

# Communicating Science with a Non-Scientist Audience

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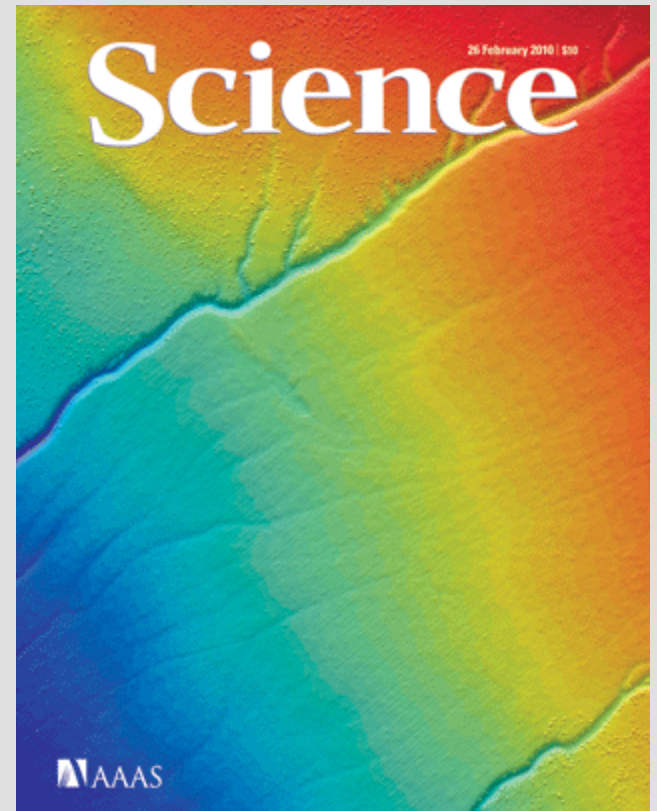
@MeetAScientist

IRIS Summer Undergraduate Internship Program  
July 9, 2015

The American Association for the Advancement of Science (AAAS), the nonprofit science society, seeks to:

“Advance science, engineering, and innovation throughout the world, for the benefit of all people.”

***Advancing science,  
serving society.***



*COVER: High-resolution map showing the topography of the San Andreas Fault in the Carrizo Plain of California.*

# Communicating Science: Tools for Scientists and Engineers



Workshops



Message  
Development



Public  
Outreach



Multimedia



Media Interviews  
and Social Media

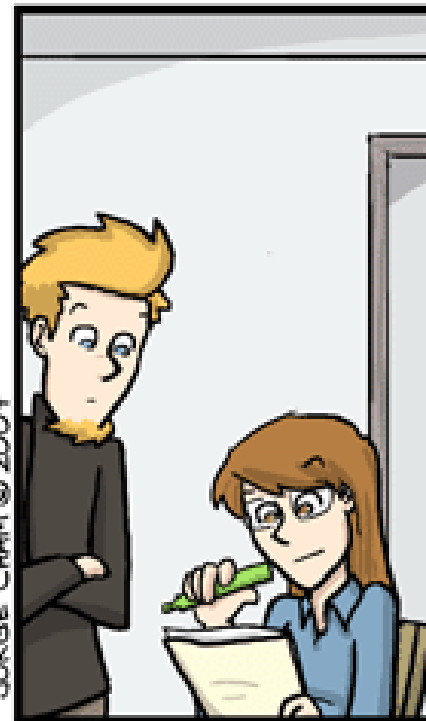
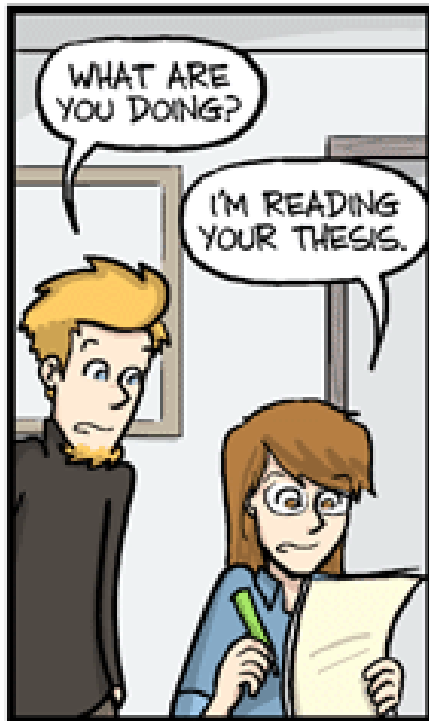
- AAAS skills development program for scientists interested in public outreach and science communication
- Workshops and website
- Launched February 2008 at AAAS Annual Meeting

## Today's discussion

- Defining your audience
- Developing key messages
- Options for communication
- Tools and resources
- Homework assignment 😊

# Homework Assignment 😊

- Explain your research to 15-18-year-old audience who is not familiar with your topic
- Choose an option:
  - (1) Brief news article
  - (2) Brief PowerPoint presentation



WWW.PHDCOMICS.COM

"Piled Higher and Deeper" by Jorge Cham

# How many of you have struggled to explain your research to...

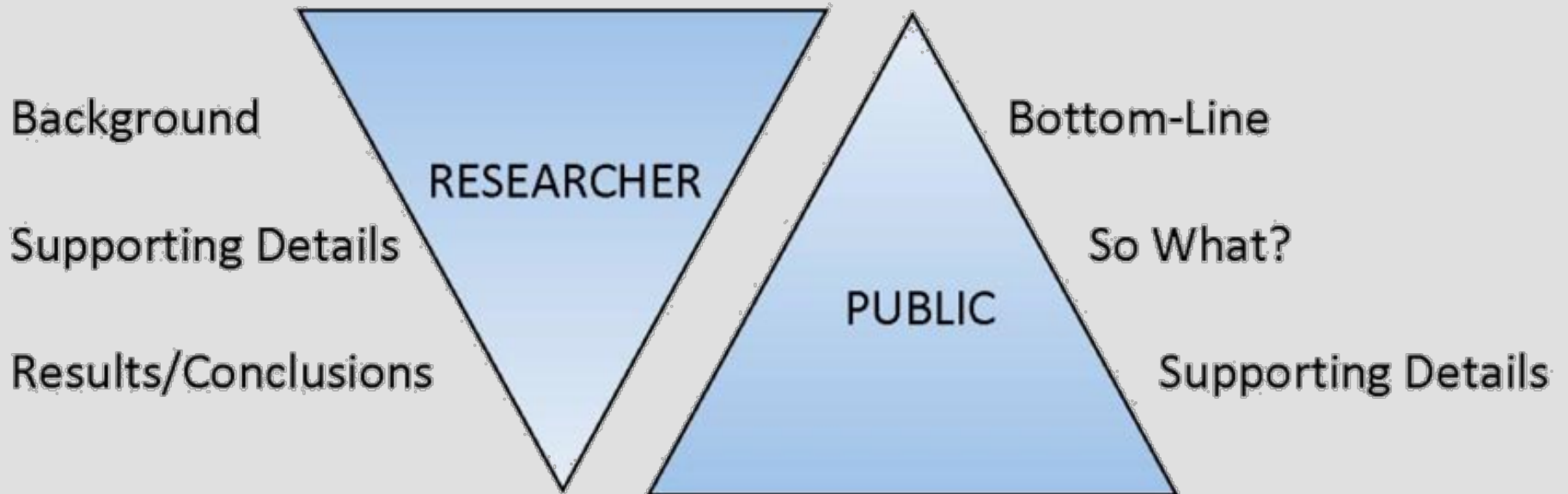
- Fellow students?
- Your family and friends?
- Others?

# Making the case for communication

- Why is communicating – to the public, media, policymakers – often difficult for researchers?
- What are the barriers?
- Why is it important?



# Different styles of communication



# Sample issues at the interface of science and society

- National security
- Bioterrorism
- Evolution
- Stem cell research
- Energy policy
- Sustainable development
- Social sciences
- Climate change
- Genetic medicine
- Emerging infectious diseases
- Genetically modified foods
- Space exploration
- Nanotechnology

## Why do scientists participate in communication & engagement activities?

- Build trust: Better awareness of public perceptions
- Get others excited about science
- Promote use of research in decision-making
- For you: Brings personal meaning to your work, increase skills for other areas of your career

**What is your communication goal?**

## Key components of communication:



# Key components of communication

Goal + **Audience** + Message

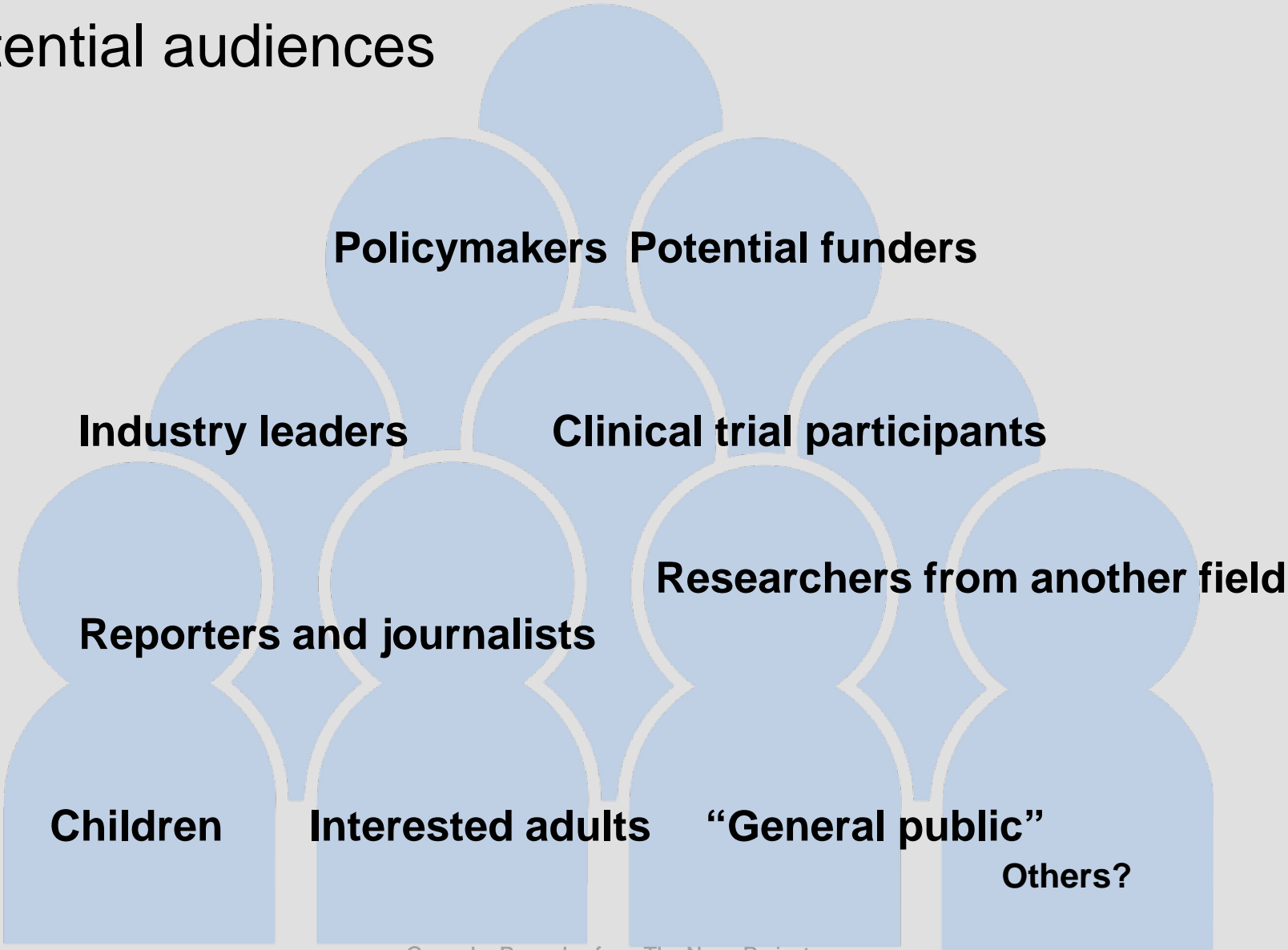


# Define your audience

- Consider your audience's interests, not just your own
- Craft your messages in a way they can digest
- Make your message relevant
- Encourage conversation



# Potential audiences



Group by Parmelyn from The Noun Project

# Factors to consider

- Demographics – age, gender, ethnicity
- Culture
- Geographic location
- Level of understanding and interest
- Experiences with your topic
- General background







## Key components of communication

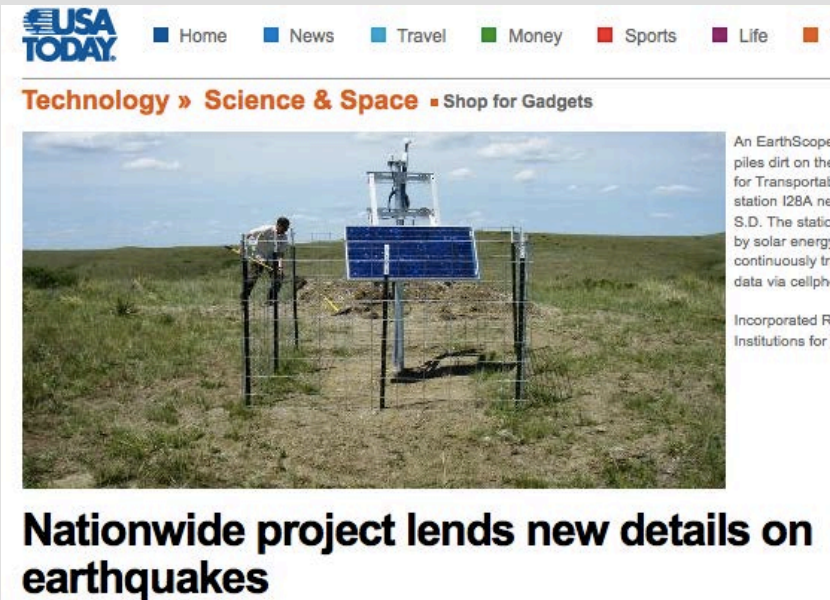
Goal + Audience + **Message**

“....No one has any obligation to listen to you. So what you say has to be relevant...what has to come across is what the new research or finding would mean to the average person.”

*Mariette DiChristina, Editor-in-Chief,  
Scientific American*



# Assignment: USA Today vs. Discover Magazine



The screenshot shows the USA Today website interface. At the top, there is a navigation bar with the USA Today logo and links for Home, News, Travel, Money, Sports, Life, and Technology. Below the navigation bar, there is a sub-header for "Technology » Science & Space" and a link to "Shop for Gadgets". The main content area features a photograph of a mobile seismic observatory in a grassy field. To the right of the photo, there is a text block that reads: "An EarthScope piles dirt on the for Transportab station 128A ne S.D. The station by solar energy continuously tra data via cellpho". Below the photo, there is a headline: "Nationwide project lends new details on earthquakes".



The image shows the cover of a magazine article. At the top, there is a blue header with a globe icon and the text "NOTES FROM EARTH BY EMILY ELERT". Below the header, the main title is "North America Spills Its Guts" in large, bold, black font. Underneath the title, there is a sub-headline: "A mobile seismic observatory, rolling out slowly across the continent, is piecing together a startling picture of what lies beneath."

- Who is the audience?
- What is the message?
- Is the article effective getting the message across?
- How are these articles different?



## Developing a message helps you

- Define the agenda
- Remember what you want to say
- Speak without notes
- Speak without jargon
- Get back to your point
- Handle questions
- Speak briefly, or at length



# Messages help your audience

- Remember your message
- Pay attention
- See parallels to their own lives
- Connect with you, trust you



# The 3Ms of Message

Key considerations about message:

- Miniature
- Memorable
- Meaningful



## Miniature

- Organizing principle: 3 key points
- Three items easiest to remember
- Works as a short message
- Enables expansion for longer presentations
- Serves as outline

“I asked one scientist about why one alternative energy source is better than another, and he launched back into the history of civilization and how cavemen used fire.

When we got to the discovery of oil in Pennsylvania, I stopped him.”

*Ira Flatow, host, Talk of the Nation:  
Science Friday, National Public Radio*





## What can 3 points describe?

- 3 focuses of your research
- 3 reasons your work is important
- 3 research questions you pursued
- 3 results you found
- 3 potential applications

**Get ready to write yours in a few minutes!**



# Memorable

- Gives cues to you and your audience
- Helps you remember
- Helps audience remember
- Alliteration, similar sounds, analogies, popular culture references, acronyms

# Meaningful



- Message should mean something to you and your audience
- Audience targeting
- Sometimes meaning lies in the process, adventure, experience
- What did it mean to you, as a person?
- Chance to convey passion, frustration, excitement about your work

5. Model the rock cycle with edibles



Fudge = Igneous Rock

Magic Cookie Bars =  
Sedimentary Rocks

Chocolate Chip Cookies =  
Metamorphic Rocks



## Write your 3 Ms

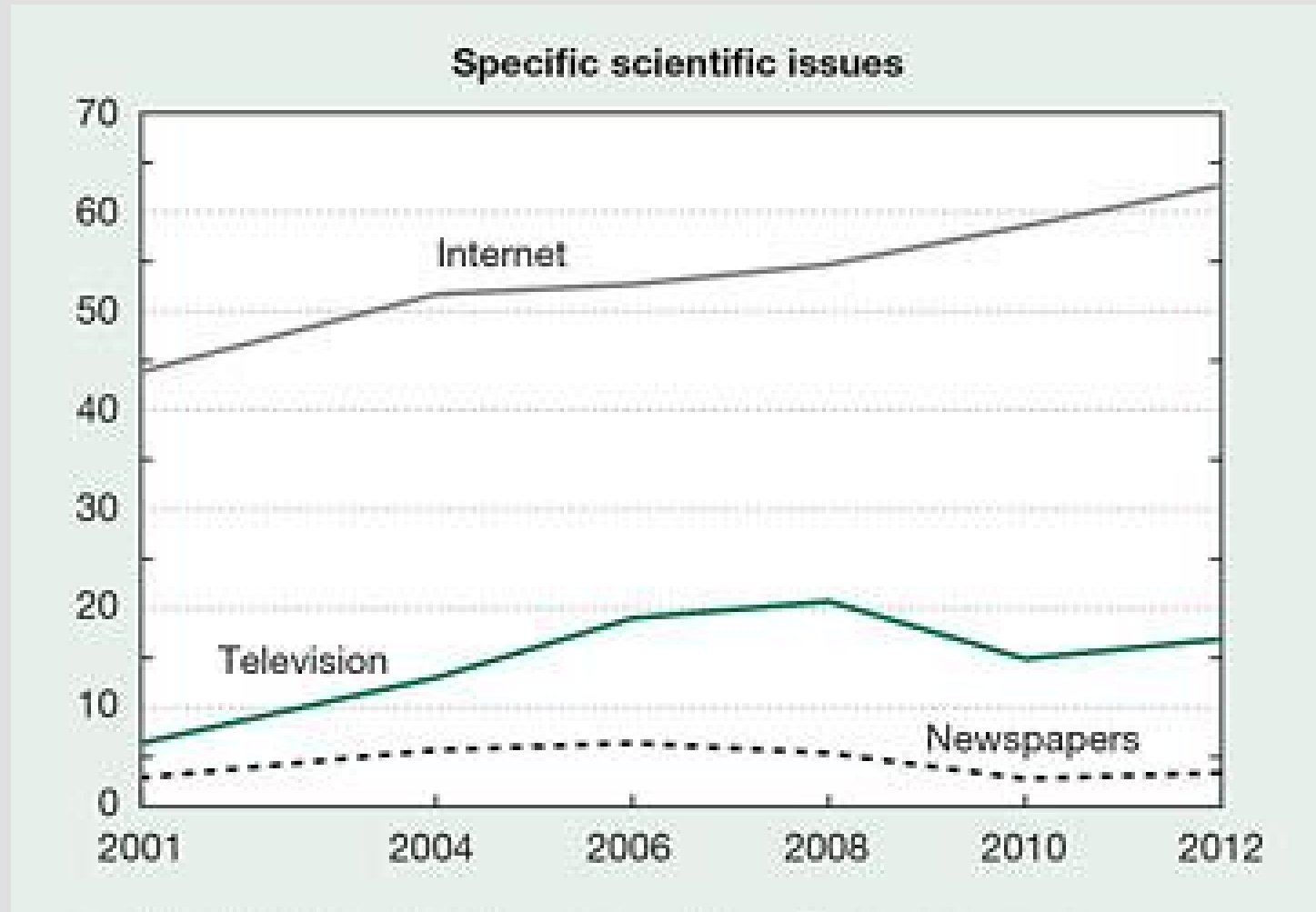
- Short introduction – your name and your title
- 3 brief phrases that describe your research
- Keep your intended audience in mind

Volunteer?

## Opportunities to communicate science

- Your website, blogs, Twitter, YouTube
- Share images and video online
- Campus and department events and websites
- Science cafes and community speaking
- Media interviews
- Others?

# Specific scientific issues






# Online platforms

- Websites
- Blogs - <http://www.iris.edu/hq/internship/blogs>
- Online video and audio – YouTube, Vine, podcasts
- Social networking – Facebook, others specific to issue or field
- Twitter
- Mobile apps




WHEN AN EARTHQUAKE HITS, PEOPLE FLOOD THE INTERNET WITH POSTS ABOUT IT—SOME WITHIN 20 OR 30 SECONDS.


ROBM163 HUGE EARTHQUAKE HERE!



DAMAGING SEISMIC WAVES TRAVEL AT 3-5 km/s. FIBER SIGNALS MOVE AT ~200,000 km/s. (MINUS NETWORK LAG)



THIS MEANS WHEN THE SEISMIC WAVES ARE ABOUT 100 km OUT, THEY BEGIN TO BE OVERTAKEN BY THE WAVES OF POSTS ABOUT THEM.




PEOPLE OUTSIDE THIS RADIUS MAY GET WORD OF THE QUAKE VIA TWITTER, IRC, OR SMS BEFORE THE SHAKING HITS.

WHOA! EARTHQUAKE!



SADLY, A TWITTERER'S FIRST INSTINCT IS NOT TO FIND SHELTER.

RT @ROBM163 HUGE EARTHQUAKE HERE!



[xkcd.com](http://xkcd.com)



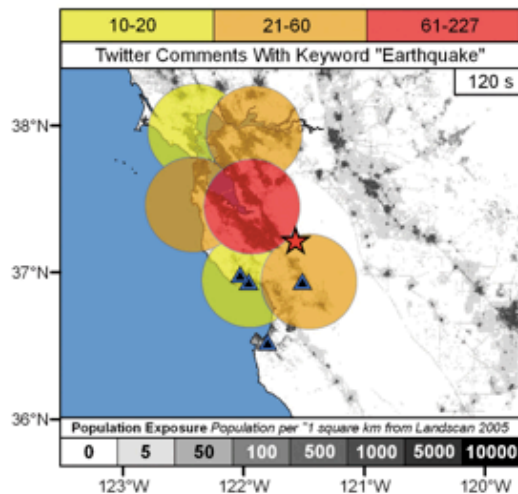
# Department of the Interior Recovery Investments

*Investing in America's Economic Recovery*



ABOUT OVERSIGHT BUREAUS PLANS *and* REPORTS CONTRACTS *and* GRANTS CONTACT *us*

## U.S. Geological Survey: Twitter Earthquake Detector (TED)



The U.S. Geological Survey is using funds from the American Recovery and Reinvestment Act to support a student who's investigating social Internet technologies as a way to quickly gather information about recent earthquakes.

In this exploratory effort, the USGS is developing a system that gathers real-time, earthquake-related messages from the social networking site Twitter and applies place, time, and key word filtering to gather geo-located accounts of shaking. This approach provides rapid first-impression narratives and, potentially, photos from people at the hazard's location. The potential for earthquake detection in populated but sparsely seismically-instrumented regions is also being investigated.

Social Internet technologies are providing the general public with anecdotal earthquake hazard information before scientific information has been published from authoritative sources. People local to an event are able to publish information via these technologies within seconds of their occurrence. In contrast, depending on the location of the earthquake, scientific alerts can take between 2 to 20 minutes. By adopting and embracing these new technologies, the USGS potentially can augment its earthquake response products and the delivery of hazard information.


For more information on this project, please e-mail [USGSted@usgs.gov](mailto:USGSted@usgs.gov) or follow [@USGSted](https://twitter.com/USGSted) on Twitter. Read more information about the [USGS Earthquake Program](#).

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# Earthquake App



**The Red Cross Earthquake App**

Real-time earthquake safety tools and info at your fingertips.

## How can you get involved?

- Improve your science communication and education skills
- Identify resources to help you
- Seek opportunities to communicate and engage with family, friends and others about your work

# Homework Assignment 😊

- Explain your research to 15-18-year-old audience who is not familiar with your topic
- Choose an option:
  - (1) News article with text and 1 visual (500 word limit) – written in 3<sup>rd</sup> person, ie. refer to yourself by name) --.doc file
  - (2) PowerPoint presentation with text and visuals (10 slide limit) --.ppt file

# Assignment deadlines and resources

- **July 9-22:** Questions? Need assistance? It might be harder than it looks! Email [lhosler@aaas.org](mailto:lhosler@aaas.org)
- **July 23:** Email your project to [lhosler@aaas.org](mailto:lhosler@aaas.org). It should be either a .doc file or .ppt file
- **July 31:** We'll provide feedback.

## Now you have a presentation or news article...

- Share with your host PI and get feedback
- Email final project to Michael Hubenthal by **August 22<sup>nd</sup>** for posting online
- In fall, you can give talk to your home department or submit article to hometown/student paper



# A refresher

- Make sure your language and tone is appropriate for your audience (high schoolers)
- Tell a story– what's the process of what you're doing, the location (if field work), the frustration, the excitement, what you hope to find, etc.

# Examples from past IRIS projects

- Use visual, jargon-less analogies:  
*“Imagine two different types of ground, one made of brick, the other of Jell-O. If both were shaken, which ground would feel the shaking more?”*
- Remember to answer the “So What?” question  
*“Near the volcanoes are hot pools of water that make up one of the largest geothermal fields in the country. Studying this area can promote the expansion of geothermal power plants in the area, which would supply a local alternative energy source.”*
- Article should be a story with a beginning, middle and an end
- Beware of being too wordy on slides

# Resources

- Handout packet:
  - Keeping an audience's attention
  - What to say when you don't know what to say
  - Ideas for communicating science
  - Creating online video and audio
  - Tips for working with the media

[www.aaas.org/communicatingscience](http://www.aaas.org/communicatingscience)

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Media Interviews  
and Social Media

- Suggestions from top science reporters
- Webinars on developing your message, doing interviews
- Resource articles, websites, and more!

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Questions?

# Thank You!

- Linda Hosler: [lhosler@aaas.org](mailto:lhosler@aaas.org), @LindaHosler
- Resources: [www.aaas.org/communicatingscience](http://www.aaas.org/communicatingscience)

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