Introduction to Ecology Research at UW-Madison

(Agr/AtmOc/Bot/Ent/EnSt/FWE/Geo/Zoo 953)
Fall Semester 2023
Version: September 4, 2023

Instructor:	Prof. Monica G. Turner, Department of Integrative Biology (turnermg@wisc.edu)
Credits:	1 credit
Time & place:	Thursdays, 9:30 – 10:45 am, 158 Birge Hall
Requisites:	Graduate student status, aimed at new graduate students
Instruction mode:	Face-to-face
Canvas link:	https://canvas.wisc.edu/courses/375556

COURSE DESCRIPTION: Designed for new graduate students in ecology, primarily 1st or 2nd year students working toward an ecology-focused PhD in any department, this seminar complements the professional development seminar designed for mid-stage (e.g., third and fourth year) ecology graduate students and taught by Prof. Tony Ives. Goals for this seminar are (1) to introduce students to the rich history and tradition of ecology at UW-Madison; (2) to familiarize students with the depth, breadth, diversity, and strength of expertise among current faculty; and (3) to develop skills needed for success in a PhD program, emphasizing skills that are important during the early years of graduate school. Varied format will include faculty presentations, graduate student panels, discussion of assigned readings, and in-class activities.

COURSE LEARNING OUTCOMES: Early career graduate students in ecological fields of study will:

- Appreciate the foundations and legacy of ecology research, conservation science at UW-Madison
- Meet faculty and graduate students and gain knowledge of the diversity and strength of current research in ecology
- Compare and contrast expectations in undergraduate education to those of graduate school and research
- Develop appropriate expectations for advisors and advisees
- Solve hypothetical scenarios based on professional codes of ethics
- Actively promote diversity, equity, and inclusion of all at UW-Madison
- Identify common challenges faced by most (all?) graduate students
- Grasp the suite of skills associated with success in graduate school and in science
- Develop a sense of community amongst graduate students and in Wisconsin Ecology

OFFICE HOURS: Office hours are by appointment. Please email me to schedule a time.

HOW ARE CREDIT HOURS MET BY THE COURSE? Learning will take place in at least 45 hours of learning activities, including time spent in class meetings; tutorials; reading; writing; preparing for class; and any other activities as described in the syllabus or assigned during the semester.

READING ASSIGNMENTS AND DISCUSSIONS / DISCUSSION BOARD
Readings are a mixture of scientific papers and articles and essays related to professional development. PDFs or links for reading assignments will be posted in Canvas. ***Everyone is expected to have read the assignments before class and be prepared to discuss the papers.*** There will be some Discussion Board prompts for readings, but in-person discussion will have greater emphasis this year.

CLASS PARTICIPATION
Graduate seminars are best when all participants are engaged with the material. Discussions are only effective when everyone is prepared and has perspectives to contribute. ***Everyone is expected to have read the assigned articles before class and given thought to the content and context, and be prepared with questions about the topic or for the speaker.*** The class benefits from the diverse interests and backgrounds of the students, and we learn a lot by listening to one another.

ASSIGNMENTS
All assignments will be submitted online via Canvas.

ABSENCE POLICY
Attendance is expected and is recorded at each class meeting. If you have an *anticipated* absence, please let me know before the class that you will miss. If you are *unexpectedly* absent (e.g., illness), please inform me by email at your earliest convenience.

For classes that are missed, students are responsible for the material that was covered in class and must complete the readings. ***Written reactions to the assigned readings should generally be submitted within one week after the missed class, but this is flexible for any classes missed to illness. Please communicate with me about timing.*** The summary should include a brief statement of what was covered in the readings, but what I really want are your thoughts and reactions, any insights that were new for you, and questions that arise in your mind. Our class is in-person and we do not have video capture in our meeting room.

USE OF ARTIFICIAL INTELLIGENCE TOOLS
This year has seen ChatGPT and other AI tools arrive in force and, as with any new technology, understanding of limitations and establishment of consistent standards for ethical and appropriate use of AI are evolving. There are productive ways to use AI in science, but this course emphasizes the skills each individual needs to develop for themselves; thus, I always want your authentic responses (not the hive mind). The abilities to read, think critically, synthesize your understanding, and convey your insights in your own words are fundamental for every scholar, and it takes lots of practice to develop and improve those skills. When using a chatbot to do your writing (or thinking!), you are not providing your original ideas. Furthermore, you are relying on material that cannot be verified, is often (shockingly) incorrect, and is mediocre at best. We will discuss appropriate use of AI tools during our class meeting focused on scientific ethics. However, ***the use of artificial intelligence (AI) tools and applications (including, but not limited to, ChatGPT, DALL-E, and others) for course assignments and assessments does not support the learning objectives of this course and is prohibited.*** Using them in any way for this course is a violation of the course's expectations and will be addressed through UW–Madison's academic misconduct policy, specifically UWS 14.03(1)b (b) Uses unauthorized materials or fabricated data in any academic exercise.

ACADEMIC INTEGRITY STATEMENT
By virtue of enrollment, each student agrees to uphold the high academic standards of the University of Wisconsin-Madison; academic misconduct is behavior that negatively impacts the integrity of the institution. Cheating, fabrication, plagiarism, unauthorized collaboration, and helping others commit these previously listed acts are examples of misconduct which may result in disciplinary action. Examples of disciplinary sanctions include, but are not limited to, failure on the assignment/course, written reprimand, disciplinary probation, suspension, or expulsion.

DIVERSITY & INCLUSION STATEMENT
Diversity is a source of strength, creativity, and innovation for UW-Madison. In this course and across the campus, we value the contributions of each person and respect the profound ways their identity, culture, background, experience, status, abilities, and opinion enrich the university community. We commit ourselves to the pursuit of excellence in teaching, research, outreach, and diversity as inextricably linked goals. The University of Wisconsin-Madison fulfills its public mission by creating a welcoming and inclusive community for people from every background – people who as students, faculty, and staff serve Wisconsin and the world.

GRADING
This course is graded on a Satisfactory/Unsatisfactory basis. Attendance is required, and having read the assignments and being prepared to discuss is expected. Online discussions or commentary, and short writing assignments, are also required. I expect all students to earn a Satisfactory grade. However, missed classes, late or missing discussion posts, or lack of participation throughout the semester may result in an Unsatisfactory grade.

COURSE EVALUATIONS
Students will be provided with an opportunity to evaluate this graduate seminar and your learning experience. Please complete the university's general course evaluation when you are notified that it is available. Your feedback is important!

Additional Information and UW-Madison Policies

Institutional academic policies and statements are reviewed and updated annually, as needed. Please visit the following links for university-wide policies.

- Teaching and Learning Data Transparency Statement
- Privacy of Student Records and the Use of Audio Recorded Lectures Statement
- Campus Resources for Academic Success
- Course Evaluations and Digital Course Evaluations
- Students' Rules, Rights and Responsibilities
- Diversity and Inclusion Statement
- Accommodations for Students with Disabilities
- Academic Calendar and Religious Observances

SYLLABUS - FALL 2023

Week	Date	Topic	Leader(s) & Readings
1	Sept 7	**Welcome to ecology at UW-Madison, Introductions, & A City Kid Finds Ecology**	Dr. Monica Turner, Professor, iBio Overview of course, intros, etc. *Zagorski (2007)* *Short video: "The Burn"*
2	Sept 14	**Ecosystems, landscapes and the history of Wisconsin conservation science**	**Dr. Curt Meine,** Senior Fellow, Aldo Leopold Foundation *Meine (2008)* *Meine (2020)*
3	Sept 21	**Skills for success** (e.g., time management, balancing demands, teaching, accountability, long-term goals, working remotely, giving/receiving constructive feedback, etc.)	**Turner + Current Grad Students**: **Alli Kneisel,** iBio **Spencer Keyser,** FWE *Christopher (2011) Chapters 1, 4, 5* *Predatory Reports blog posts*
4	Sept 28	**Covid collaborations and other tales of teamwork**	Dr. Emily Stanley, Professor, iBio and Center for Limnology *Rocher-Ros et al. (2023)*
5	Oct 5	**On becoming a scientist** (e.g., generating new knowledge, learning from your system, collaboration, diversity in science, importance of questions, etc.)	**Turner** *Chamberlin (1965)* *Alberts (2009)* *Schneider (2021)* *Hansen et al. (2018)* *Dutt (2020)* *Kimmerer (2013) Three Sisters*
6	Oct 12	**Streams meander and so do ecohydrologists** – A career path of a geologist/engineer/ecologist through mountain meadows, wetlands, cities and corn fields	Dr. Steve Loheide, Professor, Civil and Environmental Engineering *Loheide et al. (2008)* *Booth et al. (2009)*
7	Oct 19	**Effective advisor-advisee relationships** (e.g., advising vs. mentoring, roles and responsibilities of mentors and mentees, relationship building, trust, advising styles, lab cultures, value of IDPs, etc.)	**Turner + Current Grad Students:** **Emily Adler** (iBio) **Connor Stephens** (FWE) *Allis (2017)* *Christopher (2011) Chapter 3* *Sarabipour et al. (2021)* *NextGenVoices (2018)*
8	Oct 26	**Serendipity as a guide on scientific pathways**	Dr. Tony Ives, Professor, iBio *Ives et al. (2008)*
9	Nov 2	**Scientific ethics** (e.g., research ethics, academic integrity, AI, professional courtesy & equity, honesty, addressing bias, duty to report, etc.)	**Turner** *Codes of Ethics:* *ESA (2020)* *AGU (2017)* *WEF (2018)* *Thorp (2023)*
10	Nov 9	**Pollutants, parasites, people… and basketball?!**	Dr. Jessica Hua, Associate Professor, Forest and Wildlife Ecology *Barncard (2023) UW News article* *Buss and Hua (2023)* *Ricci et al. (2023)*
11	Ricc	**Effective communication** (e.g., internal and external, scientists as professional writers, honing SciComm during grad school, etc.)	**Turner** *Christopher (2011) Ch. 8* *Schimel (2012) Ch. 1-3* *Baron (2010) Ch. 1-2*
12	**Nov 23**	**No class**	**Happy Thanksgiving!**

13	Nov 30	**Call of the Spotted Owl: A tale of fire, invaders, and agendas**	**Dr. Zach Peery**, Professor, Forest and Wildlife Ecology *Hofstadter et al. (2022)* *Peery et al. (2019)*
14	Dec 7	**Riding the roller coaster – the fun and the fear** (e.g., maintaining health and wellbeing, countering perfectionism, fear of failure, importance of resilience, time management)	**Turner + Current Grad Students:** **Timon Keller,** iBio **Dana Johnson,** Soils *Langenheim (2010), Ch. 3* *Schwarz (2008)* *DePauw (2016)* *Powell (2017)* *Brown (2020)*

READINGS

Full book (required) *(specific chapters assigned, but there's more good content! Links also in Canvas)*
Christopher, S. A. 2011. Navigating graduate school and beyond. A career guide for graduate students and a must read for every advisor. American Geophysical Union, Washington, DC. https://search.library.wisc.edu/catalog/9910120827802121

Recommended:
Gray, P. and D. E. Drew. 2012. What they didn't teach you in graduate school: 299 helpful hints for success in your academic career. Stylus Publishing LLC, Sterling, Virginia. *(Tongue-in-cheek humor, but a whole lot of good, common sense advice; fast read)*
https://search.library.wisc.edu/catalog/9912862652902121

(1) September 7 – Welcome to ecology at UW-Madison
Background – who is your instructor anyway?
Zagorski, N. 2007. Profile of Monica G. Turner. Proceedings of the National Academy of Science 104:4779-4781.
Link to THE BURN, 4.5 minute video produced by the Franklin Institute:
https://www.fi.edu/en/laureates/monica-g-turner

(2) September 14 - Ecosystems, landscapes and the history of Wisconsin conservation science (Meine)
Meine, C. 2008. The view from Man Mound. Pp. 17-20 In: D. M. Waller and T. P. Rooney, editors. The vanishing present. Wisconsin's changing lands, waters and wildlife. University of Chicago Press.
Meine, C. 2020. The crucible of conservation: Land, science, community, and the Wisconsin Idea. Pages 120-148 In: C. A. Goldberg, editor. Education for Democracy Renewing the Wisconsin Idea. University of Wisconsin Press, Madison, WI.

(3) Sept. 21 - Skills for success
Christopher, S.A. 2011. Chapter 1 – Introduction; Chapter 4 – Skills; and Chapter 5 – Organize. In: Navigating graduate school and beyond. American Geophysical Union, Washington, DC.
Links to Predatory Reports blog posts *(beware of predatory journals!)*
https://predatoryreports.org/news/f/predatory-journals-list-2023
https://predatoryreports.org/news/f/is-frontiers-media-a-predatory-publisher

(4) September 28 – Covid collaborations and other tales of teamwork (Dr. Emily Stanley)
Rocher-Ros, G., E. H. Stanley, L. C. Loken, N. J. Casson, P. A. Raymond, S. Liu, G. Amatulli, and R. A. Sponseller. 2023. Global methane emissions from rivers and streams. Nature (Early access). DOI: 10.1038/s41586-023-06344-6.

Additional resource:
Cheruvelil, K. S., P. A. Soranno, K. C. Weathers, P. C. Hanson, S. J. Goring, C. T. Filstrup, and E. K. Read. 2014. Creating and maintaining high-performing collaborative research teams: the importance of diversity and interpersonal skills. Frontiers in Ecology and the Environment 12:31-38.

(5) October 5 – On Becoming a Scientist

Alberts, B. 2009. On becoming a scientist. Science 326:916.

Chamberlin, T. C. 1965. The method of multiple working hypotheses. Science 148:754-769. *[Legacy reading, reprinted from an 1890(!) article by a former president of UW-Madison]*

Dutt, K. 2020. Race and racism in the geosciences. Nature Geoscience 12:2-3.

Kimmerer, R. W. 2013. The three sisters. From her best-selling book, Braiding Sweetgrass. [Kimmerer is a UW-Madison graduate and winner of a 2022 MacArthur Foundation "Genius" award.]

Schneider, D. C. 2021. Becoming an ocean scientist: learning from surprise. ICES Journal of Marine Science78(10):3544-3551.

Additional recommended readings:

Wasserman, E. 2000. The door in the dream. Conversations with eminent women in science. Joseph Henry Press (imprint of the National Academy Press), Washington, DC.

Damschen, E. I., K. M. Rosenfeld, M. Wyer, D. Murphy-Medley, T. R. Wentworth, and N. M. Haddad. 2005. Visibility matters: increasing knowledge of women's contributions to ecology. Frontiers in Ecology and the Environment 3:212-219.

Hansen, W. D., J. Scholl, A. E. Sorensen, K. E. Fisher, J. A. Klassen, L. Calle, G. S. Kandlikar, N. Kortessis, D. C. Kucera, D. E. Marias, D. L. Narango, K. O'Keeffe, W. Recart, E. Ridolfi, and M. E. Shea. 2018. How do we ensure the future of our discipline is vibrant? Student reflections on careers and culture of ecology. Ecosphere 9(2), e02099.

(6) October 12 – Streams meander and so do ecohydrologists (Dr. Steve Loheide)

Loheide, S. P. II, R. S. Deitchman, D J. Cooper, E. C. Wolf, C. T. Hammersmark, and J. D. Lundquist. 2008. A framework for understanding the hydroecology of impacted wet meadows in the Sierra Nevada and Cascade Ranges, California, USA. Hydrogeology Journal 17:229-246.

Booth, E. G., S. P. Loheide, II, and R. D. Hansis. 2009. Postsettlement alluvium removal: A novel floodplain restoration technique (Wisconsin). Ecological Restoration 27:136-139.

(7) October 19 - Effective advisor-advisee relationships

Allis, C. D. 2017. On being an advisor to today's junior scientists. PNAS 114:5321-5323.

Christopher, S.A. 2011. Chapter 3 - Your advisor and you. In: Navigating graduate school and beyond. AGU Press.

Sarabipour et al. 2021. Building and sustaining mentor interactions as a mentee. The FEBS Journal 289:1374-1384.

NextGen Voices: Quality mentoring. 2018. Science 362:22-24. *(Collection of short letters from young scientists about mentoring that mattered to them).*

Useful article on relationships between STEM PhD students and their advisors.

DeWelde, K., and S. L. Laursen. 2008. The "Ideal Type" advisor: How advisors help STEM graduate students find their "scientific feet". The Open Education Journal 1:49-61.

Excellent reference/background:

National Academies of Sciences, Engineering, and Medicine. 2019. The science of effective mentorship in STEMM. The National Academies Press, Washington, DC.

(8) October 26 – Serendipity as a guide on scientific pathways (Dr. Tony Ives)

Ives, A. R., A. Einarsson, V. A. A. Jansen, and A. Gardarsson. 2008. High-amplitude fluctuations and alternative dynamical states of midges in Lake Myvatn. Nature 452:84-87,

(9) November 2 – Scientific ethics

Ecological Society of America. 2020. Code of ethics. Available online and as PDF.

American Geophysical Union. 2017. AGU Scientific integrity and professional ethics. Available online and as a PDF.

World Economic Forum. 2018. Young scientists code of ethics. Available online and as a PDF.

Thorp, H. H. 2023. ChatGPT is fun, but not an author. Science 379:313.

(10) November 9 – Pollutants, parasites, people… and basketball?! (Dr. Jess Hua)

Barncard, C. 2023. Pollutants are important to biodiversity's role in spread of wildlife diseases. UW-Madison News release (use hyperlink or visit: https://news.wisc.edu/pollutants-are-important-to-biodiversitys-role-in-spread-of-wildlife-diseases/

Buss, N., and J. Hua. 2023. Host exposure to a common pollutant can influence diversity-disease relationships. Journal of Animal Ecology.
Ricci, K., B. McLauchlin, and J. Hua. 2023. Impact of a science art exhibit on public interest and student comprehension of disease ecology research. Journal of Microbiology and Biology Education.

(11) November 16 – Effective communication

Christopher, S.A. 2011. Communicating (Ch. 8). In: Navigating graduate school and beyond. American Geophysical Union, Washington, DC.
Schimel, J. P. 2012. Chapters 1 to 3 In: Writing science. How to write papers that get cited and proposals that get funded. Oxford University Press, New York, NY. (*This is a terrific resource, I recommend you keep it and read the rest this year. My own copy stays handy!*)
Baron, N. 2010. Chapters 1 and 2 In: Escape from the ivory tower: a guide to making your science matter. Island Press, Washington DC. https://search.library.wisc.edu/catalog/9911070642202121
Gruber, J., L. H. Somerville, and J. J. Van Bavel. 2020. Scientists' guide to email etiquette. Science (link will open in a new window)

Additional background:
Baron, N. 2010. Chapters 3 - 7 In: Escape from the ivory tower: a guide to making your science matter. Island Press, Washington DC.
Developed by Compass: The Message Box Workbook.

(12) November 23 – No class, Happy Thanksgiving!

(13) November 30 – Call of the Spotted Owl: A tale of fire, invaders, and agendas (Dr. Zach Peery)

Hofstadter, D. F., N. F. Kryshak, C. M. Wood, B. P. Dotters, K. N. Roberts, K. G. Kelly, J. J. Keane, S. C. Sawyer, P. A. Shaklee, H. A. Kramer, R. J. Gutiérrez, and M. Z. Peery. 2022. Arresting the spread of invasive species in continental systems. Frontiers in Ecology and the Environment, article 2458.
Peery, M. Z., G. M. Jones, R. J. Gutiérrez, S. M. Redpath, A. B. Franklin, D. Simberloff, M. G. Turner, V. C. Radeloff, and G. C. White. 2019. The conundrum of agenda-driven science in conservation. Frontiers in Ecology and the Environment 17(2):80-82

(14) December 7 - Riding the roller coaster – the fun and the fear

Langenheim, J. H. 2010. The odyssey of a woman field scientist. Chapter 3: Graduate student years, pp. 45-64. Xlibris Corporation (book is out of print).
Schwartz, M. A. 2008. The importance of stupidity in scientific research. Journal of Cell Science x:1771.
Powell, K. 2017. Break or burnout. Nature 545:375-377. (+ bonus short feature on mentors!).
DePauw, K. P. 2016. Tips for thriving in graduate school. (Originally a Twitter thread, saved as a PDF).
Brown, A. M. 2020. Data-driven advice for grad school. Science 369:6509.

Some additional short commentaries:

Rosen, J. 2018. How a hobby can boost researchers' productivity and creativity. Nature Career Feature.
Weiss, A. 2022. Turning off my phone improved my science. Nature Career Column.
Woolston, C. 2015. Leisure activities: the power of a pastime. Nature Career Colum.