Communicating Science

Syllabus

"We have also arranged things so that almost no one understands science and technology. This is a prescription for disaster. We might get away with it for a while, but sooner or later this combustible mixture of ignorance and power is going to blow up in our faces." — Carl Sagan

Course Description. For students seeking to develop practical skills in communicating science across broad platforms. Students will be asked to think critically about science outreach strategies and actively participate in class discussions. Course topics include science writing, crafting effective presentations, matching audience and form, and using online media for science communication. The course will culminate in student-led science communication projects. *Prerequisites: 100 level majors science class.* 3(3-0) credits. Course Format: Synchronous Online.

Course Meetings.

Monday, Wednesday, Friday   11:30 am – 12:20 pm   *Online: Canvas*

Instructor.   Dr. Mackenzie Gerringer   ISC 255   gerringer@geneseo.edu

Office Hours.   Mon. 1:30–3:30 pm, Fri. 1:30–2:30 pm, and By Appointment

Office hours are your time for getting questions answered, course expectations clarified, advice on pursuing opportunities or careers in science and more! Office hours will be held on Zoom, accessible through our Canvas course page. Please email me (gerringer@geneseo.edu) or chat before/after class if you have questions or would like to set up a meeting outside of office hours.

Course Materials. Our course will be conducted through Canvas with course meetings held over Zoom. Our required course textbook is *Writing Science*. Joshua Schimel, 2011.

There is a digital copy available through the library course reserves. This eBook is limited to three users at one time, so please log out when you are finished with the reading for that day. We will explore additional readings, videos, and podcasts, all provided via Canvas. Please note that readings may be subject to change given current events: you will be given as much notice as possible about any changes. Any course software and websites will be free to access. You are encouraged to seek and interact with science media on your own throughout the semester, including reading science news and blogs.

Learning Objectives

Throughout this course, we will:

- Learn and implement inclusive, accessible ways to communicate science to diverse audiences.
- Understand and use storytelling techniques across multiple platforms.
- Gain confidence, experience, and practical strategies for presentations.
- Hone writing, editing, and peer review skills.
- Develop strategies for the critical consumption and evaluation of science news.
- Engage with new and creative outlets for science communication.

How this course fits into your biology education...

This course will help you work toward the following Biology Program Learning Outcomes:

- *Biology Learning Outcome 3.* Students will be able to communicate biological ideas from literature or their own laboratory investigations to audiences of biologists and non-biologists in a variety of formats including written reports, poster and oral presentations. *Level:* Mastery.
- *Biology Learning Outcome 4.* Students will recognize the importance of scientific integrity and ethical research and applications of biology to science policy. They will be able to work independently and in teams for life-long learning. *Level:* Mastery.

"It would be possible to describe everything scientifically, but it would make no sense; it would be without meaning, as if you described a Beethoven symphony as a variation of wave pressure."   *– Albert Einstein*

Course Expectations.

Much of the value of this course will come from our in-class activities and discussions. Therefore, online attendance is expected when possible and active participation will be part of your course grade. If you cannot join a synchronous class session, please plan on participating in our discussions on Canvas and/or completing an alternative reading and response. Please reach out to me to discuss potential or needed extended absences. The earlier you get in touch about questions or concerns, the more options we will have.

For nearly all course assignments, you will focus on a science topic of your choosing. You will read and evaluate primary literature on the topic, then synthesize your knowledge in writing, illustration, and presentation. Further details on expectations, strategies, and resources will be provided in class and on Canvas. Please do not hesitate to reach out if you have any questions.

Options for our COVID-19 discussions. We will have the opportunity to discuss some of the science communication and social challenges that have been highlighted in the COVID-19 pandemic. The pandemic has impacted us all, in ways deep and personal. While current events are important to discuss and understand, it can be very difficult to participate in academic conversations about crises we are still enduring. If you need to step away from or sit out a discussion on the pandemic, you may do so without penalty. In these cases, there will be an alternative reading and short response on the topic you will complete instead. It is your responsibility to ask for the alternative assignment by the end of the day of our discussion. Please let me know if you have questions or concerns regarding the difficult topics we will address this semester.

Assignments & Grading.

Course grades will be based on the following assignments, out of a total of 300 points. Detailed expectations, rubrics, and further resources are available on Canvas. Further details and resources will be provided during our class meetings.

Introductions   Sept. 4th   *10 points*

Compose one thoughtfully-written paragraph introducing yourself and your interests in science and your goals.

Semester Topic Proposal   Sept. 18th   *20 points*

    Write a two-paragraph summary of your semester topic, referencing at least one scientific journal article you will use as a source. What scientific questions would you like to investigate this semester?

Mini-Paper   *80 points*

    Write a mini-literature review on your topic from three studies, developing best practices in science writing. The paper will be short to give you time to thoughtfully revise your writing.

Three References	Sept. 25th	*15 points*
Mini-Paper Introduction	Oct. 5th	*10 points*
Mini-Paper	Oct. 14th	*15 points*
Mini-Paper Peer Reviews	Oct. 19th	*10 points*
Revised Mini-Paper	Nov. 6th	*30 points*

Skills Brief Presentations   Throughout the Semester   *20 points*

    Practice your presentation strategies by teaching the class a science communication skill! Topics and basic materials will be provided, communicate the information in a format of your choosing. Sign up for a topic on Sept. 4th.

Infographic   Oct. 23rd   *25 points*

    Create a beautiful and informative infographic to visualize your topic. The infographic should be clear and well-supported with scientific evidence.

Elevator Pitch   Oct. 30th   *20 points*

    Use short-form communication to distill your topic, pitch your project, and engage your audience. Record your talk and write a short reflection on what you learned from watching the recording. Present your pitch during our class meeting.

SciFi as SciComm Response   Dec. 11th   *10 points*

    Write a short response to a piece of science fiction or climate fiction and reflect on its potential and limitations in communicating science.

SciComm Project   *75 points*

How will you communicate your topic beyond written papers and presentations? Define your audience and design a SciComm project to engage them with your topic. You will give a talk during the final period, introducing your topic and summarizing your project. Students who wish to may work in pairs for the final project; see instructor for expectations.

Project Update	Nov. 13th	*15 points*
Project Post	Nov. 20th	*10 points*
Final Talks	Dec. 16th	*40 points*
Final Talk Reviews	Dec. 17th	*10 points*

Participation   Every Class   *40 points*

Earn full credit for participation by attending class and engaging in discussions and activities to the best of your ability. You will not be evaluated on whether your insights are "right" or "wrong" during discussions, think critically and be actively involved. If you are unable to join a synchronous session, contribute to the Canvas discussion board on that topic. Please reach out if you have questions or concerns about participation expectations!

Resources & Policies.

Geneseo Mission and Values. SUNY Geneseo has several core documents that articulate our shared commitments and learning objectives. These include:

- SUNY Geneseo Mission, Vision and Values: https://www.geneseo.edu/about/mission-vision-and-values
- Community Commitment to Diversity, Equity, and Inclusion: https://www.geneseo.edu/diversity/commitment
- Geneseo Learning Outcomes for Baccalaureate Education: https://www.geneseo.edu/provost/globe-geneseo-learning-outcomes-baccalaureate-education

Academic Support Services. The campus provides a range of support services to help students thrive in their classes. These services include: Tutoring, both drop-in and by-appointment, with student tutors in the Writing Learning Center, the Math Learning Center, and a range of department-based tutoring centers

- Online tutoring through the SUNY-wide STAR-NY system (www.starny.org/tutoring_schedule)
- Supplemental Instruction, in which trained student assistants review lecture material from specific classes. Information on times and locations is available through the Center for Academic Excellence website at https://www.geneseo.edu/academic-support-services.

Additionally, the college offers a number of peer mentoring programs that are designed to reinforce good academic habits. These include:
- Academic Peer Mentors in the Office of Academic Planning and Advising provide students with promising study strategies and can host on-going appointments with students seeking an "accountability buddy". More information is available at: https://www.geneseo.edu/dean_office/academic-peer-mentors-0.
- The ONYX Academic Success workshop series sponsored by the GOLD Leadership Program introduces students to a variety of study skills, time management techniques, and instruction on how to access campus resources for academic and career guidance. A full list of GOLD workshops can be accessed at https://www.geneseo.edu/gold/app/browse.
- Tutoring, both drop-in and by-appointment, with student tutors in the Writing Learning Center, the Math Learning Center, and a range of department-based tutoring centers

Library Research Help. Geneseo's Library staff has created online research guides, self-help databases, and are available for individual consultation. Research Librarians are available for walk-in consultations and students may request appointments with staff experts in particular fields. Full information on library research resources, hours, and consultation options is available at www.geneseo.edu/library/ask-us. Students, faculty, and staff will be able to schedule research consultations with librarians via Zoom or another medium, using the same link as in past semesters: geneseo.edu/library/researchconsultations In lieu of in-person drop-in hours, the librarians are staffing LibChat, a service that allows for online, chat-based synchronous communication. LibChat is available Mondays–Fridays. Access it by clicking on the green owl icon, which is located throughout the library website. While electronic resources will continue to be accessible, Milne's physical collection will have limited access. Faculty, staff, and students are encouraged to use IDS to borrow materials from other libraries. For information about IDS and library services as a whole, see geneseo.edu/library/library-service-information The librarian for our course is Dr. Jonathan Grunert, grunert@geneseo.edu.

Academic Integrity and Plagiarism. The library offers frequent workshops to help students understand how to paraphrase, quote, and cite outside sources properly. With your Topic Proposal submission, you'll be asked to complete the Avoiding Plagiarism Tutorial on Canvas to help clarify expectations. These sessions are meant to educate about the importance of using original ideas and language, and how to incorporate paraphrases and quotes into writing. The complete list of library workshops can be found at www.geneseo.edu/library/library-workshops.

Academic dishonesty includes cheating, knowingly providing false information, plagiarizing, and any other form of academic misrepresentation, including self-plagiarism. Academic dishonesty will not

be tolerated in this course. College policies and procedures regarding academic dishonesty are available at www.geneseo.edu/handbook/academic-dishonesty-policy.

Computer and Technology Support. To help reduce the spread of COVID-19, the CIT HelpDesk will not be available for walk-in appointments this fall semester. Contact us at 585-245-5588 and our HelpDesk technicians will help you over the phone or schedule a follow-up appointment if necessary. Individuals looking to borrow equipment such as video adapters, cameras, projectors, and laptops will be able to do so from the Library Service Desk.

Getting Help from CIT. For the fastest response to technical questions or issues, please call the CIT HelpDesk at 585-245-5588. If you are unable to reach us by phone, please leave a voicemail, and we will follow up within one business day. You can also submit a ticket through the CIT Service Desk Portal. If you prefer, for non-critical issues, you may also submit a ticket via email at helpdesk@geneseo.edu.

For assistance with your computer or mobile device, visit the CIT HelpDesk in Fraser. CIT provides self help guides on a range of computer issues, including access to the campus network, Canvas, printing, software guides, and other resources. The CIT Self Help Guides at wiki.geneseo.edu/display/cit/CIT+Self+Help can be helpful in finding quick solutions to basic technology issues.

Geneseo students, faculty and staff have FREE access to the entire LinkedIn Learning training library (over 7,500 courses, including tutorials for software, digital tools, web development, programming, and design) through Geneseo's site license. For more information, visit this wiki page. (https://wiki.geneseo.edu/display/cit/LinkedIn+Learning+Training+Library)

Course Accessibility. SUNY Geneseo is dedicated to providing an equitable and inclusive educational experience for all students. The Office of Accessibility will coordinate reasonable accommodations for persons with documented physical, emotional, or cognitive disabilities, as well as medical conditions related to pregnancy or parenting. Students with letters of accommodation should submit a letter to each faculty member at the beginning of the semester and discuss specific arrangements. Please contact the Office of Accessibility Services for questions related to access and accommodations.

> Office of Accessibility Services
> Erwin Hall 22
> (585) 245-5112
> access@geneseo.edu
> www.geneseo.edu/accessibility-office

All course materials are available on Canvas and I've made every attempt to ensure that they are accessible to everyone. If you have difficulties accessing any materials (including needs for alternative formats), please let me know as soon as possible and I will rectify the situation.

Attendance at "Live" or "Synchronous" Online Sessions. Accessing course materials online may be challenging—we've all experienced things like unforeseen emergencies and internet

disruptions. Although this course centers on "live" or synchronous course activities, we can all be understanding about the challenges posed by the COVID-19 pandemic and the limits of technology. If you miss a synchronous session, please let me know as soon as possible so that we can discuss ways to keep you on track. If you are experiencing longer-term disruptions, please be proactive in communicating with me and contact the Dean of Students if you expect to be out for an extended period of time.

Getting Help with Online Classes. CIT has developed a number of [resources that can help you formulate good strategies for success in online courses](). These include general strategies for keeping on track with your courses as well as more specific resources about learning experiences that you may encounter in an online course. The Office of the Dean for Academic Planning and Advising has also introduced the new [KOALA (Knights' Online Academic Learning Assistance)]() course support resource. Throughout the semester, if you need help with online learning strategies, you can contact the KOALA support desk, which will assist you with identifying resources and strategies for success.

[CIT also provides a range of technology support resources](). When you are in Canvas, the Help menu on the left side of the screen will also direct you to a number of CIT supports, including self-help resources and options to request technology assistance.

Religious Observations and Class Attendance. Student attendance in classes on religious holidays is governed by New York State Education Law 224-a (see https://www.geneseo.edu/apca/classroom-policies). Students who anticipate an absence due to religious observations should contact their faculty member as soon as possible in advance to arrange make up plans.

Bias-Related Incidents. "We are here to listen, to learn, to teach, to debate, to change, to grow. We should all be safe to pursue these goals at SUNY Geneseo while being who we are. Together, we commit ourselves to pluralism, cultivating a community that respects difference and promotes a sense of inclusion and belonging."

As this excerpt from our Community Commitment to Diversity, Equity, and Inclusion states, here at SUNY Geneseo, we want to provide a space where everyone feels welcome to learn and grow in their identities as well as in their role as students, faculty, and staff. If in the unfortunate instance you experience an incident of bias, we encourage you to reach out to the Chief Diversity Officer (routenberg@[geneseo.edu]()) and/or our University Police Department. In trying to create an environment that facilitates growth through diverse thoughts and ideas, reporting incidents of bias—including threats, vandalism, and microaggressive behaviors—can help bring a better understanding of our campus climate as well as provide opportunities for learning and restoring harm. Hateful speech or actions will not be tolerated in our class.

Student Well-Being is a priority in this class, to support the achievement of academic goals and alleviate stress. Eating nutritious foods, getting enough sleep, exercising, avoiding drugs and alcohol, maintaining healthy relationships, and building in time to relax all help promote a healthy lifestyle and general well-being. Concerns about academic performance, health situations, family health and wellness (including the loss of a loved one), interpersonal relationships and commitments, and other factors can contribute to stress. Students are strongly encouraged to communicate their needs to faculty and staff and seek support if they are experiencing unmanageable stress or are having

difficulties with daily functioning. Please feel free to reach out to me if you have questions or concerns. The Dean of Students (585-245-5706) can also assist and provide direction to appropriate campus resources. For more information, see www.geneseo.edu/dean_students.

Mental Health Resources. As a student, you may experience a range of challenges that can impact your mental health and thus impact your learning; common examples include increased anxiety, shifts in mood, strained relationships, difficulties related to substance use, trouble concentrating, and lack of motivation, among many others. These experiences may reduce your ability to participate fully in daily activities and affect your academic performance.

SUNY Geneseo offers free, confidential counseling for students through the Lauderdale Center for Student Health and Counseling, and seeking support for your mental health can be key to your success at college. You can learn more about the various mental health services available at health.geneseo.edu.

Health and Wellbeing in a Stressful Time. The changes brought on by COVID-19 have impacted us all in a number of ways, and will continue to do so at various times and to varying degrees during the upcoming semester. Your health and wellbeing are foundational to your ability to learn, and if you find that you are feeling unwell (physically or mentally) and it is impacting your ability to complete your coursework, please reach out. Because the learning environment will be different than it has been in the past, the indicators that usually let you know something is wrong may not be as clear to you or those around you as they would be during a typical semester. Additionally, the ways in which you normally engage in self-care may have been disrupted. Please remember that it's never too late to ask for help. The Dean of Students (585-245-5706) can assist and provide direction to appropriate campus resources. The college also has collected resources in a Coping with COVID webpage.

In a similar way, I may occasionally ask for some patience and flexibility on your part. The pandemic is affecting faculty as well as students and creating demands that would not be present in an ordinary semester. You will never suffer any disadvantage in the course because of delays on my part. Remember that we are all in this together.

Parents. Students who are parenting will be supported in this class. I ask that all students work with me to create a welcoming environment that is respectful to all forms of diversity, including diversity in parenting status. All exclusively breastfeeding babies are welcome in our class sessions as often as is necessary. For older children and babies, I understand that unforeseen disruptions in childcare and pandemic-related changes often put parents in the position of having to miss class to care for a child. While not a long-term childcare solution, occasionally bringing a child to class to cover gaps in child care is perfectly acceptable. If babies and children come to class, I ask that you be mindful of your video and microphone on Zoom to avoid disrupting learning for other students. Finally, I understand that often the largest barrier to completing your coursework as a parent is the tiredness many parents feel in the evening once children have gone to sleep. While I maintain the same high expectations for all students in my classes regardless of parenting status, I am happy to problem-solve with you in a way that makes you feel supported as you strive for school-parenting balance.

Food Security. SUNY Geneseo students who find themselves in a position of food insecurity and do not have the financial resources to support their food and nutrition needs can access the Geneseo Groveland Food Pantry located at the First Presbyterian Church, 31 Center Street in Geneseo.

Students can utilize the pantry once with no referral or contact with the College. At this visit they will be provided items that will address their basic needs for several days. If a student continues to face difficulties providing for their own nutritional needs beyond their first visit to the pantry they should connect with Susan Romano, Director of Financial Aid to receive a brief letter that they will present to the staff at the pantry that verifies their need. If students do not have a FAFSA on file for any reason they should contact Dr. Leonard Sancilio, Dean of Students, to discuss their particular situation and options. The Geneseo Groveland Food Pantry is open on the following days and times:

Tuesday: 10 AM–2 PM
Wednesday: 4 PM–6:30 PM
Thursday: 10 AM–2 PM

If you have any questions please contact Dr. Leonard Sancilio, Dean of Students at: sancilio@geneseo.edu or 585-245-5706.

US Election Day. Please note that Tuesday, November 3rd is Election Day in the US. Due to the pandemic, mail-in voting is the safest way for you to vote in the 2020 election. Most states already have mail-in voting in place, without a need for an excuse (or COVID-19 is an acceptable excuse). Visit vote.gov to register and for further information.

BIOL 388: SCIENCE COMMUNICATION

SCHEDULE

Week 1: Communicating Science

Aug. 31	Welcome to Communicating Science	
Sept. 2	The Scientific Method	*Schimel Ch. 1*
Sept. 4	Perceptions of Scientists	
	Due: Introductions	

Week 2: The Audience

Sept. 7	*Labor Day, No Classes*	
Sept. 9	Knowing Our Audience	*Schimel Ch. 20*
Sept. 11	Meet Them Where They Are	*Hendricks, The Conversation*

Week 3: Story

Sept. 14	Story	*Schimel Ch. 2*
Sept. 16	Narrative: Dr. Lytton Smith	*Schimel Ch. 3*
Sept. 18	Storyboarding	*Schimel Ch. 4*
	Due: Semester Topic Proposal	

Week 4: Writing & Rewriting

Sept. 21	Science Writing	*Freeling et al. 2019, PNAS*
	Bring an Example Scientific Paper	
Sept. 23	References & Reference Management	
Sept. 25	Revision, Concision, & Critique	*Schimel Ch. 16*
	Due: Three References for Mini-Paper: Annotated	

Week 5: Writing & Rewriting

Sept. 28	Titles, Openings, & Jargon	*Schimel Ch. 5*
	Bring Example Paper to Class	
Sept. 30	*No Classes*	
Oct. 2	Challenge & Action	*Schimel Ch. 6 & 7*

Week 6: Writing & Rewriting

| Oct. 5 | The Resolution | *Schimel Ch. 8 & 9* |

Due: Mini-Paper Intro

| Oct. 7 | Distilling, Not Dumbing Down: Dr. Lytton Smith |
| Oct. 9 | Communicating Risk & Uncertainty | *Schimel Ch. 18* |

Week 7: Data Visualization

| Oct. 12 | Ethics in Science Writing | *Schimel Ch. 10 & 11* |
| Oct. 14 | The Power of Visualization | *Schimel Ch. 12* |

Due: Mini-Paper

| Oct. 16 | Infographics | *BBC Infographics Guide* |

Bring Example Infographic to Class

Week 8: Public Speaking

| Oct. 19 | Figure Building | *Schimel Ch. 17* |

Due: Mini-Paper Peer Reviews

Download or Update R & R Studio for Class

| Oct. 21 | Public Speaking | *Science Talk* |
| Oct. 23 | Performance Workshop | *Schimel Ch. 13* |

Due: Infographic

Week 9: Presentations

| Oct. 26 | Sound Bites & Elevator Pitches | *Schimel Ch. 14; Two minutes* |

Watch an Example Science Talk

| Oct. 28 | Conference Talks | *Schimel Ch. 15* |

Bring a Joke

| Oct. 30 | Talk Tips |

Due: Elevator Pitch: Recording & Reflection

Week 10: Science News

Nov. 2	Science Journalism	*Schimel Ch. 19*
Nov. 4	The Same Old Story	*Black Hole Readings*
Nov. 6	Science Blogs

Due: Revised Mini-Paper

Week 11: Communication, Controversy, & Crisis

Nov. 9	Climate Change	*IPCC Report for Educators*
Nov. 11	Climate Change in the News	
Nov. 13	Discussion: COVID-19, Communication, & Crisis	*Yong, The Atlantic*
	Due: SciComm Project Update	

Week 12: Digital Media

Nov. 16	Social Media for Science Communication	*Science Twitter*
Nov. 18	Apps & Games	
Nov. 20	Discussion: Digital Tools	*Vosoughi et al. 2018*
	Due: SciComm Project Post	

Week 13: Documentaries

Nov. 23	Documentaries
Nov. 25–27	*Thanksgiving Break – No Classes*

Week 14: Museums & Beyond

Nov. 30	Science Museums	*Henson 2007*
Dec. 2	Children's Books	
Dec. 4	Unconventional Avenues for Science Communication	
	Optional: Project Updates & Presentation Draft	

Week 15: Science Fiction & Science Communication

Dec. 7	Science Fiction as Science Communication	*GATTACA (Film)*
Dec. 9	Climate Fiction	
Dec. 11	Discussion: SciFi/CliFi as Communication Mechanisms	
	Due: SciFi/CliFi Response	

Week 16: The Resolution

Dec. 14	Reflection: Communicating Science	*Schimel Ch. 21*
Dec. 16	Project Presentations, 3:00 – 5:30 pm	
	Due: Final Talk Slides; Final Projects	
Dec. 17	Due: Final Talk Peer Reviews	