

Natural Sciences / Humanities 7000: Public Engagement with Science

Spring 2020, Mondays 12pm – 2:50pm

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Course Description

Scientists cannot simply communicate more scientific facts to the public to improve public understanding of scientific issues; new approaches to public engagement are needed. This course leverages theory and practices from a variety of disciplines to develop graduate students' ability to meaningfully connect with the public about scientific research. One focus will be how addressing the nature of science and scientific methods can enrich public-facing activities about science. Students will work in teams to develop activities for engaging the public at local venues, such as museums, libraries, field stations, or other community organizations where science may be shared.

Course Learning Outcomes

Learning Outcome...	Will be supported by...	Will be assessed through...
Identify questions about the nature of science and scientific methods and how these bear on one's own area of expertise.	Reading the course material; weekly class discussion.	Journal Reflections; Final Project
Evaluate the features and effectiveness of a variety of approaches used to engage with the public about science.	Reading the course material; weekly class discussion.	Journal Reflections; 5-minute pitch; Final Project.
Adapt an approach to public engagement with science to a particular body of research and circumstances of engagement.	Reading the course material; weekly class discussion.	Journal Reflections; 5-minute pitch; Final Project.
Develop assessment approaches for public engagement activities and reflect on the assessment results.	Readings and discussion of assessment in public settings.	Journal Reflections; Final Project Assessment Activities; Course Reflection
Design, execute, and assess a science engagement project that emphasizes the nature of science.	Reading the course material; weekly class discussion; work time with peers to develop final project; weekly journal reflections.	Journal Reflections; Final Project Assessment Activities; Course Reflection

Required Texts

All readings for our course will be made available on Canvas. Please contact us if there are any issues accessing the readings.

Course Requirements and Grading

Your grade in this course will be determined by the following:

5% 5-Minute Public Talk	Due: Thursday, January 23 by 11:59pm
30% Weekly Journal Reflections	Due: 11:59pm Sundays before class meeting
60% Outreach Project	Due: In stages, see course schedule below
5% Course Reflection	Due: Monday, April 27 by 11:59pm

Further details on each of these requirements will be discussed in class, as well as posted online in Canvas. Below is a short overview of each component to give you a sense of what to expect.

5-Minute Public Talk: During the first two weeks of class, you will develop a 5-minute talk about your own research for non-academic audience. These will be posted to Canvas then viewed by all students in the course, as well as presented in class for small-group feedback.

Weekly Journal Reflections: Each week you will be given a prompt for writing. These may be aimed at helping you develop your own views on public engagement or to scaffold your group project. Writing prompt for the week will be assigned in class each Monday and due Sunday.

Final Project: This will be a team project with three other students with different disciplinary expertise. In consultation with the site partner the team selects, teams will choose a form of engagement, develop a public engagement project of that form, and assess its success. Project will be developed in stages through the course with a "rough plan" proposal, project execution, and final write-up as the main milestones.

Course Reflection: Your final assignment for the course will be to complete a course reflection. We will provide prompts for this assignment.

Course Schedule

Each reading assignment should be completed before the class meeting when it is scheduled to be discussed. Assignments should be completed prior to the next class meeting (generally the Sunday before the meeting).

January 13th – Goals of Public Engagement

Discussion of forms of public engagement with science, the public faces of science, and how to map the various goals of public engagement with science. To prepare, read:

- “The lure of rationality: Why does the deficit model persist in science communication?” Simis, Molly J., Haley Madden, Michael A. Cacciatore, and Sara K. Yeo. *Public Understanding of Science* 25, no. 4 (2016): 400-414.
- “A March Won’t Make the Public Respect Science: Here’s what will.” Jason Lloyd, *Slate*. April 2017. <https://slate.com/technology/2017/04/a-march-wont-make-the-public-respect-science.html>

Assignment: Develop 5-minute Public Talk video, post to Canvas by Thursday, January 23.

January 20th – No Class, MLK

Readings to assist you in preparation of your 5-minute Public Talk Video:

- American Association for the Advancement of Science (AAAS) Communication Toolkit
 1. Engagement Fundamentals Page: <https://www.aaas.org/resources/communication-toolkit/communication-fundamentals>
 2. Engagement Fundamentals Video: <https://youtu.be/UzN6N5HTTMY>
 3. In-Person Engagement: <https://www.aaas.org/resources/communication-toolkit/person-engagement>
 4. Non-Verbal Communication: <https://www.aaas.org/resources/communication-toolkit/strategies-person-engagements-nonverbal-communication>

January 27th – Public Lectures & Communication

Small group feedback on public talks; Q&A with panel of visiting experts about press interactions and science journalism. To prepare, watch:

- Public Talk videos of all your classmates on Canvas

Panelists: Steve Depoe* (Communication Department Head); Chris Anderson* (Host, Science Around Cincy); John Lynch (Communication Faculty)

February 3rd – Sharing Science Workshop and Practicum

Workshop at the Cincinnati Museum Center led by Brian Pollock, Manager of STEM Resources for CMC; pairs of students will present prepared science kits to museum audiences. To prepare, read:

- Meet an 11 year old: <https://www.aldacenter.org/meet-11-year-old>
- At least one video from the WIRED 5 Levels Series: <https://www.wired.com/video/series/5-levels>

February 10th – Cincinnati Venues & Working with Community Partners

Discussion of the different venues for science engagement in Cincinnati and what types of projects are suited for them, followed by a Q&A with panel of visiting experts about how to effectively engage with community partner organizations. To prepare, read:

- Web research into facilities, programming, and staff of Cincinnati Museum Center, Cincinnati Zoo and Botanical Gardens, UC Field Station, Greater Cincinnati STEM Collaborative, and the Cincinnati Observatory
- Web investigation of other potential science engagement venues in Greater Cincinnati

Panelists: Curtis Webb (Project Coordinator, The Cincinnati Project); Brenda Hunda (Paleontologist and Curator, Cincinnati Museum Center); Amy Hunter (Program Director, The Mercantile Library)

February 17th – Working with Interdisciplinary Teams

Guidance on working effectively in an interdisciplinary team; formation and initial discussion of teams for Final Project. To prepare, read:

- Eigenbrode, Sanford D., Michael O'rourke, J. D. Wulforth, David M. Althoff, Caren S. Goldberg, Kaylani Merrill, Wayne Morse et al. "Employing philosophical dialogue in collaborative science." *BioScience* 57, no. 1 (2007): 55-64.

February 24th – Philosophy of Science: Methods

Discussion of how philosophy of science can influence technique and content of public engagement with science; brainstorming about how scientific practices and change can be communicated in public engagement. To prepare, read:

- "Opinion: Why science needs philosophy," Lucie Laplane, Paolo Mantovani, Ralph Adolphs, Hasok Chang, Alberto Mantovani, Margaret McFall-Ngai, Carlo Rovelli, Elliott Sober, and Thomas Pradeu, *Proceedings of the National Academy of Science*: <https://www.pnas.org/content/116/10/3948.full>
- Patrick Stokes, "Science communication and the public intellectual: a view from philosophy" https://jcom.sissa.it/archive/16/01/JCOM_1601_2017_C01/JCOM_1601_2017_C03
- Table of contents, *Recipes for Science: An Introduction to Scientific Methods and Reasoning*, Angela Potochnik, Matteo Colombo, and Cory Wright, 2018.

March 2nd – Site Visit Week

No class meeting. Project teams meet separately with their community partner organization to tour and discuss the site's needs and constraints and possible projects.

March 9th – Public Engagement Theory & Practice: Part 1

Discussion focused on theory behind and existing practical expertise bearing on public engagement with science; this will draw substantially from literature in science communication. To prepare, read:

- "Typology for Public Engagement with Science," Martin Storksdieck, Cathlyn Stylinski, Deborah Bailey http://www.aaas.org/sites/default/files/content_files/AAAS_Typology.pdf
- Chapter 6, "Getting Started with Public Science Communication" from *Science Communication: A Practical Guide for Scientists*, Laura Bowater and Kay Yeoman, 2012

March 16th – No Class, Spring Break

March 23rd – Public Engagement Theory & Practice: Part 2

"Jigsaw" activity to guide a discussion informed by students' different background research: small-group discussion with other students assigned the same reading, then small-group discussion with students assigned the other readings.

- Different papers on public engagement theory and practice will be chosen to compliment each team's interests and projects.

March 30th – Learner-Centered Education & Public Engagement

Discussion on how learner-centered pedagogical approaches can inspire new approaches to public engagement with science, and how to implement more public-centered features into a variety of types of engagement. To prepare, read:

- Melissa's Learner-Centered Education Handout
- "Drawing Lessons for Science Engagement from Learner-Centered Teaching," draft by Melissa Jacquart, Andrew Evans, Chris Rickels, Lucas Dunlap, and Angela Potochnik.

April 6th – Scientific Understanding & Public Understanding of Science

Discussion about the nature of scientific understanding and the goals for public understanding of science. To prepare, read:

- "Climate change denial and beliefs about science," Karen Kovaka, *Synthese*, forthcoming.
- "Why the Difference between Explanation and Argument Matters to Science Education," Ingo Brigandt (tentative)

April 13th – Assessing Success

Discussion of how to conduct assessment of public engagement projects; project teams develop their assessment plans.

- Survey of Understanding Science Instruments and Measures.
- Chapter 5, "Monitoring and Evaluating your Event or Activity", from *Science Communication: A Practical Guide for Scientists*

April 20th – Outreach Project Presentations

Project teams present about their public engagement project plans, goal(s) for the outreach, anticipated challenges, and assessment plans; big-picture discussion of the goals and challenges of public engagement with science.

- Teams develop presentation of their planned projects

By April 27th – Final Meetings / Presentation to Sites

Project teams conduct their science engagement activity, including assessment; submit their final project reports and course reflections.