

# Making a Case for Ourselves: Boundary Objects in STS Critical Pedagogy

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# Timing: 10am-11:45am (EST)

10am: Quick ground rules, overview of boundary objects, waterfall (5 minutes)

10:05: Zoom: 5-7 minutes Presentations (40 minutes total) [POST LINK TO [spatial.chat](https://spatial.chat)]

10:45: Brainstorm 10 minute mapping and free writing wherever folks are comfortable, and get situated in Spatial Chat groups

10:55 Wordcloud shareout if time permits-->25 minute small group reflection and sharing

11:20: Report back for 25 minutes

# Boundary Objects

## Definition:

“Those scientific objects which both inhabit several intersecting social worlds ... *and* satisfy the informational requirements of each of them. Boundary objects are objects which are both plastic enough to adapt to local needs and the constraints of the several parties employing them, yet robust enough to maintain a common identity across sites. They are weakly structured in common use, and become strongly structured in individual-site use. These objects may be abstract or concrete. They have different meanings in different social worlds but their structure is common enough for more than one world to make them recognizable, a means of translation. The creation and management of boundary objects is a key process in developing and maintaining coherence across intersecting social worlds.” (Star & Griesemer, p 393)

S. L. Star & J. R. Griesemer (1989) “Institutional Ecology, 'Translations' and Boundary Objects: Amateurs and Professionals in Berkeley's Museum of Vertebrate Zoology, 1907-39” *Social Studies of Science* 19:3, 387-420

## Waterfall Prompt:

What kinds of boundary objects do you use to make a case for yourself as an STS educator?

# Marisa Brandt

## Teaching Context for STS Writing Instruction



MICHIGAN STATE UNIVERSITY

### Lyman Briggs College



ABOUT

FUTURE STUDENTS

CURRENT STUDENTS

FACULTY & STAFF

ALUMNI & FRIENDS

# CELEBRATING 50 YEARS

of bridging the sciences and humanities



LYMAN BRIGGS COLLEGE  
1967-2017



Word cloud of  
1st year student  
intended majors

# Mission and Vision

**Mission:** Lyman Briggs College is a residential, undergraduate-focused learning community dedicated to innovative and inclusive teaching, research, and engagement with science in its diverse human, social, and global contexts.

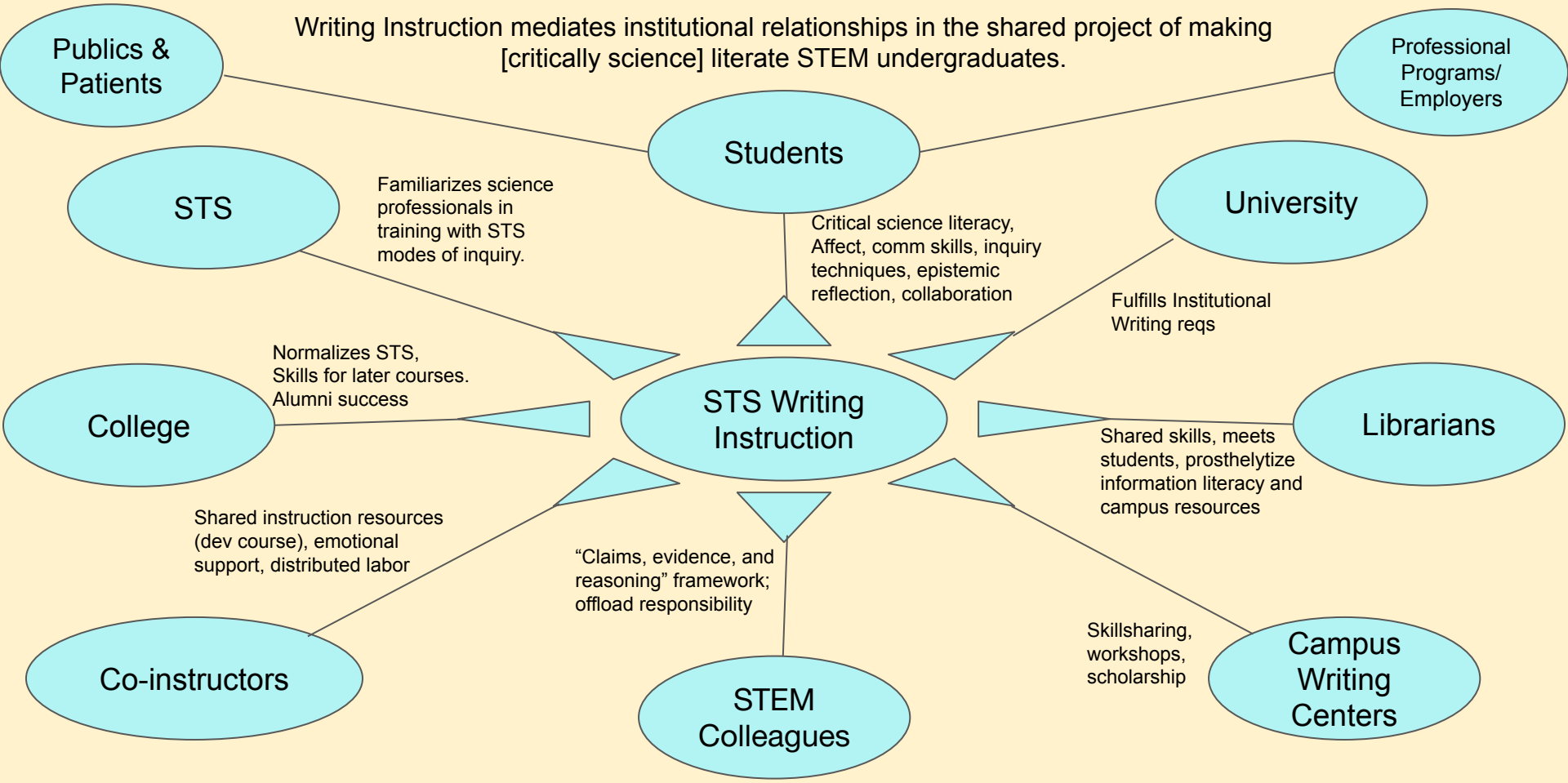
**Vision:** Lyman Briggs College will transform what it means to be a scientist. Through teaching and research, interdisciplinary collaboration, and a culture of support, inclusion, and mutual respect, Lyman Briggs will build a world in which:

- Everyone can see themselves as active participants in the exploration of scientific knowledge.
- Greater inclusion and participation strengthens the knowledge gained from scientific research and practice.
- Scientists are well-rounded, critical, compassionate thinkers deeply engaged with the human, social, and global dimensions of their work.



# STS Writing Instruction as Boundary Object

Writing Instruction mediates institutional relationships in the shared project of making [critically science] literate STEM undergraduates.



# STS Methods as Writing Instruction Course Design

## Making Translators of Scientific Cultures

LB 133  
Intro to the History, Philosophy &  
Sociology of STEM:  
Science and Culture

### Course Structure: Science & Culture

Assessment	Science Studies Content Learning Goals	Literacy & Writing Skills Learning Goals
<b>Part 1 - Cultures of Science</b>		
<b>Personal Writing 1: Personal Statement [STEM Ed Op-ed]</b> Short form writing from scientific subject position.	Reflect on evolving identity, role, and responsibilities in scientific culture.	Diagnostic for answering questions, supporting a claim, providing evidence, structure, and clear writing.
<b>Scientific Sites Portfolio</b> Collaborative investigation of how a local lab produces knowledge.	Understand scientific practice, reasoning, and communication in its diverse social, material, and cultural contexts. Demystify labs and humanize scientists.	Making observational field notes. Reading scientific papers. Peer review. Claim, evidence, reasoning. Writing analytical essays based on observation.
<b>Part 2 - Science in Culture</b>		
<b>Unpacking a Fact Poster</b> Partner project assessing validity of a public scientific claim.	Understand the mediation of science and how to evaluate scientific claims. Identify popular conceptions of science and contrast these with scientists' practices.	Following sources upstream. Comparing sources. APA citation style. Visual display of info on a poster.
<b>Perspectives Portfolio</b> Collaborative investigation of a debate concerning science in Michigan.	Identify and analyze how diverse stakeholders are included in and/or excluded from science. Recognize value of diverse perspective.	Find, use, and correctly cite primary and scholarly secondary sources from different stakeholder perspectives. Learn communicating to a broader audience in an online platform.
<b>Personal Writing 2: Letter + PS Revision</b> Sharing a course takeaway with someone.	Reflect again on evolving identity, role, and responsibilities in scientific culture.	Final assessment of answering questions, supporting a claim, providing evidence, structure, and clear writing.
<b>Weekly Formative Assessments</b>		
<b>Discussion Activities</b> Pre-meeting writing about the readings	Reflect on prompted aspects of science and culture	Writing as critical inquiry. Note-taking. Preparation for discussion.
<b>Curiosity Colloquium responses</b> 200 words reflecting on weekly speaker series	Exposure to college, campus, and academic guests—including diverse science professionals—who share their curiosity and career story.	Writing as reflection on presentations and their personal value. Some presenters share research and writing skills.



# Personal Statement Assignment Directions

## PROMPT

Write a short essay, then meet with me for a short conversation. Think of this essay as an opportunity to introduce yourself, and share how your goals, values, and experiences make you who you are. This assignment will be used as "diagnostic" of your writing. So please use a thesis, paragraphs, transitions, and other standard writing elements you have learned from your past education. The diagnostic will be used to give you initial feedback on first-year writing skills.

## STEPS

1. Write a 500-600 word (~2 double-spaced pages) personal statement with a thesis, structured into paragraphs, that answers the prompt question, "Why do you want to continue your science education?"

In order to support your answer, address the following (in whatever order flows best for you). Draw on stories from your life as evidence to support your answers.

1. What does "science" mean to you? (Provide a personal definition)
2. What makes you curious about science?
3. What are your personal learning goals? Why do you think it is valuable for someone with those goals to study science?
4. What are the one or two most important opportunities or experiences you have had that shaped your interest in continuing your science education?
5. Who is your role model (living, historical, or fictional) for the kind of science professional you want to become? What do you admire about them? By science professional we a person who creates, applies, or shares scientific knowledge as their main occupation.
6. What does it mean to you to be a trustworthy science professional? In what ways do you hope that continuing your science education will help you become one?

2. Submit the essay in the [D2L dropbox](#)

3. Schedule and hold a conversation with your professor (weeks 2 - 4). We will provide an easy way to sign up for a time. During this short conversation, we will talk about your personal statement and your writing experience. More importantly, it is a great chance to get to know your professor and for your professor to get to know you.

## CRITERIA

This project is less about earning a grade and more about practicing several necessary skills in the process of us getting to know one another. Your instructor will give you writing feedback about your essay so that you can apply those lessons to future work, but the main objective is to establish clear expectations and lines of communication with one another.

# Personal Statement Rubric

Course: LB 133 - Dev Course

Criteria	Proficient	Satisfactory	Developing	Problematic	Criterion Score
Main Claim	2 points Makes a statement at the beginning of the essay that provides a bold, specific, and clear answer to the question "why do you want to continue your scientific education?" that is well-supported by the rest of the content.	1.8 points Makes a statement that provides an answer to the question "why do you want to continue your scientific education?" that is supported by the rest of the content.	1.5 points Makes a statement that provides an answer to the question "why do you want to continue your scientific education?" that is somewhat vague or unrelated to the rest of the content.	1 point No clear answer to the question "why do you want to continue your scientific education?"	/ 2
Evidence	1.5 points Provides specific personal details and examples to clearly answer the questions and support the thesis.	1.35 points Provides details and examples to answer the questions and support the thesis. Some evidence could be more detailed.	1.125 points Missing meaningful evidence to address several questions. Evidence may not be entirely relevant or coherent.	0.75 points Missing evidence to support claims.	/ 1.5
Completeness and organization.	1 point Clearly addresses all prompt questions in a logical order.	0.9 points Addresses all prompt questions, though details or structure could be clearer.	0.75 points Missing some required answers.	0.5 points Missing significant components.	/ 1
Style	0.5 points Clear, grammatical, proofread prose that advances the writer's purpose.	0.45 points Mostly clear prose that advances the writer's purpose.	0.375 points Errors and sentence-construction intermediately make prose difficult to read.	0.25 points Many grammatical errors and typos.	/ 0.5

Total

/ 5



# MISSOURI S&T

Kate Sheppard:  
History of Science and  
Engineering Student  
Engagement

History? STS?

Critical thinking about  
the world and its  
problems?

Communication skills?

Real world, experiential, transactional learning

60% of the course grade in total

Smaller assessments along the way that will add up in the end

Content gap

Sources

Analyzing Wikipedia itself as a source (ethics, inclusivity)

Final deliverable

They become the experts

Millions could see their work

Global could wait until I was ready. Testing global partnerships was terrifying and was supposed to occur after thoroughly studying up; testing to learn flew in the face of training in how to proceed as a scholar.

"What led a bunch of crazy people to devote so much of their time and energy to helping students gain new forms of knowledge that might be called 'international'?" - Gary Lee Downey & Kacey Beddoes (2010, p.3)

**Good and Great**  
"The very best faculty, students and staff are going to want to live, work and study at institutions in which they can believe wholeheartedly; institutions that are both outstanding and ethical; institutions that are excellent, but excellent for a purpose." - UVA President Jim Ryan 06/2019

**Globalist  
or  
International  
Education?**

...The two-semester senior-level courses allow students to do research on a topic of their choice as long as it addresses an ethical, social, or policy issue related to a technical project they are working on with an advisor in their major. A second premise of the UVA senior thesis is that it recognizes that ethical issues in engineering practice do not arise abstractly or theoretically or in a vacuum...engineers need concepts and language with which to analyze social context. The field of STS provides concepts and methods that help to do just this. (NAE 2016, pgs. 11-12)

# Counting Work

**3 Sections**  
33 students  
99 research papers  
15 pages  
12 citations  
\*\*  
**1 section**  
10 students  
5 international guests  
2 reports

Quality of work is:

- Practically?
- Politically?
- Positionally?

**Quantified  
Teaching /  
Research /  
Work /  
Self**

90/10  
40/40/20

\*\*

90/10/30  
40/40/20

Who evaluates and where does power lie in evaluation?

# Biases & Stereotypes between US and Chinese Students

## US student views on China



## Chinese student views on US

- Fruitful ideas
- Democratic
- Critical thinking
- Open-minded
- Gun violence
- Racism
- Disagreement with Chinese values





## JOHN J. REILLY CENTER

SCIENCE · TECHNOLOGY · VALUES

### Undergraduate Programs:

- Dual Degree Program in Engineering and Arts & Letters
- Science, Technology and Values Minor (STV)
- Health, Humanities & Society (launching this fall)

### Graduate Programs:

- PhD Program in History and Philosophy of Science
- GLOBES Graduate Certificate in Environment and Society

# STS role in STEM education (and beyond!)





Still from *Hedgehog in the Fog*, Soyuzmultfilm, 1975.



## Questions for discussion:

- What are your structural challenges?
- How do these impact your teaching, your research, your job satisfaction?
- What strategies do you use to mitigate these?
- Which have worked for you, which not so much and why?



GINA CODY  
SCHOOL OF ENGINEERING  
AND COMPUTER SCIENCE

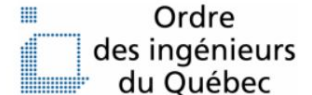
## Centre for Engineering in Society



GINA CODY  
SCHOOL OF ENGINEERING  
AND COMPUTER SCIENCE

MONTREAL, QC, CANADA

Our programs are accredited by:



**3.1.2 Problem analysis:** An ability to use appropriate knowledge and skills to identify, formulate, analyze, and solve complex engineering problems in order to reach substantiated conclusions.

**3.1.8 Professionalism:** An understanding of the roles and responsibilities of the professional engineer in society, especially the primary role of protection of the public and the public interest

**3.1.9 Impact of engineering on society and the environment:** An ability to analyze social and environmental aspects of engineering activities. Such ability includes an understanding of the interactions that engineering has with the economic, social, health, safety, legal, and cultural aspects of society, the uncertainties in the prediction of such interactions; and the concepts of sustainable design and development and environmental stewardship.

**3.1.10 Ethics and equity:** An ability to apply professional ethics, accountability, and equity.



..... in the presence of these my betters and my equals in my Calling, bind myself upon my Honour and Cold Iron, that, of the best of my knowledge and power, I will not henceforward suffer or pass, or be privy to the passing of, Bad Workmanship or Faulty Material in aught that concerns my works before mankind as an Engineer, or in my dealings with my own Soul before my Maker.

MY TIME I will not refuse; my Thought I will not grudge; my Care I will not deny towards the honour, use, stability and perfection of any works to which I may be called to set my hand.

MY FAIR WAGES for that work I will openly take. My Reputation in my Calling I will honourably guard; but I will in no way go about to compass or wrest judgement or gratification from any one with whom I may deal. And further, I will early and warily strive my uttermost against professional jealousy and the belittling of my working-colleagues in any field of their labour.

FOR MY ASSURED FAILURES and derelictions, I ask pardon beforehand of my betters and my equals in my Calling here assembled; praying that in the hour of my temptations, weakness and weariness, the memory of this my Obligation and of the company before whom it was entered into, may return to me to aid, comfort and restrain.

## **Mini-Assignment: Value-Laden Designs**

(I'm indebted to Kristen Koopman for the initial version of this exercise!)

**Efficiency for the student.** Students are overworked: most have heavy course loads and many work long hours in addition to taking classes. The pandemic has made this situation even worse for many people. Students should be able to demonstrate their understanding of course material efficiently, without unnecessary effort on their part.

**Fun for the student.** Education should be a joyful experience. Courses that are enjoyable will not only be more pleasant for students, but will also result in better learning outcomes. Demonstrating new knowledge should be fun for students, not stressful or frustrating.

**Upholding the reputation of Concordia University and the Gina Cody School.** Engineering programs in Canada are subject to formal, external accreditation reviews to ensure that graduates have a sufficient knowledge base to succeed as professional engineers. Informally, an institution's reputation can influence students' decisions about applying to or attending the school, and professors' decisions about whether to apply for or accept a job. The ways that students are evaluated in engineering courses must contribute positively to maintaining institutional reputations.



A quick guide to get oriented:

- You only see and hear those you are in close proximity--the "spatial" part of this platform. Chats can be local (pops up from your icon) or global (see side menu to right)
- Drag your image over to the blue bubble you find most appealing. Make your own group if you'd like. Just in case, an additional 'room' is also accessible from the side menu
- 11:20a or when asked, meet back at the "Gathering Space" for sharing. Quee up at the 'mics'.to indicate you'd like to speak.

Quant/Qualifying  
'work'

Engagement

Accreditation

STS Writing  
Instruction

Gathering  
Space



Institutional  
Locations for  
STS

deliberations  
popular  
health  
meetings  
social  
years  
literature  
salon  
physical  
design  
around  
centered  
audience  
works  
related  
views  
human  
science  
scientific  
ultimate  
summarizing  
term  
counts  
responsible  
syllabi  
guess  
found  
salon  
general  
different  
personal  
teaching  
news  
metaphor  
ecological  
ideas  
fiction  
infrastructure  
classrooms  
weeds  
ethics  
discuss  
thing  
public  
restoration  
useful  
terms



# Spatial Chat

<https://spatial.chat/s/STSCriticalPedagogy2>

# Quick notes on prior meetings not incorporated into plan

- Does it matter for strategy whether we have a sort of STEM/Engineering pair and a pre-med/science/mixed pair of panelists?
- Do we want to develop the experience as a starting point for longer term engagement (or data collection) that would turn into...something like a paper, ongoing conversation, or future panel?
- Would it be helpful to start putting together a resource list on enabling or constraining factors for critical, innovative, liberatory, or {pick your theory} pedagogy to share among ourselves and then with the audience?

# Spatial Chat

Congratulations on creating your new space "STSCriticalPedagogy2" on SpatialChat!

Use the following link to enter your Space as well as invite your friends:

<https://spatial.chat/s/STSCriticalPedagogy2>

**Generated password for your space:**

b9aRf

**Space Management**

To manage your Space, use the Admin SECRET link below:

<https://spatial.chat/s/STSCriticalPedagogy2?password=b9aRf>