


**IOWA STATE UNIVERSITY**  
Greenlee School of Journalism and Communication

**Communicating Science and Research Impacts to Non-Experts**

Michael F. Dahlstrom




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**Science Communication**

- Interdisciplinary social scientific field that explores:
  - How scientific information is communicated to various audiences
  - How audiences interpret scientific information
  - Effects of communication practices upon scientific understanding, acceptance and support



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**Science Communication**

- Why is this important?
- What would you hope to achieve by communicating your science to non-expert audiences?



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**Science Communication**


- Why is this important?
- Educate
  - Inform people so they can make better decisions
  - Improve society by increasing understanding about the world
  - Taxpayers funded the research and deserve to know what they paid for



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## Science Communication


- Why is this important?
- Defend Science
  - Counter misinformation and pseudoscience
  - Increase support and trust toward science
  - Persuade audiences toward certain beliefs within contentions social issues



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## Science Communication

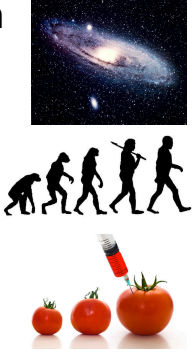
- Why is this important?
- To Inspire
  - Share the wonder and awe of scientific discovery
  - Help audiences appreciate the world around them
  - Get people excited about future possibilities



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## Science Communication


- Relevant goals depend on how the science intersects with non-experts
  - What type of science is involved?
  - Does it intersect with societal decision-making?
  - Does it intersect with individual decision-making?



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## Science Communication

- What language should I use when communicating with non-experts?



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## Science Communication



1. Avoid Jargon
  - Science uses words that often mean nothing to a non-expert
    - Parts per million, *Arabidopsis*, phenotype, etc.
  - Describe your science only using words your audience uses frequently

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## Science Communication



2. Analogies and Metaphors
  - Offers a comparison to allow a complex topic to be understood through a familiar idea.
    - Capillaries grow around a blockage like ivy around a fence post

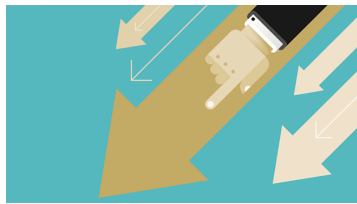
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# Science Communication



3. Narrative examples
- Stories about impacts/desires of people
  - Place abstract ideas into everyday contexts
  - Increases relevance
    - Cover crops are important for maintaining soil health
    - Robert decided to use cover crops and here is his story...

# Your turn!



1. Describe your research in one sentence - no jargon!
2. Describe your research with a metaphor / analogy.
3. Describe your research through a brief story.

# Your turn!



1. I help scientists share their knowledge in ways that make other people want to listen.

# Your turn!



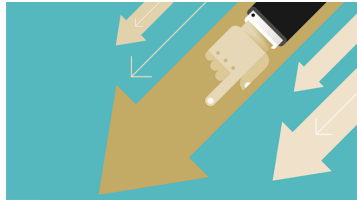
2. Communicating science is like washing the muck off a beautiful river rock.

# Your turn!



3. I used to work in a lab...

# Your turn!



1. Describe your research in one sentence - no jargon!
2. Describe your research with a metaphor / analogy.
3. Describe your research through a story.

**Your turn!**



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- <http://splasho.com/upgoer5/>

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**Your turn!**



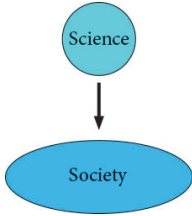

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**Science Communication**

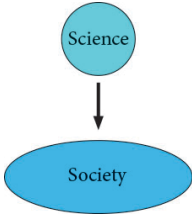
- People often think of science communication as providing scientific information to an audience
- **Public Understanding of Science or Deficit Model**
  - One way transmission of science from expert to public



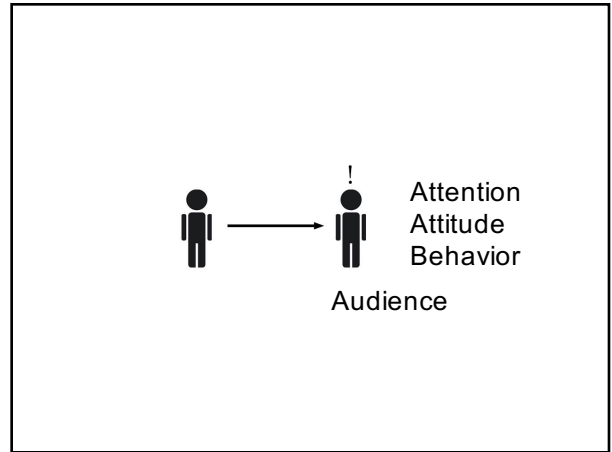
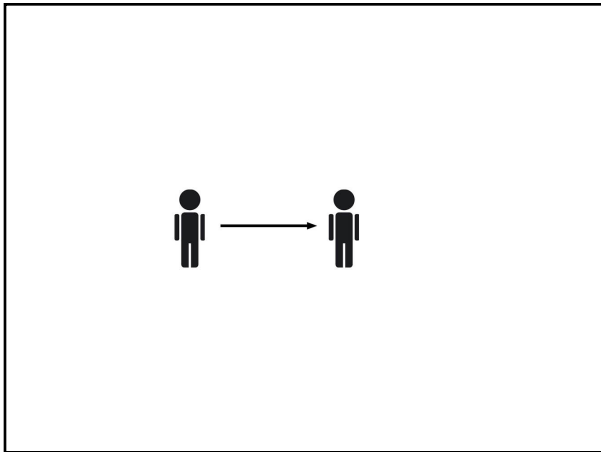
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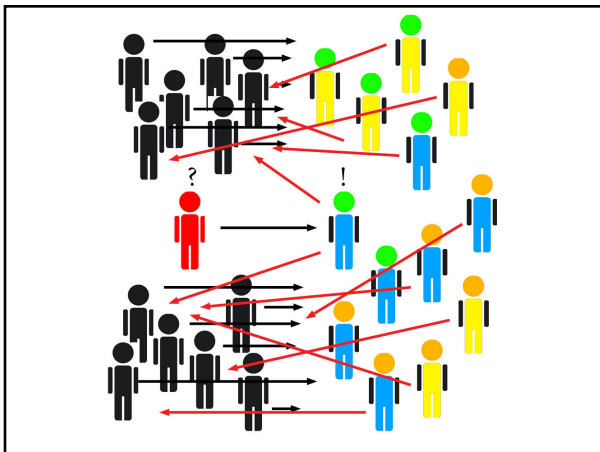
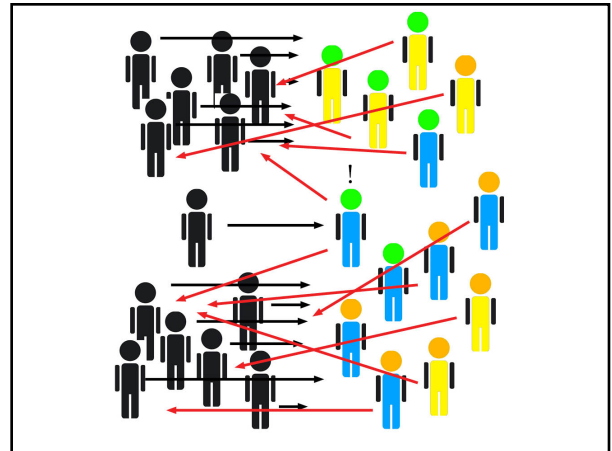
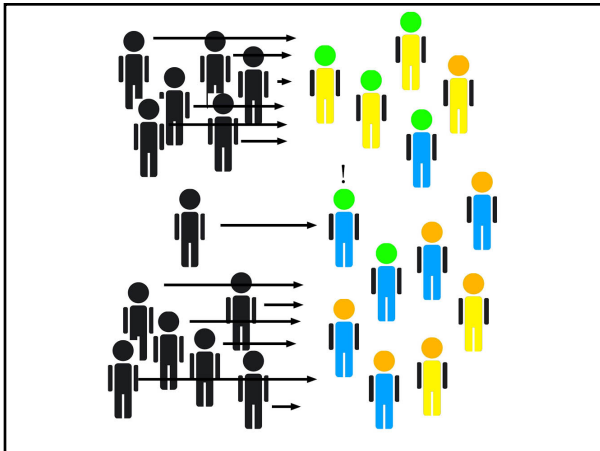
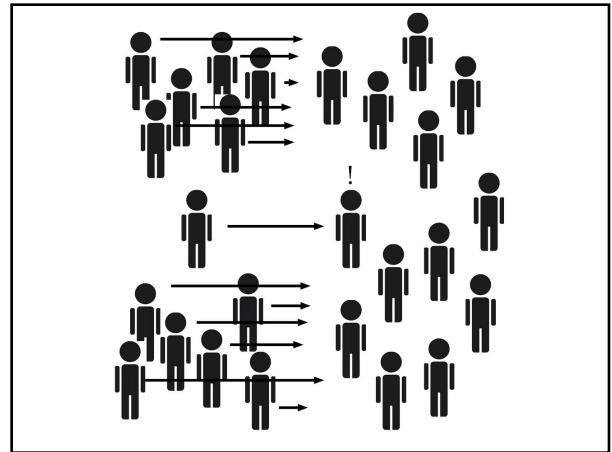
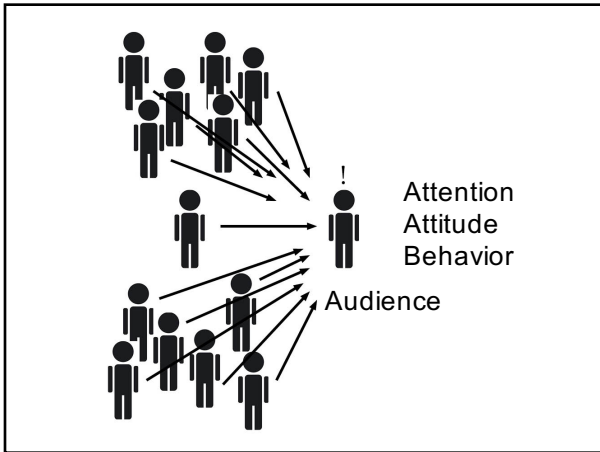
- People often think of science communication as providing scientific information to an audience
- **Public Understanding of Science or Deficit Model**
  - One way transmission of science from expert to public
  - However, this model is naïve and has long been discredited



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### Science Communication

- The public understanding of science model is too simplistic
- Science cannot compel action
  - Science is descriptive to tell us how or what
  - Human values are prescriptive to tell us how to apply knowledge
  - The facts will never speak for themselves

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### Science Communication


- Knowledge is important, but uninterpretable until applied to an underlying value system
- It is this application that drives attitudes and behaviors related to science



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### Science Communication


- Should I support wind energy?
- Science: Wind energy in 2015 reduced total CO2 emissions by 6%.



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### Science Communication


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- **Value 1:** Reduce climate change impacts



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### Science Communication


- Should I support wind energy?
- Science: Wind energy in 2015 reduced total CO2 emissions by 6%.
- **Value 1:** Reduce climate change impacts
- **Value 2:** Avoid landscape degradation



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### Science Communication

- Cultural Theory of Risk
  - Many contentious science issues are not disagreements about science, but are rather differences in aligning the desired solution to what an individual views as a "good" societal structure
  - Individuals selectively attend to and interpret information relative to risks in a manner that expresses and reinforces their preferred way of life



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### What Quadrant are you?

|     |     |
|-----|-----|
| ??? | ??? |
| ??? | ??? |

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**A1** The government interferes too much in our everyday lives.

**A2** It's society's responsibility to make sure everyone's basic needs are met.

**A3** Cooperation with others rarely works.

**A4** Decisions in business and government should rely more heavily on popular participation.

**A5** If people have the vision and ability to acquire property, they ought to be allowed to enjoy it.

**A6** We need laws that keep people from harming themselves.

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**B1** It's old-fashioned and wrong to think that one culture's set of values is better than any other culture's way of seeing the world.

**B2** Society works best when people obey all rules and regulations.

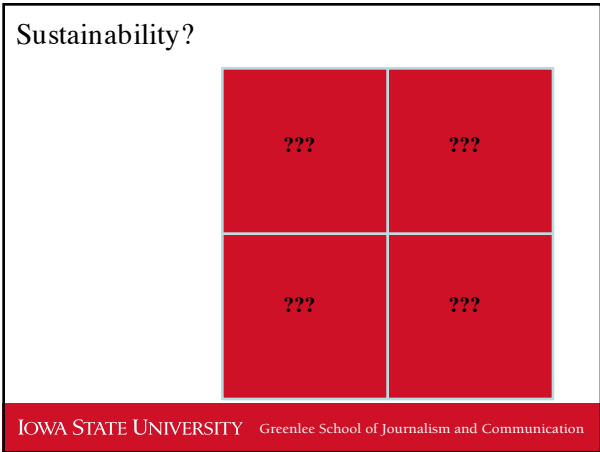
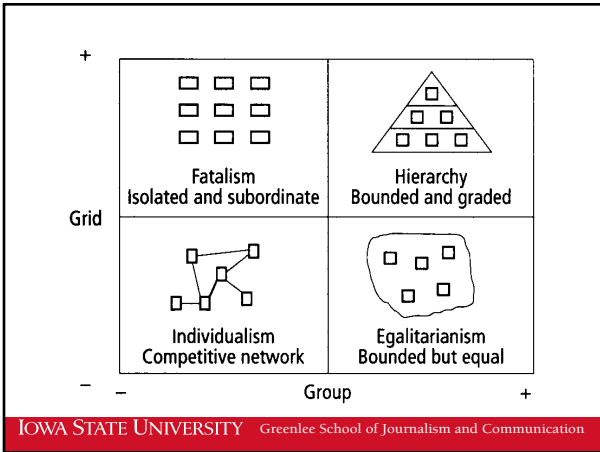
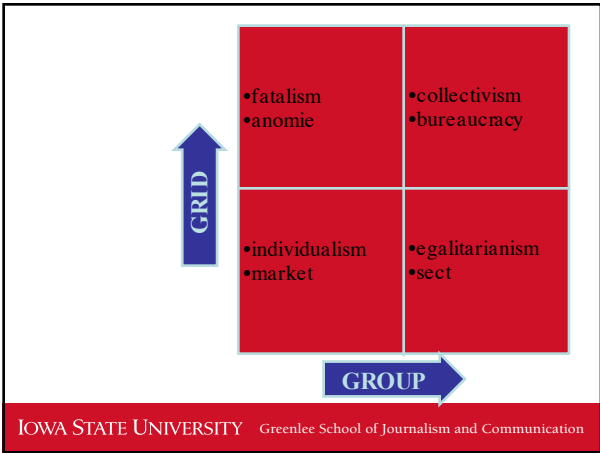
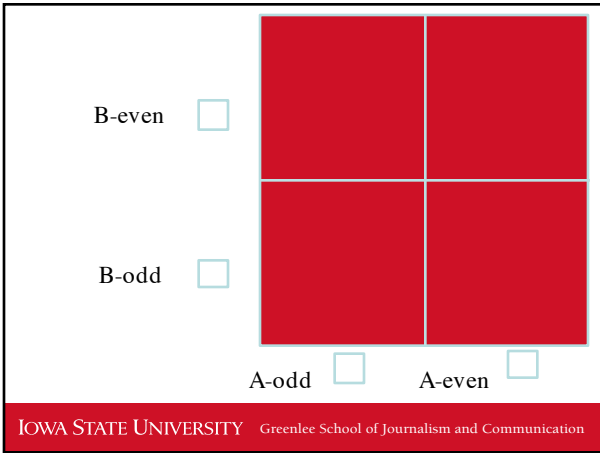
**B3** We need to dramatically reduce inequalities between men and women.

**B4** Respect for authority is one of the most important things that children should learn.

**B5** Our society would be better off if the distribution of wealth were more equal.

**B6** Different roles for different sorts of people enable people to live together more harmoniously.

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### Sustainability?

|     |  |
|-----|--|
| ??? | ???  |
| ??? | Greed has destroyed shared resources:<br>Return to smaller institutions, simpler lifestyle – everyone should do a little |

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### Sustainability?

|     |  |
|-----|--|
| ??? | Lack of order has destroyed shared resources: Need new organizations with rules and enforcement – authoritative truth needs to be accepted |
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### Sustainability?

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| ???   | Lack of order has destroyed shared resources: Need new organizations with rules and enforcement – authoritative truth needs to be accepted |
| Unnecessary social burdens have destroyed resources: Need more freedom to allow solutions to arise from competition – other groups are scaremongers | Greed has destroyed shared resources:<br>Return to smaller institutions, simpler lifestyle – everyone should do a little                   |

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### Sustainability?

|   |  |
|---|--|
| Destroyed resources are inevitable: All other groups have failed sometime in the past – stop wasting time and energy trying                         | Lack of order has destroyed shared resources: Need new organizations with rules and enforcement – authoritative truth needs to be accepted |
| Unnecessary social burdens have destroyed resources: Need more freedom to allow solutions to arise from competition – other groups are scaremongers | Greed has destroyed shared resources:<br>Return to smaller institutions, simpler lifestyle – everyone should do a little                   |

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### Science Communication

- So how to communicate?
  - The audience will seek out information that aligns with their existing needs and values
  - They will also interpret science information through the filter of those values
  - Messages must be interpretable according to their values.
    - It doesn't make science communication easier, but it will make it more effective.



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### Science Communication

- You need to take an audience-centered approach
- Who is your audience?
  - The “general public” does not exist



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### Science Communication

- You need to take an audience-centered approach
  - Who is your audience?
    - The “general public” does not exist
  - Why would they care about your information?
    - Who does the communication serve? You, because you want them to know something, or does it really meet your audience's needs?




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### Science Communication

- You need to take an audience-centered approach
  - How will you reach them?
    - Making content available doesn't mean anyone will find it.



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### Science Communication

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  - Public Engagement with Science Model**




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### Communicating Science and Research Impacts to Non-Experts

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### Communicating Science and Research Impacts ~~X~~ Non-Experts


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with


## Science Communication

- Did it work?
  - Evaluate your communication as you would your science.
  - How do you define success?
  - How do you measure it?
    - Numbers of attendees, viewers, visitors, etc.?
    - Measure understanding?
    - Survey for belief or attitude change?
    - Observe behavior change?



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## Science Communication



- Yes, this all matters.
  - Grant reviewers are increasingly wary of proposals with vague or cookie-cutter dissemination plans.
    - Tools no one uses
    - No funding for dissemination or evaluation
  - If you truly want societal impact you have to work at it

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## Your turn!

- Break into groups
  - Pick one of your research projects and propose a plan for successful science communication.
  - Be able to answer:
    - Who is my audience?
    - Why would they care?
    - How will I reach them?
    - How will I earn their trust?
    - How can I evaluate success?




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## Thank you



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