Invasive Species Biogeography

BIOL 188/288

Thursdays 2:00-2:50, 3:00-5:50, ISC 107

Welcome to this research course!

Anyone can do research. Scientific progress depends on diverse skills and perspectives. Our varied experiences and backgrounds are a strength and enable us to be better scientists, scientists who recognize that research is not just about results, but also about people.

What is this course about?

BIOL 188/288 is a special new lab course designed for students who are interested in gaining research experience, those who enjoy applying knowledge to solve problems in the real world, and anyone who wants to discover how invasive species relate to changes in biodiversity. You'll be studying real research questions in a team environment!

This course also has a focus on the methods of modern ecology, which has become a data-driven, multidisciplinary field focused on applied environmental issues. There are now many ways to study ecology beyond fieldwork, which means a greater opportunity for diversity in the scientists who become ecologists. In this lab, we'll gain experience with some of the digital methods and tools used in modern ecology, which are also applicable to other fields of biology and biology-related careers.

Land acknowledgement

Acknowledging the original occupants of the land upon which we reside is essential to our obligation to conduct research in a way that benefits all people. Furthermore, I share this land acknowledgement as a reminder to honor and express gratitude to those who are the traditional stewards of the land. The location of our classroom is on the homeland of the Seneca Nation of Indians and Tonawanda Seneca Nation. We will also be analyzing data collected from places where these original occupants and other Indigenous groups have lived and still continue to live. Please check out the Native Land app and/or websites such as sni.org to learn more about the community of more than 7,000 enrolled Indigenous Peoples.

Instructor

Dr. Suann Yang (she/her)

Office: ISC 256

Email: yang@geneseo.edu

Phone: 585-245-5311

Peer Research Mentors

Abigail (Abby) Minnekine

Madison Steates

Student drop-in hours (no appt. necessary)

Mondays (online): 11:00-11:50 AM

Tuesdays/Thursdays (ISC 256): 1:00-1:50 PM

You can always email yang@geneseo.edu for an appointment outside of these times

What will you learn?

I have designed this course to enable you to integrate multiple bodies of knowledge with your personal experience and apply what you have learned, in a learning community that values you and your growth. Specifically, we will work together to achieve these **Learning Objectives**:

1. Design a study using open-source data and open-access tools to build on the primary literature.
2. Use a variety of modes to communicate science effectively to peers and the general public (e.g., oral, written, visual).
3. Reflect or work on things that you personally value or feel proud of, including developing tolerance for obstacles faced in the research process.

What are the required materials for this class?

I have designed this course to be as affordable as possible. Access to a computer, the internet, and open-source freeware programs are the only things we will need for doing our research.

1. Regular access to our course **Brightspace** site. You may be used to using Canvas for other courses; Brightspace is similar. Use our Brightspace site as the starting point for everything you need to do in the course. It will also be the primary mode of communication used by the instructional team to send you regular announcements and updates.
2. Reliable **Internet** access and a **laptop** that can run these **applications**

a. R software (free download, https://cran.r-project.org/)
b. RStudio (free download, https://posit.co/downloads/). RStudio requires a 64-bit operating system.
c. Microsoft Excel (free to all Geneseo students, https://wiki.geneseo.edu/display/cit/Software+at+Geneseo)
d. We will be using several web-based programs, which will work best if your operating system is up-to-date.
3. Because lab is several hours long, you may want to bring your **power cable** for your laptop.

How will you know that you are learning?

Learning to do research requires just that – *doing research*. For this two-credit laboratory course, most of the work that we are doing occurs during the scheduled lab period. Because modern biology research is collaborative and increasingly reliant on computational tools, we will be developing our teamwork and computing skills, in addition to other critical scientific inquiry skills such as communication, problem-solving, creativity, and resilience.

BIOL 188: If you are taking this course as BIOL 188, you do not need to have any previous biology coursework or lab experience. Your assignments are designed with this in mind.

BIOL 288: If you are taking this course as BIOL 288, I expect you to use the knowledge that you have gained from BIOL 117, 119, and any other biology courses you have taken or are taking. Your assignments are designed around your prior knowledge of biology and experience with the processes of science.

Grading scheme

Item	Points	Notes
Individual Homework	135	Due Tuesdays before lab
Group Assignments	210	Due Thursdays at the end of the lab period
Total	345	Group assignments score is adjusted according to peer evaluation

Final course grades will be assigned as shown below:

A range	B range	C range	D and below
A 93.3 - 100%	B+ 86.6 - 89.99%	C+ 76.6 - 79.99%	D 60.0 - 69.99%
A- 90.0 - 93.29%	B 83.3 - 86.59%	C 73.3 - 76.59%	E <59.99%
	B- 80.0 - 83.29%	C- 70.0 - 73.29%	

Components of your grade

1. **Individual homework.** Because most of the work that we are doing in our class occurs during the scheduled lab period, we want to make an efficient use of that time. Individual

homework assignments have two parts: wrapping up the previous lab and preparing for the next lab.

2. **Group assignments.** Group assignments help us to make progress in our research as well as develop our collaborative skills. We will always work on and complete these assignments during our scheduled lab time, because this is the time that is scheduled for us to work together. Your responsibilities toward the group assignment will always be clearly stated. Group assignments will include maintaining organized research notes and data, oral and written reports, oral presentations, a scientific paper, and other products that are typical for a scientific research team.

3. **Peer evaluation adjustment of group scores.** Offering and receiving constructive feedback from our peers is a critical component of effective teamwork. We will informally and formally rate the work of ourselves and our teammates throughout the semester as part of developing our scientific teamwork skills. A final peer evaluation at the end of the semester will be used to adjust the proportion of group scores that is earned by each team member.

Credit for BIOL 116 or BIOL 204/216/223

If you are taking this course to fulfill a lab requirement for the Biology major, please get in touch with your academic advisor to let them know about it. You will also need to ask your academic advisor to submit a substitution request on your behalf after you have completed the course.

What are our shared responsibilities?

Students, teaching assistants, and the professor have communal responsibilities to our community, to promote learning, maintain a respectful environment, and prioritize our health and wellbeing. In our classroom, we are preparing you for not only other courses in the biology program, but also for your professional career.

In our classroom, we are preparing you for not only other courses in the biology program, but also for your professional career. To achieve this goal, a respectful and professional environment is essential. Students, teaching assistants, and the professor are expected to treat each other with respect. Our communal responsibilities are:

- **Making space for everyone to contribute.** Scientific innovation arises from the insights of a diverse community. The unique talents, experiences, and contributions of each individual in our class are crucial and necessary. Be ready to learn from others and be willing to teach what you can in return. As in any learning endeavor, we naturally may make mistakes despite good intentions. Each person will do their best, and believe that others are doing their best, to learn from and correct mistakes that are harmful to others.
- **Preparation.** All members of our community – students, teaching assistants, and professors – must come to lab engaged and prepared for the day's work. This includes completing all assignments on time (students) and returning graded assignments promptly (instructor).
- **Timeliness.** Everyone should arrive a few minutes before class begins. This allows us to start on time. The professor will not cause students to be late for their next class, while students will work

efficiently and carefully during the lab so that all work can be completed by the end of our lab period.

- **Commitment.** Everyone will dedicate the entire lab period (to being present and engaged in lab work. We will be reasonable about taking breaks, so that these breaks are not disruptive to the work that we are doing. As the exact times for taking breaks are not guaranteed, please try to take care of any personal matters before or after lab.
- **Attendance.** If there is an emergency or you are ill and risk infecting others, it is reasonable for you to miss a class. However, educational researchers conclude that class attendance is highly tied to success in a course. Attendance is especially critical in our course because it is logistically difficult to replicate what you will miss if you are absent from lab. The limit for excused absences (illness, emergency) is two. Please email me within 24 hours of an absence for the absence to be considered excused and for us to discuss how you will make up the missed work. Three or more absences equates to missing over 20% of the course material, and any student with three or more absences will be assigned a grade of "E."
- **Focusing and minimizing distractions to others.** Everyone should promote an effective learning environment by staying on task and helping others to stay on task. We will sometimes need to use our cell phones during class for specific tasks; for all other uses we will abide by our community guidelines on cell phone use.
- **Communication.** Everyone is expected to check their email at least twice a day, and use email, Brightspace, or other agreed upon methods to communicate with each other. Please make sure to set Brightspace notifications to send you emails with updates.
- **Uphold the student code of conduct.** The Geneseo code of conduct asks all students to commit to behaviors so that all members of our community can fulfill the values of the college: Learning, Creativity, Belonging, Civic Engagement, and Sustainability. Academic dishonesty and behavior that physically or psychologically harms others will be reported to the corresponding authorities. Academic dishonesty includes providing false information (lying, making up data), cheating (seeking, receiving and/or offering unpermitted help) and plagiarism (representing work as your own when it was created by others, including AI such as ChatGPT). In addition, all materials used in this course, including lectures, slides, videos, and handouts, have specific licensing and copyright restrictions that identify how they can be used, distributed, and adapted. I would rather work with you to solve problems before they become issues of misconduct, so please come talk to me early and often. For full details of the Student Code of Conduct, please see the [Student Handbook](#).

How else does this class support your success and well-being?

At Geneseo, we strive to support your academic success and well-being. This course works with and complements the resources available campus wide, such as support services, accessibility, mental health, diversity and inclusion policies, and much more. Links are available on Brightspace.

Getting help with technology

We will be using computers in our class all the time. For everyday troubleshooting in the apps used the class, we have the instructor, TAs, and each other. For other assistance, CIT also provides a range of [technology support resources](#), including self help resources and options to request

technology assistance. CIT also provides free access to over 7,500 online tutorials for software, digital tools, web development, programming, and design through LinkedIn Learning.

Library Research

Fraser Hall Library has an award-winning staff trained in finding the best information using library resources and advanced search strategies. Students may ask questions about using library services, locating materials, or conducting research projects. There is a librarian who specializes in the subject matter for each major. Librarians meet with students through a variety of ways, including chat, email, and in-person and virtual one-on-one research consultations. Email libraryhelp@geneseo.edu or visit their online help desk.

Accessibility

All course materials are available on Brightspace 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 do my best to address the situation.

SUNY Geneseo is dedicated to providing an equitable and inclusive educational experience for all students. If you are experiencing any kind of barrier to learning opportunities, please know that there is support for you. The Office of Accessibility will coordinate accommodations, auxiliary aids, and/or services designed to ensure full participation and equal access to all academic programs, activities, and services at SUNY Geneseo. Students with letters of accommodation should submit a letter to us and discuss needs at the beginning of the semester. Please contact the Office of Accessibility Services for questions related to access and accommodations: Erwin Hall 22 or call (585) 245-5112 or email access@geneseo.edu. Visit the Office of Accessibility Services for more information www.geneseo.edu/accessibility-services

- *Student responsibility:* Please submit your letter of accommodations to me at the beginning of the semester (or as soon as they have been established) and make an appointment to discuss arrangements.

- *Instructor responsibility:* I am committed to working with you to figure out how to create a just learning environment while meeting the learning outcomes of the course. Unless you communicate otherwise, I will keep all accommodations confidential.

Well-Being

Prioritizing well-being can 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. I strongly encourage you to communicate any issues related to your well-being to me or other faculty and staff, and seek support before you experience unmanageable

stress or have difficulty with daily functioning. Dr. Leonard Sancilio, Dean of Students (585-245-5706), can assist and provide direction to appropriate campus resources. For more information, see www.geneseo.edu/dean_students.

Mental Health

I consider mental health to be no less important than physical health with respect to learning. 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 at the Lauderdale Center for Student Health and Counseling (call 585-245-5716 to make an appointment), 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 on campus at health.geneseo.edu.

Food Security for SUNY Geneseo Students

There are resources available for students who are food insecure. If you're unfamiliar with the phrase "food insecurity," you can learn more at the following link on Feeding America's website: Understanding Food Insecurity.

The Pantry at Geneseo, our on campus food pantry, works in partnership with the Geneseo-Groveland Emergency Food Pantry (GGEFP) and is facilitated by interns and volunteers working out of the Office of Student Volunteerism and Community Engagement as well as the School of Business, and the GOLD Leadership and Student Athlete Mentors programs.

Any student who is food insecure can submit a request here: Food Pantry Request Form to receive a bag of food that will provide them with items that will last a few days, including nonperishables and when available fresh fruits, vegetables, meat, and dairy. Once submitted, interns will connect directly with the student to communicate next steps and the time of your pick up. Pickups will take place in the MacVittie College Union, Room 114 - the GOLD Leadership Center.

This program will provide individuals with a bag of food up to once a month. We will do our utmost to ensure anonymity, while also working to destigmatize food insecurity in our community.

Students are also able to access the Geneseo-Groveland Emergency Food Pantry on their own if that is their preference. It is located at 31 Center St. and is open Tuesdays and Thursdays 10 AM - 2 PM and Wednesdays 4 - 6:30 PM.

If you have any questions about this process or anything relating to food insecurity, or have a need beyond what is outlined above, please refer to our website or contact us directly at foodpantry@geneseo.edu / 585-245-5893 or the Dean of Students at 585-245-5706.

Emergency Funding

The college has three sources of emergency funding for students experiencing short-term financial crises. The Camiolo Student Emergency Loan Fund (SELF) provides short-term loans to students for situations both temporary and beyond their control.The SELF was established with the expectation that students who use the fund seek to "pay it forward" as soon as they are able by contributing to the fund so other students can be helped, too. While there is not a legal obligation, the donors hope that student loan recipients respect and honor the value of community and helping others in their time of crisis. The One Knight Student Aid Emergency Fund assists Geneseo students who are facing financial emergencies mainly related to the COVID-19 pandemic. The fund offers grants (one-time award) depending on a student's documented financial need. For those students expecting a refund from financial aid, a Temple Hill loan of up to $500 can be offered prior to the approved loan dispersal. If you are experiencing financial hardship, please contact the Dean of Students (585-245-5706), who can assist and provide direction to appropriate campus resources.

Religious Observances and Class Attendance/Deadlines

If you anticipate an absence or conflict with an assignment deadline due to religious observances, please contact me as early in the semester as possible to make alternative arrangements for those days that you'll miss. Student attendance in classes on religious holidays is governed by New York State Education Law 224-a. See calendar of major religious observances.

Military Obligations and Class Attendance

Federal and New York State law requires institutions of higher education to provide an excused leave of absence from classes without penalty to students enrolled in the National Guard or armed forces reserves who are called to active duty. If you are called to active military duty and need to miss classes, please let me know and consult as soon as possible with the Dean of Students.

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.

Planned schedule

Research can take unexpected turns, but we can still have a tentative plan. We'll likely need to make adjustments along the way, according to what we discover at each step. Don't worry, this is a normal process in research.

Date	Guiding questions	Lab activities
1/26/23	What are we going to investigate? How do we build an effective research team?	Introductions, make observations in the Roemer Arboretum, collect data using iNaturalist
2/2/23	How do we use natural history collections data to conduct scientific inquiry?	Form teams, discuss the utility of citizen science data, explore natural history collections databases, interpret maps and graphs
2/9/23	What are introduced species, and how do they become invasive?	Conduct literature research on invasive species, propose hypotheses
2/16/23	How do we predict the distribution of species?	Model species distributions, develop research proposals
2/23/23	What species do we want to investigate and why?	Present research proposals, refine hypotheses, download & clean data
3/2/23	How do we prepare our data for analysis?	Use GeoLocate for georeferencing, begin writing outline of methods section
3/9/23	How have the distributions of our study species changed over time?	Use QGIS to calculate species ranges, add to outline of methods section
3/16/23	(Spring Break - no class!)	(Relax and recharge!)
3/23/23	How have the distributions of our study species changed over time?	Use R to analyze data patterns of range expansion, add to outline of methods section
3/30/23	How have the distributions of our study species changed over time?	Finish using R to analyze data patterns of range expansion, complete outline of methods section
4/6/23	What have we discovered?	Summarize results in an infographic
4/13/23	What have we discovered?	Present results, discuss significance of findings, write outline of introduction and discussion sections
4/20/23	How do we share our findings with other scientists?	Write first draft of scientific paper
4/27/23	How do we share our findings with other scientists?	Revise first draft of paper, create scientific presentation slide show
5/4/23	What have we learned, and what could be studied next?	Present research, identify and discuss future directions

Notes

You can use this page to add your own notes.