“Communicating Science in a Networked World”

Alison Van Eenennaam, Ph.D.
Cooperative Extension Specialist
Animal Biotechnology and Genomics
Department of Animal Science
University of California, Davis, USA

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

Most Americans Can’t Name a Living Scientist

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

- Yes: 34%
- No: 66%

- Stephen Hawking: 15%
- James Watson: 1%
- Jane Goodall: 1%
- Bill Nye: 1%
- Michio Kaku: 1%
- Neil Degrasse Tyson: 1%
- Other: 14%

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

Van Eenennaam 4/16/2015
Opinion differences between the public and scientists

Percentage agreeing with statement

<table>
<thead>
<tr>
<th>Statement</th>
<th>U.S. adults</th>
<th>Agreement gap</th>
<th>Scientists</th>
</tr>
</thead>
<tbody>
<tr>
<td>Safe to eat genetically modified foods</td>
<td>37%</td>
<td>51%</td>
<td>88%</td>
</tr>
<tr>
<td>Climate change is mostly due to human activity</td>
<td>50</td>
<td>37</td>
<td>87</td>
</tr>
<tr>
<td>Humans have evolved over time</td>
<td>65</td>
<td>33</td>
<td>98</td>
</tr>
<tr>
<td>Favor more offshore drilling</td>
<td>32</td>
<td>20</td>
<td>52</td>
</tr>
<tr>
<td>Childhood vaccines such as MMR should be required</td>
<td>68</td>
<td>18</td>
<td>86</td>
</tr>
</tbody>
</table>

Van Eenennaam 4/16/2015
‘Mommy PhD’ Launches Scientists are People Campaign (March 9, 2015)

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

Van Eenennaam 4/16/2015
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/
Reminds me of the 1989-1990 TV series “Alien Nation”
Part of the problem is that communication styles need to differ depending upon the audience.
How Academic audiences respond to various aspects of communication

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


Van Eenennaam 4/16/2015
How Academic versus “General Public” audiences respond to various aspects of communication

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

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
Have spent my career in animal agriculture
Work with producers using different production systems
SCIENTISTS ARE SHILLS; ACTIVISTS ARE GOOD

PINK SLIME

1950s AGRICULTURE WAS BETTER

GMOS MAKE LIVESTOCK SICK

ANIMAL AG IS MAIN CAUSE OF GLOBAL WARMING

ANTIBIOTIC USE IN ANIMAL AG IS ALWAYS BAD

FARMERS SHOULD NOT USE NEW TECHNOLOGY

ALL FARMERS MISTREAT ANIMALS

AGRIBUSINESS IS BAD

SCIENTISTS ARE SHILLS; ACTIVISTS ARE GOOD

1950s AGRICULTURE WAS BETTER

GMOS MAKE LIVESTOCK SICK

ANIMAL AG IS MAIN CAUSE OF GLOBAL WARMING

ANTIBIOTIC USE IN ANIMAL AG IS ALWAYS BAD

FARMERS SHOULD NOT USE NEW TECHNOLOGY

ALL FARMERS MISTREAT ANIMALS

AGRIBUSINESS IS BAD
Past and projected trends in consumption of meat and milk in developing and developed countries

“Irony at the Apple Store” – Why can’t AG use tech?

New improved products!

We loves new Apple products!

Don’t want new apple products!

I demand new technology!

If nature didn’t make it, I don’t want it!!

The best company on earth!

Down with corporations!
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

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


Van Eenennaam 4/16/2015
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).

GHG = Greenhouse gas

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.

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….I only need such people as will obtain the results that I need.”
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
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
- 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
- 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

Van Eenennaam 4/16/2015
MOLINE, Ill., 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.”
“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.”
Google image search for “Ideal Farm”

Of the total annual pest losses in crops, weeds account for 37%, insects 29%, diseases 22% and other pests 12%.
Weeds use water, nutrients and decrease yield per acre
Pinkeye is caused by bacteria carried by face flies.
“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
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’, ‘responsible’, ‘citizen’ and ‘independent’ science, which carries the implication that ‘normal’ science is not any of these.

Van Eenenmaa 4/16/2015
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 has been published in a peer-reviewed open access journal, Environmental Sciences Europe. It now belongs to the body of open peer-reviewed scientific literature and stands as a citable publication.

“This European Network of Scientists for Social and Environmental Responsibility”

Van Eenennaam 4/16/2015
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
Scientists are cautious about public outreach

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

Chris Woolston

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

Richard Sever
@cshperspectives

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

David Grinspoon
@DrFunkySpoon

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

Not all scientists are willing to speak out in public.

Bill Nye changes his mind about GMOs

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

http://www.naturalnews.com/049257_Bill_Nye_Monsanto_propaganda_GMOs.html
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

http://news.sciencemag.org/scientific-community/2015/02/agricultural-researchers-rattled-demands-documents-group-opposed-gm
Van Eennenam 4/16/2015

Images taken from Dr. Kevin Folta’s (University of Florida) BLOG “Illumination”
http://kfolta.blogspot.com
“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.”


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

September 2012

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

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

Signers from 57 Countries including all 50 US States

# Signers per Country:
- USA: 974
- Canada: 109
- UK: 60
- Australia: 29
- Argentina: 26
- Belgium: 25

# Signers per US State:
- California: 122
- New York: 108
- Hawaii: 80
- Missouri: 47
- Florida: 46
- Texas: 44
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/center-science-and-democracy/protecting-scientists-harassment/freedom-bully-how-laws#.VSr3bk0tGUl
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

Van Eenennaam 4/16/2015

Animal Genomics and Biotechnology Education
CALIFORNIA EGG PRICES INCREASE DUE TO NEW LAW AROUND CHICKEN FARMING

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

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

Really? A slaughtered chicken produces eggs?? Wow!!
“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”

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.”

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

Van Eenennaam 4/16/2015
Effectively communicating science is one of the most important things that scientists can contribute to future generations.
Thanks for bestowing upon me the honor of the 2014 BORLAUG CAST COMMUNICATION AWARD and for CAST’S continued efforts to communicate agricultural science & technology.