Communicating Science with a Non-Scientist Audience

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"Piled Higher and Deeper" by Jorge Cham
Have you struggled to explain your research project to...

- Other students?
- Your family and friends?
Making the case for communication

• Why is communicating – to the public, media, policymakers – often difficult for scientists?

• What are the barriers?

• Why is it important?
Different styles of communication

SCIENTIST

Background
Supporting Details
Results/Conclusions

PUBLIC

Bottom-Line
So What?
Supporting Details
Sample issues at the interface of science and society

- Evolution
- Stem cell research
- National security
- Bioterrorism
- Energy policy
- Sustainable development
- The environment
- Climate change
- Genetic medicine
- Emerging infectious diseases
- Genetically modified foods
- Space exploration
- Nanotechnology
Why do scientists participate in communication & outreach activities?

- Skills transfer to other areas of your career – other scientists, research presentations, media
- Outreach funding requirements (NSF)
- Awareness of public perceptions and concern
- Help make science of interest and relevant to others
- Brings personal meaning to your work
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.
• AAAS skills development program for scientists interested in public outreach and science communication
• Workshops and Web site
• Launched February 2008 at AAAS Annual Meeting
Most of the fundamental ideas of science are essentially simple, and may, as a rule, be expressed in a language comprehensible to everyone. — Albert Einstein

Scientists and engineers who foster information-sharing and respect between science and the public are essential for the public communication of and engagement with science. Although traditional scientific training typically does not prepare scientists and engineers to be effective communicators outside of academia, funding agencies and research institutions are increasingly encouraging researchers to extend beyond peer-reviewed publishing and communicate their results directly to the greater public.

In response to this need in science communications, the AAAS Center for Public Engagement with Science and Technology has provided resources for scientists and engineers, both online and through in-person workshops to help researchers communicate more broadly with the public. Communicating Science: Tools for Scientists and Engineers includes learning the basics of communication, how-to tips for working with reporters, strategies for using online media effectively, and more.
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
Today’s discussion

- Defining your audience
- Developing key messages
- Options for communication
- Tools and resources
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Audiences

• Who are you talking to?
• Who are you trying to reach?
Defining your audience

• It’s important to consider your audience’s interests, not just your own

• Helps you better position your messages to reach them

• Encourages conversation
What kinds of audiences?

• Scientists in your field and other fields
• Reporters and journalists
• Family and friends
• Interested adults
• Children
• Others?
Audience factors

- Demographics – age, gender, ethnicity
- Culture
- Geographic location
- Level of scientific understanding and interest
- Experiences with science, or your topic:
  - As student
  - As professional
  - Positive/negative
  - Recent/long ago
“… 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
Messages

• What are you trying to say?
• What is your goal for the communication?
Developing a message helps you

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

- Remember
- Pay attention
- See parallels to their own lives
- Connect with you, trust you
Assignment: USA Today vs. Discover Magazine

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

• Miniature
• Memorable
• Meaningful
Miniature

- 3 key points help you organize
- Serves as an outline
- Works as a short message
- Can be expanded for longer communications/talks
What can 3 points describe?

• 3 focuses of your research
• 3 reasons your work is important
• 3 research questions you are pursuing
• 3 results you found
• 3 potential applications
“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
Memorable

• Gives cues to you and your audience
• Helps you remember
• Helps audience remember
• Words with similar sounds, analogies, popular culture references
Meaningful

- Message should mean something to you and your audience
- Audience targeting
- Describe process, adventure, experience
- What did it mean to you, as a person?
- Chance to convey passion, frustration, excitement about your work
“You do not really understand something until you can explain it to your grandmother.”

*Albert Einstein*
Exercise:

Write your 3 key points

• Short introduction – your name and your field

• 3 brief words or phrases that describe your research and serve as an outline for your message
Questions?
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?
Media interview types

- Newspaper
- Magazine
- TV – recorded or live
- Radio – recorded or live
- Online publication
- Podcast
- Skype
- Blog
- “Source”
“New” web-based media

- Websites
- Blogs - http://www.iris.edu/hq/internship/blogs
- Online video and audio – YouTube, iTunes
- 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.

Quake! Earthquake!

Tweets

Whoa! Earthquake!

RT @RobM163: Huge earthquake here!
The USGS is Tracking Earthquakes with Twitter

By Jason Koeble

This cage still surrounds the Washington Monument after the August, 2011 quake. During that quake, there were more than 4,000 tweets per minute mentioning it. Photo: USDA

When people feel the ground shake, they talk about it.
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 3rd 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 15-24**: Questions? Need assistance? It might be harder than it looks! Email lcendes@aaas.org.

• **July 25**: Email your project to lcendes@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 16\textsuperscript{th} 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

• Convey some of the experience – process of what you’re doing, the location (if field work), the frustration, the excitement, what you hope to find, etc.
Examples from past 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
Communicating Science website
www.aaas.org/communicatingscience

• Sample Q&A on topical issues – evolution, stem cells, climate change
• Suggestions from top science reporters
• Webinars on developing your message and doing media interviews
• Opportunities for public outreach
• Resource articles, websites, and more!
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
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Questions?
Thank you!