



# Communicating Your Science



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# Speaker Introduction

- Academic Preparation
  - First Degree
  - Higher Degree
- Research Interests
  - Scientific Mobility
  - Applying Scientific Knowledge and Technical Skills in Transnational Contexts of Professional Practice
  - International Research Collaboration / Exchange and the Scientific Membership Society
- Professional History
- Family
- Contact Coordinates – [b\\_miller@acs.org](mailto:b_miller@acs.org)

# Outline

- Communicating science
- Informal communication
  - Speak simply about your science
- Communicating to the public
- Thinking about your audience
- Developing your message
- Resources at the ACS



# Talking Points about Science

- Science is everywhere and contributes to everyone's daily life
- Science and scientists drive innovations to discover solutions to problems
- Science and engineering are important to the world's economic health
- It's important that the next generation understands its importance; career in science also offers opportunities to change the world
- Examples:
  - New drugs to cure diseases
  - Cleaner air and water
  - Alternative energy
  - Improved crop yield and pest resistance

# Communicating Science

- Communication is one of the most important aspects of science. How you communicate depends on whether you are -
  - publishing research results in a peer-reviewed journal
  - presenting your results in a scientific meeting
  - interacting with students
  - discussing your research with the public
  - talking to media about increased research funding
  - telling your neighbors all the good things that science has done for the society(Some of the communication skills will also help you in your careers.)

# Role Play

## Elevator Speech

**What is it that you do (and how does it relate to me)?**

# Informal Talk – Key Points

- Who am I talking to?
  - Connect to his/her work, community, or event
  - Avoid using technical terms
- Will they be interested?
  - Show connection to real life situations
  - Show enthusiasm and pride in what you do
- KISS (keep it short and simple)
  - 1 or 2 sentences, depending on situations

# Speak Simply about your Work

- No matter where you go or whom you're talking to, you can tell them about your work
  - neighborhood gathering
  - airplane ride
  - airport
  - taxi ride
  - barber shop
  - **elevator (lift)**
  - restaurant
  - bank personnel





# Activity

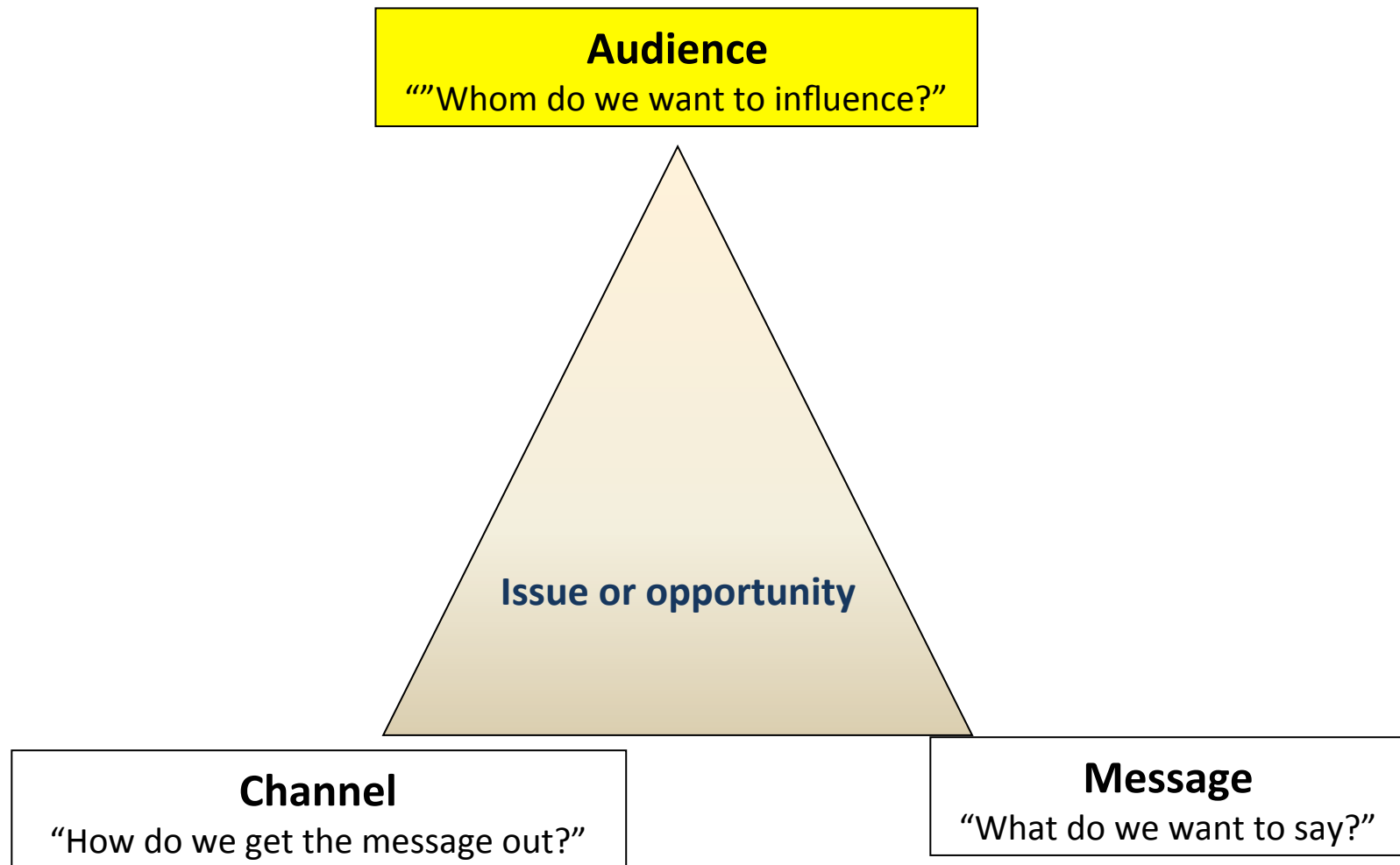
- Think about your research interests and priorities.
- What is the key problem or scientific question you are addressing?
- Write two to three sentences to answer the question, “what do you do?”



# What do you do?

- I am an engineer, and I'm doing research to produce faster and better computers.
- I am an engineer and I devise cleaner processes to produce less industrial wastes.
- I am a chemist and I'm discovering drugs to cure cancer.
- I am a chemist and I help make the paints that people use in their home and on things like bridges, buildings, and
- I'm a scientist and I'm trying to improve the yield of crops to produce more food.
- I'm a science professor and I teach my students to discover nature and learn new skills to get jobs.
- I'm a high school teacher and I prepare students to major in science and engineering when they get to university.

# Elements of Communication



# Think about Your Audience

- Before preparing a communication, you must first identify and analyze your audience
  - What are the demographics?
    - age, income, education
  - What do they know or believe about the issue?
  - Why should they care about issue?
  - What values are *emotionally* important to them?



# Think about Your Audience

- If you can pick an audience
  - Who benefits from the opportunity?
  - Who is adversely affected by the opportunity?
  - Who can help address the issue or opportunity?

# Further Communications to the Public

- All STEM fields (science, technology, engineering, and math) impact the public. Anyone working in STEM can engage the public.
- Communication can take place in different ways and with different people
  - Examples of different modes: library programs, invited talks to schools, interviews with the media, science cafes, chemistry demonstrations, ACS National Chemistry Week
  - Examples of different groups: retirees, secondary school students, civic associations, social and religious organizations, neighborhood parties
  - Communication can be as simple as a casual talk to a few people about your work or a prepared speech in a formal event
    - In all cases careful preparation is recommended

# Possible Opportunity or Issue

- public support for high school projects
  - Need money for students to work part-time
- publicity for an upcoming event
  - Special seminar
  - Science café
- public education outreach (K-12)
- Negative media reports on science/chemistry
  - Need to improve public image of science

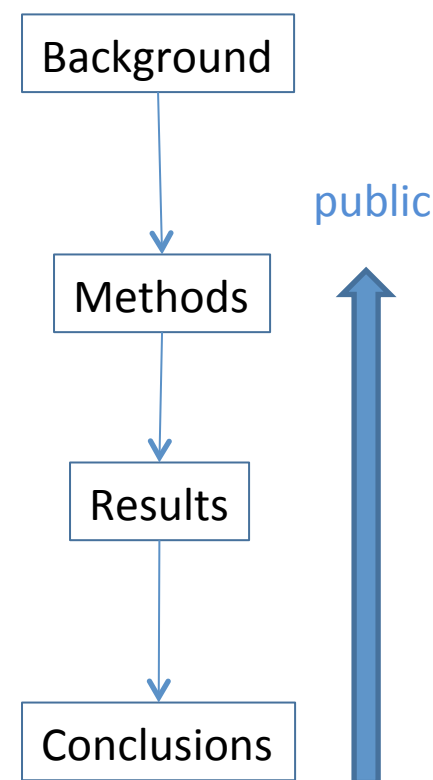
# Improve public image of science

- Audience???
- Who benefits from the issue?
- Who is adversely affected by the issue?
- Who can help address the issue?



# Use the “Public” Communication Style

- In science and engineering, we start with introduction (background) and proceed to experimental methods, results, and conclusions.
- For the public, we need to start with the results and the impact (why should they care) and delve into details only to elaborate upon your message.
- Minimize unnecessary details. Repeat the message as needed.
- Emphasize why the work is done and potential applications.



# Key Factors of Communication – 4C's

- Concise
- Compelling
- Customized
- Consistent

# Activity

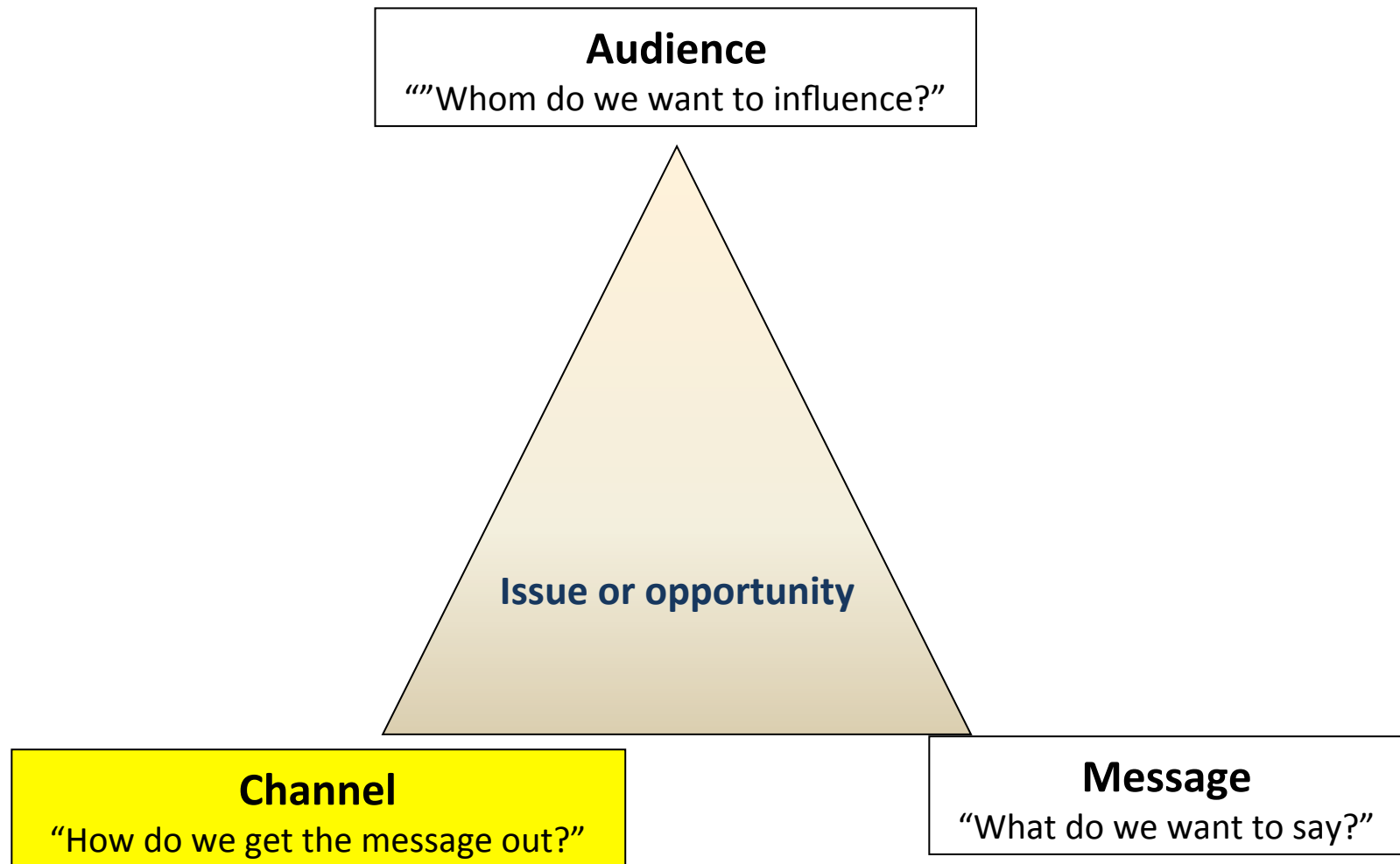
- Convert a scientific report for the public.
  - Remember the "big picture" and why the audience should care
  - If possible, include
    - reasons why the work is done
    - main results of your work
    - potential applications



Zein is a major protein found in corn. In this work, zein was modified with several isocyanates and diisocyanates in solution to evaluate its potential usage in bioplastics. The reactions are fairly complex, but the major reaction pathways were identified with the help of NMR and FTIR. The key functionalities are amides, urea, and urethanes. Gel electrophoretic patterns showed that diisocyanate crosslinked a portion of zein to generate higher molecular weight species. DSC data showed single glass transition temperatures in all cases indicating that homogeneous blends were formed. The mechanical properties of modified zein were either similar to unmodified zein or slightly reduced in some cases. For all the isocyanates employed, the modified zein exhibits increased water resistance, which enhances its applications as a major ingredient in coatings.

With rising petroleum prices, there is increasing interest in using natural renewable materials to make everyday things. Zein, a major protein of corn, can potentially be used in many applications, but its poor water resistance property hinders its development. Scientists have now shown that a particular reaction of zein can improve its water resistance. As a result, this material can now replace some of the petroleum-based products in paints and coatings.

# Elements of Communication



# The Main Channels for Communication

- Informal networking
- Formal one-on-one meeting
- Live presentation to group
- Events
- Print media (newspapers, magazines, etc.)
- Broadcast media (radio, network TV, cable)
- Personal electronic media (Web, blogs, etc.)



# Trends in Communication Channels

- General decline of print media in favor of broadcast and (especially) personal electronic (web and blogs).
  - Coverage for science in print is down
  - But coverage is up for *local* education, news, local government and politics
- Much of the population listens to the radio.
- Cable and on-line media are free from traditional publishing deadlines. The new news cycle is 24/7.
- The Web is fundamentally changing the way we communicate:
  - The Web is the journalism of the future.
  - Web-conferences are replacing many meetings and one-to-group presentations.
  - Networking applications (Facebook, Twitter, LinkedIn, etc.) help us identify contacts and communities of interest.
  - Many young people prefer texting and podcasts.
- Television is the primary source of science news for most people; the Web is a strong second.
- Implication: Communication materials need to be shaped so that they can be used in a variety of media.

# Improve public image of science

- Audience:
  - Teachers, school administrators, government, media, public at large

- Channels???

General Public

Parents



# Improve public image of science

- Audience:
  - Students, parents, teachers, school administrators, employers, public at large

- Channels???

## General Public

letters to newspapers  
public meetings  
ads on buses

## Parents

school meetings  
information to the kids  
personal visits

# Importance of Contacts

- Contacts are important because they bring opportunities
  - including opportunities to communicate science to the public
- Networking – friends, and friends of friends.
  - Particularly those who are (or have been) involved in science communication
- Get in touch with people in the media. Cultivate relationships.
- Get involved in some social activities – get to know opinion leaders.
- Compile the list of publicity people in companies, schools, and government agencies.
- Be active – speak and write about science. As more people know you, more opportunities will come.
- Use online tools (more later)

# Live Presentations

- Choose the right words
  - Avoid technical jargon
- Choose supporting information carefully
  - Simplify data. Avoid unnecessary details
- Illustrate your points
  - Use examples & stories to strengthen your point.
  - Use slides with images
- Non-verbal communication

# Live Presentations

- **Use an appropriate communication style**
  - Direct versus Indirect, Task versus People orientation
  - Be aware of cultural differences
- **Public Attitudes**
  - Public attitudes regarding STEM tends to be positive
  - However, most people do not really understand science
  - Be careful on some controversial topics (global warming, evolution, stem cell research, genetically modified crops)
- **Questions**
  - Encourage questions. People ask questions because they are interested.
  - You can also ask them questions to keep their attention.
  - If someone in the audience is difficult with questions, stay with the facts. Be nice but authoritative. Don't over-react. Thank the person for asking the questions.

# Working with Media

- Print Media
  - Establish contacts with the publication (especially the reporters on the science or technology “beat”) before you need to get coverage
  - Offer yourself and your local scientific group as a potential resource for future science stories
  - Invite the journalist to your event. Make sure he/she is treated well.
  - Offer to write a draft of the article. Follow the newspaper communication style when you write.
- Broadcast Media
  - Invite the media. The event or activity you want covered should have a compelling visual element.
  - Be prepared for an interview with a reporter.

# Preparing for (Media) Interviews

- Primary
  - Prepare (purpose, participants, probable issues)
  - Positive
  - Posture
- Secondary
  - Solution
  - Specific
  - Sound bites
- Provide anecdotes and examples to illustrate your point while avoiding jargon. Remember that for radio or television, your information will be delivered as a sound bite.
- Practice makes perfect!



# Interview Tips

- Be clear in your own mind about the three main points you want to convey.
- Ask to get the questions in advance (or create your own questions for the interviewer to use).
- Use language that the audience will understand.
- Make connections between chemistry and everyday life.
- Stay on the main points. Do not get off on a tangent.
- For print media
  - Use “public” writing communication style. State the impact and results first .
  - Be concise and cogent. Don’t add unnecessary details.
  - Request that they send the draft of the article to you (for changes) before publication.
- For broadcast media
  - Need to get your message in “sound bites”
  - If you cannot answer a question, tell the interviewer that you will get back to him/her.
  - Try to have the last word. Repeat your main point.
  - Non-verbal aspect (body language, tone of voice) is very important

Example:

You are an industrial scientist and you have developed a pesticide for farm products.

We should all be thankful to the farmers for giving us the food that we eat everyday. In farming the biggest fear is the loss of the crop, which can cause financial ruin for the farmer. A major source of the crop loss is the attack by pests. In my laboratory, my group has developed a new pesticide that can eliminate these pests while not hurting the crops. We believe this development will be helpful to the farmer and improve food safety.



# Activity #3

- Draft an introductory statement (1 paragraph) for a radio show based on one of the topics below:
  - You are a high school teacher, and 90% of your students were accepted to college.
  - ~~You are an industrial scientist and you have developed a pesticide for farm products.~~
  - You are a software developer and you just designed a game that has been a hit with the consumers.
  - You are a researcher and your research group has just found a cure for AIDS.

# Letters and Op-ed articles

- **Letter to Editor and Op-ed article**
  - **Look for a suitable newspaper or magazine:** Don't rule out local papers! In the age of the internet, local papers can be read all over the world
  - **Writing tips:** Be sure that you have something to say and that you can offer a distinct perspective. Keep to within the word limit (varying from 50 to 750 words). Include your address and a phone number where you can be reached.
  - **Timely Response:** Timeliness is key. The faster you are able to respond to breaking news events, the more likely your letter or op-ed will be considered for submission.
  - **Make One Major Point:** Editors seek clear, concise opinions on a topic. Clearly state one major point with a strong perspective. They often select letters that comment on an issue that is being covered in the news, or is missing from the current public conversation on an issue.

# Improve public image of science

- Optional Activity
- Formulate a message for the project.
  - Audience = Public
  - Channel = Letter to Editor of local newspaper
  - Message ???

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- Optional Activity
- Formulate a message for the project.
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  - Channel = Letter to Editor of local newspaper

I am writing to remind our community that science is cool. If you look around you, science is everywhere – your pen, your clothes, the cosmetics you use on yourselves, your computer, your car – almost everything is the product of scientific innovation and production. In addition, scientists study how nature works, attempt to cure cancer, improve crop yields, and solve the world's energy and water problems. If our country is to grow and to prosper, we need scientists. Let's support science and the scientists!

# Guidelines for Working with Students

- Share about yourself.
- Involve students in the process of science.
- Stimulate thinking by asking questions.
- Use language the audience will understand.
- Make your subject real to the students.
- Encourage observation.
- Prepare students for the unexpected, if appropriate.
- Leave more than a memory behind you.

# One-on-One Meetings with Policymakers and Opinion Leaders

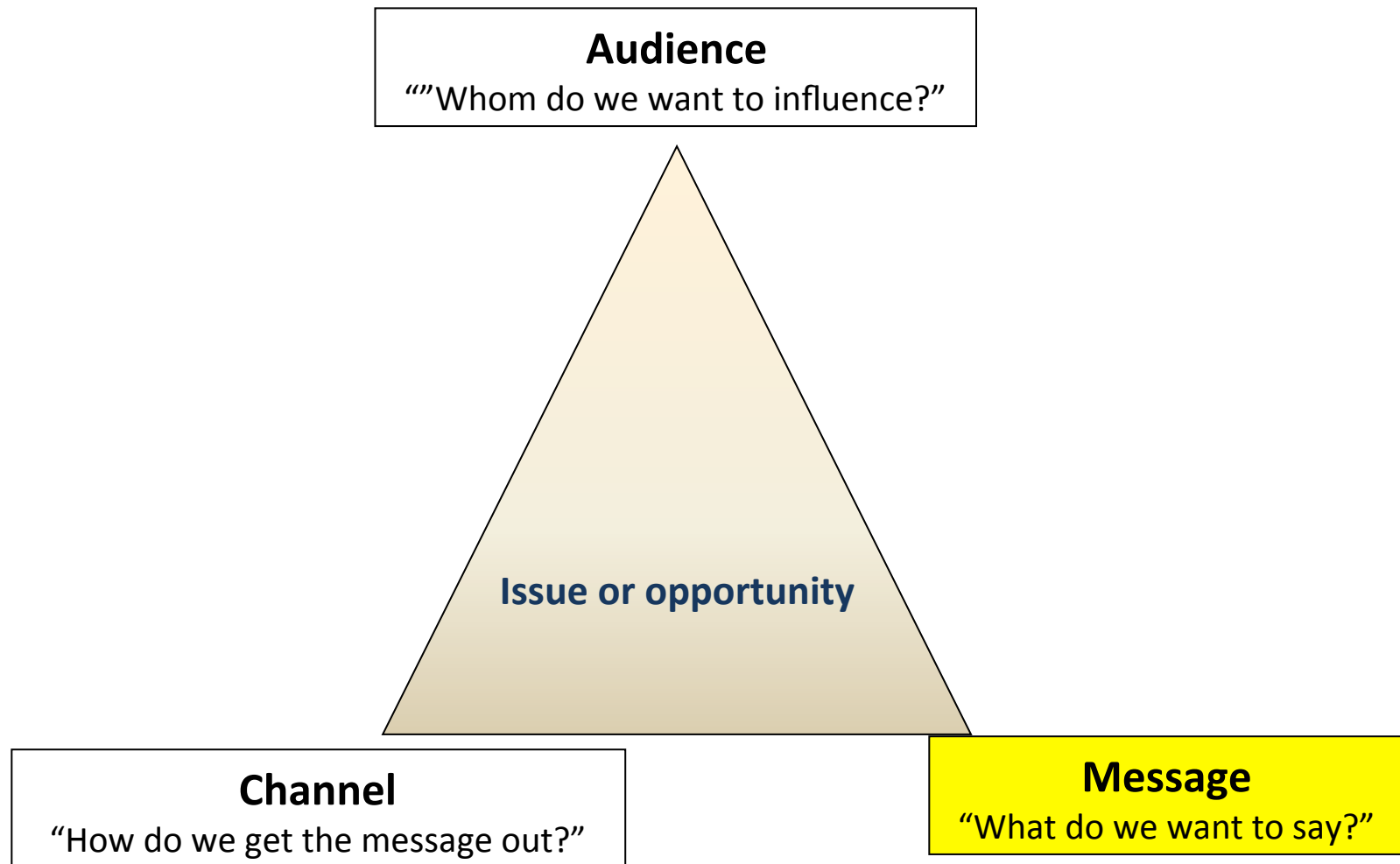
- Be Prepared
  - Before your meeting, lay out your key points
  - Know the materials you will leave behind
  - Know the position of the policy maker before your visit
- Be Focused
  - Make your key introductions up front
  - Focus on your request, and stay on message
  - Explain the facts
- Be Courteous
  - Don't be surprised to wait, but be punctual yourself
  - Send a thank-you note after the meeting
- Build Your Relationship
  - Don't let that meeting be your only contact
  - Stay in touch with the policymaker and staff

# Activity #4

- Work with a different partner this time – *talk to each other*
  - You as Business Owner: “I have many people who want money. Why should I donate money to buy equipment for science and engineering?”
    - Your partner provide a response
  - Your partner as School Administrator: “I don’t think scientists make a lot of money. Why should I encourage my students to study science?”
    - You provide a response



# Elements of Communication





# Message: Communicating Science

Communication is one of the most important aspects of science.

- Are you sharing facts?
- Are you persuading?
- Are you teaching?

# The Art of Persuasion

## Key Points

- Grab the person's attention, particularly emotion
- Find the person's weak spot
- Find common ground with the person

## Example: School Administrator

- Because if the students do well in science, it will make the school look good.
- The country needs scientists. You can justify the expense of spending money in science.
- Yes, most scientists are not rich, but if they enjoy science, it's good for them, good for the school, and good for the country.

# The Art of Persuasion

## Key Points

- Grab the person's attention, particularly emotion
- Find the person's weak spot
- Find common ground with the person

## Example: Business Owner

- Because this is an excellent investment for your future.
- Several Asian countries are competing in your business. Their workforce seems better trained in science than ours.
- Yes, the equipment will cost money, but the students will be much better trained. When you hire them, they will be much better workers, and your business will thrive.

# Online Media

- **Your Website**
  - Make an effort to keep your website dynamic and interesting
  - Add video and images as needed to clarify and emphasize your messages
- **Social Media (ACS Network, Facebook, Twitter, LinkedIn)**
  - Good way to get connected with others, e.g., colleagues in your field.
  - Use it to solicit or provide input, collaboration, job opportunities, announcement of events, etc.
  - Also a good way to let the public know of your work. You can cultivate your fans.
  - View it as advertising for your work and widen your contacts.
  - Video and photos can be used frequently as needed.
- **Others**
  - Contribute to Wikipedia on scientific topics.
  - Consider podcasts posted online (YouTube, etc.) to reach public listeners.

# Resources at the ACS

- ACS Public Relations Guide Book
  - [http://portal.acs.org/portal/fileFetch/C/CNBP\\_022677/pdf/CNBP\\_022677.pdf](http://portal.acs.org/portal/fileFetch/C/CNBP_022677/pdf/CNBP_022677.pdf)
- Chemistry in the News
- ACS Chemistry Ambassadors
- ACS Career Navigator
- ACS Communicating Chemistry Toolkits
  - Climate Science
  - Water
  - Food
  - Energy

[http://portal.acs.org/portal/fileFetch/C/CNBP\\_022677/pdf/CNBP\\_022677.pdf](http://portal.acs.org/portal/fileFetch/C/CNBP_022677/pdf/CNBP_022677.pdf)




## The **American Chemical Society** PR Guidebook

Communicating the relevance of chemistry to the general public

## Public Relations and Media Outreach

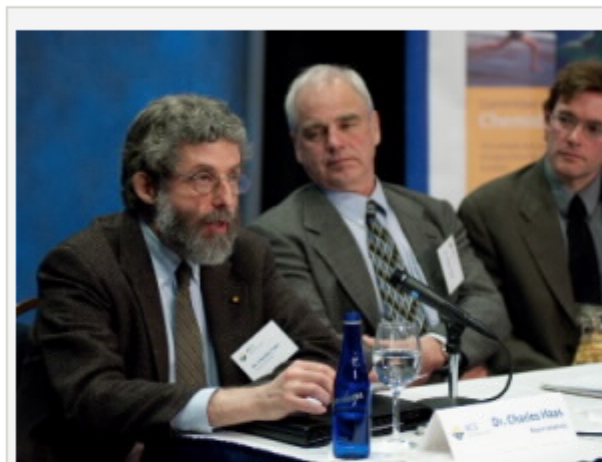
Would you like to see more positive stories about chemistry in the news? Would you like to see the activities of your local section get news coverage – to both bring people in and to cover the actual event? Maybe there's an issue in your community that involves science and you'd like to write a letter to the editor. How do you reach the newspapers and other media in your community? More to the point, how do you gain interest in what you have to say?

From local section National Chemistry Week activities to a breakthrough performed by chemists in your town, there are many great chemistry stories happening in your community that your local media may want to cover. But first they have to know about them – and that's where you, as a Chemistry Ambassador, can make a difference. The American Chemical Society PR Guidebook is a great resource for you in creating relevant messages about chemistry, creating news releases and other materials, and making contact with local news media.

The links below contain highlights from the [American Chemical Society PR Guidebook](#) . There's more detailed information inside the PR Guidebook.

- [Local Section Public Relations](#)
- [Chemistry Facts, Talking Points and Messages](#)
- [Creating Media Materials](#)
- [Types of Media Outlets and How to Reach Them](#)

[www.acs.org/international](http://www.acs.org/international)



Scientists discuss water safety and other water quality issues at a briefing on the American Chemical Society Global Challenges / Chemistry Solutions Final Report. From left: Charles Haas, Drexel University; William Ball, Johns Hopkins University, and Marc Edwards, Virginia Tech University. Credit: Sam Hurd.

# ACS Career Navigator

## Professional Education

Short Courses  
On Demand  
Online Courses  
Sci-Mind™

## Careers Services

Career Consulting  
Career Fairs  
Virtual Career Fairs  
Career Pathways Courses



## Leadership Development

Online Courses  
Facilitated Courses

## Market Intelligence

Employment Dashboard  
Salary Comparator  
Employment Reports  
Ethics & Professional Guidelines  
Chemical labor market tracking





# ACS International Activities

[www.acs.org/international](http://www.acs.org/international)

Email [intlacts@acs.org](mailto:intlacts@acs.org)

# Back-up Slides

# Public support for HS projects

- Audience???
- Who benefits from the issue?
- Who is adversely affected by the issue?
- Who can help address the issue?

# Public support for HS projects

- Optional Activity
- Formulate a message for the project.
  - Audience = Public
  - Channel = Letter to Editor of local newspaper

All of us know how important education is to children. The high school curriculum is good, and the students learn a lot. But the students need practical experience dealing with real life situations. In this proposal, the students will work on community projects and learn real-life skills. These are good for the students, good for future employers, and good for the community. I hope our community can support this initiative.

# Communication Across Cultures

## Indirect/High Context

- Cultures tend to be homogenous and collectivist
- Already know and understand each other quite well
- Less need to be explicit, rely less on words to convey meaning
- Goal of exchange is to maintain harmony and save face
- Examples: Africa, China, France, Spain, Thailand, Latin America, India, Italy

## Direct/Low Context

- Cultures tend to be heterogeneous and individualist
- People prefer independence, self-reliance, and a greater emotional distance from each other
- Rely more on words, and being interpreted literally
- Goal is to get or give information
- Examples: United States, Australia, England, Germany, Ireland, New Zealand