Welcome!
We will begin at 12:00 pm (ET)

You Have Two Choices for Audio:

Via Audio Broadcast (Default)
The Audio Broadcast will connect automatically, and the Audio Broadcast panel will appear: Listen through your computer speakers or headset.

Via Telephone or Computer
Select the phone icon below the participants list. Connect using computer audio or dial in using 1-866-469-3239, event number, and your attendee ID. Alternatively, select for WebEx to call you.

• Phone lines will be muted.
• Send questions to “All Panelists” via the Q&A panel.
• This webinar will be recorded.
Teaching Scientific Consensus for Toxicology and Public Health

Sponsored by FUTURE (Faculty United for Toxicology Undergraduate Recruitment and Education) Committee

February 23, 2022 12:00 Noon (ET)
Welcome

Katie Paul Friedman, PhD
US EPA

Jaime Mirowsky, PhD
SUNY, College of Environmental Science and Forestry
Webinar Objectives

- Empower undergraduate educators to pursue controversial topics by providing strategies for scientific discourse and critical evaluation of controversy.
- Communicate the rigorous processes that govern science to illustrate scientific integrity.
- Discuss incorporating tools such as debate and project-based learning into consideration of science topics.
Speakers

Catherine Morrison, PhD
Department of Communication Studies
Harrington School of Communication and Media
University of Rhode Island

Barbara Kaplan, PhD
Comparative Biomedical Sciences
Center for Environmental Health Sciences
Mississippi State University
Contextualizing Controversy: Using Argumentation and Debate in the Science Classroom

Catherine Morrison, PhD
University of Rhode Island
Department of Communication Studies
Overview

• Where I’m coming from: rhetoric, argument, science and publics
• Argumentation and debate in the classroom: understanding and engaging with controversies in context
• Basic guidelines and classroom examples
In the public understanding of science, rhetoric has two distinct roles. It is both a theory capable of analysing public understanding and an activity capable of creating it. […] Unless we analyse, we cannot understand the public interest; unless we turn analysis into activity, we cannot serve it.

Rhetoric: Not Actually Pejorative!

- Persuasive communication aimed toward changing, creating or strengthening belief for the purpose of judgment and action
- Arises under conditions of uncertainty
- Oriented toward others
- Aimed at relative, situational judgment
- Matters deal with shared politics, ethics and social propriety
- Our business is with what seems or is believed to be, not what is
Three Perspectives on Argument

• Argument as product: Making *an argument* (logical)
  – “A good argument is one in which a clearly stated claim is supported by acceptable, relevant and sufficient evidence.”

• Argument as procedure: Facilitating *argumentation* (dialectical)
  – “Good argumentation consists in the systematic organization of interaction (e.g., a debate, discussion, trial or the like) so as to produce the best possible decisions.”

• Argument as process: Having an argument/*arguing* (rhetorical)
  – “Good arguing consists in the production of discourse (in speech or writing) that effectively helps members of a social group solve problems or make decisions.”

Argument as “a process whereby people reason their way from one problematic set of ideas to the choice of another.”

1) An inferential leap
2) A perceived rationale to support the leap
3) A choice amongst two or more competing claims
4) A regulation of uncertainty
5) A willingness to risk confrontation of a claim with peers
6) A frame of reference shared optimally

Part II
Argumentation and Debate in the Classroom: Understanding and Engaging with Controversies in Context

One part of teaching is to present reasons. Another part of teaching is persuading students that the reasons have validity.

Deficit and Contextual Models of the Public Understanding of Science

Deficit model
• Scientific sufficiency and public deficiency
• Asymmetrical communication flows one way
• The public as passive
• The goal: appreciation
• Communication as cognitive
• Methods: surveys and media content analyses

Contextual model
• Interactivity between scientists and the public
• Symmetrical communication flows bi-directionally
• The public as active
• The goal: integration and action
• Communication as cognitive, socioethical and emotional
• Methods: case studies of specific situations

The Classroom Is No Different!

Deficit model
- [specialized field] sufficiency and [student] deficiency
- Asymmetrical communication flows one way
- The [student] as passive
- The goal: appreciation
- Communication as cognitive
- Methods: [various assessment metrics]

Contextual model
- Interactivity between [specialized field] and [student]
- Symmetrical communication flows bidirectionally
- The [student] as active
- The goal: integration and action
- Communication as cognitive, socioethical and emotional
- Methods: [situational exercises]
Benefits of Debate

• Understanding: Critical thinking and engagement
  – How to produce sound field-specific arguments
  – The procedures of scientific argumentation
  – The process of engaging with the public and serving its interests

• Acting: Inventive creation of argument and advocacy
  – Recognizing not just badly constructed, but *bad faith* argument and responding strategically
  – Designing engagements that enable audiences to make critical decisions through argumentation
  – Not just adapting to audiences, but genuinely hearing their concerns and imagining their perspectives

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Specific Benefits For the Science Classroom

• **Dealing with manufactured controversies**: Reframing questions and disproving accusations of closed orthodoxy

• **Teaching science controversies in context**: Exploring open questions and modeling the process of coming to consensus

• **Argument as inoculation**: Giving controlled, limited exposure to ideas and arguments to build student defenses

• **Depersonalizing through roleplay**: Representing a given position or perspective distinct from one’s own
We can try business as usual, with more desperate patching up as we go along, with rising polarization, instability, the devaluation of public discourse into "public relations," and social embrittlement of public decision processes generally…

Part III
Points of Practice: Integrating Debate Into the Classroom

…An alternative is to seek out the elements of current practices and approaches where critical dialogue of frameworks and mutual learning does seem possible, and to build upon these.

Debate Basics and Some Considerations

- A **constructive phase** to build one’s position and show proof
- An opportunity to **ask questions** of one’s opposition
- A **rebuttal phase** to respond to opposing arguments and comparatively appeal for one’s side
- A **judgment** phase to weigh options and decide
- Not necessarily two sides!
- Concrete situations and creative roleplay
- Considerations: Time, size, aim
Time, Size, Aim

• **Informal discussion**: Low levels of additional preparation, short time frame, loose structure, aimed at *exploratory thinking*

• **Guided class discussion**: Moderate additional preparation on part of instructor, longer time frame, intentional structure, aimed at *demonstrating/modeling processes of thinking and decision-making*

• **Substantial in-class exercise**: Specific preparation and organization, moderate time frame, clearly articulated structure, aimed at *applying knowledge and/or practicing a skill*

• **Extended-preparation assignment**: Long-term preparation on part of instructor and student, substantial in-class time, structured assignment, clear assessment, aimed at *researching, constructing, responding and performing*
Examples From My Classroom

- 400-level elective, mostly Communication Studies (BA) majors, some College of Environmental and Life Sciences, Health Studies
- Manhattan Project Fred Friendly Seminar
- One on one debate: “The COM455 Journal of Science should adopt a policy of open peer review, including but not limited to disclosure of author and reviewer identities”
- Simulated town hall: Niceville public school vaccination policy
- Propose, respond and discuss: Rhetorical interventions into public science controversies
Questions and Comments

- Please participate.
- Send to “All Panelists” via the Q&A.
Pursuing Research with Integrity on Controversial Topics: Marijuana in the Immune System

Barbara Kaplan, PhD
Center for Environmental Health Sciences
Department of Comparative Biomedical Sciences
College of Veterinary Medicine
Mississippi State University
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Conflict Declaration

Funding from Nanomedical Systems, Inc. (Austin, TX) but was not used to fund this work
Objectives

- Introduce Marijuana
  - Define
  - Scheduling
  - History and Controversy
- Regulations and compliance for research—provides credibility
- Kaplan lab marijuana research
  - Major findings
  - Significance

- Cannabinoid Science Communication
  - My path
  - My resources
    - Ones I have used
    - Ones I have provided
    - Ideas for the classroom
## Marijuana and Cannabinoids

<table>
<thead>
<tr>
<th>Plant-derived</th>
<th>Endogenous</th>
<th>Synthetic</th>
<th>Therapeutic</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Cannabis sativa</em></td>
<td>Arachidonic acid-like lipids that have affinity for CB1 or CB2</td>
<td>Synthesized as high affinity agonists of CB1 or CB2</td>
<td>Marinol (THC) – schedule III drug used for nausea and appetite stimulation (oral pill)</td>
</tr>
<tr>
<td>Over 60 cannabinoids</td>
<td>Involved in neurotransmitter release, temperature, appetite, mood, sleep</td>
<td>Some compounds used in K2/spice mixtures</td>
<td>Epidiolex (CBD) – unscheduled drug used for childhood epilepsy</td>
</tr>
<tr>
<td>Δ⁹-tetrahydrocannabinol (Δ⁹-THC) is primary psychotropic congener</td>
<td></td>
<td></td>
<td>Clinical trials: Sativex (THC/CBD)</td>
</tr>
<tr>
<td>Cannabidiol (CBD) is non-psychotropic</td>
<td></td>
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</tr>
</tbody>
</table>

**CB1–receptor in the brain**

**CB2–receptor in the periphery**
DEA Drug Scheduling

**Plant-derived**
- Cannabis sativa
- Over 60 cannabinoids
- Δ⁹-tetrahydrocannabinol (Δ⁹-THC) is primary psychotropic congener
- Cannabidiol (CBD) is non-psychotropic

**Synthetic**
- Synthesized as high affinity agonists of CB1 or CB2
- Some compounds used in K2/spice mixtures

**Endogenous**
- Arachidonic acid-like lipids that have affinity for CB1 or CB2
- Involved in neurotransmitter release, temperature, appetite, mood, sleep

**US Drug Scheduling**
- Schedule I – high addiction liability and no established medical use
- Schedule II
- Schedule III
- Schedule IV
- Schedule V

**Therapeutic**
- Marinol (THC)—schedule III drug used for nausea and appetite stimulation (oral pill)
- Epidiolex (CBD)—unscheduled drug used for childhood epilepsy
- Sativex (THC/CBD)

**US Drug Scheduling**
- Schedule I – high addiction liability and no established medical use
- Schedule II
- Schedule III
- Schedule IV
- Schedule V

**Clinical trials**
- Sativex (THC/CBD)
Marijuana–History (US) and Controversy 1

- Hemp, defined as containing less than 0.3% THC, was used extensively in the US since early 1600s
- THC-containing marijuana was being used extensively for various medical reasons by the late 1800s
  - It fell out of favor for more water soluble and potent opioids – invention of syringes
- 1937 – Marijuana Tax Act made possession and transfer of cannabis illegal at the federal level
  - Henry Anslinger took control of the Federal Bureau of Narcotics and launched a campaign against marijuana publishing “Marijuana: Assassination of Youth”
- After WWII, in the 1950s, marijuana use by young people was viewed negatively by adults
- 1960s saw a huge increase in popularity in recreational marijuana use that has not really waned too much since then
Marijuana–History (US) and Controversy 2

- In the mid 1970s ideas about marijuana decriminalization at state levels began
- In the late 1970s cannabinoid research around the world was increasing
- US FDA approved synthetic THC (Marinol) for nausea in 1986 then added cachexia and rescheduled it in 1992
- International Cannabinoid Research Society was established in 1992, right between the time that the two cannabinoid receptors were cloned
- Early 1990s to now individual states started to legalize marijuana for medical use or recreational use and/or legalize specific chemicals from the plant (i.e., CBD)
Challenges With Marijuana as Medicine or Recreational Drug—Adding to the Controversy

- Marijuana (THC) is psychotropic—you get high
  - driving issues
  - drug-free workplaces
  - adverse reaction for some users (i.e., the elderly and/or inexperienced)
  - addiction liability—cannabis use disorder
- Crude marijuana contains over 60 cannabinoids and hundreds of other compounds
- Although there are 2 known cannabinoid receptors, it is clear that other receptors must be involved in the effects
- Marijuana efficacy is highest when smoked
Marijuana Research in the US—Credibility

• Required approvals for labwork
  – Animal – Institutional Animal Care and Use Committee (IACUC)
  – Human – Institutional Review Board (IRB)
  – Biological samples – Institutional Biosafety Committee (IBC)

• Required approvals for marijuana chemicals
  – Marijuana is still illegal federally and is considered a Schedule I chemical by the DEA
    • State Schedule I registration
    • Federal Schedule I registration
Kaplan Lab Marijuana Research Highlights

• Contributed to the observation that cannabinoids are predominantly immune suppressive
• Contributed to understanding that cannabinoid compounds suppress critical immune proteins (cytokines) through inhibition of transcription
• Established that many marijuana compounds do not act in immune cells by binding the cannabinoid receptors–there must be other receptors to which they bind
• Demonstrated that there are differential effects of cannabinoids depending on the degree to which the immune system is activated
Significance of my Findings

Cannabinoids are immune suppressive:
Bad–susceptible to diseases
Good–autoimmune disease therapy

Cannabinoids are immune stimulatory:
Bad–allergy or autoimmunity development
Good–strengthen immunity
Cannabinoid Science Communication!

- I have a track record of researching marijuana
- There is LOTS of information about marijuana out there – much of it is misinformation, overstated information, or opinion rather than science-based fact
- Non-scientific sources being used more often than scientific sources
- Motivated by a missed opportunity
Science Communication Opportunities

• Training
  – Alan Alda Center for Science Communication at Stony Brook University
  – Communication departments at any institution
  – Scientific societies
  – Webinars

• Vehicles
  – Blogs, vlogs
  – Websites
  – Open access journal articles
  – Interviews—phone, live
  – Podcasts
  – Webinars, symposiums, workshops

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My Challenges in Talking About Marijuana

• I can be lighthearted and fun, but I take my work very seriously
  – Sometimes it is difficult to strike the correct balance
  – Depending on my audience one or the other persona might be more relatable

• It is often difficult to identify our own jargon
  – Someone once asked me “Why don’t you just call it pot?”
  – I think of “pot” as jargon but pot might be more relatable
  – I think of marijuana as more scientifically accurate and identifiable
  – How do you balance what is relatable to your audience with scientific accuracy?

• People with experience share their science or their stories
  – Helpful—sometimes
Preparation is Key

- Think about my audience
- Think about my goal
- Be ready to define terms I might bring up (psychotrophic – rewarding properties)
- Favor (stick to) the science but use metaphors so it’s relatable
- Be ready to provide my 10-second wrap up message
- Get feedback from friends or colleagues on what they thought of my article or interview
- Allow myself to “fail”
- Practice!
Metaphor Examples

- If marijuana and associated chemicals are immune suppressive and anti-inflammatory then I might say they act like Ibuprofen (Advil)
- If I am talking about receptors and ligands there is a classical example of a lock and key to describe that interaction
- I have also used unlocking a cell phone as a metaphor for the ligand (your fingerprint) engaging the receptor (unlocking the home button) and that interaction triggering cellular signaling changes (gives you access to your apps)
- Define efficacy as effectiveness
Controversial Questions

• Be prepared; have an answer ready
• Some possible questions:
  – Do you smoke pot?
  – Is marijuana good or bad for you?
  – Do you think marijuana should be legal?
• Don’t be afraid to redirect the conversation back to the goal of your communication piece
• If it’s difficult to provide a clear yes/no answer be specific about why
Ways to Talk About the Science of Cannabinoids in your Classes

• Peer review of scientific literature as compared to Google search
  – Compare facts, compare sources
  – Can you identify a trusted internet source? On what do you base that?
• Project-based learning
  – Incorporate the scientific method into critical review of a science paper
  – Present a problem and have the students provide an experimental approach to address that problem
  – Talk about scientific controls that are necessary
  – Identify the challenges of approving marijuana for medical versus recreational use
• Debate
  – Should marijuana be legal?
  – Is marijuana safe?
  – Should marijuana compounds be developed as a drug or drugs?
  – Should marijuana be used for Multiple Sclerosis (or other disease?)
  – Should marijuana use (recreationally or medically) be limited to certain age groups?
Open Access/Science Communication about Marijuana and its Chemicals

We've seen CBD marketed as a cure for anything from anxiety to cancer. Now, some companies say it will fight cold and flu. Scientists say there's actually evidence against that claim.

Immune Responses Regulated by Cannabidiol

Abstract

Introduction: Cannabidiol (CBD) is a non-psychoactive, non-psychoactive component of the cannabis plant that has been receiving a lot of attention for its potential health benefits. CBD is a naturally occurring compound found in the cannabis plant and has been studied extensively for its therapeutic properties.

Research has shown that CBD may have potential health benefits for a wide range of conditions, including anxiety, inflammation, and pain.

Cannabidiol History and Therapeutic Uses

Cannabidiol (CBD) is a plant-derived compound that has structural similarities to the primary psychoactive compound in marijuana, tetrahydrocannabinol (THC). While THC is known for its psychoactive effects, CBD is not psychoactive and is generally considered to be safe for consumption.

CBD has been shown to have potential therapeutic effects on a range of conditions, including anxiety, inflammation, and pain. Research suggests that CBD may be effective in treating conditions such as epilepsy, chronic pain, and anxiety.

CAUTION: Before using any products containing CBD, it is important to consult with a healthcare professional to determine if CBD is right for you and to ensure that it is safe to use in conjunction with any medications you may be taking.

Get the latest news and updates on cannabis research and legislation from the Society of Cannabis and Psychoactive Plant Sciences (SCPP). Join us today and stay informed on the latest developments in the cannabis industry.
Resources

- Kaplan Sci Comm/Open Access
  - https://scicomm.plos.org/2018/07/05/cbd-is-certainly-a-big-deal/
  - https://scicomm.plos.org/2017/10/25/marijuana-more-than-just-the-high/

Questions?
Discussion
Upcoming SOT Activities of Interest to Undergraduate Educators and Students
For Undergraduate Faculty

- Education Poster Session (Monday)
- Undergraduate Educator Network Meeting (Monday 4:00 pm)
- 3 Communication/Education Sessions
- Other scientific and poster sessions
- Networking

Proof of Covid vaccination required onsite. Scientific sessions will be live-streamed and recorded for registrants. Poster sessions and networking events are onsite only.
Double Feature: Improving SciComm Skills through Creative Storytelling and Novel Presentation Delivery, Plus an SOT 2022 Three-Minute Thesis (3MT)

Monday, March 28, 2022
9:15 AM to 12:00 noon PT

Chair: Sumira Phatak
Co-Chair: Virunya Bhat

- Maximizing Your Impact as a Science Communicator and Writer, Jennifer Loukissas, NCI
- Translating Science into “Edutainment” on YouTube, Podcasts, and Other Media, David Faulkner, PAX labs
- A Practical Guide to Creating Beautiful and Professional Figures, Shiz Aoki, BioRender
- “Three-Minute Tox”: The GSLC 3MT Competition, Samira Phatak, University of California, Irvine

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Communicating Science in an Age of Misinformation and Mistrust

Wednesday, March 30, 2022
8:00 AM-10:45 AM

Chair: Courtney Sulentic, Wright State University
Co-Chair: Barbara Kaplan, Mississippi State University

• Introduction, Courtney Sulentic, Wright State University
• Talking about Toxicology: Some Tips for Explaining the Frustrating Scientific Gray Areas, Barbara Kaplan, Mississippi State University
• Using the SOT-NCABR Partnership to Communicate Toxicology to Faculty and Undergraduates, Antonio Baines, North Carolina Central University
• The Pen is Mightier: How to Leverage your Technical Expertise is SciComm, Lauren Walker, Rutgers, The State University of New Jersey
• Navigating the Risk Landscape: How to Combat Misinformation with Science, Alison Bernstein, Michigan State University
• Understanding the Social Context is Critical for Communication about Environmental Justice Issues, Charles Lee, US EPA
Publishing Educational Toxicology Exercises in CourseSource: A Step-by-Step Workshop for Preparing Your Manuscript

Monday, March 28, 2022
1:45 PM to 4:30 PM PT

Chair: Joshua Gray
Co-Chair: Lauren Aleksunes

- Introduction to CourseSource, Erin Vinson, University of Maine, Orono
- Pick Your Poison: A Semester-Long Toxicology Project Integrating Toxicology Core Concepts and Scientific Communication, Joshua Gray, US Coast Guard Academy
- Repurposing Drugs as Countermeasures for Chemical Weapons: An Interactive Training for Undergraduate Students, Lauren Aleksunes, Rutgers, The State University of New Jersey
- A Case Study Approach to the One Environmental Health Hypothesis, Mindy Reynolds, Washington College
- Step-by-Step Workshop for Preparing Lesson Manuscript for Publication in CourseSource, Erin Vinson, University of Maine, Orono
Other Educator Events

Monday, March 28
4:30 PM-5:30 PM
Undergraduate Educator Network Meeting

Tuesday, March 29
9:00 AM-10:45 PM Author Attended
Education, Ethical, Legal, and Social Issues Poster session

Use the SOT Online Planner to develop your meeting schedule.
Toxicology Curriculum Webinar

A Culmination of Core Concepts to Teach Toxicology

April 11, 2022
12:00 noon-1:00 pm ET

Facilitators

Joshua Gray, PhD
US Coast Guard Academy

Mindy Reynolds, PhD
Washington College

Nimrat Obhi, PhD
Beyond Benign
Faculty Grant Applications Due April 8

Search “Awards” at [www.toxicology.org](http://www.toxicology.org)

- **Undergraduate Faculty Research Grant**
  - Up to $1500 for undergraduate student research

- **Undergraduate Faculty Development Grant**
  - Up to $1500 to support a professional development experience that will support recruitment of undergraduate students to toxicology
Undergraduate Student Events

Undergraduates Receive Complimentary Registration!

Undergraduate Education Program Sunday 8:00 am-5:00 pm (onsite only)
  • Introduction to toxicology topics
  • Focus on graduate school preparation, meet with academic program representatives
  • Students are in mentoring groups

Student/Postdoctoral Mixer Sunday 7:30-9:00 pm

Undergraduate Student Meeting Tuesday 12:30-1:30 pm

…and more!

Proof of vaccination required onsite. Many scientific sessions live-streamed and recorded for registrants. Poster sessions and networking events are onsite only.
Diversity in Toxicology Discussion
Undergraduate Students and Faculty Encouraged to Attend!

February 23
12:00 noon-1:00 pm ET via Zoom

Speakers include:
Antonio Baines, PhD, North Carolina Central University
Schantel A. Bouknight, DVM, PhD, Diplomate AVP, Charles River
Checo Rorie, PhD, North Carolina A&T
Kristen Ryan, PhD, DABT, National Toxicology Program
Robert Casillas, PhD, ATS, Latham BioPharm Group
Undergraduate Educator Network Webinars

Thank you for participating today!

Please provide feedback via the link sent by email.


Questions? Contact bettye@toxicology.org.