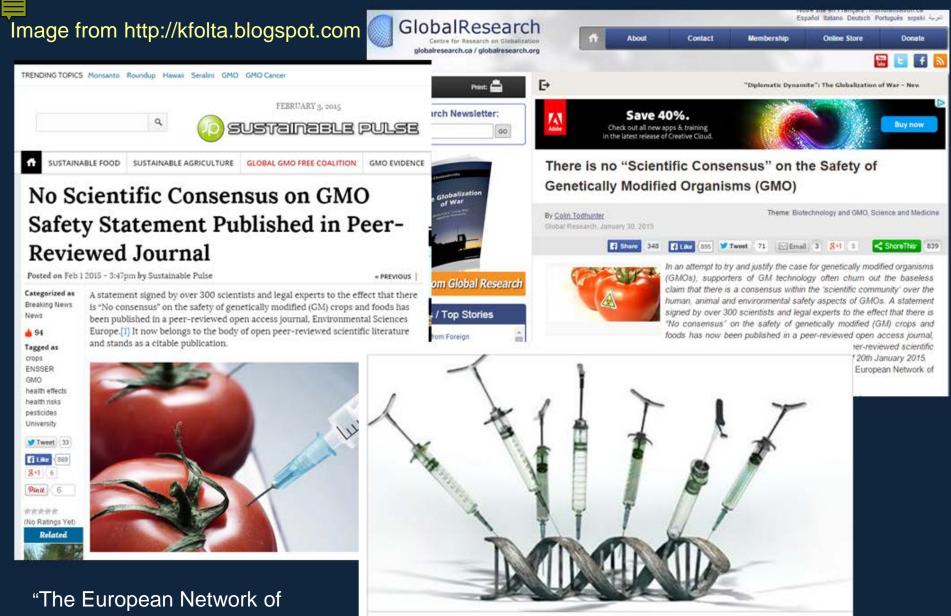




This is exacerbated by 'parallel science'. Unlike regular science, 'parallel science' serves political goals and describes itself with positive-sounding terms such as 'concerned', 'respon-sible', 'citizen' and 'independent' science, which carries the implication that 'normal' science is not any of these.



Scheufele DA. 2014. Science communication as political communication. PNAS. 111:13585-13592. Van Eenennaam 4/16/2015 Animal Genomics and



### Scientists for Social and Environmental Responsibility"

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No Scientific Consensus on GMO Safety Statement Published in Peer-Reviewed Journal

A statement signed by over 300 scientists and legal experts to the effect that there is "No consensus" on the safety of genetically modified (GM) crops and foods...



### The internet and particularly social media have opened up dialogue – and can be used to help counteract the spiral of silence and "parallel science" narratives

"Scientists and universities need to develop proactive communication strategies that accurately portray scientific consensus in public discourse.
Such efforts will go a long way toward countering the development of spirals of silence based on misperceptions of public support or opposition."
Scheufele DA. 2014. Science communication as political communication. PNAS. 111:13585-13592

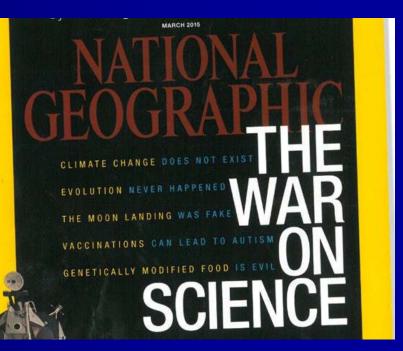




initiative for science-based communic

**IANCE FOR SCIENCE** 

The Science Source for Food, Agricultural, and Environmental Issues



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NATURE | RESEARCH HIGHLIGHTS: SOCIAL SELECTION



#### Scientists are cautious about public outreach

Researchers online react to a survey showing mixed feelings about news and social media.

#### Chris Woolston

#### Nature Volume:518, Page:459 Date published: 26 February 2015



Caleph Wilson @HeyDrWilson



@PCRcmu @sldewit Been saying for years scientists need to come down from "ivory tower" and engage public. #AAASmtg

7:40 PM - 14 Feb 2015





Why do scientists not engage with the public? No rewards, lack of peer approval, doubt about level of interest. #AAASmtg #scicomm

> http://www.nature.com/news/scientists-arecautious-about-public-outreach-1.16965





**Richard Sever** @cshperspectives

Follow

Twitter, etc. may be the future of sci comm but remember most scientists aren't there (yet).. pewrsr.ch/1vw6wMD



David Grinspoon @DrFunkySpoon

Follow

@drkeegansawyer @chelle\_ecoed ah thanks. Should b OK to not engage. Some not inclined, ill equipped, shy, etc. The 87% sounds pretty good ...

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# Not all scientists are willing to speak out in public

#### Bill Nye changes his mind about GMOs





Image:Credit: AP/John Davisson

http://www.zmescience.com/medicine/bill-nye-view-gmos-5345435/

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ARTICLES BLOGS LABS SCIENCE REFERENCE REPORTS VIDEOS RADIO INFOGRAPHICS MUSIC CARTOONS LIBRAF

EXCLUSIVES: EXCLUSIVE: Mainstream media fails heavy metals math: shocking mini-documentary exposes all New Kir



#### Monsanto propaganda scientists brainwash Bill Nye into changing position on GMOs

Sunday, April 05, 2015 by: Jennifer Lilley Tags: Bill Nye, Monsanto propaganda, GMOs



7 Common Foods that KILL People

Click here to discover these DEADLY foods

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Plant these 7 survival crops to prepare for Iltimate self-reliance

Paul Offit's vaccine lies deconstructed: A mindblowing interview with Dr. Suzanne Humphries (NaturalNews) Bill Nye, the "Science Guy," is a favorite childhood icon to many people, often touting the wonders of the universe with ease and simple explanation. He's a trusted source, a man with a passion for science, someone who places value in understanding and preserving all of life's intricacies. 
 3,032
 68
 21

 f share
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 Save

 ★ share on diaspora
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Sadly, it appears that Bill Nye has gone to

the dark side.

Until now

http://www.naturalnews.com/049257\_Bill\_Nye\_Monsanto\_propa ganda\_GMOs.html







### SCIENCEINSIDER

Breaking news and analysis from the world of science policy



LUCY NICHOLSON/REUTERS/CORBIS

GM food opponents, like these in Los Angeles, are adopting new strategies that put academics on the spot.

# Updated: Agricultural researchers rattled by demands for documents from group opposed to GM foods

#science14

http://news.sciencemag.org/scientific-community/2015/02/agricultural-researchers-rattled-demands-documents-group-opposed-gm

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#### Like this? lo



7 A V - Reply - Share >

a day ago Now all we need is to see where they have attached the strings ......;)

Images taken from Dr. Kevin Folta's (University of Florida) **BLOG "Illumination"** http://kfolta.blogspot.com

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### You are paid by tax payers. Why are you hiding your emails from the biotech industry?



Like Comment

Share

#### 781 people like this.



Kevin Folta

Not afraid at all. No big deal. I'm glad to talk to anyone, as I have few dealings with these companies. Aside from a few old friends and former students, there's not much to talk about. Our university is happily providing all materials requested.

The big question is one of what the FOIA system is for. Should someone that has done nothing wrong, who simply taught science consistent with the literature, be subject to having private emails probed? Worse, it discourages scientists from interacting with the public.

It also discourages the public from asking scientists for help or assistance. Would you ask a scientist to help with a project, if you knew that your name, or your child's name, would become public and smeared on the internet?

It also opens up a public scientist, that did nothing wrong, to having phrases lifted, items taken out of context. I don't have time to read everything for alternative interpretations.

As a public employee my records are all public, folks scan for any way they can to try to harm my reputation all the time.

Keep in mind that these laws are wonderfully important for finding cases of illegal action, etc. They should not be used to harass or intimidate scientists that do nothing wrong other than teach science



GMO shill telling lies





"Has your institution been served with an open records request for your email? As odd as it may seem, you deserve congratulations. The attention you are receiving shows that your research is now at the center of public policy debate."



Concerned Scientists
Science for a healthy planet and safer world



Gretchen Goldman @GretchenTG · Feb 20 For the record, no scientist should face harassment. Period, My new post: blog.ucsusa.org/no-scientist-s...

Our Work Ab

Science in an Age of Scrutiny: How Scientists Can Respond to Criticism and Personal Attacks (2012)

CENTER FOR SCIENCE AND DEMOCRACY > PROTECTING SCIENTISTS FROM HARASSMENT

September 2012



Scientists are increasingly targets of personal attacks when their work touches on public policy debates

#### Yes, but ...

🛣 18

24

"I have nothing to hide. Shouldn't I just hand over everything and get this over with?"

#### Think again.

While transparency is important, all scientists need and deserve safe space to develop and test new ideas. Institutions should balance transparency and free-speech rights. Automatically complying with requests can set a bad precedent for when your colleagues face similar attacks.

http://www.ucsusa.org/our-work/center-science-and-democracy/protecting-scientistsharassment/science-in-an-age-of-scrutiny.html

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## Cornell Alliance for Science Petition of Scientists in support of the #Science14 – over 1400 signatures from 57 countries



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## Freedom to Bully

How Laws Intended to Free Information Are Used to Harass Researchers

Michael Halpern

February 2015

The 1966 Freedom of Information Act (FOIA), a landmark law familiar to many, enables ordinary citizens to file requests with the federal government for public records. "I signed this measure with a deep sense of pride that the United States is an open society in which the people's right to know is cherished and guarded," President Johnson wrote at the time, despite having some reservations about transparency (Bridis 2006; Johnson 1966).

But the federal government was behind the curve. Many states already had laws governing the release of public records dating back decades, with some, such as Florida, eventually enshrining the right to them in their constitutions (Winkler 2010). Ever since, federal and state governments have tried to balance the public interest in transparency and accountability with the privacy essential to allow both government and society to function.

Open records laws are critical tools that enable people to learn more about how public officials make decisions, and to hold them accountable. Individuals



Broad open records requests can be used to distruct and harass researchers whose results or fields of study direaten wested Interests. The use of such requests is on the rise, and many academics and universities are inadequately prepared to respond appropriately.

### A problem that cuts across disciplines – and ideologies

Abuse of open records requests has affected researchers in a broad spectrum of fields:

- Climate scientists
- Tobacco researchers
- Historians
- Environmental chemist
- Occupational health
- Epidemiologist
- Researchers who use animal subjects
- A legal scholar of **religious**
- North Carolina poverty
   researcher
- Economics professor estimating cost of initiative

http://www.ucsusa.org/centerscience-and democracy/protectingscientists-harassment/freedombully-how-laws#.VSr3bk0tGUI



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From the San Francisco Business Times :http://www.bizjournals.com/eastbay/stories/2008/09/01/daily64.html

### Humane Society sues University of California over Prop. 2 activities

Sep 5, 2008, 4:40pm PDT

David Goll Staff reporter

The Humane Society of the United States said Friday it filed a lawsuit in Yolo County Superior Court in Woodland to force the University of California to make public documents that the society contends would reveal "potentially unlawful campaign activities by (UC) staff regarding Proposition 2..."

That proposition on the Nov. 4 ballot, called the Standards for Confining Farm Animals initiative, would amend the state's Health and Safety Code to prohibit the confinement of certain farm animals that does not allow them to turn around freely, lie down, or stand up and fully extend their limbs. It would apply to three types of confinement: veal crates, battery cages, and sow gestation crates.

If approved by state voters, the statute would go into effect Jan. 1, 2015.

The Humane Society said in its lawsuit that the University of California Agricultural Issues Center recently published a report that predicted myriad economic outcomes for industry and consumers if Prop. 2 passes in November, and that the UC system's promotion of the report emphasized negative aspects of the study's claims, while downplaying its conclusion that California consumers would see "little to no impact" on food prices if Prop 2 passes.

The society contends a press release accompanying the report "repeats nearly verbatim many of the talking points of the 'No on Prop. 2' campaign," and charged that the report was co-authored by UC staff aligned with the factory farming industry.

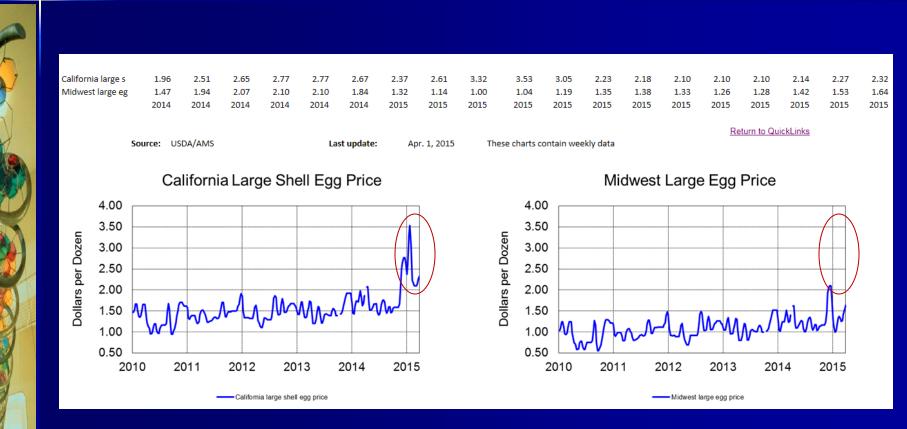
http://www.bizjournals.com/eastbay/stories/2008/09/01/daily64.html



### What does that have to do with the price of eggs?



(Not really about the price of eggs or anything related to it. Just a sarcastic phrase used in a conversation when one tends to gloat off the subject... "what does that have to do with the price of eggs?")



Data courtesy of Dr. Scott Brown, University of Missouri http://amap.missouri.edu/data-we-are-watching.html

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### UNIVERSITY CALIFORNIA

# CALIFORNIA EGG PRICES INCREASE DUE TO NEW LAW AROUND CHICKEN FARMING





#### · 3 days ago

"Industry analysts say egg prices could go up anywhere from 20 cents per dozen to \$3".....this is an outrage!

A V Reply Shares

#### 3 days ago

Any excuse to raise prices, but in the end, a happy chicken still gets slaughtered so we can have eggs.

~ | ~ · Reply · Share ›

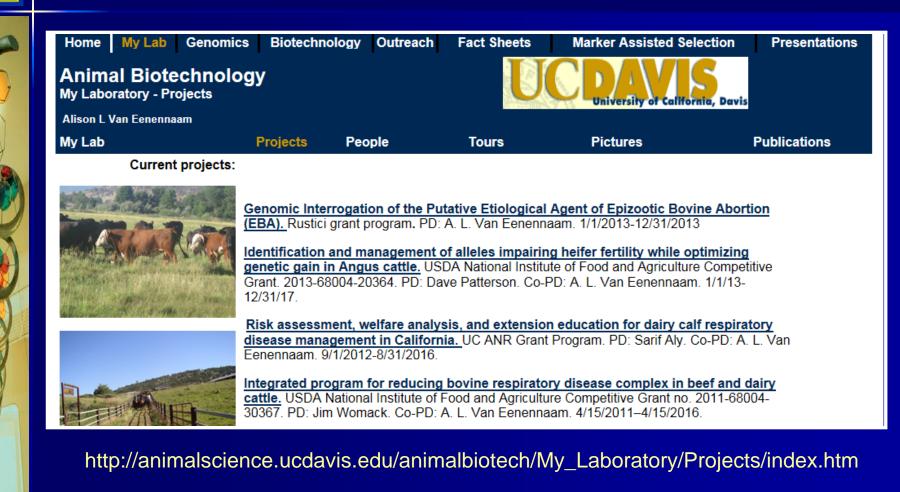
- 3 days ago Really? A slaughtered chicken produces eggs?? Wow!!

1 A V Reply Shares



### "The public should also have access to information on who is funding an academic's work, and any influence the funder has on the content of that work"

http://www.ucsusa.org/center-science-and-democracy/protecting-scientists-harassment/freedom-bully-how-laws#.VSsX200tGUI



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If lawmakers, universities, and researchers develop a shared understanding of what they should disclose and a system for proactively doing so, they can avoid costly and time-consuming lawsuits and other battles.

"The use of open records laws to harass researchers emerged with the growing use of electronic communications. Conversations that used to take place over the phone or in person are now conducted by email, a format that leaves a permanent record. When these email discussions are made public through records requests, the privacy that academics have long enjoyed in discussions with colleagues is compromised. This can have a chilling effect on the frank exchange of ideas and constructive criticism, a crucial part of the scientific process.

Abuse of open records requests can also hinder researchers simply by hijacking their schedule. Complying with requests may take dozens or even hundreds of hours of researchers' time, putting their real work on hold or on the back burner for a long while. This may often be the main purpose of such requests."

http://www.ucsusa.org/center-science-and-democracy/protecting-scientists-harassment/freedombully-how-laws#.VSsX200tGUI



### How should I manage my electronic communications in light of the potential obligation to disclose public records in the future?

Although electronic resources may be used for incidental personal use, it is best not to include any personal communications on a University email account or to store personal records on a University system. When communicating by electronic communications consider the following:

- A. Limit Addressees.
- B. Use a Descriptive Subject Line.

#### C. Limit the Scope of the Content.

- Keep all messages short and on point.
- Only include relevant portions of prior emails in new emails to prevent lengthy email strings. This makes it ....
  - Easier for recipients to read.
  - Aids review and redaction.
- D. Limit Personal and Sensitive Information.
- E. Remember that other electronic devices are subject to the same obligations.

https://www.apo.ucla.edu/resources/recordrequest



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