

UNIVERSITY OF WYOMING

SCIENCE COMMUNICATION INITIATIVE

CERTIFICATION IN SCIENCE COMMUNICATION

Syllabus



PURPOSE

i In this program, you will touch on both theoretical and practical aspects of scientific communication. You will also reflect on the relationship between science and society and discuss the role that the community can have in affecting the scientific process. By mixing applied features, theoretical matters, and practical examples of science communication, this program will allow you to reflect on some of the unique challenges of science communication in a both interesting and useful way.

In recent decades, the importance of communicating science has increased both inside and outside of academia, and most universities have a dedicated staff of science communicators and public information officers. They disseminate the results obtained by the university scientific staff and try to engage wide sectors of society, to increase the benefits of the research activities and the visibility of the institutions.

The goal of science communication has evolved in more recent times, moving away from the idea that the public had a deficit of understanding towards science, to an approach that includes aspects such as trust and participation. Therefore, science communication is now faced with a new set of challenges:

- How to deliver the scientific messages in a time where there is so much messaging to compete with?
- What should be its goal - to transmit scientific knowledge or to engage with society and encourage its participation in the scientific process?
- How should scientific messages be framed?

Why Communicate Science?

i If you are here, it is likely that you don't need to be convinced of the need for communicating science. Maybe you are a scientist driven by the belief that your research should be communicated to a greater audience, or by your sense of duty.

You would not be alone: a study published in 2011¹ found that, among scientists working for the Argentinian National Scientific and Technical Research Council, about 15% did science communication because they perceived it as their duty, and a similar percentage named the need for a greater understanding of science by the public.

¹ Kreimer P, Levin L, & Jensen P. (2011). Popularization by Argentine researchers: the activities and motivations of CONICET scientists. *Public Understanding of Science*. 20(1):37-47. doi:10.1177/0963662510383924

More recently, a paper published in 2016², which surveyed 5000 members of the American Association for the Advancement of Science, found that the top two reasons for their communication activities were informing the public and defending science.

An even more recent survey³ found that the scientists' attitudes toward science communication are another major factor that drives outreach efforts. For many researchers, disseminating their results is not only important from a social point of view; it is also enjoyable and rewarding.

These are not the only reasons to communicate science, though. If you are a researcher, there is a long list of benefits that derive from practicing science communication: increased visibility, improved networking opportunities, inspiring and recruiting new researchers, skill development and more, as mentioned by a 2010 report⁴ published by the UK Research Council. Furthermore, funding bodies are more and more likely to require a science communication strategy, and research institutions are required to develop science communication strategies.

The Need for Good Science Communication

i The societal need for science communication, however, runs deeper than the individual motivations, even if noble. The scientific decision-making process has moved over the years outside of the public arena. Therefore, there have been calls to restore the democratic participation to science, through public debates, discussion fora and the involvement of all stakeholders.

In fact, the top-down transmission of scientific information has led, in the past, to unwanted consequences and distrust from the public. As pointed out by researchers such as Karen Bultitude, there are other factors increased the separation between science and society:

- The loss of authority of scientists, caused by increased reliance on private funding and high levels of press coverage of scientific controversies
- The proliferation of sources of information and communication channels
- A change in the nature of knowledge production
- The lack of democracy in the scientific decision-making process

In this scenario, science communicators are still split between two approaches: on one hand, filling the “gap” in the public understanding of science, and on the other hand, adopting a more collaborative approach. While the institutional focus is shifting more towards the latter aspect, there is still ample space for the researchers that want to bridge the space between them and the society by communicating the results of research. In fact, a recent global survey, the Wellcome Global Monitor, found that over half of the world population does not believe to know a lot about science, and about 60% would like to learn more. This means that billions of people feel the need to know more about science and technology.

² Dudo, A. & Besley, J. C. (2016). Scientists' Prioritization of Communication Objectives for Public Engagement. *Plos One*. doi: 10.1371/journal.pone.0148867

³ Besley, J. C., Dudo, A., Yuan, S., & Lawrence, F. (2018). Understanding Scientists' Willingness to Engage. *Science Communication*, 40(5), 559–590. <https://doi.org/10.1177/1075547018786561>

⁴ <https://www.ukri.org/wp-content/uploads/2020/10/UKRI-16102020-Benefits-of-public-engagement.pdf>

Scientists and science communicators cannot avoid this challenge - if there ever was one, this is the time to roll up our sleeves and get into the science communication arena!⁵

OBJECTIVES

i This program is primarily self-directed, and as such you will have your own unique objectives for what you want to accomplish with this certification. However, the core objectives that are expected of you are listed below.

- Describe your interest in and personal goals for science communication
- Identify key audiences, including their values and preexisting knowledge
- Create a plan for engaging key audiences in science communication
- Implement research-supported communication methods
- Establish meaningful dialogue with key populations
- Produce a portfolio to use to communicate with key audiences
- Reflect on your public engagement interest and experiences

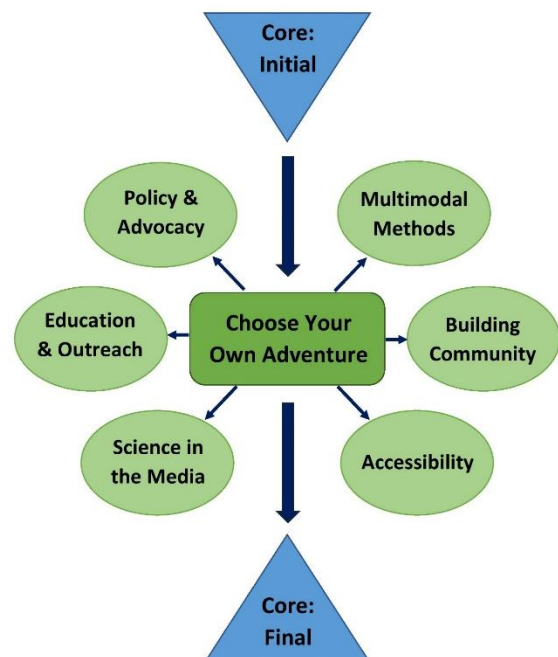
PROGRAM STRUCTURE

i This program will be largely self-directed, but you should aim to complete this certification within three years of starting. The content and submission pages will be hosted in the course shell on WyoLearn. You need to submit 100 points worth of work to obtain the certification.

There are several mandatory required Core assignments that amount to 25 points: pre-program sci-comm survey, pre-program sci-comm stance, introductory activity on goals and messaging, annotated bibliography, post-program sci-comm stance, post-program sci-comm survey, and an overall reflection.

You will earn the remainder of your points in the following areas of focus: Policy & Advocacy, Education & Outreach, Science in the Media, Multimodal Methods, Building Community, and Accessibility. To earn the certification, you need to attain the remaining 75 points through assorted projects in at least two of the six areas of focus. Each area of focus has a required activity to orient you, which is worth 2 points. To earn points, you must engage in a SciComm activity or project and then write a reflection about your experience and impression.

You will self-assess how many points you think your activity is worth (typically ~1 pt/hr), and a program



⁵ Adapted from <https://www.classcentral.com/course/science-communication-for-researchers-15231>

facilitator will award the points as they see fit. You will submit each of your activities and reflections in the assignment pages under each area of focus.

AREAS OF FOCUS

i Here is a brief description of each area of focus and some possible activities you may want to engage in. This list of activities is not comprehensive, and you are encouraged to consult with a science communication expert (for points) on any project you are considering.

Please note: Simply taking a course in science communication and writing a reflection will not be eligible for points. However, any project developed in a science communication course you take may be eligible if it is appropriate in content and rigor and submitted alongside a reflection.

1. Policy & Advocacy

Influencing the decision-making process of politicians or corporations. This could include contacting local, state, or federal government officials, partnering with a non-governmental organization, or soliciting businesses. One example of a way to engage with policy makers and resource managers could be to draft an effective one-pager handout.

2. Education & Outreach

Improving the learning experience in both traditional and non-traditional spaces. This could entail creating educational resources for under-served groups, hosting activities at museums, engaging the public at research labs, volunteering for outreach events organized by the university, or mentoring a K-12 student interested in STEM.

3. Science in the Media

Communicating with journalists or engaging in science-related journalism. This could entail giving a radio/newspaper interview, submitting an op-ed piece, or writing a non-technical article for a science magazine or blog.

4. Multimodal Methods

Incorporating different mediums into your communication projects. This includes text, audio, and visuals, often intermixed. Some examples include making a graphic of your research, improving a standard research poster, creating videos, contributing to a sci-comm blog, or developing a presence as a science communicator on social media.

5. Building Community

Establishing a relationship with key audiences. This could entail reading literature to build a plan to connect, learning social science (qualitative) research skills, or actually reaching out and begin working with a target audience.

6. Accessibility

Working to make science readily available to the masses. This could include reducing jargon in a presentation, designing color-blind-friendly graphics, developing alt-text for graphics, writing a press release, developing an open educational resource (OER), or hosting your data/research on a public website.

TRACK YOUR PROGRESS

i Your points will be tallied in the WyoLearn course shell, but you will probably want to track your progress yourself, so you know exactly what is left on your to-do list. You may choose to do this on your own computer, or you may decide to do so in a public ePortfolio. The table below shows how these points can be accumulated.

Topic	Activity	Points	Cumulative
Core	Pre-Program Survey	1	1
Core	Pre-Program Stance	2	3
Core	Goals and Messaging	3	6
Core	Annotated Bibliography	10	16
	<various activities>	9	25
BRONZE LEVEL			
	<various activities>	25	50
SILVER LEVEL			
	<various activities>	25	75
GOLD LEVEL			
	<various activities>	16	91
Core	Post-Program Stance	5	96
Core	Post-Program Survey	2	98
Core	Overall Reflection	2	100
CERTIFICATION			100

Please note the following requirements and restrictions:

Mandatory Activities: The required Core activities have point values pre-assigned as shown above.

Self-Directed Activities: For the remainder of the points, the participant is asked to self-assess how many points they believe their activities and projects are worth. A general guideline is 1 point per hour of work; this will typically encompass attending workshops, participating in a WySCI coffee hour, or watching an asynchronous training video, as well as the reflection that follows. Book reviews shall be 5 points flat.

Point Distribution: To gain experience in areas potentially outside of their comfort zone, participants must earn at least 10 points in 2 different areas of focus. This is to ensure that someone isn't pigeon-holed into something they already know how to do.

Production vs Training: In order to ensure that participants actively develop their own SciComm projects, as opposed to sitting through a bunch of passive training sessions, at least 25 points of the self-directed activities must be action strategies that generates an original product.

Interdisciplinary: The interdisciplinary nature of STEM, and therefore SciComm, means that there are a multitude of ways to tackle any activity. Participants may take their self-directed projects in any direction that they choose (for instance, embracing STEAM) as long as they demonstrate an acceptable level of quality and rigor. If you feel that your project represents multiple areas of focus, you may ask to split your points among the various categories. The certificate facilitator will ultimately have the final say in point allocation after reviewing the submissions.

Point Caps: Certain activities may have a point-cap to ensure that participants have a well- rounded experience. This will only become an issue if participants are distinctly only engaging in one or two types of projects. The certificate facilitator should address this issue with the participant when it becomes an issue and will ultimately have the final say in point allocation after reviewing the submissions.

Double-Dipping: Participants may not take a course in science communication and have that count for points. However, any project that they develop in that course is eligible to earn points upon submission alongside their activity reflection.

MORE INFORMATION

For information about the certification, contact WySCI director Bethann Garramon Merkle (bmerkle@uwoyo.edu).

About WySCI

www.uwoyo.edu/wysci

The University of Wyoming Science Communication Initiative is a grassroots, campus-wide initiative which envisions a campus community that values, supports, and creates effective science communication and engagement.

WySCI was founded in summer 2017, as a result of several Initiative members offering science communication courses and/or obtaining grant funding which supports our work.

Today, we are a 17-unit, campus-wide effort which works to support, create, and value the following:

Training

- 10+ semester-long courses (2017-2021)
- 22 trainings (2018-2020; others canceled due to pandemic; trainings will resume after pandemic)
- 300+ participants
- Weekly resources newsletter
- SciComm certification (will launch in 2021)

Research

- Leadership in Science of SciComm on and beyond campus
- Enhanced grant writing and Broader Impacts efforts
- UW-led research on SciComm & Broader Impacts
- Campus-wide surveys
- Course-based surveys

Culture

- Enhance internal (UW) awareness & valuation of SciComm and Broader Impacts
- Build campus community & capacity
- Awards & Fellowships
- T&P credit (for all employee types)
- Growth towards peer model institutions