

## The Changing Arctic: Arctic Ecology in the 21<sup>st</sup> Century



The Arctic is Earth's most rapidly warming biome. It is also home to massive carbon reservoirs and diverse biological adaptations to extreme elements, as well as oil extraction and vanishing sea ice. We will examine how climate change is impacting the biodiversity, ecophysiology, and biogeochemistry of this crucial biome, and as a result, the rest of the world.

### COURSE LOGISTICS

Instructor: Prof. Mary Heskel (she/her); [mheskel@macalester.edu](mailto:mheskel@macalester.edu)

Class: Mod 2, MTWRF 9:30-10:45 AM Central. All meetings through Zoom link. See schedule for more details on day-to-day schedule and synchronous/asynchronous breakdown.

Office Hours: Tuesday/Thursday, 10:45AM-12PM (right after class)

Texts: All readings, articles, and media will be made available through Moodle. No text to purchase.

Email Policy: I will respond to emails promptly between 9AM-5PM on weekdays; emails received after 5PM will be answered the following morning. I often cannot answer emails over the weekend, so please plan accordingly. If a Zoom meeting is easier than email, let me know.

Out of class work expectations: Readings and daily assignments should take ~1-2 hrs. Longer assignments and group work may require more time to be scheduled. If you are having trouble working in a group setting due to work or class scheduling conflicts, let me know.

Developing your voice in science: Science requires a balance of courage and humility – this is as true for undergraduates as it is for researchers at leading institutions. You need courage and confidence to pursue and develop new ideas and approaches, confidence to critique others' ideas, confidence to follow your curiosity. But science also requires humility – identifying limitations, asking for advice, help and guidance, accepting appropriate criticism from others, and reflecting on improvement. As you develop your thoughts and opinions in this class, be mindful that we are also collectively creating a supportive, inclusive community of learning.

YES, WE ARE STILL IN THE MIDST OF A GLOBAL PANDEMIC, A NATIONAL RECKONING ON RACE, AND A TUMULTUOUS PRESIDENTIAL TRANSITION. THIS COURSE IS ADAPTED FROM ITS FIRST ITERATION IN SPRING 2019, WHICH WAS IN PERSON, AND HONESTLY, A TON OF FUN AND ONE OF MY FAVORITE CLASSES AT MACALESTER SO FAR. SO, LET'S TRY TO MAKE THE MOST OF A CHALLENGING SITUATION, KEEP OPEN LINES OF COMMUNICATION TO ADAPT THE CLASS AS NEEDED, AND BUILD A COMMUNITY. I RECOGNIZE THAT FEW OF US ARE OPERATING AT REGULAR FUNCTIONING AND ATTENTION LEVELS, PLEASE REACH OUT IF YOU FIND YOURSELF IN NEED OF ADDITIONAL SUPPORT AND FLEXIBILITY BEYOND WHAT IS CURRENTLY OFFERED. ADVOCATE FOR YOUR NEEDS, THE ANSWER WILL ALWAYS BE "YES". PRIORITIZE TAKING CARE OF YOURSELF. LET'S LEARN, PRACTICE, AND GROW.

### LEARNING GOALS

As an upper-level biology course, Arctic Ecology aims to challenge students to improve their science communication skills through varied written, spoken, and visual presentations. Students will also be challenged to synthesize content across systems and create novel hypotheses about current and future impacts of change at a species, community, ecosystem, and landscape scales.

1. Interpret, critique, and evaluate scientific and general audience articles.
2. Connect major drivers of environmental and ecological change in the Arctic and hypothesize outcomes based on theory, first principles, and experimental evidence from the literature.
3. Deeply consider and evaluate topics of interest in Arctic Ecology through targeted and analytical synthetic reviews of different topics via ArcGIS StoryMaps.
4. Identify recent issues in the Arctic and interpret for a general audience.
5. Write about complex scientific concepts in multiple tones and voices for different audiences.
6. Build confidence in discussing concepts in class, asking probing questions, and encouraging the engagement of peers.
7. Effectively communicate ideas through conceptual diagrams, writings, visual and spoken presentations.
8. Build community with peers online, create an environment of learning that de-emphasizes individual success and promotes collective support.

### ASSESSMENTS

**Weekly Quizzes:** On Wednesday, short, targeted quizzes will ask you to make connections across content covered in the previous week -including group work, discussions, primary literature, and lectures. You are expected to take these independently, but can use resources available to you (ie - open book). These Quizzes will be graded and are aimed to help you synthesize concepts. Quizzes will be available on moodle (unless otherwise specified) for 30 minutes, during a 24 hour period starting at 9:30AM Central. (5 Total Quizzes)

**Discussion Diagram & Summary:** For our peer discussions, you will work in small groups to create a diagram that represents connections between variables and drivers highlighted in the paper and our week's content. By Sunday night, you are expected to submit via Moodle the diagram (same for group members is fine), and independently respond to the discussion prompts as described on Moodle (*ie - Highlight a connection and develop a testable hypothesis around this connection? Design an experiment that would test this hypothesis*). You are expected to contribute to commenting and discussion on Perusall prior to Friday's class. (6 total discussions)

**Arctic Current Events Small Group Presentations:** Early in the semester, students will work in groups of 3 on a topic of Arctic Science that has been in the news in the past 1-2 years. Students will create a short 6-minute presentation together that will emphasize different perspectives on the issue.

**Theme Examinations -** Mixed media examinations and analyses that include: 550 word analysis that includes at least 5 peer-reviewed articles, maps, figures, and/or media that support your analysis. Our class covers roughly 6 Themes total: Climate, Humans, Development/Built Environment, Plants & Soils, Marine/Aquatic Systems, and Animals. You will pick 3 themes to delve into for your Examinations. Examinations will be posted and shared via ArcGIS Story Maps

in their final form, and each requires a self-reflection/assessment (10 points, 60 points for analysis). See more in depth write up on this for details.

**Presentations & Peer Reviews** - On March 8th and 9th, everyone in class will present their ArcGIS story map, synthesis, and connections between themes. These presentations will be 6 minutes long and done during class time. After class, each student is responsible for the peer-evaluation/review of 2 peers' works, which will be randomly assigned. Guidelines will be shared on how to conduct peer-review. Mary will also provide feedback on presentations and projects.

**Response to Peer Review, Self Reflection & Assessment** - By Friday, March 12. Responses to peer review and your self-reflection and assessments will be due. These are a change to make suggested improvements based on others' feedback during the peer review process and rate your own finalized projects.

Assessment	Due	Points	%
Quizzes	Wednesdays (x3)	40 each, 120 total	
Discussion Diagram & Summary	Sunday after Discussion (x4)	15 each; 60 total	
Current Event Group Presentation	Jan 29	20	
Theme Examinations	3 times during Module	70 each, 210 total	
Completed ArcGIS StoryMap with 3 themes and synthesis & Presentation	March 7	40	-
Peer Review of 2 Peers' Projects	March 8-9	20	-
Response to Peer Review, Reflection & Assessment	March 11	30	

Total Points Possible: 500

### Grading Scale

100-94	A	Dates to remember for grading options  Feb 22 - First Day to Designate Grading Option (M3) March 10: Last Day to Designate Grading Option (M3) March 10: Last Day to Withdraw from a Class (M3)  If you are interested in knowing what your current grade is, please contact Mary or attend Office Hours. Moodle grades are often "off" given the complexities of Moodle - so not great to go by those alone.  Also, a hard reminder that grades are over-emphasized, and the whole point of this and all classes is to learn, understand, and grow.
90-93	A-	
87-89	B+	
84-86	B	
80-83	B-	
77-79	C+	
74-76	C	
70-73	C-	

**Learning environment and inclusivity.** A foremost responsibility while leading this class is to make sure every student feels comfortable, welcome, and able to succeed. The course is structured to promote inclusivity and the ability for everyone to thrive. COVID-19 and our national reckoning on race, as well as the events surrounding the presidential transition add additional and unequal stresses on us - please be mindful of the challenges everyone faces as we work together this semester. My goal is to promote an inclusive learning environment where diverse perspectives are recognized, respected, and seen as a source of strength. Part of that effort includes a recognition that all humans have implicit biases, and it is our responsibility to do our best to identify them in ourselves and take actions to mediate them. If something in or about this class makes you feel unwelcome, please see me, your advisor, a professor you trust, or a college administrator.

**Names and pronouns.** You should be addressed in the manner that you prefer. If you want to make sure I address you with a particular name and/or pronoun please let me know.

**Title IX.** Macalester College is committed to providing a *safe learning environment* for all students that is free of discrimination, sexual harassment, sexual assault, domestic violence, dating violence, and stalking. Further details are explained in the college's Title IX regulations (<https://www.macalester.edu/titleix/>). If you, or someone you know, experiences a Title IX violation, know that Macalester has staff trained to support you. Macalester faculty members are "responsible employees," which means that if you tell me about a Title IX violation, I must share that information with the Title IX Coordinator. Still, you will control how your case is handled, including whether or not you wish to pursue a formal complaint. Our goal is to make sure you are aware of the range of options available to you and have access to the resources you need (Title IX Office, 651-696-6258).

**Accessibility.** All students are entitled to fair and equitable access to the learning opportunities in this course. If there are aspects of the instruction or design of this course that result in barriers to your inclusion or to accurate assessment of achievement, please notify me as soon as possible. Students are also welcome to contact the disability service office to discuss a range of options to removing barriers in the course, including accommodations (contact Disability Services, 651-696-6275 or [disabilityservices@macalester.edu](mailto:disabilityservices@macalester.edu)). Once you have a letter of accommodations, please see me so that we can implement an action plan. Furthermore, I know that at times personal issues, stress, health problems or life circumstances may impact your ability to perform academically. Please contact the Office of Student Affairs at 651-696-6220 ([studentaffairs@macalester.edu](mailto:studentaffairs@macalester.edu)) for support and ask them to get in touch with your instructors.

**Other means of support:**

- For class and personal concerns → Contact me via email or Student Hours (after class on Tues & Thurs); you can also contact Aleah Wong, our class TA.
- Need additional writing support → Check out the MAX Center for writing tutors or Works in Progress peer review program
- Do you have a known schedule conflict with the class meetings due to work? All work will be able to make up independently. Similarly, deadlines can be flexible. Please let me know promptly, so all group meetings can be adjusted as needed.
- Absence due to religious observance → Please let me know you will be observing ahead of time, so that you can obtain course materials ahead of the absence.
- Do you need to sleep? Of course you do. Take care of yourself. If you are feeling overwhelmed about the scheduling or pace of this course, please let me know.