



Image: wildlife handling Lab from Spring 2022

WILDLIFE MONITORING TECHNIQUES

Biodiversity is fast disappearing from the face of the planet. To keep a check on wildlife species, populations, and individuals, we need robust methods to enumerate individual and population scale processes such as abundance, distribution, resource use, and behavior. In this course you will be exposed to the fundamentals of wildlife monitoring techniques and their relevant applications. We will learn about wildlife census techniques and how these methods have expanded and championed wildlife conservation. We will engage in hands-on, outdoor experiences such as camera trapping, distance sampling, diet monitoring, animal capture and telemetry. Three hours of lecture/discussion and three hours of laboratory each week.

[A link to a youtube video from Wildlife Monitoring Course in Spring 2023](#)

COURSE LOGISTICS

Instructor: Prof. Stotra Chakrabarti; schakrab@macalester.edu

How to address me: I go by Stotra (*STOW-T-RA*), Prof. Chakrabarti (*CHAAK-RA-BARTI*), or Dr. Chakrabarti. My pronouns are he/him/his.

Want to know about my lab and research? [Check Out the CAB Lab here](#)

Follow me on Twitter for Sci-com: [@StotraChakraba2](#)

Lecture: MWF 10:50 am-11:50 am; OLRI 284

Sports: I try to regularly play ping-pong at the LC and/or soccer. If you are interested in either, join the team 😊

Lab: T 1:20-4:30 pm [some outdoor labs can start earlier or go on for a tad longer – trust me they will be fun because the extra-time is to commute to places where we are going to *rendezvous with wolves and other wild animals*]

Want to Meet? Please sign-up for 20-minute meeting slots (link will be posted on moodle) if you need. **I also have an open-door and/or zoom-friendly policy, even if the door is closed! So, please find me around if you need help. I am always around to listen to you. I would be really keen to meet all of you one-on-one in the first 2 weeks to know more about you and your expectations from the course. Please reach out to schedule a meeting with me in the first couple of weeks.**

Email Policy: I generally respond to emails promptly on weekdays; emails received after 5PM can take longer to respond. I often cannot answer emails over the weekend, so please plan accordingly.

Lab TA: Lorena Escobosa, lescobos@macalester.edu

How to address: I go by Lorena and my pronouns are she/her.

Office Hours: Tue/Thu 12-1 pm, Smail Gallery/Zoom

Class TA: Sophie Carpenter, scarpen2@macalester.edu

How to address: I go by Sophie and my pronouns are she/her.

Office Hours: Tue/Thu 5-6 pm Smail Gallery or on zoom

Course Presence: The course primarily relies on experience and exposure (seminar style lectures, paper discussions, hands-on field and analytical labs, interactions with peers and guest speakers), and it will greatly benefit you to ‘participate and learn’. **You will earn most of the points if you just show up for class!** I will expect students to attend lectures regularly on time, unless there is an emergency (*which is absolutely fine*). You can take *3 leave of absences without questions* for the whole course, but an intimation would be appreciated, otherwise I will be worried about your well-being. Lugard was a famous big-tusked elephant from Tsavo. Also, if you cannot attend class, please let me know and I will try and record the lecture/discussion. Please inform me beforehand if you need more time off. **I am committed to be extra-sensitive towards the flexibility that is required in the special times that we live in currently, so please let me know what I can do to make this course more accessible to you. Please see the Covid Consideration Section at the end of the document for more details.** If you are feeling perpetually low, remember we are going through a severe collective trauma for >2 years. It will have a significant, long-term effect on mental health. If you are getting out of bed and managing to do some things, then you are doing great!

Out of class work expectations: Readings and paper responses should take ~1-2 hours. Longer assignments and group work, will require some more time to be scheduled. If you are having trouble working in a group setting due to personal/professional/scheduling conflicts, please let me know. **I want you to learn in this course but not rush to achieve that. Take your time. Also, please do not be afraid to make mistakes, we only learn when we make them. Remember “why do we fall? So that we can learn to pick ourselves up!” We are going to make mistakes together and learn together in this course.**

Deadlines: All deadlines are flexible and come with an automatic grace period of 48 hours. **However, based on feedback from earlier courses where there were no deadlines, I am bringing in something new this time. There are deadlines this time, to add a little bit of structure and not overwhelm you to remain motivated to submitted.** But if you need extra-time, you can choose from a total of **6 flexibility tokens** throughout the course. Each token will grant you an additional 48h of time. The tokens are exclusive of the automatic grace period. **If you wish to avail a token, please reach out to me/Lorena/Sophie in advance of an assignment deadline*. Grace time/tokens are not applicable for Mini-Quizzes.**

If you feel that you won’t be able to turn in an assignment even after the grace period and/or token time, don’t worry, please contact me ASAP so that I can work with you to schedule a deadline that works for you. Otherwise, the assignment portal will automatically expire

Texts: No general textbooks for this course, but book chapters and readings will be made available through Moodle.

Developing your voice in science: Science requires a balance of courage, humility and kindness – 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, and to follow your curiosity. But science also requires humility and empathy – identifying limitations, asking for advice, permissions, help and guidance, accepting appropriate criticism from others, and reflecting on improvements. **ASK QUESTIONS, CRITIQUE PEERS, BUT PLEASE DO SO WITH KINDNESS.** As you develop your thoughts and opinions in this class, be mindful that we are also collectively creating a community of learning.

LEARNING GOALS

This upper-level biology course will introduce you to the fine nuances of monitoring nature. *While, there will be no ‘wand-waving’ or ‘incantations’ in my course, we can definitely believe in some MAGIC – the magic of how to understand wild animals and their environments.* This course will make you aware of the fundamental techniques used for monitoring and managing wildlife, worldwide. **The course is designed to expose you to these techniques through seminar styled lectures, discussions, hands-on training, and interactions with researchers from around the world who are experts in their fields.** Through this course, I will help you to be aware of what it takes to be a wildlife researcher, and the avenues that you can pursue. By the end of the course, you should also be able to:

- To understand fundamental the theoretical and applied framework behind tools and techniques pertaining to the study of wildlife biology
- Analyze and critique scientific publications
- Demonstrate the ability to synthesize and communicate concepts and case studies through scientific as well as popular formats
- Choose projects from across the world where you could take up internship opportunities and embark upon a journey to make a change!

ASSESSMENTS (for deadlines and flexibility tokens please refer to page 2, timing of assignment submissions will be on moodle and iterated in class)

Mini Quiz: MQs will be held as given in the class schedule. It will comprise of 5 ‘applied’ question quizzes based on class lectures and information. Open-book but **no google allowed** collaborative format. You are encouraged and recommended to take the quiz from class, class time will be set aside for taking the quiz. After completing the quiz (30 min), we will discuss them as a group.

Paper Responses: Each response entails the summarization and your insights from a scientific literature assigned in class. Paper responses will be due on the day indicated in the course schedule. The reading material as well the rubric will be made available ahead of time on Moodle so that you have ENOUGH time to prepare. Please check Course schedule/Moodle for updates and timings.

Twitter summary: This will comprise of a gist of the reading material/scientific paper (assigned in class) in the form of 5-6 tweets. Students are allowed/expected to be creative in the use of images, memes, gifs etc. **There will be one twitter summary throughout the course.** Please check Course schedule/Moodle for timings.

Lab Reports: Lab reports should comprise of a brief synthesis of the lab activities. Specific instructions will be given in each lab handout (check Moodle). **The report for a lab is usually due by 10 am on the next lab day (at least a week from the current lab).** Most of the work will be done in the lab - you will get at least week to edit, organize, beautify and submit! **Labs are required, many of the labs are outdoors and cannot be replicated, unfortunately 😞**

Midterms: It will be an outdoor lab based experiential exam at the Como Zoo (. The assignment submission will be in the form of a lab-report before spring break starts (March 10th, 5 pm)

Seminar Reflection: We have a line-up of 10 amazing guest speakers, **actual living scientists**, who will be speaking to you about their amazing wildlife research and also give you a peek into their professional journey. You are expected to write separate reflections (major take-home messages, what you enjoyed the most, the most stimulating concepts/questions in ~300 words) **for any 2 guest seminars of the course. This assignment is due at the end of the course (April 29); however, I strongly recommend you to choose the seminars you want to write about and submit your reflections soon after the seminar(s).**

Grading rubric for lab-reports, paper responses, twitter summary and seminar reflections are on moodle
THERE ARE NO FINALS FOR THIS COURSE

GRADING (no overlapping due dates for any assignments)

Assessment	Due	Points (each)
Mini Quizzes	As given in the schedule	10
Paper responses	As given in the schedule	20
Twitter summary	As given in the schedule	10
Lab Reports	As given in the schedule	20
Midterms	March 5	50
Seminar Reflections	Apr 29	10

Grade	%
A	94-100
A-	90-93.9
B+	87-89.9
B	83-86.9
B-	80-82.9
C+	77-79.9
C	73-76.9
C-	70-72.9
D+	67-69.9
D	63-66.9

THERE ARE NO FINALS FOR THIS CLASS

Extra Points/Credits

1. **Participation in 2 bio-seminars that are related to wildlife research. If you are to avail the extra points, please email me one question that you asked/wish to ask the seminar speaker.**
2. **You will receive 2 extra points for every assessment that you turn in before or by the due date. There are in total of 6 lab reports, 4 paper responses and 1 twitter summary, which cumulatively adds up to 22 extra points if you submit all assessments on or before time**

LEARNING ENVIRONMENT AND INCLUSIVITY

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 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) including, if you wish, confidential sources on campus who are not subject to the mandatory reporting requirement (see list of "Confidential On-Campus Support" at <https://www.macalester.edu/health-and-wellness/sexual-violence-prevention-education/>).

Accessibility: I want all students to have 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).

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) for support and ask them to get in touch with your instructors.

Other helpful information to support your experience in the class:

- To address concerns on content or experience in the class, either find me before/after class; email me to set up a time to meet in person, and/or attend TA office hours
- If you need additional writing support, please check out *MAX Center* for writing tutors or *Works in Progress* peer review program (Kagin Commons, first floor)
- You are not able to attend class due to an unexpected event (sickness, family or personal issues) - Contact me as soon as possible to set up a time to talk about options.

Kaa was an Indian rock python

- You are not able to attend class 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.
- If you need an extension on the submission deadlines - Please let me know ahead of the deadline either through email or before/after class.
- **Do you need time for yourself? Studentship can be overwhelming, and I want you to take care of yourself. Your wellbeing is of paramount importance and I do not want you to compromise on that, **EVER!** If you are finding it difficult to follow the scheduling or pace of this course, please let me know. Also please check these [resources](#) out.**

All readings, assignment descriptions, and other information about the course will be on Moodle. Moodle will be updated frequently, so please check regularly.

THIS IS A COURSE TO 'EDUCATE' YOU ABOUT TECHNIQUES PERTAINING TO WILDLIFE MONITORING AND NOT LOSE OUR WAY IN COMPLEX THEORIES OR JARGONS, SO PLEASE HAVE FUN WHILE YOU WORK THROUGH THE COURSE! ALSO, A SYLLABUS IS NOT A CONTRACT --- WE WILL REMAIN FLEXIBLE MUTUALLY



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WEEKLY COURSE SCHEDULE

WEEK	DAYS	TOPIC		
1	Jan 18-20	Monday	Wednesday	Friday
		N/A	N/A	No Class
		T: N/A		
2	Jan 22-26	Personal Intro, Ice breaking, who's who	Ethics, Protocols and Guidelines	Questions & Design
		T: Syllabus & Techniques Overview (Lan with treats)		
3	Jan 29-Feb 2	Questions & Design	Sampling Strategies	Identifying & Marking Animals
		T: Fun Lab on Animal ID (Lab report due Feb 6 at 10 am)		
4	Feb 5-9	Mini Quiz 1	Aging & Sexing Animals	Science with Animal Signs
		Paper 1 Uploaded on moodle	Science with Animal Signs	
		T: Lab on Ungulate Body Scoring (Lab report due Feb 13 at 10 am)		
5	Feb 12-16	Occupancy Analysis	Occupancy Analysis	Mini Quiz 2 Paper 1 Discussion *Paper 2 Uploaded on moodle*
		T: Lab on aging and sexing lions and tigers (Lab report due Feb 20 at 10 am)		
6	Feb 19-23	Distance Sampling	Distance Sampling	Paper 2 discussion *Paper 3 uploaded*
		T: Occupancy Analysis Lab (Lab report due Feb 27 at 10 am)		
7	Feb 26-Mar 1	Use of Remote Cameras in Wildlife Surveys	Guest Speaker	Mini Quiz 3 Paper 3 discussion
		T: Camera Trapping at Ordway (outdoor, no lab report)		
8	Mar 4-8	Mark Recapture	Mark Recapture	Guest Speaker
		Midterm Lab (Como Zoo) (midterm report due March 8, 5 pm)		
9	SPRING BREAK YAAAAAY			
10	Mar 18-22	Catch up	SECR	Lion SECR
		T: Mark Recapture Lab (Lab report due Mar 26 at 10 am)		
11	Mar 25-29	Resource Use	Resource Use	Guest Speaker
		T: Distance Sampling Lab (Lab report due Apr 2 at 10 am)		
12	Apr 1-5	TBD	TBD	Review Session *Paper 4 Uploaded* (twitter paper)
		T: Understanding Activity Patterns from Cameras (Lab Report Due Apr 12 at 10 am)		
13	April 8-12	Brain Break	Diet Sampling	Diet Sampling
		No Lab		
13	Apr 15-19	Brain Break	Animal Behavior	Lion Behavior
		T: Mist netting for birds Lab (outdoor, no lab report)		
14	Apr 22-26	Inclusive Wildlife Research	Dos and Dents	Review Session
		T: Fish Monitoring Lab (outdoor, no lab report)		
15	Apr 29	End of Class celebrations		

Non-compulsory component of the course:

April 6 & 7: Physical and Chemical Immobilization of Wildlife at the Wildlife Science Center, Stacy, MN

Full day labs (8:30 am – 5 pm) – you will learn about the different drugs used to sedate wild animals, how to use dart-guns and blow-pipes, sedate wolves and other wildlife to measure vital rates, collect samples, fit radio-collars and revive them appropriately

Feb 9th: Course get-together (5:30-7 pm)

Recommended Study Materials:

While there is no textbook for this course and all reading materials (book chapters/articles) will be made available on Moodle, I recommend the following books for further reading, which I would also be referring to throughout the course:

1. *Wildlife Techniques Manual (Vol 1& 2)* ed NJ Silvy. The Wildlife Society 2012
2. *Research & Management Techniques for Wildlife & Habitats* ed. TA Bookhout, The Wildlife Society 1996

Land Acknowledgement

Our college resides on the ancestral homeland of the Dakota people (particularly the Sisseton and Wahpeton bands) who were forcibly exiled from the land in response to aggressive and persistent settler colonialist oppression. We make this acknowledgement to honor the Dakota people, ancestors and descendants; as well as the land itself.

Sickness Policy

For your well-being and for the community: We are living in unprecedented times, and it is our collective responsibility to ease the stress/trauma that we are facing. There are multiple ways and avenues through which you can get help. Please check this [Campus Resource](#) for information regarding immediate issues.

Please stay back if you are not feeling well, nothing is more important than your health and wellbeing. Also, if you are not feeling well, please stay back for the sake of the community as a whole.

Help re. absence: I will work with you so that you can get all the resources and help you need to make-up for lost lectures/lab. **I generally record all lectures when any student is absent. However, if you cannot attend, it would be really helpful if you could drop me a line before class so that I can get the equipment ready to record the session.** [Help will always be given in my class to those who ask for it and otherwise.](#)

If you are not feeling well and/or worried that you might be contagious, **please stay back**. No class is more important than your well-being --- it is far more meaningful and prudent to rest, heal and get back when you are physically and mentally ready. As mentioned earlier, Lorena, Sophie, and I will work with you so that you can get all the resources you need to make up.

If you are feeling perpetually low, remember we are going through a severe collective trauma for >2 years. It will have a significant, long-term effect on mental health. If you are getting out of bed and managing to do some things, then you are doing great! Your wellbeing is of paramount importance and I do not want you to compromise on that, **EVER!** Also, please check these [resources](#) out.

Buddy-up: While we I will always be around to help and work with you, I would strongly suggest that you have a class buddy (/buddies) who you can rely on to share notes and discuss class lectures and labs. This would be of real help IF owing to unforeseen circumstances you have to miss classes/labs – y'all can fill each other in. IT REALLY HELPS! Learning is all about community and collaborations – it never occurs in containment 😊

Covid 19 at-home tests: Outdoor labs that include shared vehicle trips and group work can have potential exposure risks. **To minimize such risks, I would encourage everyone to test 24h before our joint adventures if you are feeling under the weather.** There are resources available at Mac to provide you with rapid-antigen tests; please work with me to avail those so that we are all safe. I test myself regularly before such field trips.