



# SCIENCE AND CIVIC ACTION



## A SAMPLE SYLLABUS INCORPORATING DIALOGUE

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### **PURPOSE:**

This syllabus serves as an example of how to incorporate dialogue into a course through syllabus design.

### **TOPIC:**

Connecting to Content

### **CREATED BY:**

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### **COURSE DESCRIPTION:**

This course teaches students conceptual approaches and practical skills needed to effectively create change on science-based issues that impact our lives and communities. The course links science issues to our professional, personal, and civic responsibilities and equips students to help others make critical choices on divisive or complex science issues. Future scientists and engineers will acquire skills that build civic capacities, while students from the humanities and social sciences will learn skills indispensable for positive civic action. This course aims to strengthen inclusivity through pluralistic and dialogic approaches to science learning and civic action.



# Readings and Assignments

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## UNIT 1 – Civic Science: Science as a Resource for Civic Action

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September 5, 2017

### Creating a classroom in which we can thrive!

We will share an open, reflective conversation about who we are and what we care about.

Through dialogue, we will discuss what exemplifies your role in creating the best possible spaces for constructive learning experiences for you and your classmates. By doing so, we will better understand the life experiences that will allow you to thrive in the classroom and beyond.

September 7, 2017

### Civic Science: Science as a Resource for Civic Engagement, Civic Discourse and Civic Action

Concepts and principles of Civic Science. These are defined by an understanding that scientific knowledge, process and outcomes can be viewed as a force for societal change when coupled with civic action. Our conversation will touch on ways of bringing citizens together with scientists to engage in public work to solve grand challenges facing society today. We will share an open discussion about the broad spectrum of influences connecting science to our lives, our communities and our world.

#### Session Objectives

- Identify examples of “real-world” science issues that spawn conflict, inform civic action and engages Civic Science learning.
- Define Civic Science, describe its 3 key principles and how they may benefit society.
- Consider the appropriateness of Civic Science solutions for different settings, contexts and audiences.
- Understand the myriad ways in which science affects our lives through a personal lens.
- Understand examples of how we engage in public discourse and decision-making on science-based issues that impact our lives.

#### TRUNK REFLECTION #1: Reflections on the impact of science issues in our lives

Please share how your thinking has been shaped by the intersection between science, your life experience and the world around you? Please provide at least one specific example of a science issue that has shaped your thinking and explain how it has impacted your life and/or the life of others.

#### Readings:

1. Garlick and Levine, “Where Civics Meets Science: Building Science for the Public Good through Civic Science”
2. Spencer, J.P. “Reflections of a civic scientist”, In H. Boyte (Ed.), *Democracy's Education: Citizenship, Public Work and the Future of Higher Education.*, Vanderbilt University Press.

(<http://civic-science.org/wp-content/uploads/2014/09/Spencer-Reflections-of-a-Civic-Scientist-V3.pdf>)

September 14, 2017

### The Scientist as a Professional for Civic Problem Solving

Scientists are professionals; they do professional work. The role of professionals in a democracy is controversial. On the one hand, they have special privileges and powers that set them apart from other citizens. On the other hand, they may have special responsibilities and assets to offer the public. Civic science requires civic scientists, but how should they act? Should all scientists be civic scientists, or is there a specific role for professionals?

#### Readings:

1. Albert Dzur, *Democratic Professionalism*, Pages 35-51, 105-134. 173-204.



September 19, 2017

### Civic Science: Redefining the Role of the Scientist in Society

Civic Science seeks to redefine the role of the scientist in society by enabling scientists to participate as civic partners who can enhance public empowerment on science issues through an inclusive and pluralistic process. According to Pilke, these roles may include the “pure scientist” who does not get involved in decisions on science issues, the “science arbiter” who answers expert questions but does not help decide science issues, the “honest broker”, who lays out a range of options without intent to persuade and the “science issue advocate” who can weigh in to narrow the choices of the public decision-maker. Rather than prescribing the role and action that each scientist might choose, the individual scientist can choose from a range of options that will inform how they want to position themselves in relation to a particular issue.

We will discuss the framework that Civic Science provides for a scientist to choose from these active roles as appropriate to the context, choices and values presented by a science issue. We will then role play these roles to bring them to life on these issues.

#### Session Objectives

- Reflect on the multiple roles that scientists can play in society.
- Articulate the four idealized roles of science and scientists.
- Apply the four idealized roles to particular case studies.

#### TRUNK REFLECTION #2:

Reflect on an important science-based decision that that needs to be made on a particular policy issue that requires input from an individual scientist or from a science institution. Choose a particular, idealized “scientist” role (as suggested by Pilke) that a scientist might play that would play a positive role in this process. Describe what considerations would be important for a scientist to think about when deciding on this role and what would the consequences of this choice be for the scientist and/or the broader scientific enterprise.

#### Readings:

1. Pielke, R., Chapter 1- “Four idealized roles of science in policy and politics”, from *The Honest Broker: Making Sense of Science in Policy and Politics*.
2. Pielke, R., Chapter 2- “The big picture, science and democracy”, from *The Honest Broker: Making Sense of Science in Policy and Politics*.

September 21, 2017

### Who Controls Science? Can Science as a Politicized Enterprise Serve the Greater Good?

In the midst of a struggle to control science, the legitimacy of the sciences as governable and trust in the goals and practices of science may be at risk. The goal of this topic is to understand science as a politicized institution. This will help students understand that the scientific process is political in nature and will help you address the question if “this is a good or a bad thing?”

This class will begin with a brief overview of how science is structured into professional societies, university departments, government scientists and private science-based institutions. We will explore science as a meritocracy versus a democracy and discuss the role scientific journals play as gatekeepers of generalized knowledge. We will then explore the following generally accepted claims: science is value laden; science can generate objective knowledge; science is not immune to politics; science is accountable to society in some respects; science is largely autonomous; science is universal (not dictated by nation states, i.e. African vs British science). We will discuss if these claims are in contradiction.

#### Session Objectives

- Identify how science is institutionally organized.
- Describe institutions charged with ‘conducting, creating and funding’ science.
- Discuss responsibilities of scientists to make their findings available to the public and what safeguards are in place to assure this.



### TRUNK REFLECTION #3:

Prof. Krinsky makes the case that the moral autonomy of science, in which freedom of inquiry is expressed as a natural right, “does not precede the social context within which science is carried out but is derivative of it”. Please reflect on the degree to which science and those who investigate it, should be directly accountable to this social context and public interest? Share an example of how science agendas and priorities are set and what factors impact the production of scientific knowledge, and if you think that this is for better or for worse.

### Readings:

1. Krinsky, Sheldon, “Science, Society and the Expanding Boundaries of Moral Discourse” in Gavroglu et al, *Science, Politics and Social Practice: Essays on Marxism and science, philosophy of culture and the social sciences*, Kluwer Publishers, 1995, pp 113-128
2. Moreno, Jonathan, “Who Owns Science?”, in *The Body Politic: The Battle Over Science in America*, 2011.

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## UNIT 2 – Collective Action: Problems and Governance

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The aim of various forms of communication (scientific, deliberative, advocacy-oriented) is generally to change people’s minds about facts or values. However, on all scales—from a small group of friends to the human race—people also face problems of collective-action. These problems can arise even when there is no disagreement about facts or values. Collective-action problems prevent groups from attaining agreed-upon goals.

### Examples:

**Free riders:** It is often tempting to let other people carry the burden for a public good, in which case the good may not be provided even if everyone wants it. Examples range from a failure to clean the dishes in a shared house, to a decision not to vote and let others choose the government, to the refusal of nations to limit their carbon emissions.

**Arms races:** When individuals can make choices that protect them against their rivals or competitors, it is often in their best interest to defend themselves, even though all parties face costs and risks that would disappear if they agreed to disarm.

**Principal/agent conflicts:** An agent is someone whom a principal employs to take care of her interests. The agent (whether a doctor paid to take care of your body or a politician elected to promote the common good) often has interests in conflict with the principal.

**Arbitrary decision rules:** When people disagree, a rule that requires consensus sounds desirable but may actually favor supporters of the status quo. Majority-rule has a natural appeal, yet the majority can badly mistreat a minority. If a vote is close, it maximizes the number of people who are dissatisfied. It has been proven that no system for turning votes into decisions can simultaneously meet several obvious criteria. The choice of rule is thus somewhat arbitrary but determines the result.

In general, a solution to a collective-action problem is not a discussion leading to consensus, but bargaining and compromise leading to new rules. The task is governance rather than deliberation. Governance is relevant at all scales.

September 26, 2017

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### Collective Action Problems Seen Through the Work of Elinor Ostrom

A great theorist of collective action problems was Elinor Ostrom, the first woman to win the Nobel Prize in economics. Her work was scientific: she used experiments and was frequently funded by the National Science Foundation. She also studied the role of science in addressing public problems. Her view of active citizenship yields practical advice that can guide collective action. Her view of citizenship is also importantly different from the kind of theory that emphasizes dialogue and deliberation. It is much more about having appropriate rules in place than about discussing contested issues.



### Play a “Tragedy of the Commons” game- adopted from

[<http://www.paec.org/biologypartnership/assets/summer%202013/Tragedy%20of%20the%20Commons%20GoldfishActivity.pdf>]

Materials: goldfish crackers (“fish”); plastic bowls (“lakes”); “straws”

Each group of four people should sit in a circle around its lake, which contains nine fish to start. You must “fish” by sucking up the goldfish from the lake with straws. All groups fish for one minute while the teacher keeps time. Each student must take at least one fish during the minute. Then students put down their straws and the fish “reproduce”: each fish left in the lake produces two offspring, up to a total population of 16, which is the carrying capacity of the lake. Then you repeat fishing for another season until either three seasons are over or the fish run out. The winner is the student who has the most fish at the end.

Rounds:

1. Each group plays three seasons without talking.
2. Each group plays three seasons rotating one fisher at a time. That person may spend as little or as much time as she likes.
3. Each group plays three seasons and may talk before the game begins and during it.
4. Each group plays an unannounced number of seasons before I stop them. (Otherwise, like season 1)

Readings:

1. Hardin, Garrett “The Tragedy of the Commons,” *Science*, December 13:162 (1968), pp. 1243-4.
2. Ostrom, Elinor “*Covenants, Collective Action, and Common-Pool Resources*”

### **TRUNK REFLECTION #4:**

Please reflect on the following questions: Can people solve their own problems of collective action? To what extent does talking about such problems help solve them?

## September 28, 2017

### Science in a Democracy: An Uneasy Partnership

Science is a matter of expertise. Some people have expert knowledge in a given domain, while others do not. In modern democracies, science and expertise are often seen to be highly influential in political decision-making and socially prestigious. More fundamentally, science offers value by helping a society to understand and predict the world and by exemplifying certain virtues (e.g., critical thinking, shared knowledge, curiosity). But, occasionally, the democratic process rejects the advice of scientific experts or refuses to heed their warnings (climate change policy is an example in the US, while Brexit is an example the UK). In this session, we will consider why citizens might refuse to follow the advice of experts by considering two great thinkers: Plato and John Dewey.

Democracy is derived from the Greek ‘demokratia’ (δημοκρατία), which means people (demos) power or rule (kratos) by the people. However, Plato, the Ancient Greek philosopher, rejected democracy because he understood it to mean rule by the ignorant. Instead, he thought that a perfectly good society should be ruled by perfectly knowledgeable rulers (he called these people ‘philosopher kings’). In other words, Plato thought that knowledge or expertise is more important to good governing than receiving the support of the people who are being ruled. Technocracy is the name often given to this idea.

In contrast, Dewey, the great American philosopher, writing in the 1920s, worried that rule by the experts stifled the deep democratic practices of selecting ethical values and common projects via collective deliberation. In fact, he advocated for a version of democracy where scientific values (as opposed to scientific knowledge) would help citizens to make big decisions together. As a result, he rejected technocracy in favour of a deeper and richer notion of democracy.

We will use two analogies in Plato’s Republic (the analogy of the ship of the state and the allegory of the cave) and a chapter from Dewey’s *The Public and its Problems* to understand and criticize their respective views about the relationship between scientific expertise and democracy.

Readings:

Plato, *The Republic*, Book VI, (488e–489d) & Book VII, (514a–520d)



John Dewey, *The Public and its Problems* (1927), Chapter 5.

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## **UNIT 3 – The Civic Process: Civic Engagement in Science-based issues, Skills and Tools**

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### **Essential for Dialogue, Deliberation, Science Communication, Science Advocacy and Civic Action on Science Issues**

In this unit, you will learn skills and capacities to advance your communication, advocacy and dialogue and deliberation on science issues to work towards creating more democratic organizations, workplaces, and societies. These tools will allow us to respond when confronted with divisive science issues that involve dialogue, deliberation, discussion and consultation among family and friends, members, stakeholders, co-workers, and community members. Readings will provide the underlying knowledge and conceptual approaches that are based on research on science communication, dialogue, deliberation and advocacy. Students will learn hands-on skills in these areas through workshops and case studies, they will be supplemented with readings, that offer theoretical and applied background in each skill area. The goal is for students to understand how they can actively engage in science-based issues by applying practical civic skills needed to evoke change.

**October 3, 2017**

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#### **What makes a good radio podcast feature and how can you create one on a science issue?**

Our semester long project will be to create a compelling radio podcast on a story about a science issue that you care about. Imagine that you are a reporter for Tufts Radio News. You will begin to learn everything you need to create 4-6 minute audio feature piece about a science issue that impacts our lives that is of your choice. We will learn to appreciate what makes radio stories so effective. We'll talk about what makes a good radio story, how to approach subjects, how to gather compelling sound, how to structure and write broadcast scripts, how to voice and mix radio stories, how to do Q&As and how to share your work through podcasting. You will also will learn how to record a story by using equipment, recording interviews and sounds, basic interviewing technique and an introduction to Adobe Audition for logging sound.

Please see the PODCAST ASSIGNMENT posted on Trunk for all details about due dates and process.

Materials: Recorders may be checked out from the Ex College, Tisch Library or TUTV. You may also record with iPhones or other smart phones with quality recording capabilities. Audio editing will be using Adobe Audition on Tufts' computers.

#### **Readings:**

1. [Sound Reporting](#), Jonathan Kern.
2. [Out on the Wire, The Storytelling Secrets of the New Masters of Radio](#), Jessica Abel.

Other instructional resources:

[Transom Manifestos](#)

[HowSound podcast](#)

**October 5, 2017**

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#### **What is Dialogue and Deliberation and Why is it Needed?**

##### **Session Objectives**

- Demonstrate understanding of definitions of public dialogue and deliberation.
- Assess the strengths and weaknesses of different formats for dialogue and deliberation.
- Describe the features of deliberation on science issues that speak to both values and facts.

#### **Readings:**

1. NCDD, What are Dialogue & Deliberation? (here is the NCDD website link) <http://ncdd.org/rc/what-are-dd>
2. Gastil, Dialogue and Deliberation, Chapter #1

#### **TRUNK REFLECTION #5:**



How are dialogue and deliberation practiced in a group to which you belong? How democratic is it? Can you imagine a way that you might strengthen the roles of dialogue and deliberation in a group to which you belong?

October 10, 2017

### Designing Meaningful, Open and Humble Dialogue

Students will plan a structured, reflective dialogue as a model for public discussion and problem solving of polarizing, science-based issues. Students will propose guidelines for facilitating dialogue that build respectful conversations by listening with empathy and resilience and being curious about the lived experience of others.

#### **TRUNK REFLECTION #6:**

If you could pick one issue that impacts your life and on which you would like to have a "healing dialogue" with others, what would that be? Please reflect on the nature of that dialogue.

#### **Readings:**

1. Herzig, Assessing Ripeness and Promoting Readiness for Dialogue
2. Stains, R. "Repairing the Breach: The Power of a Healing Dialogue".
3. Handout on planning dialogue- Essential Partners, Inc.

October 17, 2017

### Civic Science Roundtable: A DNA Dialogue—Do You Want to Know Your Genome?

Shared learning about the topic of genetics in relationship to ancestry and race generates many questions, and requires an open-minded conversation that encourages perspective-based discussion. We will share a reflective dialogue to discuss the complex science of genetics, ancestry, and race that will speak to the life experiences of it's participants through the lens of the social and ethical implications of modern genome science. The dialogue will be preceded by a short overview of the science content related to DNA, our genome and how ancestry testing is performed.

#### **Session Objectives**

We will then participate in a facilitated dialogue that will engage diverse participants to:

- Discuss perspectives and life experience that speak to their understanding of the relationship between DNA, ancestry and race;
- Discuss their hopes and concerns about technologies such as DNA testing services that are meant to determine geographic or racial ancestry
- Explore how situations and experiences in their own lives that have affected their understanding of genetics and race; and
- Discuss the potential consequences of the racialization of findings that may be revealed through DNA ancestry testing.

#### **Readings:**

1. Stains, Cultivating Courageous Communities through the Practice and Power of Dialogue, Mitchell Hamline Law Review, Vol 42, Iss. 5, Article 5, 2016
2. Using Dialogue to Explore Genetics, Ancestry and Race, *The American Biology Teacher*, 2016.

#### **TRUNK REFLECTION #7:**

Read the insights and guidelines on the role of the facilitator in dialogue from Essential Partners that is attached here. Write about an example of a divisive or polarizing science issue that may offer opportunities to find common ground through dialogue.

What is polarizing and makes people reactive about this science issue? Explain why you think Structured Reflective Dialogue will be particularly important in deepening understanding, decreasing polarization and reactivity on the particular science issue you have chosen? Please comment on what your role as a facilitator in dialogue on such a divisive science issue would be (based on the attached reading).

October 19, 2017



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## Creating Equality and Respect in Dialogue: How to Deal with Difficult Dynamics

### Session Objectives

- Compare and contrast different types of interventions that can build shared understandings and solutions.
- Learn a range of research-based approaches to handling difference and conflict.

### TRUNK REFLECTION #8:

Situations arise in dialogue (or in our daily conversations) where individuals are triggered to respond in ways that cause fear, guilt, shame, blame, coercion, threat or open hostility. We often feel challenged to respond. This is true for conversations about divisive science issues, as well. Dr. Mark Brimhall-Vargas will discuss intervention strategies that will help us respond with consciousness, language, communication skills and use of power that enable us to remain human, even under such trying conditions.

Briefly describe an example of when you faced a difficult time responding to such a threat that arose in conversation because you felt unable to respond. If you can not think of such an experience, perhaps you can imagine one. What you have wanted to do in response but were not able to? I will send these to Mark and will ask him to tailor his teaching of intervention strategies to your interests so you will have hands-on tools to manage divisive and difficult conversations with others.

October 24, 2017

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## Dialogue and Deliberation in Civic Organizations, Communities, & Societies

How can we address differences and resolve conflicts fairly and effectively? We are confronted with this question repeatedly in our families and friendship groups, clubs, workplaces, and political institutions. In a democratic society, the answers often involve discussion and consultation among family and friends, members, stakeholders, co-workers, and community members. We will guide students to understand how deliberation can create more democratic organizations, workplaces, and societies when tackling divisive science issues.

### Session Objectives

- Learn a range of research-based approaches to handling difference and conflict through dialogue and deliberation
- Understand deliberation skills used by effective individuals, professionals, and members of the public in real-world situations
- Understand how to design ways to involve stakeholders and the public in conflict resolution and policy development
- Understand what is meant by “public deliberation”.

### Reading:

1. Levine, P, “Values: Collaboration, Deliberation and Civic Relationships” (page 35-63) from *We Are the Ones We Have Been Waiting For*

### TRUNK REFLECTION #9:

Please respond to the following prompt:

Would we have a better country if we deliberated more? And how can we make deliberation more common and important?”

October 26, 2017

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## Towards an Informed, Civic Science Conversation: How to Frame Issues for Discussion and Deliberation

An important question regarding democracy is if citizens have the ability to understand the complexity and uncertainty of issues that confront them or if this is the job of politicians and experts? Many believe that citizens need to develop enough understanding of issues to be part of the decisions that impact their lives. McAfee notes that citizens need not become experts to contribute, but need to acquire “public knowledge” that includes “constraints, consequences, trade-offs, competing values, aims and necessary sacrifices” to make choices on community issues. In this light, issue learning is a critical component of deliberation. In this class, we will learn how to “frame” issues for understanding as





part of the development of improved democratic skills and attitudes. Students will practice their capacity to write for understanding and implementation of policy issues grounded in science.

### Session Objectives

- Learn to thoughtfully review a current science issue and its portrayal in a variety of news outlets, across multiple perspectives.
- Understand how to frame and use issues from multiple perspectives in order to engage in an informed dialogue with peers on a current science issue
- Identify the barriers to knowledgeable discourse for the American public on issues of science, as well as the challenges that arise from an uninformed/misinformed populace.

### Readings:

1. “Making Sense of...New Research on the Diagnosis of CTE”: This includes a collection of short, online news paper reports (ie. New York Post) and television interviews about this topic that represent a diversity of viewpoints on this science issue. Prepared by Dr. Adam Gismondi of the Institute for Democracy & Higher Education.

### Assignment (due for November 2 class):

Using content aggregators and the concept of “wide news” sites, including <https://www.allsides.com/bias/bias-ratings> and <http://graphics.wsj.com/blue-feed-red-feed/>, choose a current science issue of personal and public interest, and do a deep dive on the topic. Once you have an understanding of the issue and useful perspectives and readings, write your own “Making Sense of”-style guide. Be sure to include summary bullet points, at least 4-6 recommended readings, and framing questions for discussion (modeled after the “Making Sense of...New Research on the Diagnosis of CTE” that you will work on in this class). This assignment will be submitted before the class on 11/2 so it can be discussed there.

## October 31, 2017

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### Podcast session #2: Broadcast interviewing, writing and structure of your “Science in Society Podcast”

We will discuss using the sound you’ve recorded to offer guidelines to write a compelling audio script, techniques for story voicing, and how to use Adobe Audition to mix an elegant, professional-sounding podcast.

After this class, you will write a script for your podcast, which should be between four and six minutes long (if you think the story needs to be longer, check first with Dr. Garlick, who is your podcast editor). If you wish, your podcast can include a Q&A, but it must also involve some reporting and scenes from “in the field,” and you must edit the Q&A to include only the most relevant and compelling discussion. Please see the PODCAST ASSIGNMENT posted on Trunk for all details about due dates and process.

## November 2, 2017

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### Issue Guide Workshop: Issue Learning as a Critical Component of Public Deliberation on Science Issues-

#### Session Objectives:

- Learn how to use the “Making Sense of...” style guides to engage with peers on an issue.
- Identify the decisions involved in framing an issue of public interest and the inherent biases and values underlying each choice.
- Discuss the responsibilities of the various stakeholders in public knowledge of current issues in science – journalists, scientists (and other experts), the general public, etc.
- Learn how to discern reliable, alternative perspectives in the media that represent a broad spectrum of opinions and beliefs that may or may not be recognized in the class.
- Develop an understanding of the ways issues can be framed and build your own skillset in this area, including the ability to better articulate your own perspectives.



- To critically analyze your own “Making Sense of”-style guide that you created for this class.

### **TRUNK REFLECTION #10**

Each of the issue guides you created is a compelling topic for dialogue. Some of you have asked to do so. First, you need to decide on a deliberative process to choose which of these topics would be most suitable for an in-class dialogue. As your Trunk reflection, please briefly share 1- Based on your understanding of deliberation, explain what you think would be a fair deliberative process for the class to make a decision about which topic to dialogue about and 2- which topic would you want to dialogue about and why?

November 9, 2017

### **Roundtable Dialogue: The Science and Governance of Human Gene Editing- Who Will Decide?**

Human genome editing is already widely used in basic research and is in the early stages of development and trials for clinical applications that involve non-heritable (somatic) cells. These therapies affect only the patient, not any offspring, and should continue for treatment and prevention of disease and disability, using the existing ethical norms and regulatory framework for development of gene therapy. Oversight authorities should evaluate safety and efficacy of proposed somatic applications in the context of the risks and benefits of intended use.

However, there is significant public concern about the prospect of using these same techniques for so-called “enhancement” of human traits and capacities such as physical strength, or even for uses that are not possible, such as improving intelligence. The recent National Academies report recommends that genome editing for enhancement should not be allowed at this time, and that broad public input and discussion should be solicited before allowing clinical trials for somatic genome editing for any purpose other than treating or preventing disease or disability. This class will explore both the science and public decisions that are needed to decide the future of this promising and life-changing technology.

#### **Session Objectives:**

- To understand the science underlying CRISPR gene editing and its relation to human health
- To aid students understanding of science-based issues that inform the societal impact of gene editing.
- To better understand the “call to action” that the NAS report offers as a blueprint for public engagement

#### **Readings:**

1. Human Genome Editing: Science, Ethics and Governance, National Academy of Sciences Report (2017)  
<http://www8.nationalacademies.org/onpinews/newsitem.aspx?RecordID=24623>

November 14, 2017

### **Advocacy and Science: A Powerful Mixture – Love Canal as Case Study in Civic Science**

#### **Session Objectives:**

- To understand the science underlying environmental hazards to human health
- To aid students understanding of advocacy work to advance social and economic justice on science-based issues.
- To better understand social change models and how to apply them to advocacy work.
- Discuss the role that science plays in advocacy work.
- To help students understand the power of information and science when used strategically.
- To help students understand the limits of science in providing answers to public policy issues.
- Learn to be aware of your personal values and how they affect your public advocacy work.

This class will address how advocacy moves issues to create change in society and what role science plays in this process. We'll discuss different theories of how change happens including a movement that believes that systemic change comes from the bottom up. Grassroots leaders believe that people plus organization equals power, more power than the money and influence that corporations bring to bear on elected officials. This grassroots strategy builds



power at the local and state levels in sufficient strength to influence federal representatives and policies. We'll also discuss where science fits into this theory of systemic change including how the strategic use of scientific information can lead to greater influence on issues that advocates are trying to move.

**Readings:**

1. Gibbs, L. Citizens Activism for Environmental Health: The Growth of a Powerful New Grassroots Health Movement. *Annals of the American Academy of Political and Social Science* 584, November, 2002.
2. Gibbs, L. When We Change The Climate - We Change the World, in *Tools for Grassroots Activists, Best Practices for Success in the Environment Movement*, edited by Nora Gallagher & Lisa Myers, Patagonia, 2016.
3. Lester, S. When People Lead Policies Follow, 23<sup>rd</sup> International Symposium on Halogenated Organic Pollutants and Persistent Organic Pollutants, August 29, 2003, Boston, MA.

## November 16, 2017

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### Advocacy Workshop: Advocating for Change on Science-based Issues From Conceptual Approaches to Practical Skills, Stephen Lester, Scientific Director, Center for Health, Environment and Justice

Mr. Lester will run this workshop based on his leadership of the Center for Health, Environment and Justice, where he works to prevent harm to human health caused by exposure to environmental threats. He will demonstrate examples of how coalition-building and one-on-one technical organizing and training can empower public action and decision-making that affects human health and well-being.

**Session Objectives:**

- Demonstrate how science can be used to empower leadership.
- Describe ways science can be used to influence advocacy and policy.
- Help students understand how science is used by different stakeholders to advance their goals.
- Identify competing goals and priorities and how these differences drive outcomes.
- Demonstrate the biases all stakeholders bring to a situation.

This session will build on the previous session and give students the opportunity to role-play and experience the complexity of science and advocacy in a real world scenario. Students will be divided into 3 groups and take on the role of being either a community member, a representative of a company that is suspected of causing pollution in the community or a government regulator. Students will be asked to work in one of these three groups in advance of the class and to address specific questions from their assigned perspective. Students will report back to the whole class. This will be followed by a facilitated discussion. This session will demonstrate the varied perspectives in play in real world situations and how these perspectives influence science outcomes and drive advocacy.

**Readings:**

1. Lester, S. Science Lessons for Community Organizations, Chapter 32 in *Organizing Handbook*, Center for Health, Environment & Justice, 2010.
2. Other links:
  - a. <https://www.ncbi.nlm.nih.gov/books/NBK201421/>
  - b. [https://link.springer.com/chapter/10.1007/978-1-4615-0569-3\\_8](https://link.springer.com/chapter/10.1007/978-1-4615-0569-3_8)
  - c. [http://www.jstor.org/stable/2387119?seq=1#page\\_scan\\_tab\\_contents](http://www.jstor.org/stable/2387119?seq=1#page_scan_tab_contents)

## November 23, 2017

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### Science Literacy- The Science of Science Communication

The goal will be to help students understand that science literacy is a complex field that provides the capacity to understand the nuances of how to communicate the important science-based issues of our times- from the laboratory to society. Students will first learn the academic underpinnings of the science communication field by reading seminal research papers in this social science discipline.

**Session Objectives:**

- Interpret seminal research studies related to the field of science communication as a foundational knowledge base for science communication skills.



- Interpret key readings from the National Academies of Sciences study on the science of science communication to discern that science is reproducible, evidence-based information that is fact and not opinion, and to understand the difference between these two.
- Students will understand science literacy as a “working language” of the basic scientific terminology needed to interpret the processes and outcomes of science.
- Students will improve scientific literacy by better understanding of the roles of science and the scientific processes in their lives.

#### Readings:

1. Dietz, T., “Bringing values and deliberation to science communication,” PNAS | August 20, 2013 | vol. 110 | suppl. 3 | 14081–14087- ([http://www.pnas.org/content/110/Supplement\\_3/14081.full.pdf](http://www.pnas.org/content/110/Supplement_3/14081.full.pdf))
2. National Academies of Sciences study on the science of science communication, 2016- Chapters 1

November 28, 2017

#### Community Organizing Workshop: Community Organizing for Civic Action

The role of the organizers is to create opportunities for a diverse group of stakeholders to come together, build a common vision of success, and foster collective action. As we have learned, dialogue and deliberation enable building coalitions of people who represent diverse populations and functions to guide the kind of change being sought. What comes next? We spoke about many stakeholders who influenced the opioid crisis and ended our dialogue by sharing what action we might want to take to effect change. With this in mind, let's continue this conversation by thinking about how we might take action through organizing on an issue you care about that can improve this crisis. Dr. Thomas will dedicate her class to discussing such organizing strategies tomorrow.

#### **TRUNK REFLECTION #11:**

Please share your thoughts about...

1. Pick a divisive science issue that you want to work on based on our discussions yesterday *and*
2. What outcomes would you hope to achieve.

Some ideas for such outcomes might include:

- Changing individual behavior (e.g., increasing the ability of people to talk despite differences).
- Bolstering existing or developing new networks (e.g., bringing together people directly effected by the crisis, nonprofit leaders, volunteers, people in local religious organizations, civic organizations).
- Changing public policy (e.g., changing an existing law, proposing and campaigning for new policies).

Keep in mind some of the Civic Science principles that we spoke about yesterday (refuting false claims, politicization of research findings and pharma, improving science literacy, confronting uncertainty of outcomes, dealing with unanticipated consequences of science information, flawed reporting of data, need for accurate media portrayal etc) as you formulate your responses.

December 5, 2017

WORKSHOP: Mixing your final Podcast- tips and guidelines?

December 7, 2017

#### SCIENCE COMMUNICATION WORKSHOP: Science Communication and Civic Science: Communicating Science-based Issues with Different Audiences and Stakeholders: Landing Your Message

Students will then learn to speak clearly about scientific work in terms that non-scientists can understand. This workshop will help students practice speaking in an understandable language with diverse listeners and at varied levels of complexity for different audiences.

#### Session Objectives:



- Discuss the importance of science literacy in the context of the wide variation of scientific knowledge across different populations and stakeholders.
- Demonstrate methods for ‘translating’ science for lay audiences.
- Understand how science and scientists can build the public’s trust to advance communication about science-based issues.
- Develop communication skills used for science issues in real-world situations.
- Produce messages that are grounded in communication research and theory and that are appropriately adapted to specific audiences and stakeholders.
- Understand how collaborators in Civic Science can become better storytellers in order to get their message out to support their advocacy on science-based issues.
- Learn social consequences of communication in active engagement with others.
- Propose how communication can contribute to social change on science issues.
- Produce messages that are grounded in communication research and theory.
- Assess audiences and adapt messages appropriately.

**TRUNK REFLECTION # 12:**

Policy makers and the public do not connect with charts and data that scientists use to communicate results, instead find them confusing and alienating. People everywhere respond to narrative, often known more simply as storytelling, and it appears to hold promise for explaining science-both its findings and its role in society-in a way that wide publics not only understand it but relate to it." (Kevin Finneran)

With this in mind, chose one specific science-related topic you feel strongly about (the topic could be the choice of your podcast, issue guide or something different). Write one concise paragraph in which you explain to your audience reading this why they should care about this topic. Write this knowing that the audience knows very little about this topic.

How did it feel to write this for this audience?