

STEM Storytellers:

Improving Graduate Students' Oral Communication Skills

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Joint Statistical Meetings

August 1, 2018

Communication: Science + Public

- Effectively communicating scientific ideas is important!
 - Direct benefits to society
 - Use of public funds
 - Inform policy decisions

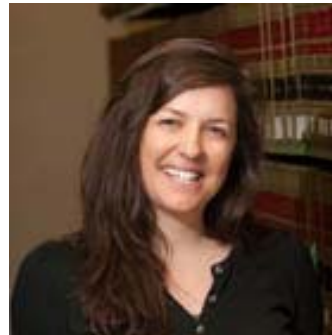
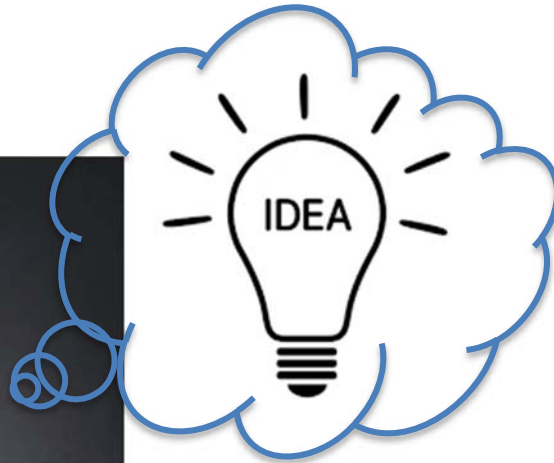


- Graduate students in Science, Technology, Engineering and Mathematics (STEM)-related fields often lack training needed (*Rising Above the Gathering Storm*, 2007)

STEM Storytellers: The Team



Shannon Willoughby
Physics



Library Sciences



Engineering



Earth Sciences



Math Sciences



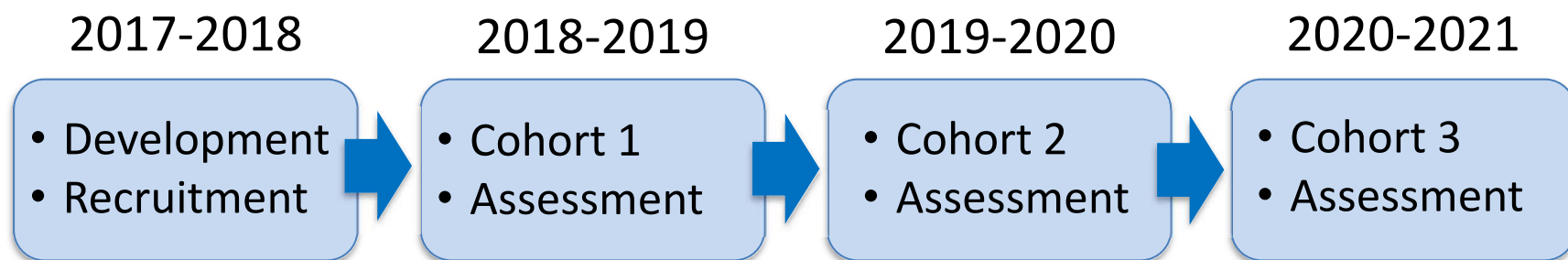
Education

STEM Storytellers

- Program and assessment
- Recruitment and application process
- Reflections

STEM Storytellers: The Program

- Novel oral communication curriculum for STEM graduate students
 - Create jargon-less podcasts
 - Train with improvisational actor on stage presence
 - Present at “Curiosity Cafés” for general public
- Three one-year cohorts; Eight fellows / cohort



STEM Storytellers: The Program

In this program, fellows will:

- Learn how to expertly communicate at conferences, in interviews, and with the public
- Record podcasts to discuss cutting edge science
- Work with a professional actor on improvisation
- Star in their own Curiosity Café
- Attend the American Association for the Advancement of Science annual meeting

STEM Storytellers: Fall Semester

- Attend weekly 90-minute workshops
 - Storytelling & improvisational techniques
 - Use of jargon
- Record podcast summarizing recent STEM journal article



STEM Storytellers: Spring Semester

- Attend weekly 90-minute workshops
 - Stage presence
 - Public speaking skills
 - Improv techniques
- Present summary of thesis at Curiosity Café



Outcomes and Assessments

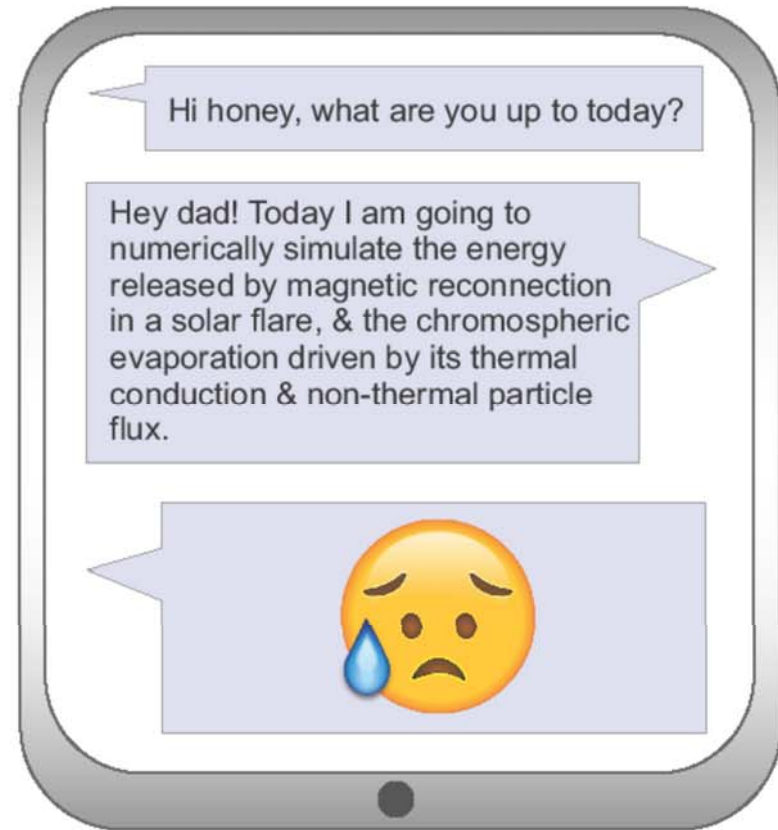
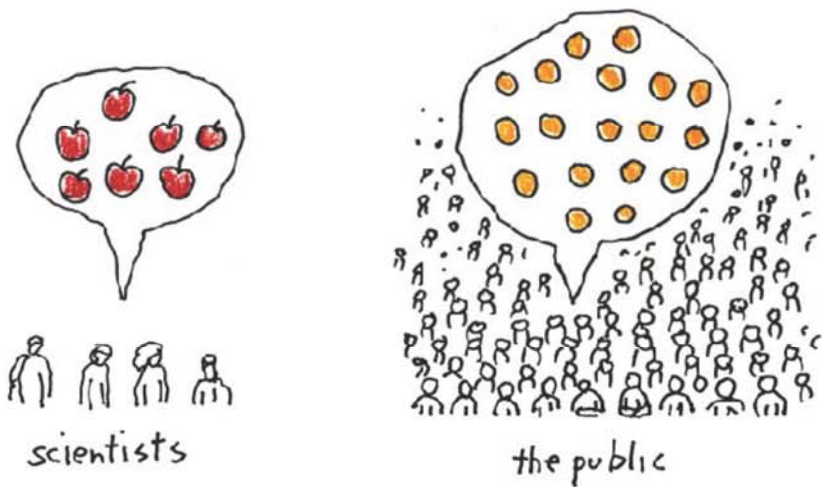
- Reduce use of jargon
 - “Jargones” score (Sharon & Baram-Tsabari, 2014)
- Improve stage presence
 - Develop body language rubric for oral communication
- Improve public speaking skills
 - Public Speaking Competence Rubric (Schreiber et al., 2012)

Advertising

- Posters put up in all STEM departments
- PI met with STEM department heads and graduate student groups
- Emails sent to students and faculty
- Email address set up to field prospective applicants' questions

Advertising: Posters

science communication



Sound familiar? If you are interested in improving your oral communication skills, we can help!

Advertising: Website

The screenshot shows a web browser window with the URL www.montana.edu/stemstorytellers/fall17_applications.html. The page is titled "Apply to become a STEM Communication Fellow: Applications due by June 15th, 2018." The main content area includes a list of application materials to be prepared, such as a 2-3 minute oral summary, a script, a current CV, and a signed form. Below this is a file upload widget for Cohort 1 applications, which includes a "Submit File to Cohort 1 applications" header, a file upload icon, and instructions to drag and drop a file. The footer of the page provides contact information for Montana State University, including the address, phone number, and email address for Dr. Shannon D. Willoughby.

Apply to become a STEM Communication Fellow:
Applications due by June 15th, 2018.

Applications for the Fellowship can be completed below. Four files need to be uploaded to Box, and the form below filled out. If you have any questions, feel free to email stemstorytellers@montana.edu

Please prepare the following materials:

1. A 2 to 3 minute oral summary (audio recording) of your thesis or dissertation work. If you have not started this work, record a summary of a recent article in your field of study.
2. A script of the above recording
3. Your current CV
4. A copy of [this form](#), signed by you and your advisor.
5. Put all of the above materials into a zip file, and upload the file below.

Use the following naming scheme: lastname.zip (eg. smith.zip).

Upload your file here:

Submit File to Cohort 1 applications

Drag and drop a file to upload or browse

Uploading a file here will not add it to your Box account

The content of this upload widget is not managed by Box. By uploading you are consenting to giving this content to the widget manager.
[View Box Terms of Service.](#)

STEM Communication Fellows

2018-2019 Fellows
2019-2020 Fellows
2020-2021 Fellows

Rubrics for Public Use

Public Speaking Competency Rubric
Body Language Rubric coming in 2019
Jargoness Equation Information

Websites regarding communicating science

Union of Concerned Scientists
Communication Best Practices

Montana State University
Bozeman, MT 59717

PI:
Dr. Shannon D. Willoughby
stemstorytellers@montana.edu

Application Materials

- 2-3 minute oral summary of thesis or dissertation work
- Script of the audio recording
- Current CV
- Expectations Contract, signed by student and advisor

Applicant Pool

- N = 19 STEM graduate students seeking doctoral degrees
- ~ 25% male, 75% female
- Departments represented:
 - Chemical Engineering
 - Chemistry
 - Earth Sciences
 - Ecology
 - Health and Human Services
 - Mathematical Sciences
 - Mechanical and Industrial Engineering
 - Microbiology and Immunology
 - Physics

Motivation to Apply

- *“As a short female I am not the typical engineer so it is hard for me to get respect in my field when speaking[;] ... stage presence will help me to **better show my knowledge** in the field.”*
- *“...I would strive to **increase STEM awareness and interest among underrepresented populations** ... through focusing on children.”*
- *“I struggle to find the **balance between personable and professional**, and I hope ... [to] develop my personal ‘brand’ as I also develop my skills.”*
- *“I would also like to **gain the confidence to ask questions** at departmental seminars.”*

Rubric / Selection Criteria

- Understandability of content for general audience
- Quality of delivery
- Use of filler words
- Organization of content
- Alignment of fellowship with student goals
- Other: Graduation date, Department, Diversity of scores

First Cohort

- N = 8 STEM graduate students (6 female, 2 male)
- Departments represented:
 - **Chemical Engineering**
 - **Chemistry**
 - Earth Sciences
 - **Ecology**
 - Health and Human Services
 - **Mathematical Sciences (n = 2)**
 - **Mechanical and Industrial Engineering**
 - **Microbiology and Immunology**
 - **Physics**

Reflections

- Multidisciplinary team
 - Diverse perspectives
 - Better understanding of different departmental / disciplinary cultures
- Application process: Adaptations and questions
 - Audio recording criteria
 - Disciplinary variation in when students identify research topics
 - Dissertation or thesis work VS summary of recent article in field of study
 - Strong applications: Will students with a well-prepared audio recording still benefit from the program?
- Wide range of fascinating research topics!

References

Committee on Prospering in the Global Economy of the 21st Century. (2007). *Rising above the gathering storm: Energizing and employing America for a brighter economic future*. The National Academies Press: Washington, D. C.

Mooney, C., & Kishenbaum, S. (2009). *Unscientific America: How scientific illiteracy threatens our future*. New York: Basic Books.

Schreiber, L. M., Paul, G. D., & Shibley, L. R. (2012). The development and test of the public speaking competence rubric. *Communication Education, 61*(3), 205-233.

Sharon, A. J., & Baram-Tsabari, A. (2014). Measuring mumbo jumbo: A preliminary quantification of the use of jargon in science communication. *Public Understanding of Science, 23*(5), 528-246.



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