

**BIOSC 1550/1551 Ecology and Evolutionary Biology Seminar with
Writing -
*Ecology & Ecologists of Sub-Saharan African***



Spring Term 2022
343 Crawford Hall

Seminar: Wednesdays, 12:00-1:50PM (1 hour and 50 minutes per week)
Writing practicum: Wednesdays, 2:00-2:50 (50 minutes per week)

Instructor: Dr. Nathan L. Brouwer (nlb24@pitt.edu)

Office: A215 Langley (through the glass door, turn right - I'm the first office, A296D)

Office hours: 11:00-12:00 Tuesdays or by appointment.

Requisites:

BIOSC 1550 Ecology and Evolution Seminar

BIOSC 0350 Genetics, 0370 Ecology, 1130 Evolution (grade of 'C' or better)

Course Description: The **seminar** portion of this course (BIOSC 1550) focuses on reading and analyzing primary research literature in the fields of ecology and evolutionary biology (focusing on ecology in the Spring of 2022). In addition to understanding and critiquing recent ecological research, we also emphasize and practice effective techniques for communicating about the associated science.

The theme of this course in the Spring of 2022 is **African Ecology**. We will focus on recent papers by African Ecologists that address key issues in ecological science.

The seminar portion of the course is divided into 3 parts.

Part 1: Introduction to the course and key issues in ecology (week 1, 2 and 3)

I will lead discussion the first 3 weeks of the course. I'll introduce the general operation of the course and model how in-class activities and discussion will occur during the rest of the course. I'll also lead discussion on key themes that we'll return to repeatedly during the course, such as the sociology of science and science publication (Nunez et al. 2021), observational versus experimental studies, experimental design and pseudoreplication (Lazic 2019), and common critiques of how ecologists work and suggestions for how to improve things (Belovsky et al 2004).

During Part 1 we will also discuss general principles on literature searching, scientific communication, and creating slides using the [assertion-evidence](#) format (Round and Campbell 2013). We'll also discuss the range of topics ecologists study and those that interest students the most.

Part 2: Survey of African Ecology (approximately weeks 4 to 10)

During Part 2 of the course teams of students will lead discussion of focal papers. I will select papers for each week, but students will be invited to suggest papers and vote on the ones they would most prefer working on. I'll arrange teams based on people's schedule, interests, and if there are other people in the class they'd like to work on.

Focal paper and secondary readings: During each week of Part 2 I will select a **focal paper** and also 2 to 3 secondary papers. These secondary papers will generally be by a **theory/issue paper** that provides important background for assessing the focal paper. Additionally, a short **thought piece** will be provided to expand our understanding on the scope of ecological research, the sociology of ecology and science publication, or other relevant big-picture issue. The focal paper will be a full-length peer-reviewed journal article, while the **theory/issue paper** and **thought piece** will typically be shorter articles or selections from articles. These will often be blogs, opinion pieces, reviews, or other non-research papers.

Class sessions will follow the general pattern outlined below. Additional activities may also take place during class, such as short assignments using Canvas quizzes, filling out information about the research on spreadsheet, or mini-lectures to prepare students for their presentations during Part 3 of the course.

Pre-class worksheet: To prepare for each session of Unit 2 all students will read the assigned papers and complete a **pre-class worksheet** (based on the Figure Facts concept, Round and Campbell 2013). To facilitate discussion and completion of the worksheet, Students will also be required to ask and answer questions on a shared version of the **focal paper**.

Introductory presentation: Each meeting during Unit 2 will begin with the team in charge of the session presenting a 10-15 minute slide presentation on the paper. This presentation will introduce the basic geography, ecology, natural history, study site, theory, and methods related to the focal paper, as well as background on the author(s). A template for the presentation will be provided.

Board work: After the introductory presentation the entire class will split up into 4 to 6 teams (depending on the specifics of the paper) and use the whiteboards in the class to sketch out the [assertion-evidence](#) slides related to components of the paper such as the experimental design, the causal / theoretical model implied by the authors, and – most importantly -- focal results from the paper.

Board work presentations & discussion: After the board work is completed each team will present their sketch. A brief discussion of each slide will be led by the lead team for that week.

Final discussion: After all of the board work has been presented the team in charge of the week will lead a general discussion about the paper, what can be learned from it, its strengths and weaknesses, and any relevant sociological issues.

Focal paper warm-up: Depending on the amount of time remaining an activity to prepare for the next reading will occur either in class or outside of class. Students will be given the title and

keywords from the paper for the next week and consider these question (Liao 2016): 1) *What was the research question/hypothesis*, 2) *What were the approaches/methods*, and 3) *What were the results/conclusions*. Students will provide answers via a Canvas quiz.

Note: other short writing assignments or Canvas-based activities may be assigned at times

Part 3: Individual presentations (approximately weeks 11 to 14)

During Part 3, students will deliver an ~25 minutes presentation to using Assertion-Evidence slides on a **primary research article** they have chosen. Articles for your talk should be current or seminal primary literature by an African author, ideally published in a major ecological journal. All articles must be approved by Dr. Brouwer. A list of major ecological journals is provided below. Articles used for these presentations are ideal candidates for the focal paper students use in the writing practicum associated with the class.

Presentation details:

- **Authorship:** The article must be first or last-authored by someone from sub-Saharan African OR of African descent, and the research conducted primarily in Africa or relating to African ecology.
- **Article age:** The article should either be relatively recent (within the last 10 years) or seminal / classic.
- **Approval:** All articles must be approved by Dr. Brouwer.
- **Source:** The article should be from a major ecological journal. While articles from any journal can be proposed, articles from major journals are more likely to be the length and format most conducive for this particular assignment. See a list of major ecological journals below. Papers from Science, Nature, and PNAS may be good, but sometimes the format of these articles makes them hard to unpack and understand.
- **Publication type:** The chosen article be a primary research article reporting new results. Reviews, essays, etc. cannot be used. Meta-analyses focused primarily on Africa could possibly be used but are not recommended.
- **Research focus:** Articles on any ecological topic can be considered as long as the focus is on biological populations, communities, or ecosystems. Studies focused on conservation or environmental issues may not be sufficiently focused to qualify.
- **Research type:** The article can report on any type of research – experiments, observational studies, modeling, etc. ***I strongly encourage you to select experimental studies since they will typically have simpler methods and statistics.*** However, you are free to use a non-experimental paper.

Seminar Assessment / Point Breakdown

Category	Activity / Activities	Item	Category	Drop
Pre-class prep	Pre-class worksheet: Weekly focal paper preparation worksheet ("Figure facts")	10	10	1
In-class participation	Board work and presentation: Weekly focal paper "board work" contribution	13	30	1
	Discussion: Weekly focal paper general discussion participation	13		1

	Focal paper warm-up: Brief in-class or after class activity to prepare for next session	2		1
	Other: Other In-class participation activity (usually Canvas quizzes, adding info to spreadsheets, etc)	2		1
Group / Team presentation	Group focal paper introductory presentation	5	10	0
	Group focal paper discussion facilitation	5		0
Individual presentations	Individual focal paper presentation	24	45	0
	Individual focal paper discussion facilitation / Q and A	20		
	Questions asked during presentations	1		0
Other	Other homework (short writing assignments, Canvas assignments etc).	5	5	~5%
		100	100	

Participation: During the first part of the course you will be expected to participate in the discussion of the journal articles. This will include describing the hypotheses being tested, techniques used, results, figures and tables, and conclusions drawn from these results. You may not be familiar with all the techniques and background information presented in the papers. Therefore, you are expected to ask relevant questions when you have them. During student presentations in the second part of the course, you will be expected to ask one or more relevant questions of the speakers each day.

Accessing Ecological Journals

To download and search for papers I recommend Google Scholar. When off campus, you'll sometimes need to log into the library system before accessing articles so that you can get them for free. **Do NOT pay for articles!**

Major ecological journals

Ecological Society of America (ESA) Journals: Ecology, Ecological Applications, Ecological Monographs**, Ecosphere**

British Ecological Society (BES) Journals: Journal of Ecology, Journal of Applied Ecology, Journal of Animal Ecology, Functional Ecology, Ecology & Evolution**

Nature Publishing Journals: Nature Ecology & Evolution

Other general ecology journals: Ecology Letters, Oikos, Oecologia, Evolutionary Ecology, Ecological Research Change Biology, Molecular Ecology**

Biogeography & Macroecology: Journal of Biogeography, Diversity & Distributions, Global Ecology and Biogeography

Landscape & Ecosystem Ecology: Ecosystems, Landscape Ecology

The Wildlife Society (TWS) journals: Journal of Wildlife Management, Wildlife Society Bulletin, Wildlife Monographs**

Conservation and natural resources management: Conservation Biology, Biological Conservation, Forest Ecology & Management, Restoration Ecology, Animal Conservation, Global Ecology & Conservation**

Botany: New Phytologist, American Journal of Botany**, Plant Ecology**, Journal of Vegetation Science**, AoB Plants**

Zoology: Journal of Mammalogy

Other biology / science journals that publish ecology papers: Science*, Nature*, Proceedings of the National Academy of Science (PNAS)*, Proceedings of the Royal Society B (PRSB), Current Biology, PLoS One**, PeerJ**, Journal of the Linnean Society**

Possibly acceptable journals (partial list): African Journal Ecology, Biotropica, Journal of Tropical Ecology, PLoS One, Auk, Condor, Agriculture Ecosystem and Environment, Journal of Arid Environments.

Unacceptable (though good) journals: Trends in Ecology and Evolutionary Biology, Frontiers in Ecology and the Environment, Biological Reviews, Quarterly Review of Biology, Annual Review of Ecology and Systematics, BioScience, Nature Reviews.

Publishers unlikely to publish acceptable papers: MDPI, Frontiers

*Papers from Science, Nature, and PNAS may be good, but sometimes the format of these articles makes them hard to unpack and understand.

**Papers in these journals may be long or more in-depth and harder to use for this class but still publish high-quality papers.

Writing Practicum

If you wish to complete the writing requirement for the Ecology and Evolutionary Biology major with this seminar course, you must also sign up for the separate writing portion of this course (BIOSC 1551 Ecology and Evolution Seminar Writing Practicum). You will have some smaller writing assignments, and then you will write and revise a literature focused mini-review paper centering on a focal ecology or evolutionary biology research article (this can be the same as the one you do your presentation on). You will put it into context by using **at least three** more primary literature articles (articles cited by your primary research article are a good place to start!) and at least **2** other papers about the geography and natural history of the study system.

You will be expected to include in your paper significant background about the biological question being investigated, the current state of knowledge about the topic, a discussion of critical experiments leading to our understanding, and your suggestions for future work.

- You will choose 1 substantial primary literature article that interests you that you will cover in detail. The same criteria listed above apply for this paper.
- You will choose at least three more **primary** literature articles that help explain your focus article.
 - Two articles must have been published *before* your focus article. These will be articles that set up or establish the key theory, models or other aspects of the research.

- The other may have been published at any time. For example, you can investigate if there has been any follow up on this topic by seeing who has cited the paper since it was published.
- You will chose at least 2 additional papers to provide broader context about the research.
 - These can be review articles, natural history papers, etc.

Writing practicum assessment / point breakdown

Assessment will be based on participation during in-class writing practicum sessions whether the goals of a writing assignment were met, quality of peer-editing tasks, and related components. The general breakdown is shown in the table below.

Category	Activity / Activities	Item	Category	Drop
In-class participation	In-class participation activity (usually Canvas quizzes, adding info to spreadsheets, etc)	5		~5%
Focal paper write-up & related tasks	Research, writing, revision, and peer editing of materials related to a focal paper and researcher	85		0
Other	Other homework (short writing assignments, Canvas assignmetns etc).	10		~5%
		100		

Focal paper write-up components:

Your write-up on your focal paper (“mini-review”) will be broken up into smaller components spaced out over the course of the semester. Potential components are listed in the table below. Many of these shorter papers will also involve a peer-review activity and/or submission of first and revised drafts.

Proposed components of focal paper write-up (To be finalized)	
Pages (approximate)	
2	Summary on key theory, background, history of topic globally AND in Africa
1	Summary on relevant biome / ecosystem type in Africa AND globally
1	African author mini-biography
8	Paper summary (hypotheses, methods, results; figures don't count towards page total)
2	Research highlight / press release
14	

Grading:

Raw percentage grades will be converted to letter grades at the end of the semester using the scale shown below. This will only be done after the final and the implementation of all dropped grades.

Note: Students planning to major in Biological Sciences must pass this course with a C (not C- !) or better.

Rounding: Rounding is not done until final grades are computed and is done by computer to 1 decimal place. Final letter grades are assigned after rounding and is done automatically by a computer including the decimal value. For example, a score of 91.99% rounds to 92.0% and is an A, but a score of 91.94% rounds to 91.9% and is an A-.

Final Percentage	Grade	GPA
98.0–100%	A+	4
92.0–97.9	A	4
90.0–91.9	A-	3.75
88.0–89.9	B+	3.25
82.0–87.9	B	3
80.0–81.9	B-	2.75
78.0–79.9	C+	2.25
72.0–77.9	C	2
70.0–71.9	C-	1.75
68.0–69.9	D+	1.25
62.0–67.9	D	1
60.0–61.9	D-	0.75
59.0 and below	F	0

Late assignment: Late assignments will be docked points (10% per day) unless excused for a documented reason that is outside of your control.

Missed class: If you need to miss class for reasons outside of your control, relevant documentation must be provided. You will be required to turn in a written summary of the journal article for that week. If you miss giving any of your presentations, you will need to be rescheduled. In the case of missing final talks, you will be required to read one of the papers and write a summary. The work must be made up within one week of missing class unless other arrangements are agreed upon.

Academic Integrity Policy: Cheating/plagiarism will not be tolerated. Students suspected of violating the University of Pittsburgh Policy on Academic Integrity (<http://www.as.pitt.edu/faculty/policy/integrity.html>) will be required to participate in the outlined procedural process as initiated by the instructor.

Violation of the Academic Integrity Code requires the instructor to submit an Academic Integrity Violation Report to the Dean’s Office.

Any attempt to submit work that is not the student’s own work is a violation of academic integrity. If I find that a writing assignment contains evidence of plagiarism, the level of severity will determine whether the sanction is an F in the course, a 0 score on the assignment, or partial credit on the assignment. **A second academic integrity offense in the course will result in an automatic grade of F.**

Turnitin: Students agree that by taking this course all required assignments may be subject to submission for textual similarity review to Turnitin.com for the detection of plagiarism. All

submitted papers will be included as source documents in the Turnitin.com reference database solely for the purpose of detecting plagiarism of such papers. Use of Turnitin.com page service is subject to the Usage Policy and Privacy Pledge posted on the Turnitin.com site.

E-mail: Although e-mail will not be used routinely in this class for communication, occasionally I may send out an e-mail notice using the University e-mail addresses available through CourseWeb. Such notices are also posted as Announcements on CourseWeb.

Each student is issued a University e-mail address (username@pitt.edu) upon admittance. This e-mail address may be used by the University for official communication with students. Students are expected to read e-mail sent to this account on a regular basis. Failure to read and react to University communications in a timely manner does not absolve the student from knowing and complying with the content of the communications. Students that choose to forward their e-mail from their pitt.edu address to another address do so at their own risk. If e-mail is lost as a result of forwarding, it does not absolve the student from responding to official communications sent to their University e-mail address.

Disability Resources: If you have a disability for which you are, or may be, requesting an accommodation, you are encouraged to contact both the instructor for this course and the Office of Disability Resources and Services, 140 William Pitt Union, 412-648-7890 (phone)/412-624-3346 (fax), as early as possible in the term. Disability Resources and Services will verify your disability and determine reasonable accommodations for this course.

References

Belovsky et al. 2004. Ten suggestions to strengthen the science of ecology. *BioScience*.

Lazic 2019. Genuine replication and pseudoreplication: what's the difference?

<https://blogs.bmj.com/openscience/2019/09/16/genuine-replication-and-pseudoreplication-whats-the-difference/>

Liao. 2016. A simple activity to enhance the learning experience of reading primary literature.

Nunez et al. 2021. Making ecology really global. *Trends in Ecology and Evolution*.

Round and Campbell 2013. Figure facts: encouraging undergraduates to take a data-centered approach to reading primary literature. *CBE – Life Sciences Education*.

Bibliography of likely “thought pieces” and additional readings

Below are papers that may be used for the weekly “thought piece” or other reading assignments. I recommend that students considering graduate school keep this list and read all of these papers.

- Agrawal et al. 2007.** Filling key gaps in population and community ecology. *Frontiers in Ecology & the Environment*.
- Belovksy et al. 2004.** Ten suggestions to strengthen the science of ecology. *BioScience*.
- Bolker. 2005.** Other People’s Data. *BioScience* [1 page]
- Bruna et al. 2021.** A proposal to advance theory and promote collaboration in tropical biology by supporting replications. *Biotropica*.
- Catford et al. 2022.** [Addressing context dependence in ecology](#). *Trends in Ecology & Evolution*.
- Culumber et al. 2019.** Widespread Biases in Ecological and Evolutionary Studies. 2019.
- Didham et al.** Are invasive species the drivers of ecological change? *Trends in Ecology & Evolution*.
- Grainger et al. 2022.** An empiricist’s guide to using ecological theory. *American Naturalist*.
- Griffin, Carson et al. 2018.** Plant hist identity and soil macronutrients explain little variation in sapling endophyte community composition: Is disturbance an alternative explanation? *Journal of Ecology*.
This is a paper by a friend, Eric Griffin, who did is PhD with Dr. Walt Caron at the University of Pittsburgh. The introduction of the paper contains an excellent example of framing multiple alternative hypotheses that Eric assesses in the paper. Other papers from the Carson lab also employ this excellent framing of hypotheses.
- Gerstner et al. 2017.** Will your paper be used in a meta-analysis? Make the research of your research broader and longer lasting. *Methods in Ecology & Evolution*.
- Hastings et al. 2005.** *Quantitative Bioscience for the 21st Century*. *BioScience*.
- Ives. 2019.** Informative irreproducibility & the use of experiments in ecology. *BioScience* [1 page]
- Kingsland. 2004.** Conveying the intellectual challenge of ecology: an historical perspective. *Frontiers in Ecology & Evolution*.
- Lazic 2019.** Genuine replication and pseudoreplication: what’s the difference?
<https://blogs.bmj.com/openscience/2019/09/16/genuine-replication-and-pseudoreplication-whats-the-difference/>
- May and Seger. 1986.** *Ideas in Ecology*. *American Scientist*.
- Nichols et al. 2019.** Accumulating evidence in ecology: Once is not enough. *Ecology & Evolution*.
- Nunez et al. 2021.** Making ecology really global. *Trends in Ecology and Evolution*.
- Odum. 1992.** Great idea in ecology for the 1990s. *BioScience*.
- Parker et al. 2018.** Empowering peer reviewers with a checklist to improve transparency.
- Parther et al. 200x.** Putting the “Ph” back into “PhD”: framing graduate research in a theoretical context. *Frontiers in Ecology & Evolution*. [2 pages]
- Round & Campbell 2013.** Figure facts: encouraging undergraduates to take a data-centered approach to reading primary literature. *CBE – Life Sciences Education*.
- Saugarin and Pauchard. 2009.** Observational approaches in ecology open new ground in a changing world. *Frontiers in Ecology & the Environment*.
- Schnitzer and Carson. 2016.** Would Ecology Fail the Repeatability Test? *BioScience*. [1 page]

- Sutherland et al. 2013.** Identification of 100 fundamental ecological questions. *Journal of Ecology*.
- Thompson et al. 2001.** *Frontiers of ecology*. *BioScience* 15.
- Yang et al. 2021.** Low statistical power and overestimated anthropogenic impacts, exacerbated by publication bias, dominate field studies in global change biology. *Global Change Biology*.
- Zuur et al. 2010. A protocol for data exploration to avoid common statistical problems. *Methods in Ecology & Evolution*.
- Zurr and Ieno 2016. A protocol for conducting and presenting results of regression-type analyses. *Methods in Ecology & Evolution*.

Bibliography of papers by African Authors:

Below is a list of papers considered in the first few weeks of the course.

- Mullah, Odee et al. 2014.** Community invasibility and invasion by non-native *Fraxinus pennsylvanica* trees in a degraded tropical forest.
- Odadi, Karachi, Abdulrazak, and Young. 2011.** African Wild Ungulates Compete with or Facilitate Cattle Depending on Season. *Science*. (Including online supplement).
- Sabiiti and Wein. 1987.** Fire and Acacia seeds: a hypothesis of colonization success. *Journal of Ecology*.