

## **BIOL575/BINF739 Landscape Genetics (Spring 2024, Credits: 2 [BIOL575] or 3 [BINF739])**

### **Course Description:**

The course caters to students in basic and applied ecology, conservation and population genetics, landscape ecology, evolutionary biology and conservation biology. A key objective of landscape genetics is to study how landscape modification and habitat fragmentation affect organism dispersal and gene flow across the landscape. Landscape genetics requires highly interdisciplinary specialized skills making intensive use of technical population genetic skills and spatial analysis tools (spatial statistics, GIS tools and remote sensing). Even when students receive disciplinary training in these areas, educational programs often lack the necessary linkage and synthesis among disciplines. This linkage can only be accomplished after experts from each discipline work together to develop guiding principles for this new research area.

This is a Distributed Graduate Seminar that uses materials and lectures from an international collaboration and is offered on weekly basis via a remote platform. This course provides a unique opportunity for interdisciplinary graduate training. The course draws on experts from around the world to deliver an in-depth introduction and overview of the field of landscape genetics. The course caters to students in both basic and applied ecology, conservation/population genetics, landscape ecology and conservation biology. Every other year, several hundred students, post-docs and faculty from around the world participate in this course.

Each course meeting will start with a live web-cast lecture by an expert on the topic that introduces foundations and methods and highlights points for discussion in local seminar groups. After breaking out into local course group discussion, a web-based discussion across campuses will wrap up the weekly topic. Lectures will be recorded for review.

**Students will be graded based on participation in lectures, group discussions and assigned work. Completion of R-based computer lab assignments is required for students who are taking the course for 3 credits (BINF739). A term group project is optional, and it is not a part of the assessment of this class but may become part of peer-reviewed publications.**

### **Lectures and group discussions (tentative dates):**

Jan 10 – May 1, 2024. Wed 11:30 – 13:30 ET. (BIOL575 and BINF739 students)

### **R lab**

Wed 13:30-14:30 ET (Required for students taking BINF739)

Online via Zoom

### **Instructors:**

Haw Chuan (HC) Lim, Asst. Professor of Biostatistics and Bioinformatics

Office: Colgan Hall, Rm 409 Email: hlim22@gmu.edu Phone: (703) 993-2344

**Office hours:** Wed 10:30-11:30 am or by appointment

**Blackboard:**

I will use the learning management system Blackboard in this class. Announcements, assignments, etc will be posted to this site. Log in at <http://mymason.gmu.edu>.

**Text:**

Landscape genetics: Concepts, methods, applications. 2015. Balkenhol, Cushman, Storfer, Waits, eds, Blackwell.

<b>Graded Work:</b>	<b>Percent</b>
Attendance and Group Discussions	30%
Weekly Assignments (+ R tutorials for students taking this as 3 credit course)	70%

**Tentative Class Schedule**

10-Jan Week 1	Introduction
17-Jan Week 2	Basics of Population Genetics
24-Jan Week 3	Basics of Landscape Ecology
31-Jan Week 4	Basics of Metapopulation Genetics
07-Feb Week 5	Basics of Study Design
14-Feb Week 6	Basics of Adaptation and Quantitative Genetics
21-Feb Week 7	Basics of Spatial Data Analysis
28-Feb Week 8	Simulation and Modeling
06-Mar Week 9	Assignment and Clustering Methods
13-Mar Week 10	Resistance Surface Modeling
20-Mar Week 11	Adaptive Landscape Genetics
27-Mar Week 12	Model Selection
03-Apr Week 13	Graph Theory and Network Models
10-Apr Week 14	Plant Studies in Landscape
17-Apr Week 15	Aquatic Systems
24-Apr Week 16	Presentation of Group Projects
01-May Week 17	Bringing it all together and look to future

### **Grading and late work policy:**

Unless you have received prior permission, you should not expect to be allowed to turn in assignments after the due date for full credit. Late work will not be accepted except in the case of a documented personal emergency or excused absence. It is your responsibility to provide written documentation from a third party of your emergency or university-excused absence. **A deduction of 10% per day will be applied to late assignments, with a maximum penalty of 30% for up to three days. Submissions beyond the three-day limit will not be accepted.**

I do not consider work-related absences, work in other classes, oversleeping, or meetings with other professors a personal emergency. I do not add points at the end of a semester to “bump up” your letter grade.

### **Grading schema**

See below for grading scale. All inquiries about partial credits or potential grading mistakes need to be addressed soon after the graded work is returned, not toward the end of semester.

A+	97-100	B	80-86
A	93-96	C	60-79
A-	90-92	F	59 or less
B+	87-89		

### **Academic integrity**

If you are caught cheating, you will be taken to the honor committee. GMU has an Honor Code with clear guidelines regarding academic integrity. Three fundamental and rather simple principles to follow at all times are that: (1) all work submitted be your own; (2) when using the work or ideas of others, including fellow students, give full credit through accurate citations; and (3) if you are uncertain about the ground rules on a particular assignment, ask for clarification.

### **Disability Accommodations**

If you have a learning or physical difference that may affect your academic work, you will need to furnish appropriate documentation to the Office of Disability Services. If you qualify for accommodation, the ODS staff will give you a form detailing appropriate accommodations for your instructor. In addition to providing your professors with the appropriate form, please take the initiative to discuss accommodation with them at the beginning of the semester and as needed during the term. Because of the range of learning differences, faculty members need to learn from you the most effective ways to assist you. If you have contacted the Office of Disability Services and are waiting to hear from a counselor, please let your instructor know.

### **Diversity**

George Mason University promotes a living and learning environment for outstanding growth and productivity among its students, faculty and staff. Through its curriculum, programs, policies, procedures, services and resources, Mason strives to maintain a quality environment for work, study and personal growth.

An emphasis upon diversity and inclusion throughout the campus community is essential to achieve these goals. Diversity is broadly defined to include such characteristics as, but not limited to, race, ethnicity, gender, religion, age, disability, and sexual orientation. Diversity also entails different viewpoints, philosophies, and perspectives. Attention to these aspects of diversity will help promote a culture of inclusion and belonging, and an environment where diverse opinions, backgrounds and practices have the opportunity to be voiced, heard and respected.

The reflection of Mason's commitment to diversity and inclusion goes beyond policies and procedures to focus on behavior at the individual, group and organizational level. The implementation of this commitment to diversity and inclusion is found in all settings, including individual work units and groups, student organizations and groups, and classroom settings; it is also found with the delivery of services and activities, including, but not limited to, curriculum, teaching, events, advising, research, service, and community outreach.

Acknowledging that the attainment of diversity and inclusion are dynamic and continuous processes, and that the larger societal setting has an evolving socio-cultural understanding of diversity and inclusion, Mason seeks to continuously improve its environment. To this end, the University promotes continuous monitoring and self-assessment regarding diversity. The aim is to incorporate diversity and inclusion within the philosophies and actions of the individual, group and organization, and to make improvements as needed.